THE I-81 CHALLENGE

Draft Final Technical Memorandum #1: Physical Conditions Analysis

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PREPARED FOR:

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ADDENDA

January 2011 – Minor clarifications were incorporated per feedback received from the I-81 Study Advisory Committee (SAC) meeting held on November 30, 2010. Bridge condition definitions of Structurally Deficient and Functionally Obsolete along with example photos were included. Clarification on the pass through study, definitions on different types of trips and a new figure was included. Traffic volume trends on the NYS Thruway and chart was included. The I-81 Challenge process graphic was updated.

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Abbreviations

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
AIRFA	American Indian Religious Freedom Act
ALPR	Automated License Plate Reader
APC	Automatic Passenger Counter
AVL	Automatic Vehicle Location
BNAM	Bridge Needs Assessment Model
BRT	Bus Rapid Transit
CBD	Central Business District
CC	Continuous Count
CCTV	Closed Circuit Television
CENTRO	Subsidiary of Central New York Regional Transportation Authority
CIM	Construction Inspection Manual
CLC	Community Liaison Committee
CNYRTA	Central New York Regional Transportation Authority
CTPP	Census Transportation Planning Package
CWA	Clean Water Act
CZM	Coastal Zone Management
DEC	Department of Environmental Conservation
DMS	Dynamic Message Sign
ECM	Erie Canal Museum
ECOPAC	Environmental Commitments and Obligations Package
EIS	Environmental Impact Statement
EJ	Environmental Justice
EMS	Emergency Medical Services
EPA	Environmental Protection Agency
ETC	Estimated Time of Completion
ETC + 20	Estimated Time of Completion + 20 years
ETC + 30	Estimated Time of Completion + 30 years
FBC	Form-Based Code
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GIF	Green Improvement Fund
GIS	Geographic Information System
GPS	Global Positioning System
HCM/HCS	Highway Capacity Manual/Highway Capacity System
HOI	Housing Opportunity Index
ITS	Intelligent Transportation System
LOS	Level of Service
LRT	Light Rail Transit
LRTP	Long Range Transportation Plan
LTPP	Long-Term Pavement Performance
LWRP	Local Waterfront Revitalization Program
MAC	Municipal Advisory Committee
MBC	Maintenance By Contract

MEP	Maximum Extent Practicable
MEV	Million Entering Vehicles
MPO	Metropolitan Planning Organization
MS4	Municipal Separate Storm Sewer System
MVM	Millions of Vehicle Miles
NBI	National Bridge Inventory
NEPA	National Environmental Policy Act
NGO	Non-Governmental Organization
NHP	National Heritage Program
NHS	National Highway System
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NWI	National Wetland Inventory
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
NYSM	New York State Museum
OPRHP	Office or Parks, Recreation and Historic Preservation
PDM	Project Development Manual
PIL	Priority Investigation Location
PIP	Public Involvement Program
POC	Pollutants of Concern
RTC	Regional Transportation Center
RWIS	Road Weather Information System
SAC	Study Advisory Committee
SAFETY-LU	Safe Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users
SEE	Social Economic and Environmental
SEQR	State Environmental Quality Review
SEQRA	State Environmental Quality Review Act
SHPO	State Historic Preservation Officer
SMTC	Syracuse Metropolitan Transportation Council
SOCPA	Syracuse-Onondaga County Planning Agency
SPDES	State Pollutant Discharge Elimination System
SUA	Syracuse Urbanized Area
SUNY	State University of New York
SWMP	Stormwater Management Program
SWPPP	Stormwater Pollution Prevention Plans
TAZ	Traffic Analysis Zone
TDM	Transportation Demand Management
TIP	Transportation Improvement Plan
TMDL	Total Maximum Daily Load
TNT	Tomorrow's Neighborhoods Today
UBMP	Urban Best Management Practices
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
VMS	Variable Message Sign
VMT	Vehicle Miles Traveled
WEP	Water Environment Protection

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Chapter 1
Executive Summary

CHAPTER 1- EXECUTIVE SUMMARY

The document presented herein is organized in conformance with the NYSDOT Project Development Manual (PDM). This Technical Memorandum #1 is an interim document developed following the overall PDM format. Some chapters are partially complete (Chapter 1 – Executive Summary and Chapter 4 – Social, Economic and Environmental Conditions), Chapter 2 – Project Context: History, Transportation Plans, Conditions and Needs is complete and Chapter 3 – Alternatives has not been initiated (future).

In the future as project strategies (alternatives) are developed, then Chapter 3-Alternatives will be completed and Chapter 4 – Social, Economic and Environmental Conditions will be updated to reflect the screening of the project strategies (alternatives) on the Social, Economic and Environmental resources. Chapter 1 will be updated to complete the Executive Summary including project purpose and need, strategies (alternatives) being considered and how they impact the environment, costs and schedule, and the preferred strategies (alternative) recommended for the next phases of the project development. This document is supported by an appendix, which provides technical backup information on data herein and more detailed information on many technical categories. Further information on the project can be obtained by contacting SMTC at contactus@thei81challenge.org or by visiting the projects web site www.thei81challenge.org.

1.1 Introduction

This report documents the findings of the in-depth evaluation of physical conditions in the I-81 corridor study area. The primary purpose of this document is to perform a detailed review of the infrastructure and function of I-81 from the I-481 (Exit 16A) interchange on the south and the I-481 (Exit 29) interchange on the north along with the short segment of I-690 from West Street to Teall Avenue. This study area covers an 12-mile stretch of I-81 in Onondaga County which starts from the southern entrance to the City of Syracuse, passes through the heart of the City and then proceeds north past Onondaga Lake, the I-90 (NYS Thruway) interchange and the Airport before rejoining I-481 on the north side of the County. This overall study effort, The I-81 Challenge is being developed in accordance with the NYSDOT Project Development Manual that integrates within its process conformance to the National Environmental Policy Act (NEPA) and State Environmental Quality Review Act (SEQRA) processes. As part of this study effort, the urban interstate freeway network that influences I-81 traffic has been reviewed for capacity and safety so that long range planning for I-81 can be developed in consideration of the overall interstate system in Syracuse. The network includes I-81 from Exits 16A-29, all of I-481, all of I-690 and the Thruway Exits 39, 36 and 34A.

This document includes a detailed condition and operational evaluation of I-81 from the south and north limits noted above, but also supporting studies to document the social, economic and environmental conditions along the corridor with a focus in areas where changes may possibly occur. The focus area covers the general downtown area along I-81 including the

Viaduct (elevated highway section between downtown and University Hill), University Hill, and downtown access/circulation.

In this area, we have documented community resources, additional information on vehicular, pedestrian and bicycle traffic, neighborhoods, business centers as well as demographic and economic conditions. Overall, the social, economic and environmental documentation focuses along I-81 and the municipalities it passes through: the City of Syracuse and the Towns of Cicero, Clay and Salina.

Project Status: This document is the first of a series of documents that will eventually comprise the I-81 corridor study. This initial document focuses on the existing conditions along with consideration of what future conditions will be like if nothing is done to I-81 except routine maintenance. This effort is a prelude and a foundation for the consideration of rehabilitation, reconstruction or system modification strategies in the next phase of this study that meet the long range needs of the I-81 corridor and the community. Reconstruction strategies would rebuild I-81 along the same general alignment with improvements balanced to address problem areas identified herein with community and environmental constraints. System modifications are expected to include such strategies as relocating I-81 over to I-481, removing the Viaduct section and replacing it with a boulevard and other system wide type recommendations from the public involvement effort.

The following outlines the basic steps of the corridor study process. It should be noted that a comprehensive public involvement program is supporting this process. Further information is available in Section 2.1.2 Public Involvement Plan that follows latter in this document and provides detailed information on the Public Involvement efforts. The primary corridor study steps are as follows:

- Step 1 – Study Existing Conditions: Collect detailed existing condition information on the physical and operating conditions of I-81 in the Primary Study Area, overall information on the Interstate system, along with reference information on other transportation modes (i.e., transit, pedestrian and bicycle), and the Social, Economic and Environmental setting.
- Step 2 – Technical Analysis: Identify and evaluate development strategies (alternatives) in cooperation with the public and pertinent local, state and federal agencies.
- Step 3 – Final Corridor Study: Finalize the corridor study recommendations and documentation.

This document does not include an analysis of future traffic operations as SMTC is currently finalizing the 2035 Regional Travel Demand Model. This information will be developed for analysis for the Null/No Build strategy (alternative) in the strategy development phase of this study that follows this Physical Condition Analysis.

Through the NYSDOT development process, one of the initial efforts is consideration of the planning horizons for the project. The first step is to establish an estimated time of completion (ETC) for the project. Then from that date, conditions are extended 20 years past the ETC.

Possible strategies will eventually be developed to serve the 20 year horizon and beyond (ETC+20). Bridges are assigned a more stringent design criterion (for longevity and safety) to ETC+30. The following are the planning horizons for the project.

- Estimated Time of Completion (ETC) 2020
- Design Year (ETC + 20) 2040
- Design Year (Bridges ETC + 30) 2050

(These dates and terms are used throughout the document.)

About this document: This Technical Memorandum #1 – Physical Conditions Analysis presents a detailed assessment of the primary study area (I-81) and its operational and functional condition. The detailed infrastructure and operational information is concentrated on the Primary Study Area – I-81, 481S to 481N. The supporting social, economic and environmental information is reference information for subsequent phases of *The I-81 Challenge* in particular the strategy development (alternatives). For this document, the format is as follows:

Chapter 1 - Executive Summary - includes an introduction, information on the project status (where we are in the project development), information on the project background, the purpose of the study, the environmental classifications, the study area limits, the project team, an overview of the projects Public involvement Program (PIP) and the schedule.

Chapter 2 - Project Context: History, Transportation Plans, Conditions and Needs – This section summarizes the detailed analysis of I-81, the primary study area, from the limits between I-481 on the south and I-481 on the north, this critical stretch of infrastructure through the center of the City of Syracuse and beyond. This is a highly technical analysis of the transportation infrastructure and the current and future operations. The study assesses the design of the existing highway, the traffic operations, the accident rates, the bridge conditions, the roadway infrastructure conditions and assesses the future no build condition (excluding traffic projections). The future no build scenario is retaining the infrastructure as it is presently configured and only routine maintenance is performed and evaluating how it will function in the design year (ETC+20) 2040. This chapter also covers the project history, transportation plans, land use plans, and the transportation conditions.

Chapter 3 – Alternatives (future) – This chapter will document the evolution of the strategies (alternatives) from initial concepts to identifying a select series of strategies that will be carried forward for further study.

Chapter 4 – Social, Economic and Environmental Conditions – This chapter documents the investigation into the existing Social, Economic and Environmental conditions along the primary study corridor, specifically in the general study limit for social, economic and environmental conditions and in some cases the overall study area. The specific study area

used for these studies varies somewhat due to the availability (and limits of) of existing data. These studies include population statistics/demographics, environmental justice, historic and cultural resources, parks and the natural environment (water resources, general ecology and farmland, and air, noise and contaminated materials).

1.2 Project Background

Interstate 81 (I-81) through Central New York was built in the 1950's and 1960's. At that time, the federal government was building interstate highways in almost every state across the country. The early designs for I-81, particularly through downtown Syracuse, were controversial. Local residents, business owners, and community leaders had concerns about the location and design of the highway and their potential effects on the community. In the end, however, the decision was made to build I-81 in its current location. By the late 1960's, I-81 was completed through Onondaga County. This was in the era when the interstate system was being constructed with I-90 (Thruway), I-81 and I-690 being constructed along with the I-81/I-690 interchange and then later I-481 providing an east side outer loop around the City of Syracuse. I-81 through Onondaga County has two main roles:

- A major commuter corridor: I-81 provides direct access from suburban communities to downtown Syracuse and its hospitals, schools and universities. The Greater Syracuse Economic Growth Council reports that 5 of the region's 10 largest employers are located next to I-81.
- National and international travel route: For long-distance travelers and freight carriers, I-81 provides north/ south mobility from Tennessee to Canada. I-81 also provides an important connection to I-90 the Thruway, a major east-west route in the Syracuse area.

I-81 serves an important role on both national and regional levels. The highway and its many major bridges are now nearing the end of their useful service life, which is typically in the neighborhood of 50 years. Of particular concern is the one-mile raised roadway section, or Viaduct, within the City of Syracuse and the adjacent I-81/I-690 interchange, which has over 11,000 feet of major bridge structures. This area through downtown and the City has a combination of design deficiencies, accident problems and isolated traffic congestion problems.

The New York State Department of Transportation and the Syracuse Metropolitan Transportation Council (SMTC) began *The I-81 Challenge* in the fall of 2009. This study will assess the overall I-81 corridor and then follow up with a Project Scoping Report (in accordance with the NYSDOT Project Development Manual (PDM)) for the Viaduct section. A Project Scoping Report is a planning document that progresses a project or multiple projects to the next design phase following a planning study like *The I-81 challenge*.

1.3 Purpose of this Study

The purpose of this study, *The I-81 Challenge*, is to:

1. Collect data to identify the condition of the Region's transportation system and the environment in which it operates, focusing mainly on I-81; and,
2. Identify potential solutions that are worthy of detailed evaluation.

The development of the study will be supported by a comprehensive Public Involvement Program which runs in parallel with the study efforts.

1.4 Environmental Class and Lead Agencies

National Environmental Policy Act (NEPA) Classification and Lead Agency

This corridor study precedes the official initiation of the NEPA process. At the completion of the I-81 Corridor Study, the official NEPA process will be initiated as a probable NEPA Class I action in accordance with 23 CFR771.115. NEPA Class I is an Environmental Impact Statement (EIS), which is the classification for the most complex type of project. This effort consists of a detailed evaluation of the environmental effects of a federal undertaking and its alternatives (development strategies) on the environment (including social, economic and the natural environment). NYSDOT and Federal Highway Administration (FHWA) are assumed co-lead agencies for future action. The lead agency(s) is responsible for supervising the preparation of the environmental analysis.

State Environmental Quality Review (SEQR) Classification and Lead Agency

This corridor study precedes the official initiation of the SEQR process. In subsequent phases of this study effort, the official SEQR process will be initiated as a probable SEQR non-Type II (EIS) action under 17 NYCRR Part 15. NYSDOT will be the SEQR Lead Agency. The lead agency(s) is responsible for supervising the preparation of the environmental analysis.

1.5 Study Area

The I-81 Challenge study area is comprised of a primary study area along I-81 as displayed in Figure 1.1 and an overall study area that expands to cover the SMTC Metropolitan Planning Area that includes all of Onondaga County and small portions of Madison and Oswego Counties. Also shown is the general study limits for the social economic and environmental features along with a general review of the Syracuse area Interstate System for capacity and safety. In this study area, resource data collection focuses around the expressway facilities and areas of potential impact. These areas are adjusted as necessary as study strategies are developed.

The following summarizes the varying study areas of the project and explains why the boundaries have been established.

- **Primary Study Area**: This study area is focused on 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 west and east of I-81, respectively. A detailed technical analysis of this segment has been performed and documented herein. This considers infrastructure condition, capacity, safety and operations along I-81.

- **Capacity and Safety Study Limit**: In order to be able to consider possible alterations to the I-81 Corridor in context of the Onondaga County interstate highway system a network of freeways is included in the study for their safety and capacity operations. These are indicated in yellow on the map and include I-81, I-481 around the east side of the county, I-690 (thruway to I-481) and the Thruway Exits 39, 36 and 34A.

- **General Social, Economic and Environmental Features Study Limit**: This initial documentation of the social, economic and environmental features was concentrated along the I-81 corridor and the adjoining municipalities, most prominently the City of Syracuse, the I-481 limits and then the adjoining towns on the north side of the corridor of Salina, Clay and Cicero. These limits are illustrated by a general rectangular area on the map but vary somewhat by subject matter and available data and are so noted in the respective technical areas.
- **SMTC Metropolitan Planning Area Boundary**: The boundary encompasses Onondaga County and portions of Oswego and Madison Counties. This boundary is the official planning area of the Metropolitan Planning Area for SMTC. This area also covers the limits of the public outreach efforts for this study and provides the limits of the data used within the SMTC's Regional Travel Demand Model. The Regional Travel Demand Model is based on household and employment data within this area and will be used in this study in developing future travel demand.

Figure 1.2 shows a closer look at the General Social, Economic and Environmental study area.

Figure 1.3 shows a close up of the City of Syracuse and Viaduct Area.

Figure 1.1 – Overall Study Area

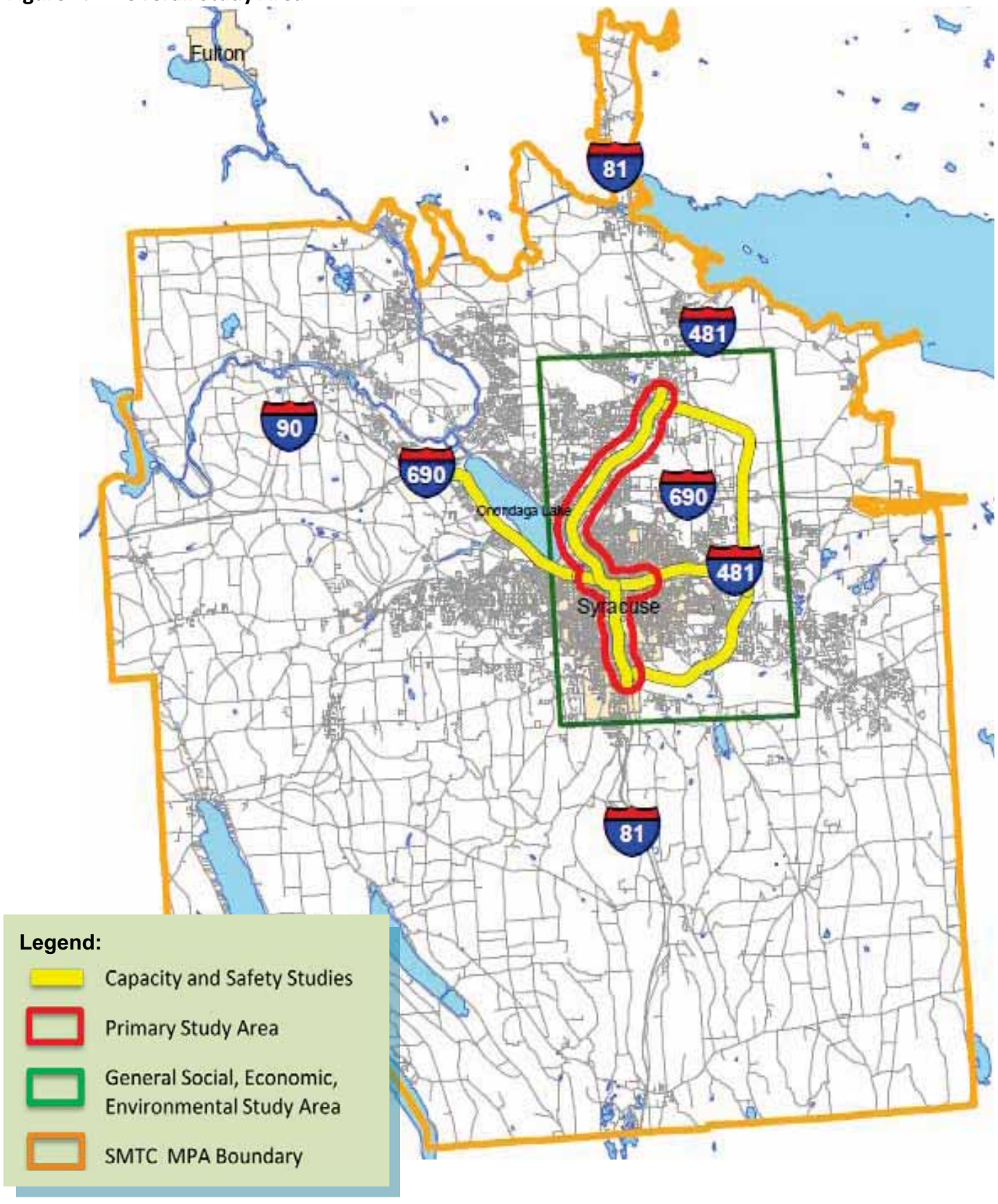


Figure 1.2 – Primary Study Area Interchanges and Major Intersecting Roadways

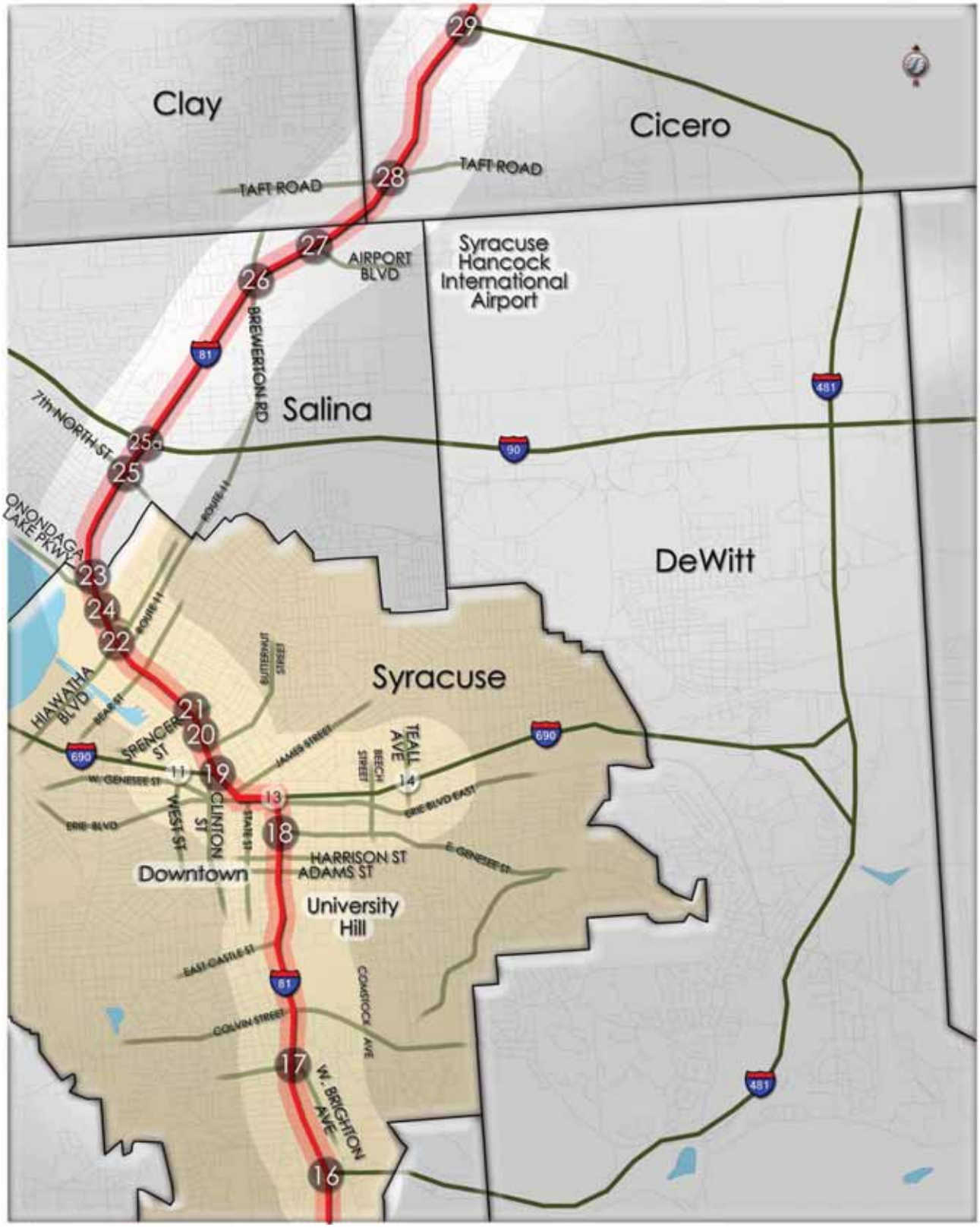
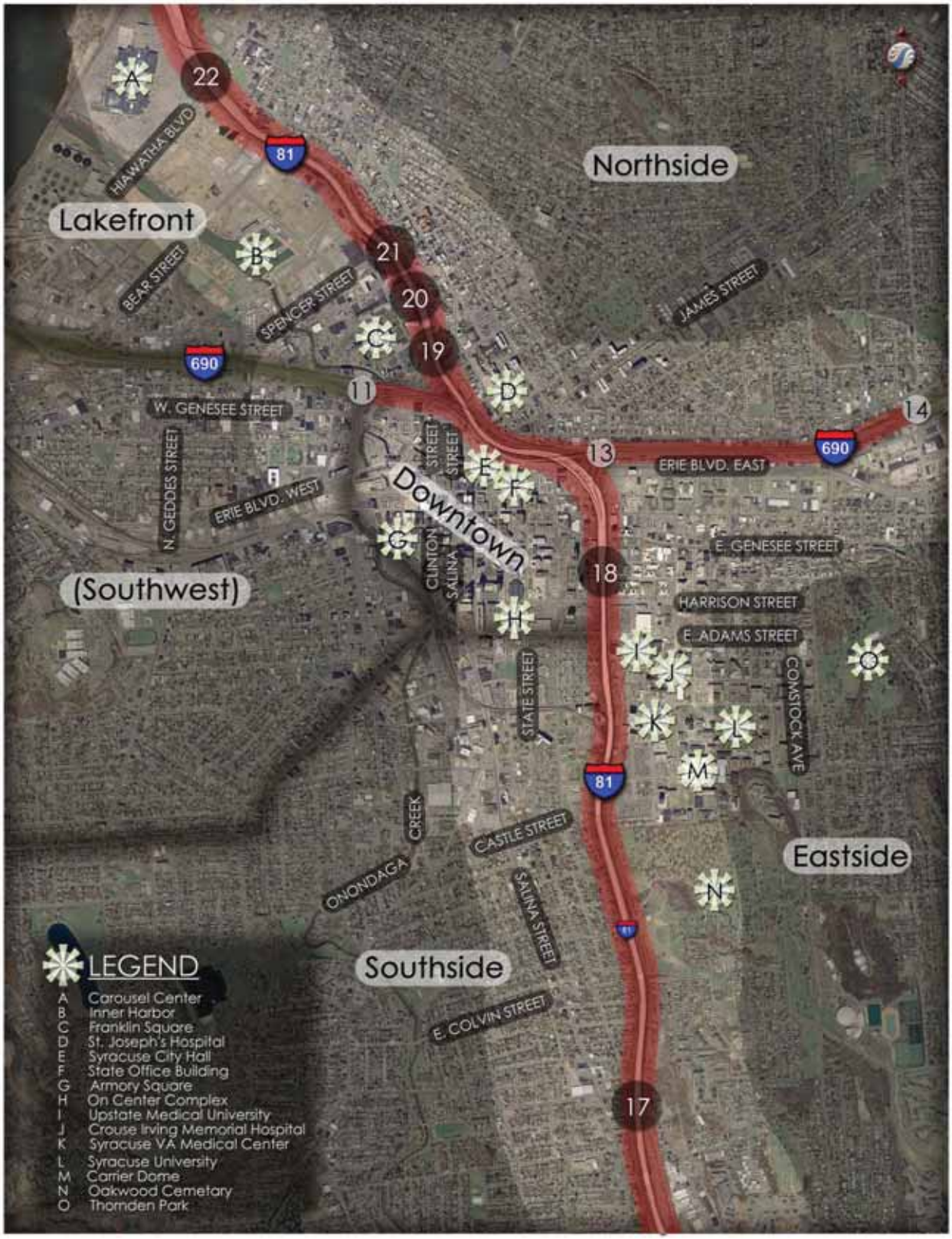


Figure 1.3 – City of Syracuse and Viaduct Area Roadways and Community Features



1.6 Project Partners

The New York State Department of Transportation (NYSDOT), the Federal Highway Administration (FHWA) and the Syracuse Metropolitan Transportation Council (SMTC) are partners in this project. *The I-81 Challenge* team has been designed to integrate three parallel efforts within the I-81 Corridor Study umbrella. These efforts include the I-81 Corridor Study, the I-81 Public Participation Program, and the Regional Travel Demand Model Update. The I-81 Corridor Study, also referred to as *The I-81 Challenge*, is being led by the NYSDOT and represents the official planning document. The SMTC's Public Involvement Program (PIP) will run in parallel with the Corridor Study development and plan, facilitate and document the Public Involvement Program activities as the study progresses.

The Regional Travel Demand Model update has been integrated with the I-81 Corridor Study data collection, and an update of household and employment data. The Regional Travel Demand Model will be used as the basis for future travel demand (2035 which will be projected to ETC+20, 2040) and study of development strategies (alternatives) and their travel demand changes.

These agencies and the public are working together to determine the future of I-81 in the greater Syracuse region:

- As the highway's owner, NYSDOT is leading the study effort and will make the final decision about improvements made to I-81. NYSDOT has assembled a comprehensive study team that has reviewed and documented the existing infrastructure conditions of I-81 and researched the Social, Economic and Environmental setting. The study team will be developing, in cooperation with pertinent local, state and federal agencies and the public, strategies for improvements to the I-81 corridor as the study progresses into the strategy development phase.
- SMTC, the state-designated metropolitan planning organization (MPO), is leading the public participation efforts as well as the update of the Regional Travel Demand Model for the study. SMTC will also make decisions on the use of Federal transportation funds for any I-81 related strategies.
- Federal Highway Administration (FHWA): Federally funded transportation projects on the National Highway System, the responsibility for ensuring the NYSDOT complies with NEPA and federally adopted design guidance rests with the FHWA.

1.7 Public Involvement Plan

At the request of the NYSDOT, the SMTC is assisting the NYSDOT by leading the public involvement effort for *The I-81 Challenge*. Together, the SMTC and the NYSDOT have developed a comprehensive plan to engage a broad cross-section of community members in developing and evaluating options for the future of I-81 and reaching consensus on feasible strategies for the future I-81. Both technical input and public input will be used to generate

initial ideas for the I-81 corridor, develop evaluation criteria for future strategies, and narrow down the broad range of strategies to a small, viable set that can be advanced to the next phase of project development in the NYSDOT process. A detailed overview of the public involvement plan, the process, outreach materials, and the Study Advisory Committee (SAC) is outlined in Section 2.1.2. Over the next several months, SMTC and NYSDOT will be conducting public outreach meetings in study area communities to ensure public input on issues, concerns and ideas/concepts regarding existing and future plans for the primary study corridor.

1.8 Project Schedule

The following illustrates the planned schedule for the I-81 Corridor Study and the following Project Scoping Report for the I-81 Viaduct Area and identifies the following phases of the NYSDOT Project Development Process:

- I-81 Challenge Corridor Study: Fall 2009 to January 2012
- Project Scoping Report – I-81 Viaduct Area: January 2012 to August 2012
- (Future) Preliminary Engineering and Environmental Impact Statement: August 2012 to 2015/16 (estimated)
- (Future) Final Design: 2015/16 to 2017/18 (estimated)
- (Future) Construction: 2018 to 2020/2021 (estimated)

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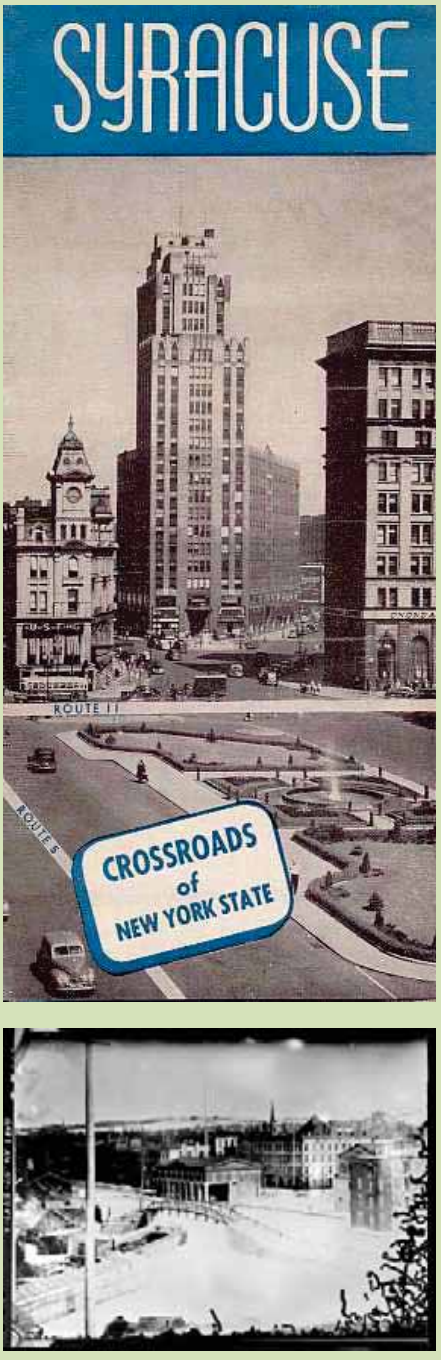
Chapter 2
Project Context: History, Transportation Plans, Conditions and Needs

CHAPTER 2 - PROJECT CONTEXT: HISTORY, TRANSPORTATION PLANS, CONDITIONS AND NEEDS



This chapter addresses the history and existing context of the project site, including the existing conditions, deficiencies, and needs for this part of the I-81 Corridor Study between I-481/I-81 Interchanges 16A and 29.

2.1 Project History

Nicknamed "The Salt City", the modern day City of Syracuse started on the shores of Onondaga Lake, which had a high concentration of salt marshes. This discovery quickly led to a thriving salt industry in the area, resulting in several settlements surrounding the Onondaga Lake area by the early 1800's. During the mid 1800's, the newly recognized City of Syracuse (1847) became known as a major stop on the Underground Railroad and an epicenter for the Abolitionist Movement in New York State. The Industrial Revolution saw Syracuse as a home for the Manufacturing Industry with many early companies such as the Franklin Automobile Company, Century Steam Car Company, Solvay Process Company and Allied Signal, quickly resulting in Onondaga Lake becoming one of the most polluted lakes in the country. The salt industry in Syracuse quickly declined during the early twentieth century and the manufacturing industry saw a period of industrial expansion during World War II, attracting large companies such as General Motors, Chrysler, the Carrier Corporation, and General Electric.

Throughout its entire history, Syracuse has been a major transportation hub for Central New York. Starting with the Erie and Oswego Canals in the late 1820's, Syracuse grew around its ability to move people and products all over New York State. The Erie Canal, which was completed in 1830, ran straight through the Village of Syracuse, providing the salt industry and later the

industrial industry with a means of shipping their products almost anywhere in the state as well as all along the East Coast and the Great Lakes.

The Oswego Canal, which was completed in 1829, connected the Erie Canal to Lake Ontario through the Port of Oswego, providing a more direct means to the Great Lake waterways. The Erie and Oswego Canals connected in downtown Syracuse near the intersections of Erie and Oswego Boulevards. This is adjacent to the Erie Canal Museum at the Weighlock Station that serviced the intersection of the two canals. About a decade later, Syracuse also became the hub for several local railroads, most owned by The New York Central Railroad. The railroads followed the canal beds, working with rather than against the canal system, providing mostly transportation for people rather than the shipping of products.

From Syracuse, rail travelers could make their way to Albany and New York City, Earlville, Rochester or the Finger Lakes, making it a stop for anyone traveling across New York State. With the development of automobile traffic and the construction of the Barge Canal, the canals and railroads through downtown Syracuse became obsolete and were replaced with paved roads. The Oswego and Erie Canals were filled in and replaced by Boulevards with their namesake, as well as Interstate 81 Northbound which is built over the original location of the downtown Oswego Canal. The intersection of the two canals was eventually replaced with a reflecting pool that is now the center of Clinton Square. Even with the filling in of the canals, Syracuse still serves as a transportation hub for Central New York, first with the intersections of Routes 11 and 5, and now with the intersection of Interstates 81 and 90 and the largest international airport in the area.

During the mid twentieth century, President Eisenhower supported a federally funded highway system that would provide Americans with easy

interstate travel, now known as the Interstate Highway System. Construction started in the late 1950's, after the Federal-Aid Highway Act of 1956. Interstate 81 was built in Central New York during this time for two main reasons: to carry through traffic between Pennsylvania and Canada, and to bring local traffic in and out of Syracuse. The idea of the proposed highway, particularly through downtown Syracuse, was controversial. Local residents, business interests, and leaders had differing opinions about the highway's design and location. During this time, the City of Syracuse was experiencing urban flight with a large portion of the city's residents and many businesses relocating to the suburbs, as well as an urban renewal program to try to attract people and businesses downtown. There were plans for large tree-lined boulevards and shopping centers throughout downtown. The then current Mayor and city Engineer, as well as many of the city's residents, believed that the plan for an elevated highway through downtown Syracuse would not only deface the city and ruin these plans but also physically split Syracuse and limit the city's economic and community growth. Although the Mayor and the community generally fought the state's plan for an elevated highway straight through the city of Syracuse, the most change they managed was to move the state's plan three blocks over. In the 1960's, portions of the highway had been completed both North and South of the city and the state waited no longer to resolve the issues about placement and design of the highway, connecting the two portions by constructing I-81 as an elevated highway through the center of the city. During construction of the highway, the city's 15th Ward, a predominantly African-American neighborhood, was demolished for urban renewal efforts and also to clear right of way for I-81. The highway also ruined city plans for a wide street-lined avenue with a promenade in the same location. Interstate 90, or the New York State Thruway, was also constructed during this time and connects to I-81 in Syracuse, resulting in both North-South and East-West drivers traveling through the city of Syracuse, not to mention air travelers from Syracuse International Airport, resulting in Syracuse being a major transportation center for Central New York.

2.1.1 Project Context

Portions of I-81 are now nearing the end of their lifespan. This is particularly true of the elevated sections of the highway in downtown Syracuse called the Viaduct and includes large portions of the I-81/I-690 interchange. Over the next decade, these portions of the road will

need to be replaced, reconstructed, removed, or otherwise changed. Given this reality, the Syracuse region, including the New York State Department of Transportation (NYSDOT), is faced with a challenge: what should be done with I-81?

As many residents of the community know, this discussion has already started. In fact, government officials, local organizations, and members of the public have already offered numerous ideas about the future of I-81. Some ideas include removal of the elevated portion (the Viaduct) and replace it with a boulevard, route traffic onto I-481 and decommission I-81 between the I-481 interchanges, bury the elevated portion underground and cover it with a park, or rebuild the Viaduct at a higher elevation with a more attractive design. Ultimately, the region is still several years from a final decision on the future of I-81 – a choice this large must involve the whole community in a thoughtful, deliberative dialogue.

But these ideas provide a starting point for the official I-81 decision-making process, which begins with this Corridor Study and will be followed by a Project Scoping Report for the I-81 Viaduct section. This official decision-making process, *The I-81 Challenge*, is being led by the New York State Department of Transportation with support from the Syracuse Metropolitan Transportation Council (SMTC), the regions metropolitan planning organization and oversight from the Federal Highway Administration (FHWA). Together, these entities are and will be engaging a broad cross-section of community members in developing and evaluating strategies for the future of the highway.

Portions of I-81 and adjacent I-690 through the primary study areas is over capacity now and presents significant geometric, safety, bridge condition and community challenges through the system interchange area (I-81/I-690) and the Viaduct south of the junction. This study will identify strategies for development of future capital projects and will examine the potential for expanded use of Interstate 481 (possible I-81 designation) to support commercial goods movement and enhanced overall mobility,

safety, efficiency, be locally responsive, and in balance with other regional needs. Using early identification and consideration of engineering feasibility, environmental compatibility, community acceptability and fundability issues is a proven method to accomplishing this t ask. The transportation infrastructure is a crucial factor in the ability of Central New York to grow economically. Transportation history shows whether it is cars, trucks, transit, trains or planes our economy's health is significantly influenced by how well we can move both goods and people.

This corridor study has been developed to plan for the future I-81 corridor and consider both upgrade/reconstruction strategies (alternatives) and system modifications that may re-route traffic or other transportation strategies (alternatives) that serve the community and regional transportation needs.

2.1.2 Public Involvement Process

At the request of the NYSDOT, the SMTC is assisting with the public involvement program for *The I-81 Challenge*. Together, the SMTC and the NYSDOT plan to engage a broad cross-section of community members in developing and evaluating strategies for the future of I-81.

Both technical input and public input will be used to generate initial ideas for the I-81 corridor, develop evaluation criteria for future strategies, and narrow down the broad range of strategies. After a series of development strategy review and refinement programs with the stakeholders, a small viable set of strategies will be advanced to the project development, design, and environmental review phase. The following graphic illustrates the overall process for *The I-81 Challenge*.

Over the course of *The I-81 Challenge*, the NYSDOT and the SMTC will use a variety of methods to raise public awareness about the project and gather public input. Outreach conducted under the I-81 Public Participation Project at the time that this Summary Report was written includes:

- An initial series of 20 focus groups with over 150 participants in September and October of 2009.
- A questionnaire about how people currently use I-81 and their concerns about the future of I-81 (approximately 80 participants).
- Three additional focus groups in February 2010 and June 2010 (approximately 30 participants).
- Numerous small-group meetings with existing community organizations to introduce *The I-81 Challenge.*

Through the focus groups, an initial and important list of emerging community principles and community impact areas surfaced. The detailed summary of these activities is provided in Appendix A of TM #1. These emerging community impact areas describe types of impacts that focus group participants suggested should be used to evaluate possible strategies. The I-81 Challenge expects that as this preliminary list evolves, both impact areas and specific,

measurable criteria will be vetted with a wider public audience. Initial emerging community principles and community impact areas are shown in Table 2.1.

Table 2.1: Draft Community Principles and Impact Areas for Evaluating Strategies

DRAFT PRINCIPLE	ENHANCE ECONOMIC OPPORTUNITY
Community Impact Area	**Economic Development Impacts**
Draft Specific Impacts To Be Evaluated	Economic conditions in downtown area/University Hill
	Economic conditions along I-81 corridor
	Economic conditions in the Central New York region
	Freight and through traffic mobility
	Employment and job creation
Community Impact Area	**Financial Impacts**
Draft Specific Impacts To Be Evaluated	Capital costs, affordability, fiscal responsibility
	Long-term operation and maintenance costs

DRAFT PRINCIPLE	ENHANCE PUBLIC SAFETY
Community Impact Area	**Public Safety Impacts**
Draft Specific Impacts To Be Evaluated	Highway safety (on I-81 and other regional highways)
	Safety of alternative modes of transportation (e.g. pedestrian, bicycle, public transit, etc.)
	Access to emergency services, such as hospitals, by service providers and the public
	Ability to provide emergency services

DRAFT PRINCIPLE	ENSURE REGION-WIDE MOBILITY
Community Impact Area	**Transportation Network/Ease and Convenience of Travel Impacts**
Draft Specific Impacts To Be Evaluated	Travel times (to/from suburbs and within/across city)
	Access to key destinations (e.g. airport, hospitals, downtown businesses, etc.)
	Visitor access to the city and key visitor destinations
	Volumes and congestion on highway system, secondary roads, city streets
	Alternative transportation (e.g. bike, pedestrian, transit, etc.)
	Through and local traffic

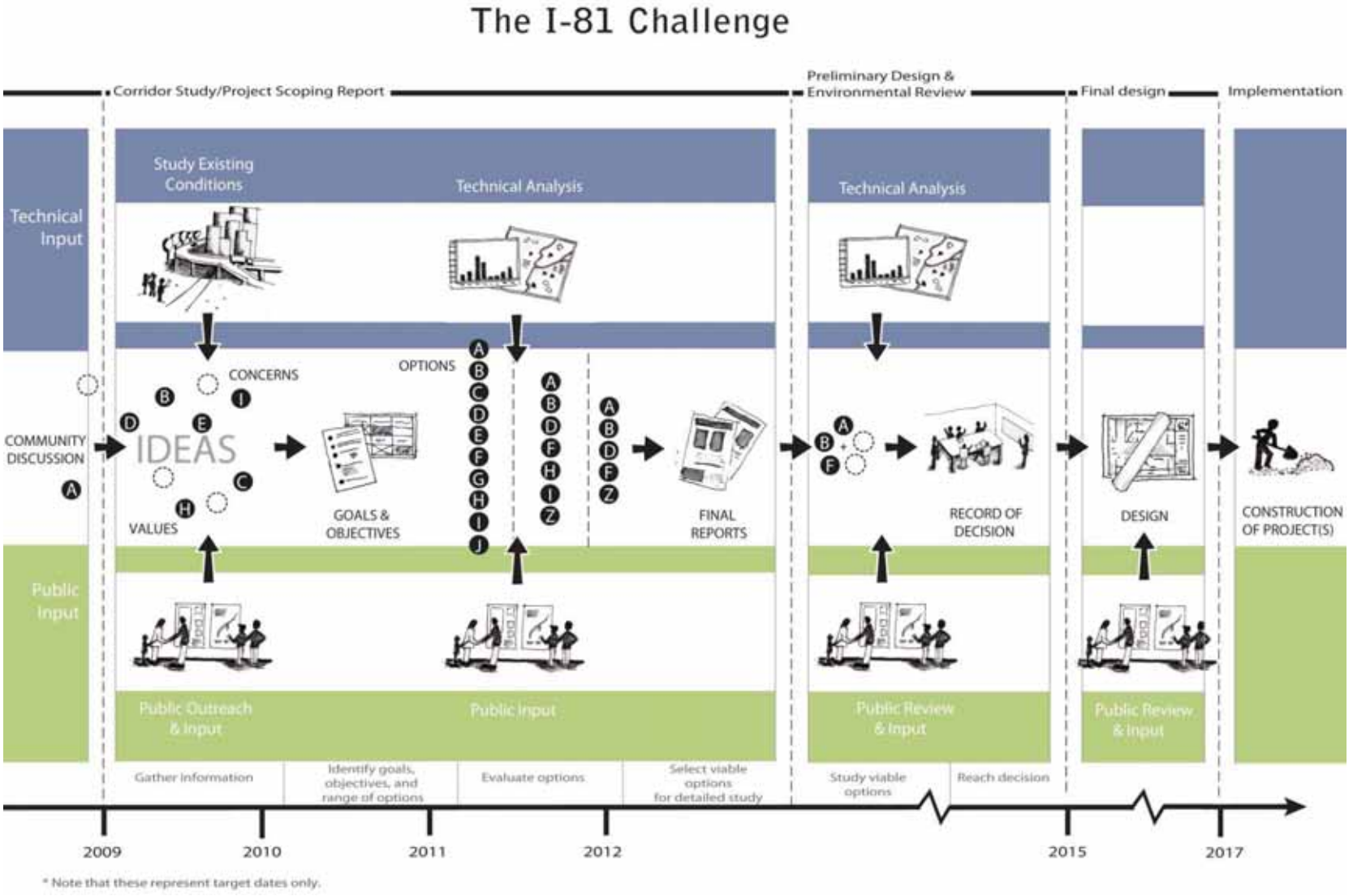
DRAFT PRINCIPLE	FIT WITHIN A REGIONAL VISION FOR LAND USE AND ECONOMIC DEVELOPMENT
Community Impact Area	**Regional Land Use Patterns Impacts**
Draft Specific Impacts To Be Evaluated	Local connectivity (e.g. linking University Hill with downtown)
	Land use and development within the city (e.g. open space, housing, business development, etc)
	Land use and development in suburban areas
	Land use and development in currently undeveloped, rural areas

DRAFT PRINCIPLE	PRESERVE OR ENHANCE ENVIRONMENTAL HEALTH
Community Impact Area	**Environmental Sustainability Impacts**
Draft Specific Impacts To Be Evaluated	Air quality (e.g, overall emissions and odor)
	Stormwater and water quality
	Noise
	Vehicle miles traveled
Community Impact Area	**Environmental Health Impacts**
Draft Specific Impacts To Be Evaluated	Air quality and noise on adjacent neighbors (downtown and in the suburbs)

DRAFT PRINCIPLE	PRESERVE OR ENHANCE SOCIAL FABRIC AND COMMUNITY VITALITY
Community Impact Area	**Social Fabric and Community Character Impacts**
Draft Specific Impacts To Be Evaluated	Adjacent communities and neighborhoods
	Important community landmarks, historic resources, and icons
	Aesthetics
	Community vitality (for downtown, adjacent neighborhoods, and the region more broadly)
	Community pride

DRAFT PRINCIPLE	SHARE BURDEN AND BENEFITS
Community Impact Area	**Quality of Decision Impacts**
Draft Specific Impacts To Be Evaluated	Distribution of the burden of impacts across stakeholders (e.g. suburbs, adjacent neighborhoods, low income communities, Onondaga Nation, etc.): • During construction • Long-term
	Distribution of benefits across stakeholders (e.g. suburbs, adjacent neighborhoods, low income communities, Onondaga Nation, etc.)
	Other planning and development initiatives and visions (e.g. county, city, region, etc.)
	Social fabric and community character

Figure 2.1 – Overall Project Process



As *The I-81 Challenge* progresses, the SMTC and NYSDOT will continue to engage the public through a variety of means. Additional questionnaires will be published and, in a later stage of the project, a statistically valid survey will be conducted. Newsletters, mobile displays, and website updates will be used to communicate with the public. The SMTC intends to produce an "educational series" of self-running DVDs concerning topics such as the history of I-81, the case studies, and regional land use and transportation planning issues.

Numerous large public meetings will be held at different stages in the project. An initial round of public workshops will be held once Technical Memorandum #1 – Physical Conditions Analysis is finalized. This initial round of workshops will be used to introduce the project to a large audience, present the physical conditions analysis, finalize evaluation criteria, and begin the public discussion about very broad, preliminary strategies for I-81. A second round of workshops will be held to narrow down the wide range of community ideas to approximately ten strategies that can be modeled and evaluated. These ten strategies will then be further refined to the point where a handful of feasible strategies are identified. Three rounds of public "open houses" will be held throughout the strategy development phase to review the results of the analysis, gather public feedback, and refine them.

A Study Advisory Committee (SAC), consisting primarily of SMTC member agencies, has been formed to provide input and guidance throughout *The I-81 Challenge.* The SAC includes representation from:

- CenterState CEO
- Central New York Regional Planning and Development Board
- Central New York Regional Transportation Authority (Centro)
- City of Syracuse Common Council
- City of Syracuse Department of Engineering
- City of Syracuse Department of Public Works
- City of Syracuse Department of Neighborhood and Business Development
- City of Syracuse Department of Planning and Sustainability
- Empire State Development
- Federal Highway Administration
- New York State Department of Environmental Conservation
- New York State Department of Transportation
- New York State Thruway Authority
- Onondaga County Department of Transportation
- Onondaga County Legislature
- Onondaga County Physical Services
- Onondaga Nation
- Syracuse-Onondaga County Planning Agency

As the study progress, two additional committees will be formed: a Community Liaison Committee (CLC) and a Municipal Advisory Committee (MAC). The CLC will be comprised of individuals representing community organizations and the MAC will be comprised of

representatives of municipalities within the SMTC planning area (likely town supervisors and village mayors). As with the SAC, both of these committees will provide input on major study outcomes and serve as a conduit between the study and their constituents. The CLC and MAC will meet three times over the course of the project, with each meeting scheduled prior to a major public outreach effort in the project.

2.1.3 Next Step

Over the next several months, SMTC and NYSDOT will be conducting public outreach meetings in study area communities to obtain input on project objectives and evaluation criteria along with obtaining the initial ideas, concepts and concerns for initiating the development of improvement strategies for the I-81 Corridor.

The NYSDOT study team will then be focusing on developing improvement strategies for the I-81 Corridor after receiving broad based input from the public and agencies as noted above. Input received from the public during outreach sessions will be integrated as strategies are developed. The NYSDOT study team will also be evaluating each strategy to determine the effects each would have on traffic, land use and neighborhoods, and environmental resources located within the study corridor.

2.2 Transportation Plans and Land Use

2.2.1 Local Plans for the Project Area

2.2.1.1 Local Master Plans

Given the size and magnitude of this project, a comprehensive range of local and regional master plans have been collected and reviewed for this study. This included consultation with many of the agencies including in particular the Syracuse-Onondaga County Planning Agency (SOCPA) and the (draft) City of Syracuse Comprehensive Plan 2025. The City of Syracuse plan also includes the Tomorrows Neighborhoods Today (TNT) plans for the specific neighborhoods. Consultation and research efforts have also included numerous town and villages. This information is presented in detail in Chapter 4 of this document and the appendices.

2.2.1.2 Local Private Development Plans

There are two regionally significant known developments planned within the project area that have the potential to affect traffic operations.

- University Hill[1]: University Hill is a thriving educational and institutional center in Upstate New York. Home to Syracuse University, Crouse Hospital, State University of New York (SUNY), Upstate Medical Center, SUNY College of Environmental Science and Forestry, the Veterans Administration Hospital, the Hutchings Psychiatric Center and other important

[1] University Hill Transportation Study, Syracuse, New York, Syracuse Metropolitan Transportation Council, April 2006

institutions and businesses, this area attracts a significant number of people each day for employment, learning, research and living.

University Hill is poised for continued development. Each institution has plans for growth that will allow them to support their mission. Growth within University Hill is positive for the region as it increases the proportion of employment and housing in urban areas. This assists in achieving the Syracuse/Onondaga County Planning Agency's (SOCPA) Onondaga County Settlement Plan policy of centeredness. One of the Settlement Plan goals is to focus development in urban areas where infrastructure already exists. Overall, the plans call for approximately 2.1 million square feet of new facility space and significant increases in parking.

- Carousel Center: This existing regional retail facility is located directly adjacent to I-81 just north of downtown along the south shore of Onondaga Lake. The center currently has plans approved to expand the facility to 1.5 million square feet. They also have long range plans to transform the facility into a multi-million dollar tourism center called DestiNY USA. It is projected that DestiNY USA may include a five million square foot facility on 800 acres of land. Only the current approved Carousel Center facility is being included for this study.

2.2.2 Transportation Corridor

2.2.2.1 Importance of the Project Route Segment

I-81 is an important trade corridor along the eastern seaboard of the United States that extends from Ottawa, Canada on the north to Tennessee. The general corridor south of NY follows the Appalachian Mountains and provides connections to Washington DC and the southern United States along with the US Northeast cities of Philadelphia, New York and Boston via east-west routes. The overall corridor has been identified as carrying 10% of the GNP for the US along the highway.

In the immediate project vicinity, I-81 comes south from the Canadian border near Watertown with Syracuse as the first major city prior to proceeding to Binghamton, NY and Pennsylvania as it proceeds south.

In the Syracuse area, I-81 was constructed through the center of the City as many interstates were in that era. This facility has been supplemented by the overall Syracuse area expressways, which include I-690, I-481 and I-90 to provide regional traffic circulation.

2.2.2.2 Alternate Routes

There are no suitable alternate routes as a permanent detour for I-81.

2.2.2.3 Corridor Deficiencies and Needs

The following provides an overview of safety, capacity, highway design, operational, infrastructure, community and environmental needs identified in the corridor. These are a

summary of the information contained within this document, which assesses the existing and future conditions.

Safety: For most of the I-81 corridor area, accident rates are above the statewide average for similar interstate systems. 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 in the northbound direction is more than triple the statewide average. The non-standard design features in this area are contributing to above average accident rates.

Capacity: The overall expressway system is operating at acceptable levels of service (LOS A, B or C) with exception of the I-81/I-690 interchange and their approaches to the City. The I-81 mainline segments of the system from approximately Hiawatha Boulevard south to Harrison Street ramps and along I-690 from the State Fairgrounds east to Midler Street interchange are approaching capacity (level of service D or E) during the commuter peak periods. The interchanges of I-81/I-690 and the I-81 interchange with Harrison Street/Almond Street/East Adams Street is also operating at or near failing conditions (level of service D, E or F).

Highway Design: When I-81 was constructed in the 1950s and 1960s, highway design standards were different from today. The primary study corridor geometrics represent areas where significant deficiencies (non-standard and non-conforming features) are evident between past and present design standards. Non standard design features are particularly prevalent in and around or adjacent to the I-81/I-690 interchange that include mainline geometry, ramp design and spacing, interchange spacing and road widths (shoulders and medians). This includes I-81 from Hiawatha Boulevard down to the Harrison Street ramps and I-690 in the area between and including I-81 and the West Street interchange.

Operational Issues: The narrow shoulder width and high traffic volumes on the urban sections of I-81 pose significant operational challenges. It is difficult to conduct routine maintenance and when accidents occur, the limited shoulder width creates backups and hazard for traffic. These tight curves and narrow shoulders, on the Viaduct and the adjoining I-81/I-690 Interchange are also very difficult for emergency responders.

Structural Issues: There are 76 bridges in the primary study corridor, bounded by the I-81/I-481 Interchanges to the north and south. The majority of the bridges were built in the mid to late 1960's and of the 76 bridges, 7 are classified as "Structurally Deficient" and 46 are "Functionally Obsolete". Assuming only routine maintenance, such as bridge washing and maintenance painting of steel is performed, the bridge conditions will continue to deteriorate until bridges need to be posted for reduced loads, and eventually closed. Based on the age of the bridges, by the year 2050 (ETC+30), over 80% of the bridges in the study corridor will have met or exceeded their expected service life.

Community Resources: A considerable amount of community resources are located along, adjacent or directly next to the I-81 Primary Study Area. These include neighborhoods, historic

resources, archeological resources; national, state and local heritage areas; medical facilities and major employers and businesses. Based on the initial public outreach efforts a series of community principles were developed and used to identify possible community impact areas including economic development, public safety, convenience of travel, regional land use patterns, resources, community character and quality /fairness of decisions. Consideration of these principles and potential impact areas is a need for the project as future strategies for I-81 are developed within *The I-81 Challenge*.

Environmental Resources: A considerable amount of environmental resources are located along, adjacent or directly next to the I-81 Primary Study Corridor. These include water resources (wetlands, water courses, floodplains and aquifers), general ecology, farmland, contaminated materials, air quality and highway noise. Based on the initial public outreach efforts several possible environmental impact areas have been identified including air quality, stormwater and water quality, noise and vehicle miles traveled. Consideration of these resources and potential impact areas is a need for the project as future strategies for I-81 are developed within *The I-81 Challenge*.

2.2.2.4 Transportation Plans

The Syracuse Metropolitan Transportation Council (SMTC) is the State-designated Metropolitan Planning Organization (MPO), responsible for administering the continuous and comprehensive transportation planning process in Onondaga County, and small portions of Madison and Oswego Counties. They are an integral part of the I-81 Corridor Study with the NYSDOT/FHWA. For this project, they have been cooperating with the local/regional planning organization along with key municipalities including City of Syracuse, Onondaga County and surrounding towns. They are developing a travel demand model extending to 2035 that includes employment and household projections to synthesize the area planning efforts. These planning efforts will be used as a basis for the future (design year 2040) transportation demand. As the MPO, the SMTC provides the forum for cooperative decision making in the development of transportation plans, programs and recommendations. Its committees are comprised of elected and appointed officials, representing local, state and federal governments, agencies, and organizations having interest in or responsibility for transportation planning and programming. The SMTC is currently working on the next update of the Syracuse Metropolitan Area Long Range Transportation Plan (LRTP). The LRTP serves as a blueprint that guides the Syracuse Metropolitan Area's transportation development over a 25-year period.

The Syracuse Metropolitan Transportation Council (SMTC) maintains the Transportation Improvement Plan (TIP), a capital program, for the greater Syracuse Area. SMTC currently has a 2007-2012 TIP that is nearing completion. This program in general, is represented by projects focused on maintenance and state of good repair including pavement rehabilitations, bridge replacements, safety improvements and ITS system upgrades. In general, the present TIP contains only a limited number of projects that add capacity to the transportation system. In general, the following summarizes planned/completed projects from the 2007-2012 TIP related to the I-81 Corridor Study area:

- Syracuse University Connective Corridor – Transit Project
- Rehabilitation of BIN 100270 Erie Blvd over West Street
- Route I-481 Freeway Incident Management System, Phase III, Phase IV
- I-81 Intelligent Transportation System (ITS)
- I-81 Maintenance By Contract (MBC), I-690 to Route 11 Interchange
- Syracuse Freeway Incident Management System – Phase II
- Interstate 690 Resurfacing (MBC)
- I-81 Maintenance by Contract (MBC), Mattydale to Oswego County Line
- I-690 Resurfacing (MBC), Teall Avenue to I-481
- I-81 MBC, I-690 to Park Street
- Butternut Street, Spencer Street, Court Street over I-81 Bridge Replacement
- I-81 over Route 11, Bearings and Pedestals
- Freeway Incident Management System Phase V &VI
- Freeway Incident Management System Phase VII

The SMTC also has a "Draft" 2011 – 2015 Transportation Improvement Plan (TIP) available on their website at www.smtcmpo.org. The capital program was distributed to the public for review and comment. Again, like the past TIP, this new plan focuses on maintenance and state of good repair versus capacity improvements. The following summarizes the planned projects in the "Draft" plan related to the I-81 Corridor Study:

- I-481 Northbound bridge rehabilitation over Kirkville Road
- Rt. 481 over Bonstead Road Bridge Rehabilitation
- I-481, I-690 to I-81 Resurfacing
- I-81 over Rt. 80 Bridge Rehabilitation
- I-81 over I-90 Bridge Rehabilitation
- Element Specific Bridge Repair, I-81 over Route 11
- Repair/Resurfacing I-81 Bridge over Calthrop Avenue
- Taft Road over I-81 Bridge Rehabilitation
- Bridge Rehabilitation, I-690 over Teall Avenue
- I-690 over Beech Street Bridge Rehabilitation
- I-690 over I-90 Bridge Rehabilitation
- I-81, Route 173 to Viaduct Resurfacing
- Rehabilitate 10 Bridges I-690/West St Interchange

The I-81 Corridor Study is on the present 2007-2012 TIP for the planning phase only. This project, due to the significance of I-81 in the Syracuse area, represents the largest transportation initiative in the region. The project area is also supported by an overall freeway ITS system which is continuing to be upgraded and enhanced through the current and past TIP. SMTC has also initiated study efforts for implementation of Transportation Demand Management (TDM) for the downtown area where parking, employment and access are all critical issues.

2.2.2.5 Abutting Highway Segments and Future Plans

I-81 north and south of the project study area continues as a divided full access control facility well beyond the project limits. I-81 is a four-lane freeway south of Syracuse and proceeds south paralleling the Eastern Seaboard and the Appalachian Mountains through Pennsylvania, West Virginia, Virginia and terminating in Tennessee. North of the project limits, I-81 is a six-lane freeway to Central Square north of Syracuse where it transitions to a four-lane freeway before it terminates at the Thousand Island Bridge that crosses the St. Lawrence River into Canada. There are no plans to modify the abutting highway sections in the near future.

2.3 Transportation Conditions, Deficiencies and Engineering Considerations

2.3.1 Operations (Traffic and Safety) & Maintenance

2.3.1.1 Functional Classification and National Highway System (NHS)

In the United States, all roads are classified in groups based on intended use according to a standardized system. This functional classification system guides how roads should be designed; how many lanes, how much traffic they are expected to carry, interchanges and their spacing (for expressways), how far apart intersections with signals should be, and so forth.

As a regional corridor study, this study focuses on the Interstate Highway System (part of the National Highway System) and how it functions and serves the community. The general function of the Interstate Highway System is to provide local, regional and intrastate traffic service for the facilities, as they are an essential part of the regional and interstate transportation system that provides mobility for trade, travel, commerce and defense. Listed below are the interstates under study:

Interstates

- I-81 (Expressway)
- I-690 (Expressway)
- I-90 (Expressway)
- I-481 (Expressway)

Urban Principal Arterial

East Brighton Avenue
South Salina Street
South State Street
East Adams Street (west of I-81)
Harrison Street (west of I-81)
East Genesee Street
West Genesee Street
Almond Street
Erie Boulevard (east and west)
James Street
Taft Road

Other cross streets within the project limits are classified at lower classification levels.

The NYSDOT owns the highways evaluated in this study as well as numerous arterials in the city and county. It has full responsibility for I-81, I-690 and I-481, including maintenance (except for highway lighting). NYSDOT also has ownership and responsibility for the highway ramps and ramp junctions where the off- and on-ramps meet the local streets. NYSDOT is responsible for some of the traffic signals at the ramp junctions as well.

The New York State Thruway Authority owns and maintains I-90 as it traverses the area with interchanges at I-81, I-481 and I-690. The City of Syracuse owns and maintains the local streets within the City limits. Local streets in the primary study area outside of the City of Syracuse are owned and maintained by their respective municipalities or by Onondaga County.

2.3.1.2 Control of Access

- I-81, I-690, I-90, I-481 within the project area are full access control expressways.
- Other roads within the project area are local roads and have uncontrolled access.

2.3.1.3 Traffic Control Devices

I-81 is a controlled access highway with no traffic control devices or ramp metering. The Viaduct section includes I-81 from interchange 17 south of the Viaduct section to interchange 20 just north of the Viaduct section, plus I-690 from interchange 11-12 (North West Street) to interchange 14 (Teall Avenue). The following ramp intersections within the Viaduct area are controlled by traffic signals:

- I-81 Exit 17 – Southbound Ramps only
- I-81 Exit 18
- I-81 Exit 23 – Northbound Off-ramp only
- I-81 Exit 25
- I-81 Exit 26 – Northbound Off-ramp only
- I-81 Exit 28
- I-690 Exit 11 – Eastbound Genesee Street Off-ramp only
- I-690 Exit 13 – Westbound Off-ramp only
- I-690 Exit 14

2.3.1.4 Intelligent Transportation Systems (ITS)

There are ITS systems in operation or planned for the project area by the New York State Department of Transportation (NYSDOT), City of Syracuse and Central New York Regional Transit Authority (CNYRTA) as follows:

The NYSDOT Freeway Management System has several types of ITS devices as follows:

- *Permanent Variable Message Signs (VMS)* – I81 SB north of Court Street
- *Portable Variable Message Signs (VMS)* – used by NYSDOT maintenance residencies
- *Video traffic detection* and *closed loop signal systems* are in operation throughout the city and county.
- *Road Weather Information System (RWIS)* – I81 over Park Street

- *Induction Loop Sites* – perform traffic volume counts on a three-year cycle for the Traffic Volume Report. Five sites are continuous count (CC) locations that provide traffic volume counts 24 hours a day 365 days a year.
- *Long-Term Pavement Performance Study Site (LTPP)* – The Federal Highway Administration has a LTPP site on I-481 between the interchanges at Route 298 and Northern Boulevard. This includes weigh-in-motion scales; temperature sensors; induction loops; piezo strips for vehicle classification.

The NYSDOT Freeway Management System comprised of cameras, dynamic message signs (DMS), speed detectors, wireless communication systems, some RWIS sites within the project limits are as follows:

Phase I – I-81, Limits of camera coverage: I-81/I-481 south of the City of Syracuse to I-81/I-481 north of the City of Syracuse.
Phase II – I-690, limits of camera coverage: I-690 at Van Vleck Road to I-690 at Bridge Street.
Phase III – I-481, limits of camera coverage: I-481 at Kinne Road to I-481/I-81 north of the City of Syracuse.

Currently under design –
Phase IV – I-481, limits of camera coverage: I-481 at Rock Cut Road to I-481/I-690.

Planned –
Phase V – fill in the gaps within coverage areas above.
Phase VI – extend ITS freeway management systems in Onondaga County, I-81, NY481, NY690 and NY695
Phase VII – ITS freeway management system on I-81 in Cortland County.
Phase VIII – ITS freeway management system on I-81 in Oswego County.

Other ITS devices identified in the Syracuse Metropolitan Area ITS Concept Plan include:
- Fixed VMS along I-690 and Route 695 near the NYS Fairgrounds
- Statewide contract for a statewide RWIS that would tie the existing system that may result in five additional RWIS within the region.
- Five new closed loop traffic signals systems in the system.

City of Syracuse - the City currently has closed loop traffic signal system, computer controlled traffic signal interconnect system, CCTV (Closed Circuit Television) in operation today. Expansion plans to the signal interconnect system to include additional intersections near Geddes Street/West Genesee Street and in the N. Salina Street/ Lodi Street area were planned and scheduled to be completed in 2005 with all the remaining city signals to be incorporated on the system by 2013.

CNYRTA is in the process of completing or initiating the following ITS devices:
- Mobile Data Acquisition System

- Automatic Vehicle Location (AVL) systems
- Fleet – equipped with Automatic Passenger Counters (APC)

Traffic Management Centers – there are six locations of the main public safety facilities (including answering points and dispatch centers) and the City of Syracuse Traffic Control Center that serve the greater Syracuse area. Five of the six centers are located within the overall study area. These locations throughout the area include NYS Police Headquarters, County Sheriff's Headquarters, City Police Headquarters, Onondaga County Department of Emergency Communications (911 Center), the City Traffic Control Center, Department of Public Works and the NYSDOT Region 3 Traffic Control Center.

2.3.1.5 Speeds and Delay

The posted speed limits on I-81 vary from end to end of the project corridor. At either end of the study area, the speed limit is 65 mph. Approaching from the south the speed limit reduces to 55 mph as you reach the Viaduct and then further reduces to 45 mph through the I-690 Interchange. Near the Spencer Street bridge (adjacent to the Old Oil City) the speed limit increases back to 55 mph and then further increases to 65 mph near the northern Syracuse city line.

There are various sources of speed data available for the study including the permanent count station on I-81 near Taft Road/Hancock Airport, travel speeds derived from the "Pass Thru Traffic Study" data and the VISSIM capacity system modeling of the Viaduct and I-81/I-690 Interchange area. At the count station location, the 85th % operating speeds are 74 mph in the northbound direction and 75 mph in the southbound direction. Note this area is posted at 65mph. In the City of Syracuse area, travel speeds are significantly constrained during the commuter peak periods through a combination of expressway and local arterial deficiencies. Travel speeds in the peak hours ranges between 20-40 mph in and around the I-81/I-690 junction. This area serves Downtown and the University Hill. In consideration of the peak 85th % speeds and the overall I-81 corridor consistency, the established design speed is a minimum of 60 mph increasing to 70 mph as I-81 transitions out of the downtown area.

Design speeds are used for design of a new freeway structure, if that is the preferred option, and for determination of existing non-standard features. The following design speeds have been established for the project study effort:

I-81: 70 mph for the areas currently posted at 65 mph
I-81: 60 mph for the areas currently posted 55 mph and 45 mph
I-690: 60 mph for the areas currently posted 55 mph or less

Old design speeds were researched from the record plans, however only limited information was available for the original design speeds:

I-81: I-481 to Raynor Avenue (start of Viaduct) - 60 mph
I-81: I-690 to Hiawatha Boulevard - 50 mph

I-690: West Street to N. Clinton Street - 50 mph

The 60 mph segment corresponds to the area south of the Viaduct where the posted speed limit increases from 55 mph to 65 mph. The other two areas are the westerly (I-690) and northerly (I-81) approaches to the I-81/I-690 Interchange where 45 mph postings transition to 55 mph.

Travel time and delay within the Viaduct and I-81/I-690 Interchange area was analyzed using the "VISSIM" computer program. The VISSIM program simulates the operation of mainline expressway, ramps, roadways and signalized intersections. The program is based on methods presented in the 2000 Highway Capacity Manual that describe the operation of intersections controlled by traffic signals, as well as expressway and ramp operations. The VISSIM program was used for this study specifically to model traffic operations through the complex Viaduct section. The travel speeds and delays associated with merge/diverge and ramp terminus operations are reflected in the overall average speeds in the Viaduct. Figure 2.2 and 2.3 show the predominant average travel speeds through the Viaduct area during the morning and evening peak hours. Detailed summaries of travel times for all major links of the expressway system in the Viaduct are provided in Appendix B – Traffic Information.

Figure 2.2 – Average Modeled Travel Speeds – Morning Peak Hour
(predominant traffic flow direction)

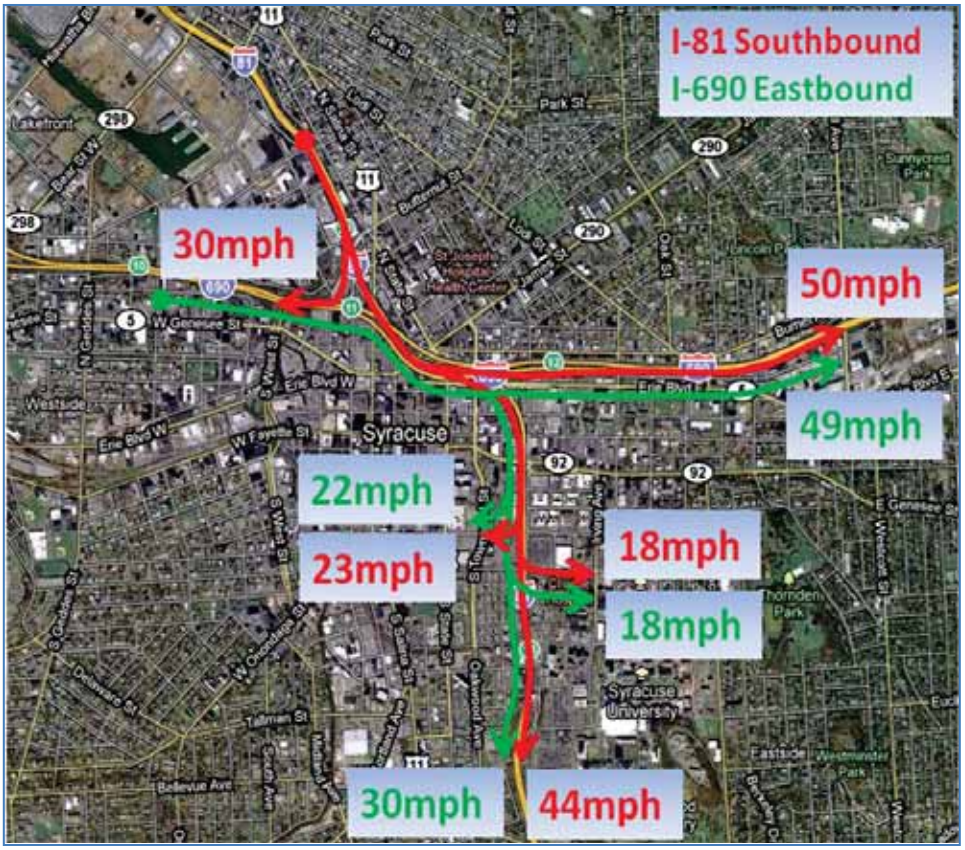
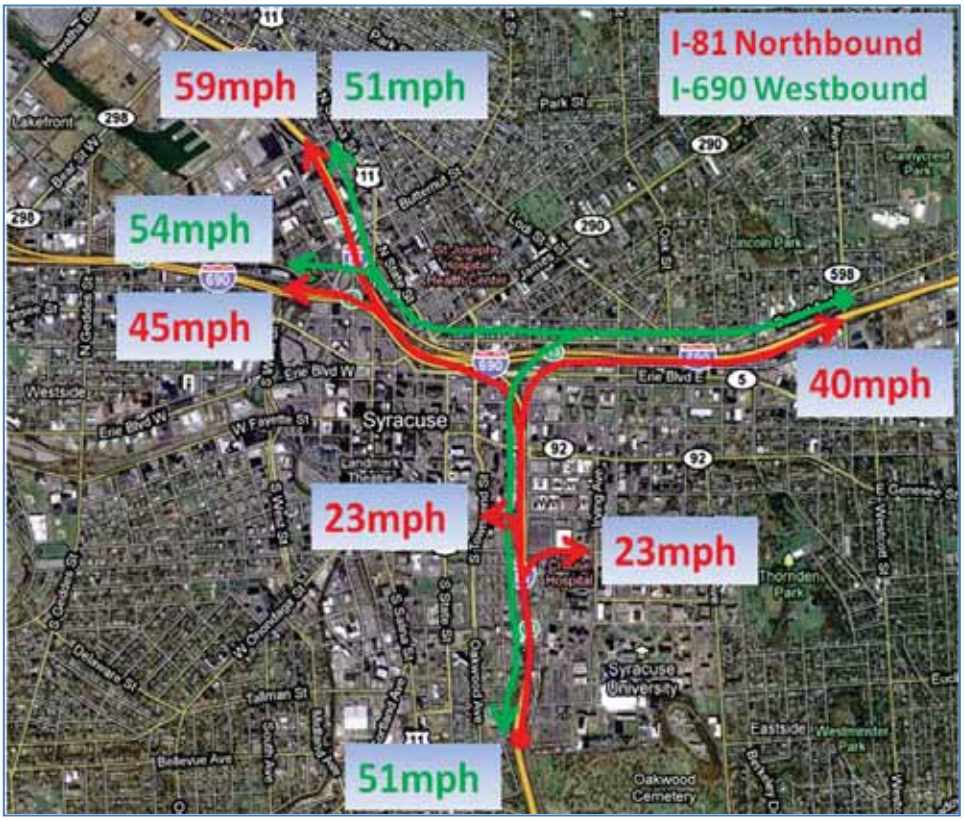


Figure 2.2 shows modeled travel speeds during the Morning Peak Hour. As an example, a vehicle on I-690 Eastbound (green line) heading south on I-81 to exit at the Harrison/ Almond/E. Adams exit is facing congestion and delays with travel speeds in the range of 18 mph (eastbound on E. Adams Street) – 22 mph (westbound on Harrison Street). A vehicle on I-690 Eastbound heading south on I-81 through this same area is anticipated to experience travel speeds of about 30 mph. I-81 southbound traffic (red line) destined to this same exit is experiencing similar delays (23 mph to Harrison westbound, and 18 mph to E. Adams Street eastbound) and congestion. These average travel speeds are well below posted speed limits through this area. Similar patterns are observed in the reverse commute during the evening peak hour shown in Figure 2.3.

Figure 2.3 – Average Modeled Travel Speeds – Evening Peak Hour
(predominant traffic flow direction)



2.3.1.6 Traffic Volumes

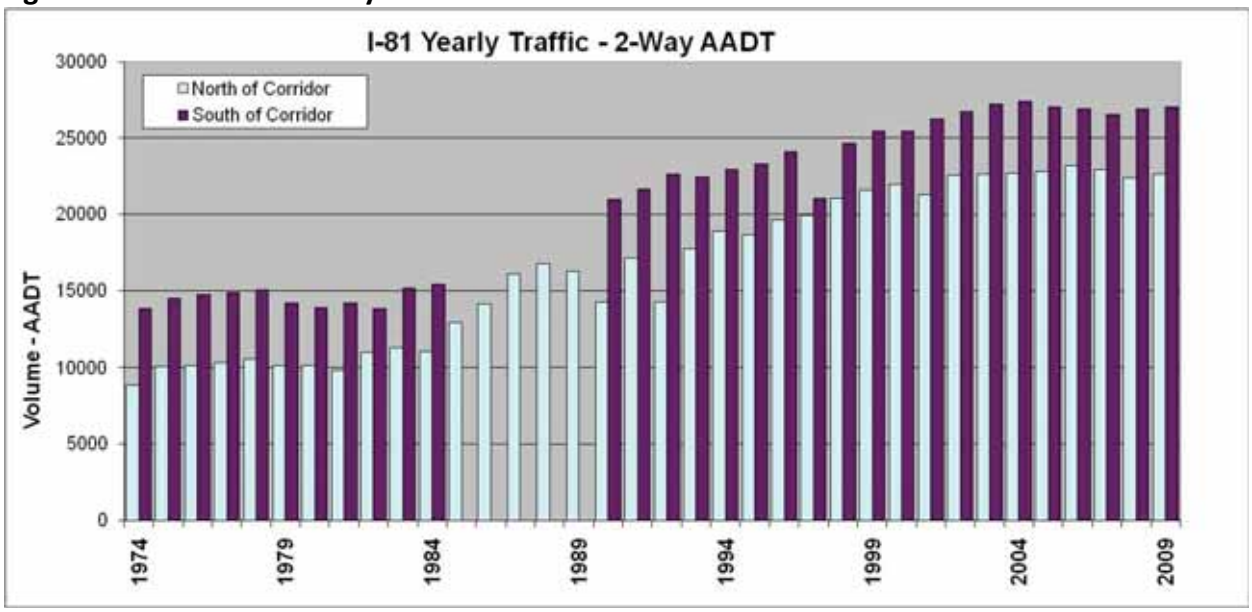
New York State Department of Transportation traffic volume data was obtained at various count locations and times along the I-81 Corridor in Onondaga County to determine traffic volume trends and peak travel periods. The following summarizes the analysis and the findings.

I-81 Traffic Growth Outside the Corridor Study Area

NYSDOT operates two permanent continuous traffic count stations along I-81 in Onondaga County. One station is located to the south between Onondaga County Line and Route 80 (approx. 10 miles south of the corridor); the other station is located north of Central Square (between Route 49 and Route 69, or 15 miles north of corridor). No permanent count stations exist within the Corridor Study area limits. Historical Average Annual Daily Traffic (AADT) volumes were obtained from both stations to determine long-term volume trends. Both data sets show an upward trend that indicates traffic has increased at a rate of 3.3-5.4 percent per year between 1974 through 2003. Both data sets, however, indicate growth since 2003 has remained flat (or 0% per year). This latest trend is similar to results found at other count locations available within the study area along I-81. Thus, overall growth in traffic external to the study corridor appears to be flat in recent years. Figure 2.4 shows the distribution of traffic over the past 35 years.

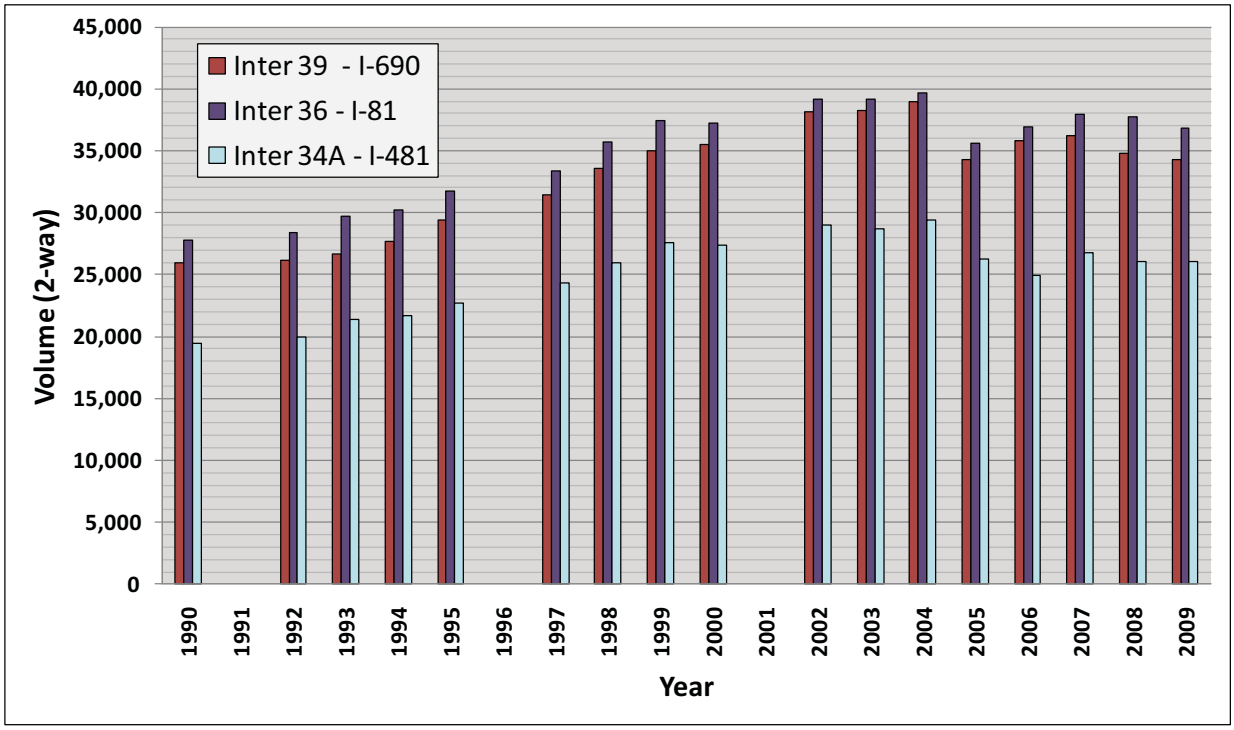
Historical traffic data was obtained for the NYS Thruway (I-90) within the area to determine if the stable growth rates observed along I-81 are consistent in the region. Figure 2.4A displays traffic volumes along the NYS Thruway from the I-690 interchange on the west to the I-481 interchange to the east. As shown on the graph, similar patterns recorded, with traffic growth reaching a high in 2004 and decreasing slightly through 2009.

Figure 2.4 – Historical Yearly Traffic Volume Trends



Note: no data available between 1985 and 1990 at the south station.

Figure 2.4A – Historical Traffic Volumes – NYS Thruway (I-90)

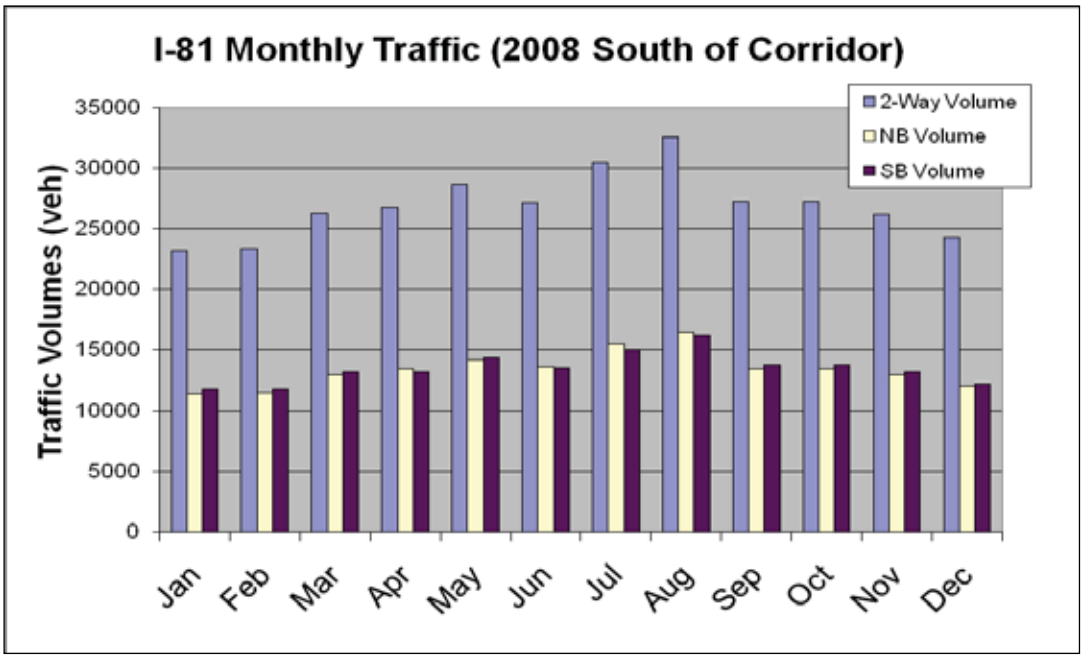


Note: no data available for 1991, 1996 and 2001.

Looking more specifically at the traffic volume information at the station south of the study area, shows a typical monthly variation in traffic, with July and August being the highest volume months and January and February the lowest. The data displayed along I-81 south of the Corridor Study area was chosen as it is closer to the study area and the information more recent. Figure 2.5 shows the monthly variation recorded in 2008.

July and August are the highest travel months on the interstate system outside the study area. However, traffic data used in the study analysis was obtained during the fall and spring months. This is when typical commuter patterns occur and Syracuse University is in session.

Figure 2.5 – Historical Monthly Traffic Volume Trends



I-81 Traffic Growth Internal to Corridor Study Area

Weekly travel data was obtained by the New York State Department of Transportation on I-81 between Exits 27 and 28 near the Airport in 2006. The data obtained was reviewed and indicates relatively consistent daily traffic volumes in this section of I-81, see Figure 2.6 for a summary Daily Traffic Volume Variation. The chart shows Friday as the highest travel day, while Saturday and Sunday are the lowest. Travel on Monday, Tuesday, Wednesday and Thursday is about 10% lower than a Friday.

Hourly traffic data was made available at two locations within the I-81 corridor, one location was between Exits 16 and 16A obtained in 2008 just north of the I-481 Interchange; and the second location was between Exits 27 and 28 obtained in 2009 near the Airport. Review of the data shows the typical peak travel hour at either location to occur between 7 and 8 AM and between 4 and 5 PM with the highest total volume occurring during the weekday evening peak travel hour. Both count locations exhibited similar volume and hourly variations. Figure 2.7 shows the hourly traffic distribution.

Heavy Vehicle Traffic

Heavy vehicle information was obtained in the same I-81 sections (north and South of Viaduct) and analyzed for the hourly traffic variation. In both sections, the highest heavy vehicle traffic volume occurred during the morning peak hour with 8.8 percent (425vph) heavy vehicles 2-way and 7.5 percent (438) heavy vehicles during the evening peak hour.

Figure 2.6 – Daily Traffic Volume Variation

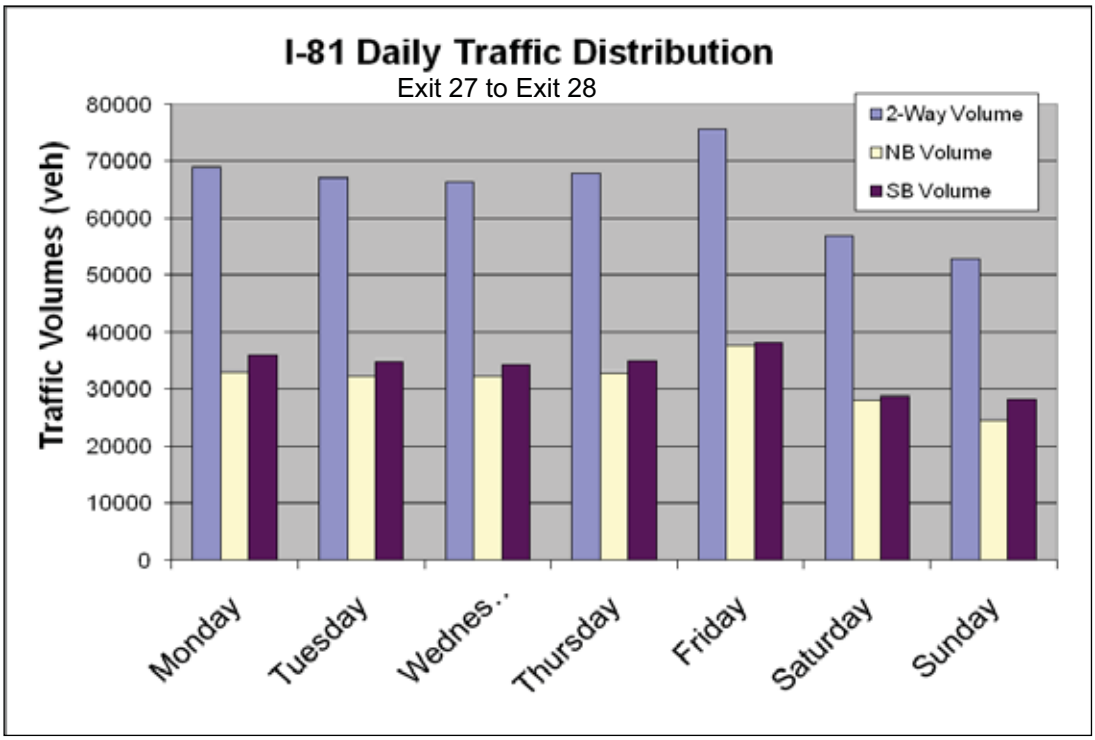
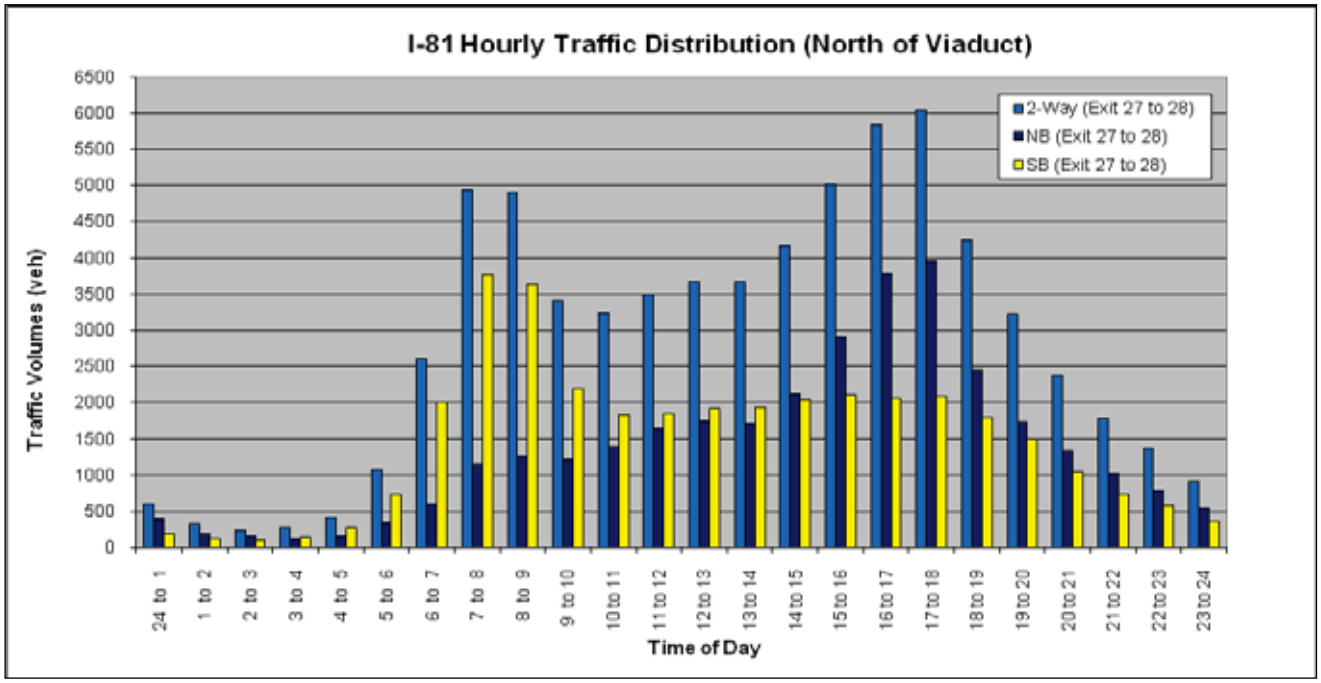


Figure 2.7 – Hourly Traffic Volume Variations



Corridor Average Daily and Peak Hour Traffic

From a series of expressway mainline, ramp hourly traffic counts, and traffic counts taken at expressway ramp junctions with the local street network, traffic flow diagrams for I-81, I-690

and I-481 were developed. The traffic volumes throughout the network were taken at varying timeframes and represent travel on a typical weekday taken during the fall or spring of 2009. The detailed traffic flow diagrams are located in Appendix B – Traffic Information. Figure 2.8 provides a summary of the 2009 Existing Average Annual Daily Traffic (AADT) on the overall expressway system in the Corridor study area.

2.3.1.7 Pass Through Study

There are multiple types of pass through vehicles and studies that can be performed. There are:

- *Internal* to *External* trips – vehicles with internal study area origins and with external study area destinations. For example, a Liverpool resident traveling to Cortland.
- *External* to *Internal* trips – vehicles with external origins and with internal destination (i.e., Cortland resident traveling to Carousel Center).
- *External* to *External* trips – vehicles with external origins and destinations. These trips are longer in nature and represent regional, intrastate, interstate or international traffic (i.e., Watertown resident traveling to Binghamton).

The purpose of the data collection effort undertaken for *The I-81 Challenge* was to determine how many vehicles over a 24-hour period, travel through or around Syracuse without an internal origin or destination. These trips are referred to as "external to external" traffic and can traverse the area using three primary routes as follows:

- Traffic using I-81 between the I-481 northern interchange (Exit 29) and the I-481 southern interchange (Exit 16A);
- I-81 external traffic by-passing the Syracuse area by using I-481;
- Thruway (I-90) traffic traveling between the I-690 Interchange (Exit 39) to I-81 south of the southern I-481 interchange (Exit 16A).

For the purposes of *The I-81 Challenge*, the pass through study obtained "external to external" trips. This study has definitive objectives and is not intended to be an origin/destination study for other internal/external trip patterns along I-81. Figure 2.9 displays the three routes observed to determine the "external to external" travel patterns. This traffic is referred to as "pass through traffic" in this study. Knowing the pass through volume provides an understanding of how much traffic is or could use I-481 to by-pass the Syracuse area and how much traffic on the I-81 Viaduct section are "external to external" trips.

Interstate 81 Corridor Assessment

Figure 2.8 - Average Annual Daily Traffic

Legend

Combined AADT

- 10,000 - 50,000
- 50,001 - 85,000
- 85,001 - Plus
- Railroad
- Waterways
- City

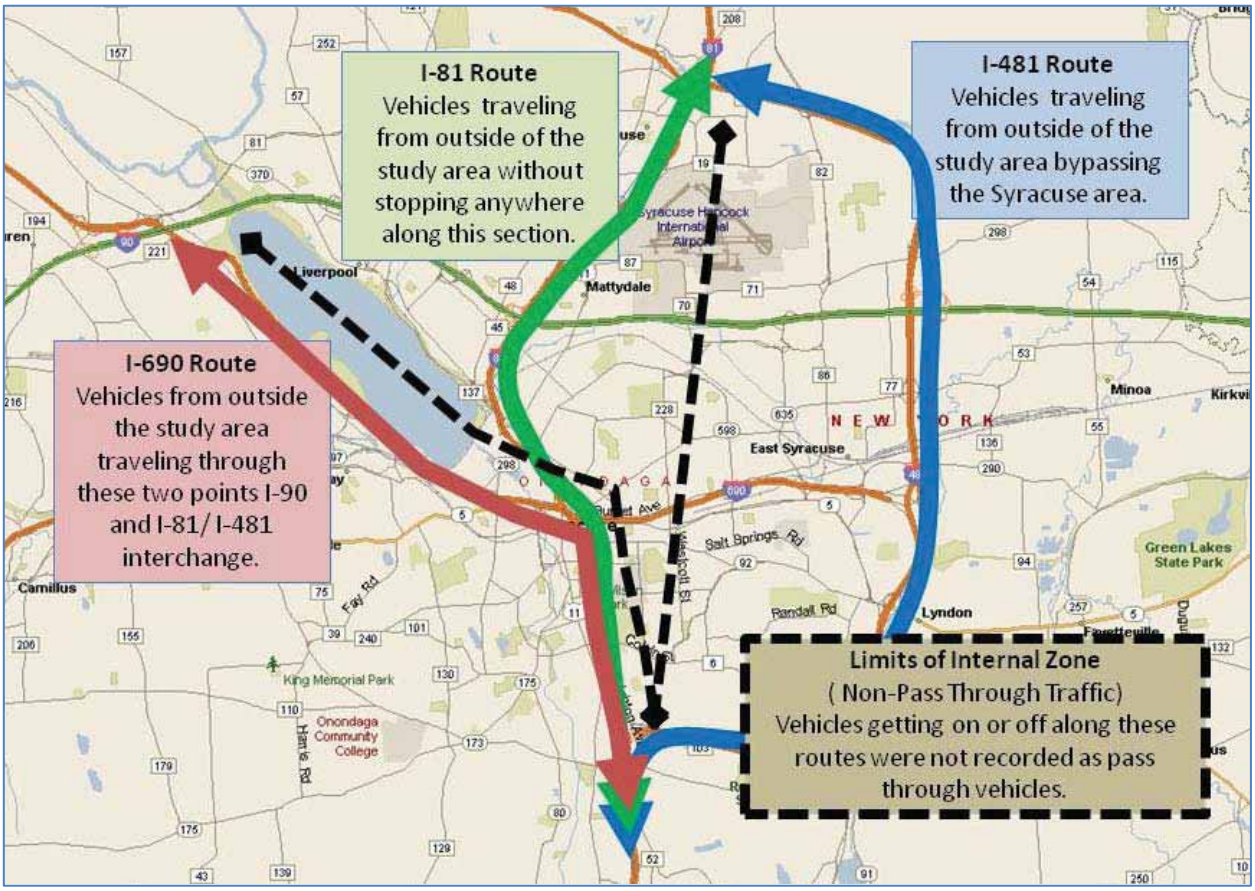
0 0.35 0.7 1.4 2.1 2.8

Miles

Jun 04, 2010

Original in Color Stantec

Figure 2.9 – Pass-Through Routes Defined

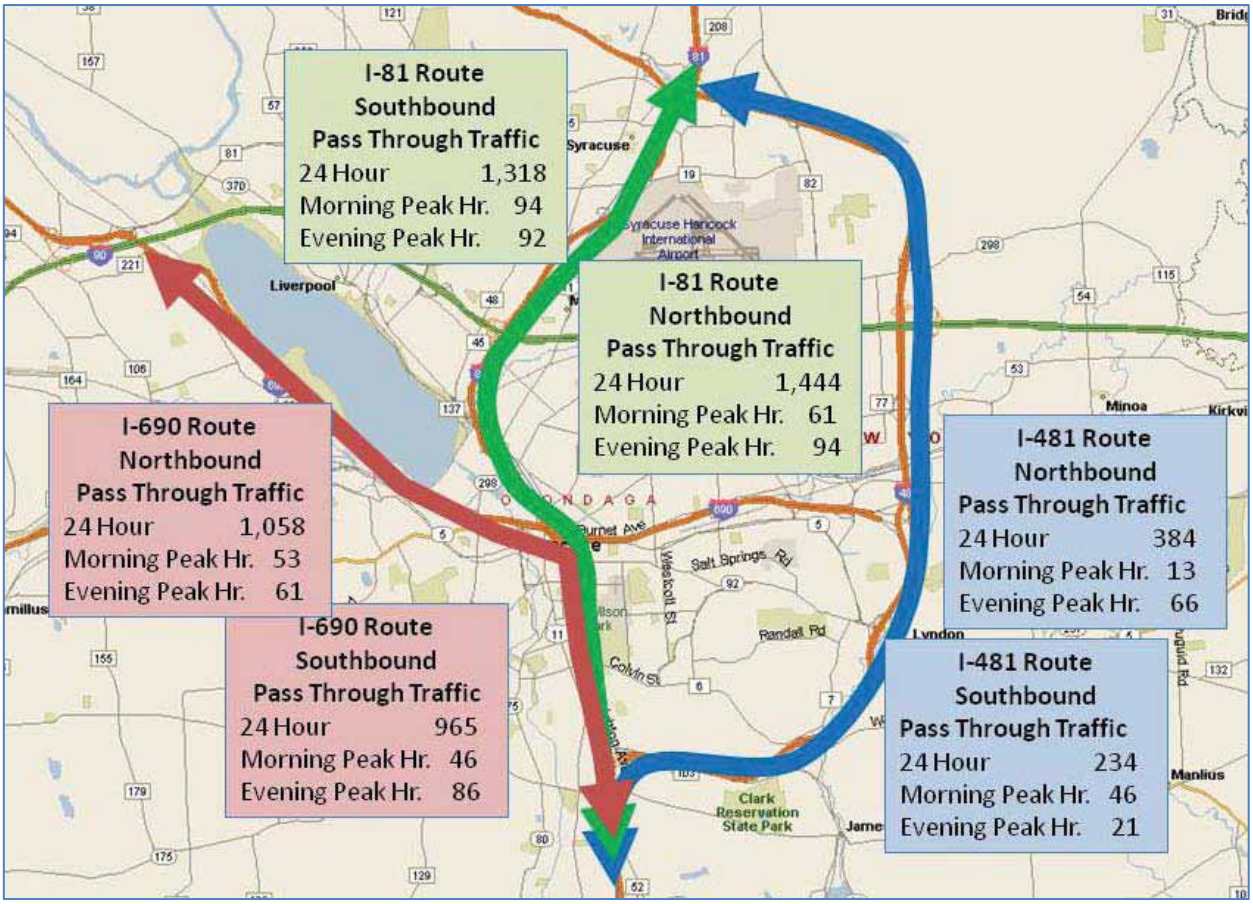


This study assumed that because of the additional travel time and Thruway tolls, that the majority of pass through traffic using the Thruway from the east side of Syracuse will use I-481 and from the west side will use I-690. Based on this assumption and knowing the number of pass through trips in the I-81 Viaduct section, it can also be assumed that the majority of other trips traveling in the Viaduct section have an origin, a destination or both within the study limits and for the purpose of this study, are referred to as “local trips”.

The data was collected by placing Automated License Plate Reader (ALPR) cameras on I-81 both north and south of the I-481 interchanges, on the I-690 ramps to and from the Thruway and on the I-481 ramps with I-81. Data was collected on a weekday (Tuesday, April 13, 2010) for 24 hour period. It should be noted that lane closures on I-81 were in effect during the time of this survey. Additional delays associated with these lane closures, however, would most likely not be known to most pass through traffic and as such most likely did not affect their route choice. At each of these sites, automatic traffic recorders (tube counters) were installed to obtain total traffic volumes to assist in normalizing the license plate data. As each vehicle passed the camera locations, the license plate number and the time was recorded. The license plates entering the area were then matched at each of the exit locations to determine the volume of pass through traffic. Travel times for the pass through traffic were calculated based

on the entry/exit times recorded. The license plates of 86% of the 112,476 vehicles counted entering or exiting the area on that day were captured and recorded. Figure 2.9a shows the results of the survey after all traffic volumes were factored to reflect 100% of the entering and exiting volume.

Figure 2.9A - Pass Through Traffic



In total, approximately 5,400 vehicles per day are traversing these corridors as "external to external" trips. It is anticipated that seasonal and daily variations do occur, however, the study was to determine typical peak travel when Syracuse University is in session. The results show that on an average weekday in April:

- Of the 44,000 vehicles per day on I-81 just south of the I-481 southern interchange, 12% (5,400 vehicles per day) are "external to external" trips using I-81, I-690 or I-481; and,
- Of the 5,400 "external to external" trips, 38% is traffic to/from the Thruway via I-690, 51% pass directly through the City of Syracuse using I-81 and 11% bypass Syracuse using I-481.

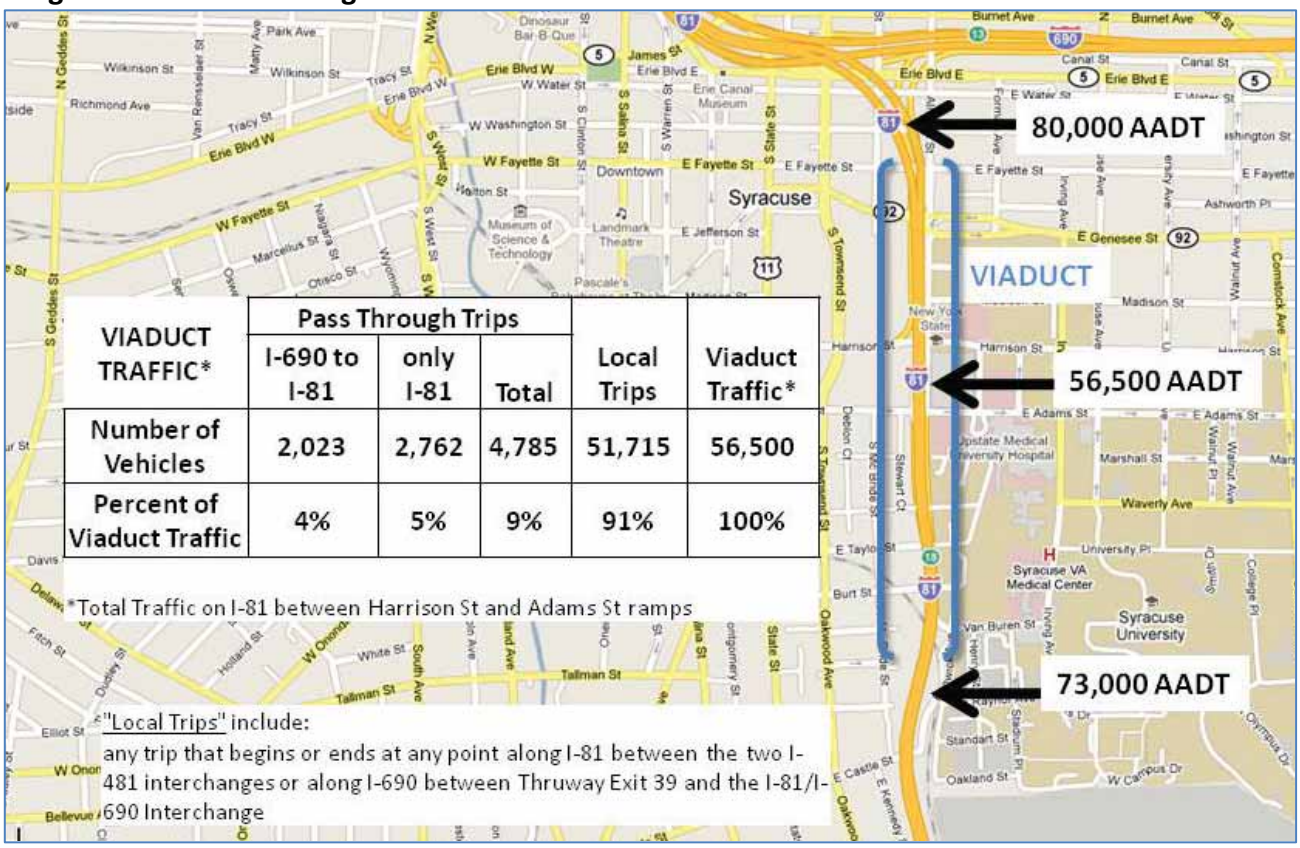
<u>I-81 Viaduct Section</u>

The I-81 Viaduct (between Harrison Street and East Adams Street) carries approximately 56,500 vehicles a day based on recent traffic counts by NYSDOT. The pass through traffic using

this section of I-81 is approximately 4,785 vehicles per day or approximately 8.5 percent of total traffic. Based on this, over 91 percent of the daily traffic in the Viaduct section has an origin, destination, or both in the study limits, and is not traffic passing through the Syracuse area. Some of this local traffic could be diverted to other routes, and will be explored further during future alternative assessments. During the commuter travel periods, "external to external" trips using the I-81 Viaduct are 7 percent or less of the peak hour volume. Figure 2.10 presents the pass through traffic using the I-81 Viaduct.

With over 91 percent of the Viaduct traffic being classified as local trips, diverting 7-9 percent of I-81 traffic to I-481 or finding an alternative route for Thruway traffic would have little notable impact on traffic volumes or operations in the I-81 Viaduct.

Figure 2.10 - Pass Through Traffic - Viaduct Section

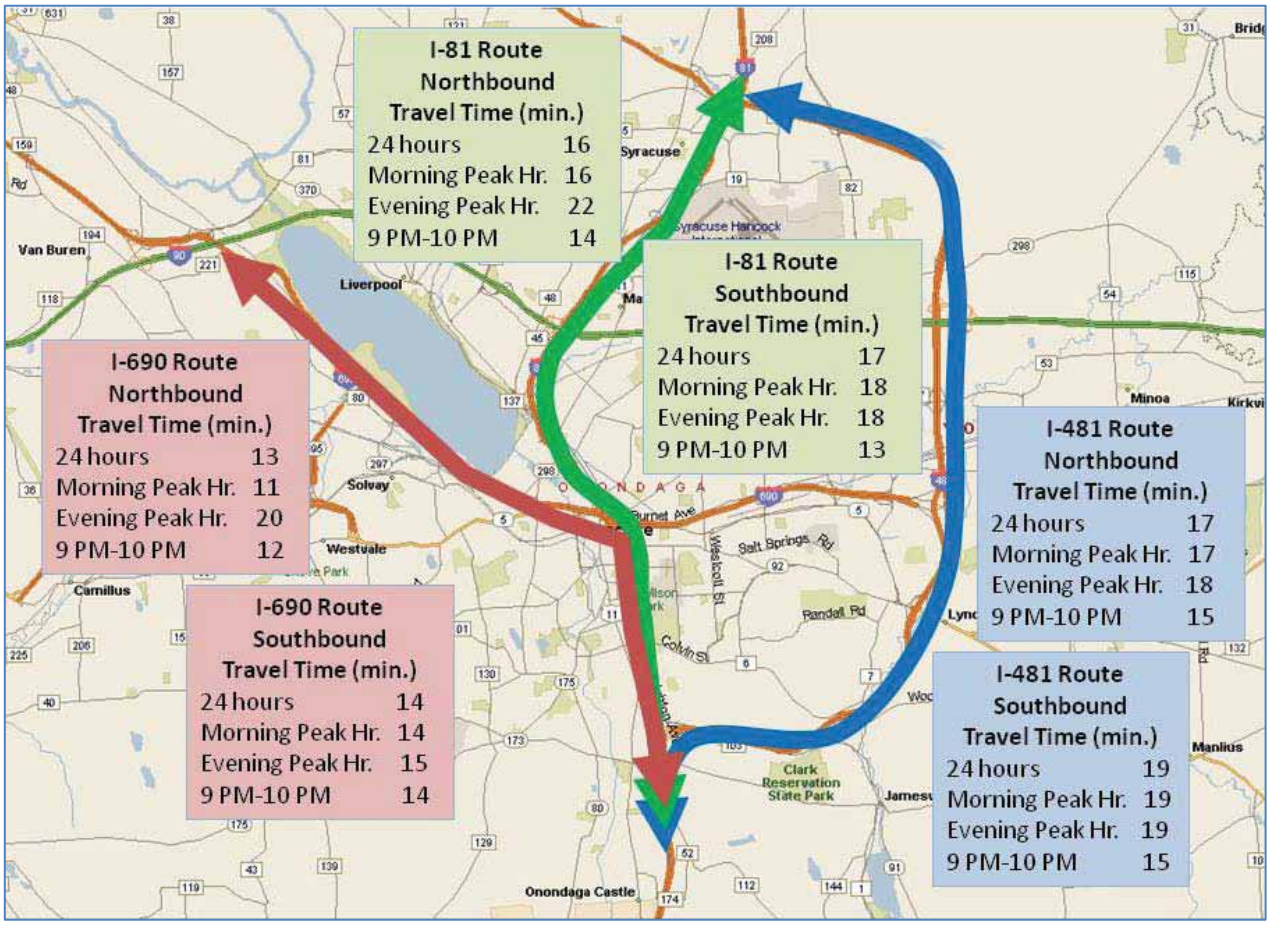


VIADUCT TRAFFIC*	Pass Through Trips			Local Trips	Viaduct Traffic*
	I-690 to I-81	only I-81	Total		
Number of Vehicles	2,023	2,762	4,785	51,715	56,500
Percent of Viaduct Traffic	4%	5%	9%	91%	100%

Route Travel Times

The ALPR's recorded when each vehicle entered and exited the area along each of the routes. When the license plates were matched, the travel time was calculated based on which route the vehicle traversed by using the lapsed time and length travelled. Figure 2.11 presents the average travel times for each route by time of day. Travel time during the 9 PM to 1O PM travel hour are included in these figures and provide an indication as to what the typical free-flow un-congested travel times time would be along each of these corridors.

Figure 2.11 - Travel Times



I-81 versus I-481

Using I-481 to bypass Syracuse is approximately 4.3 miles longer, has a posted speed of 65 MPH for its entire length, and traffic congestion and construction is relatively light in comparison to I-81 corridor through Syracuse. In addition, signing on I-81 at both north and south ends directs the use of I-481 to bypass the City of Syracuse. Thus, simply considering these elements, it would appear the I-481 corridor should be a more attractive route for pass through traffic.

Review of the pass through data however offers contradictory results. During a 24-hour period, of the 3,380 vehicles that could use either I-81 or I-481 to pass through Syracuse, only 21 percent of the passenger vehicles and 11 percent of the heavy vehicles currently choose the I-481 route over I-81. The use of this route does increase during peak travel periods. During the evening peak hour, 32 percent of the 224 passenger cars and 33 percent of the 49 heavy vehicles use the I-481 route rather than staying on I-81 to pass through Syracuse.

Review of the travel time data collected provides an indication as to why I-81 is the chosen route for most times of the day. In spite of traffic congestion, construction, and lower posted speeds, I-81 is generally still a faster route than I-481.

Summary

The following conclusions can be drawn from the data and analysis related to the I-81 corridor and the I-81 Viaduct section. They are:

- Over 91 percent of the traffic travelling in the I-81 Viaduct section has an origin or destination in the Syracuse area and is not considered "external to external" trips.
- Using the I-81 corridor through Syracuse even with congestion, construction and lower speed limits, is generally faster than using I-481.
- Forcing "external to external" trips to use I-481 will have little notable impact on traffic operations in and around the I-81 Viaduct.
- If all "external to external" traffic was forced to use I-481, the additional traffic would have a minor impact on I-481 operations, but would experience an increase in travel time of one to two minutes.

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. There may be additional travel patterns affecting the viaduct that could be diverted to other routes. This will be investigated as part of the future alternatives analysis.

A detailed report on the survey process, summary tables and matched plate data is in Appendix B – Traffic Information.

2.3.1.8 Level of Service and Mobility

Level of Service (LOS) is an indicator of congestion on road segments and at intersections. LOS is a measure of the delay experienced by drivers at an intersection or road segment on a scale of A to F. At intersections, a rating of A indicates very short waiting times while a rating of F indicates very long delays (failing operations); while along a freeway segment, a rating of A indicates low vehicle density traveling at free flow speeds, while a rating of F indicates congestion and high vehicle density traveling at low speeds. The design criteria from the NYSDOT Highway Design Manual indicate that Interstate highways should function at LOS C or better.

Expressway - Existing Traffic Operations

Each mainline section of the expressway system was analyzed using the Highway Capacity Software developed by McTrans and based on Highway Capacity Manual method to determine current operations or Level of Service (LOS). The analysis identifies mainline sections and ramps that currently experience traffic operational problems. Note that using the HCM method analyzes the expressway sections in pure isolation. Thus, the impact of a downstream failing traffic condition is not reflected in the operation of an upstream section of the expressway. An example ramp operation that causes slowing or stopped traffic is the I-690 eastbound exiting traffic to I-81 southbound during the morning peak hour that interferes with upstream I-690 eastbound mainline operations. However, this type of interference is not accounted for with the mainline capacity analysis for this upstream section of the expressway. Hence overall favorable operations may be reported using HCS. For the sections where this

type of interference with other sections may be occurring, a network traffic simulation model (VISSIM) was used. This simulation model identifies the effects on the network as a result of failing or slow moving sections, including the impact of at-grade intersection operations on the arterial network downstream of a ramp terminal.

Figure 2.12 and 2.13 show 2009 Existing Level of Service operations throughout the entire network for both commuter peak hours, and Figure 2.14 and 2.15 provide a close up of the Viaduct area and I-81/I-690 Interchange during both commuter peaks. As can be seen in the figures, the majority of the highway system outside the general downtown areas is shown as "green" levels of operation that reflect Levels A, B or C. Approaching capacity areas are shown in "orange" which indicates LOS D-E operations. Over capacity areas are shown in "red" which indicates Level F, failing conditions.

Review of current travel conditions on the expressway system indicates that most of the current concerns are concentrated on I-81 from north of Hiawatha Boulevard to just south of the Harrison Street ramps. On I-690 present capacity issues start around the Rte. 695 and end near the Midler Avenue interchange thus encompassing the primary study corridor limits on I-690 from West Street to Teall Avenue. The only traffic operational issue related to I-481 was during the evening peak hour at the southbound I-481 off-ramp to eastbound East Genesee Street. The off ramp has sufficient capacity; however, the issue relates to the merging movement with East Genesee Street and therefore has not been illustrated in the figures showing the interstate highway and ramp operations.

Using the HCM/HCS methodology described above, the expressway system mainline analysis indicates no failing operations (LOS F) in either the weekday morning or evening peak period; however, a number of merge/diverge ramp analysis are shown operating at failing levels. The ramps operating at failing levels are listed below:

Failing Ramp Operations - Morning Peak Hour

- I-81 Southbound off-ramp to Harrison Street/Almond Street
- I-81 Southbound off-ramp to North Salina/North Clinton Street
- I-690 Eastbound off ramp to I-81 Southbound

Failing Ramp Operations - Evening Peak Hour

- Harrison Street on-ramp to I-81 Northbound
- I-81 Northbound off-ramp to I-690 Eastbound
- I-81 Northbound off-ramp to I-690 Westbound
- Butternut Street on-ramp to I-81 Northbound
- Pearl Street on-ramp to I-81 Northbound

There are several expressway mainline sections and ramp sections near failing conditions (LOS E) within the corridor and are listed below:

Near Capacity Operations - Morning Peak Hour

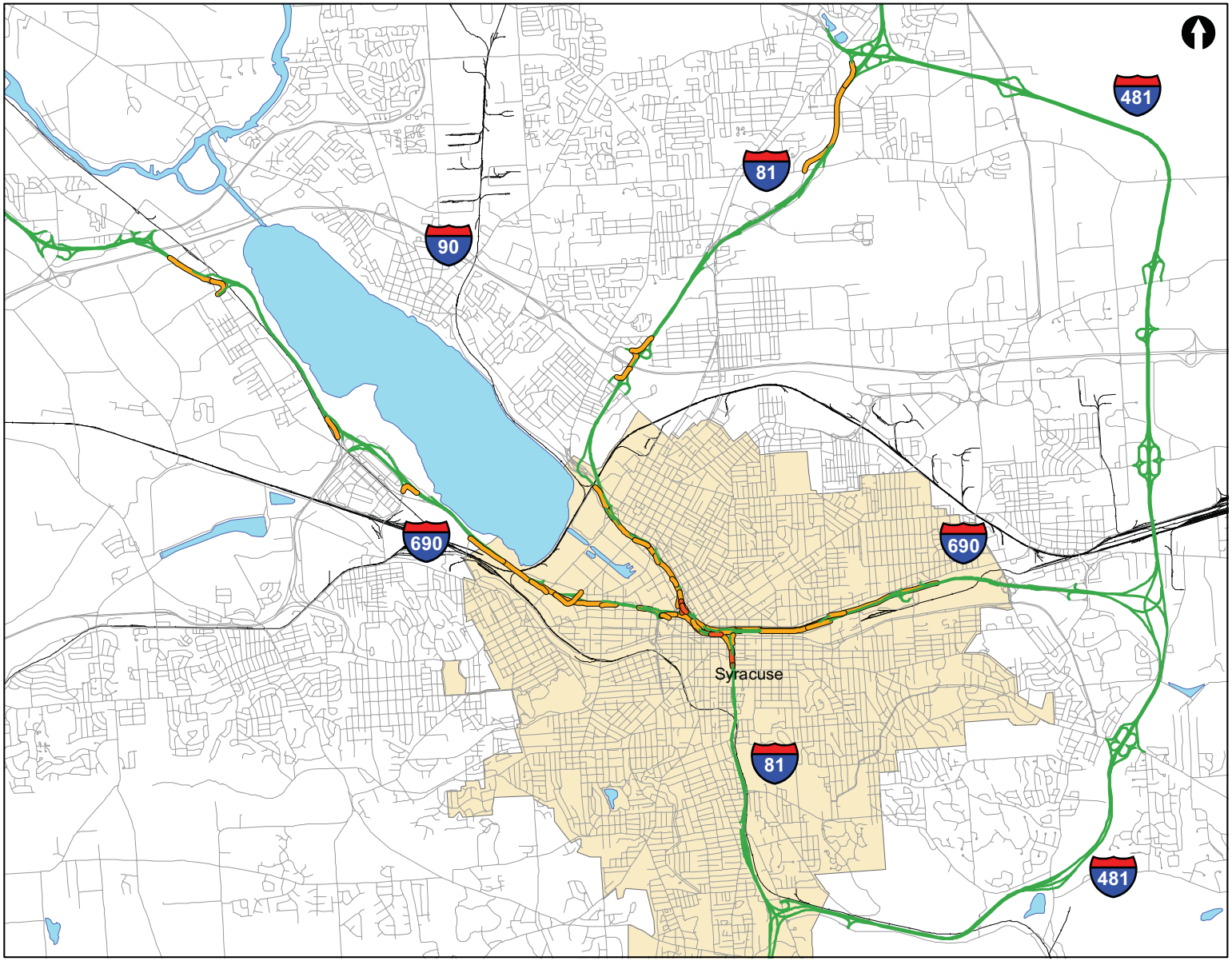
- Most of I-81 Southbound from Hiawatha Boulevard to the I-81 Southbound off-ramp to Harrison Street/Almond Street including most of the southbound on/off ramps from Court Street to Salina Street.
- I-690 Eastbound from east of the West Street on-ramp to the I-81 Southbound off-ramp
- I-81 Southbound off-ramp to Butternut Street
- I-90 on-ramp to I-81 Southbound
- I-81 Southbound off-ramp to 7th North Street
- Rte. 370 on-ramp to I-81 Southbound
- I-690 Eastbound off-ramp to Hiawatha Boulevard

Near Capacity Operations - Evening Peak Hour

- I-81 Northbound from the Butternut Street on-ramp to the Court Street on-ramp
- I-690 Eastbound from the I-81 Southbound on-ramp to the McBride Street on-ramp
- I-690 Eastbound from the I-81 on-ramp to the Teall Avenue off-ramp
- I-690 Westbound off-ramp to West Street
- I-690 Westbound off-ramp to Rte. 695

Intersection turning movements were obtained at 79 intersections during the weekday morning and evening peak hours. These intersections are located throughout Downtown, University Hill and near St. Joseph Hospital. At 45 of these intersections, updated traffic counts were obtained in 2009 (November and December) or 2010 (February and March) when schools were in session. The only identified construction activity was the Butternut Street Bridge which was closed to traffic; all travel lanes on I-81 were open during the traffic counting periods.

Review of the capacity analysis for the traffic signal controlled intersections indicate nearly all intersections are operating at overall good Levels of Service (LOS) C or better during peak hours, with the exception of the following intersections with poor or failing movements or approaches:



Interstate 81 Corridor Assessment

Figure 2.12 - Overall Level of Service - Morning Peak Hour

Legend

Level of Service

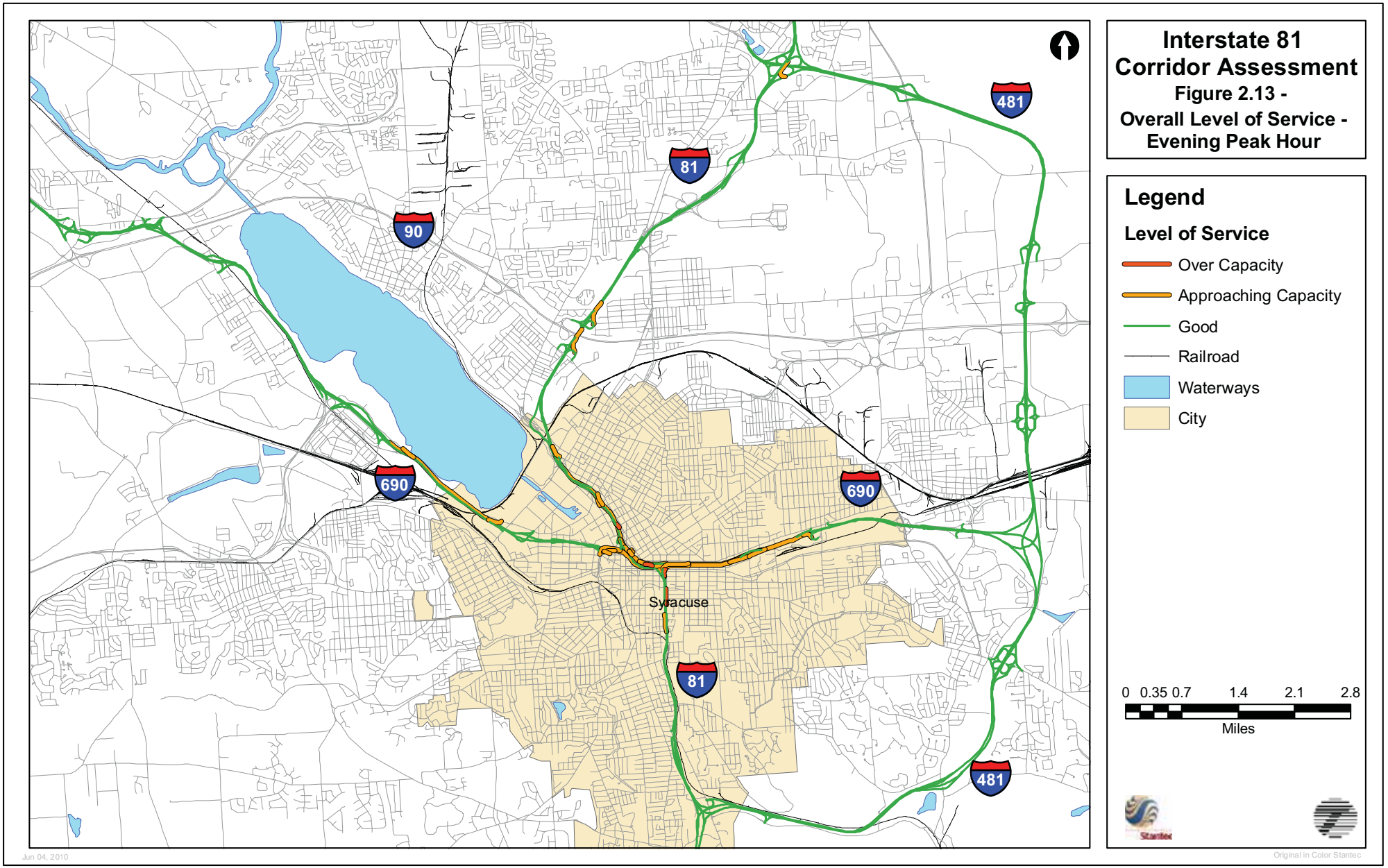
- Over Capacity
- Approaching Capacity
- Good
- Railroad
- Waterways
- City

0 0.35 0.7 1.4 2.1 2.8

Miles

Jun 04, 2010

Original in Color Stantec


Interstate 81
Corridor Assessment
Figure 2.13 -
Overall Level of Service -
Evening Peak Hour
Legend
Level of Service
Over Capacity
Approaching Capacity
Good
Railroad
Waterways
City
0 0.35 0.7 1.4 2.1 2.8
Miles
481
81
90
690
690
Syracuse
81
481
Jun 04, 2010
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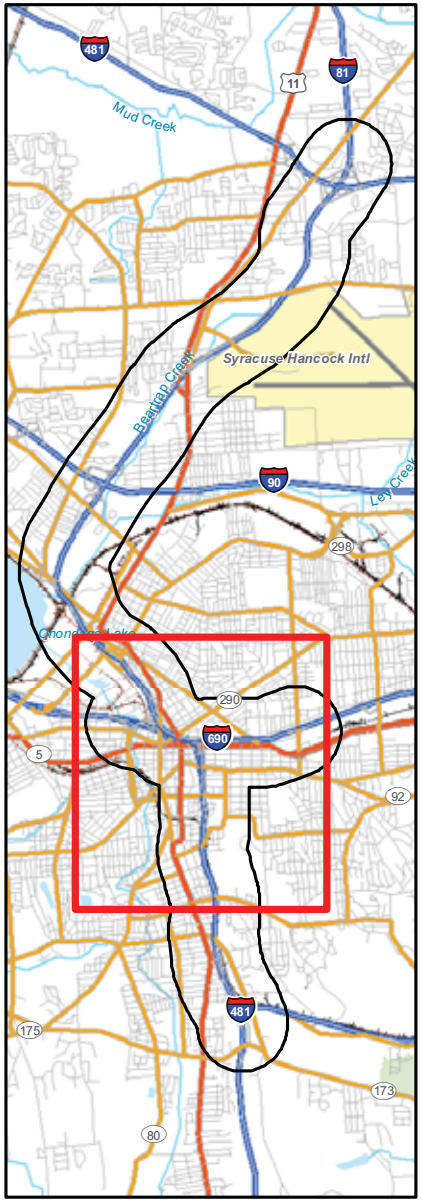
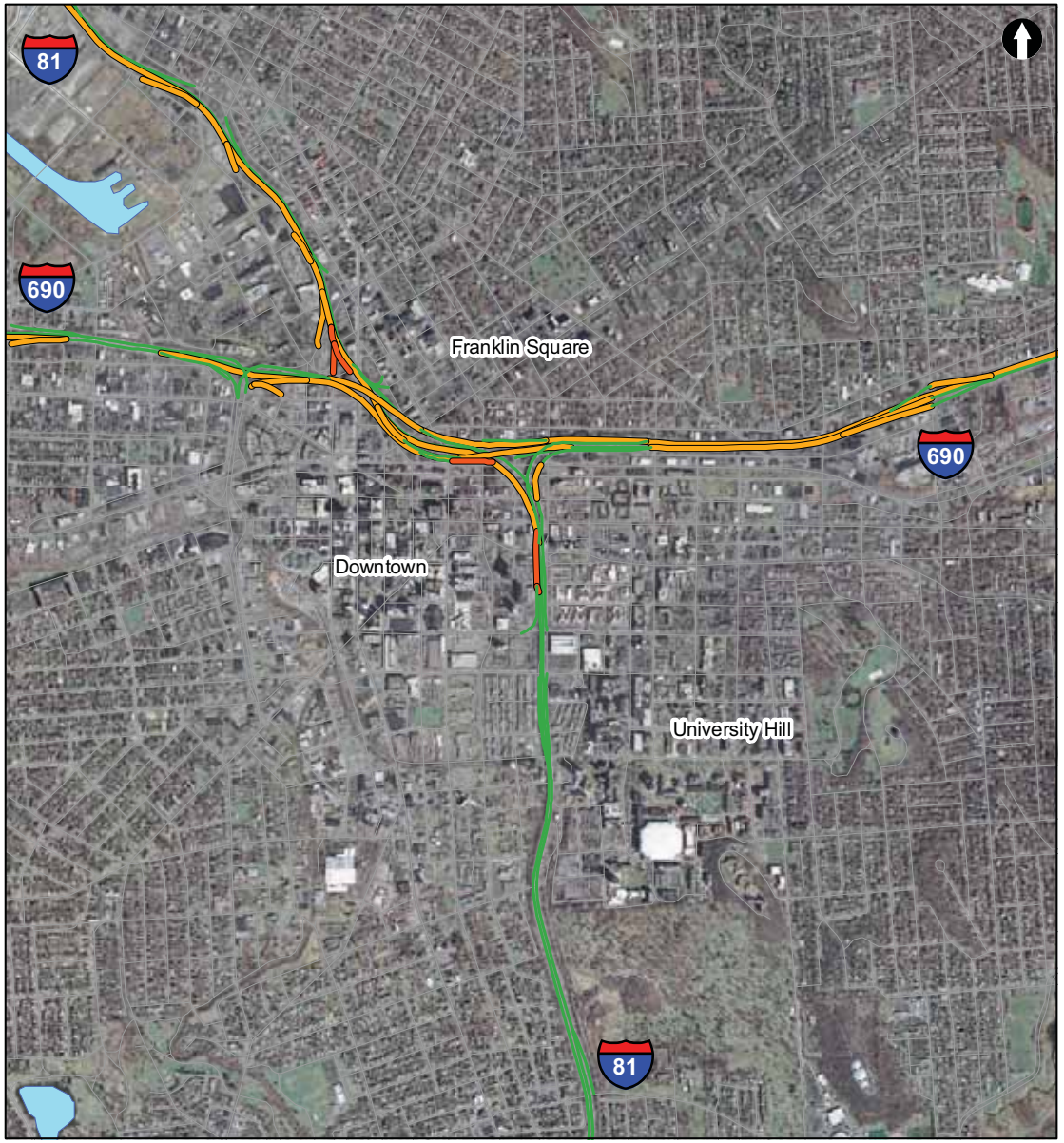




Interstate 81 Corridor Assessment

Figure 2.14 - Level of Service - Morning Peak Hour Viaduct Area

Legend

Level of Service

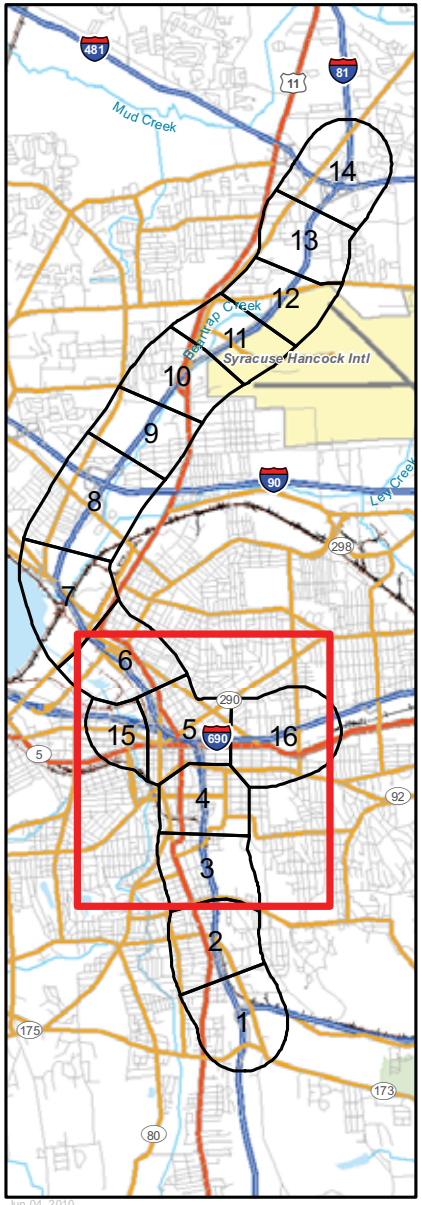
- Over Capacity
- Approaching Capacity
- Good
- Waterways

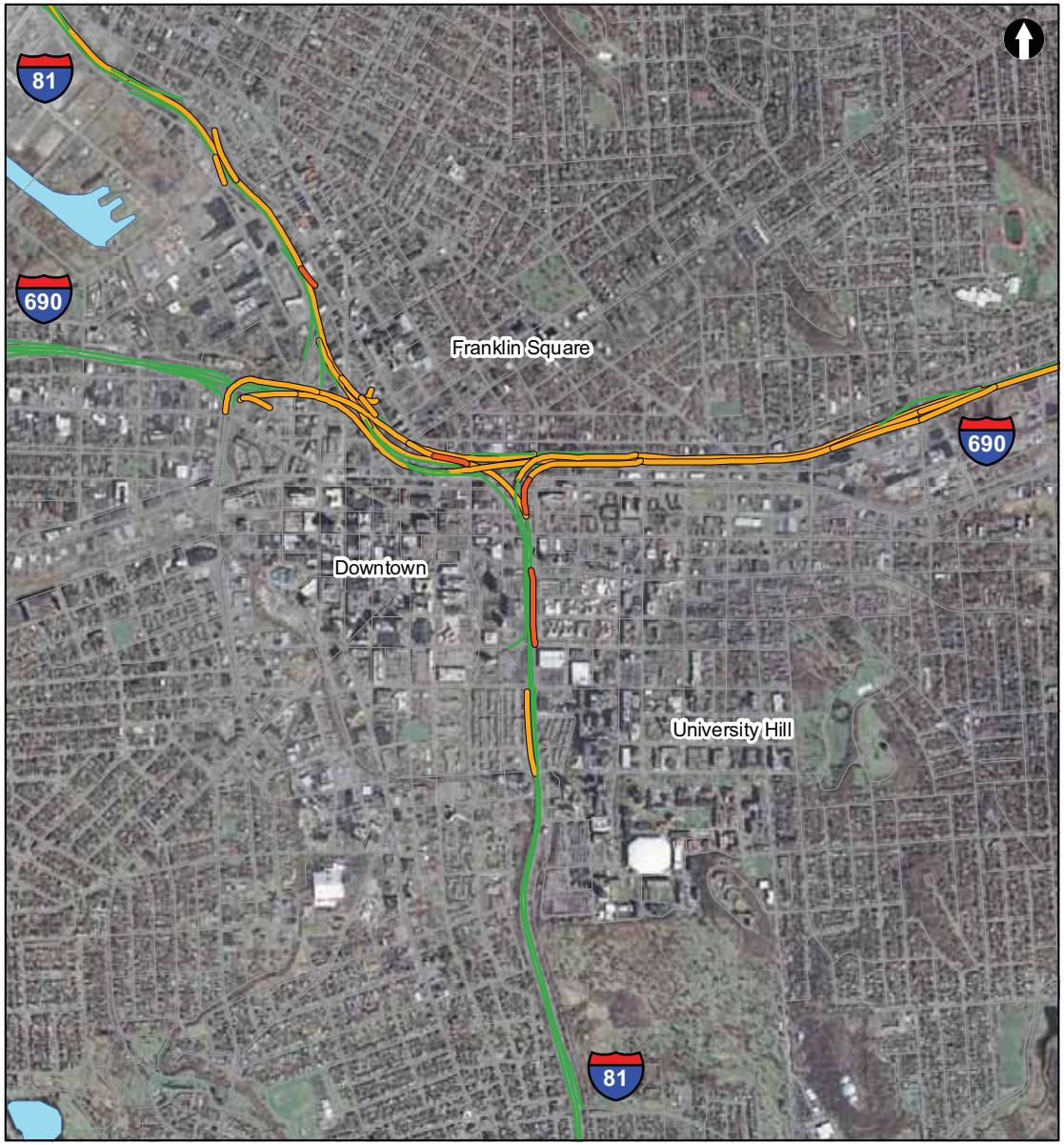
0 0.1 0.2 0.4 0.6 0.8

Miles

Jun 04, 2010

Original in Color Stantec





Interstate 81 Corridor Assessment

Figure 2.15 -

Level of Service - Evening Peak Hour Viaduct Area

Legend

Level of Service

- Over Capacity
- Approaching Capacity
- Good
- Waterways

0 0.1 0.2 0.4 0.6 0.8

Miles

Jun 04, 2010

Original in Color Stantec

Intersection Operations - Weekday Morning Peak Hour

- Almond Street @ I-81 Southbound off-ramp- ramp approach is Failing, Level F
- Almond Street @ East Adams Street –
  - Almond Street northbound right turns - Level F
  - Almond Street southbound left turns – Level E
- East Adams Street @ Sarah Loguen Street – eastbound approach – Level D;
- West Genesee Street @ North Clinton Street – southbound through traffic – Level E;
- Butternut Street @ I-81 Southbound off-ramp – ramp approach - LOS E

Storage and queuing concerns were observed along the Almond Street corridor between the above noted intersections.

Intersection Operations - Weekday Evening Peak Travel Hour

- Almond Street @ East Adams Street –
  - East Adams Street - eastbound right turns - Level E
  - East Adams Street - eastbound left turns - Level D, with queuing concerns
- Almond Street @ Harrison Street - westbound approach - Level E, this result in vehicle queues in one lane blocking other lanes. Thus, the overall high level of intersection operations cannot be achieved and the intersection appears to be failing during the evening peak hour.

Capacity analysis indicates most intersections in the Downtown and the University Hill are providing very good level of service and are expected to continue to provide good levels of service in the near future if no major changes or travel patterns are adjusted. The analysis indicates most of the morning and evening traffic operational issues are generally associated with the Almond Street intersections under the I-81 Viaduct Section. During the morning peak travel period, poor traffic operations at these intersections are causing traffic to back up on the I-81 off ramps to the point that it impacts I-81 mainline operations. A detailed Level of Service table showing each intersection analyzed is presented in Appendix B – Traffic Information.

Future Traffic Operating Conditions

The SMTC Regional Travel Demand Model is currently being updated and future travel forecasts will not be available until later in this study; however, some estimates of future travel conditions can be made. General modest growth in traffic will occur with the exception of where major development or redevelopment efforts are planned (i.e., Carousel Center and University Hill areas). Given no highway capacity improvements or changes in travel patterns are made in the future, then it can be expected that current ramps and sections operating near failing conditions (LOS E) will fail at some point in the future. Furthermore, expressway sections operating at LOS D may also reach near failing or failing conditions.

The cursory review of future conditions shows that most of the mainline expressway sections and ramps are operating well and are expected to continue to operate well into the future, including all of I-481. Along I-81, most of the present and future traffic capacity issues, both

mainline and various ramps, start just north of Hiawatha Boulevard and end at the East Adams Street Southbound on-ramp. On I-690, present and future capacity issues start around the Rte. 695 and end near the Midler Avenue interchange, which includes the primary study area section of I-690 from West Street to Teall Avenue.

2.3.1.9 Safety Considerations, Accident History and Analysis

The following steps were used to conduct an accident analysis for the primary study area of I-81, I-690, and I-481 corridors and their associated on- and off-ramps:

- Collision data was obtained from New York State Department of Transportation (NYSDOT) for the most recent three-year period available (February 1, 2006 – January 31, 2009).
- The data were assigned to individual roadway segments within the study corridor and the total number of accidents during the three-year period for each segment was summed. The length of each mainline segment or ramp was determined based on Geographic Information System (GIS) line files provided by NYSDOT.
- Annual Average Daily Traffic (AADT) volumes were also provided by NYSDOT and the project data collection efforts. Using the AADT and the length of each segment, a value representing millions of vehicle miles (MVM) was calculated for the three-year period for the mainline segment and for million entering vehicles (MEV) for the on- and off-ramps. This value was used to calculate the accident rate per MVM and MEV.
- The calculated accident rates were then compared to the average accident rates for specific corridor roadway types, as shown in Tables 2.2 and 2.3 for ramps and mainline segments, respectively.

Table 2.2: Statewide Average Rates for Ramp Type

Configuration*	On-Ramp Rates**	Off-Ramp Rates*
Merge with 1 lane	0.10	0.19
Merge with 2 lanes	0.02	0.02
Merge with 3 lanes	0.01	0.01

* For Urban Function Class
**Based on accident data for November 1, 2007 through October 31, 2009.
Source: NYSDOT, 2010

Table 2.3 – Statewide Average Rates for Highway Facility Type

Configuration*	Accident Rate per MVM**
4 Lanes	1.04
6 Lanes	1.07
7 Lanes	1.07

* For urban function class, controlled access, divided.
**Based on accident data for November 1, 2007 through October 31, 2009. Mainline accidents only.
Source: NYSDOT, 2010

Comparisons to the statewide average accident rate for each respective roadway segment are in Appendix C - Safety Information. Table 2.4 provides a summary of the segments analyzed with accident rates higher than the statewide average for that roadway type.

Table 2.4 – Summary Average Accident Rates for State Highways by Facility Type

Roadway Type/Configuration*	Average Statewide Accident Rate	% of Segments with higher than average accident rate
Expressway Sections with 6 or 7 Lanes	1.07 MVM	54%
Expressway Sections with 4 Lanes	1.04 MVM	83%
On-Ramp or Off-Ramp, Merge with 2 lanes	0.02 MEV	100%
On-Ramp, Merge with 1 lane	0.10 MEV	96%
Off-Ramp, Merge with 1 lane	0.19 MEV	96%

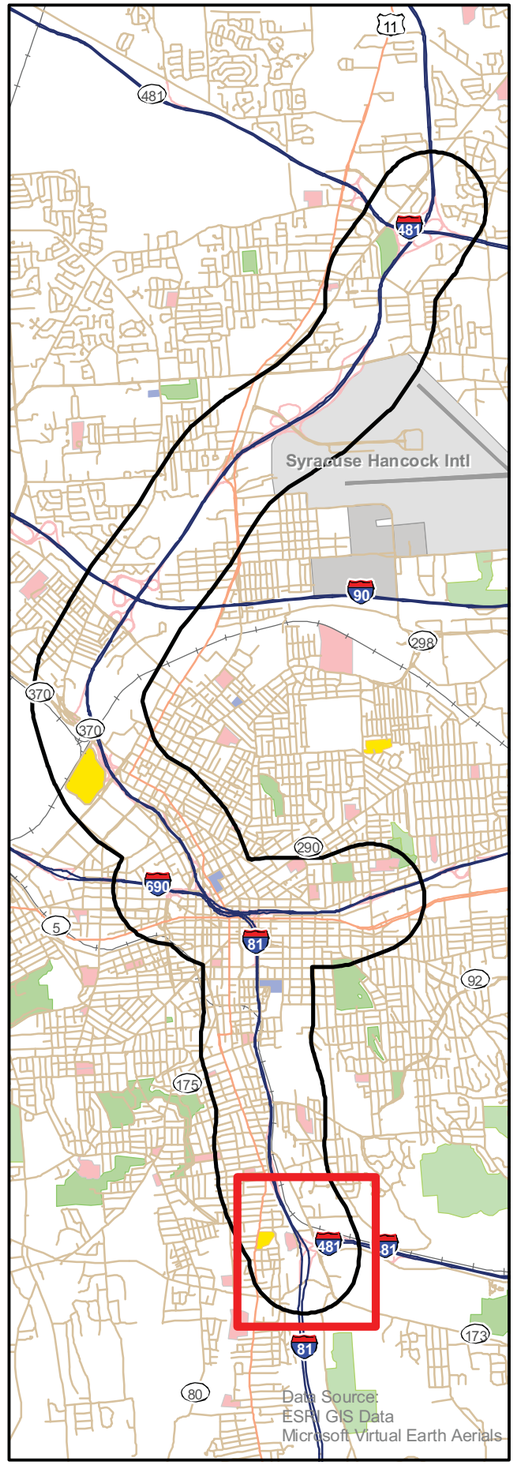
Figure 2.16 (sheets 1-12) shows a ratio of how far above the statewide rate each of the sections in the corridor are experiencing crashes. The figures show accident ratios for mainline segments versus ramps as they are calculated differently and have different statewide rates. It should be noted that mainline segment statistics are inherently more important than ramps due to the higher speeds and volumes. The total number of accidents per roadway segment in the study corridor (I-690, I-481 and the Thruway) is provided in Appendix C.

The New York State Priority Investigation Locations (PIL) list was researched and includes many locations within the study corridor. PILs are locations where accident rates exceed the mean rate for a similar type of facility to such an extent as to suggest that some other factor than pure chance may be contributing to the accident experience. They are locations where persistent accident problems have been documented and warrant further study for cause and remediation. These locations are shown in the accident rate figures and listed below for the three major corridors.

For the Route I-81 section from the Forest Interchange I-481 to the NY481 Interchange, 10 PIL locations are on the current 2009-2010 PIL List:

PIL# LOCATION

37 E. Castle Street to James Street (Rt.290) Onondaga Int. Viaduct South of (Exit 19)
7 Onondaga Interchange I-690 to Butternut St. (Exit 20)
16 Salina Street - Spencer Street
63 Kirkpatrick Street to Court Street/Route 298 (Exit 22)
78 Court Street/Rt.298 (Exit 22) to Hiawatha Blvd. (Exit 23)
33 7th North Street (Exit 25) to I-90 Thruway
107 North of I-90 Thruway Interchange (Exit 25A)
87 NB off-ramp Northern Lights (Exit 26) to Airport Service Road
51 NB on-ramp to Airport Service Road
172 I-81/NY 481 Interchange (Exit 29) Town of Cicero, Village of North Syracuse



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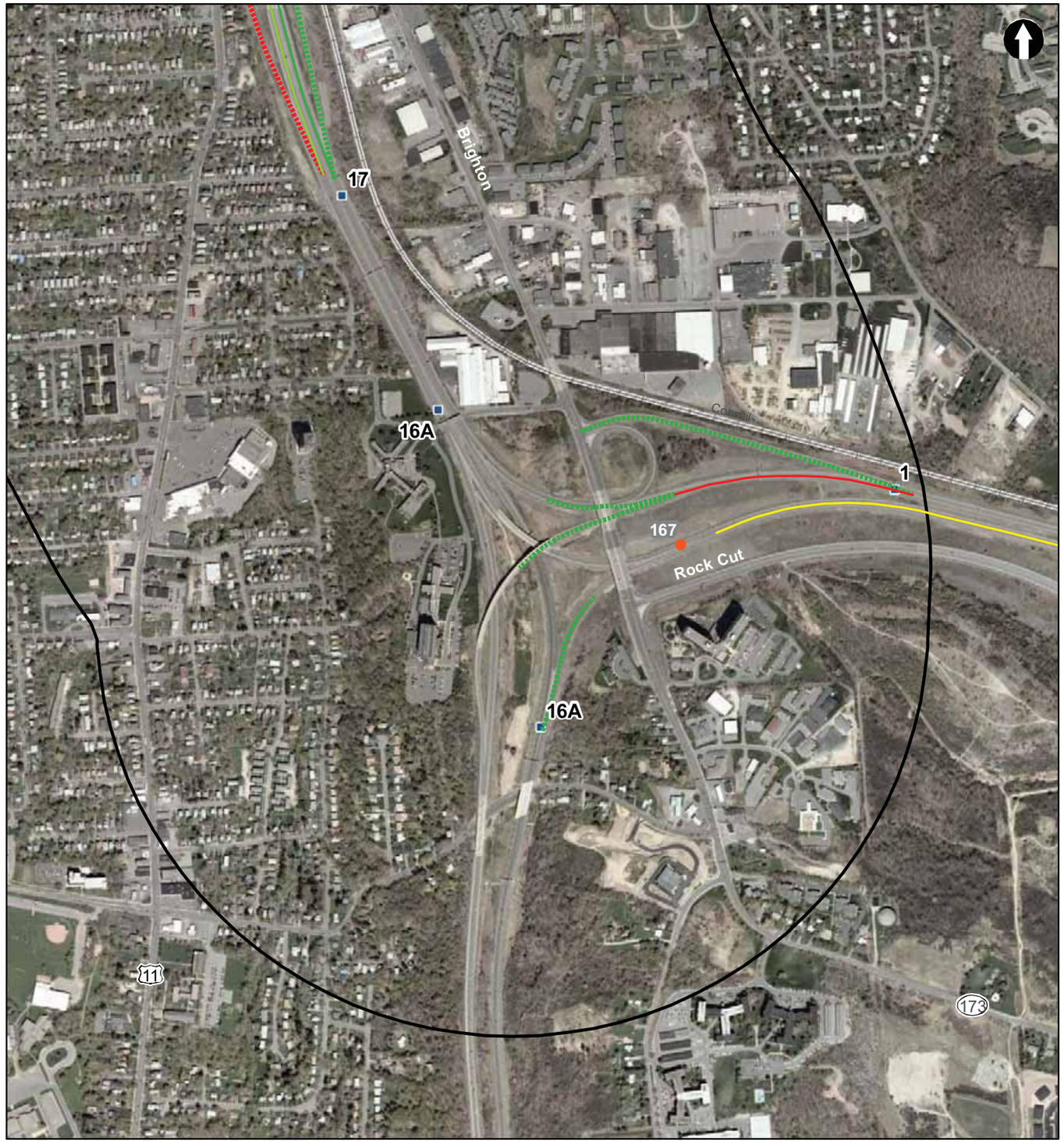


Interstate 81 Corridor Assessment

Figure 2.16 - Accident Rate Ratio

Legend

- 16 — Exit Numbers
- Half Mile Study Area
- PIL Sites

Mainline - Accident Rate Ratio

- 1.04 - 2.00
- 2.01 - 2.96
- 2.97 - 3.92
- 3.93 - 4.89
- 4.90 - 5.84

Ramps - Accident Rate Ratio

- 1.10 - 19.45
- 19.46 - 37.80
- 37.81 - 56.14
- 56.15 - 74.49
- 74.50 - 92.84

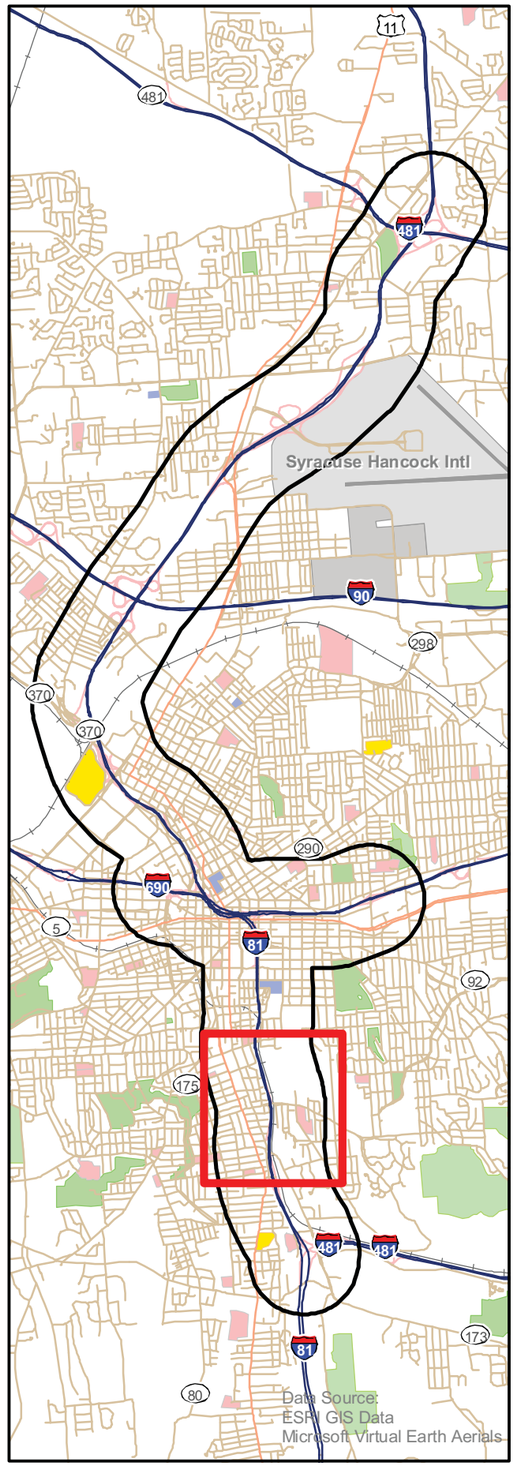
The Accident Rate Ratio is the observed accident rate divided by the Statewide Average accident rate for the respective roadway type

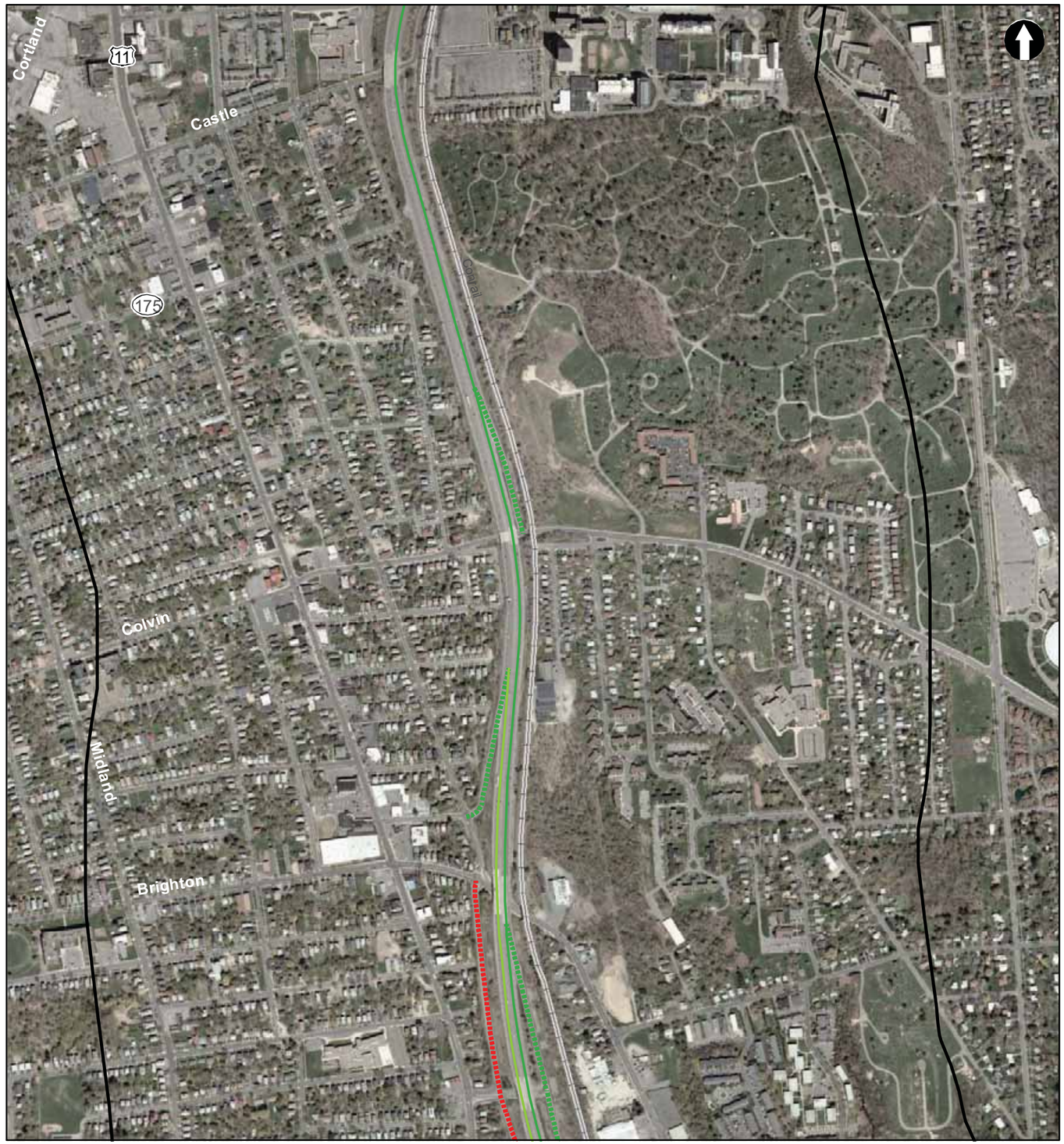
Source: NYSDOT

0 400 800 1,200 1,600 Feet

SHEET 1

Original in Color FHI





Interstate 81 Corridor Assessment

Figure 2.16 - Accident Rate Ratio

Legend

- 16 Exit Numbers
- Half Mile Study Area
- PIL Sites

Mainline - Accident Rate Ratio

- 1.04 - 2.00
- 2.01 - 2.96
- 2.97 - 3.92
- 3.93 - 4.89
- 4.90 - 5.84

Ramps - Accident Rate Ratio

- 1.10 - 19.45
- 19.46 - 37.80
- 37.81 - 56.14
- 56.15 - 74.49
- 74.50 - 92.84

The Accident Rate Ratio is the observed accident rate divided by the Statewide Average accident rate for the respective roadway type

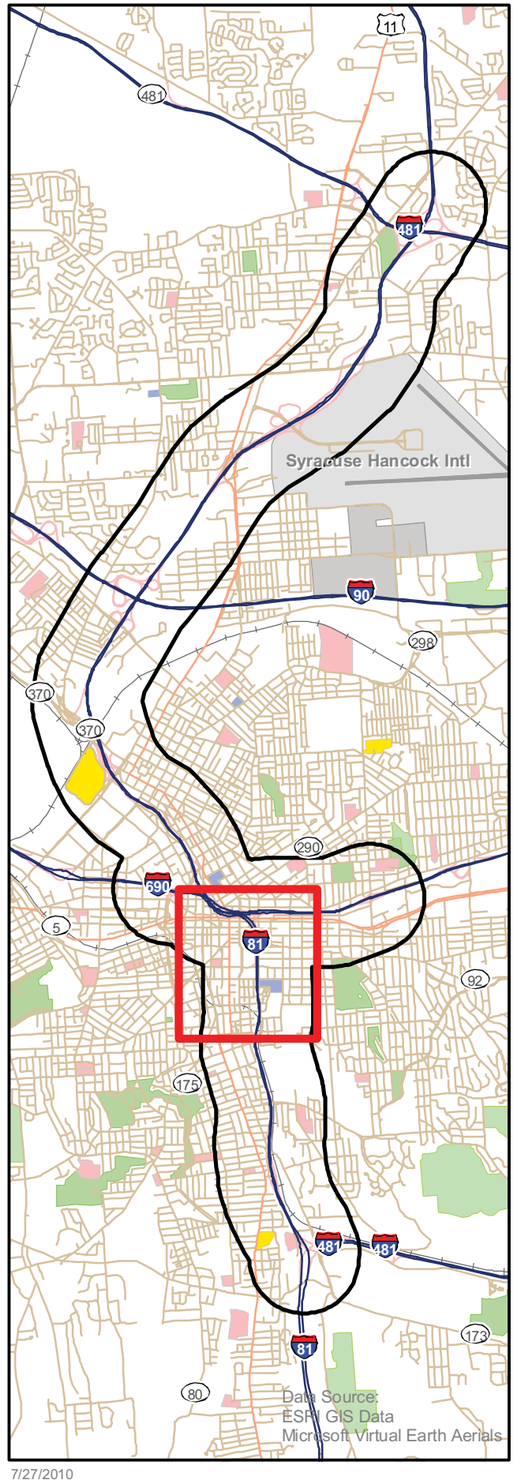
Source: NYSDOT

0 400 800 1,200 1,600 Feet

SHEET 2

7/27/2010

Original in Color FHI



Interstate 81 Corridor Assessment

Figure 2.16 - Accident Rate Ratio

Legend

- Exit Numbers (16)
- Half Mile Study Area
- PIL Sites

Mainline - Accident Rate Ratio

- 1.04 - 2.00
- 2.01 - 2.96
- 2.97 - 3.92
- 3.93 - 4.89
- 4.90 - 5.84

Ramps - Accident Rate Ratio

- 1.10 - 19.45
- 19.46 - 37.80
- 37.81 - 56.14
- 56.15 - 74.49
- 74.50 - 92.84

The Accident Rate Ratio is the observed accident rate divided by the Statewide Average accident rate for the respective roadway type

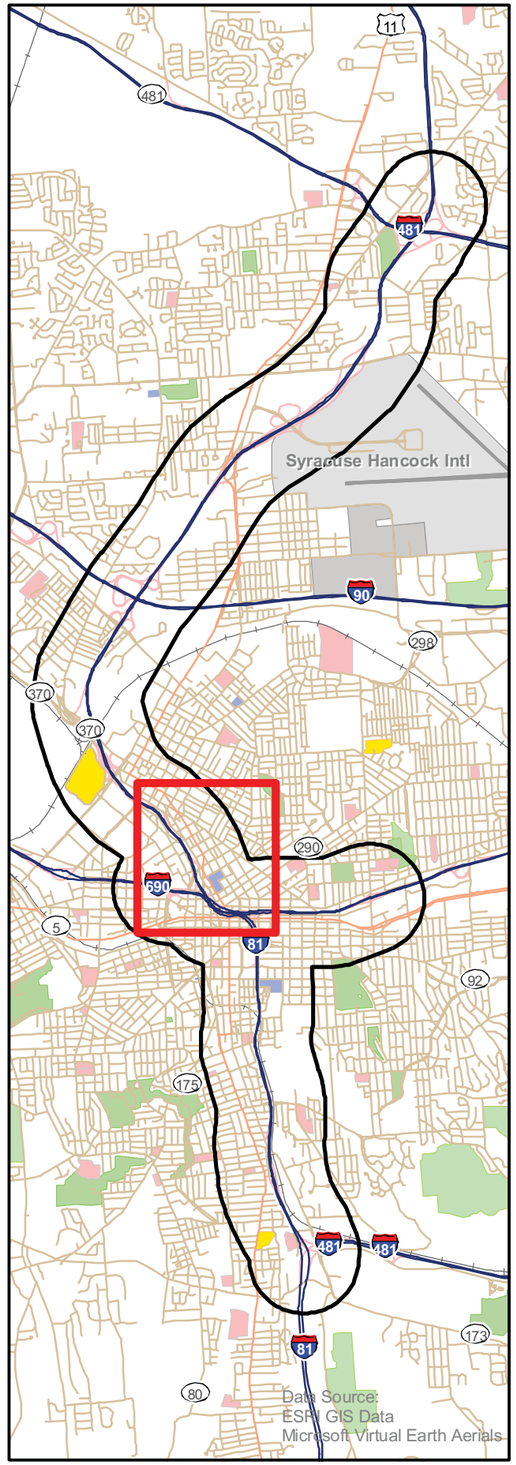
Source: NYSDOT

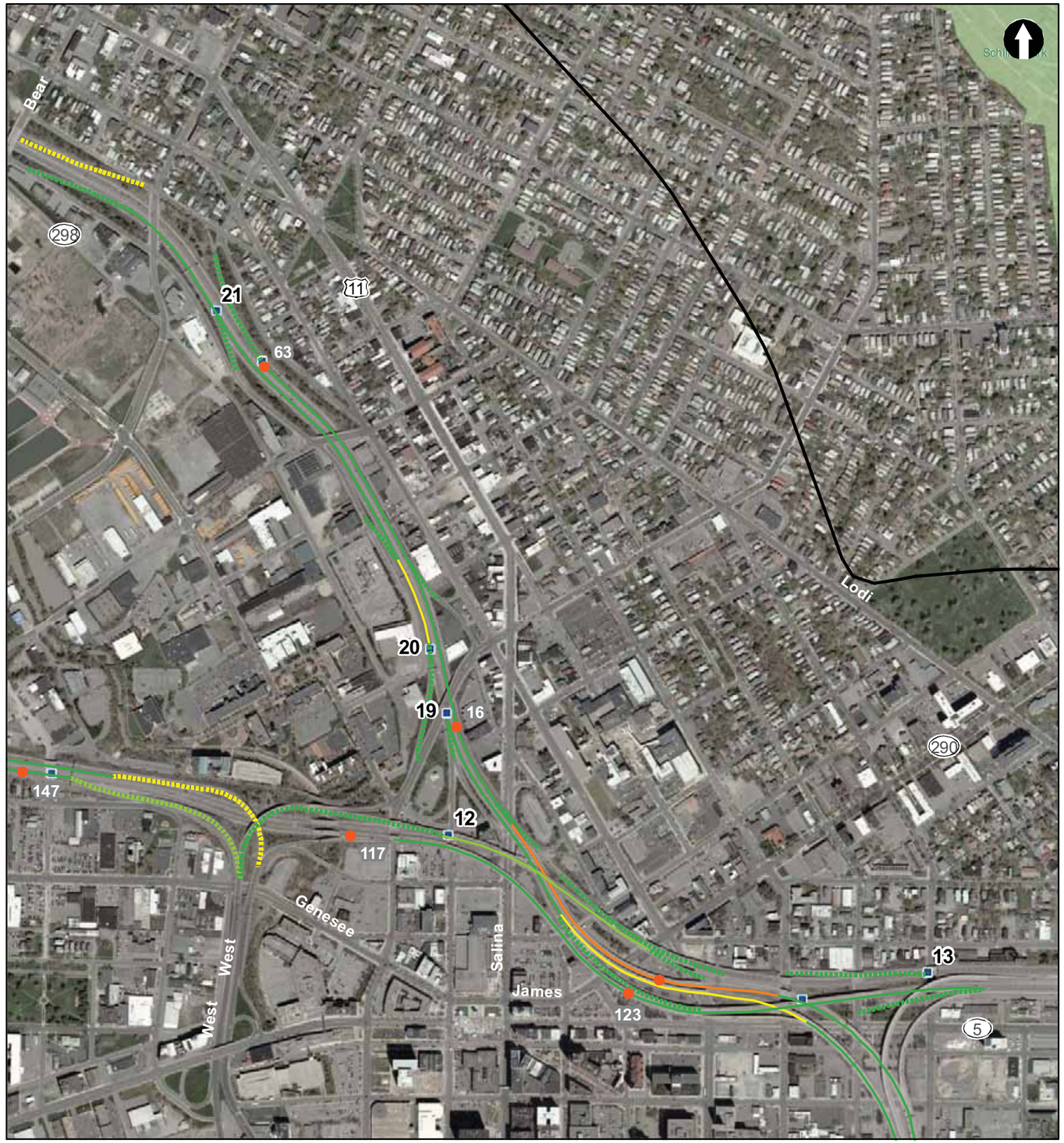
0 400 800 1,200 1,600 Feet

SHEET 3

7/27/2010

Original in Color FHI





Interstate 81 Corridor Assessment

Figure 2.16 - Accident Rate Ratio

Legend

- 16 — Exit Numbers
- Half Mile Study Area
- PIL Sites

Mainline - Accident Rate Ratio

- 1.04 - 2.00
- 2.01 - 2.96
- 2.97 - 3.92
- 3.93 - 4.89
- 4.90 - 5.84

Ramps - Accident Rate Ratio

- 1.10 - 19.45
- 19.46 - 37.80
- 37.81 - 56.14
- 56.15 - 74.49
- 74.50 - 92.84

The Accident Rate Ratio is the observed accident rate divided by the Statewide Average accident rate for the respective roadway type

Source: NYSDOT

0 400 800 1,200 1,600 Feet

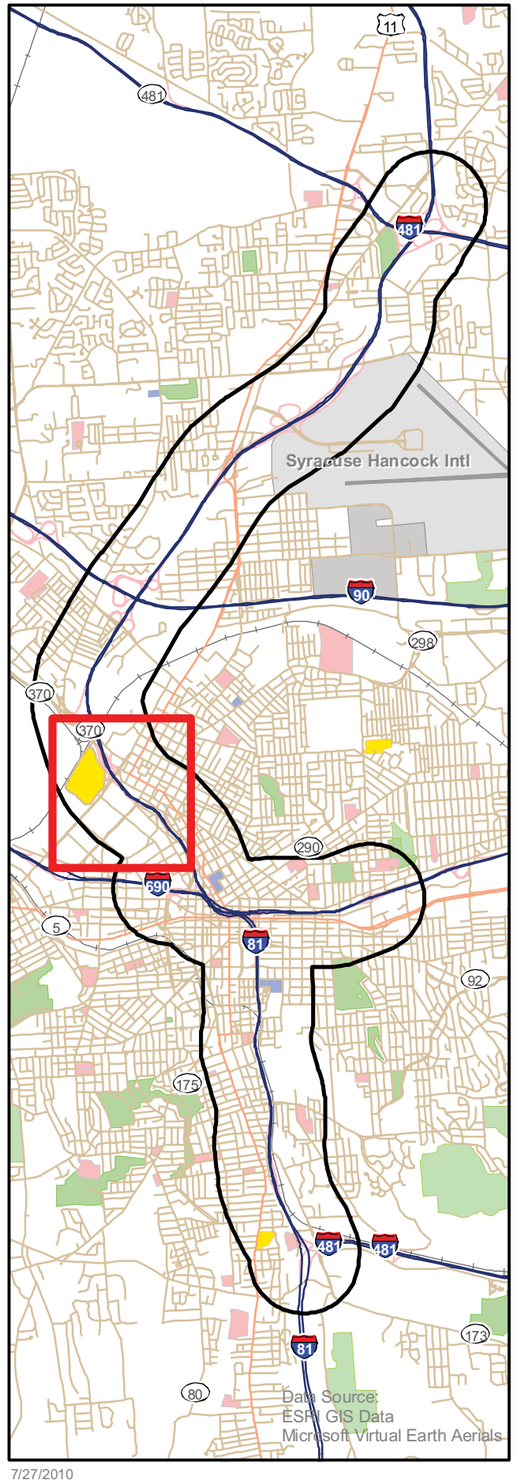
SHEET 4

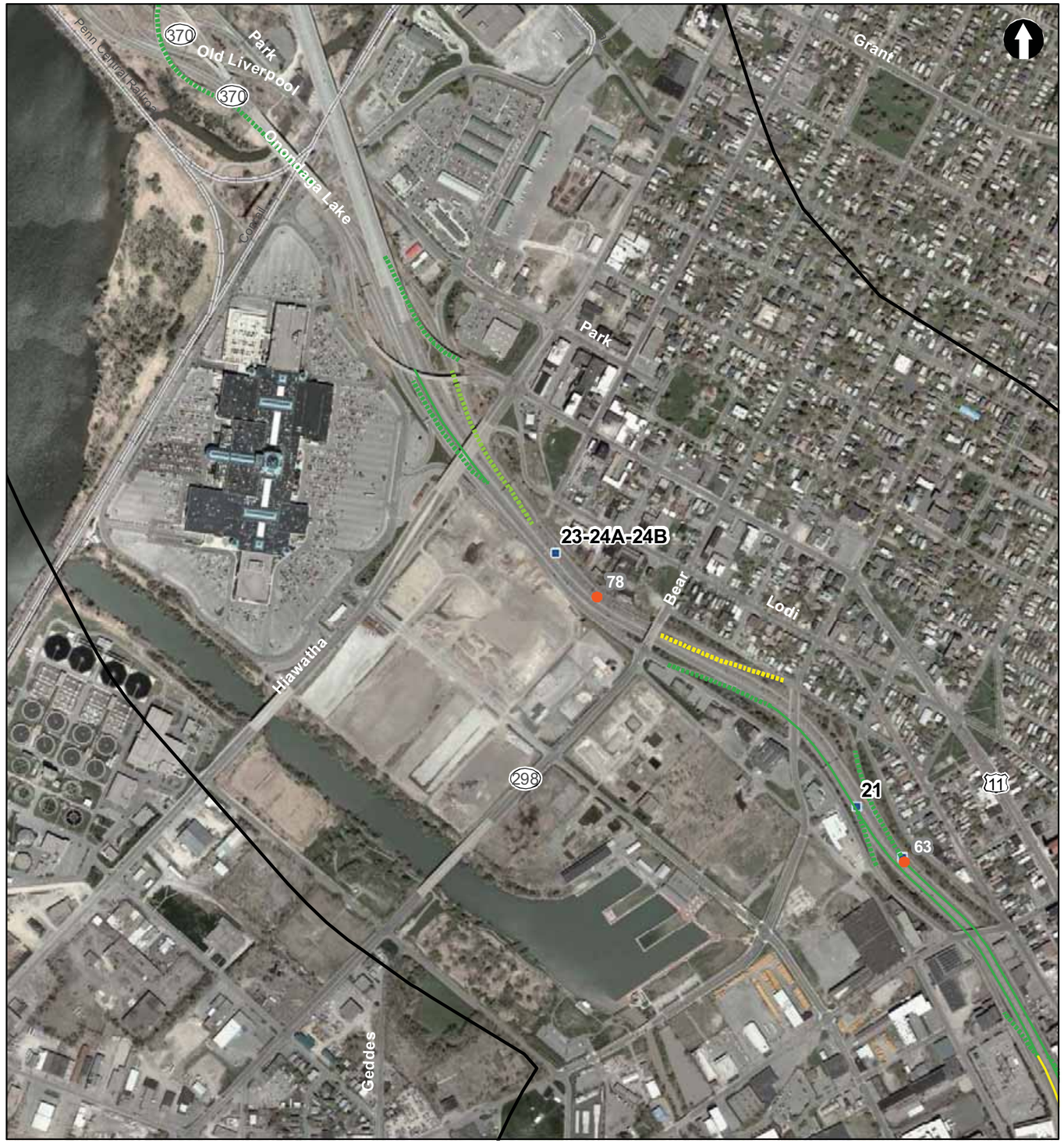
7/27/2010

Original in Color FHI

Interstate 81 Corridor Assessment

Figure 2.16 - Accident Rate Ratio





Legend

- 16 — Exit Numbers
- Half Mile Study Area
- PIL Sites

Mainline - Accident Rate Ratio

- 1.04 - 2.00
- 2.01 - 2.96
- 2.97 - 3.92
- 3.93 - 4.89
- 4.90 - 5.84

Ramps - Accident Rate Ratio

- 1.10 - 19.45
- 19.46 - 37.80
- 37.81 - 56.14
- 56.15 - 74.49
- 74.50 - 92.84

The Accident Rate Ratio is the observed accident rate divided by the Statewide Average accident rate for the respective roadway type

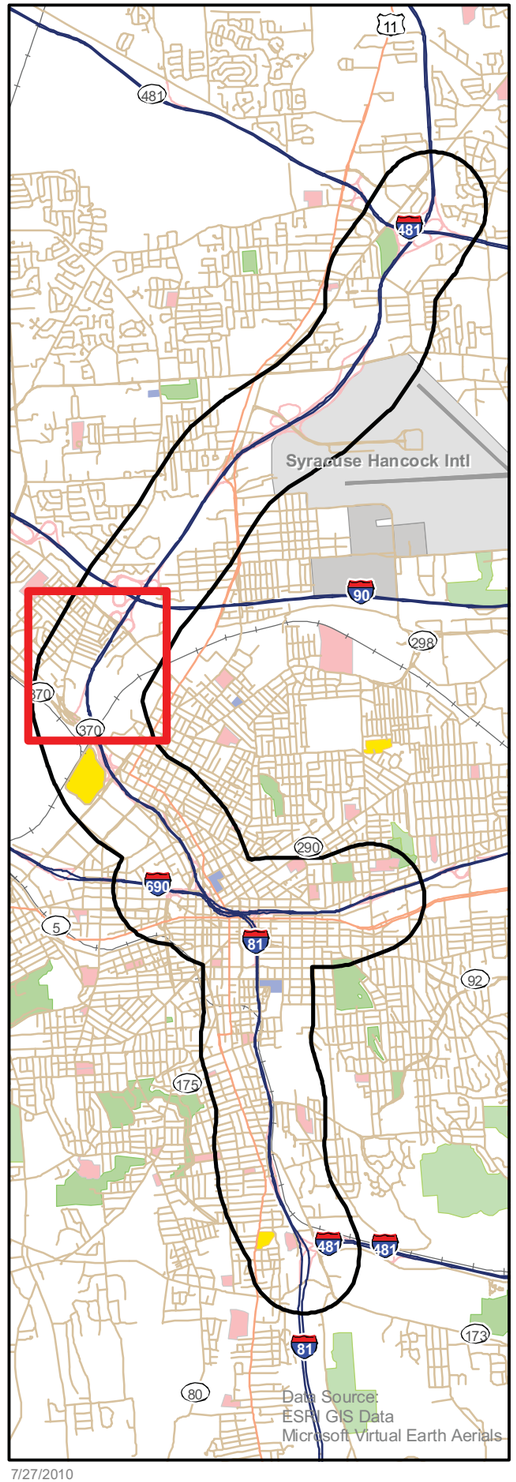
Source: NYSDOT

0 400 800 1,200 1,600 Feet

SHEET 5

7/27/2010

Original in Color FHI



Interstate 81 Corridor Assessment

Figure 2.16 - Accident Rate Ratio

Legend

- 16 — Exit Numbers
- Half Mile Study Area
- PIL Sites

Mainline - Accident Rate Ratio

- 1.04 - 2.00
- 2.01 - 2.96
- 2.97 - 3.92
- 3.93 - 4.89
- 4.90 - 5.84

Ramps - Accident Rate Ratio

- 1.10 - 19.45
- 19.46 - 37.80
- 37.81 - 56.14
- 56.15 - 74.49
- 74.50 - 92.84

The Accident Rate Ratio is the observed accident rate divided by the Statewide Average accident rate for the respective roadway type

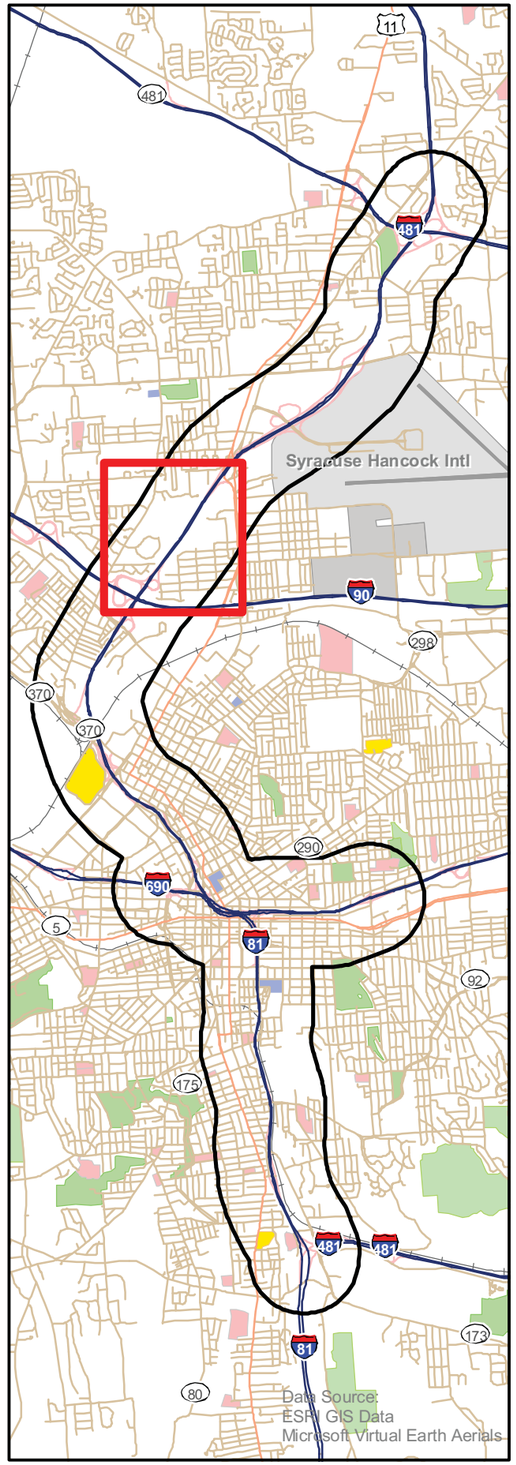
Source: NYSDOT

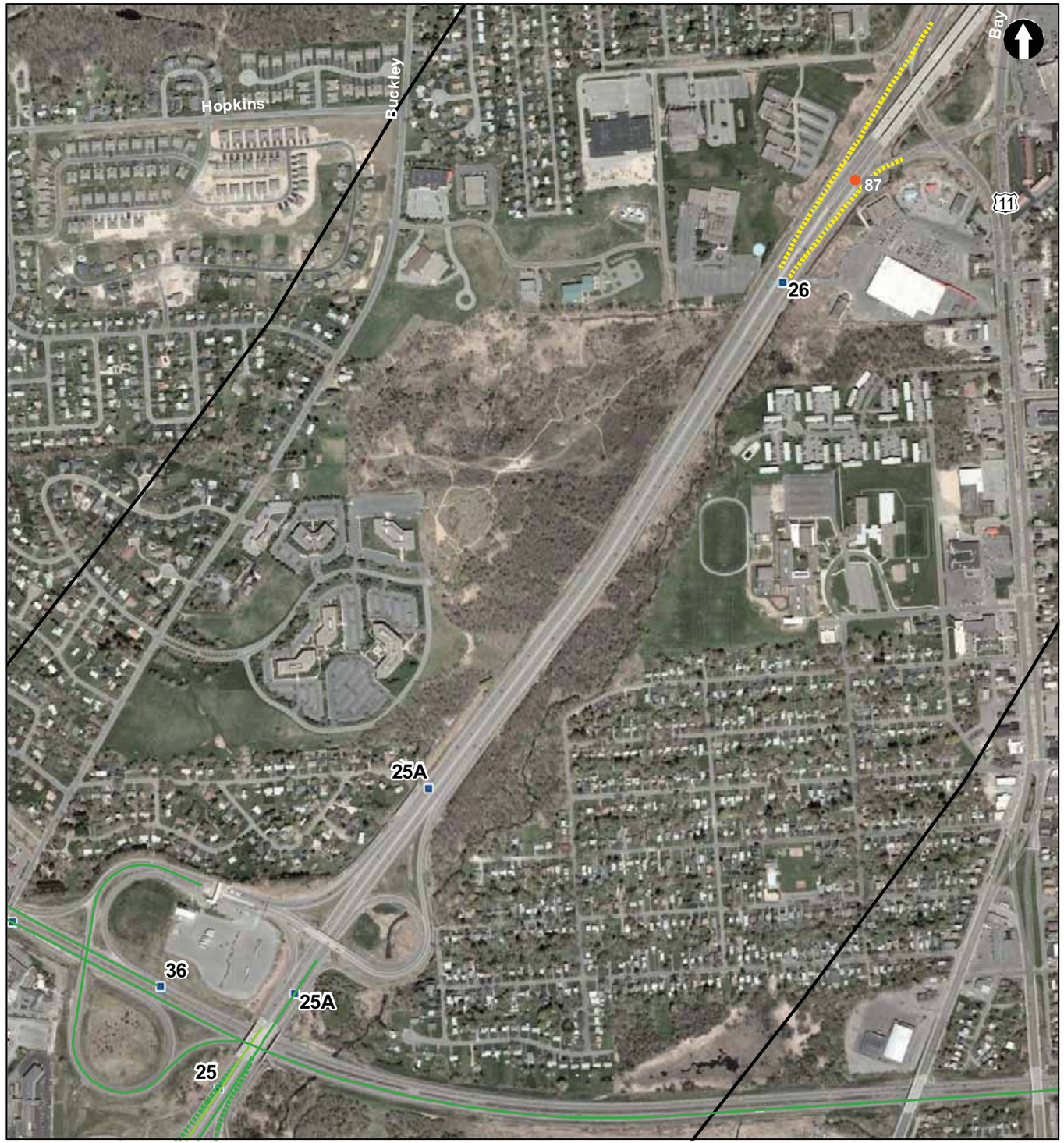
0 400 800 1,200 1,600 Feet

SHEET 6

7/27/2010

Original in Color FHI





Interstate 81 Corridor Assessment

Figure 2.16 - Accident Rate Ratio

Legend

- 16 — Exit Numbers
- Half Mile Study Area
- PIL Sites

Mainline - Accident Rate Ratio

- 1.04 - 2.00
- 2.01 - 2.96
- 2.97 - 3.92
- 3.93 - 4.89
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Ramps - Accident Rate Ratio

- 1.10 - 19.45
- 19.46 - 37.80
- 37.81 - 56.14
- 56.15 - 74.49
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The Accident Rate Ratio is the observed accident rate divided by the Statewide Average accident rate for the respective roadway type

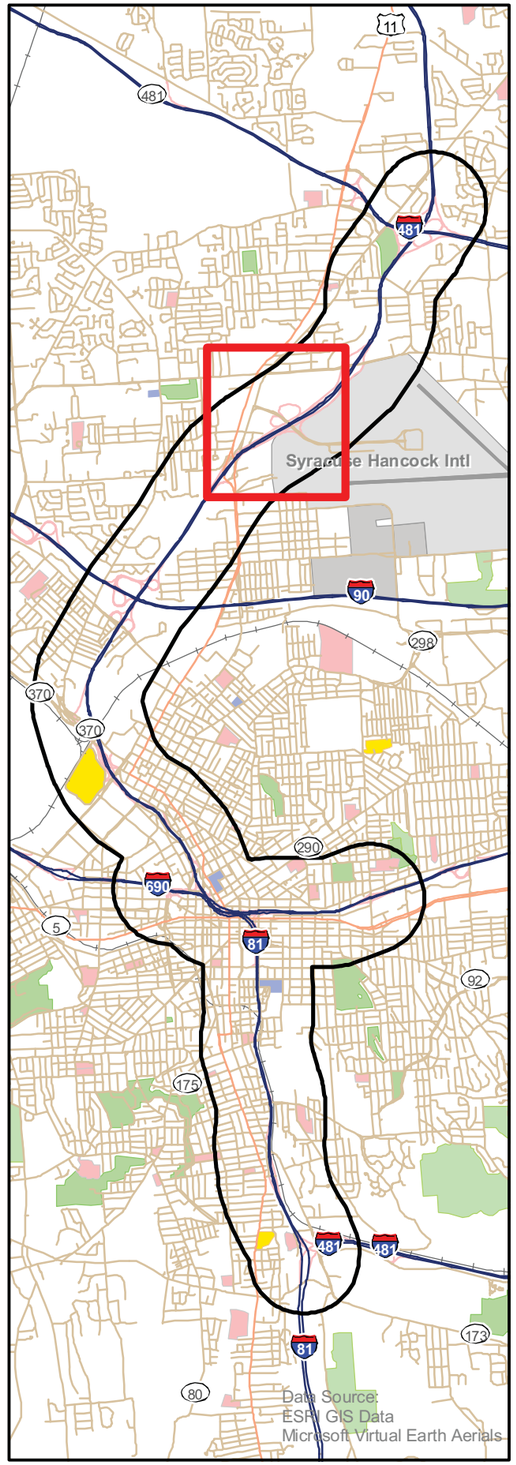
Source: NYSDOT

0 400 800 1,200 1,600 Feet

SHEET 7

7/27/2010

Original in Color FHI



Interstate 81 Corridor Assessment

Figure 2.16 - Accident Rate Ratio

Legend

- 16 — Exit Numbers
- Half Mile Study Area
- PIL Sites

Mainline - Accident Rate Ratio

- 1.04 - 2.00
- 2.01 - 2.96
- 2.97 - 3.92
- 3.93 - 4.89
- 4.90 - 5.84

Ramps - Accident Rate Ratio

- 1.10 - 19.45
- 19.46 - 37.80
- 37.81 - 56.14
- 56.15 - 74.49
- 74.50 - 92.84

The Accident Rate Ratio is the observed accident rate divided by the Statewide Average accident rate for the respective roadway type

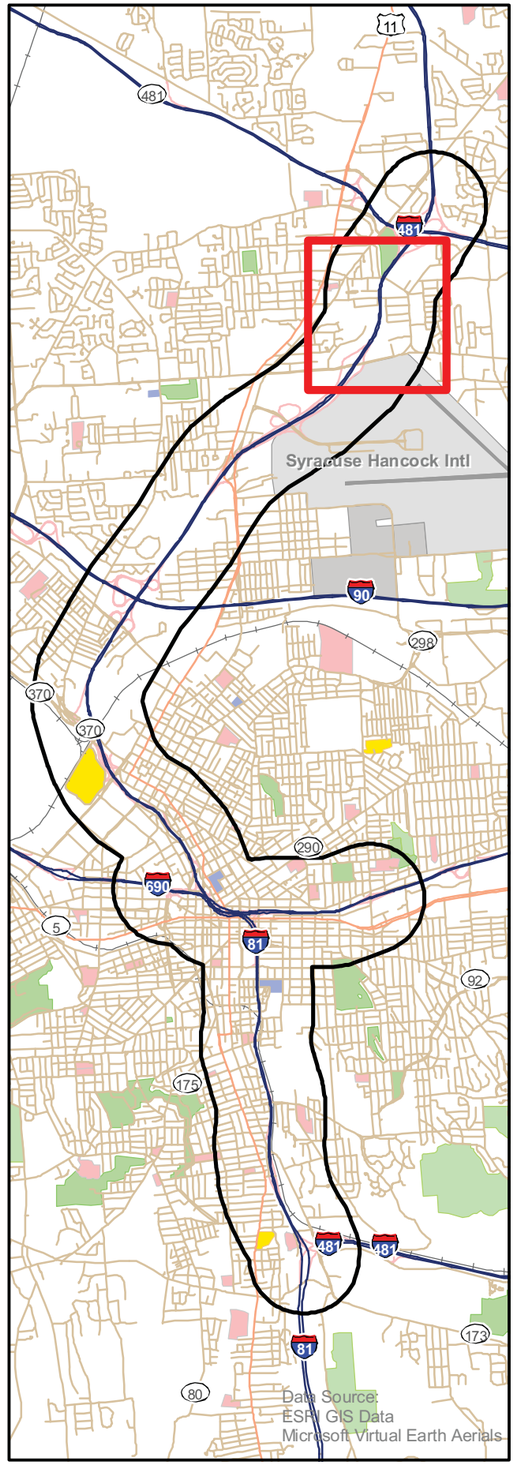
Source: NYSDOT

0 400 800 1,200 1,600 Feet

SHEET 8

7/27/2010

Original in Color FHI



Interstate 81 Corridor Assessment

Figure 2.16 - Accident Rate Ratio

Legend

- 16 — Exit Numbers
- Half Mile Study Area
- PIL Sites

Mainline - Accident Rate Ratio

- 1.04 - 2.00
- 2.01 - 2.96
- 2.97 - 3.92
- 3.93 - 4.89
- 4.90 - 5.84

Ramps - Accident Rate Ratio

- 1.10 - 19.45
- 19.46 - 37.80
- 37.81 - 56.14
- 56.15 - 74.49
- 74.50 - 92.84

The Accident Rate Ratio is the observed accident rate divided by the Statewide Average accident rate for the respective roadway type

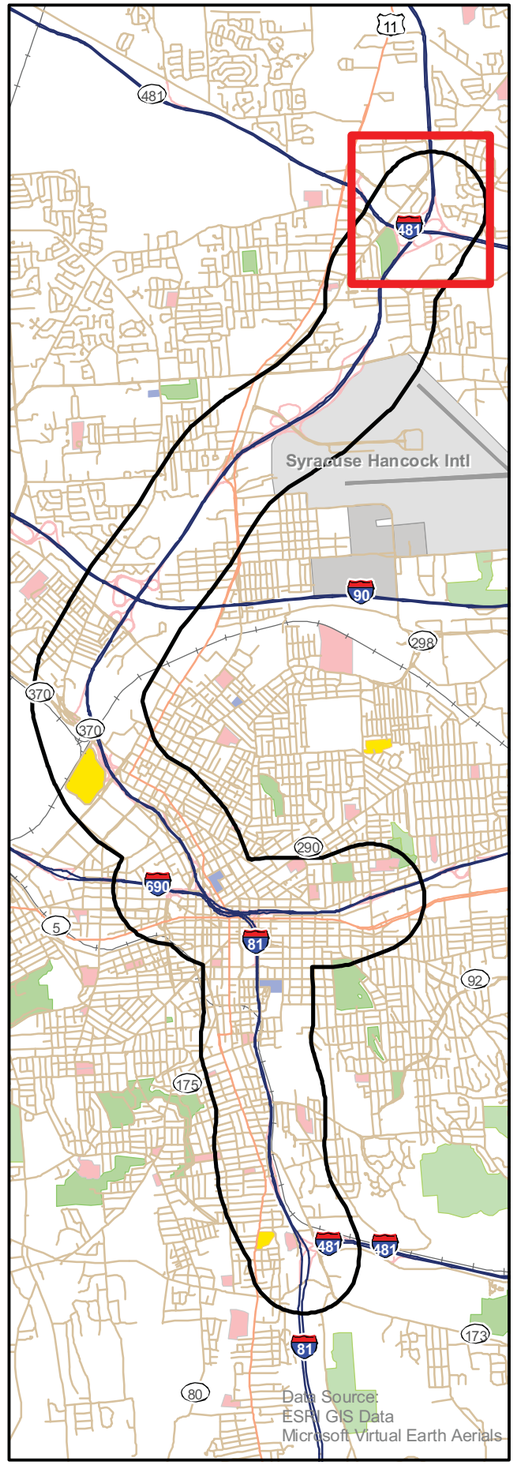
Source: NYSDOT

0 400 800 1,200 1,600 Feet

SHEET 9

7/27/2010

Original in Color FHI



Interstate 81 Corridor Assessment

Figure 2.16 - Accident Rate Ratio

Legend

- 16 — Exit Numbers
- Half Mile Study Area
- PIL Sites

Mainline - Accident Rate Ratio

- 1.04 - 2.00
- 2.01 - 2.96
- 2.97 - 3.92
- 3.93 - 4.89
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Ramps - Accident Rate Ratio

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- 19.46 - 37.80
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- 56.15 - 74.49
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The Accident Rate Ratio is the observed accident rate divided by the Statewide Average accident rate for the respective roadway type

Source: NYSDOT

0 400 800 1,200 1,600 Feet

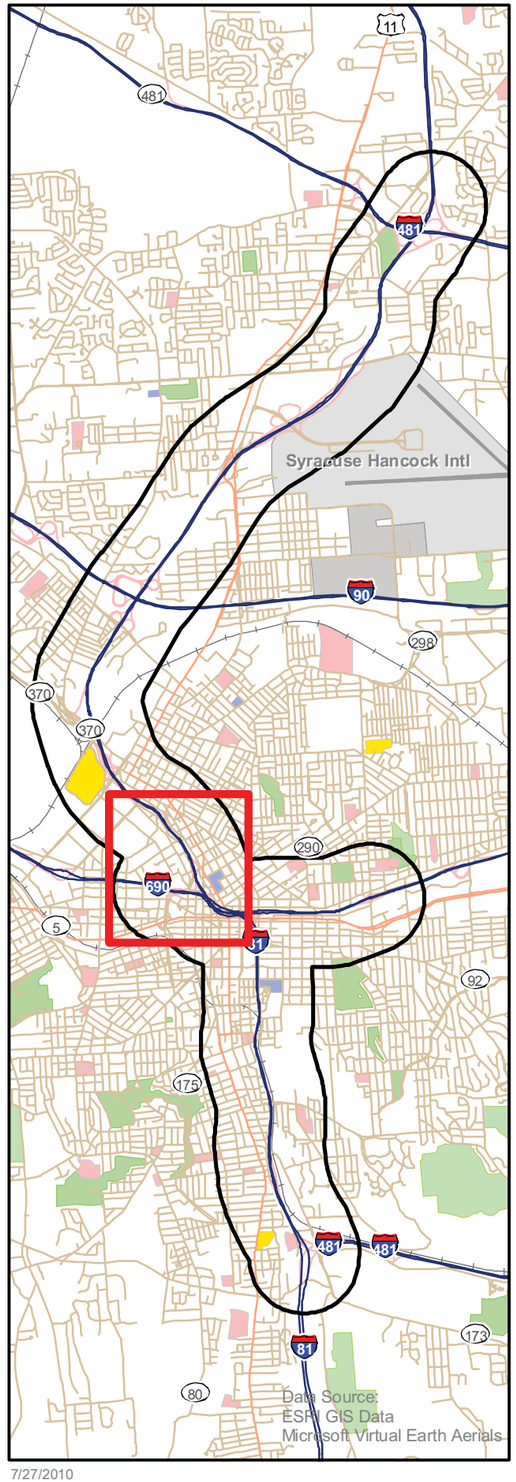
SHEET 10

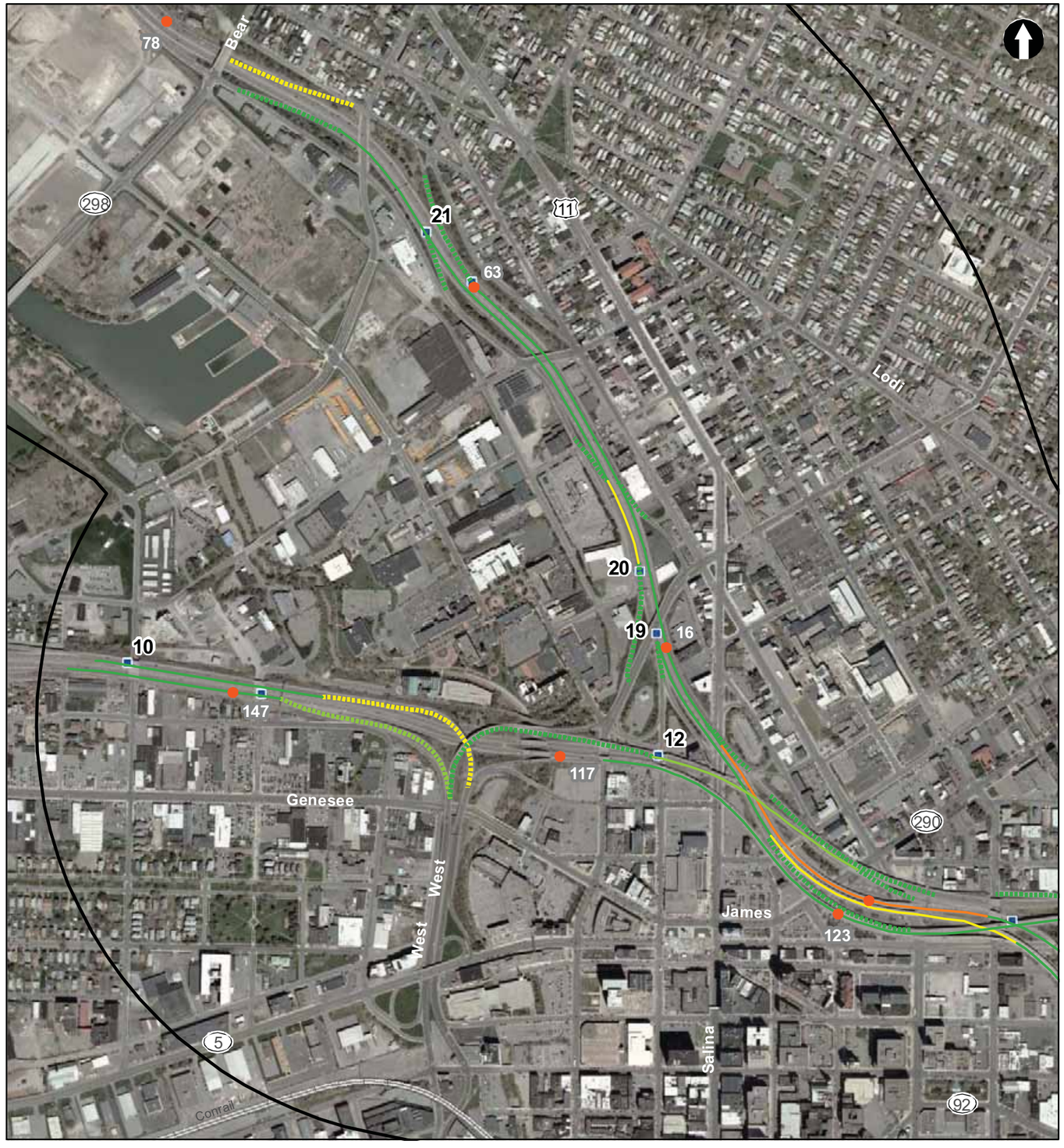
7/27/2010

Original in Color FHI

Interstate 81 Corridor Assessment

Figure 2.16 - Accident Rate Ratio





Legend

- 16 — Exit Numbers
- Half Mile Study Area
- PIL Sites

Mainline - Accident Rate Ratio

- 1.04 - 2.00
- 2.01 - 2.96
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Ramps - Accident Rate Ratio

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- 56.15 - 74.49
- 74.50 - 92.84

The Accident Rate Ratio is the observed accident rate divided by the Statewide Average accident rate for the respective roadway type

Source: NYSDOT

0 400 800 1,200 1,600 Feet

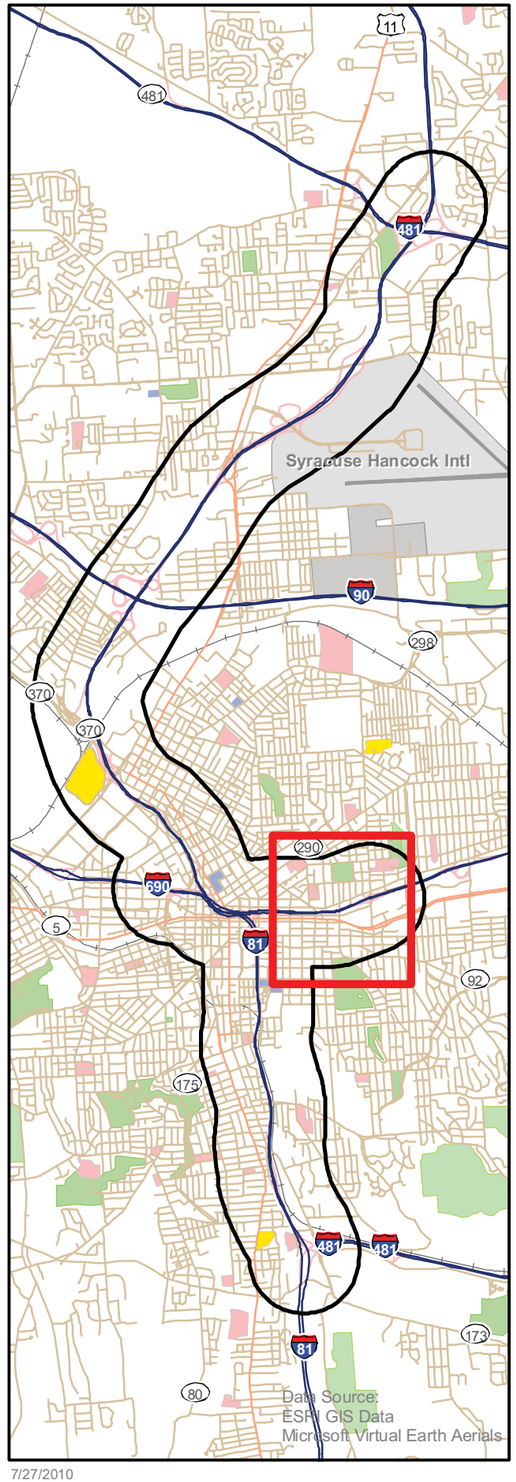
SHEET 11

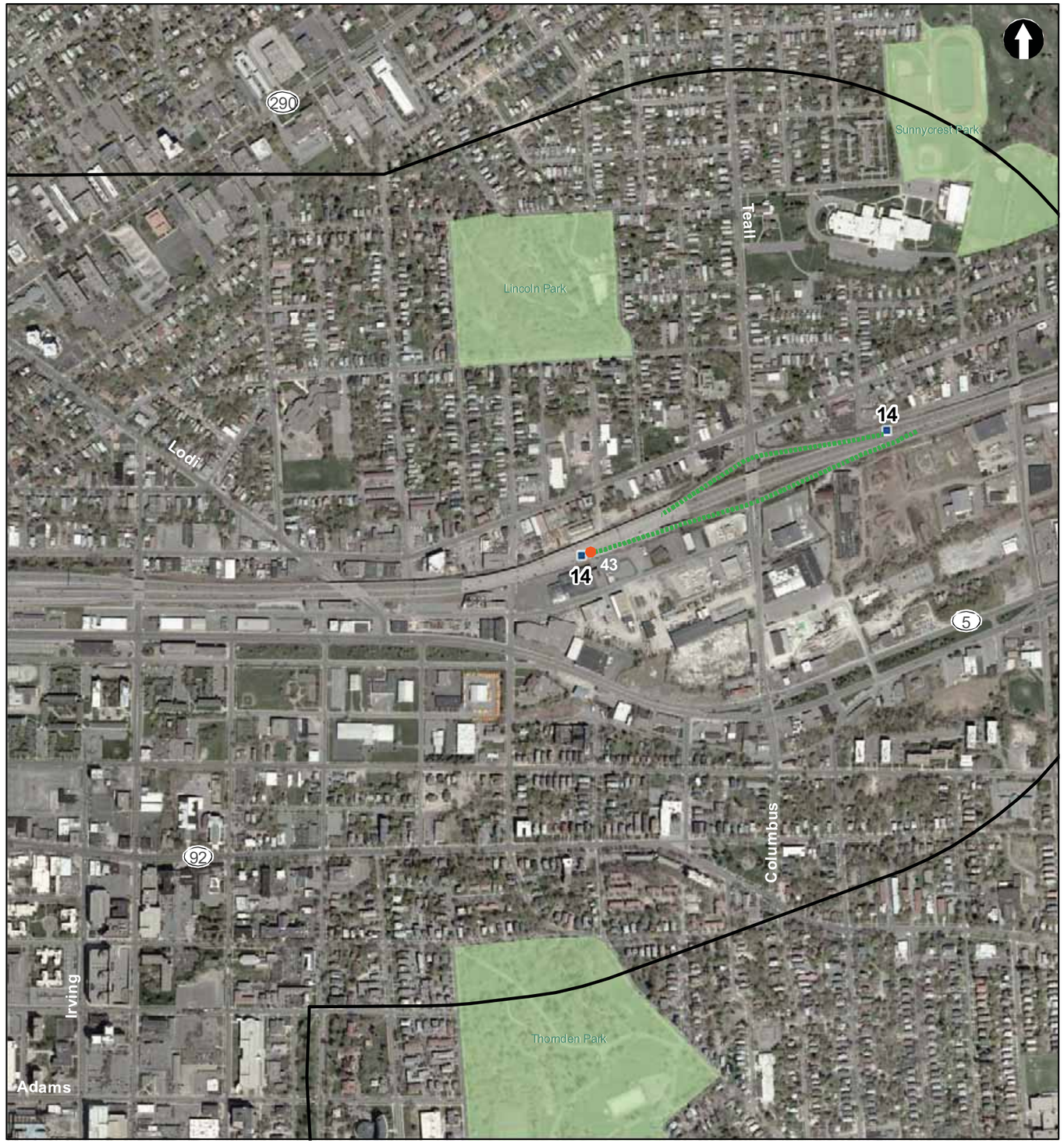
7/27/2010

Original in Color FHI

Interstate 81 Corridor Assessment

Figure 2.16 - Accident Rate Ratio





Legend

- 16 — Exit Numbers
- Half Mile Study Area
- PIL Sites

Mainline - Accident Rate Ratio

- 1.04 - 2.00
- 2.01 - 2.96
- 2.97 - 3.92
- 3.93 - 4.89
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Ramps - Accident Rate Ratio

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The Accident Rate Ratio is the observed accident rate divided by the Statewide Average accident rate for the respective roadway type

Source: NYSDOT

0 400 800 1,200 1,600 Feet

SHEET 12

7/27/2010

Original in Color FHI

For the section of I-690 (I-90 Thruway to I-481), there are eight PIL locations on the current 2009-2010 PIL List:

PIL#	***LOCATION***
62	Jones Road to Thruway I-90 (Exit 1)
93	Route 48/Farrell Road (Exit 3) to John Glen Blvd Interchange (Exit 4) Town of Van Buren
76	Liberty Street to Van Rensselaer Street (N. Geddes Street)
147	I-690 at West Street Arterial 930 B (Exit 11-12) to just west of I-81 Interchange
117	Franklin Street underpass to James Street (Route 290) Underpass
123	James Street (Route 290) Underpass to I-81 Interchange (Exit 13)
43	Teall Avenue Interchange (Exit 14)
94	Thompson Road (Rt. 635) Interchange (Exit 16)

For the section of I-481 from Route I-481/I-81 Forest Interchange to the NY 481/I-81 Interchange, there are nine PIL locations on the current 2009-2010 PIL List:

PIL #	***LOCATION***
167	I-81/I-481 Forest Interchange (I-81 Exit 16A)
143	Jamesville Road Interchange (Exit 2)
52	I-690/I-481 Merge (Exit 4) to Routes 5/92 Dewitt/ Fayetteville Interchange (Exit 3)
124	I-690 EB off-ramp to I-481 SB merge to Butternut Spur overpass ramp (closed)
118	I-690 EB off-ramp to I-481 NB merge (Route 290-Bridge Street underpass) to Conrail Bridge South Abutment
122	I-481/I-90 Thruway Interchange (Exit 6) Town of Dewitt
108	I-481/Rt. 298 Interchange (Exit 7) Town of Dewitt
182	I-481 NB on-ramp merge (Exit 9) from I-81 NB Town of Cicero
28	I-81 underpass to NY 481 NB onramp (Exit 9) from I-81 SB Town of Cicero

Collision diagrams and a detailed review of the crash occurrences on the Viaduct section of I-81 and the I-81/I-690 interchange were completed. The purpose of this detailed analysis is to identify crash patterns, highlight contributing factors and potential safety countermeasures. Collisions were aggregated by roadway and location and a collision diagram was prepared which illustrates the incidents by collision type. The collision diagrams and the tabular summary of the total number of incidents for each roadway segment are in Appendix C - Safety Information.

As aggregated for the purposes of preparing collision diagrams, the following locations near the Viaduct area experienced accident rates particularly higher than the statewide average for their respective roadway types:

- I-81 Mainline Northbound: Exit 18 to Almond Street on-ramp (southern segment) – the most prevalent type of collision in this segment was fixed object collisions, and the most frequent contributing factors were slippery pavement and unsafe speeds.

- I-81 Mainline Southbound: I-690 EB off-ramp to I-690 EB on-ramp (southern segment) – typical collision types on this segment were overtaking or rear end collisions, although the collision type for a number of incidents was unknown or unreported. The most prevalent contributing factors were unsafe lane changing and failure to yield right-of-way.
- I-690 Mainline Westbound: Between Exit 12 (West Street) Ramps – rear end and fixed object collisions were equally common on this segment, with driver inattention and following too closely serving as the most frequent contributing factors.
- I-81 Mainline Northbound: I-690 WB off-ramp to I-690 WB on-ramp (northern segment) – rear end collisions were the most prevalent type of incident, with following too closely being cited most frequently as a contributing factor.
- I-81 Mainline Southbound: Exit 19 off-ramp to I-690 EB off-ramp (southern segment) – rear end collisions were the typical type of incident along this section and the most frequent contributing factor was following too closely.

2.3.1.10 Existing Police, Fire Protection and Ambulance Access

The following police departments, fire departments, and emergency responders are located within I-81 primary study area:

- Salina Fire Department Station #58 – 3504 Brewerton Road, Salina;
- Syracuse Fire Department Station #1 – 900 South State Street, Syracuse;
- Syracuse Fire Department Station #2 – 2300 Lodi Street;
- Syracuse Fire Department #8 – 2412 South Salina Street, Syracuse;
- Syracuse Fire Department #12 – 400 West Genesee Street, Syracuse;
- Syracuse Police Department – 511 State Street, Syracuse;
- Syracuse Police Department East – 710 Hawley Avenue, Syracuse;
- Syracuse Police Department North – 500 Butternut Street, Syracuse; and
- Syracuse Police Department Northside.

There are five public safety facilities (including answering points and dispatch centers) and the City of Syracuse Traffic Control Center that serve the greater Syracuse area. Four of the five centers are located within the project study area. These locations include NYS Police Headquarters, Onondaga County Sheriff's Headquarters, City of Syracuse Police Headquarters, Onondaga County Department of Emergency Communications (911 Center) and the City Traffic Control Center. The New York State Police and Onondaga County Police conduct regular patrols of I-81. Both have officers assigned to patrols 24 hours a day, seven days a week. Depending on the number of incidents, emergencies or other calls, State Police and County police officers could perform three or more patrols within any given 12-hour shift.

Fire and Rescue providers and EMS also use I-81. I-81, I-690, and I-481 are major routes used in emergencies; however, there are no set routes of travel. Drivers use their discretion, based on time of day and travel conditions, to determine the quickest route to/from emergencies and area hospitals.

2.3.1.11 Parking Regulations and Parking Related Conditions

This information included herein on parking regulations and parking related conditions is reference data for developing and evaluating strategies in future phases of *The I-81 Challenge*. Parking on the Interstate highway system (I-81, I-690) is restricted by law. There are areas regulated by parking restrictions within the City of Syracuse along the local roadway system in the project limits.

To determine the relationship between expressway interchanges and available parking in and around the Syracuse Downtown and the University Hill area, information on parking was gathered from various sources, mapped in GIS and summarized. These sources include:

- Information from 2003 and 2006 contained in the SMTC GIS files;
- The "Downtown Syracuse Parking Study", prepared for the Syracuse Industrial Development Agency, February, 2008;
- Estimates base on recent aerial photographs;
- Phone calls to various parking operators.

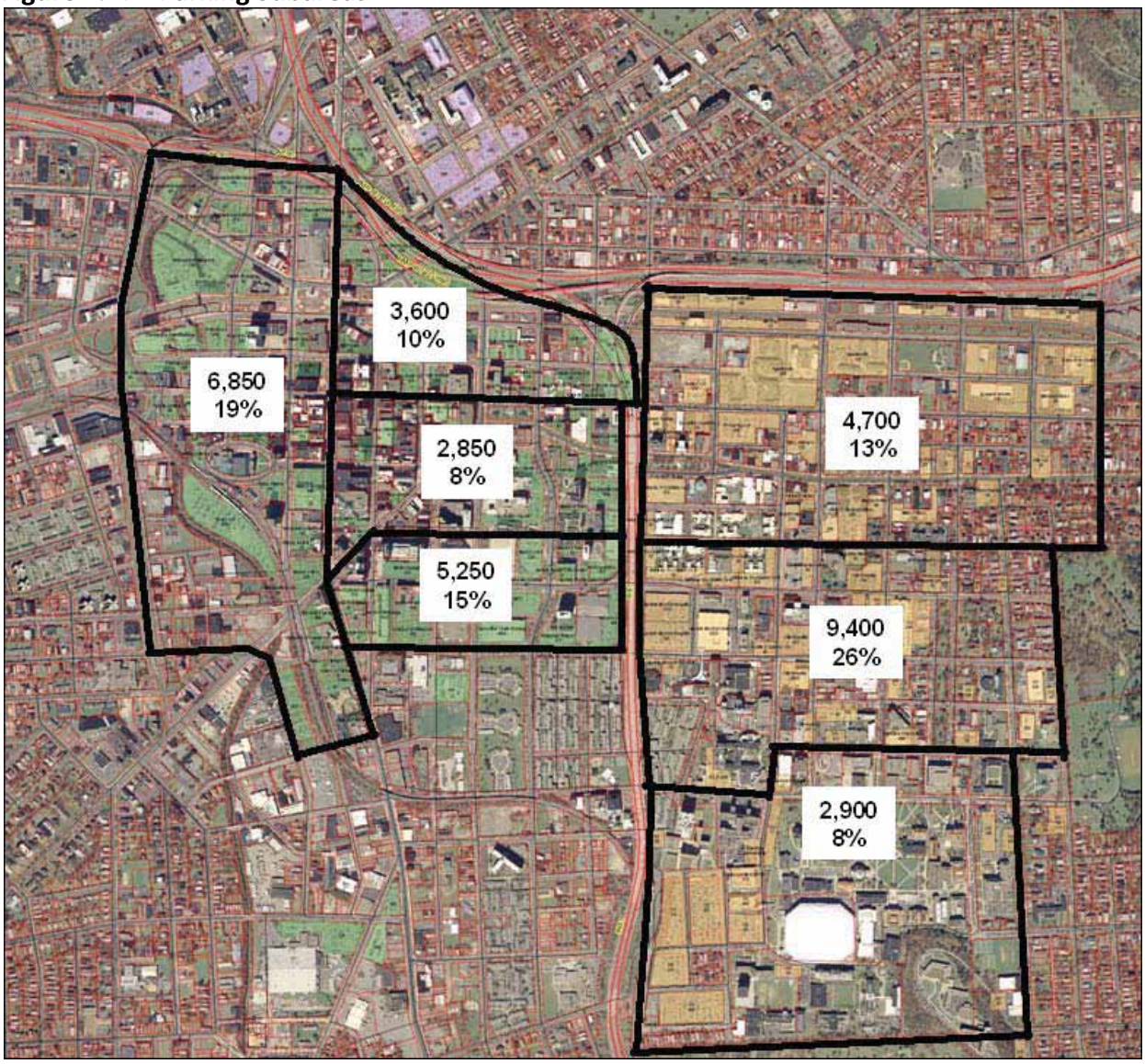
The result is a general estimate of off-street parking spaces in this area. Note that on-street parking is not included in this estimate, yet can be of quantifiable amount in the Downtown and Hill area. The results are summarized below.

There are approximately 18,550 off street parking spaces in the downtown area bounded by I-690 to the north, West Street to the west, East Adams Street to the south and I-81 to the east. In the University Hill area there are approximately 17,000 off street parking spaces in the area bounded by I-690 to the north, I-81 to the west, Oakwood Cemetery to the south and Comstock/Osborn/Beech Street to the east for a total of approximately 35,500 off street parking spaces serving these two areas that straddle the I-81 Viaduct area. In addition, there are approximately 2,300 off street parking spaces surrounding St. Josephs Hospital, north of the downtown area and another 1,050 off street parking spaces around the Manley Field House area south of Syracuse University Main Campus. The 35,500 parking spaces in this area were further subdivided along logical routes from the expressway system interchanges and shown in Figure 2.17.

In the Downtown Tomorrow's Neighborhoods Today (TNT) sector there are 18,550 off-street parking spaces. Approximately 6,850 off-street parking spaces (19% of the 35,500 spaces) west of Salina Street serve the Power District and Armory Square areas. Direct access is provided by the I-690 Interchange with West Street, and I-81 Interchanges north of I-690. The Hanover Square and Downtown blocks include another 6,450 off-street spaces with direct access from the I-690 Townsend Exit and other I-81 interchanges north of the I-690. Local east/west corridors traverse this area providing further access.

The Convention Center and Presidential Plaza area includes 5,250 parking spaces (15%) primarily bound by East Adams and Harrison Street (east of Salina Street). Direct access to this area is provided by the East Adams and Harrison Street Interchange with I-81.

Figure 2.17 - Parking Subareas



In the Eastside TNT sector, the University Hill area is served by approximately 17,000 (47%) off-street parking spaces. The primary direct access from I-81 is the East Adams and Harrison Street interchange. The highest concentration of parking within this area is 9,400 spaces (26%) along the East Adams Street and Harrison Street corridor, with the majority of these spaces supporting major medical institutions and university related services. It should be noted that a notable amount of the University parking is served by Almond Street to VanBuren Street.

The combination of major concentration of parking facilities in the Downtown and University Hill area infers that nearly half the expressway drivers are destined to these areas will attempt to use the East Adams/Harrison/Almond Street Interchange. Further, it would imply that of the total trip destinations in this area, two-thirds are destined to the Hill, while the remaining one-third is destined to parking in downtown from this interchange.

Note that the distribution and number of parking spaces in these areas, does not necessarily indicate the distribution of traffic to these areas. For example, while approximately 19% of the parking spaces are around the West Street arterial, this does not mean that 19% of the traffic to the overall area is destined to this area. They can be higher or lower depending on the activities they are supporting, parking turn-over rates and parking utilization which will vary from area to area.

Based on the distribution of the 35,500 parking and its relationship to the I-81 and I-690 interchanges, approximately two-thirds of all off-street parking is served by the I-81 Harrison Street and East Adams Street interchange. This concentration of parking is placing notable traffic demands at the immediate intersections and ramp junctures during commuter peak periods.

2.3.1.12 Lighting

There is overhead street lighting along the Interstate highway system within the City of Syracuse limits and at isolated interchanges outside the City. This includes the I-81 corridor from just north of the I-481 interchange 16A to south of Hiawatha Blvd as well as the entire portion of I-690 within the project limits. The following interchanges within the primary study area and located outside of the city limits have overhead interchange lighting:

- Interchange 23A & 23B – Hiawatha Boulevard/Park Street/Carousel Center
- Interchange 25 - 7th North Street
- Interchange 27 – Airport Boulevard

Maintenance and operation of the highway lighting is the responsibility of the local jurisdictions. Hence, while overhead street lighting maybe available, some communities have chosen not to power them.

2.3.2 Multimodal

The information herein on Pedestrians, Bicyclists, Multi-Use Trails and Transit is reference data for future phases of *The I-81 Challenge.*

2.3.2.1 Pedestrians

Existing Conditions: The I-81 Corridor study area has an existing sidewalk network that is utilized by various users including employees, residents, visitors and students. The Syracuse Metropolitan Transportation Council (SMTC) *Bicycle and Pedestrian Plan*[2] reports that 95 - 97% of the parcels within the City of Syracuse have a sidewalk on at least one side of the adjoining roadway. In addition, the Village of North Syracuse and the towns of Cicero, Clay and Salina (all traversed by the northern section of the I-81 study area) have sidewalks on select roadways. This information is reference data for future phases of *The I-81 Challenge*.

[2] *Syracuse Metropolitan Transportation Council, Bicycle and Pedestrian Plan, March 2005.*

The City of Syracuse has an ADA (Americans with Disabilities Act) accessible curb ramp program that has existed for more than 20 years, well ahead of comparable cities. The City has prioritized non-ADA compliant sidewalks, curbs, and ramps in order to replace them based upon population need. Sidewalks, curbs and ramps near schools, public buildings, senior centers, buildings that serve physically challenged individuals and large apartment buildings are being brought into ADA compliance first. In addition, those intersections (approximately 300-400 citywide) with no ramp or access at all are being brought into compliance.

The most evident pedestrian activity in the study area was observed in the University Hill area where thousands of students, faculty, staff, residents and visitors travel by foot. This area houses Syracuse's major educational and medical institutions, including Syracuse University, the SUNY College of Environmental Science and Forestry (SUNY ESF), SUNY Upstate Medical University, Crouse Hospital, the Veterans Administration Hospital, and the Hutchings State Psychiatric Center. This area also includes commercial, arts, and recreation destinations, including the Crouse Marshall Business Improvement District, Syracuse Stage, and the Carrier Dome. Steep slopes in this area did not appear to be a significant impediment to walking. Sidewalks with handrails were noted on the most severe slopes.

Wayfinding in the study area was primarily limited to street signs and directional signs for auto traffic. No consistent downtown or University Hill wayfinding system was evident.

There are a small number of intersections in the city that have an exclusive pedestrian phase so that pedestrians can move in all directions, while no vehicular movements are allowed. These include:

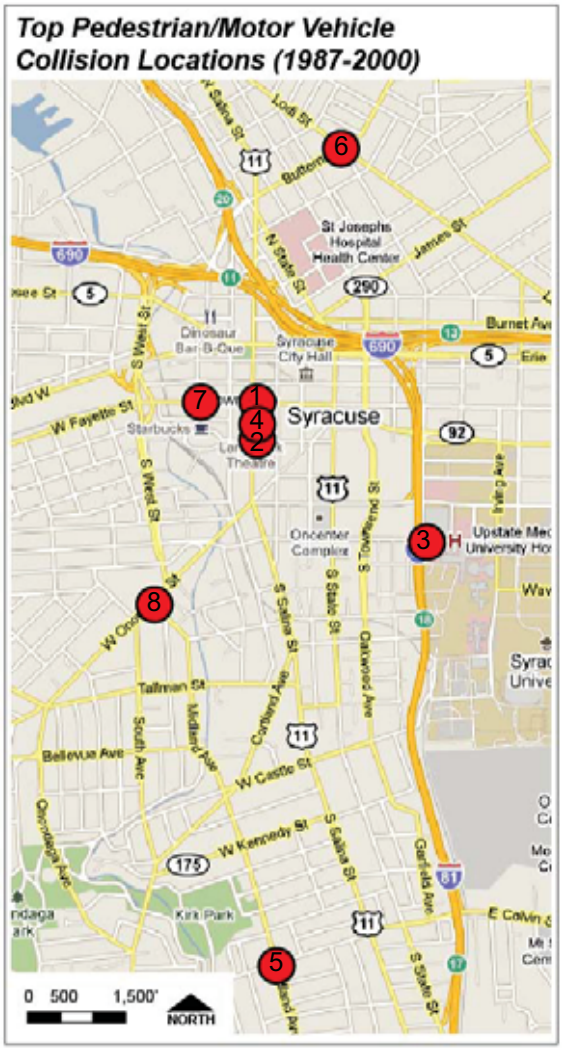
- James Street and Lodi Street;
- University Avenue and Waverly Avenue;
- Warren Street, Madison Street and Onondaga Street;
- Burt Street and Almond Street; and
- Walnut Avenue and Waverly Avenue.

Pedestrian safety is an important factor to be considered in future stages of this corridor study where study strategies (alternatives) may alter the I-81 infrastructure. SMTC reported that in Onondaga County in 2000, there were 20 fatal motor vehicle accidents in which 21 people were killed. Five of the 21 were pedestrians,

representing nearly 25% of those killed in motor vehicle accidents in 2000[3]. The majority of the pedestrian accidents occur at heavily traveled intersections. Table 2.5 presents the locations within the study area where pedestrian accidents occurred with most frequency. The Fayette/South Salina Street intersection had 52 collisions over a 13-year period, by far the highest volume of pedestrian/motor vehicle accidents. This volume of accidents may be due to the existing Common Center transfer point being at this location. The new Common Center is being relocated to South Salina Street/South Warren Street/Adams Street so accidents at the Fayette/South Salina Street location are expected to decrease.

Table 2.5 - Top Pedestrian/Vehicle Collision Locations (1987-2000) [4]

Street or Intersection	No. Of Collisions
1 - E. Fayette Street/W. Fayette Street/S. Salina Street	52
2 - E. Jefferson Street/S. Salina Street	17
3 - E. Adams Street underneath I-81 near Almond Street	15
4 - S. Salina Street between W. Fayette Street and E. Jefferson Street; 5 - Midland Avenue/W. Colvin Street	14
6 - Lodi Street/Butternut Street/ Catherine Street; 7 - W. Fayette Street/S. Franklin Street	13
8 - Midland Avenue/W. Onondaga Avenue	11

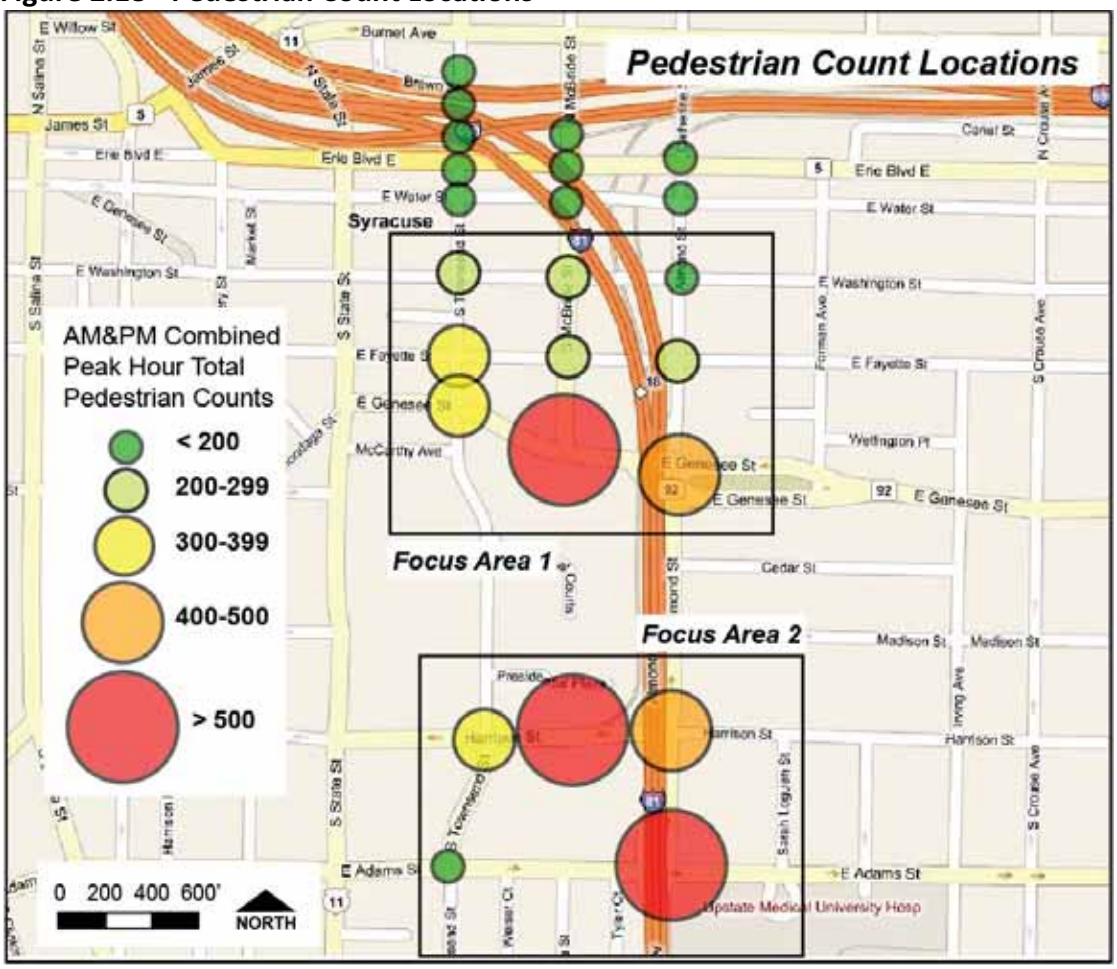


Data Collection: Pedestrian count data was collected in November and December 2009 and in February and March 2010, concurrent with all intersection turning movement counts taken during the morning and evening peak commuter periods. The pedestrian and traffic counts were also collected in a focus area along and under the Viaduct as base information for possible strategies (alternatives) that may modify access to downtown and University Hill or modify the overall transportation system. Of these, twenty-four were located near or directly south of the interchange of I-81 and I-690 (Figure 2.18). Of

[3] *Syracuse Metropolitan Transportation Council, Bicycle and Pedestrian Plan, March 2005.*
[4] *Syracuse Metropolitan Transportation Council, Bicycle and Pedestrian Plan, March 2005.*

those intersections, pedestrian traffic was most abundant on six east-west streets and three north-south streets. From north to south these streets are: East Washington, East Fayette, East Genesee, Harrison, and East Adams. From west to east these routes are South Townsend, South McBride and Almond.

Figure 2.18 - Pedestrian Count Locations



Of the intersections studied, the largest pedestrian counts were found north-south on Almond Street with as many as 399 people walking north during the six combined hours of morning and afternoon peaks. A large pedestrian generator in this area is the SUNY Upstate Medical Hospital and associated parking facilities. High pedestrian counts on Almond Street suggest that Almond is used as a north/south corridor by pedestrians, connecting downtown Syracuse with the University Hill area. The need for a strong pedestrian connection between downtown Syracuse and the University Hill area is evident by the City of Syracuse's "Connective Corridor" project that is improving pedestrian and transit connections between these two areas and facilitating integration between these two centers. Additional high activity areas include East Genesee Street at the Renaissance Hotel and East Genesee and South McBride near the large residential tower.

Sidewalks and walking conditions within the University Hill area were inventoried and assessed in SMTC's 2006 *University Hill Transportation Study, Task 4: Pedestrian and Bicyclist Issues and Needs Assessment*. The University Hill study area included an area generally within 0.5 mile to 1 mile of Waverly Avenue and bounded by Madison Street, Ostrom Avenue, Stratford Street and Almond Street. Higher quality pedestrian friendly environments generally have street trees, lighting, aesthetically pleasing building façades, and minimal curb cuts, while lower quality environments are primarily auto-oriented. The following items were 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 contribute to this issue. 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.
- Wide Streets with unmarked crossings are a common condition in the area. Due to the large blocks (distant signalized crossings) associated with institutional uses on University Hill; 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, and furnishings. Pedestrian crossings are generally not marked with high-visibility pavement markings, and ADA accessibility is lacking in many locations.
- Many intersections were found do not have up-to-date signage, pedestrian signals and pavement markings.

2.3.2.2 Bicyclists

The City of Syracuse has a number of on-street bicycle lanes. In the study area, on-road bicycle routes can be found on such streets as East Colvin Street and East Water Street. Typically, the bike lanes are four feet wide and have pavement markings as well as steel-posted signs designating the lanes. The City plans to install bike lanes on East Genesee Street from Salt Springs Road to University Avenue. The Connective Corridor plan includes proposed bike lanes on East Genesee from University Avenue to I-81. Figure 2.19 illustrates existing and proposed bicycle facilities in the study area. This information is reference data for future phases of *The I-81 Challenge*. Existing bicycle lanes include:

- Meadowbrook Avenue
- Colvin Street (I-81 onramp to Nottingham Road)
- Water Street (Beech Street to Almond Street)
- Salina Street (Dorwin Avenue to Seneca Turnpike)
- Comstock Avenue (Euclid Avenue to Colvin Street)
- Euclid Avenue (Comstock Avenue to Meadowbrook)
- East Genesee Street (from City Line to Salt Springs Road)

The City plans to install bike lanes on East Genesee Street from Salt Springs Road to University Avenue. The Connective Corridor plan includes proposed bike lanes on East Genesee from University Avenue to I-81. Figure 2.19 illustrates existing and proposed bicycle facilities in the study area.

The SMTC has created a Bicycle Suitability Map that rates roadways as excellent, good, average, fair, and/or poor for bicycling. The rating is based on traffic volumes, shoulder width, and riding conditions such as slopes and pavement conditions. Nearly 80% of these rated roads in the region are considered suitable for bicycling (excellent, good, and average). Interstate highways, expressways, and other roads where bicycling is prohibited by law (e.g. I-81, I-690, I-481) were not included in the suitability analysis.

The locations within the study area where a high frequency of bike/auto accidents have occurred are shown in Table 2.6.

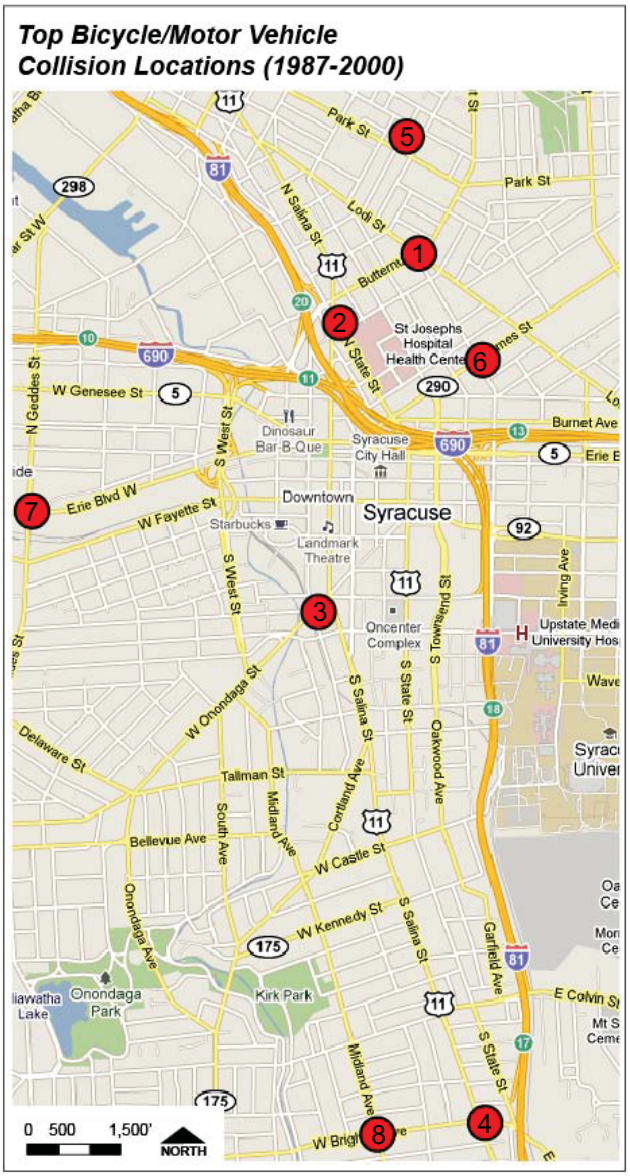


Table 2.6 - Top Bicycle/Vehicle Collision Locations (1987-2000)

Street or Intersection	No. Of Collisions
1- Lodi St /Butternut St/ Catherine St	11
2 - James St / N. State St / S. State St	8
3- S. Clinton St /W. Onondaga St /Gifford St; 4- S. Salina St /W. Brighton Ave /E. Brighton Ave	7
5- E. Division St /Carbon St; 6- Catherine St /James St; 7- N. Geddes St/Erie Blvd West /S. Geddes St; 8- Midland Ave /Brighton Ave	6

Nearly all Central New York Regional Transportation Authority buses are equipped with bicycle racks. As regular full-size buses are replaced, they are replaced with buses that are equipped with bicycle racks.

2.3.2.3 Multi Use Trails

There are a number of multi-use trails within the I-81 corridor study area used by both bicyclists and pedestrians. These facilities shown in Figure 2.19 include:

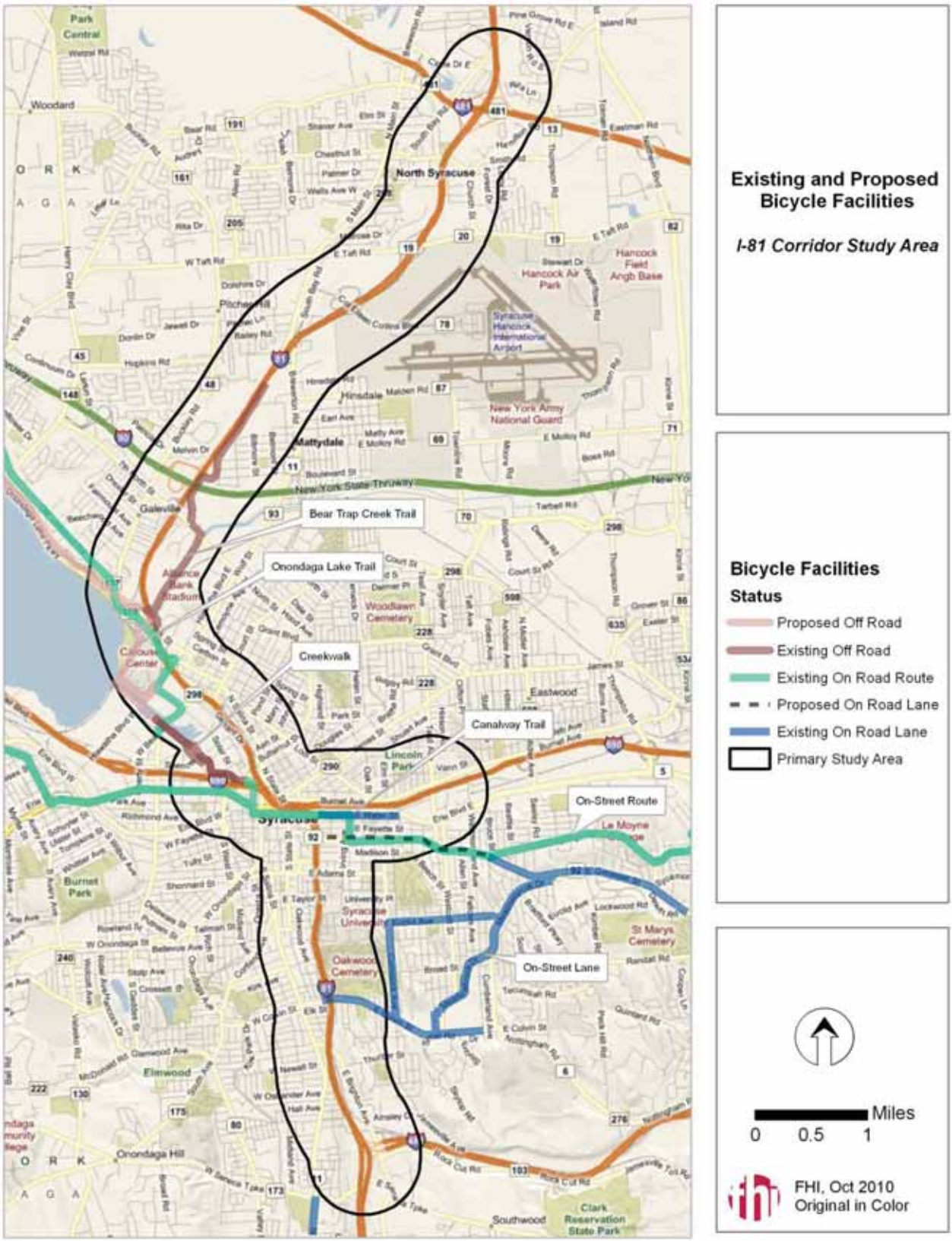
Onondaga Creekwalk: The Onondaga Creekwalk currently runs along Onondaga Creek within the City of Syracuse. Currently the Creekwalk is divided into two sections: one section in Franklin Square and the other in the Inner Harbor; there is a temporary trail connecting these two sections. The Syracuse Creekwalk Phase I Project will extend the existing Creekwalk both to the north and to the south, connecting Armory Square to Onondaga Lake. A permanent link between the two existing trails will also be constructed.

To the south, the Creekwalk will be extended from Franklin Square to Armory Square in Downtown. To the north, the Creekwalk will be extended to the mouth of Onondaga Lake. Construction began in Fall 2009 and is slated to be complete by the end of 2011.

Once expanded, the Onondaga Creekwalk will measure 2.2 miles with an average width of 13 feet. It is planned to connect to the proposed Onondaga County Loop the Lake Trail, as well as to the Erie Canalway Trail. The Syracuse section of the Canalway Trail will connect 15 miles of trails in Onondaga County. The three major components of the Syracuse Creekwalk Phase I project are highlighted in more detail below:

- *Linking Section:* There is currently a temporary trail between the two existing segments of the Onondaga Creekwalk, from Maltbie Street to Kirkpatrick Street. A permanent section will be constructed on the west bank of Onondaga Creek from Spencer Street to Kirkpatrick Street. Once complete this 0.1-mile section of the trail will traverse the Syracuse Parks Department Main Office property.
- *Northern Extension:* This segment will extend the Creekwalk north approximately one-half mile, from its current terminus just north of Bear Street to the southern Onondaga Lake shoreline. This trail will start at the existing trail along the west side of the Barge Canal, travel north up to Hiawatha Boulevard, where it will cross over the Barge Canal to east side. The trail will then proceed north along the east side of the Barge Canal. At an undetermined future date, it will connect to both the Carousel Center and the planned 12-mile Loop the Lake Trail (being planned by Onondaga County).
- *Southern Extension:* This segment will continue the Creekwalk south from its point of departure at Franklin Square toward Downtown Syracuse. This 0.6-mile segment will travel alongside Onondaga Creek to Armory Square. The Creekwalk will travel past the historic Art Deco Niagara Mohawk building, offer views and connections with several downtown streets, and terminate at the popular Armory Square mixed-use district.

Figure 2.19 - Existing and Proposed Multi-Use Facilities



New York State Canalway Trail: Portions of the Erie Canalway Trail have been completed within Onondaga County that link to the end-to-end statewide Canalway Trail. The Syracuse segment of this trail is considered one of the most difficult gaps to complete, primarily because the segment traverses land that is the most urbanized along the entire state route. The proposed route also exhibits widely differing characteristics and features, as it passes over public streets, moderately maintained utility roads, 36 access roads, multi-use trails, and a waste settling bed. It should be noted, that a portion of this trail is an on-street bicycle route through Downtown Syracuse. Once complete, the Canalway Trail will connect the DeWitt path to the Canalway Trail in western Onondaga County in the Town of Camillus. The entire Erie Canalway Trail will eventually connect communities between Albany and Buffalo along the 524-mile Erie Canalway system. The Canalway Trail Planning Group meets approximately every two months at the Erie Canal Museum to discuss possible routes through the City of Syracuse.

Downtown Bus Station

Bear Trap Creek Trail: The Bear Trap Creek Trail runs along the east side of Interstate 81 from near the New York State Thruway Exit 36 interchange at Seventh North Street to the Kmart Plaza in Mattydale. Constructed during Route 81 improvements in the 1980s, Bear Trap Creek Trail is a 1.5-mile long, 8-foot-wide paved trail, which ultimately, via the proposed Ley Creek Trail section, will connect the northern suburbs to the hub-trail activity in the Carousel Center/Regional Market/P&C Stadium district.

Typical Bus Stop Treatment

2.3.2.4 Transit

CENTRO, a subsidiary of the Central New York Regional Transportation Authority (CNYRTA), provides fixed route and call-a-bus (para-transit) bus transit services to Syracuse and Onondaga County as well as other metropolitan areas in Central New York. In fiscal year 2010, the CENTRO transit system served approximately 11.6 million riders. For the purpose of the I-81 Corridor Study, the transit analysis will examine the existing 97 fixed-route bus system in the Syracuse metropolitan area.

Typical CENTRO Bus Shelter

Fixed Bus Routes – CENTRO currently operates 97 fixed bus routes in Syracuse and Onondaga County, operating in a series of base routes and deviation routes. A base route is the general path of a series of routes, called deviations, which typically operate along major arterials and are shorter than the deviation routes. A deviation route provides a service extension that typically serves a particular destination such as a residential development, suburban employment center, or shopping area, and is labeled with a number (one through five) followed by the base route number. For example, route 210 and 310 are deviations of base route 10.

Deviation routes comprise 67 of the 97 fixed bus routes in the CENTRO Syracuse/Onondaga County system. The frequency of bus service is independent of whether the particular route is a base route or deviation, and depending on the demand for service along a particular route, a base route may have little to no frequency. The deviation routes serve the majority of base routes; therefore, in many cases, there is no need to operate a bus specifically for the base route.

In addition to the deviation routes, CENTRO also provides express service along some of its routes that operate during the morning and evening peak periods and provide direct service to/from Downtown Syracuse. The express services typically operate from Park-N-Rides, shopping areas, and residential developments and utilize area expressways, when available, to bypass the local road network and reduce travel time. The routes operate on a hub and spoke system with the majority of the routes originating/terminating at a central bus station at the corner of Fayette Street and Salina Street in downtown Syracuse. CNYRTA is moving forward on its plan to build a new transfer hub in downtown Syracuse.

The authority received FTA approval of the proposed site bound by South Salina Street, South Warren Street and Adams Street that is about two blocks south of the existing “Common Center”. The central bus station consists of several bus shelters and an information booth, staffed during the day, where riders can obtain schedules and purchase bus passes. From the central bus stop, the routes act as spokes providing connection between downtown Syracuse and residential areas, suburban employment centers, and shopping centers. Prior to March 2010, CENTRO operated several suburb-to-suburb routes but, due to low ridership, those routes were terminated.

CENTRO also operates from the William F. Walsh Regional Transportation Center (RTC). The RTC is Central NY’s one-stop transportation center providing service to other cities. The RTC is home to train and bus services provided by Amtrack, Greyhound and Trailways.

Fares – Fares for the system are collected by zone, and zones are defined by distance traveled. The base fare for one ride that covers one zone, is $1.25, and each additional zone results in a fare increase of $0.25. For longer routes to destinations such as Tully or Auburn, the fee structure is adjusted to reflect the distance that is traveled; however, the majority of the fixed

route bus system operates over only one or two zones. CENTRO offers a variety of payment methods including:

- On-board cash collection
- 10-Ride Pass ($12.50) – valid for travel in one zone only and does not expire
- 7-Day Pass ($12.50 One Zone, $15.00 Two Zones) – allows users unlimited rides over a period of seven consecutive days
- 30-Day Pass ($50.00 One Zone, $60.00 Two Zones) – allows users unlimited rides over a period of 30 consecutive days
- Debit Cards – pre-loaded debit cards. CENTRO fare boxes will deduct the fare when the card is swiped, and the remaining balance will be printed on the back of the card

Passes and debit cards can be purchased at the CENTRO main offices, the downtown information booth, by mail, or by phone.

Connective Corridor – In addition to the 97 fixed bus routes, CENTRO operates a free shuttle along the Connective Corridor, a two-mile long corridor connecting cultural destinations across the city from University Hill to Downtown and Armory Square. The shuttle is free for all passengers and operates approximately every half-hour between 7:30 AM and 3:00 AM Monday through Friday and every hour between 8:00 AM and 3:00 AM on weekends. The shuttle operates on a reduced schedule during the summer. Plans for the Connective Corridor include multi-modal improvements along University Avenue, East Genesee Street, and West Fayette Street such as bike lanes, pedestrian improvements, parks, and a dedicated bus route (by CENTRO).

Syracuse University – CENTRO operates eleven bus routes, including the Connective Corridor, to Syracuse University. Shuttles are free for students and faculty with valid ID and connect to various on-campus locations, as well as off-campus destinations such as the Regional Transportation Center (RTC), downtown Syracuse, and Carousel Center. The Syracuse University routes operate on a modified schedule when school is not in session.

Park-N-Ride – CENTRO currently lists fourteen Park-N-Ride lots in the Syracuse metropolitan area, the majority of which are located in shopping centers. Free parking is provided at these locations through an agreement between the land owner and CENTRO, and amenities typically include a bus shelter with a posted bus schedule. Bus service to the Park-N-Ride locations is provided during the AM and PM peak periods with express and/or local service directly to downtown Syracuse.

Bus Stop Treatment – The CENTRO system is extremely accessible with bus stops at almost every cross-street along local routes. Typical bus stop treatment consists of a blue sign. These signs do not list the bus route that the stop is served by, or contain a schedule with bus route information. CENTRO also maintains 193 bus shelters, typically located at major stops along a route, such as Park-N-Rides or shopping areas. The majority of shelters contain posted bus schedules.

Data Collection Program

Boarding and alighting data is necessary when analyzing a transit system to identify ridership trends, deficiencies, and analyze future improvements. CENTRO was contacted to obtain boarding and alighting data, by stop, for several bus routes, but we were informed that the data was several years old and no longer valid, and that new counts were necessary. With the cooperation of CENTRO, a data collection program, consisting of approximately one third of the routes in the system, was defined that would provide a "snapshot" of system operations.

The objective of the data collection program was to provide stop-by-stop boarding and alighting data to identify ridership patterns and system deficiencies that will help to guide the analysis of improvements. Improvements that may be analyzed include minor route adjustments, scheduling changes, consolidation, bus rapid transit (BRT), light rail (LRT) or trolley service, among others. Therefore, the existing bus routes were divided into three categories:

Urban Routes – provide all day service to destinations within Syracuse or the immediate metropolitan area. These routes serve areas that may be most suited for frequent bus, trolley, or LRT service.
Suburban Routes – provide service to suburban locations that is typically oriented toward the AM and PM peak commuting periods. These routes serve areas that may be most suited for commuter BRT or LRT.
University Hill Routes – provide service to and from the University Hill area. These routes serve areas that may be suited for both commuter and local system improvements.

In order to identify which routes should be included in the data collection program, CENTRO provided factored average hourly ridership data by route for September and October 2009 and stop-by-stop data, most of which was collected in 2007. The 2007 stop-by-stop data was reviewed to identify routes with higher than average ridership. After identifying routes with higher than average activity, the factored average hourly ridership data, which provided a more recent summary of general route activity, was consulted. CENTRO defines system standards for factored average hourly ridership that help to provide a measure in which to evaluate the performance of a route. The standard is 33 persons per hour for urban routes, and 20 persons per hour for suburban routes.

Routes with ridership at or exceeding the standard were considered to be included in the data collection program in order to identify ridership patterns. Routes with ridership lower than the standard were not recommended to be included because they were considered to be deficient and will be analyzed separately. Improvements including route changes, schedule adjustments, or consolidation may be considered for these routes.

The routes were evaluated to ensure that the snapshot of the system provided a balance between the urban, suburban, and University Hill routes, and to ensure that the data collection

was distributed evenly over the entire system. The resulting routes that were selected for data collection are shown in Table 2.7 and Figure 2.20.

Data Collection Schedule and Procedures

The on-board boarding and alighting data was collected Tuesday, April 6 through Thursday, April 8, 2010 to capture typical weekday operations. Urban routes were scheduled for all-day data collection from 7:00 AM to 6:00 PM with a focus on inbound trips during the morning peak period (7:00 AM to 9:00 AM), circulating trips (inbound and outbound) during the midday period (11:00 AM to 2:00 PM), and outbound trips during the evening peak period (4:00 PM to 6:00 PM). Suburban routes were scheduled for peak-period data collection only during the morning (7:00 AM to 9:00 AM) and evening (4:00 PM to 6:00 PM) peak periods. For routes that only operated during the peak hours, it was assumed that they carry commuters and therefore the inbound ridership would roughly equal the outbound ridership. Additional data, including data for routes that were missed during the first data collection period, was collected on Tuesday, April 13, 2010 and Wednesday, April 14, 2010. CENTRO provided data collection sheets that listed each stop along each route.

While there were no major issues during the data collection, two minor issues were observed that affect first-time transit system users; identification of bus stops/routes, and bus displays.

As discussed in the previous section, each bus stop is marked with a blue sign; however, the signs do not include any information on what route stops at the location. This can be confusing for first-time riders, or riders unfamiliar with the particular route, especially if there are multiple routes or deviations that may stop at the same location. More information on the bus stop signs would make the system more user-friendly.

CENTRO buses are equipped with a changeable message sign that displays the route and the destination. In general, many of the routes that were selected for data collection terminated downtown; however some would continue from downtown to another destination along a separate route. In these cases the route number and destination that would be displayed on the inbound route would be that of the subsequent outbound route. For example, if Route 176 from Shoppingtown to downtown then continued as Route 110 to Valley Plaza, a passenger waiting at the first stop along Route 176 headed to downtown would see a bus that displayed “110 Valley Plaza” rather than “176 Fayette and Salina”. This practice is confusing for first-time riders.

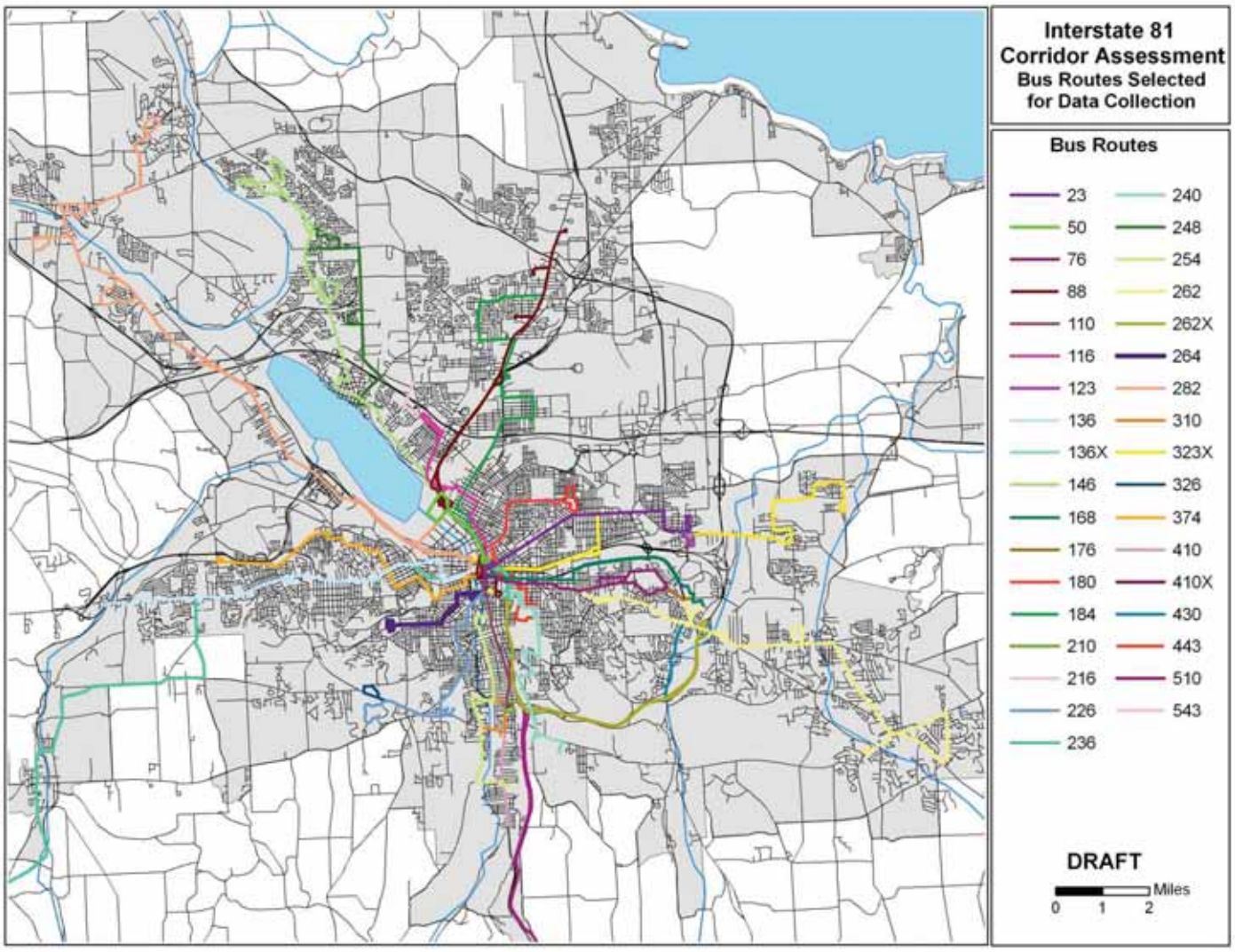
Table 2.7 - Bus Routes Selected for Data Collection

Base Route No.	Base Route Name	Dev. Rte No.	Deviation Route Name	Route Type	Threshold (pph)	Factored Hourly Ridership (pph)	Comments
10	South Salina-Brighton	110 210 310	S. Salina S. Salina/Bernardine S. Salina/Valley	Urban	33	48.94	
10	South Salina-Brighton	410(X)	Nedrow (Express)	Suburban	-	-	Selected to compare local vs. express ridership
10	South Salina-Brighton	510	Tully	Suburban	20	9.46	Provide data for a long-distance commuter route
16	North Salina	116 216	N. Salina-7th North N. Salina-Electronics Pkwy	Urban	33	36.51	
23	East Syracuse	123	E. Syracuse/Walmart	Urban	33	43.01	
26	South Ave-Elmwood	226 326	S. Ave-OCC S. Ave-High Acres	Urban	33	55.08	
30	Sryacuse-SU	430	Jamesville Rd-E. Genesee	University	20	35.94	
36	W. Genesee/ Camillus Commons	136(X) 236	Camillus(Express) Auburn-Camillus-Syracuse	Suburban	20	31.73	Selected to compare local vs. express ridership
40	Syracuse University	240	SU-Nob Hill	University	33	36.18	
46	Liverpool-Rte 57	146(X)	Liverpool-Rt.57-Casual Estates (Express)	Suburban	20	18.63	Commuter coverage to compare local vs. express ridership.
48	n /Avon/Grampian	248	Liverpool/Morgan/ Great Northern Mall	Suburban	20	20.56	
50	Carousel via I-81	N/A	N/A	Urban	33	37.93	
54	Midland-Matson	254	Midland-Valley	Urban	33	39.24	

Table 2.7 - Bus Routes Selected for Data Collection (cont.)

Base Route No.	Base Route Name	Dev. Rte No.	Deviation Route Name	Route Type	Threshold (pph)	Factored Hourly Ridership (pph)	Comments
		262	Manlius-E.Genesee				
62	Fayetteville	262X	Manlius Express via481	Suburban	20	13.74	Commuter coverage to compare local vs. express ridership.
64	W. Onondaga/ Western Lights	264	W. Onondaga/Western Lights Expansion	Urban	33	40.58	
68	E Fayette/ Westmoreland	168	E. Fayette/Erie/ Shoppingtown	Urban	33	42.96	
74	Solvay-Milton	374	Solvay-Avery-Elm Hill Plaza	Urban	33	31.32	Selected due to proximity to threshold.
76	E. Genesee-Salt Springs	176	E. Genesee-Salt Springs-Shoppingtown	Urban	33	47.19	
80	Grant Boulevard	180	Grant Blvd-Taft+Dunlap	Urban	33	34.22	
82	Baldwinsville	282	Baldwinsville (Radisson)	Suburban	20	10.96	Provides additional suburban coverage.
84	Mattydale	184	Mattydale-Allen Rd	Suburban	20	18.05	Provides additional suburban coverage.
88	North Syracuse	88X	N. Syracuse Express	Suburban	20	14.72	Commuter coverage to compare local vs. express ridership.
323	E. Syracuse-Minoa	323X	E.Syracuse-Minoa Express	University	20	11.58	Suburban coverage to compare local vs. express ridership.
443/ 543	Connective Corridor Shuttle	N/A	N/A	Suburban	-	-	

Figure 2.20- Selected Bus Routes for Data Collection



Data Collection Results

Following the data collection program, the data was summarized into peak period ridership and daily ridership. Overall ridership trends were consistent with the 2007 boarding and alighting counts as well as the factored average hourly ridership data. The routes that had higher than average ridership continued to be the routes with higher than average ridership during the data collection periods.

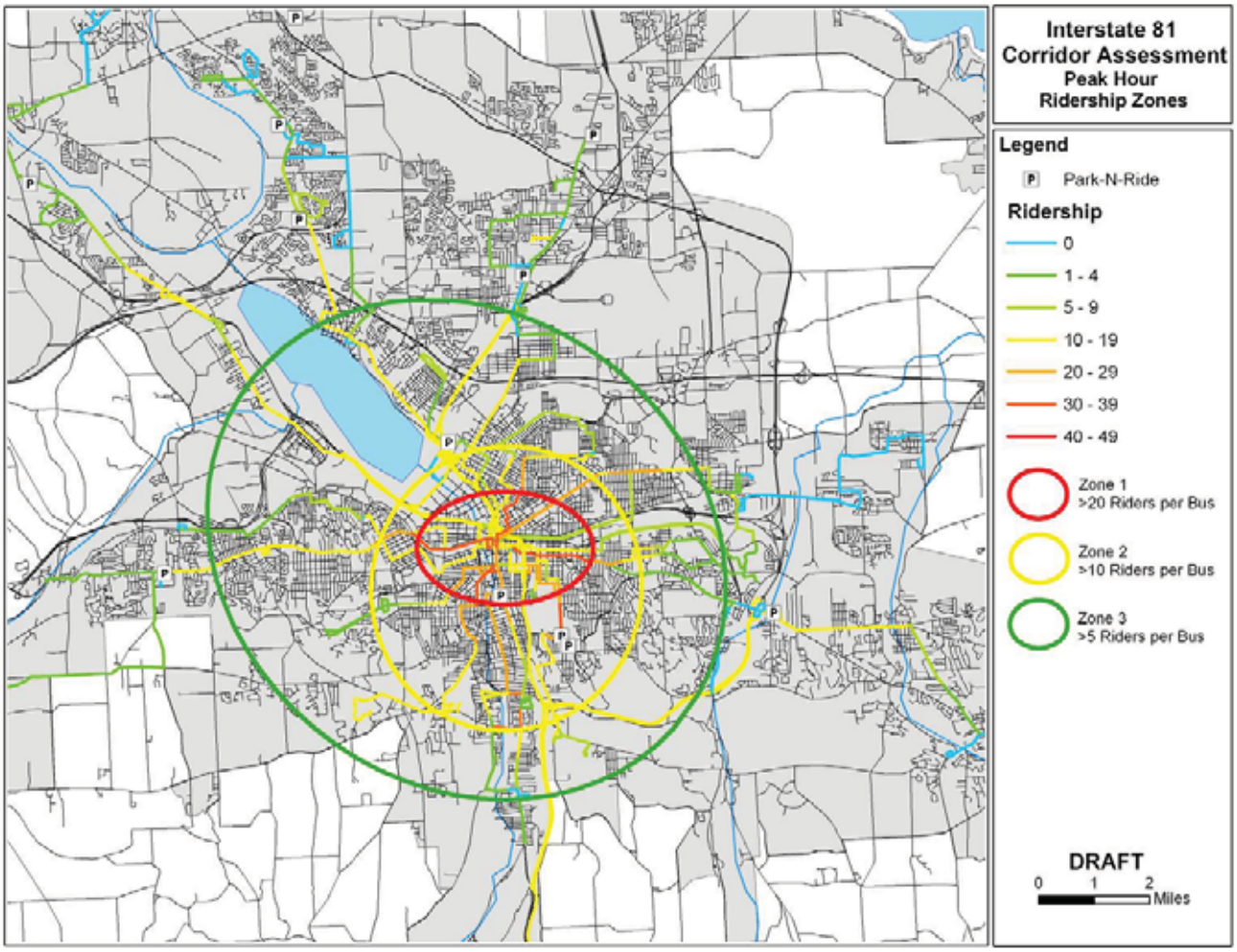
In order to understand the system operation it was important to summarize the overall ridership trends rather than that of each individual route; therefore ArcGIS was used to visualize passenger loads during the peak and midday off-peak periods using a color structure with green being light loads and red being heavy loads, see Figures 2.21 and 2.22. Blue lines represent sections of the routes with an average of zero passengers per bus. A

passenger load is the average number of passengers on the bus at a given point along a route. Each of the figures is labeled with three zones:

- Zone 1: Average passenger load greater than 20 per bus.
- Zone 2: Average passenger load between 10 and 20 per bus.
- Zone 3: Average passenger load between 5 and 10 per bus.
- Outside Zone 3: Average passenger load less than 5 per bus.

Zone 1 – During the peak and midday off-peak periods, Zone 1 is centered over the downtown bus hub at the intersection of Salina Street and Fayette Street. During the peak periods, Zone 1 is a two by four-mile oval with a northwest-southeast axis. The shape and size of the oval is governed by both commuters and transit-dependent markets such as Syracuse University or low income neighborhoods such as those along South Salina Street. Commuter ridership results in higher passenger loads along routes that travel outside the city; while transit-dependent market ridership results in higher passenger loads along routes that travel within the city.

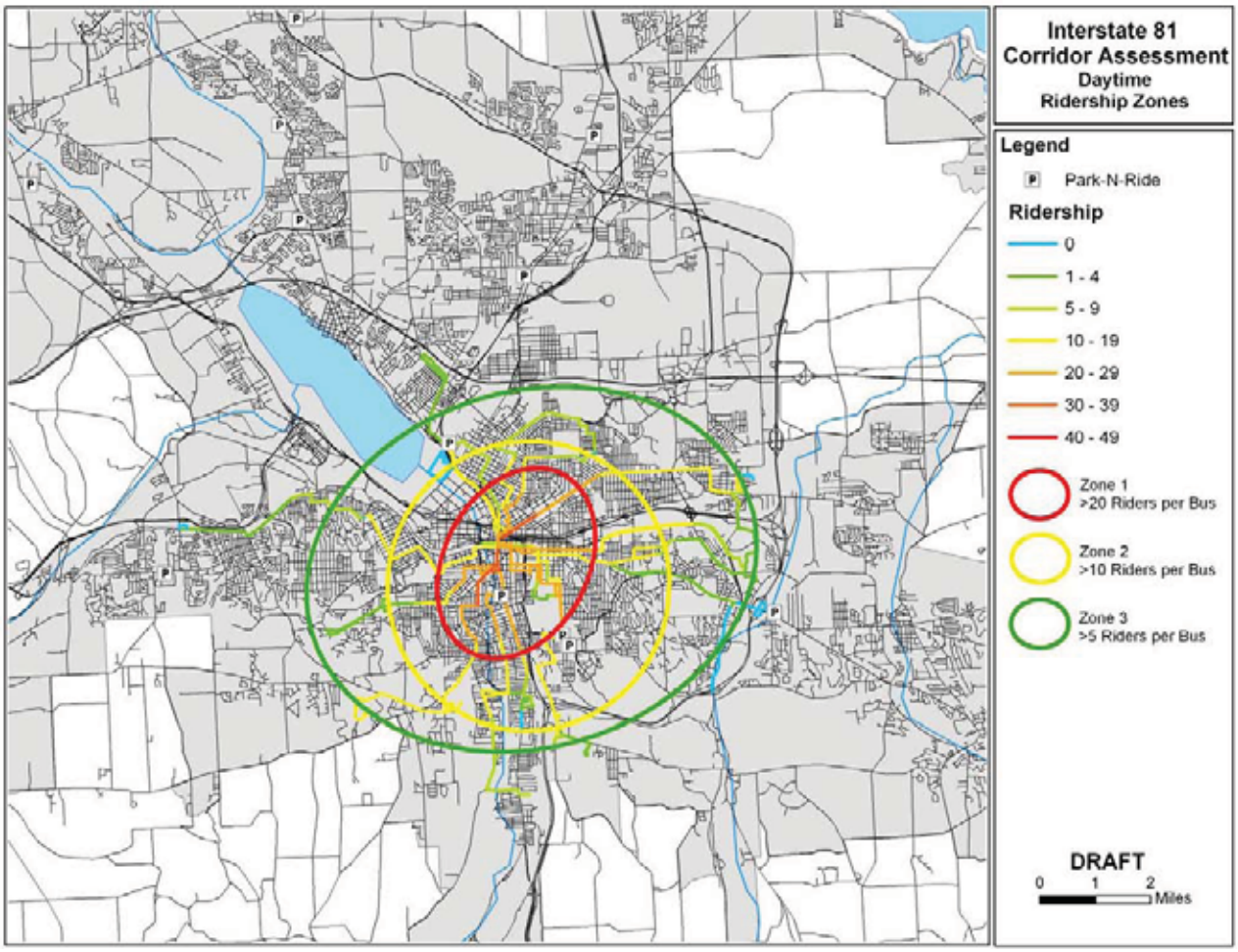
Figure 2.21 - Peak Hour Ridership Zones



Spikes in passenger loads can be seen approaching the downtown bus hub at Fayette Street and Salina Street, which would be anticipated with a hub and spoke system. In a hub and spoke system, passenger loads generally increase as a bus approaches the central hub. However, slight deviations can be seen around Syracuse University where passenger loads spike because of student ridership.

When comparing midday off-peak passenger loads to peak period passenger loads, it should be noted that the orientation Zone 1 shifts from a northwest to southeast orientation to southwest to northeast and the zone gets slightly smaller due to the removal of the influence of commuters. The midday off-peak passenger loads show the areas where transit ridership is steady throughout the entire day such as densely populated areas, or transit-dependent markets such as low-income areas and the University. Routes in Zone 1, especially those that show higher than average passenger loads throughout the entire day, may be suitable for transit improvements such as bus rapid transit (BRT), light rail transit (LRT), trolleys, or other high-frequency transit improvements. Further analysis is needed to determine appropriate improvements and investments.

Figure 2.22 - Daytime Off-Peak Ridership Zones



Zone 2 – Zone 2 represents the area of the system where average passenger loads are between ten and twenty people per bus. Unlike Zone 1, Zone 2 is much larger during the peak period and has a significant shift in orientation to the north and west. Zone 2 experiences greater passenger loads during the peak periods due to the affect of commuters, with a large percentage of suburban residential developments being located to the north and west of the City. However, the impact of the Park-N-Rides seems to be minimal with no significant changes in passenger loads after a bus has passed a Park-N-Ride location.

Zone 2 is much smaller and more circular with an orientation slightly to the south and east during the midday off-peak period. Without the influence of commuters, the routes to the suburbs to the north and west have significantly lower ridership, allowing transit-dependent areas govern the passenger loads during this time period. Routes to shopping areas, such as Shoppingtown, continue to generate a steady ridership between 10 and 20 passengers per bus.

Routes in Zone 2 may be appropriate for adjustments in route frequency, BRT, or LRT. Further analysis will be undertaken later in this study to determine appropriate improvements.

Zone 3 – Zone 3 represents the area of the system where average passenger loads are between five and ten people per bus. This zone is more heavily influenced by the effect of commuters, with a larger area during peak periods with passenger loads between five and ten people per bus. This is consistent with the lower frequency bus routes in these areas that provide concentrated commuter service during the peak periods and less frequent bus service off-peak. Similar to Zone 2, Zone 3 has a significant orientation to the north and west during the peak periods. In addition, the Park-N-Rides in this zone seem to have little influence on passenger loads. Routes in Zone 3 with higher commuter loads may be candidates for BRT or other improvements to increase amenities for commuters. Further analysis is needed to determine appropriate improvements.

The area outside of Zone 3 represents the system where average passenger loads are less than 5 people per bus. In many cases, the very end of the routes averaged zero riders per bus during both the peak period and daytime off-peak period, most likely due to the very specific destinations, such as stops inside residential developments, which these routes serve. The routes in this area tend to be scheduled for commuting, with some routes not offering off-peak service. Routes outside of Zone 3, especially those with sections of the route that average zero passengers per bus, are candidates for schedule adjustments, changes to routes, and consolidation. Centro is currently examining additional routes for system efficiency. More analysis is needed to determine appropriate improvements.

Transit Summary

Based on the data analysis and observations made in the field, several conclusions can be drawn. 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 institutions (health care). Average passenger loads remain at less than twenty people per bus on routes to and from suburban locations. Park-N-Rides are not generating a significant number of riders. Commuters represent only a small portion of overall system ridership. According to the 2005 Transportation Profile for Onondaga County, 2.2 percent of the county population uses public transit as their mode choice to work and 7 percent of the City of Syracuse population uses public transit as their mode choice to work. The table below shows comparable upstate New York City's transit mode share for comparison purposes and several larger US cities for reference.

Table 2.8 - Transit Mode Share

	City	Greater Metropolitan Area
Syracuse	7%	2.2%
Rochester	8%	2.0%
Buffalo	12%	3.5%
Albany	13%	3.2%
New York City	25%	
San Francisco, CA	31%	9.5%
Dallas, TX	5%	1.8%
Philadelphia, PA	25%	8.7%
Atlanta, GA	15%	3.6%

Source: 2000 US Census

Overall perception is that the bus system needs improvement, there is a resistance to riding transit, and that relatively low parking fees, and comfortable commute times discourage transit use. This has resulted in the majority of the system ridership coming from passengers/markets who have no alternative to public transit.

In the future stages of this study, the transit system will be analyzed in two components; core market and commuters. Improvements to increase connectivity within Syracuse as well as to and from transit dependent markets will be analyzed. Land-use, demographic, and transit/travel data will be combined to identify possible improvements that will improve service to existing markets and promote transit use by new markets.

The general bus system will be reviewed for improving park and ride facilities and bus routing particularly for a possible Bus Rapid Transit (BRT) system. These types of systems are an express type facility where bus priority can be accomplished through a variety of applications.

The general downtown area will be reviewed for more intensive type transit options like Light Rail Transit (LRT) or more likely the new "street car" type applications.

2.3.2.5 Airports, Railroad Stations, and Ports

There are airports, rail service and port entrances within the Social, Economic and Environmental study limit as follows:

Airports – Hancock International Airport is the only airport providing commercial air passenger service and air cargo service in the area. Hancock International Airport is owned and operated by the City of Syracuse and is located off of I-81 at Exit 28 – Airport Blvd. In addition to commercial passenger service, Hancock provides an extensive air cargo operation, including U.S. Customs inspection service, as well as general aviation services for private pilots and military operations.

Passenger Rail Service – the National Railroad Passenger Corporation (Amtrak) provides intercity rail passenger service in the Central New York Region. Amtrak experienced substantial increases in passenger trips shortly after the opening of the William F. Walsh Regional Transportation Center in 1998 and is experiencing decreased travel since the disaster of September 11, 2001. The Regional Transportation Center is located off of I-81 at Exit 23 – Park Street. The Regional Transportation Center provides interconnectivity between bus and rail transportation modes. Potential initiatives such as the NYS high-speed rail service across Upstate and the proposed expansion of Carousel Center to become DestiNY USA may include rail system extensions to the mall, Hancock International Airport, downtown locations and the University Hill Area.

OnTrack was a Regional rail line that operated in Syracuse from 1994 to 2007. During its operation, Syracuse was the smallest city in the US to have regional train service. The line ran from Colvin Street on the City's south side via Syracuse University and Armory Square to the Carousel Center, using four Budd Rail Diesel Cars built in the 1950s. The system operated over Syracuse, Binghamton & New York Railway track, a subsidiary of New York, Susquehanna & Western Railway (NYS&W). When service began in 1994, the trains ran between Syracuse University, Armory Square and Carousel Center ten times a day, seven days a week. In 2005, service was limited to Saturdays.

Financing was approved in April 2004 to build the Park Street bridge that would allow OnTrack to reach the regional transit center, regional market, and Alliance Bank Stadium. These stations were built and most of the track completed, however construction of the bridge was plagued with construction challenges and was never built. OnTrack also ran the "Orange Express" shuttle during Syracuse University Carrier Dome events. This shuttle was more successful. OnTrack was heavily subsidized with roughly $8 million of state money spent on the system. In order to be profitable, OnTrack needed 500 riders a day; at its height it received only 75. In July 2007, OnTrack ended service indefinitely.

Rail Freight – In the Central New York region there is one major (Class 1) carrier, CSX Transportation; one regional carrier, New York, Susquehanna & Western Railway; and one shortline railroad, Finger Lakes Railway. CSXT replaced Conrail as the major rail freight service provider in 1999 and operates the Chicago Main line that links Central New York with New York City, New England and the Midwest. CSXT also operates the Baldwinsville, Fulton and Montreal Secondary lines to the north of Syracuse, with the Montreal Secondary being the gateway to Montreal and Canada. A significant segment of the CSXT business is the rail/truck intermodal freight terminal located in the DeWitt rail yard. The DeWitt yard is a major intermodal facility serving the Northeast and is the only terminal of its type between New York City and Buffalo. This intermodal center is located northeast of the I481/I690 interchange.

Ports – The New York State Canal Corporation is responsible for the overall operation, maintenance and rehabilitation of the New York State Canal System. The Central New York portion of the Canal system traverses Onondaga County northwest of the City of Syracuse connecting Onondaga Lake, Oneida Lake to Lake Ontario. The Syracuse Canal Port located at the Syracuse Inner Harbor is within the project limits southwest of I-81 between Bear Street and W. Kirkpatrick Street. The Erie Canal system provides recreational and seasonal cargo movement across the State linking the Port of New York, Port of Albany, Port of Oswego, Port of Rochester and Port of Buffalo, and connecting throughout the Great Lakes and beyond. Commercial passenger vessel traffic such as tour ships sailing from Rhode Island traverse the Hudson River to the Erie Canal and proceed north on the Oswego Canal to Montreal and then south along the Atlantic Coast and back to Rhode Island.

Intermodal Connectivity – Observations on multi modal interconnectivity within the overall study area are from our assessment of the individual modes that comprise the multimodal transportation network. These modes include vehicular traffic, transit services, pedestrians and bicyclists, the Amtrack rail service, CSX and regional freight service along with access to the regional airport (Hancock International Airport) and the Onondaga Lake Inner Harbor.

Key findings include:

- The Dewitt rail yard is a significant regional hub for rail to freight breakdown.

- Amtrack rail connectivity includes access to the CENTRO bus system, and the airport, as well as pedestrian and vehicular access.
- Area municipalities have comprehensive plans for multi-use trails, roadside bike lanes and pedestrian systems (ADA compliance).
- The CENTRO bus system provides a mode share (how many people use the bus system) of 2.2 percent of county population for travel.

2.3.2.6 Access to Recreation Areas (Parks, Trails, Waterways, State Lands)

There are numerous entrances to recreational areas within the Social, Economic and Environmental study area limits and are listed by neighborhood. These sites are shown in Appendix F - Neighborhood and Community Resources. The only state lands within the project limits is the waterway system at Syracuse Inner Harbor.

Parks, Community, Recreational Centers, Waterways and Trails

Southside Neighborhood
- Cannon Street Community Center
- Salvation Army Community Center
- Teen Challenge Community Center
- Dunbar Park
- Danforth Park

Southwest Neighborhood
- Salvation Army Shelter
- Wilson Community Center & Pool
- Faith Hope Community Center
- Huntington Village Youth Center
- Central Village Youth Center
- Billings Park
- Wilson Park
- Roesler Park
- Libba Cotton Park

Downtown Neighborhood
- Fayette Park

University Hill Neighborhood
- Carrier Dome
- Forman Park

Franklin Square Neighborhood
- Franklin Park
- Onondaga Creekwalk Trail

Park Avenue Neighborhood
- Leavenworth Park

Prospect Hill Neighborhood
- Eckel Park
- Sniper Park
- McBride Park

Hawley-Green Neighborhood
- Clinton Park
- Finnergan Park

Near Eastside Neighborhood
- Columbus Park
- Westmoreland Park

Lincoln Hill Neighborhood
- Northeast Community Center
- Lincoln Park

Eastwood Neighborhood
- Sunnycrest Park & Ice Rink

Washington Square Neighborhood
- Amos Park
- Upper Union Park
- Demong Park
- Union Park
- Dossert Park
- Grosso Park

Lakefront Neighborhood
- Syracuse Inner Harbor
- Alliance Bank Park/Stadium
- Onondaga Creekwalk Trail
- Onondaga Lake Trail

Salina

- Bear Trap Creek Trail

Cicero

- Cicero Senior Center

North Syracuse

- North Syracuse Community Center
- Kennedy Park & Pool
- Centerville Park

Westcott

- Thornden Park

Galeville

- Dan Tangredi Memorial Park

Mattydale

- Richfield Park
- Bear Trap Creek Trail

2.3.3 Infrastructure

2.3.3.1 Existing Highway Section

The following Table 2.9 – Existing Highway Sections segments the I-81 project corridor into 16 sections starting in the south and progressing in a northerly direction with the I-690 overlap sections at the end. All critical highway features such as number of travel lanes, shoulder width, median type and widths, posted speed, lighting, and guide rail are shown. An expanded version of this table listing other features such as grade and general alignment data is located in Appendix D – Highway Information.

2.3.3.2 Geometric Design Elements Not Meeting Standards

This section compares the existing geometric elements with the minimum standards used to make capital infrastructure improvements. This section helps ensure the objectives and feasible alternatives consider key deficiencies.

The focus of the evaluation is on how the roads as they exist today conform to current standards in terms of safety, capacity and operations. There are two categories used for comparing how they conform to the NYSDOT standards.

Non-Standard Design Features

- Horizontal Curve Radius
- Grades (steepness)
- Sight-distance - ability of a driver to see far enough down the road for the conditions
- Super-elevation – roadway banking around curves
- Lane widths
- Shoulder Widths
- Median Width

Non-Conforming Design Features

- Ramp Spacing
- Ramp Acceleration / Deceleration Length
- Interchange Spacing

The geometric roadway features within the project limits were evaluated in accordance with current design policies in Chapter 2 of the NYSDOT Highway Design Manual and AASHTO's "A Policy on Geometric Design of Highways and Streets, 2004". In order to assess the roadway features, appropriate design speeds must be established to determine whether the features meet current design standards. Design speeds for mainline sections of the interstates within our project limits were determined based on desired free flow speeds for the corridor within the highway design manual's range. Further information on design speeds can be found in Section 2.3.1.5 Speeds and Delay. The following summarizes the design speeds to be used for the project study:

- I-81 - 70 mph for the areas currently posted at 65 mph
- I-81 - 60 mph for the areas currently posted 55 mph and 45 mph
- I-690 between Exits 11 and 14 – Design speed has been established as 60 mph

This analysis compares what is there now to what the design features should be today, to present NYSDOT and AASHTO guidelines and standards. For example, if a mainline curve on I-81 is too "sharp" (turns too quickly) per the design standard then it has been identified and also reviewed in combination with accidents and capacity. I-81 has several mainline curves through the primary study area in particular at the I-690 interchange where the posted speed limit is reduced to 45 mph due to the "too sharp" mainline curves.

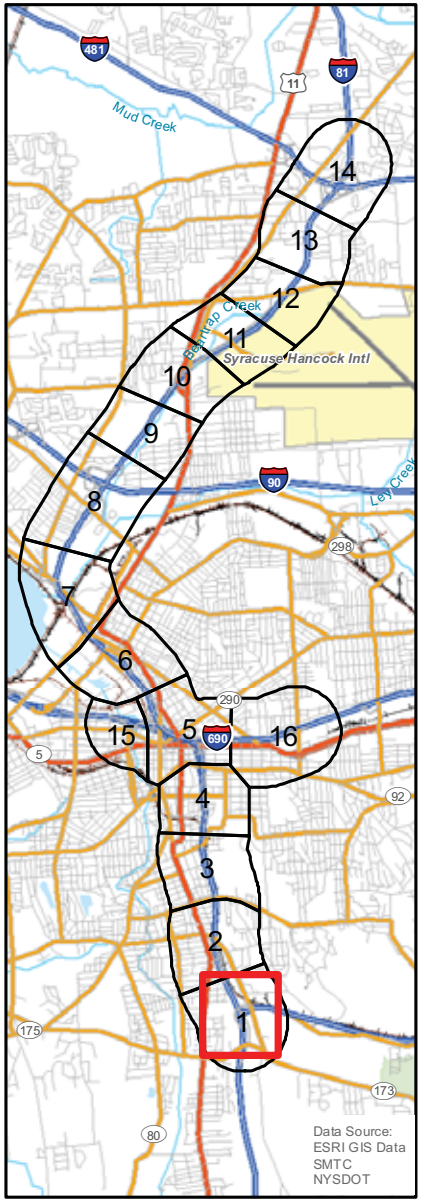
Using the noted design speeds within the project study area, existing conditions were evaluated using the following Table 2.10 – Critical Design Elements to determine the presence of any non-standard design features.

The following Figure 2.23 - Existing Highway Non-Standard Features (Sheets 1-16), display the area with non-standard design features. Each sheet displays a section of the corridor and highlights all the non-standard components associated with that stretch of highway with each feature represented by a different color/sysmbol. The following summarizes the key findings of the non-standard feature analysis by location along the corridor:

- ***I-81 / I-481 South Interchange Area – Exit 16A*** (see Sheet 1): the main interchange connector ramps have two areas of non-standard horizontal curvature and several areas with non-standard grades, superelevation and sight distance.
- ***I-81 Exit 17 Area*** (see Sheet 2): ramp and mainline sight distance issues.
- ***I-81 Viaduct Area*** (see Sheets 3 and 4): Significant issues associated with non-standard shoulder and median widths along with one mainline horizontal curve, mainline sight distance over the railroad and ramp sight distance at Exit 18.
- ***I-81 / I-690 Interchange*** (see Sheet 5): there are significant issues with non-standard shoulder and median widths here (not enough shoulder area or space in the middle of the roadway between opposing lanes). There are also issues with mainline horizontal curvature, sight distance, grades, ramp spacing and layouts, and inadequate super elevation.

- ***I-81 Downtown to Onondaga Lake Parkway – Exit 23*** (see sheets 6 and 7): primarily super elevation issues with one mainline non-standard horizontal curve and ramp sight distance issues.
- ***I-81 Exits 25 and 25A*** (see Sheets 8 and 9): super elevation and ramp sight distance issues.
- ***I-81 / Brewerton Road – Exit 26*** (see Sheet 10): one mainline non-standard horizontal curve and superelevation and sight distance issues.
- ***I-81 / Taft Road – Exit 28*** (see Sheet 12): minor superelevation and sight distance issues.
- ***I-81 Mainline*** (see Sheet 13): one mainline non-standard horizontal curve along with sight distance and superelevation issues.
- ***I-81 / I-481 North Interchange Area – Exit 29*** (see Sheet 14): primary issues are the horizontal curves in the cloverleaf ramp layout along with some grades and sight distances.
- ***I-690 / West Street*** (see Sheet 15): horizontal curvature issues for ramps along with non-standard median width, sight distance and superelevation.
- ***I-690 / Teall Avenue*** (see Sheet 16): minor ramp sight distance issues.

The full tables with details of all the non-standard design features within the project limits are located in Appendix D – Highway Information.



Oct 22, 2010

Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

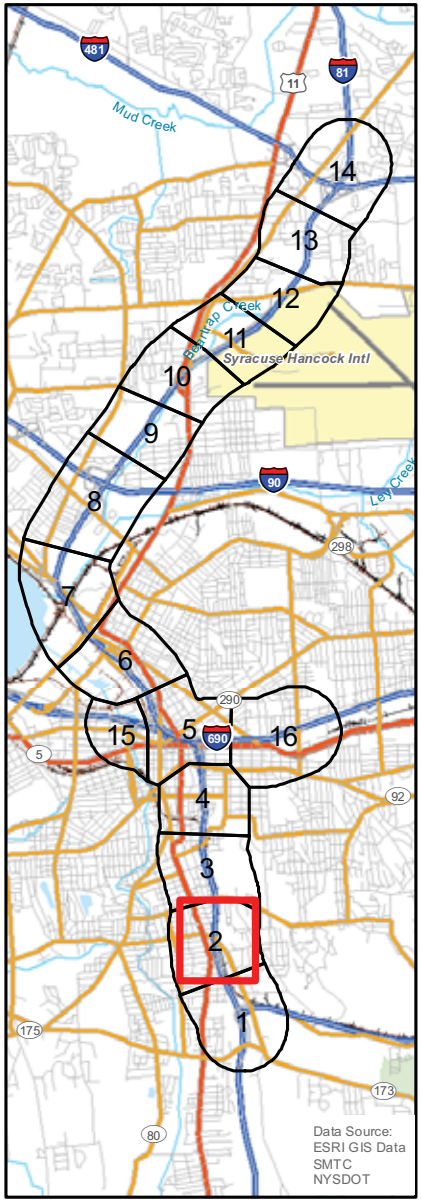
Median Width
Less Than Standard

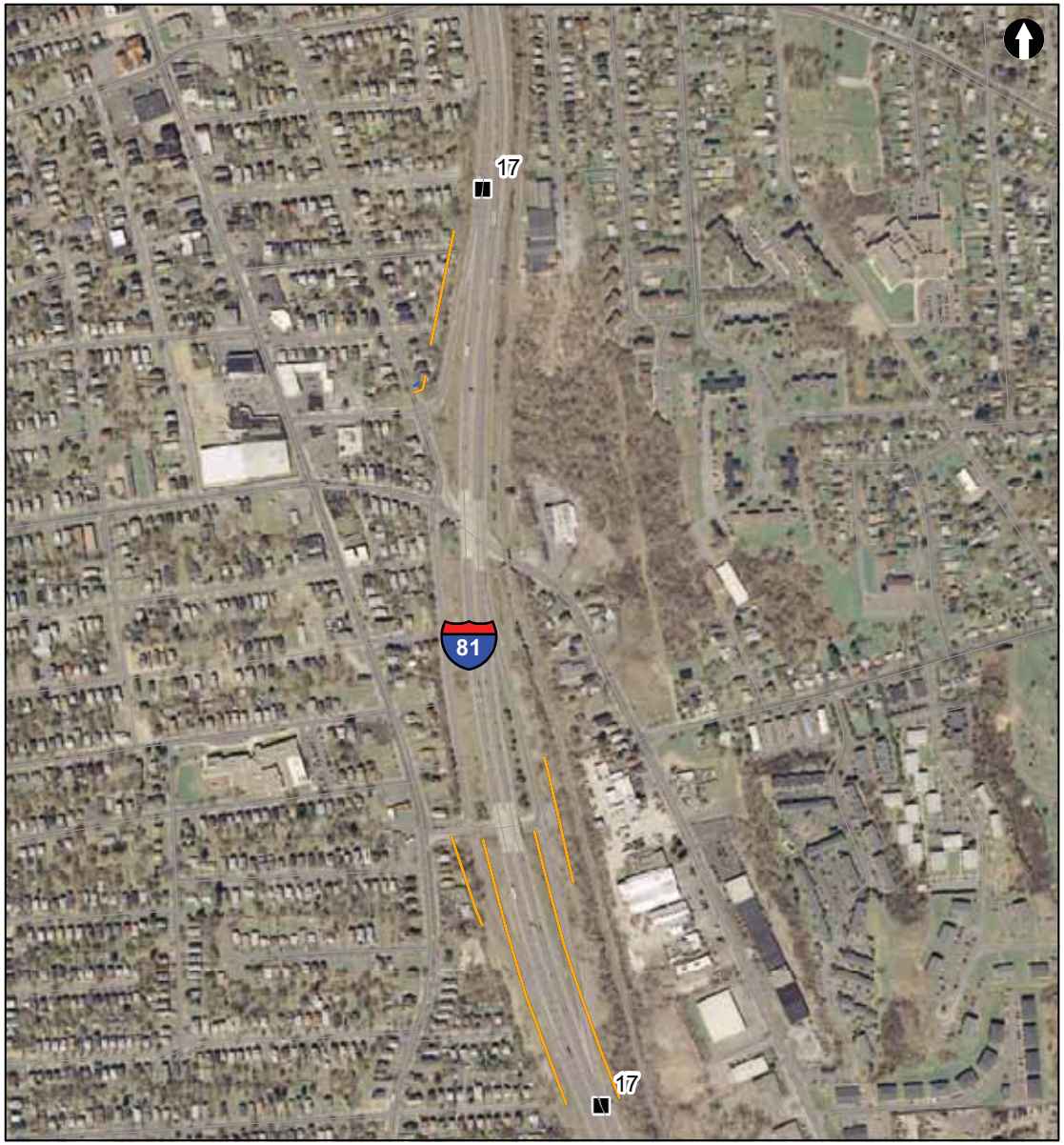
Exit Number

0 250 500 1,000
Feet

SHEET 1

Original in Color Stantec





Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

Median Width
Less Than Standard

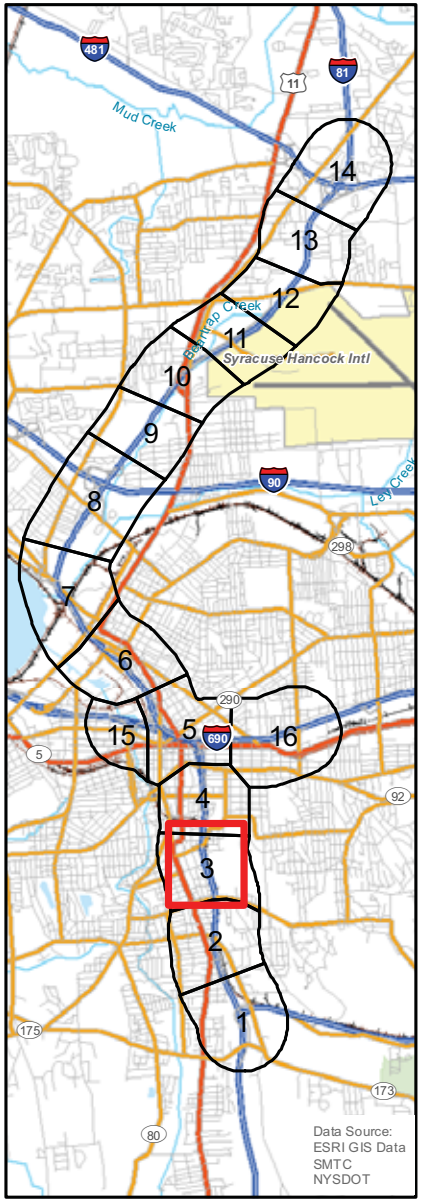
Exit Number

0 250 500 1,000
Feet

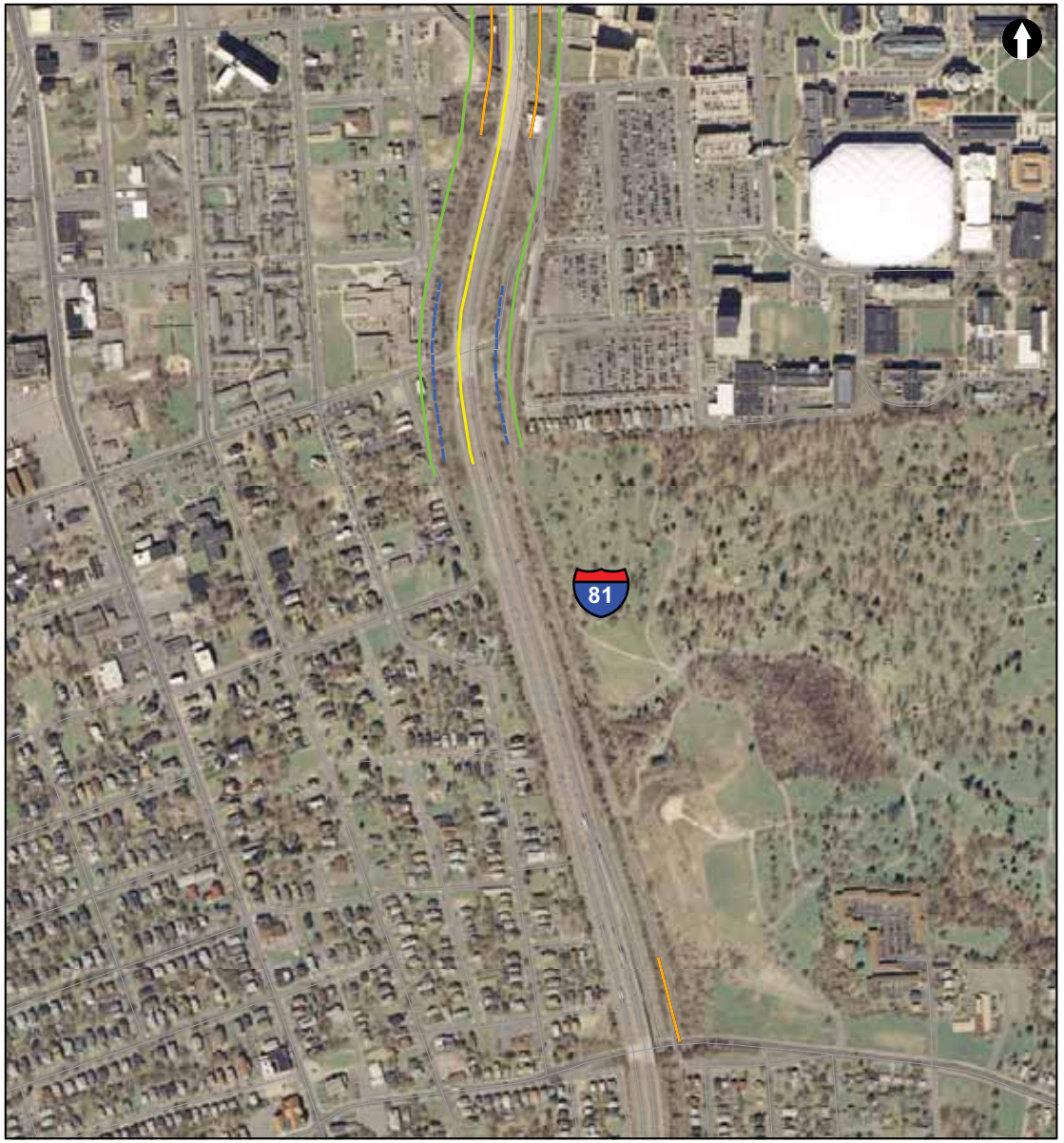
SHEET 2

Oct 22, 2010

Original in Color Stantec



Oct 22, 2010



Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

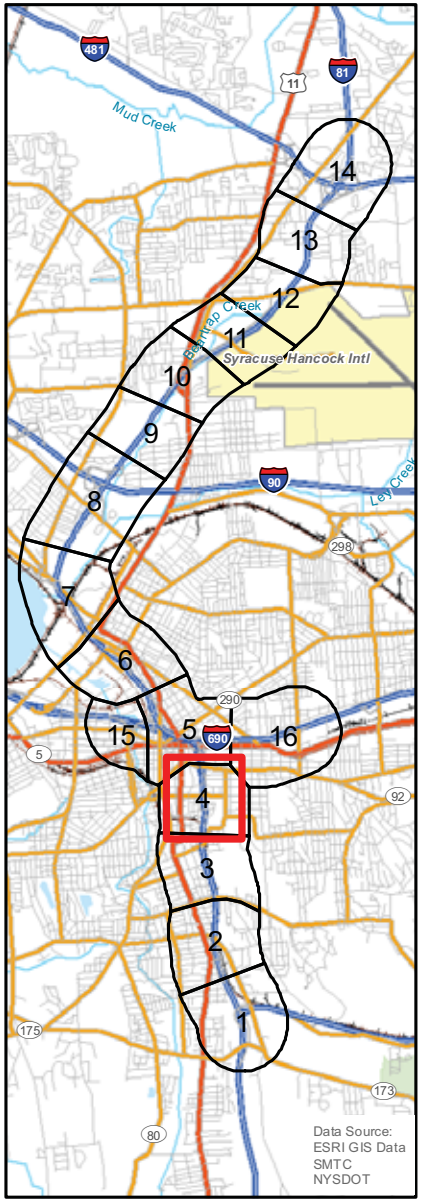
Median Width
Less Than Standard

Exit Number

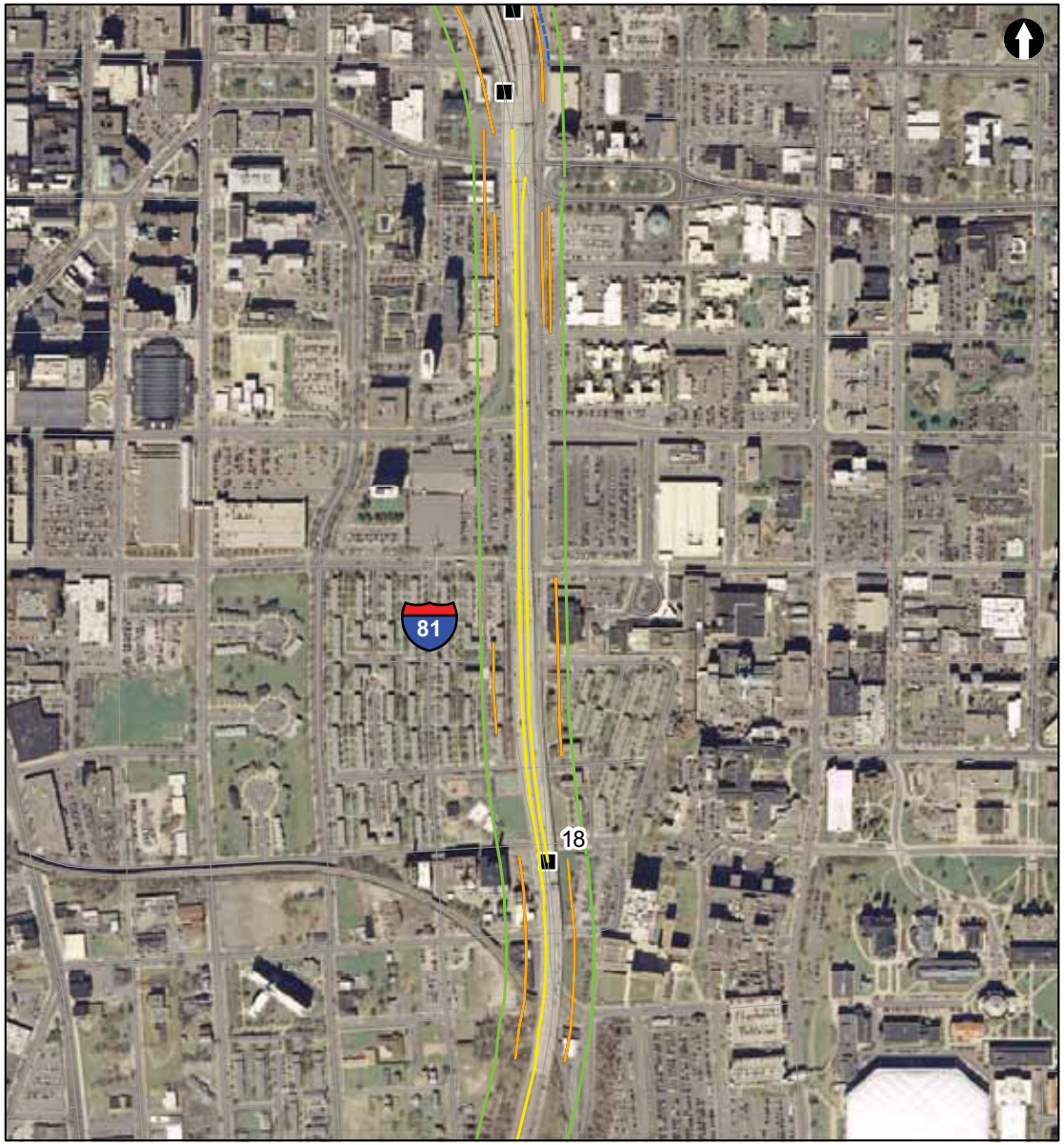
0 250 500 1,000
Feet

SHEET 3

Original in Color Stantec



Oct 22, 2010



Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

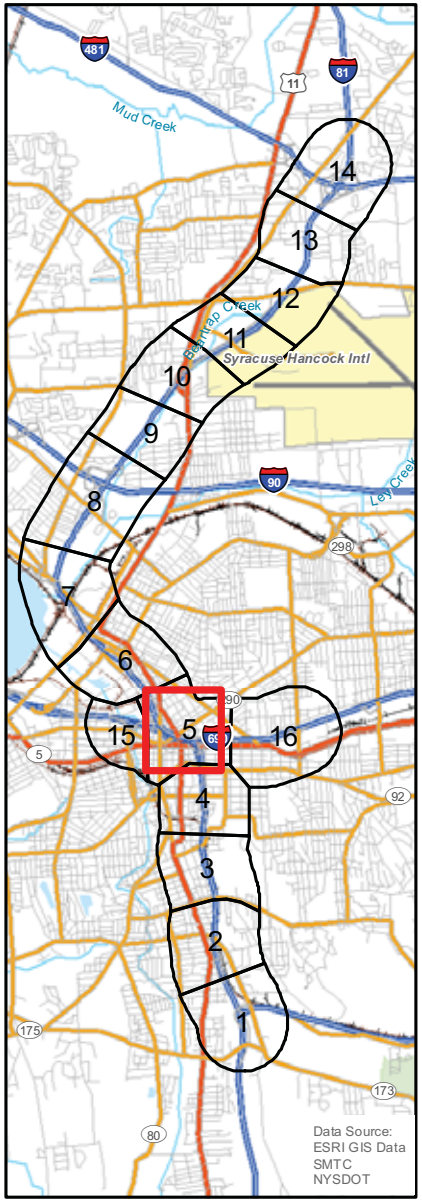
Median Width
Less Than Standard

Exit Number

0 250 500 1,000
Feet

SHEET 4

Original in Color Stantec



Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

Median Width
Less Than Standard

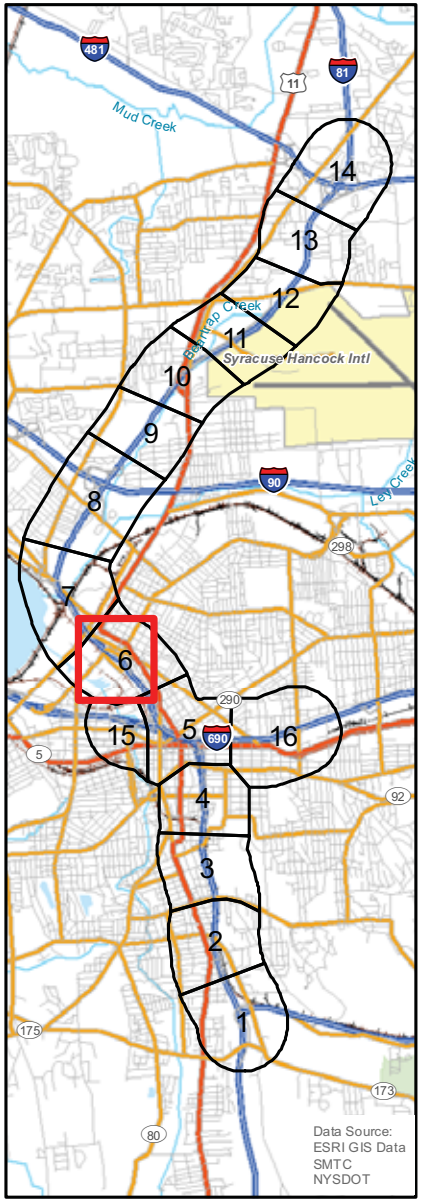
Exit Number

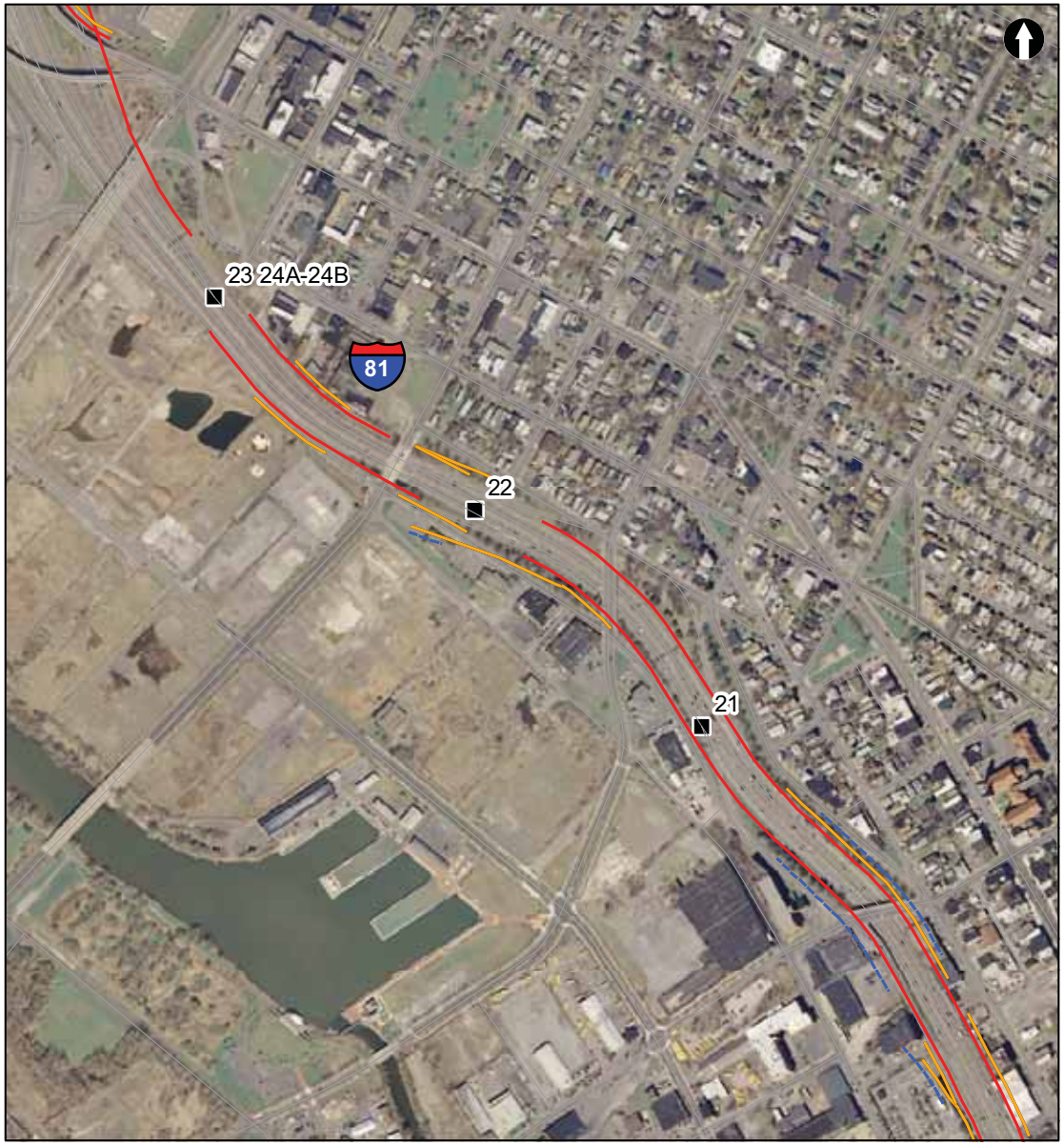
0 250 500 1,000
Feet

SHEET 5

Oct 22, 2010

Original in Color Stantec





Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

Median Width
Less Than Standard

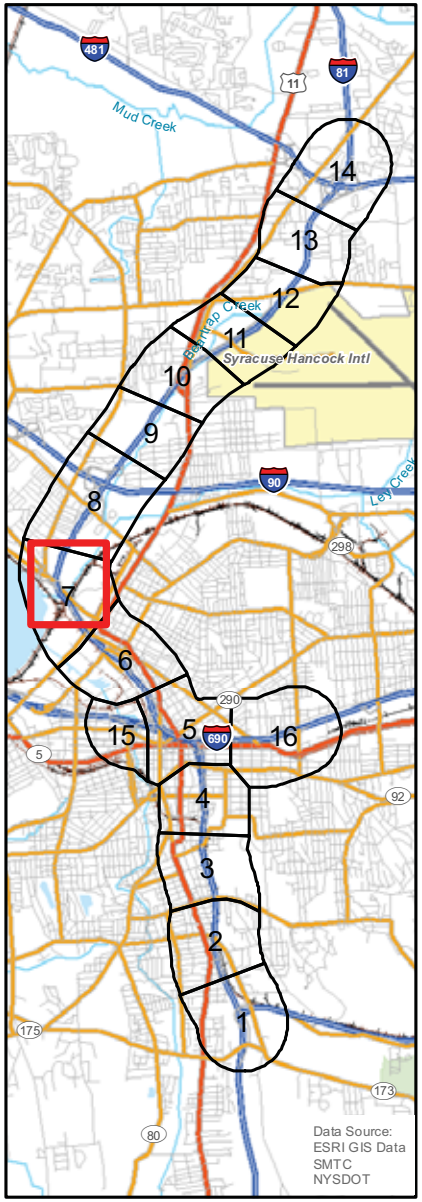
Exit Number

0 250 500 1,000
Feet

SHEET 6

Oct 22, 2010

Original in Color Stantec



Oct 22, 2010

Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

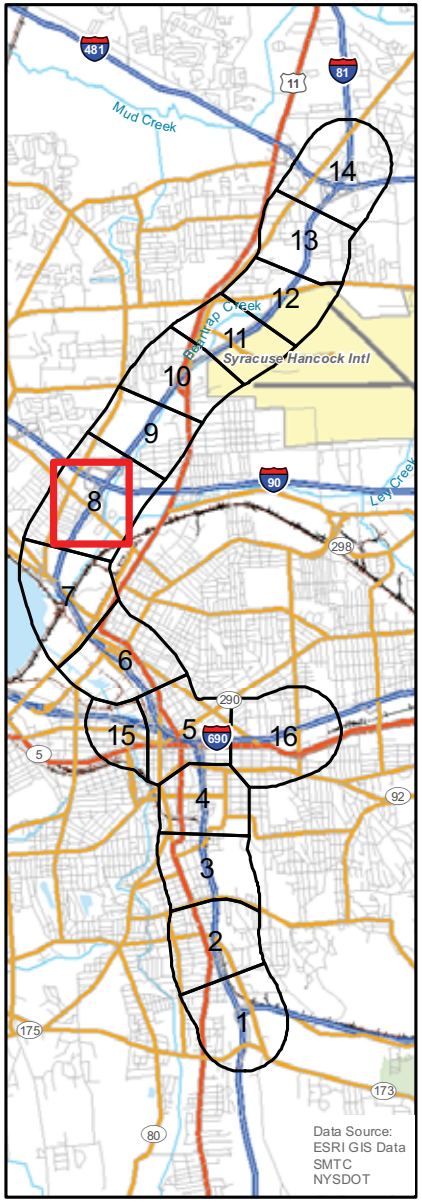
Median Width
Less Than Standard

Exit Number

0 250 500 1,000
Feet

SHEET 7

Original in Color Stantec



Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

Median Width
Less Than Standard

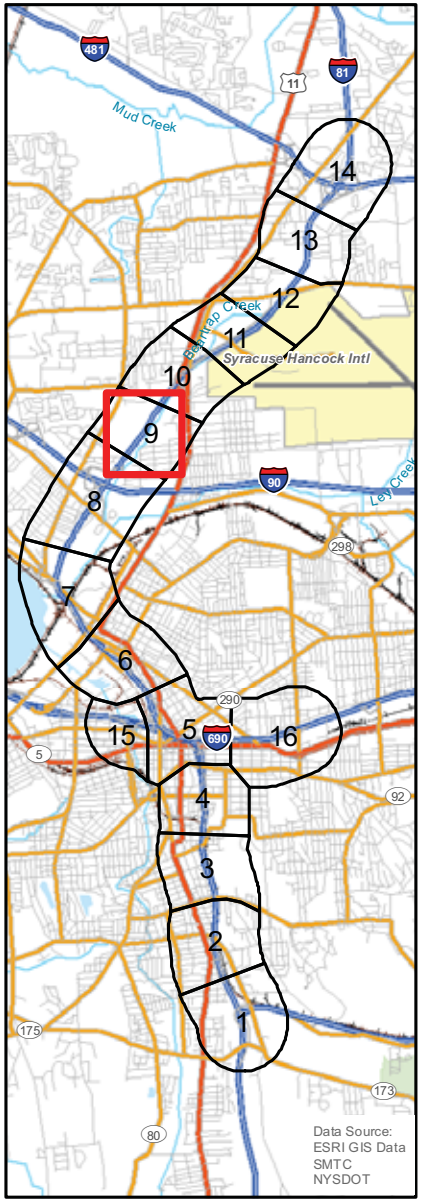
Exit Number

0 250 500 1,000
Feet

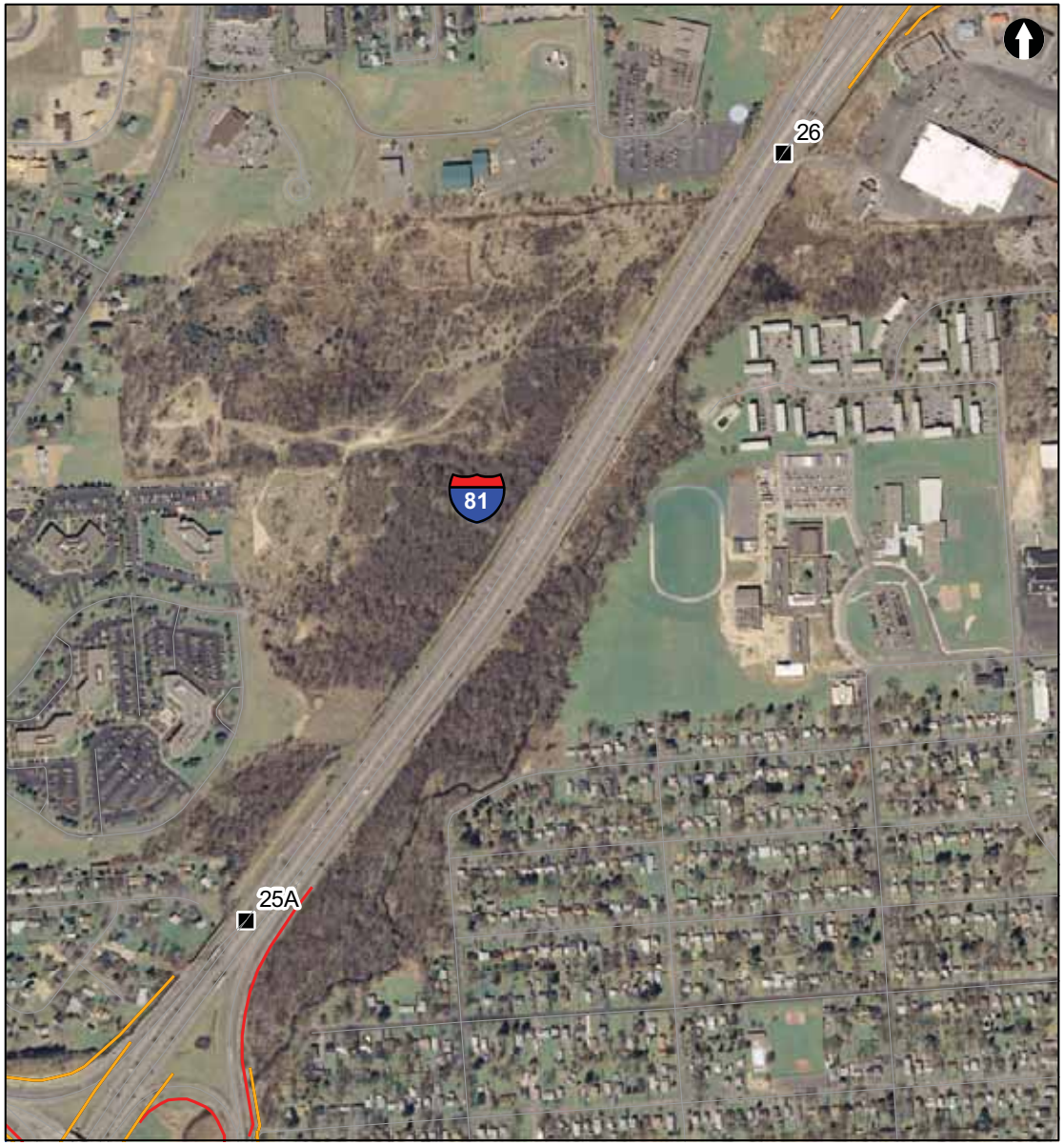
SHEET 8

Oct 22, 2010

Original in Color Stantec



Oct 22, 2010



Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

Median Width
Less Than Standard

Exit Number

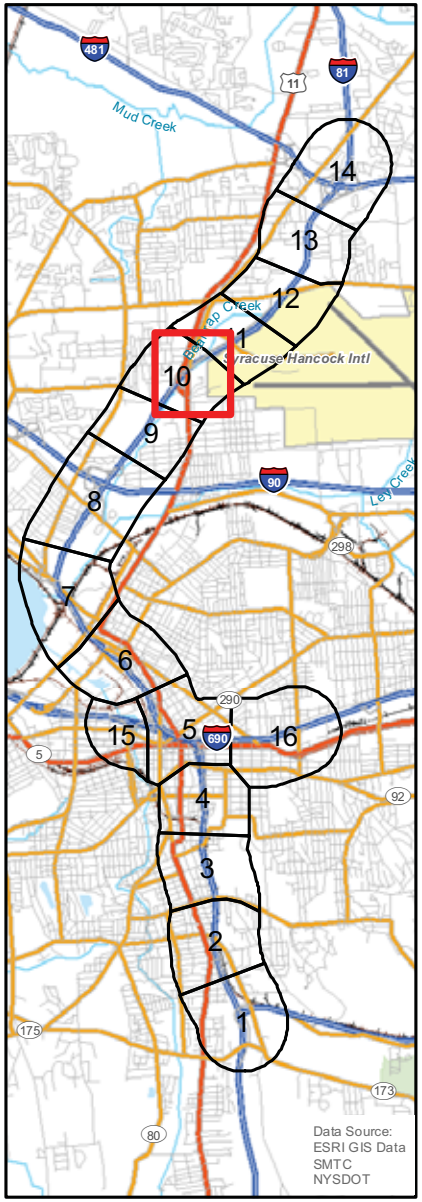
0 250 500 1,000
Feet

SHEET 9

Original in Color Stantec

Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features



Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

Median Width
Less Than Standard

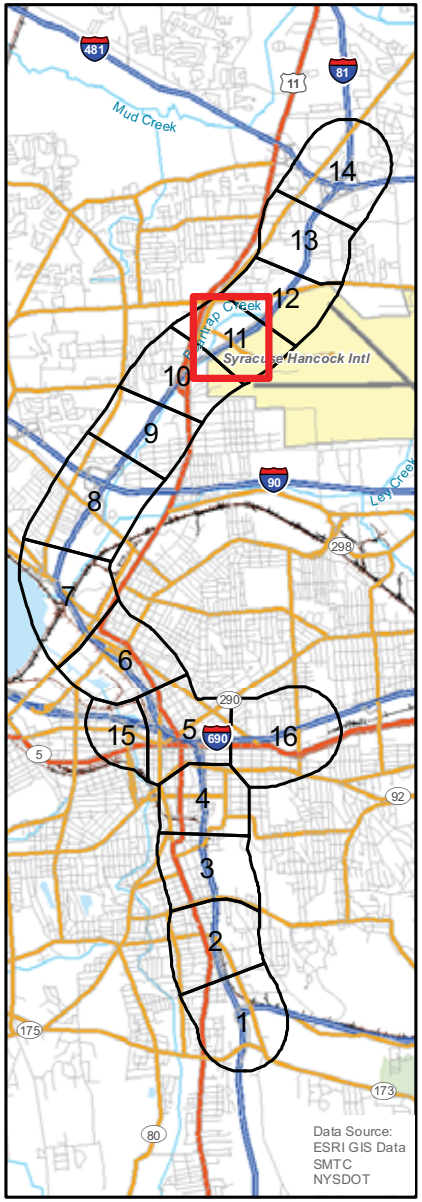
Exit Number

0 250 500 1,000
Feet

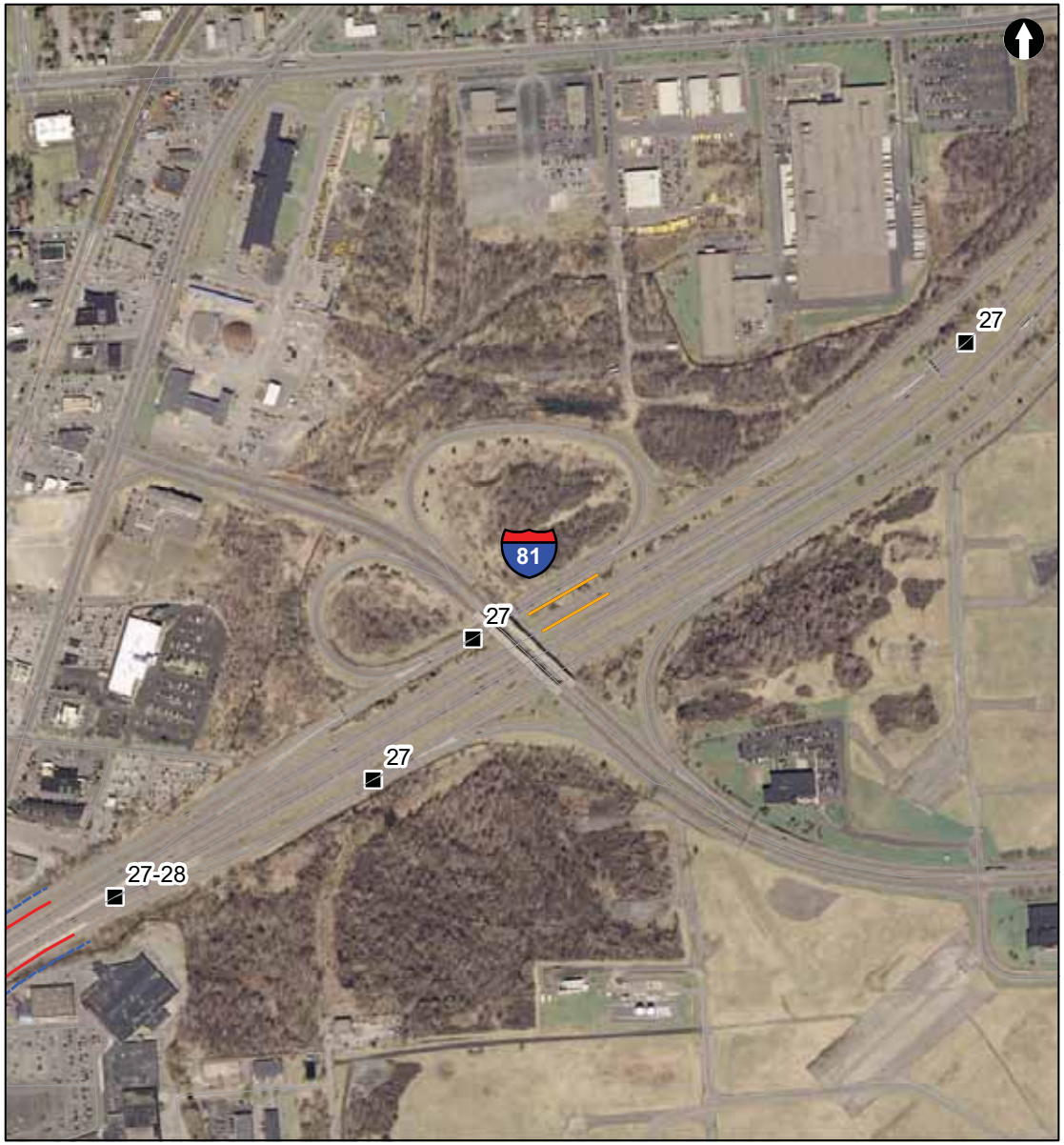
SHEET 10

Oct 22, 2010

Original in Color Stantec



Oct 22, 2010



Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

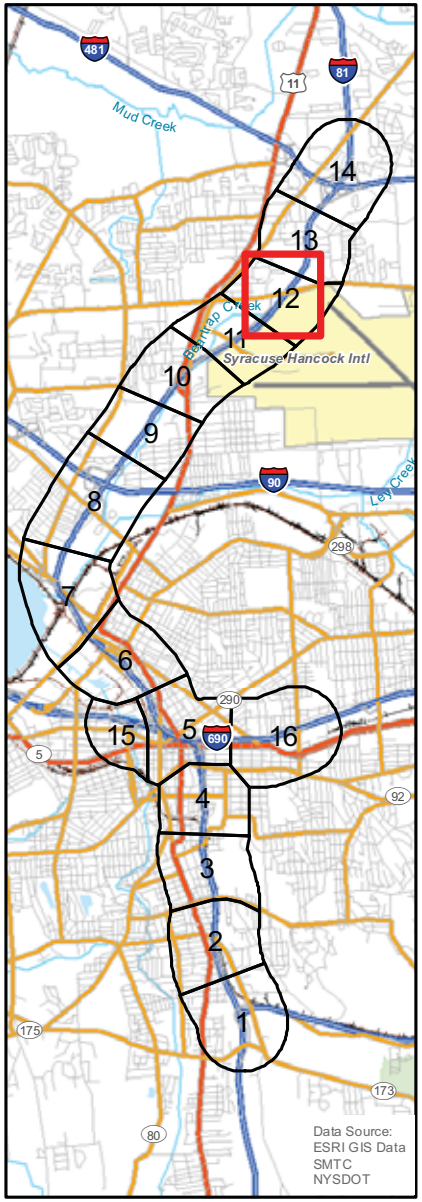
Median Width
Less Than Standard

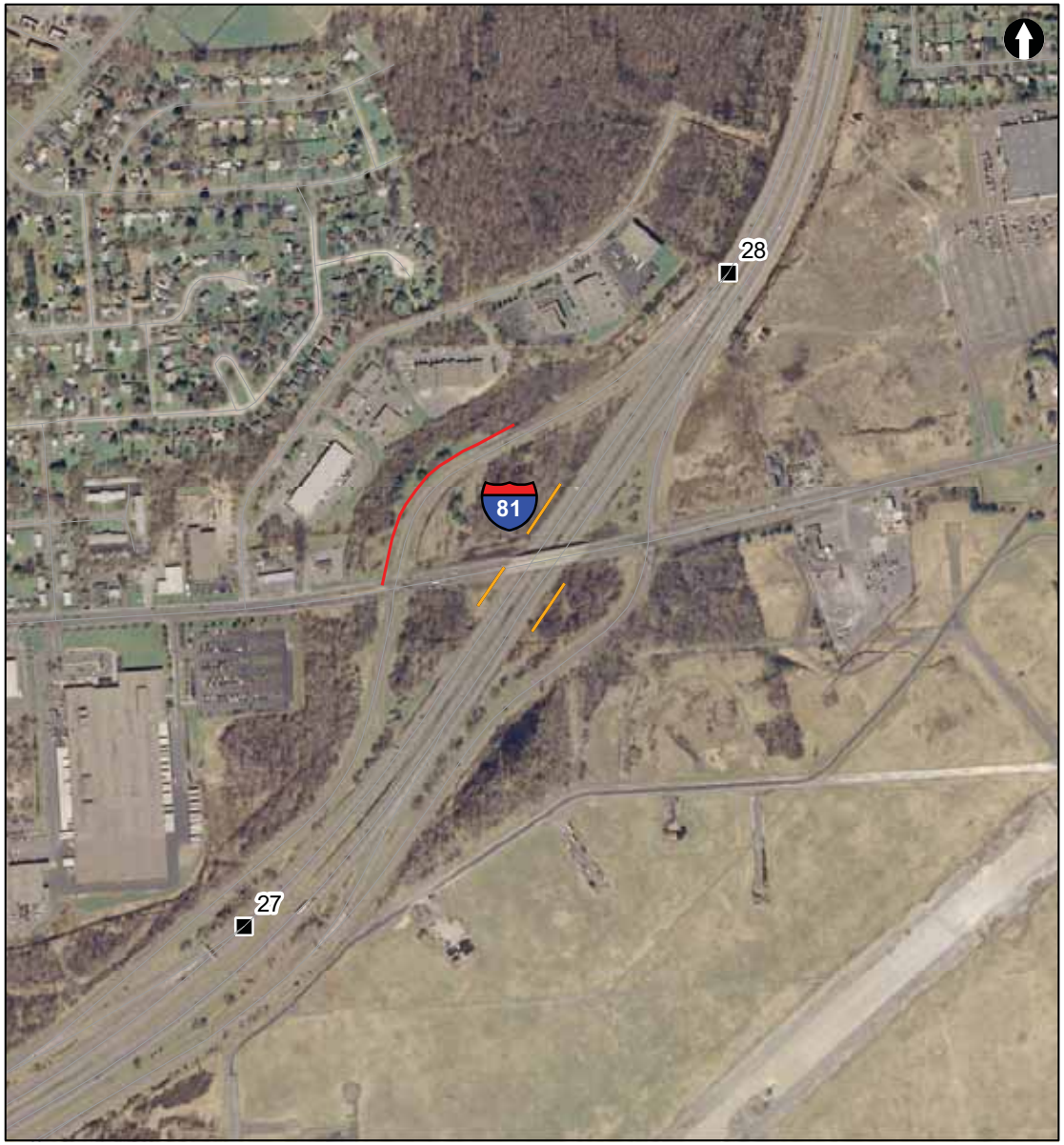
Exit Number

0 250 500 1,000
Feet

SHEET 11

Original in Color Stantec





Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

Median Width
Less Than Standard

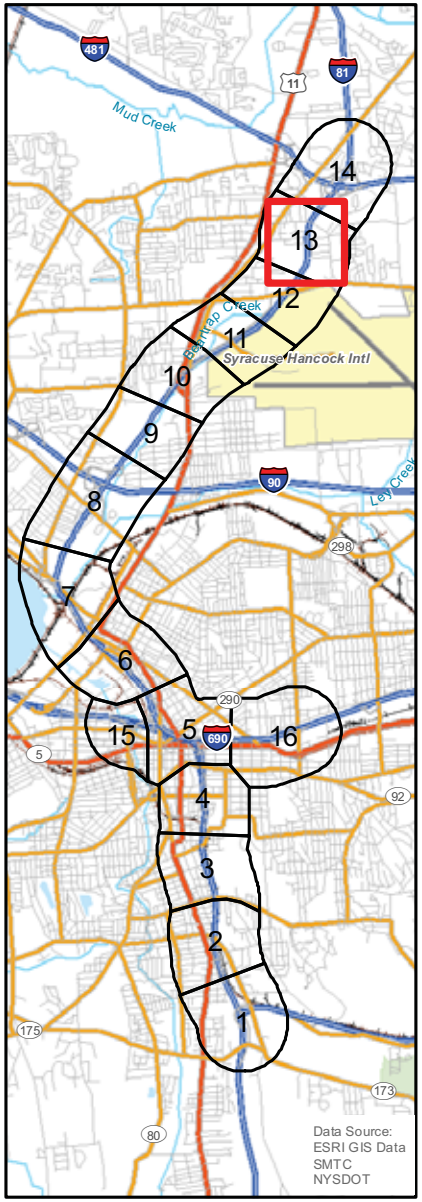
Exit Number

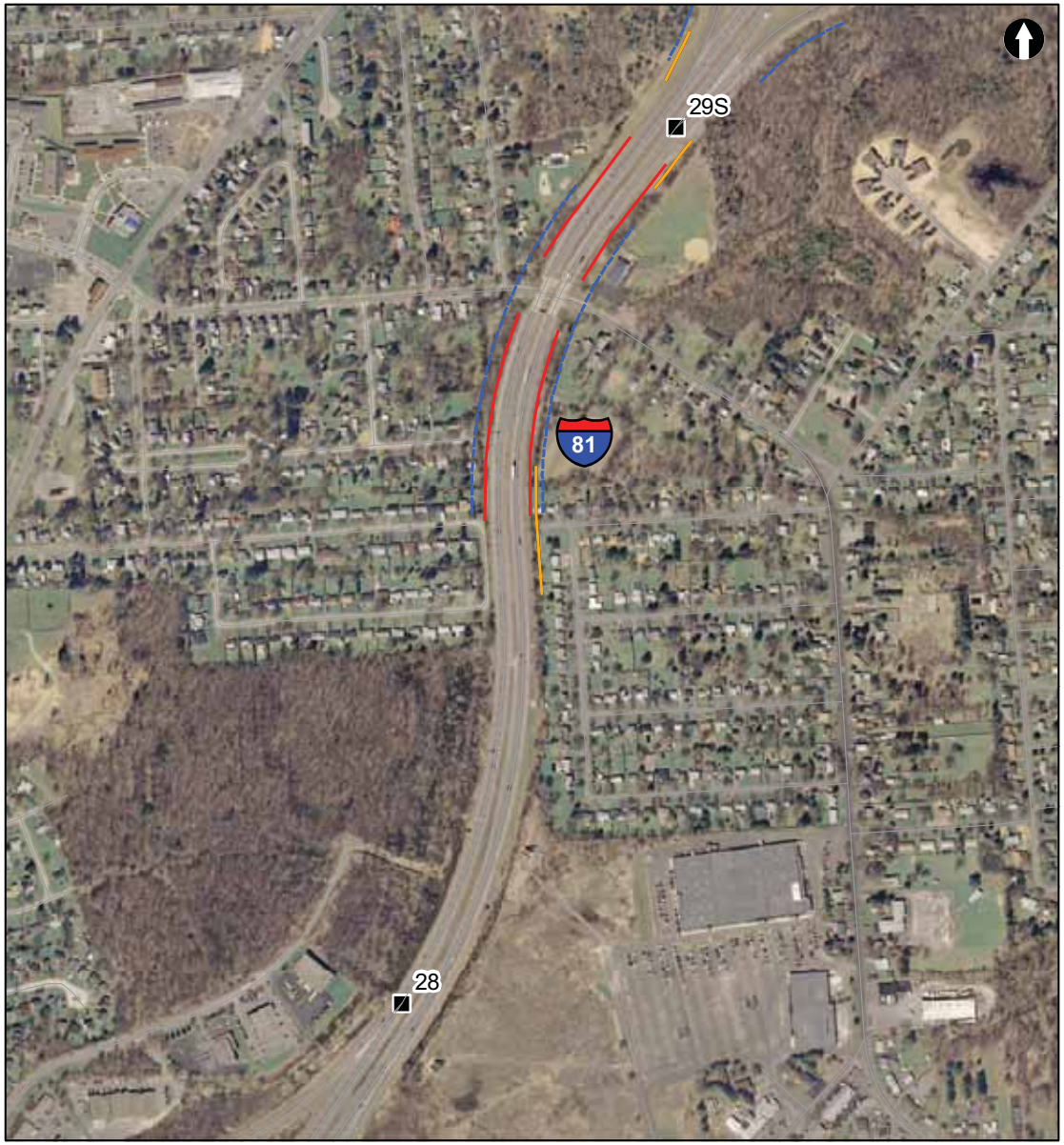
0 250 500 1,000
Feet

SHEET 12

Oct 22, 2010

Original in Color Stantec





Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

Median Width
Less Than Standard

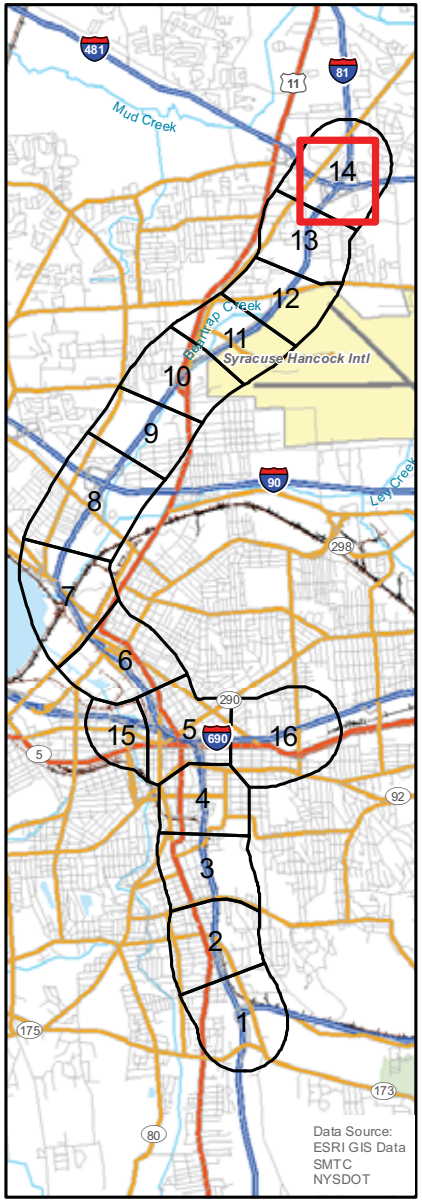
Exit Number

0 250 500 1,000
Feet

SHEET 13

Oct 22, 2010

Original in Color Stantec



Oct 22, 2010

Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

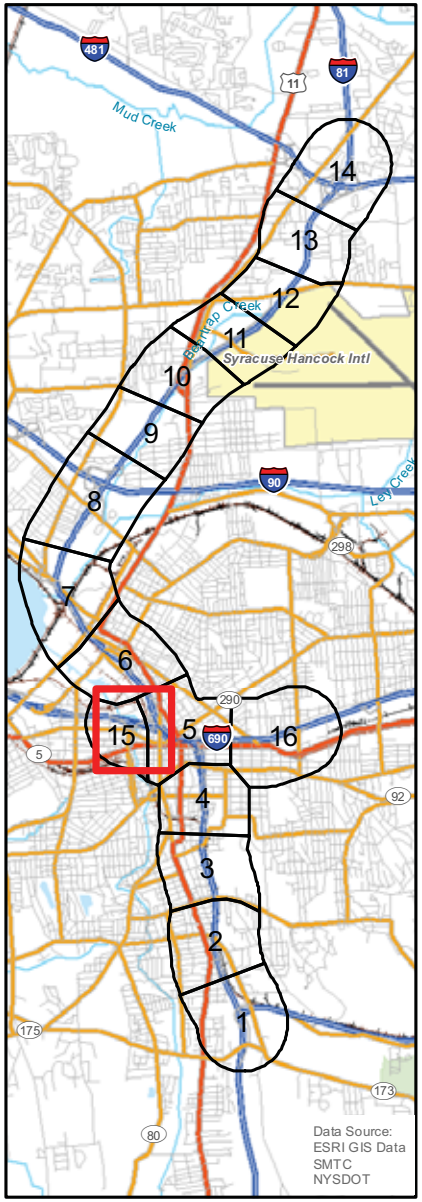
Median Width
Less Than Standard

Exit Number

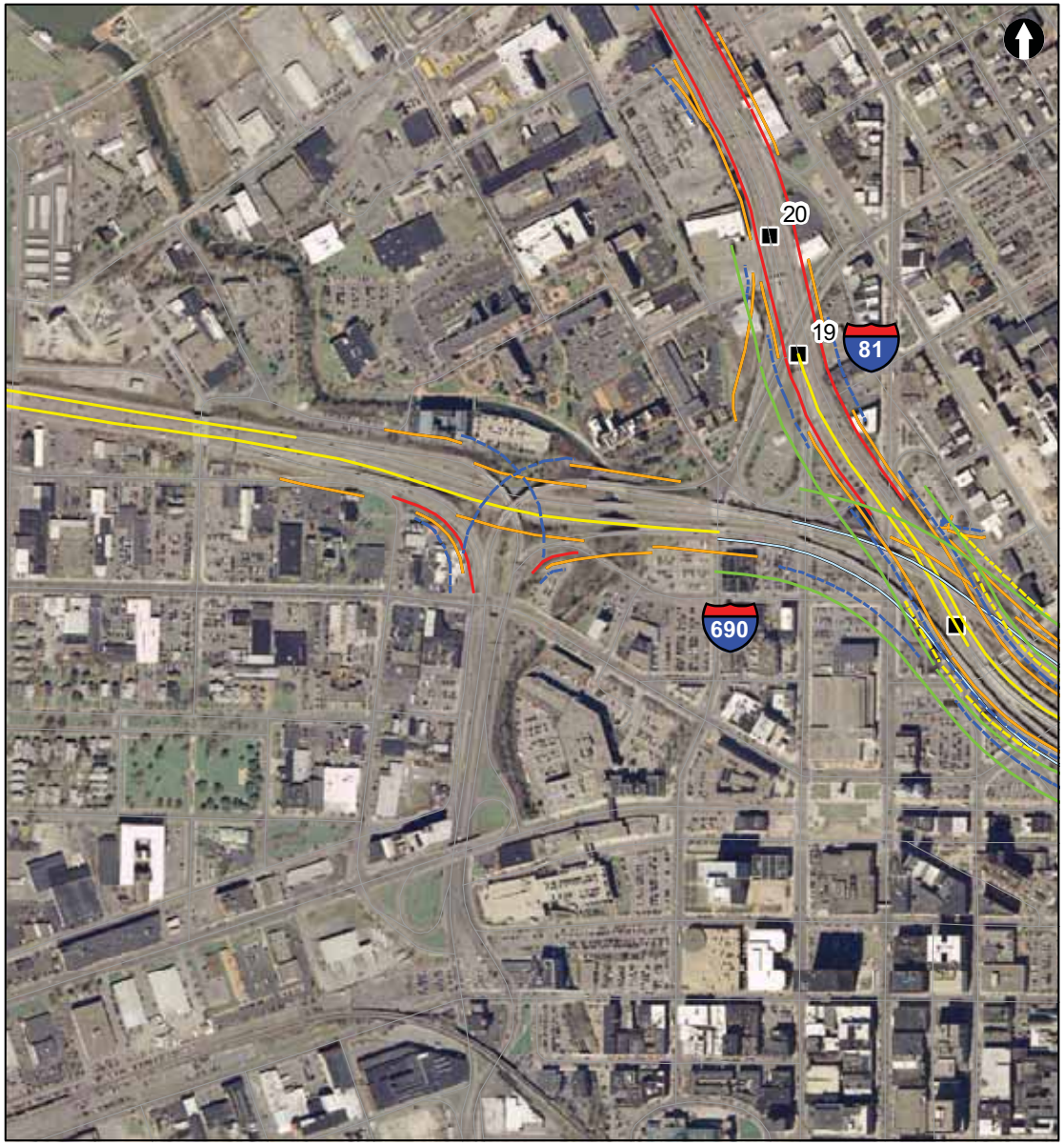
0 250 500 1,000
Feet

SHEET 14

Original in Color Stantec



Oct 22, 2010



Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

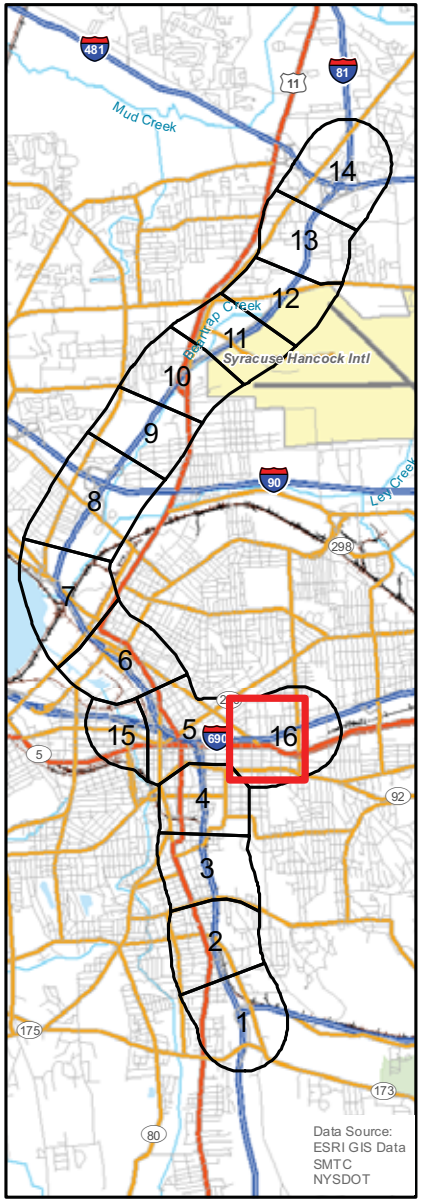
Median Width
Less Than Standard

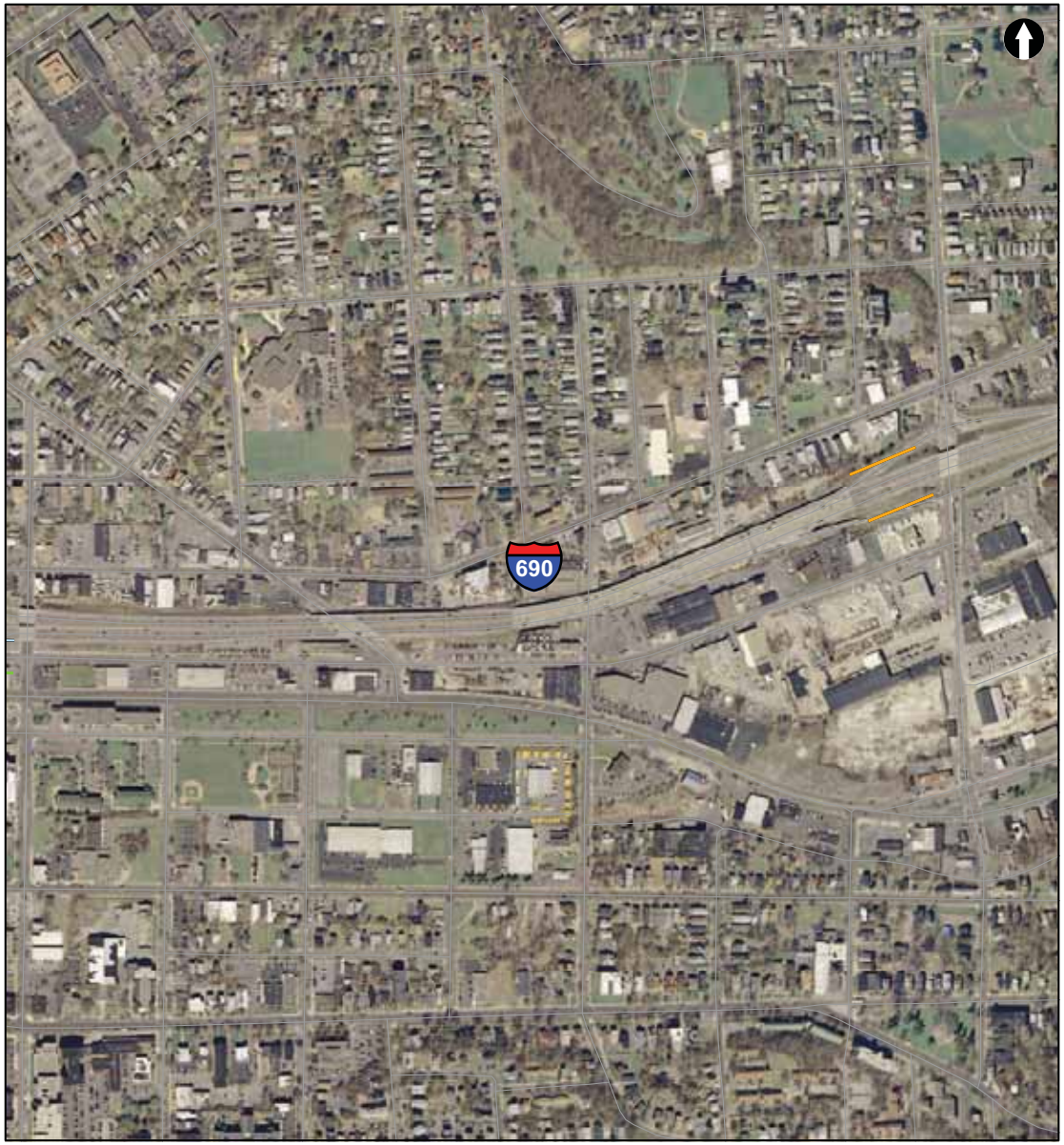
Exit Number

0 250 500 1,000
Feet

SHEET 15

Original in Color Stantec





Interstate 81 Corridor Assessment

Figure 2.23 - Existing Highway Non-Standard Features

Legend

Shoulder Width
Less Than Standard

Grade
Less Than Standard

Horizontal Curve Radius
Less Than Standard

Sight Distance
Less Than Standard

Superelevation
Less Than Standard

Lane Width
Less Than Standard

Median Width
Less Than Standard

Exit Number

0 250 500 1,000
Feet

SHEET 16

Oct 22, 2010

Original in Color Stantec

Table 2.9 - EXISTING HIGHWAY FEATURES

	I-81 Section Description (see maps for location)	Distance (ft) Miles	Lanes NB (SB)	Lane Width NB (ft)	Lane Width SB (ft)	Lane Designation NB	Lane Designation SB	Shoulder Width NB Left (ft)	Shoulder Width SB Left (ft)	Shoulder Width NB Right (ft)	Shoulder Width SB Right (ft)	Guide Rail	Curbed Section	Median Type	Median Width (ft)	Lighted	Posted Speed NB (mph)	Posted Speed SB (mph)	Interchange NB Number	Interchange SB Number
1	I-481 Southerly Interchange	(5707) 1.08	3 (3)	12	12	3 Travel w/ exit only	3 Travel w/ exit only	6	6	12	10	Intermittent Steel	No	Concrete Barrier	14 - 350	No		65 mph	16A, 17	
2	E Calthrop Ave Exit 17 to E. Colvin St	(4743) 0.9	3 (3)	12	12	3 Travel	3 Travel	6	6	10	10	Steel	No	Concrete Barrier	14 - 15	Yes	55 mph		18	
3	E. Colvin St to Railroad/Van Buren st, beginning of VIADUCT	(3941) 0.75	3 (3)	12	12	3 Travel w/ on ramp	3 Travel	6	6	10	10	Concrete & Steel	On Concrete Barriers	Concrete Barrier	14 - 15	Yes				17
4	VIADUCT - Railroad/Van Buren St to E. Fayette st.	(4150) 0.79	2 (2)	12	12	2 Travel either on ramps	2 Travel w/ exit only	4	4	5	5	Concrete	On Concrete Barriers	Concrete Barrier	8	Yes	45 mph	55 mph	I690	
5	VIADUCT - E. Fayette St to Genant/Butternut Street Exit 20	(5635) 1.1	2 (2)	12	12	2 Travel w/ off/ on only ramps	2 Travel w/ off/on ramps	0	0	0	0	Concrete	On Concrete Barriers	No Median, Raised Split	2 - 12	Yes	45 mph	45 mph	I81N&S	18, 19, 20
6	Genant Dr to Hiawatha Blvd	(4802) 0.91	3 (3)	12	12	3 Travel	3 Travel	4	4	10	10	Intermittent Steel	No	Concrete Barrier	14 - 18	Yes	55 mph		22, 23, 24	
7	Hiawatha Blvd to SB off ramp Exit 22/23A-B	(5402) 1.02	3 (3)	12	12	3 Travel	3 Travel	10	10	10	10	Concrete	No	Concrete Barrier	20 - 22	Yes	65 mph	55 mph		
8	SB off ramp Exit 22/23A-B to I-90 NB On ramp	(6594) 1.25	4 (4)	12	12	3 Travel	3 Travel	10	10	10	10	Concrete (NB) Concrete w/steel (SB)	No	Concrete Barrier	22 - 30	No		55 mph	25, 25a	22, 23
9	I-90 On-ramp to Rt. 11 NB off ramp (Exit 26)	(3605) 0.68	4 (4)	12	12	4 Travel	4 Travel	10	10	10	10	None	No	Concrete Barrier	20 - 28	No			26	25a
10	Rt. 11 NB off ramp to Airport Blvd SB on ramp (Exit 27-28)	(4227) 0.80	3 (3)	12	12	3 Travel	3 Travel	10	10	10	10	None	No	Split Raised Structure GAP	Gap & 20 - 40	No				
11	Airport Interchange Area	(3533) 0.67	3 (3)	12	12	3 Travel	3 Travel	6	6	12	12	Steel @ bridge base	No	Grassy, Concrete @ Bridge	40 - 80	No		65 mph		
12	Taft Road Interchange Area	(3536) 0.67	3 (3)	12	12	Travel	Travel	6	6	12	12	Small steel sections	No	Grass Ditch	50	No				27, 28
13	North of Taft Rd to I-481 Ramps	(4055) 0.77	3 (3)	12	12	Travel	Travel	6	6	12	12	Steel @ Curves	No	Grass Ditch	40 - 50	No	65 mph	65 mph	29S	
14	I-481 Northerly Interchange	(5945) 1.13	3 (3)	12	12	3 Travel	3 Travel	6	6	12	12	Intermittent Steel	No	Grass Ditch	40		65 mph		29N	29N
15	I-690 from Van Rensselaer St to N Franklin St	(3601) 0.68	4 (4)	12	12	2 Travel	2 Travel	6	6	10	10	Steel, Concrete @ Bridges		Steel & Concrete Barrier	18 - 40	YES	55 mph (WB)	45 mph (EB)	11 (WB)	11,12 (EB)
16	I-690 from I-81 Interchange to Teall St	(6590) 1.25	3 (3)	11	11	3 Travel	3 Travel	3.5	3.5	10	12	Steel, Concrete @ Bridges		Concrete Barrier	10	YES		55 mph (EB)	14 (WB)	14 (EB)

Not NB = North Bound Travel Direction, SB = South Bound Travel Direction

TABLE 2.10 - CRITICAL DESIGN ELEMENTS

DESIGN CRITERIA	I-81 Exits 16 to 18	I-81 Exits 18 to 20	I-81 Exits 20 to 25	I-81 Exits 25 to 29	I-690 Exits 11 to 14	DIRECT RAMPS	SEMI DIRECT RAMPS (7)	LOOP RAMPS	LOCAL LOOP RAMPS
Design Speed **(4)**	70 mph	60 mph	60 mph	70 mph	60 mph	60 mph	50 mph	30 mph	30 mph
Min. Lane Width **(3)**	12 ft	12 ft	12 ft	12 ft	12 ft	12 ft	12 ft	12 ft **(6)**	12 ft **(6)**
Min. Shoulder Width									
Right	10 ft	10 ft	10 ft	10 ft	10 ft	8 ft	6.5 ft	6.5 ft	6.5 ft
Left	4 ft	4 ft	4 ft	4 ft	4 ft	3 ft	3 ft	3 ft	3 ft
Min. Bridge Roadway Width	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**
Max. Grade (Rolling Terrain)	4%	4%	4%	4%	4%	5%	6%	6%	6%
Min. Horizontal Curvature (Radius)	2040 ft	1330 ft	1330 ft	2040 ft	1330 ft	840 ft	485 ft	235 ft	150 ft
Max. Superelevation	6%	6%	6%	6%	6%	6%	6%	6%	6%
Min. Stopping Sight Distance	730 ft	570 ft	570 ft	730 ft	570 ft	425 ft	305 ft	200 ft	155 ft
Min. Lateral Clearance	15' w/o Barrier,	15' w/o Barrier,	15' w/o Barrier,	15' w/o Barrier,	15' w/o Barrier,				
Right	4' with Barrier	4' with Barrier	4' with Barrier	4' with Barrier	4' with Barrier	6 ft	6 ft	6 ft	6 ft
Left	**(10)**	**(10)**	**(10)**	**(10)**	**(10)**	4 ft	4 ft	4 ft	4 ft
Min. Vertical Clearance **(2)**	16 ft	16 ft	16 ft	16 ft	16 ft	16 ft	16 ft	16 ft	16 ft
Pavement Cross Slope: **(9)**									
Min.	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Max.	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Rollover:									
Between Lanes	4% max.	4% max.	4% max.	4% max.	4% max.	4% max.	4% max.	4% max.	4% max.
At Pavement Edge	8% max.	8% max.	8% max.	8% max.	8% max.	8% max.	8% max.	8% max.	8% max.
Min. Structural Capacity **(8)**	MS-23	MS-23	MS-23	MS-23	MS-23	MS-23	MS-23	MS-23	MS-23
Level of Service	C Min,	C Min,	C Min,	C Min,	C Min,	C Min,	C Min,	C Min,	C Min,
Control of Access	Full Control	Full Control	Full Control	Full Control	Full Control	Full Control	Full Control	Full Control	Full Control
Pedestrian Accom.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Minimum Median Width	10 ft Min.	10 ft Min.	10 ft Min.	10 ft Min.	10 ft Min.	N/A	N/A	N/A	N/A
Design Vehicle	WB-20	WB-20	WB-20	WB-20	WB-20	WB-20	WB-20	WB-20	WB-20

N/A Not Applicable

(1) Use Proposed Highway Approach Width

(2) 0.5 ft of additional clearance for maintenance overlay is desired.

(3) Minimum width shown. Additional width may be required for turning roadways. Overall ramp width to be based on Case II - one lanes, one way operation with provision for passing a stalled vehicle and vehicles combinations (Category A-D)

(4) Design speeds were typically established by assuming a value of 5 mph over the posted speed planned for the proposed facilities.

(5) Trucks exceed 250 DDHV

(6) Ramps passing under structures require an additional 4.0 ft lateral clearance beyond the outside shoulders to bridge piers or abutments.

(7) Diagonal or Semidirect Ramps.

(8) Minimum structural capacity for new bridges shall be MS-23. Bridge rehabilitations may use MS-18.

(9) Values shown are for normal crown/tangent segments.

(10) The minimum horizontal clearance to obstructions (measured from edge of travel way) is 15 ft where no barrier is provided. Where barrier is provided, the minimum is the shoulder width, but never less than 4 ft.

Other Design Parameters – Non Conforming Design Features

Other design parameters include reviewing and assessing other critical design elements beyond Section 2.3.3.2(1) which have an influence on the existing system operations and in this case are directly related to the interchanges function and operation within the primary study area and their conformance with the guidelines. Critical design elements that are documented herein include:

- Ramp Spacing
- Ramp Acceleration / Deceleration Length
- Interchange Spacing

Interchange Spacing

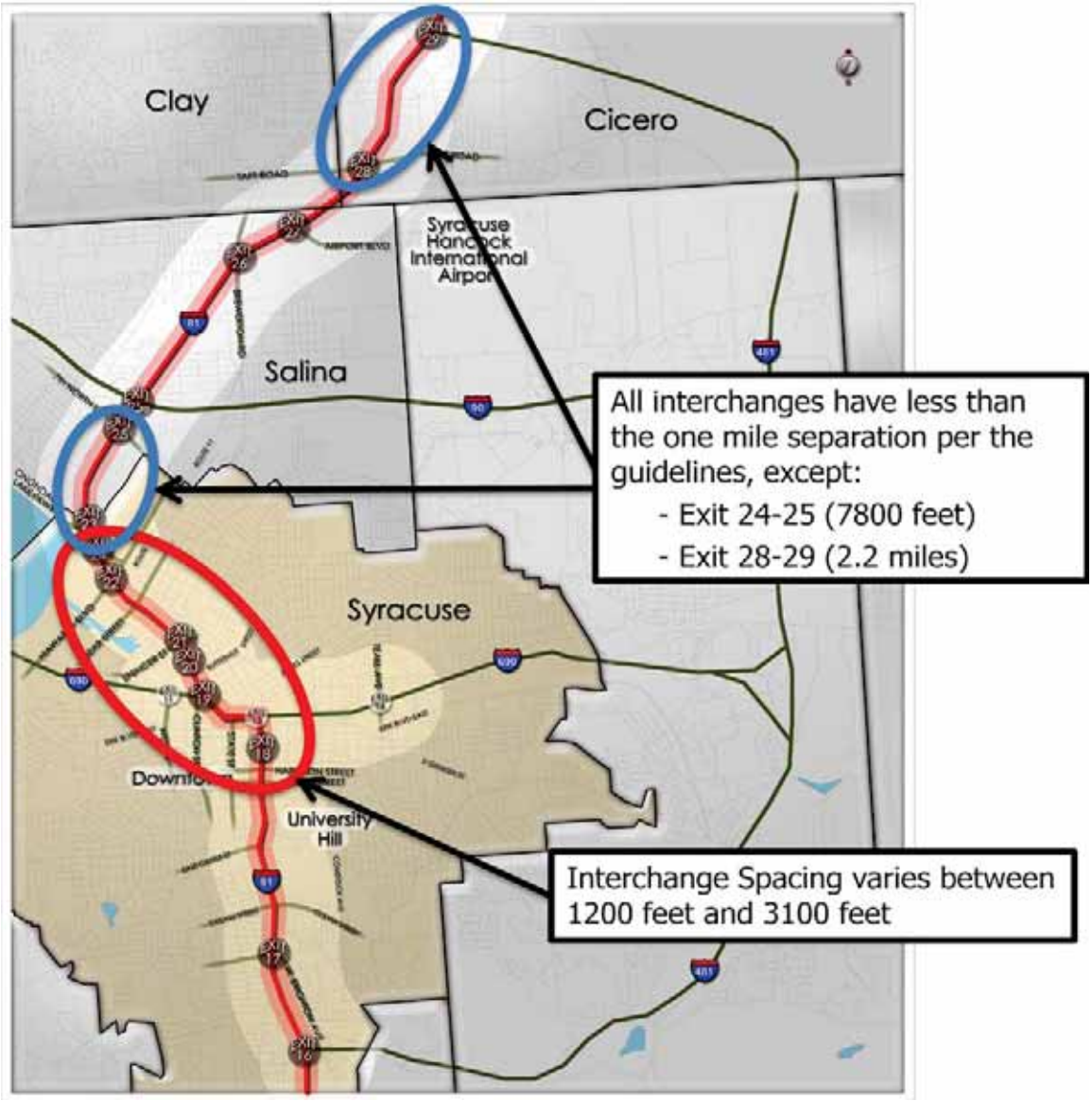
There are 18 interchanges in the primary study area. Of these, four are what is classified as a system interchange. A system interchange is considered to be a major juncture of two highways where the traffic flows freely between them. The four system interchanges are: I-81/I-481 South, I-81/I-690, I-81/I-90 and I-81/I-481 North. These are all of special importance as "system" junction points. The remaining 14 interchanges are "service" interchanges where the interstate highway intersects with local arterials.

- Two of the system interchanges (I-81/I-481 South and I-81/I-690) have local service interchanges essentially embedded within the overall system interchange.
- I-81/I-690 is particularly complicated with the closely spaced downtown interchanges.
- The I-81 / I-690 system interchange is also not a fully directional layout. The southbound I-81 to westbound I-690 and vice versa connections are missing. Drivers are diverted to Bear Street.
- Interchange spacing for the primary corridor (I-81) is less than the recommended AASHTO guideline of one mile for almost all the interchanges. This issue is most prevalent in the downtown area.

Figure 2.24 shows a summary of the interchange spacing issues.

Of particular importance is the I-81/I-690 interchange area. This area has numerous non standard/non conforming design features and overlaps areas of accident and capacity problems. Figure 2.25 (Sheets 1-16) illustrate the non-conforming design features.

Figure 2.24 - Interchange Spacing Summary



- ***I-81 / I-690 Interchange Area:*** a large majority of the issues are located in this area along with the I-81 Exit 18 (Almond St) just south of the interchange, the system of interchange (Exits 19-23) immediately north of the I-81/I-690 interchange, the I-690 West Street Interchange (Exit 11) on the west and I-690 Exit 13 on the east. Overall, there are significant sections where ramp spacing is below the guideline values and there are acceleration /deceleration and geometric issues for ramps. Most likely, the worst location is the weaving movements just south of the interchange. These are the high volume morning peak hour weaves where I-690 east and I-81 south traffic converges before the Harrison Street exit and the reverse evening peak hour move where the Harrison Street northbound on ramp weaves with I-81 north to I-690 east traffic.

The I-81/I-690 system interchange also has two left hand entrance terminals, which are highly undesirable: I-81 Northbound to I-690 Westbound and I-81 Southbound to I-690 Eastbound.

The system interchange is also not a fully directional layout as the southbound to westbound and eastbound to northbound connections are missing in the northwest quadrant. These movements are accommodated by Bear Street, which connects between I-690 Exit 9 and I-81 Exit 22/23.

Other areas with non conforming features include:

- Exit 22 – Acceleration/Deceleration lengths
- Exit 23 to 22 Southbound ramp spacing
- Exit 25/25A Acceleration/Deceleration lengths
- Exit 27 Acceleration length
- Exit 28 Acceleration length
- Exit 29 Acceleration length
- Exit 14 (I-690) Acceleration/Deceleration length

What follows the illustrations is a summary table of the project interchanges with a discussion on their configuration and statistical information on the interchange spacing. In reviewing the information there are 18 interchanges in the primary study area, Table 2.11 - Interchange Summary. Of these interchanges four are what is classified as a system interchange. A system interchange is considered to be a major juncture of two freeways (i.e. Interstate highway) where the mainline traffic and the connector ramps are all free flow connections. The four system interchanges are: I-81/I-481 South, I-81/I-690, I-81/I-90 and I-81/I-481 North. These are all of special importance as a “system” junction. The remaining 14 interchanges are “service” interchanges where the interstate highway intersects with local arterials. In the study area both the system and service interchanges are unique geometric arrangements due to many factors including terrain, existing infrastructure, geography and the pre-existing built environment. Two of the system interchanges (I-81/I-481 South and I-81/I-690) have local service interchanges essentially embedded within the overall system interchange. I-81/I-690 is especially complicated with Exit 13 (I-690), Exits 19 and 20 (Butternut, Salina, Clinton and Pearl) on I-81 just to the north and west with Exit18 (Harrison/Almond/Adams) on the immediate south.

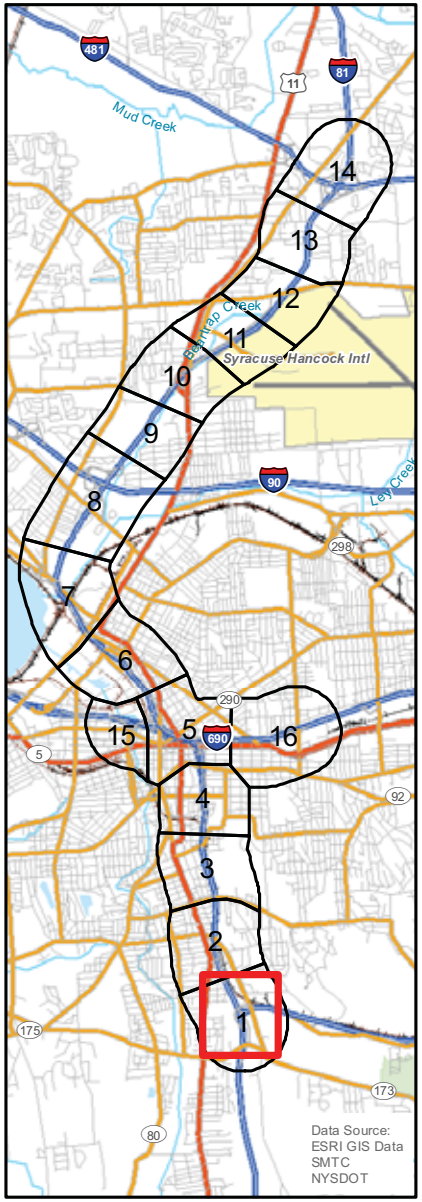


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Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

Less Than Standard

Accel & Decel Lane Lengths

Less Than Standard

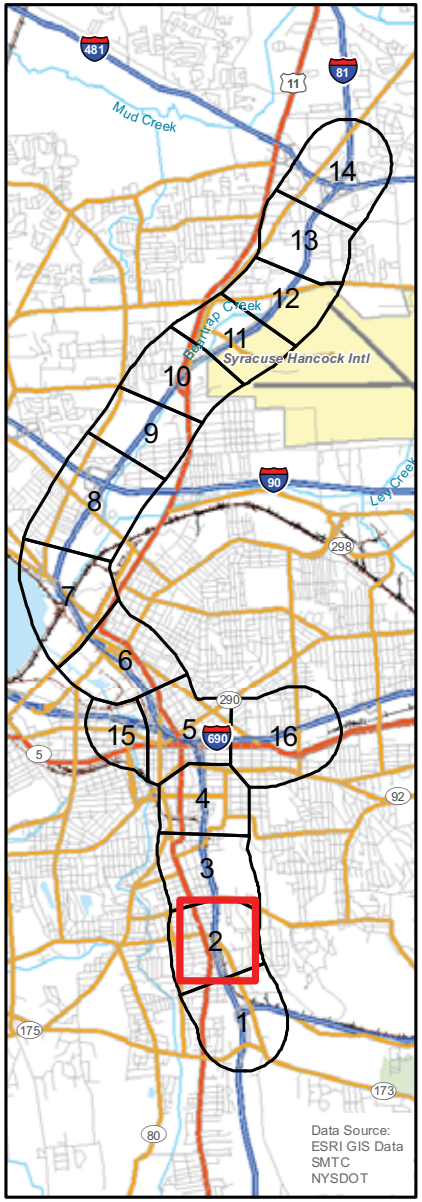
Exit Number

0 250 500 1,000

Feet

SHEET 1

Original in Color Stantec



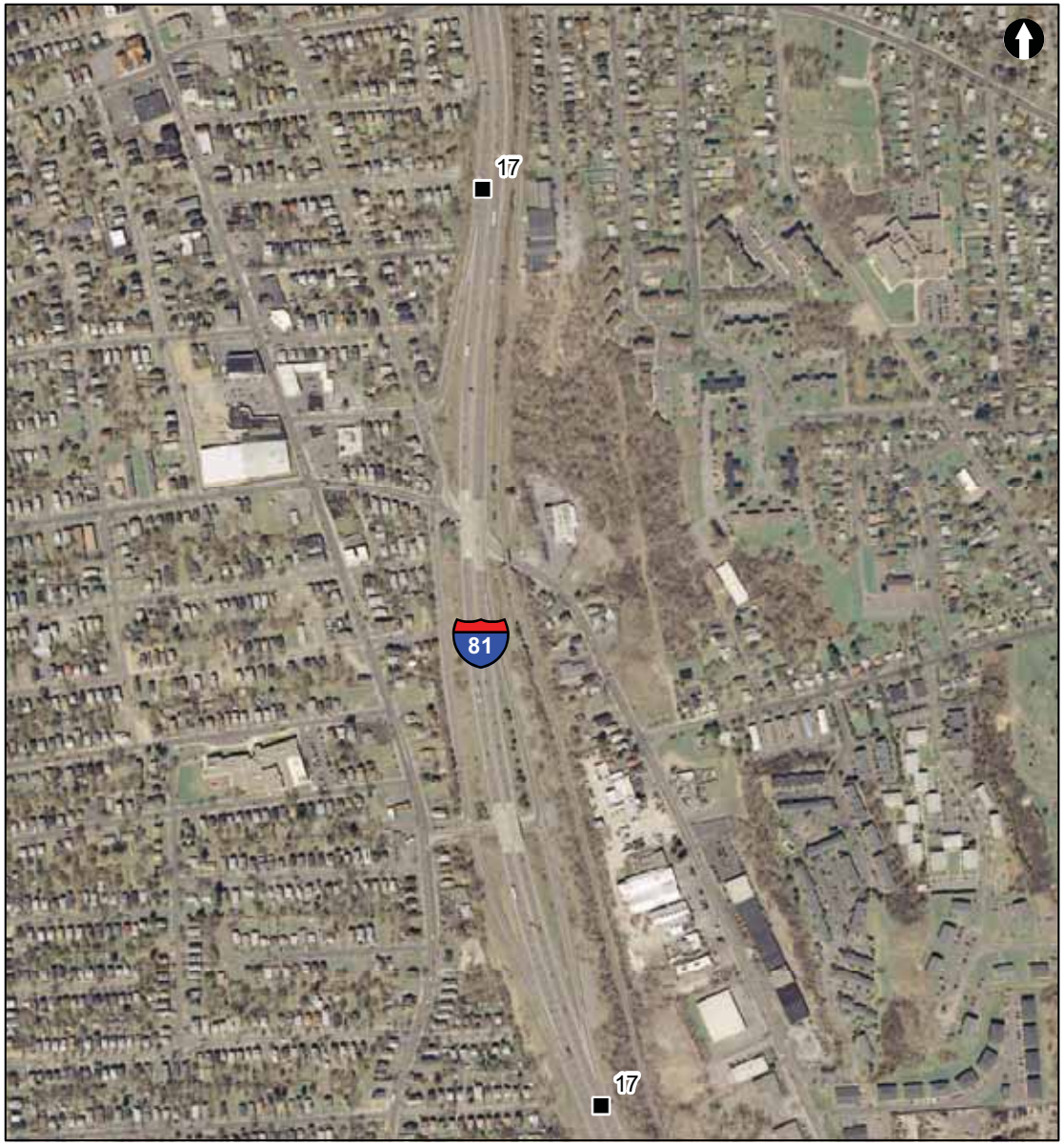


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Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

- Less Than Standard

Accel & Decel Lane Lengths

- Less Than Standard
- Exit Number

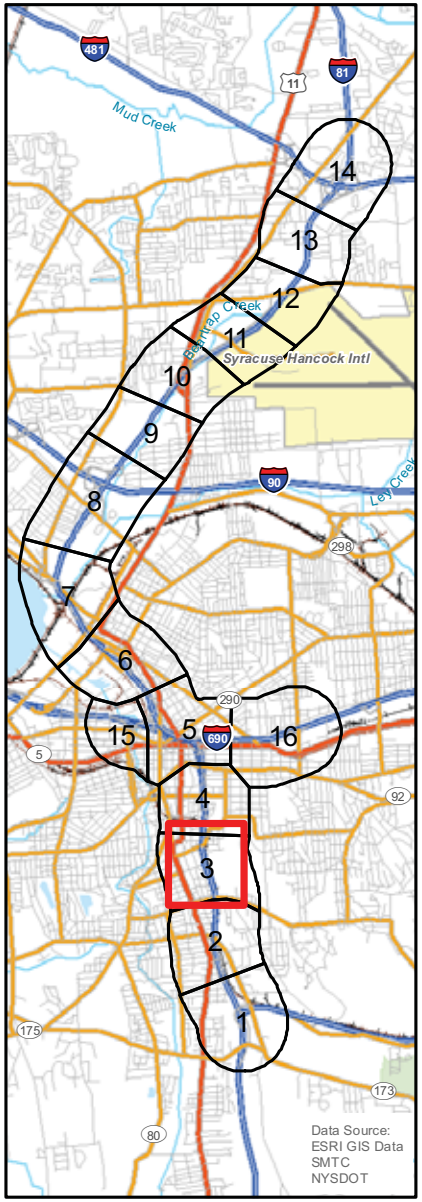
0 250 500 1,000

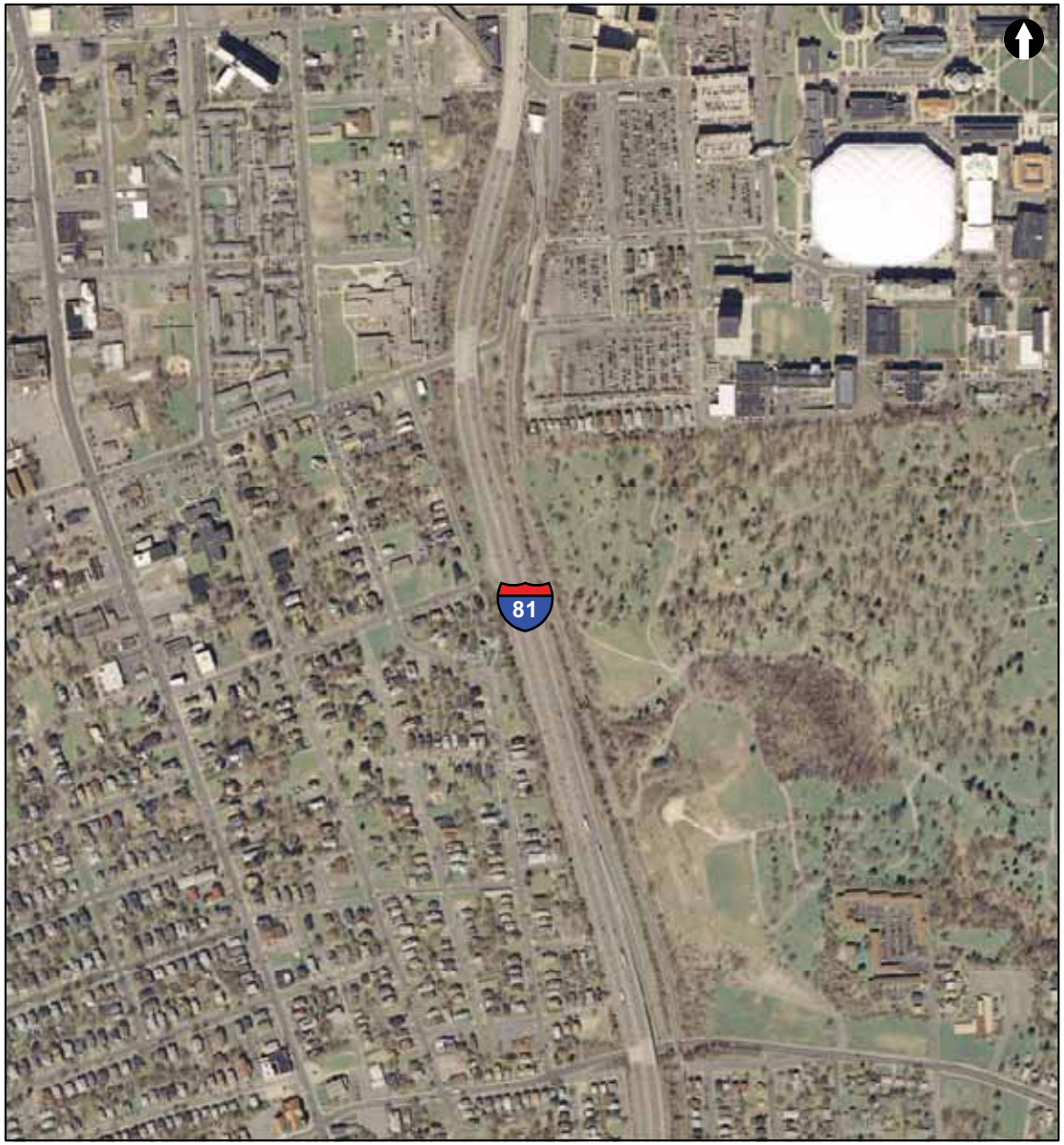
Feet

SHEET 2

Oct 22, 2010

Original in Color Stantec





Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

- Less Than Standard

Accel & Decel Lane Lengths

- Less Than Standard
- Exit Number

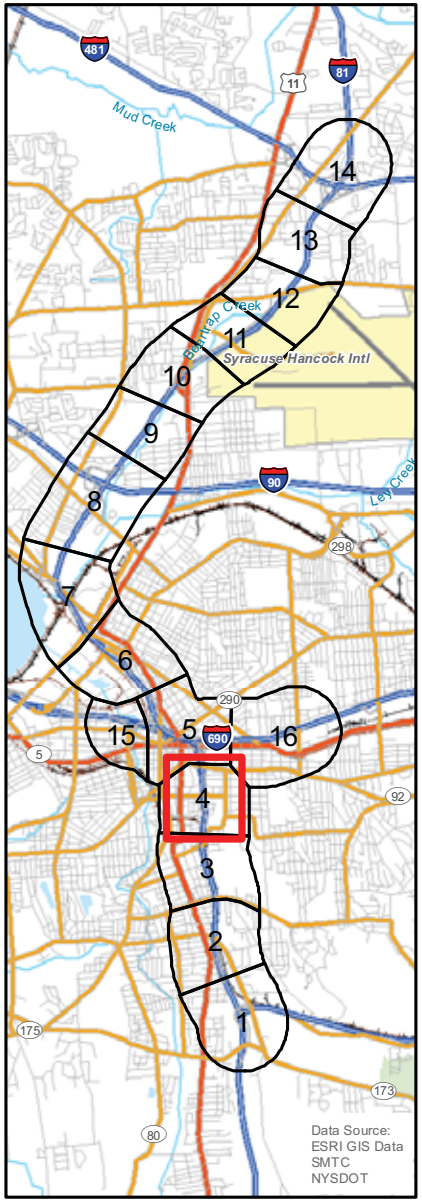
0 250 500 1,000

Feet

SHEET 3

Oct 22, 2010

Original in Color Stantec



Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

Less Than Standard

Accel & Decel Lane Lengths

Less Than Standard

Exit Number

0 250 500 1,000

Feet

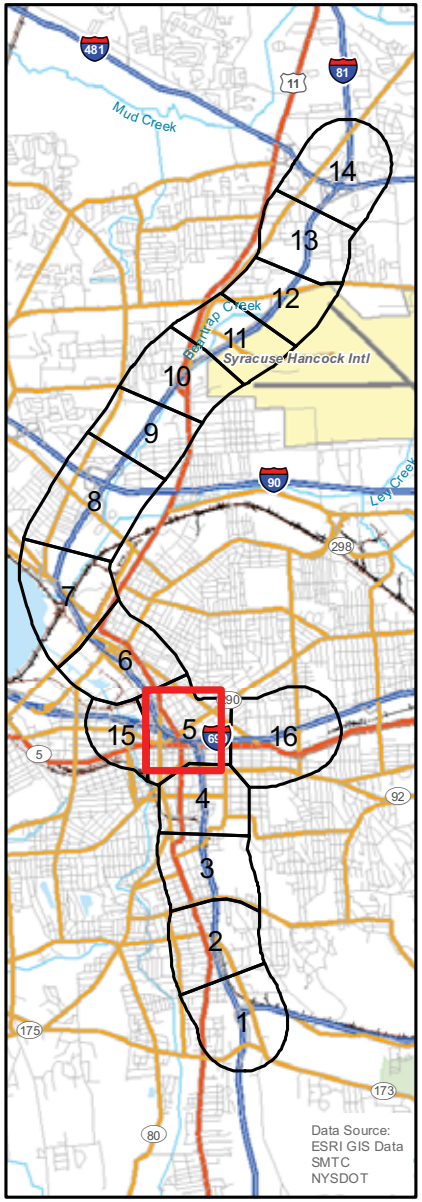
SHEET 4

Oct 22, 2010

Original in Color Stantec

Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features



Legend

Ramp Spacing

- Less Than Standard

Accel & Decel Lane Lengths

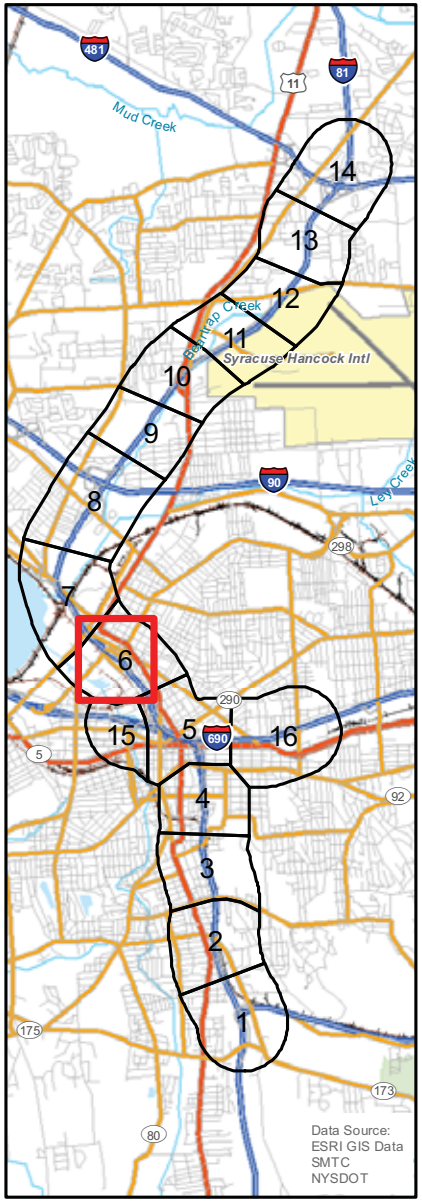
- Less Than Standard
- Exit Number

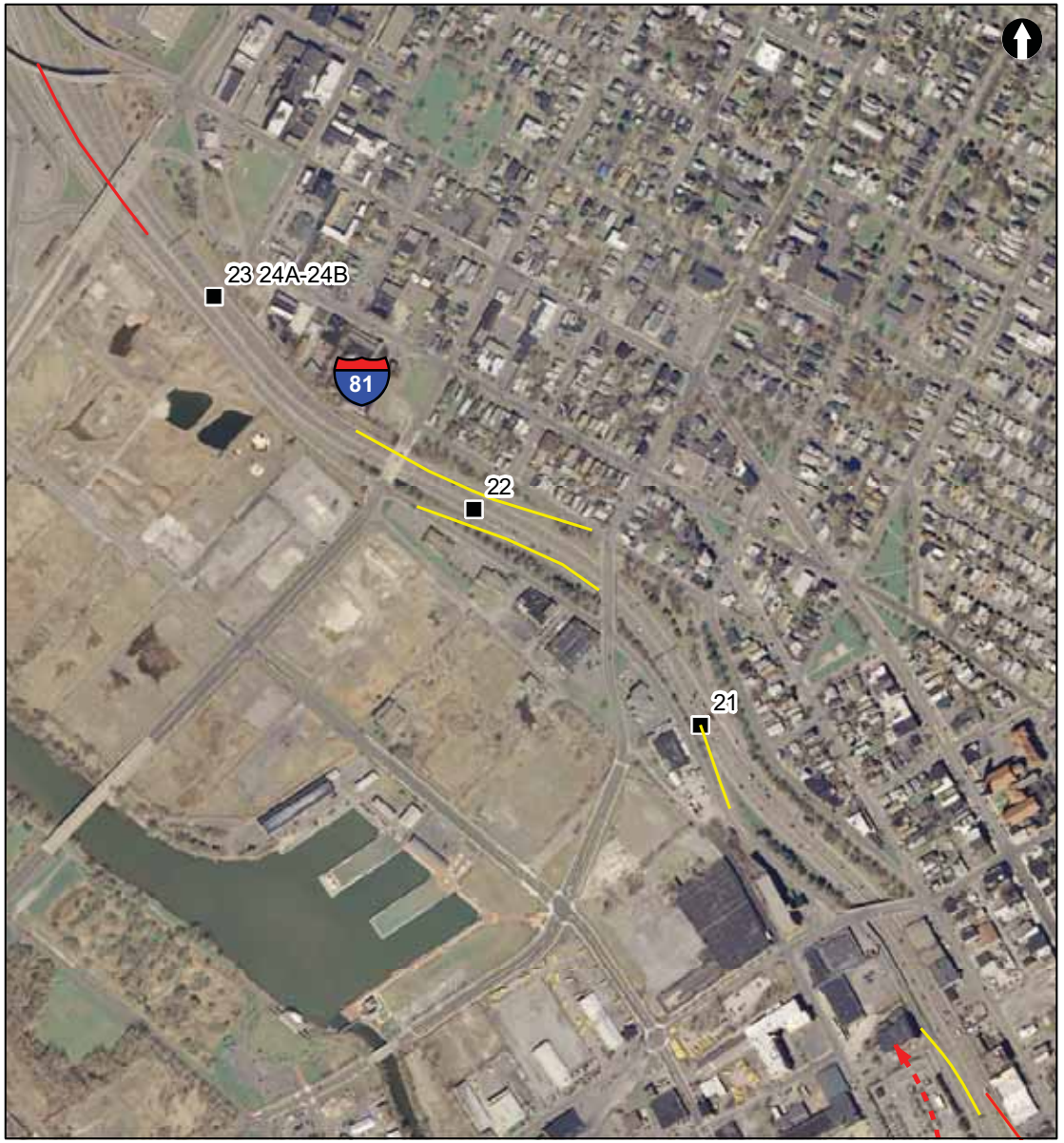
0 250 500 1,000
Feet

SHEET 5

Oct 22, 2010

Original in Color Stantec





Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

- Less Than Standard

Accel & Decel Lane Lengths

- Less Than Standard
- Exit Number

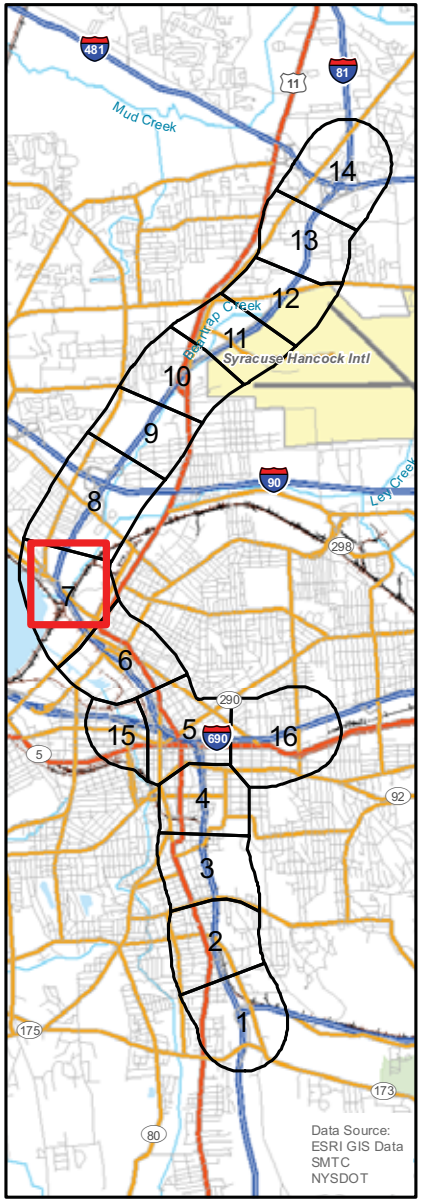
0 250 500 1,000

Feet

SHEET 6

Oct 22, 2010

Original in Color Stantec



Oct 22, 2010

Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

Less Than Standard

Accel & Decel Lane Lengths

Less Than Standard

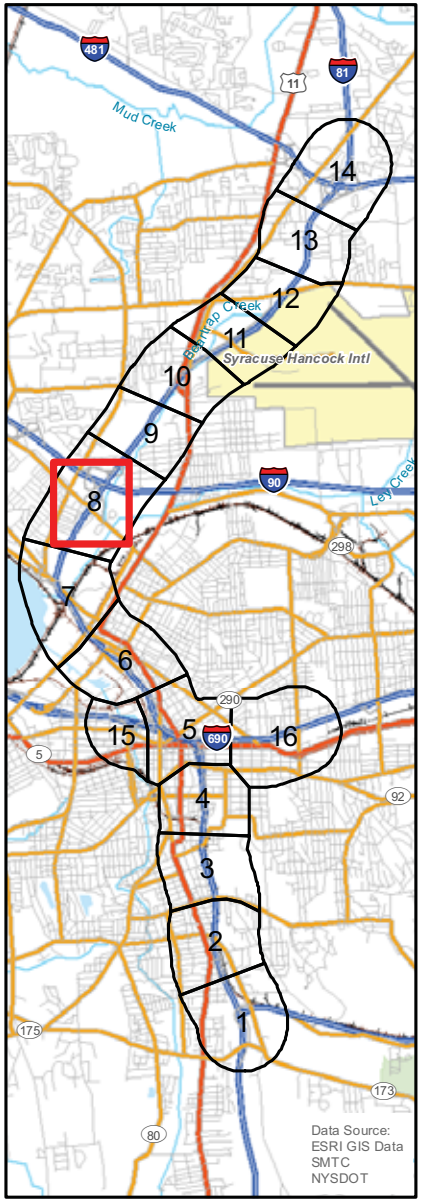
Exit Number

0 250 500 1,000

Feet

SHEET 7

Original in Color Stantec



Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

- Less Than Standard

Accel & Decel Lane Lengths

- Less Than Standard
- Exit Number

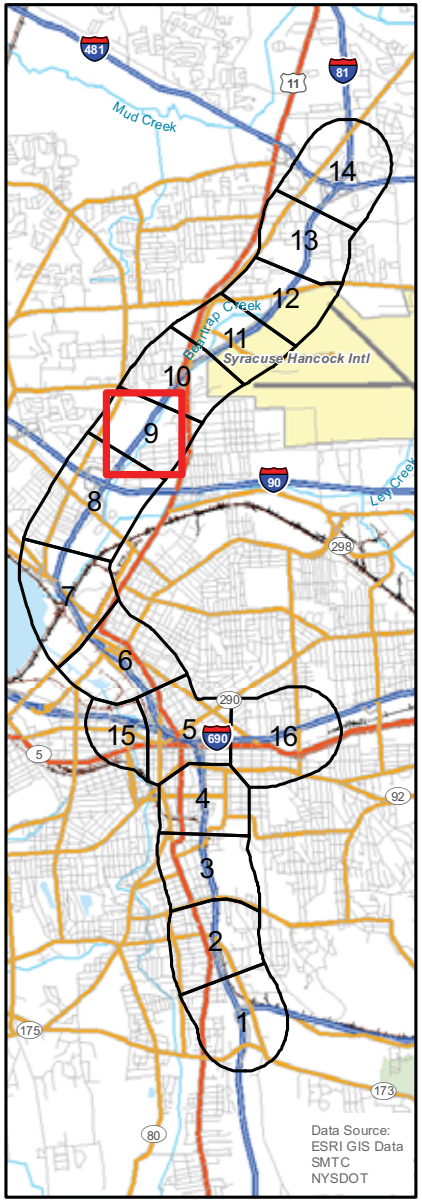
0 250 500 1,000

Feet

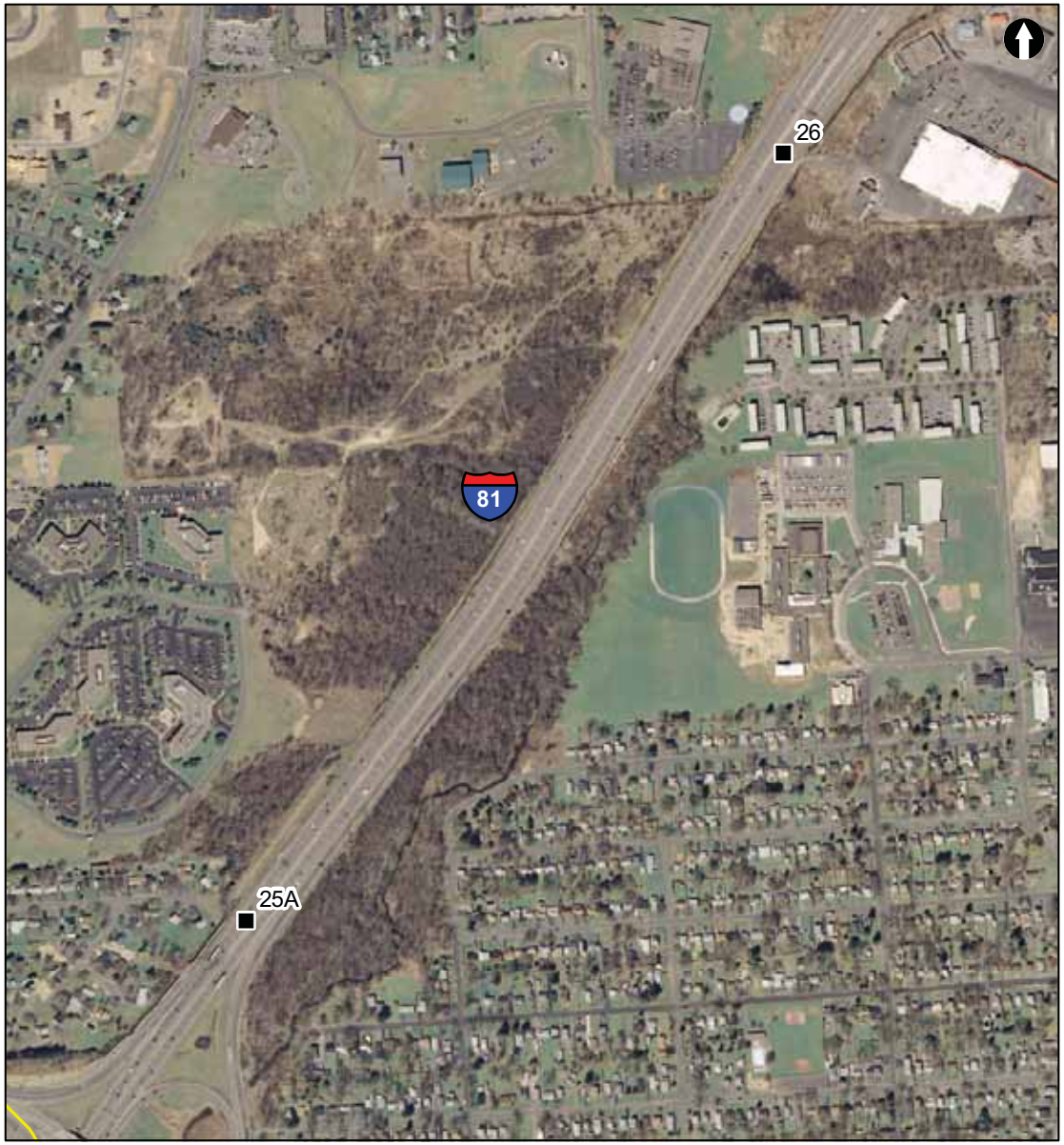
SHEET 8

Oct 22, 2010

Original in Color Stantec



Oct 22, 2010



Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

- Less Than Standard

Accel & Decel Lane Lengths

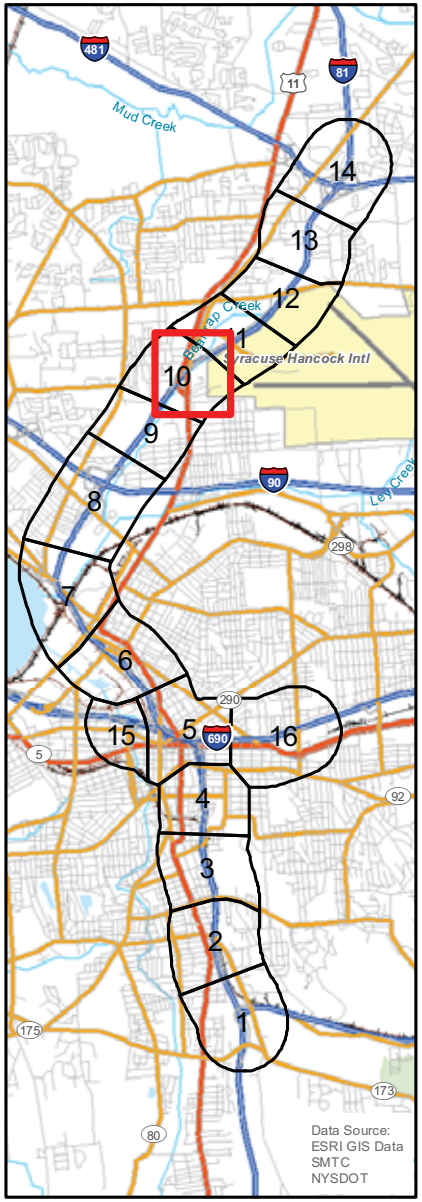
- Less Than Standard
- Exit Number

0 250 500 1,000

Feet

SHEET 9

Original in Color Stantec



Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

Less Than Standard

Accel & Decel Lane Lengths

Less Than Standard

Exit Number

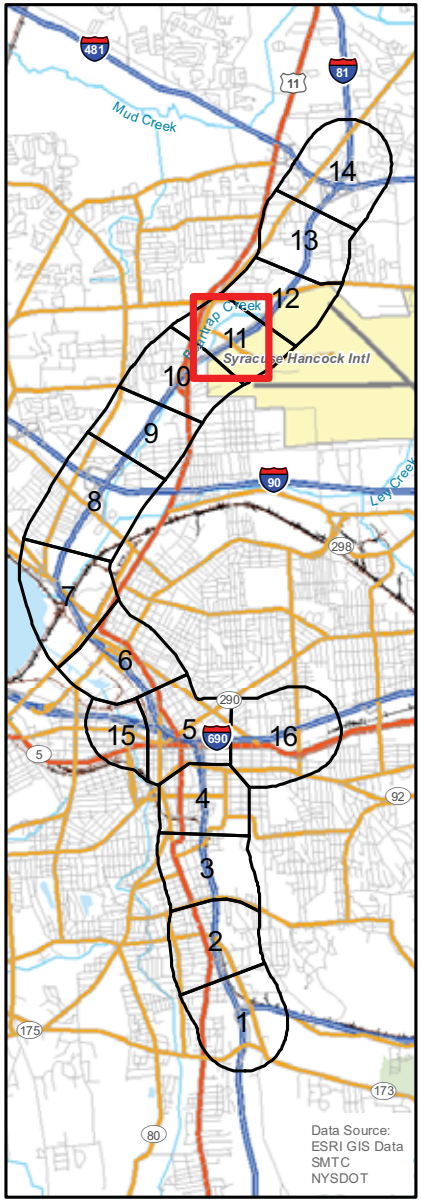
0 250 500 1,000

Feet

SHEET 10

Oct 22, 2010

Original in Color Stantec



Oct 22, 2010

Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

- Less Than Standard

Accel & Decel Lane Lengths

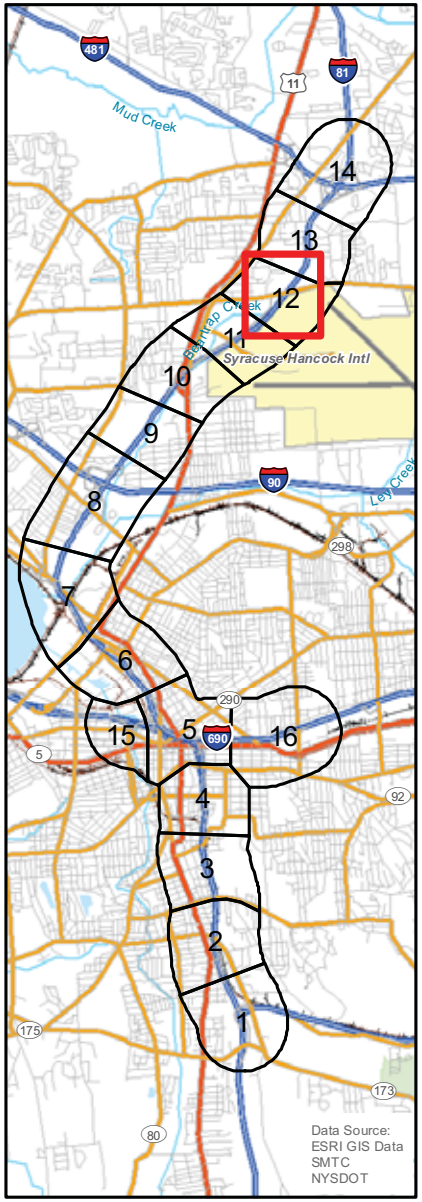
- Less Than Standard
- Exit Number

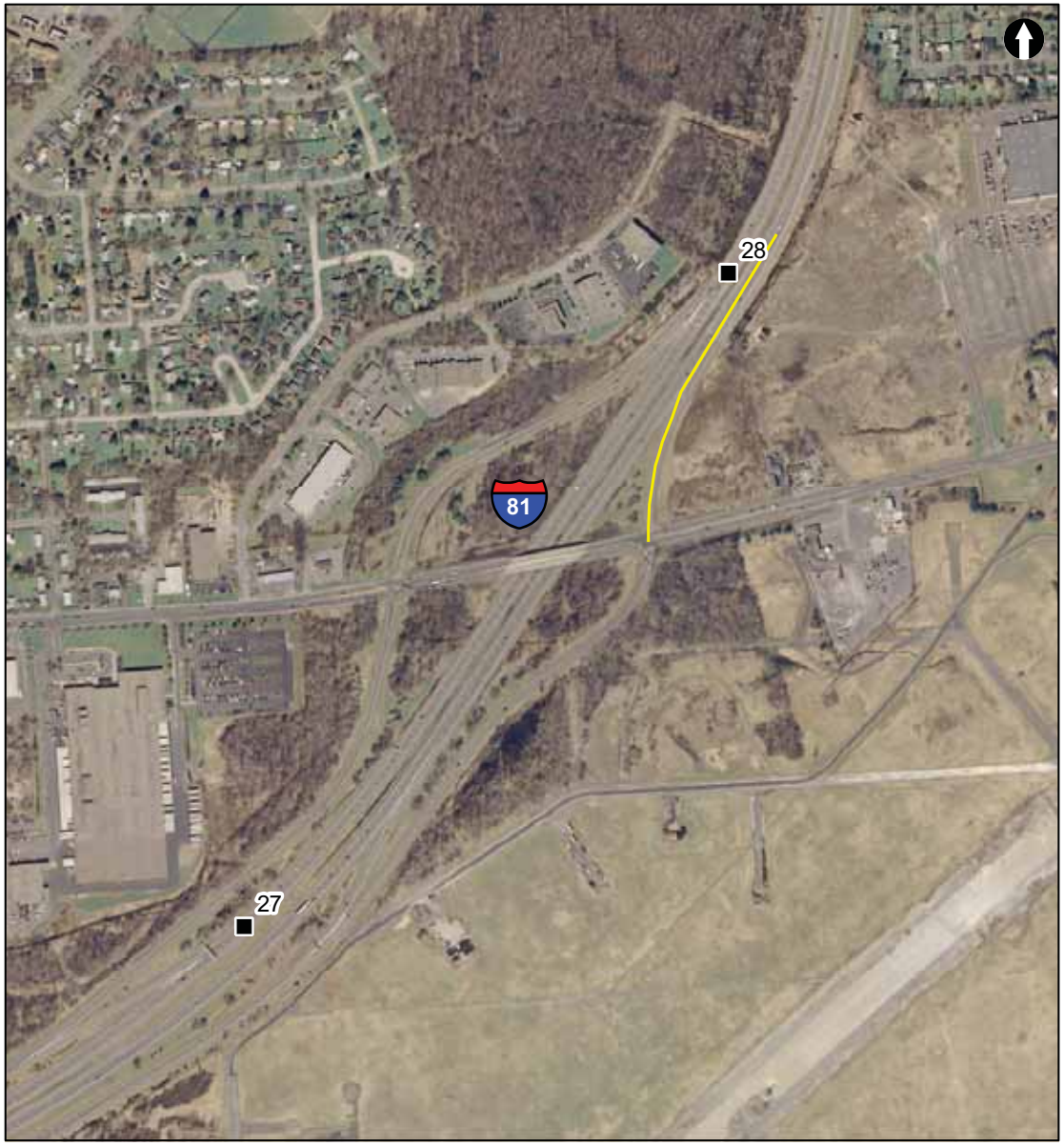
0 250 500 1,000

Feet

SHEET 11

Original in Color Stantec





Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

- Less Than Standard

Accel & Decel Lane Lengths

- Less Than Standard
- Exit Number

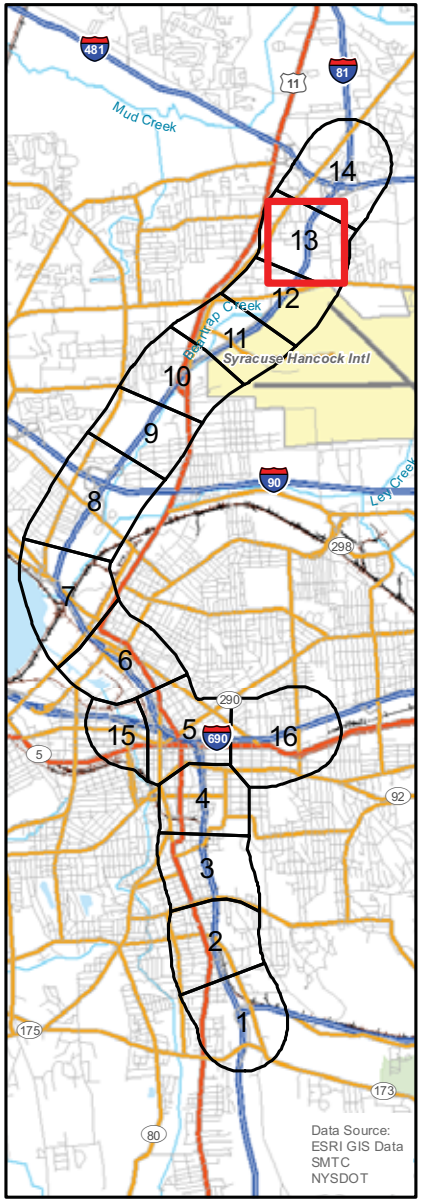
0 250 500 1,000

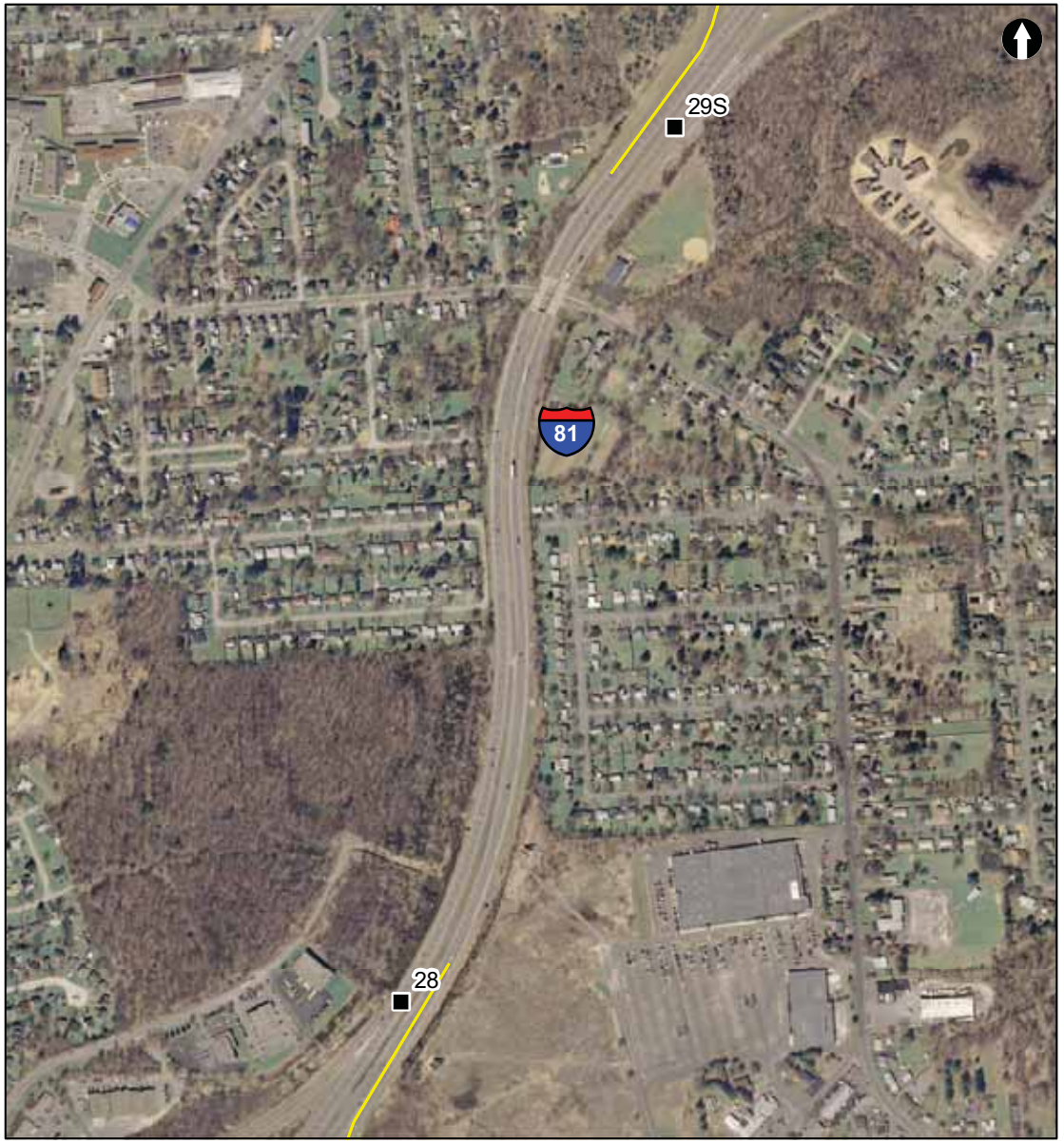
Feet

SHEET 12

Oct 22, 2010

Original in Color Stantec





Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

- Less Than Standard

Accel & Decel Lane Lengths

- Less Than Standard
- Exit Number

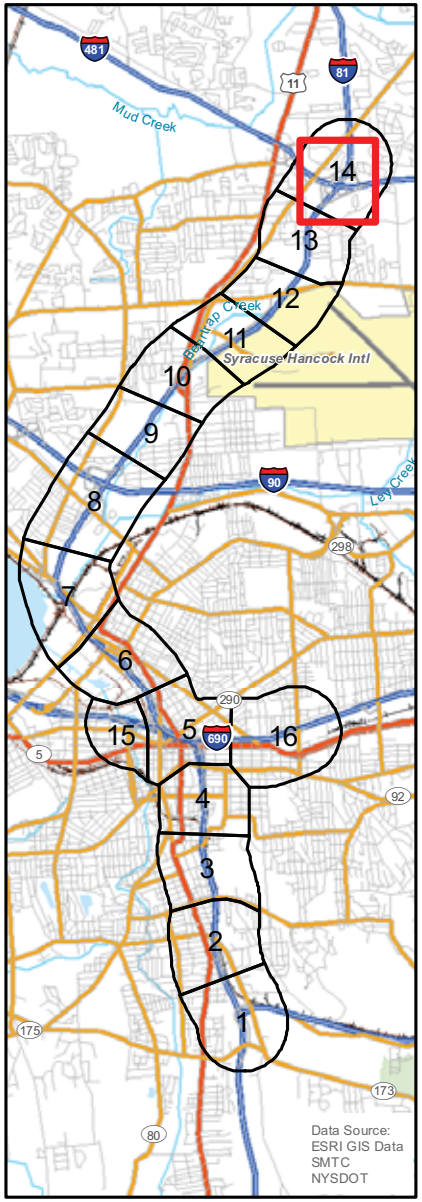
0 250 500 1,000

Feet

SHEET 13

Oct 22, 2010

Original in Color Stantec



Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

- Less Than Standard

Accel & Decel Lane Lengths

- Less Than Standard
- Exit Number

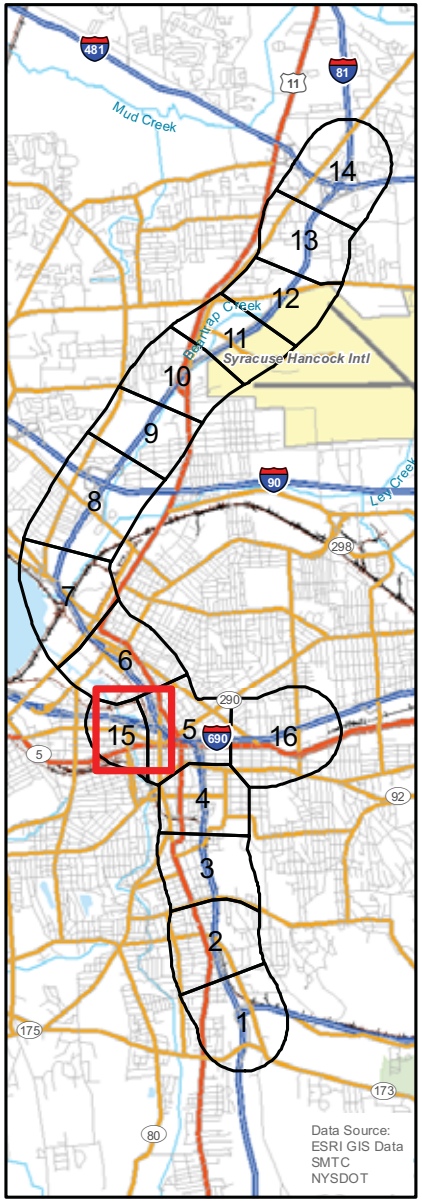
0 250 500 1,000

Feet

SHEET 14

Oct 22, 2010

Original in Color Stantec



Oct 22, 2010

Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

Less Than Standard

Accel & Decel Lane Lengths

Less Than Standard

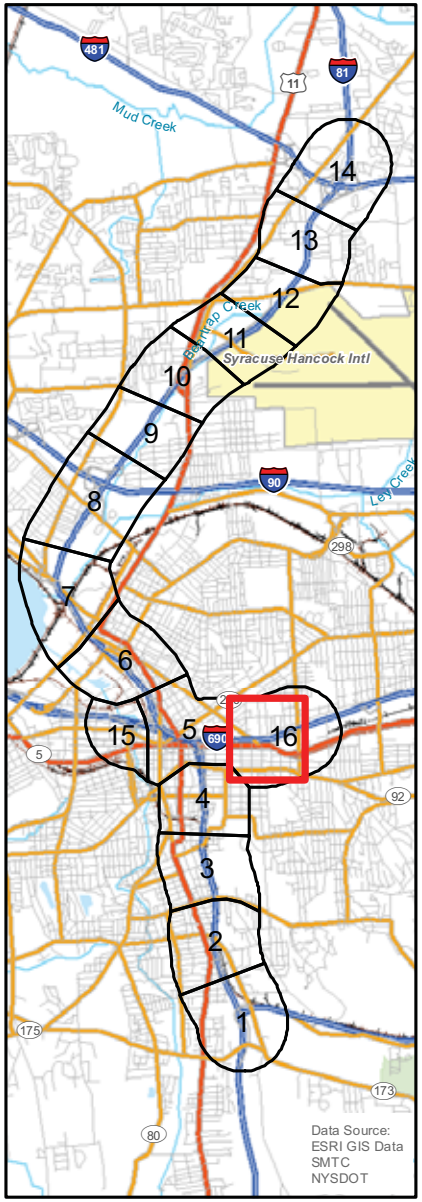
Exit Number

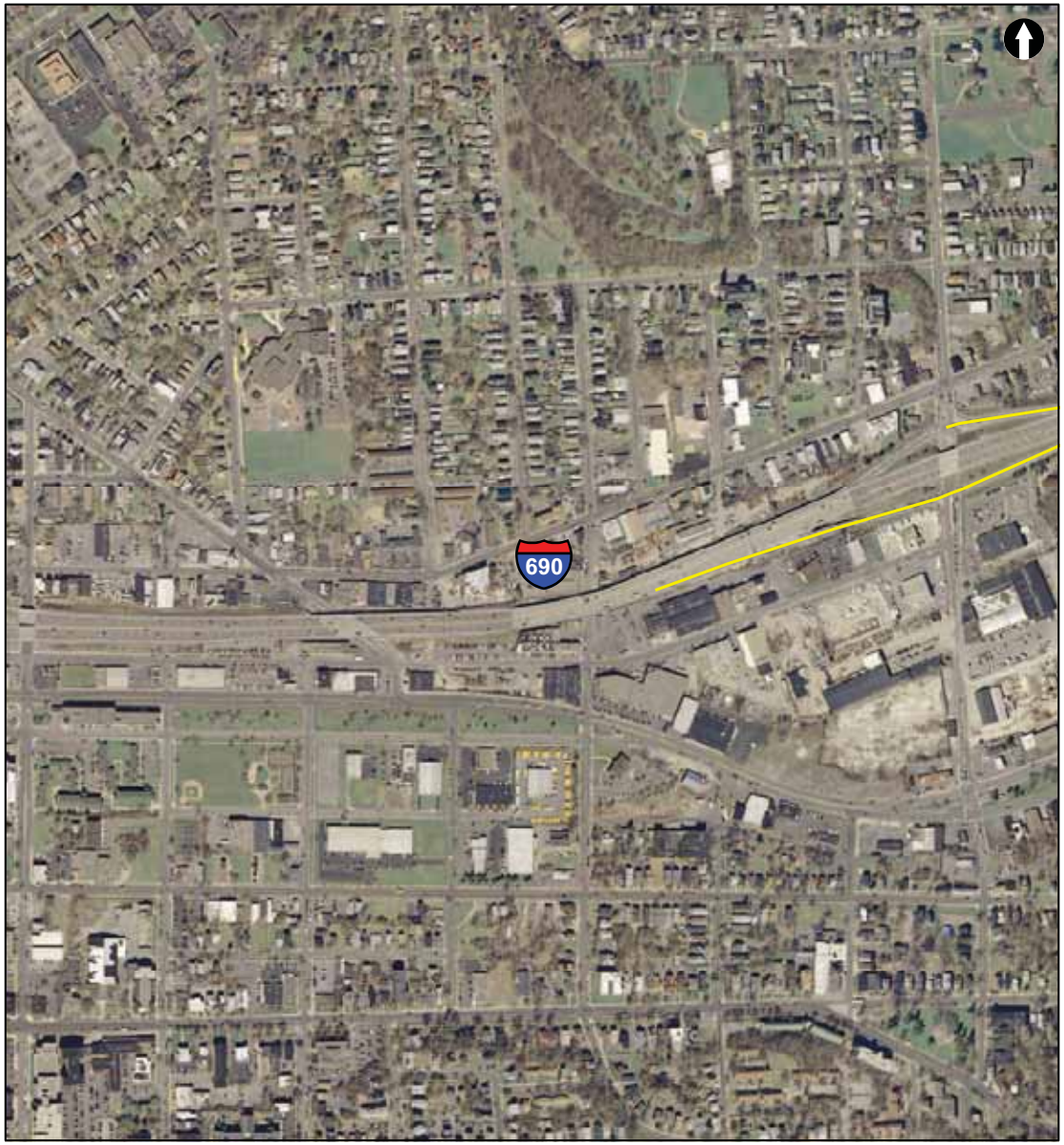
0 250 500 1,000

Feet

SHEET 15

Original in Color Stantec





Interstate 81 Corridor Assessment

Figure 2.25 - Existing Highway Non-Conforming Features

Legend

Ramp Spacing

- Less Than Standard

Accel & Decel Lane Lengths

- Less Than Standard
- Exit Number

0 250 500 1,000

Feet

SHEET 16

Oct 22, 2010

Original in Color Stantec

Table 2.11–Interchange Spacing – Non-Conforming Feature

Exit #	Interchange	Classification (System/Service)	Distance to Downstream Interch	Distance to Upstream Interch	AASHTO Minimum Spacing	Non-Conforming (Spacing)
16A	I-481 South & Brighton Ave.	Full System Interchange with I-481 with a local service interchange embedded within the system interchange. The system interchange provides free flow ramps for all interstate to interstate connections. The local service interchange provides access to Brighton Avenue, southern University Hill and southwest city neighborhoods.				
		System/Service	3 miles	3900'	1 mile	X
17	S. State St. & Salina St.	Diamond full service interchange with S. State Street/S. Salina Street. The basic interchange is a unique "stub" diamond configuration due to the railroad that parallels immediately to the east. The stub diamond feeds primarily to S. Salina St. (on the west side of I-81) with the southbound ramps split, but connected by a frontage road from S. State St. to the S. Salina St. on-ramp (SB). This interchange also includes an additional northbound on-ramp at Colvin St., which provides "eastside" access to I-81 NB verses the basic exit 17, which is more convenient to the west side of I-81.				
		Service	3900'	9500'	1 mile	X
18	Almond St, Harrison St & Adams St.	Diamond Full Service Interchange with the West/East one-way couple of Harrison St. and Adams St. in the primary downtown area. The interchange is highly unique in that Almond St. immediately parallels I-81 and for significant portions runs under I-81, between the piers, to serve as a service/frontage road for downtown and University Hill traffic.				
		Service	9500'	2900'	1 mile	X
I-81 / I-690 (I-690 - 13)	I-81 / I-690	This interchange is the most important and significant interchange in the Syracuse/Onondaga County transportation network. The interchange lies at the City of Syracuse junctions of I-81 & I-690 and provides the system connections (minus the northwest quadrant) and most importantly, downtown/University Hill ingress/egress either directly or indirectly through adjacent interchanges. The interchange is a system interchange (I-81/I-690) with local service connections embedded in the design. There are I-690 service ramps (Exit 13) on the east side of the system interchange and the adjacent Exit 19 and 20 immediately to the north with a complex network of downtown on and off ramps. The I-81 alignment is offset by approximately a quarter mile (1200') between its north and south approaches and parallels I-690 for this distance. The overall combination of exits 18, 19, 20 and the I-81/I-690 junction presents significant interstate standard deviations for ramp spacing, geometry and road section.				
		System/Service	2900'	2800'	1 mile	X

Exit #	Interchange	Classification (System/Service)	Distance to Downstream Interch	Distance to Upstream Interch	AASHTO Minimum Spacing	Non-Conforming (Spacing)
19 & 20	Butternut St, Salina St, Clinton St. & Pearl St	Exit 19 and 20 are immediate north of the I-81/I-690 Interchange, in the northwest quadrant. The interchanges are a unique layout of entrance and exit ramps primarily serving downtown. The combined interchanges are immediately adjacent to each other and provide capacity for the commuter peak periods with a series of southbound off-ramps for the morning peak and a complimentary set of northbound on-ramps for the evening peak. The southbound approach has a series of major exits to Downtown via Franklin St, Clinton St, and Salina St. The northbound system feeds off N. State St. and Salina St. to a series of northbound entrances. Both interchanges are partial interchange layouts. Interchange spacing between exit 19 and exit 20 is approximately 1200'.				
		Service	2800'	3100'	1 mile	**X**
21	Genant Dr. & Court St./ Sunset Ave.	Exit 21 is a partial interchange along I-81 between Exits 20 and 22. The interchange provides southbound and northbound off-ramps to the frontage roads/city streets that parallel I-81. This interchange provides two of the four directional movements typically provided.				
		Service	3100'	1600'	1 mile	**X**
22	Bear/Genant & Court St. /Sunset Ave.	Exit 22, Route 298 (Bear St./Court St.) is a three quarter partial diamond configuration (missing a northbound on-ramp). Access is provided from the parallel frontage roads/city streets (Genant Dr. & Sunset Ave.) that parallel I-81.				
		Service	1600'	1800'	1 mile	**X**
23 & 24	Route 370 & Hiawatha Blvd.	Exit 23 and 24, Hiawatha Blvd and Onondaga Parkway connection: This interchange, particularly in combination with Exit 24 immediately to the north, is geographically unique. The main interchange integrates the parkway into the I-81 corridor on the northwest side and also accommodates Hiawatha Blvd (Mall) to/from I-81. Exit 24 component is limited to a southbound exit ramp to the parkway and then Hiawatha Blvd/I-81 to the south. The interchange includes a significantly long bridge over CSX tracks, a creek and a local road. Interchange spacing between exit 23 and exit 24 is approximately 4000'.				
		Service	1800'	7800'	1 mile	**X**
25 & 25A	7th Street North & I-90 NYS Thruway	Exit 25 and Exit 25A: Partial cloverleaf full service interchange with 7th North Street. Immediately north is the Thruway (I-90) exit 36 that is a trumpet configuration. The interchanges are closely spaced with weaving movements in both directions (which has an acceptable level of service). Interchange spacing between exit 25 and exit 25A is approximately 2200'.				
		Service & System	7800'	6800'	1 mile	**X**

Exit #	Interchange	Classification (System/Service)	Distance to Downstream Interch	Distance to Upstream Interch	AASHTO Minimum Spacing	Non-Conforming (Spacing)
26 & 27	Brewerton Rd. (US 11) & Mattydale/ Hancock Airport	Exit 26 and Exit 27 is again a unique configuration with US Route 11 (Brewerton Rd.) crossing at a severe skew angle and the interchange extending to Exit 27 (Airport) via collector-distributor roads (frontage roads) to complete the directional movements. Exit 26 and Exit 27 are approximately 3900' apart and thus below the interstate spacing guidelines. Exit 27 is the primary entrance to the Hancock International Airport, the regional airport. The layout is a unique combination of loop ramps, diamond ramps and a fly over through road. The interchange connects via C-D roads to Exit 26 to the south and Exit 28 to the north with the service roads tapering out immediately to the north of Exit 28. Exit 26 to Exit 27 interchange spacing is approximately 3900'				
		Service	6800'	4300'	1 mile	X
28	Taft Rd.	Exit 28: Diamond Full Service Interchange signal controlled at both Taft Road intersection. Interchange consists of northbound on-ramp and southbound off-ramp on I-81, and northbound off-ramp and southbound on-ramp on the frontage road.				
		Service	4300'	7200'	1 mile	X
29	I-481 North	Is a four quadrant full cloverleaf interchange with I-481. Typical concern on a cloverleaf system interchange is the inherent weaving movements in the interchange design. Weaving movements were analyzed for existing conditions and were found acceptable.				
		System	7200'	2.2 miles	1 mile	
I-690 - 11	West St.	Full Service Interchange with West St. Interchange also includes a spur ramp to W. Genesee St and a connector ramp from Exit 20 on I-81. Interchange is closely spaced to Exit 20 on I-81 (1000') and the I-81/I-690 Interchange (2000'). Exit 11 to I-81/I-690 interchange spacing is approximately 2000' Exit 11 to Exit 19/20 (I-81) interchange spacing is approximately 1000'.				
		Service	3300'	2200'	1 mile	X
I-690 - 14	Teall Ave.	Diamond Full Service Interchange with signals at both intersection on Teall Ave.				
		Service	6800' (I-81)	5000'	1 mile	X

In general, the interchange spacing for the primary corridor is less than the recommended AASHTO guideline of one mile. Almost all the interchanges lack the desired spacing. This issue is particularly problematic in the general vicinity of the I-81/I-690 Interchange downtown where the combination of ramp spacing, local arterial capacity and logistics significantly contribute to downtown congestion.

Summary

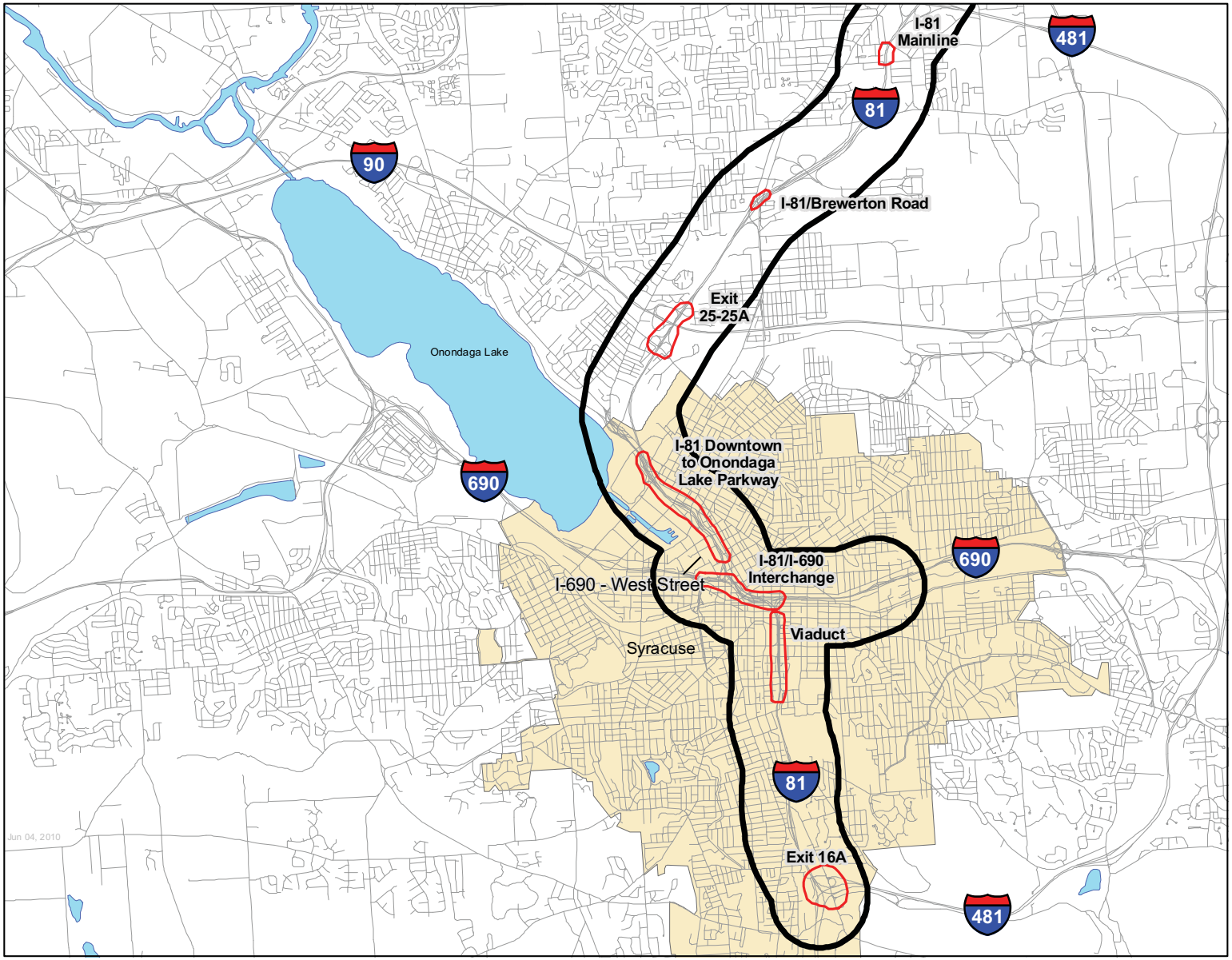
The non-standard features combined with the non-conforming features need to be reviewed holistically with the other transportation conditions, deficiencies and engineering considerations in Section 2.3.1 of this report. In particular, this includes Level of Service and Mobility, Safety Considerations, and Accident History and Analysis. As would be expected the areas of poor Level of Service and high accident rates coincides with the areas of geometric deficiencies which is concentrated in the general vicinity of the I-81/I-690 Interchange and the adjacent service interchanges of Exit 18, 20 and 21 on I-81 and Exits 11 and 13 on I-690. These are all closely spaced and have a complex and unique layout for downtown ingress and egress. The basic I-81/I-690 Interchange layout has significant geometric deficiencies from its original layout in the 1960's. This is evidenced by the posted speed reductions on I-81 to 45mph and is reflective of the physical constraints present when the roadway was first constructed. Figure 2.26 Shows the Existing Key Areas of Non-Standard or Non-Conforming Design Features. Figure 2.27 summarizes the key roadway deficiencies along the I-81 primary study area for traffic Level of Service below LOS C, Non-Standard or Non-Conforming design features and areas with above average accident rates.

2.3.3.3 Pavement and Shoulder

The physical condition of each highway section is determined by assessing the condition of the pavement surface. The NYSDOT surface rating survey is performed using an windshield survey with a rating scale of 1-10 where "1" is the worst and "10" is the best. In general, surface ratings may be categorized as follows:

Rating		Condition
9-10	Excellent	No pavement distress
7-8	Good	Distress symptoms are beginning to show
6	Fair	Distress is clearly visible
1-5	Poor	Distress is frequent and may be severe

An in-depth pavement evaluation has not been completed at this time. The pavement condition of I-81, I-690 and I-481 was rated by NYSDOT in 2008. The majority of area expressway surface condition is rated as "Good". Figure 2.28 shows the surface ratings for the entire project study area.



Interstate 81 Corridor Assessment

Figure 2.26 -

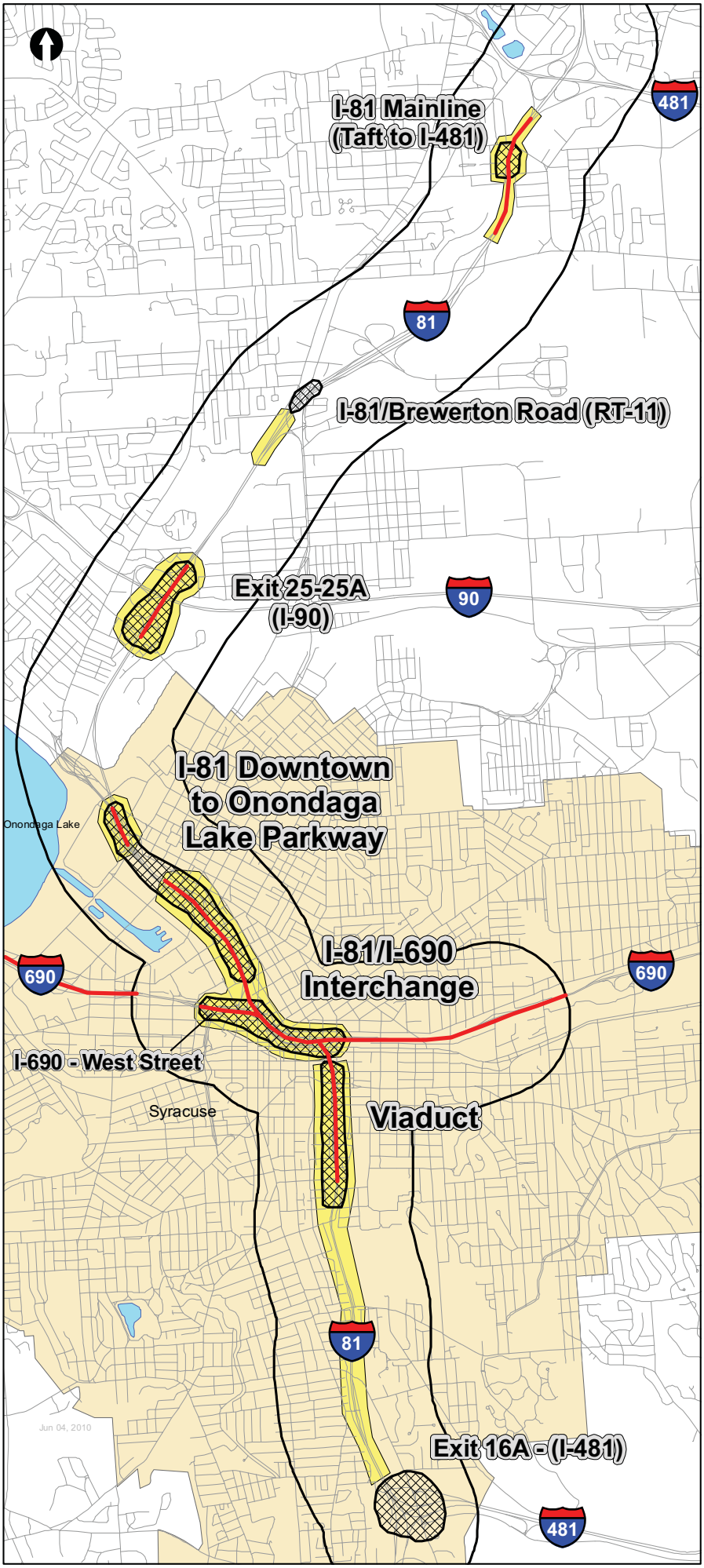
Key Areas of Non-Standard or Non-Conforming Design Features

Legend

- Primary Study Area
- Waterways
- City
- Key Areas of Non-Standard or Non-Conforming Design Features

0 0.3 0.6 1.2 1.8

Miles



Interstate 81 Corridor Assessment

Figure 2.27 - Primary Study Area - Key Area Roadway Deficiencies

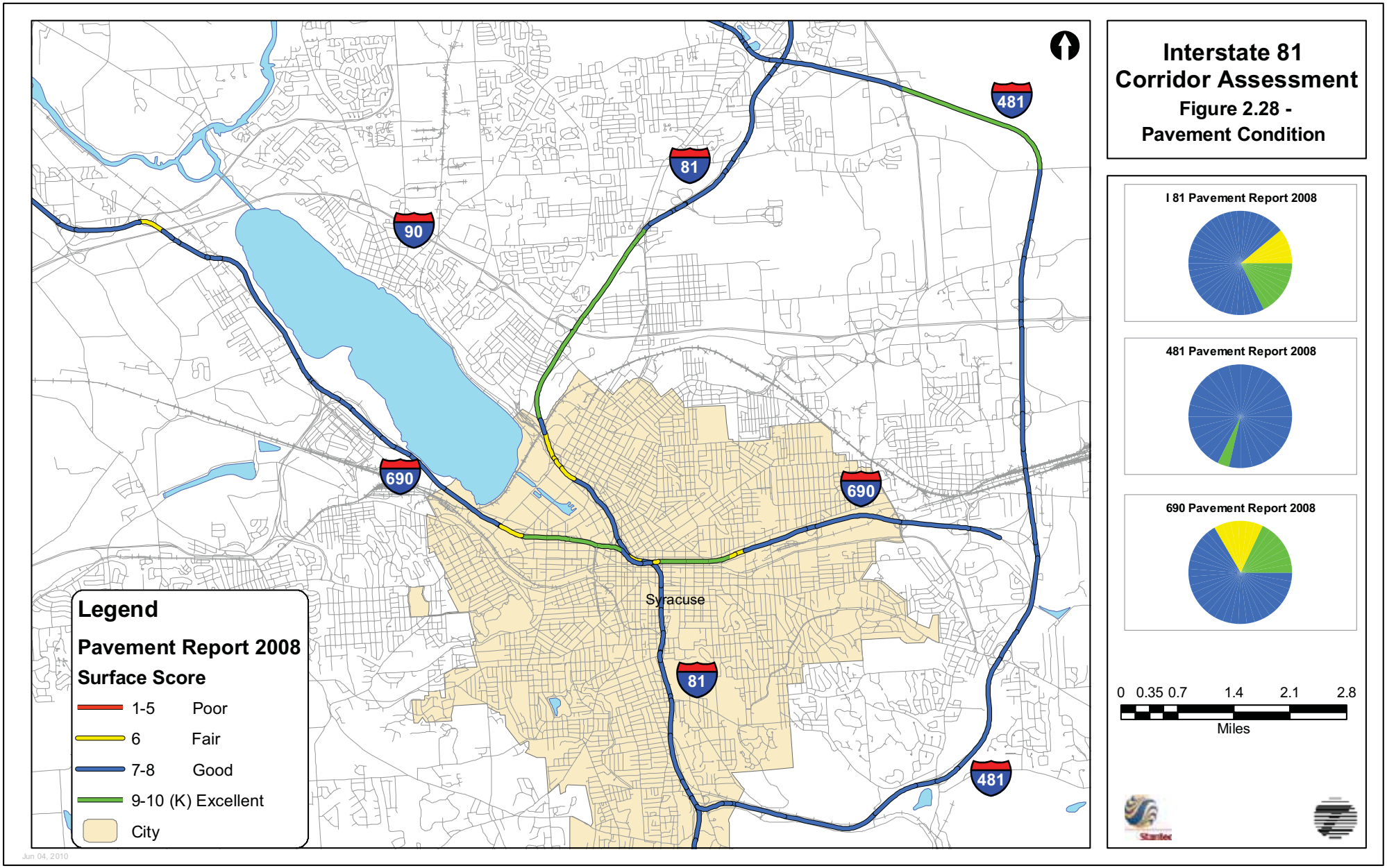
Legend

- Key Areas With Traffic Level of Service Below C
- Key Areas of Non-Standard or Non-Conforming Design Features
- Key Areas with Above Average Accident Rates
- Primary Study Area
- Waterways
- City

Note: For Bridge Deficiencies see Figures 5 and 6.

0 0.25 0.5 1 1.5

Miles


Interstate 81
Corridor Assessment
Figure 2.28 -
Pavement Condition
I 81 Pavement Report 2008
481 Pavement Report 2008
690 Pavement Report 2008
0 0.35 0.7 1.4 2.1 2.8
Miles
Legend
Pavement Report 2008
Surface Score
1-5 Poor
6 Fair
7-8 Good
9-10 (K) Excellent
City
Syracuse
81
90
690
481
Jun 04, 2010

2.3.3.4 Drainage Systems

An in-depth evaluation of the drainage system has not been completed at this time. As study strategies are developed in future phases of this study overall drainage basins for I-81 and their discharge locations will be identified and considered in an overall evaluation of stormwater management. Information on surface waterbodies, watercourses, wetlands and floodplains is included in Chapter 4.

2.3.3.5 Geotechnical

The Surficial Geologic Map of New York - Finger Lakes Sheet, (Muller and Cadwell, 1986) and the Geologic Map of New York - Finger Lakes Sheet, (Rickard and Fisher, 1970), and the Onondaga County Soil Survey (United States Department of Agriculture, 1977) were reviewed. The soil, surficial soil and rock are described below.

According to the Onondaga County Soil Survey, there are many types of surface soils in the general project area, including several types of fill. Fill types include urban land, made land, and cut and fill land. These fill types can be found throughout the project area; however, made land is found primarily in the Viaduct section near Onondaga Lake. Urban land is generally found in the more urban areas, particularly near the downtown Syracuse area. Cut and fill land is found under and around much of the project area, particularly in the northern and middle sections of the project area.

The soils types found in the general project area consist of Kame moraine, Lacustrine silt and clay, Outwash sand and gravel, Till and Recent deposits. The Surficial Geologic Map did not identify fill in the project area. Boring location maps are available, but no subsurface information. Additional local groundwater information was not able to be located from Onondaga County sources. Surface water bodies and water courses are described in section 4.4.2. The aquifer, well, and reservoir data is included in section 4.4.7.

- Kame moraine is variable in texture from boulders to sand; deposited during deglaciation; and it is locally cemented with calcareous cement. Kame moraine has variable thickness (11-33 yards).
- Lacustrine silt and clay is generally laminated clay and silt; deposited in proglacial lakes; is generally calcareous and has the potential to cause land instability. Lacustrine silt and clay has variable thickness (up to 55 yards).
- Outwash sand and gravel is coarse to fine gravel with sand; deposited is related to proglacial fluvial deposition; is well-rounded and stratified, and generally has a finer texture. Outwash sand and gravel has variable thickness (2-22 yards).
- Till has a variable texture (ex. clay, silt-clay, boulder clay); is usually poorly sorted diamict; its deposition is beneath glacier ice; is generally calcareous in the project area. Till is relatively impermeable and has variable clast content. Till is related to potential land instability on steep slopes, and has a variable thickness (1-55 yards).

- Recent deposits are generally confined to floodplains within a valley; are oxidized, non-calcareous, fine sand to gravel and in larger valleys may be overlain by silt. They are subject to frequent flooding and are 1-11 yards thick.

There are two (2) circular Till deposits generally located north of the junction of I-690 and I-81 and southeast of the intersection of I-81 and I-690. The Lacustrine silt and clay deposit surrounds the Till and generally follows I-690, I-81 and I-90. A deposit of Kame moraine is located south of the Lacustrine silt and clay along I-81. The Recent deposits are located west of the Kame moraine. The Outwash sand and gravel is located east of I-81 along I-481.

Two (2) areas of rock that are exposed or within 1 yard of the land surface are located along I-481 east of I-81 and in the area of Rock Cut Road. From north to south in the project area, bedrock consists of shale and dolostone of the Vernon Formation; dolostone, shale, gypsum and salt of the Syracuse formation; and the Cobleskill Limestone of the Bertie and Camilllus Formation that consists of dolostone and shale. The Cobleskill Limestone outcrops forms a finger south along I-81. According to the mapping, this does not appear to be exposed at the surface.

2.3.3.6 Structures

2.3.3.6(1) Description

There are 76 bridges located in the primary study corridor, 47 bridges along the I-81 corridor and 29 bridges along the I-690 corridor. See Appendix E–Structures Information for a summary of each bridge. Bridge information is current as of May 31, 2010.

2.3.3.6(2) Clearances (Horizontal/Vertical)

There are no horizontal clearance postings associated with any bridges in the study corridor.

Two bridges in the study corridor have vertical clearance restrictions:
BIN 1031559, I-81 over East Castle Street is posted for 12 ft. – 11 in.
BIN 1051063, Ramp ‘O’ to I-690 Eastbound over Catherine Street is posted for 12 ft. – 9 in.

2.3.3.6(3) History & Deficiencies

Bridges in the study area are generally summarized in Table 2.12.

The FHWA definition of a “Structurally Deficient” bridge is a bridge with a National Bridge Inventory (NBI) condition rating of 4 or less for the deck, superstructure or substructure; or an appraisal rating of 2 or less for structural condition or waterway adequacy. This means the bridge is moderately to totally deteriorated, or not able to convey the waterway passing below the bridge. By contrast, NYSDOT defines a “Deficient” bridge as a bridge with an NYSDOT Condition Rating less than 5. Visible examples of these types of bridges include pier and wall deterioration as seen in the examples below. Absent of maintenance and repairs, these bridges will eventually be posted or closed depending on severity of the condition.

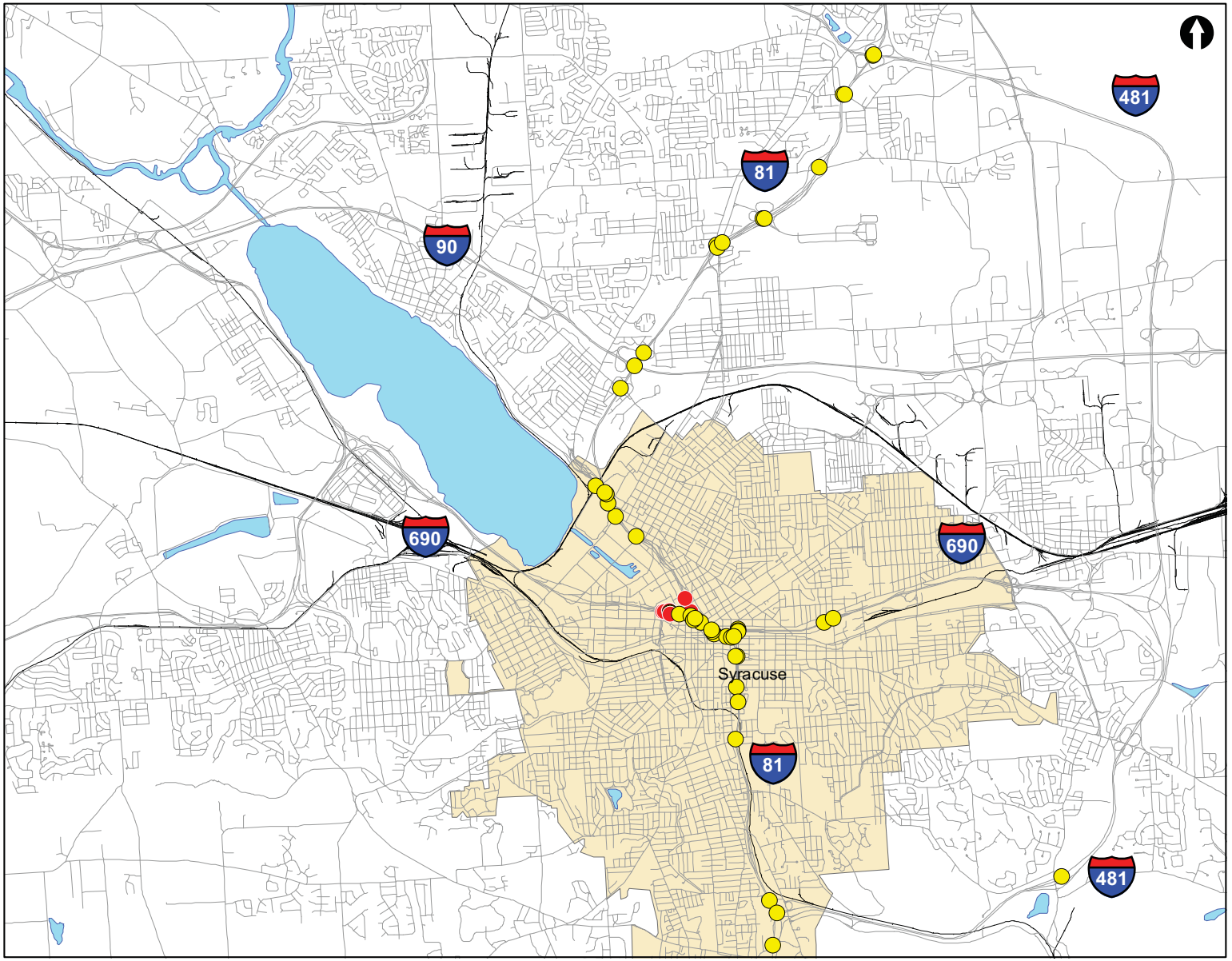
Table 2.12 – General Bridge Summary

	I-81 Corridor Bridges	I-690 Corridor Bridges
Year Constructed	1950s – 8 bridges 1960s – 22 bridges 1970s – 1 bridge 1980s – 13 bridges 2006 – 1 bridge 2009 – 2 bridges	1966 – 2 bridges 1968 – 27 bridges
Number of Spans	1 to 36	1 to 31
Bridge Length	65 ft. to 4097 ft.	66 ft. to 3147 ft.
NYSDOT Condition Rating	3.319 to 7	4.031 to 5.750
FHWA Sufficiency Rating	47.4 to 98.5	59.5 to 97.1
Statewide Priority Rating	2104 to 18727	2274 to 11280
Regional Priority Rating	110 to 1255	132 to 868
Structurally Deficient Bridges	2	5
Functionally Obsolete Bridges	34	13

Example Structurally Deficient Bridges

Pier and wall deterioration examples

A "Functionally Obsolete" Bridge, as defined by FHWA, is a bridge with an appraisal rating of 3 or less for the deck geometry, under clearance below the bridge, approach roadway alignment, structural condition, or waterway adequacy. Functionally Obsolete is a measure of the bridge geometry and its ability to safely convey traffic on the bridge or below the bridge, or its ability to pass water below the bridge without flooding in the case of a waterway crossing. For example, a bridge may be functionally obsolete if it has narrow lanes, no shoulders, or low clearances (see examples below). These bridges may not need any maintenance or repair, but may be posted for restriction or safety warnings. A bridge that qualifies as Functionally Obsolete is not necessarily in poor condition, but may have substandard features. By FHWA policy, bridges that are both Structurally Deficient and Functionally Obsolete are categorized as only Structurally Deficient.



Interstate 81 Corridor Assessment

Figure 2.29 - Structurally Deficient and Functionally Obsolete Bridges - Regional View

Legend

Bridge Conditions

- FHWA Functionally Obsolete (46)
- FHWA Structurally Deficient (7)
- Railroad
- Waterways
- City

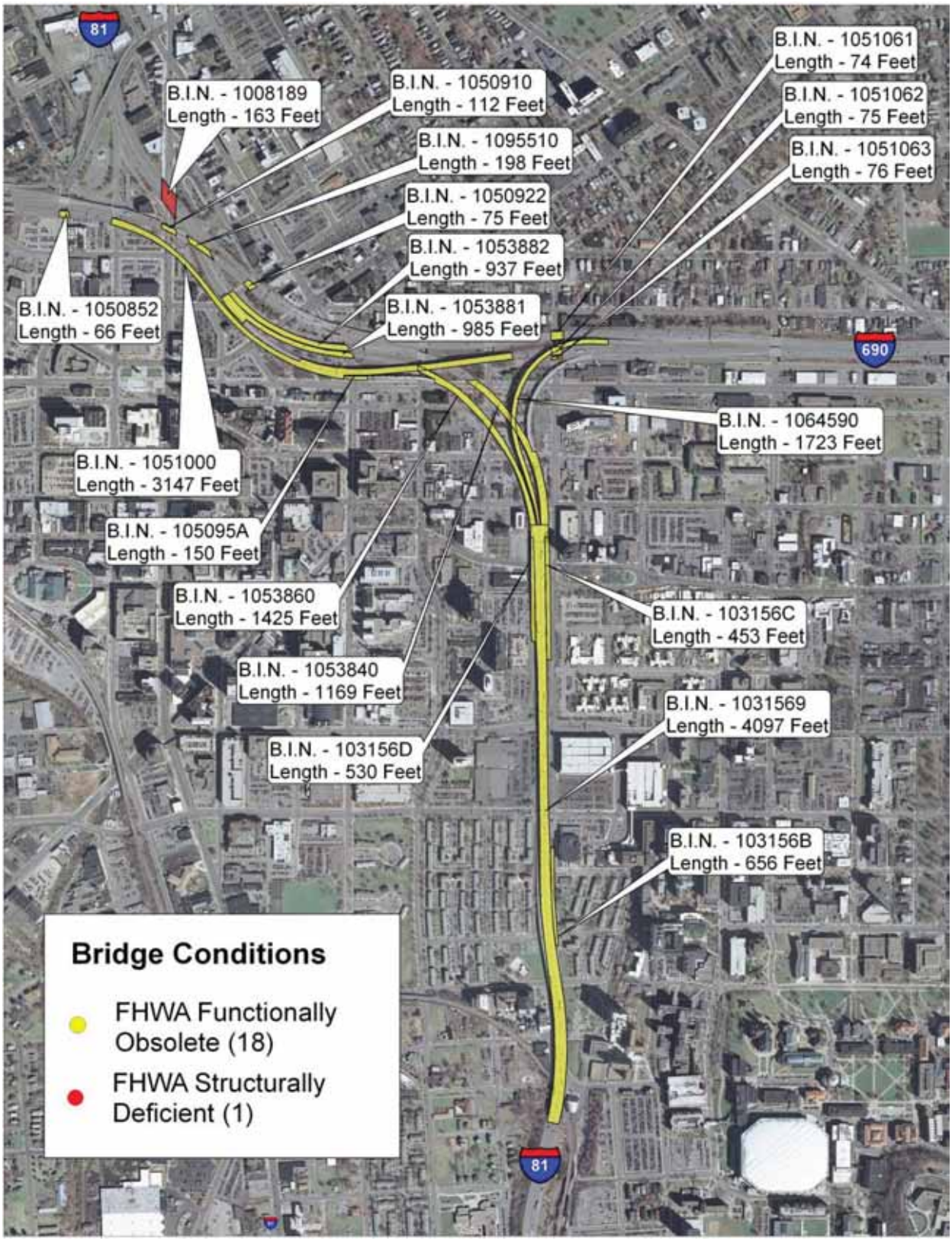
0 0.35 0.7 1.4 2.1 2.8

Miles

Jun 04, 2010

Original in Color Stantec

Figure 2.30 – Structurally Deficient and Functionally Obsolete Bridges in the Viaduct area



Example Functionally Obsolete Bridges

Vertical Clearance Posting and Narrow Shoulder examples

Figure 2.29 shows a regional view of the "Structurally Deficient" and "Functionally Obsolete" bridges in the study area, as defined by FHWA. Figure 2.30 shows a close-up of the "Structurally Deficient" and "Functionally Obsolete" bridges in the Viaduct area. It should be noted that these bridges are safe to drive on and that these classifications of bridges are used to prioritize repairs. For the Interstate related bridges in particular, the NYSDOT has a long term commitment of funding for maintaining them in good repair.

2.3.3.6(4) Inspection

A summary of the conditions of the significant bridges, which for purposes of this technical memorandum are defined as bridges exceeding 1000 feet in length, or with NYSDOT Condition Ratings less than 5.0, or Structurally Deficient/Functionally Obsolete in accordance with FHWA guidelines. NYSDOT Bridge Inspection Reports for all bridges in the study corridor are available from Region 3 of the NYSDOT. The following bridges are considered significant based on the above criteria.

Table 2.13 - Bridge Condition Summary – Significant Bridges

BIN	Bridge	Length (ft.)	NYSDOT Rating	FHWA	
				Structurally Deficient	Functionally Obsolete
I-81 Corridor Bridges					
1008489	I-81 NB & SB over North Salina Street	163	5.111	✔	
1008530	Ramp from I-81 SB to Route 11 over Route 11	950	4.906		✔
1031569	I-81 over East Adams Street (Viaduct)	4097	4.597		✔
1031671	I-81 SB over Route 11	1780	3.794	✔	
1031672	I-81 NB over Route 11	1780	4.972		✔
1053840	I-81 NB over Erie Boulevard (I-81/I-690 Interchange)	1169	4.472		✔
1053860	I-81 SB over North Townsend Street (I-81/I-690 Interchange)	1425	4.875		✔
1064590	I-81 NB over East Fayette Street (I-81/I-690 Interchange)	1723	5.083		✔
1071341	I-81 SB over Park Street, Bear Trap Creek and CSX Railroad	1928	5.451		✔
1071342	I-81 NB over Park Street, Bear Trap Creek and CSX Railroad	2176	5.521		✔
I-690 Corridor Bridges					
1050780	Ramp from West Street to I-690 WB over I-690	269	4.234	✔	
1050790	Ramp from I-690 WB to West Street over I-690	360	4.031	✔	
1050800	Ramp from N. Franklin Street to West Street over Onondaga Creek	200	4.208	✔	
1050840	Ramp from West Street to I-690 EB over Onondaga Creek	172	4.313	✔	
105080A	Ramp From I-690 WB to West Street over Onondaga Creek	116	4.875	✔	
1051000	I-690 over I-81 (I-81/I-690 Interchange)	3147	4.817		✔
10511139	I-690 over Beech Street	1522	4.406		

Federal Highway Administration information is generated from data provided by NYSDOT and focuses on the structurally deficient and functionally obsolete categories using information from the most recent inspections and the history and design of the original structure. They focus on:

Structurally Deficient:

- Rating less than 4 or less for deck, superstructure or substructure
- Rating of less than 2 or less for structural condition or waterway deficiencies

Functionally Obsolete: Rating of 3 or less for deck geometry, under clearance, roadway alignment, street condition or waterway adequacy.

The information that follows summarizes the results of the most recently available bridge inspections and the conditions found.

NYSDOT Rating Scale

Bridge conditions are determined by periodic inspections conducted by NYSDOT. They are given an NYSDOT Condition Rating on a scale of 1-7, where "1" is the worst and "7" is the best.

The following scale is used to rate the condition of various bridge elements:
1 – Totally deteriorated or in failed condition.
2 – Used to shade between a rating of 1 and 3.
3 – Serious deterioration or not functioning as originally designed.
4 – Used to shade between a rating 3 and 5.
5 – Minor deterioration but functioning as originally designed.
6 – Used to shade between a rating of 5 and 7.
7 – New condition. No deterioration.
8 – Not applicable.
9 – Condition and/or existence of element is unknown.

I-81 Corridor Significant Bridges

BIN 1008489, I-81 NB and SB over North Salina Street - 163 ft long, NYSDOT Condition Rating = 5.111, Federal Sufficiency Rating = 86.6.

The bridge is in good overall condition but is classified as Structurally Deficient. The primary findings of the latest inspection include:

- Both abutment joints are rated 4 due to leakage.
- Fascias are rated 3 in both spans due to spalling of the right fascia to 3 inches deep in Span 1 and 6 inches deep in Span 2.
- Paint is rated 4 in both spans, with 10% paint loss on Girders G1 and G3, and 100% paint loss in the begin right diaphragm bay, with heavy steel section loss.
- Structural Deck is rated 4 in both spans due to staining, delaminations and spalling in Bays 1 and 4. There are three spalled areas measuring up to 3 ft x 2 ft, with exposed bottom reinforcing bars.

BIN 1008530, Ramp from I-81 SB to Route 11 over Route 11 - 950 ft long, NYSDOT Condition Rating = 4.906, Federal Sufficiency Rating = 83.8.

The bridge is in good overall condition but is classified as Functionally Obsolete due to inadequate deck geometry. The primary findings of the latest inspection include:

- Cap beams for Piers 2 thru 7 are rated 4 due to delamination on up to 40% of the surface, with some minor spalling.
- Pier columns for Piers 2 thru 7 are rated 3 or 4 due to delaminations, with some cracking and spalls to 3 inches deep.

BIN 1031569, I-81 over East Adams Street (Viaduct) - 4097 ft long, NYSDOT Condition Rating = 4.597, Federal Sufficiency Rating = 64.8.

The bridge is in fairly good overall condition but is classified as Functionally Obsolete due to inadequate deck geometry. The primary findings of the latest inspection include:

- Deck Integral Wearing Surface is rated 3 for all spans. The Northbound direction is in good condition, but the southbound direction has abraded concrete, unsatisfactory transverse grooving, some concrete patches, several cracks, and polished aggregate in the wheel paths.
- Parapets are rated 3 or 4 in 60% of the spans due to spalling, exposed reinforcing bars and cracking.
- Superstructure Paint is rated 4 in all spans due to failure near joints and under fascias.
- Superstructure Joints are rated 4 in all spans due to leakage.
- Bearings are rated 4 in all spans due to seizure of the fascia and first interior bearings due to rust and several layers of paint.
- Pier Cap Beams rated 4 in spans 1 and 2 due to web pitting with 5% to 10% section loss of the steel webs.
- Pier Columns are rated 4 in nine spans due to vertical cracks, hollow sounding concrete, and spalls. Some of the locations are adjacent to previously repaired areas.
- Superstructure Primary Members rated 4 & 5 in all spans due to general deterioration, with excessive section loss in the bottom 6 to 12 inches of the web. Several locations have holes through the web due to deterioration.

A Safety Flag was issued on this bridge for delaminated deck concrete in 2 spans that could fall off onto vehicles or pedestrians.

Two Yellow Flags were issued on this bridge for deterioration and holes in girder webs; and the right fascia girder in span 21, where the web is deflected up to 1.25 inches from vertical for the first six feet from the begin bearing.

BIN 1031671, I-81 SB over Route 11 - 1780 ft long, NYSDOT Condition Rating = 3.794, Federal Sufficiency Rating = 80.3. This bridge is currently under construction (PIN 380499) for bearing and pedestal repairs, so conditions of these elements from the inspection report are not discussed.

The bridge is in fair overall condition but classified as Functionally Obsolete due to inadequate deck geometry. The primary findings of the latest inspection include:

- Begin Abutment Backwall is rated 4 due to spalls (up to 2 in deep) near the fascias, and hollow sounding concrete.
- End Abutment Pedestals are rated 4 due to cracked and hollow sounding concrete on 3 pedestals.
- Superstructure Joints over 8 piers are rated 1 or 4 due to various degrees of damaged or missing joint material.
- Primary Members in span 23 are rated 4 due to a crack along the top right side of the bottom flange of Girder 4 near Pier 22. The crack does not appear to begin in the flange,

but likely propagated from a 10-inch long crack in a plate welded to the top of the girder top flange.

- Pier cap beams are rated 4 for seven piers due to horizontal cracks up to ¼ in wide and 3 ft long, with some rust staining, across the bottom of the begin and end faces. Several cracks have loose or hollow sounding concrete around the cracks. Three of the pier cap beams also exhibit map cracking of the full height of the begin and end faces, with rust staining and hollow sounding concrete.
- 24 of the 26 piers have columns that are rated 4 due to vertical cracks, ranging from hairline to 1/8 in wide, with some rusting staining and efflorescence. Concrete adjacent to some cracks is hollow sounding, loose or spalled, with some exposed reinforcing bars.

A Red Flag was issued on this bridge for several concrete area that are cracked and spalled on two pier pedestals. These conditions should be corrected by the current construction project for bearing and pedestal repairs.

A Yellow Flag was issued for this bridge for the crack in the bottom flange of Girder 4 near Pier 22.

BIN 1031672, I-81 NB over Route 11 - 1780 ft long, NYSDOT Condition Rating = 4.972, Federal Sufficiency Rating = 91.7.

The bridge is in good overall condition but is classified as Functionally Obsolete due to inadequate deck geometry. The primary findings of the latest inspection include:

- Both abutments joints, and the joints at Piers 1, 4 and 8, are rated 4 due to holes and rips in seals, as well as spalling of the end abutment header concrete.
- Both abutment bridge seats and the Begin Abutment stem are rated 4 due to cracks, spalls and hollow sounding concrete.
- Pedestals on Piers 1 and 6 are rated 4 due to cracking concrete.
- Pier cap beams on Piers 1 and 8 are rated 4 due to horizontal cracks measuring up to 1/8 in wide across the top and/or bottom of one or both cap beam faces. The top cracks are located midway between pedestals, and the bottom cracks are located midway between pier columns. Cracks measure 1 ft to 3 ft in length, and have rust staining and loose or hollow sounding concrete.
- Pier columns of Piers 1,4, 8 and 9 are rated 4 due to vertical cracks, ranging from hairline to 1/8 in wide. Concrete adjacent to some cracks is hollow sounding, loose or spalled.

BIN 1053840, I-81 NB over Erie Boulevard - 1169 ft long, NYSDOT Condition Rating = 4.472, Federal Sufficiency Rating = 67.3.

The bridge is in fairly good overall condition but is classified as Functionally Obsolete due to inadequate deck geometry. Primary findings of the latest inspection include:

- The concrete wearing surface is rated 4 in all spans due to random transverse cracking, patches and the surface is worn smooth to polished aggregate.
- The structural deck is rated 4 in seven spans and 3 in two spans due to isolated areas of cracking, efflorescence and punky sounding concrete over approximately 20% of the

area. Spans 7 and 9 also have spalling in 10% of the area with rusted reinforcing bars exposed. Span 9 has a 2 ft round delamination on the underside of the deck that could fall onto pedestrians. Spans 4 and 5 also have delaminations on the underside of the deck.

- Paint is rated 4 in all spans due to peeling and painting. Overall paint loss estimated at 15%. Girders at the fascias, bearings and end diaphragms exhibit rusting and section loss.
- Joints are rated 3 in nine spans due to leakage at right and left ends. Most concrete joint headers are spalled on the bottom surface with exposed reinforcing bars.
- Bearings at piers 6, 8 and 11 are rated 4 due to general pack rust and general inability to function properly. Three bearings at Pier 4 are rated 3 due to welded reinforcing bars on each side of the bearings, preventing the bearings from functioning properly.

BIN 1053860, I-81 SB over North Townsend Street - 1425 ft long, NYSDOT Condition Rating = 4.875, Federal Sufficiency Rating = 64.9.

The bridge is in good overall condition but classified as Functionally Obsolete due to inadequate deck geometry. The primary findings of the latest inspection include:

- The concrete wearing surface is rated 4 in spans 1 through 12 due to being worn smooth. There are also a few random cracks, ranging from hairline to 1/8 in wide.
- The left fascia in 10 of the 15 spans is rated 4 due to isolated spalls adjacent to the pier joints, with spall depths to 3 inches, and exposed reinforcing bars.
- Both right and left concrete parapets in all spans are rated 4 due to map cracking and spalls on the inside face.
- The Structural deck on spans 5, 8 and 14 are rated 4, and span 15 is rated 3 due to isolated areas of spalling concrete, efflorescence, and exposed reinforcing bars on the bottom of the deck. Span 15 is the most severe, with approximately 5% of the deck area involved.
- The joints at 6 piers are rated 3 due to leakage onto the pier cap beams.
- The bearings at pier 8 are rated 4 due to warped slider plates inhibiting movement. The bearings at Pier 13 are rated 4 due to corrosion inhibiting bearing movement.

Two Safety Flags were issued for this bridge. One for loose concrete on the bottom of the deck slab in Span 14 that could fall on pedestrians below, and one for a loose lighting electrical junction box with a cover that is falling off and could fall on pedestrians or traffic below.

BIN 1064590, I-81 NB over East Fayette Street - 1723 ft long, NYSDOT Condition Rating = 5.083, Federal Sufficiency Rating = 71.4.

The bridge is in good overall condition but classified as Functionally Obsolete due to inadequate deck geometry. The primary findings of the latest inspection include:

- The Begin Abutment, left fascia girder bearing is rated 3 due to moderate corrosion.
- The Span 2, 4, 5, 9 and 15 fascias are rated 4 due to isolated spalls and hollow sounding concrete, mostly on the right side of the bridge.

- Mono deck surface is rated 4 in six spans due to cracking (Spans 2, 5, 11, 12, and 13), and hollow sounding concrete in two three foot diameter areas of Span 17.
- Joints at Piers 4 and 11 are rated 4 due to leakage at the right side.
- Paint in Spans 13 and 14 are rated 4 due to spot rust on the begin left side of the cap beam web at Pier 13, and rusting of the stringers over I-690 in both spans.
- Bearing at 9 of 16 piers are rated 4 due to corrosion and pack rust.
- Pedestals at Piers 6 and 11 are rated 4 due to cracking; and in the case of Pier 6, spalls and exposed reinforcing bars.
- Pier 7 and 13 pier caps are rated 4 and 3 respectively due to concrete debris on the lower flange of the steel cap beams.

BIN 1071341, I-81 SB over Park Street, Bear Trap Creek and CSX Railroad - 1928 ft long, NYSDOT Condition Rating = 5.451, Federal Sufficiency Rating = 91.7.

The bridge is in good overall condition but classified as Functionally Obsolete due to inadequate deck geometry. The primary findings of the latest inspection include:

- Parapets are rated 4 in Spans 1 and 2 because the outside of the left parapet is spalled for the first three feet of each span.
- Paint is rated 4 in 8 of the 12 spans due to the weathering steel having a rough texture at the Begin Abutment, Piers 3, 6 and 9, and the End Abutment. These substructures are the location of expansion joints in the deck.

BIN 1071342, I-81 NB over Park Street, Bear Trap Creek and CSX Railroad - 2176 ft long, NYSDOT Condition Rating = 5.521, Federal Sufficiency Rating = 74.4.

The bridge is in good overall condition but classified as Functionally Obsolete due to inadequate deck geometry. The primary findings of the latest inspection include:

- Wearing surface is rated 4 in Spans 5 and 6 due to hairline transverse cracks, alligator and pattern cracks.
- Paint is rated 4 in 8 of 11 spans due to scaling of weathering steel girders and cross bracing, especially below deck joints.
- The deck joint at Pier 9 is rated 4 due to the seal being torn and distorted, and leaking on the right pedestal.

I-690 Corridor Significant Bridges

BIN 1050780, Ramp from West Street to I-690 WB over I-690 - 269 ft long, NYSDOT Condition Rating = 4.234, Federal Sufficiency Rating = 59.5.

The bridge is in fair overall condition and classified as Structurally Deficient. The primary findings of the latest inspection include:

- Bearing bolts are rated 3 at Begin Abutment (2 locations) and End Abutment (6 locations) due to missing anchor bolts.
- Parapets and Mono Deck in all spans are rated 4 due to spalls at the joints and isolated hollow sounding concrete throughout.

- Paint is rated 4 in all spans due to surface rust on lower flanges throughout, and on end diaphragms at joints. Moderately heavy rust at joints, particularly on fascia girders.
- Bearings are rated 3 at all piers due to pack rust and frozen bearings.
- Pedestals are rated 3 at all piers due to cracking, delaminations and spalling to 3 inches deep, with some exposed reinforcing bars.
- Pier capbeams are rated 3 at all piers due to generally widespread cracks, delaminations and spalls.
- Pier columns are rated 4 at all piers due to cracks and delaminating concrete.

A Safety Flag was issued for this bridge for failed box beam guide rail at the begin left bridge approach.

BIN 1050790, I-81 NB over Park Street, Bear Trap Creek and CSX Railroad - 360 ft long, NYSDOT Condition Rating = 4.031, Federal Sufficiency Rating = 61.7.

The bridge is in fair overall condition and classified as Structurally Deficient. The primary findings of the latest inspection include:

- Begin and End Abutment joints are rated 4 due to missing joint filler material at the Begin Abutment and uneven elevations on the End Abutment armor angles.
- Begin and End Abutment bearings are rated 3 due to frozen bearings.
- Parapets are rated 4 in all spans due to impact damage, map cracking, rust stains throughout, and spalls joints over Piers 3 and 4.
- Joints at Piers 1, 2 & 4 are rated 4 due to protruding and tearing joint material. Armor angles are slightly damaged in various locations.
- Bearings at all piers are rated 3 or 4 due to pack rust at all locations, some frozen bearings, and sheared anchor bolts.
- Pier pedestals are rated 3 or 4 due to cracks, delaminations, rust stains, and spalls 1 to 3 inches deep.
- Pier caps are rated 3 or 4 at all piers due to cracks, delaminations, rust stains. Pier 4 is the worst with spalling to 4 inches deep and exposed reinforcing bars.
- Pier columns are rated 3 or 4 at all piers due to cracks, delaminations and spalls on up to 20% of the surface area. Pier 4 is the worst with a full height open crack in column 3, with spalling and exposed reinforcing bars.

BIN 1050800, Ramp FF to West Street over Onondaga Creek - 200 ft long, NYSDOT Condition Rating = 4.292, Federal Sufficiency Rating = 66.5.

The bridge is in fair overall condition and classified as Structurally Deficient. The primary findings of the latest inspection include:

- The bearings for both abutments are rated 4 due to pack rust. Some bearings appear to not be functioning.
- The bridge seat and pedestals are rated 4 for both abutments due to cracking, spalling to 2 in deep and debris buildup.

- The Begin Abutment backwall is rated 4 due to hollow sounding concrete and efflorescence on the top half of the backwall.
- The End Abutment stem is rated 4 due to hairline cracks, rust stains, hollow sounding concrete, and delaminations and spalls on approximately 50% of the wall face.
- The End Abutment cheekwalls are rated 4 due to spalls to 3 in deep at the bridge seat level.
- The deck wearing surface is rated 4 in Span 1 because the right half exhibits numerous longitudinal cracks a few transverse cracks to 1/8 in wide.
- The Sidewalk/Fascia and Parapets are rated 4 in all spans due to cracks, hollow sounding concrete, crumbling and spalled concrete on the safety walk, fascia and parapet.
- Paint is rated 4 in all spans due to peeling from the lower girder flange and at abutment and pier bearings, resulting in pitting and minor section loss, especially below the deck joint.
- Joints at both piers are rated 4 due to leakage.
- The bearings at both piers are rated 4 due to being rusted and frozen, especially the fascia and center bearings.
- Pedestals on both piers are rated 4 due to spalls and cracks (to 4 in deep) on several pedestals of both piers.
- Both pier stems are rated 4. Pier 1 is worse with cracking and spalls to 3 in deep. The Pier 2 stem exhibits horizontal cracking at the tip of the stem.
- The Pier 1 cap beam is rated 4 due to cracked and hollow sounding concrete on the top and bottom edges, and the bottom surface of the cap between columns. The Pier 2 cap beam is rated 3 because the bottom surface between columns 2 and 3 is completely spalled with nine stirrups exposed and rusted through.
- The columns of both piers are rated 4 due to column 2 of both piers being cracked and spalled to 2 in deep on 40% of the end face on Pier 1 and for the top 3 ft of the right face on Pier 2.

A Yellow Flag was issued for this bridge for the loss of concrete and rusted through stirrup bars in the Pier 2 cap beam.

BIN 1050840, Ramp from West Street to I-690 EB over Onondaga Creek - 172 ft long, NYSDOT Condition Rating = 4.313, Federal Sufficiency Rating = 68.4.

The bridge is in fair overall condition and classified as Structurally Deficient. The primary findings of the latest inspection include:

- The End Abutment backwall is rated 4 due to spalling and delaminations between the right fascia pedestal and the cheekwall.
- The Begin Abutment is rated 4 for Erosion/Scour due to a channel that has eroded due to a curb cut at the begin right shoulder. Drainage has eroded the soil and exposed the begin right corner of the footing and undermined the block paving.
- The concrete parapets are rated 4 in all spans due to map cracking on the inside face of both parapets.

- The bearings of both piers are rated 4 because they are frozen, have pack rust and warped sliding plates.
- Pier pedestals are rated 3 for both piers due to cracking, spalling and delamination of several pedestals.
- Both pier cap beams are rated 3 due to extensive spelling of the underside of the cap beams, with delaminations, cracks, and exposed and rusting reinforcing bars.
- Pier columns are rated 4 for both piers due to cracks, delaminations and some minor concrete spall pop-offs.

BIN 105080A, Ramp from I-690 WB to West Street over Onondaga Creek - 116 ft long, NYSDOT Condition Rating = 4.875, Federal Sufficiency Rating = 60.9.

The bridge is in fairly good overall condition but is classified as Structurally Deficient. The primary findings of the latest inspection include:

- Begin and End Abutment bearings are rated 4 due to rust, and appear frozen, especially fascia bearings.
- Parapets are rated 4 in both spans due to localized areas of punky, delaminated and spalled concrete.
- Paint is rated 4 in both spans due to peeling paint on the right fascia girders, and rusting on the girders over the pier.
- The joint over the pier is rated 4 due to bulging and tearing of the seal, allowing water to leak on the steel below.
- The pier bearings are rated 4 due to rusted and being frozen.
- The pier solid stem below the columns is rated 4 due to complete spalling (to 8 inches deep) of the right half of the wall.
- The pier cap beam is rated 4 due to cracking, efflorescence, delaminations and rust staining. The bottom face is spalled to 4 inches deep, with exposed reinforcing bars.
- The pier columns are rated 4 due to cracks, rust stains and hollow sounding concrete on the right face of Column 4.

BIN 1051000, I-690 over I-81 - 3147 ft long, NYSDOT Condition Rating = 4.817, Federal Sufficiency Rating = 72.3.

The bridge is in good overall condition but classified as Functionally Obsolete due to inadequate deck geometry. The primary findings of the latest inspection include:

- The wearing surface and monolithic deck are both rated 4 in all spans due to worn wearing surface in the wheel paths, cracks, delaminations, small spalls and hollow sounding concrete to various extents in all spans.
- Fascias are rated 4 in 10 of 30 spans due to cracking and spalling adjacent to the deck joints, with exposed reinforcing bars at some locations.
- Parapets are rated 4 in all spans due to cracking, hollow sounding concrete, minor spalls, dampness and rust stains to various extents throughout the bridge.
- The bearings at Piers 3, 15, 17 and 18 are rated 4 because they are underextended. The bearings at Pier 3 also have moderate pack rust.

- The deck in Spans 3, 4, 15, 16 and 29 are rated 4 due to mapcracks, efflorescence and minor spalls with loose concrete on the underside of the deck.

A Safety flag was issued for this bridge due to the concrete spalls on the underside of the deck that could fall off onto parked cars or pedestrians below. Since the issuance of the flag, the loose concrete in Spans 15 and 29 was removed and the Safety Flag was removed.

BIN 1051139, I-690 over Beech Street - 1522 ft long, NYSDOT Condition Rating = 4.406, Federal Sufficiency Rating = 67.2. This bridge is currently funded in the Draft 2011-2015 TIP for engineering design only.

The bridge is in fairly good overall condition. The primary findings of the latest inspection include:

- Abutment pedestals are rated 4 for both abutments due to cracked and rust stained pedestals (two pedestals at Begin Abutment, one pedestal at End Abutment). One of the pedestals on the Begin Abutment has exposed reinforcing bars.
- The End Abutment backwall is rated 4 due to full height hairline to 1/8 inch wide cracks, and the top of the backwall is spalled to 1 inch deep in bays 2 and 4.
- The Begin and End Right Cheekwalls are rated 4 due to map cracking, rust stains, hollow sounding concrete, and delaminations. The top of the wingwalls are crumbling and spalling at the locations of the bridge rail posts.
- Fascias and Parapets are rated 4 and 3, respectively, in all spans. Both faces of the parapets, as well as the fascias, exhibit map cracking with rust stains and delaminations. The tops of the parapets have longitudinal cracking, with loose, crumbling and spalling concrete in several locations. The inside face of the parapets have spalls up to 2 ft high x 6 ft long x 3 in deep in various locations.
- The wearing surface in spans 4, 12, 13 and 15 are rate 4 due to small spalled areas of wearing surface, or patches that have settled.
- The median barrier is rated 4 in Span 1 due to map cracks and rust stains on both faces, with spalling along the top at mid-span. The median ramp barrier for the Teall Avenue off ramp is rated 3 due to impact damage that has crushed the first two section of the barrier.
- The structural deck in all spans is rated 4 due to hairline cracks, efflorescence, and areas of hollow sounding or spalled concrete.
- Paint is rated 3 in all spans. The fascia girders in several spans have blistering and peeling paint on the outside face of the webs, and along the lower flange edges. Conditions are worse within three feet of each joint.
- Pier bearings are rated 4 at all piers due to pack rust under and around fascia rocker bearings.
- Pier pedestals are rated 4 at all piers due to horizontal cracks and hollow sounding concrete at various pedestals on each pier.
- Cap beams at all piers are rated 4 due to cracking and hollow sounding concrete along the upper and lower 6 inches of the cap beam. Several cap beams also exhibit hollow and delaminating concrete on cap beam faces and undersides, up to 2 ft in diameter.

- Pier columns are rated 4 at Piers 2, 6 and 7 due to vertical cracks up to 1/8 in wide; and hollow, delaminating or spalling concrete. Pier 7 is the worst, with rusted reinforcing bars in spalled areas within the top 4 ft of Column 2.

2.3.3.6(5) Restrictions

None of the bridges in the study corridor have load posting restrictions, and it is not anticipated any load postings will be necessary in the foreseeable future.

2.3.3.6(6) Future Conditions

The future structural conditions of the all the bridges in the study corridor, represented by the numerical bridge Condition Rating, were projected to ETC (year 2020) and ETC + 30 (year 2050) using the Bridge Needs Assessment Model (BNAM) data provided by Region 3. The deterioration rates assume only routine maintenance such as bridge washing and maintenance painting of steel members will be undertaken over the assessment period. This information can be compared to the NYSDOT condition ratings where a bridge rated less than 5 is considered deficient. It should be noted that the NYSDOT also has a Capital Improvement Plan that is or will be addressing many of these structurally deficient bridges. These include Butternut Street over I-81, I-690 over Beech Street and several of the bridges in the I-690/West Street interchange.

The calculated future Condition Rating of all bridges can be found in Appendix E – Structural Information. The calculated future Condition Rating of the bridges identified as significant in Section 2.3.3.6(4) are shown in Table 2.14.

Assuming only routine maintenance, such as bridge washing, maintenance painting of steel and spot repairs is performed in the future, the bridge conditions would continue to deteriorate until bridges need to be posted for reduced loads, and eventually closed. However, the NYSDOT has an interim program to keep them safe and useable until long term solutions are developed. Using the NYSDOT 2008 Bridge Needs Assessment Model predictions, most deficient bridges in the corridor will be in a state of serious deterioration by 2020(ETC); and by year 2050 (ETC+30), these same bridges will be in a state of total to very serious deterioration. Based on the age of the bridges, by year 2050 over 80% of the bridges in the study corridor will have met or exceeded their expected service life. This reinforces the importance of developing a long-term plan for I-81 so these important components of the transportation system can be remodeled.

Table 2.14 – Future Condition Ratings of Significant Bridges

BIN	Features Carried & Crossed	Current Cond. Rating	ETC (2020) Cond. Rating	ETC +30 (2050) Cond. Rating
I-81 Corridor Bridges				
1008489	I-81 NB & SB over North Salina Street	5.111	4.788	3.599
1008530	Ramp from I-81 SB to Route 11 over Route 11	4.906	4.597	2.940
1031569	I-81 over East Adams Street	4.597	4.528	2.685
1031671	I-81 SB over Route 11	3.794	2.773	1.000
1031672	I-81 NB over Route 11	4.972	4.677	3.230
1053840	I-81 NB over Erie Boulevard	4.472	3.950	1.000
1053860	I-81 SB over North Townsend Street	4.875	4.575	2.857
1064590	I-81 NB over East Fayette Street	5.083	4.774	3.554
1071341	I-81 SB over Park Street, Bear Trap Creek and CSX Railroad	5.451	5.020	4.151
1071342	I-81 NB over Park Street, Bear Trap Creek and CSX Railroad	5.521	5.062	4.218
I-690 Corridor Bridges				
1050780	Ramp from West Street to I-690 WB over I-690	4.234	3.508	1.000
1050790	Ramp from I-690 WB to West Street over I-690	4.031	3.164	1.000
1050800	Ramp from N. Franklin Street to West Street over Onondaga Creek	4.208	3.622	1.000
1050840	Ramp from West Street to I-690 EB over Onondaga Creek	4.313	3.863	1.000
105080A	Ramp From I-690 WB to West Street over Onondaga Creek	4.875	4.570	2.841
1051000	I-690 over I-81	4.817	4.503	2.596
10511139	I-690 over Beech Street	4.406	3.990	1.000

2.3.3.6(7) Waterway

A Coast Guard Checklist is not required for the Technical Memorandum phase of the study.

2.3.3.7 Hydraulics of Bridges and Culverts

Seven bridges in the study corridor cross over waterways:

BIN 1050800, Ramp FF to West Street over Onondaga Creek – During the latest inspection, Stream Alignment, Erosion and Scour, and Waterway Opening were all rated 6, indicating very good condition; Bank Protection was rated 5, indicating good condition. The Begin Abutment, End Abutment, Pier 1 and Pier 2 are all founded on cast-in-place concrete piles. Pier 3 is not founded on piles. During the inspection, piles were not exposed and therefore the conditions are unknown.

BIN 105080A, I-690 WB to West Street SB over Onondaga Creek - During the latest inspection, Stream Alignment, Erosion and Scour, and Waterway Opening were all rated 6, indicating very good condition; Bank Protection was rated 5, indicating good condition. The Begin Abutment and Pier 2 are not founded on piles, the End Abutment is founded on cast-

in-place concrete piles, and Pier 2 is founded on precast concrete piles. During the inspection, piles were not exposed and therefore the conditions are unknown.

BIN 1050821, I-690 WB over Onondaga Creek - During the latest inspection, Stream Alignment, Erosion and Scour, and Waterway Opening were all rated 6, indicating very good condition; Bank Protection was rated 5, indicating good condition. The Begin and End Abutments are founded on cast-in-place concrete piles, Piers 1 and 2 are founded on steel H-piles, and Pier 3 is not founded on piles. During the inspection, piles were not exposed and therefore the conditions are unknown.

BIN 1050822, I-690 EB over Onondaga Creek - During the latest inspection, Stream Alignment, Erosion and Scour, and Waterway Opening were all rated 6, indicating very good condition; Bank Protection was rated 5, indicating good condition. The Begin and End Abutments are founded on cast-in-place concrete piles, Piers 1 and 2 are founded on steel H-piles, and Pier 3 is not founded on piles. During the inspection, piles were not exposed and therefore the conditions are unknown.

BIN 1050840, Ramp CC to I-690 EB over Onondaga Creek - During the latest inspection, Stream Alignment, Erosion and Scour, and Waterway Opening were all rated 6, indicating very good condition; Bank Protection was rated 5, indicating good condition. The Begin and End Abutments are founded on cast-in-place concrete piles, Piers 1 and 2 are founded on steel H-piles, and Pier 3 is not founded on piles. During the inspection, piles were not exposed and therefore the conditions are unknown.

BIN 1071341, I-81 SB over Park Street, Bear Trap Creek and CSX Railroad **-** During the latest inspection, Stream Alignment, Erosion and Scour, and Waterway Opening were all rated 6, indicating very good condition; there is no stream bank protection installed at the bridge. All substructures, with the exception of Pier 12, are founded on steel H-piles. During the inspection, piles were not exposed and therefore the conditions are unknown.

BIN 1071342, I-81 NB over Park Street, Bear Trap Creek and CSX Railroad **-** During the latest inspection, Stream Alignment, Erosion and Scour, and Waterway Opening were all rated 6, indicating very good condition; there is no stream bank protection installed at the bridge. All substructures, with the exception of Pier 11, are founded on steel H-piles. During the inspection, piles were not exposed and therefore the conditions are unknown.

In future phases, preliminary hydraulic evaluations, and ultimately detailed hydraulic analyses will be performed as needed for the above bridges to determine hydraulic adequacy, failure vulnerability, flooding potential and scour susceptibility. At this stage, since all substructures which could be affected by flooding are founded on piles, and there is no historical or current evidence of scour or undermining, it can be assumed the hydraulic adequacy of each bridge is acceptable.

2.3.3.8 Guide Railing, Median Barriers and Impact Attenuators

As a planning level corridor study, detailed information on guide rail, median barriers and impact attenuators has not been collected.

2.3.3.9 Utilities

Within the I-81 Study area, the following utility providers serve residents:

Table 2.15 - Utilities

Utility Type	Provider	Location
Power	National Grid	Overhead
Telephone	Verizon	Overhead and underground- (Fiber Optic)
Cable	Time Warner	Overhead
Gas	National Grid	Underground
Sewer	City of Syracuse and Onondaga County Water Environment Protection Departments	Underground
Water	Onondaga County Water Authority City of Syracuse	Underground Underground

2.3.3.10 Railroad Facilities

The National Railroad Passenger Corporation (Amtrak) provides intercity rail passenger service in the Central New York Region at the William F. Walsh Regional Transportation Center located off of I-81 at Exit 23 – Park Street. There is one major (Class 1) rail freight carrier, CSX Transportation; one regional carrier, New York, Susquehanna & Western Railway; and one shortline railroad, Finger Lakes Railway. CSXT replaced Conrail as the major freight service provider in 1999 and operates the Chicago Main line that links Central New York with New York City, New England and the Midwest. CSXT also operates the Baldwinsville, Fulton and Montreal Secondary lines to the north of Syracuse, with the Montreal Secondary being the gateway to Montreal and Canada. A significant segment of the CSXT business is the rail/truck intermodal freight terminal located in the DeWitt rail yard. The DeWitt yard is a major intermodal facility serving the Northeast and is the only terminal of its type between New York City and Buffalo. This intermodal center is located northeast of the I481/I690 interchange. Six (6) rail facilities cross the study area as follows:

- ***Auburn Road (Finger Lakes)*** – an east/west rail line from Auburn and ties into the Chicago Line near the State Fair Grounds along I-690.
- ***Baldwinsville Secondary (CSXT)*** - an east/west rail line from Baldwinsville and ties into the Chicago line near the State Fair Grounds along I-690. This line crosses under I-690 near Exit 5 – County Road 80
- ***Chicago Line (CSXT)*** – traverses the study area in an east/west parallels I-690 near the State Fair Grounds and crosses I-690 near Hiawatha Blvd. This line proceeds north from the south end of Onondaga Lake and crosses under I-81 at the Regional Transportation Center at Park Street. This rail line proceeds east through the Dewitt rail yard crosses under I-481 just north of the I-690 interchange.
- ***Jamesville Industrial Track (Susquehanna)*** – this line traverses downtown Syracuse by Armory Square, proceeding in a southeast direction and crossing under I-81 near Van Buren Street. This line proceeds in a southerly direction and parallel to I-81 then east along I-481 before crossing under I-481 and proceeding south.

- ***Lake Industrial Track (Susquehanna)*** – this line links the Chicago Line and the Jamesville Industrial Track through downtown Syracuse. This line connects with Chicago Line near Hiawatha Blvd and Erie Blvd West.
- ***Montreal Secondary (CSXT)*** – connects with the Chicago line near I-81 and the Regional Transportation Center and it progresses on the north shores of Onondaga Lake.

2.3.4 Landscape and Environmental Enhancement Opportunities

This section focuses on the critical existing areas to identify potential enhancement opportunities related to the project.

2.3.4.1 Landscape

2.3.4.1(1) Terrain - The general terrain of the I-81 Corridor within the primary study area is fairly level from end to end. The roadway, however, rises south of the Viaduct as it enters the hilly terrain that abuts the Syracuse Metropolitan Area on the south. I-81 rises from a typical elevation of 400' in the City to over 1,200' just a few miles to the south.

North of the city the terrain is generally level with flatlands extending north past the Cicero swamp to the NYS Canal. There are prominent land features in the City to the southeast and southwest at the foothills of the Finger Lakes glacial deposits. In these areas, numerous hills and mounds rise to the 650 feet – 750 feet elevation or greater with many having been developed within the urban environment. West of I-81 (and south of I-690) the terrain is fairly level in the immediate Onondaga Creek drainage basin (elevation 400 feet to 420 feet) before rising to the west. This area is similar to the east side with significant land forms and elevation changes. The majority of the I-81 Primary Study Area drains to Onondaga Lake. Study area terrain feeds to Onondaga Lake via a series of creeks and streams including Onondaga Creek, Butternut Creek, Ley/Beartrap Creek and Harbor Brook. The very northern sections in the towns of Clay and Cicero drain north away from Onondaga Lake towards the Oneida Lake and the Oneida River (NYS Canal System).

2.3.4.1(2) Unusual Weather Conditions – The Syracuse area receives a fare share of unusual weather conditions particularly in the winter with lake effect snow, sleet and ice weather conditions. These are particularly relevant to the elevated portions of I-81. Syracuse traditionally leads the snowfall totals for the upstate cities of Buffalo, Rochester, Syracuse and Albany. Winter Canadian air flows contribute considerable lake effect snow to Oswego, Tug Hill Plateau and Syracuse/Utica.

2.3.4.2 Opportunities for Environmental Improvements

In accordance with Environmental Initiative EI 99-026 the primary study corridor has been reviewed for possible environmental initiative opportunities. Additional documents consulted include the NYSDOT's GreenLites Program and NYSDEC's Beyond Waste program guidelines. One of the most obvious opportunities is in the area of stormwater management. The original I-81 was most likely not constructed with the stormwater

management guidance in use today, in particular water quality and water quantity features. In connection with Onondaga County's "Save the Rain" program along with overall efforts to clean up Onondaga Lake, modern stormwater management techniques can assist in improving the overall water quality. The other obvious major area is in the area of reusing and recycling materials. With the reasonably high quality of existing pavement condition, the embankment foundation appears to be sound, which would promote the use of recycling pavement and possibly subbase materials.

Other possible applications of environmental enhancements include:

- Integration of context sensitive design,
- Landscape plantings to enhance roadside appearance,
- Created wetlands and stormwater management facilities,
- Consideration of natural and historic features in highway alignment selection,
- Protection/enhancement of wildlife habitats,
- Noise abatement,
- Increased support for transit usage, and
- Enhancements to pedestrian, bicycle and multi-use trails.

The project will be entering the next phase of public involvement efforts in the winter of 2010/2011 and community and agency input will be further documented.

2.3.5 Miscellaneous

No additional pertinent information on the existing conditions has been identified.

THE I-81 CHALLENGE

Chapter 3
Alternatives

CHAPTER 3 – ALTERNATIVES - Future

In the future, this chapter will document the project strategies (alternatives) considered and examined during the strategy development process. This process will be comprehensive and performed in concert with the Public Involvement Process illustrated on Figure 2.1 of Section 2.1.2 Public Involvement Process. The process follows a logical progression from the initial step; gathering the community's ideas, thoughts and concepts, to carefully sorting the viable options to a select group of strategies. This process will integrate community input and will include a comprehensive screening of Social, Economic and Environmental effects. The process is summarized as follows:

1. Collecting the full range of community and agency input to ensure that the broadest range of concepts are "on the table" for consideration.
2. Analyze, blend and consolidate the concepts/ideas above into a comprehensive range of strategies. It is estimated that 8-10 overall strategies will be identified including possible system modifications.
3. Screen and analyze the above noted concepts and present to the public; how they were consolidated and what are the initial screening results of transportation service and Social, Economic and Environmental considerations.
4. Present and evaluate 5 or 6 strategies screened down from the task above.
5. Further screen, discuss and evaluate strategies to identify a select group of strategies (3 or 4) to carry forward to the next step of the NYSDOT Project Development Process.

Through the entire process, the public will be engaged along each step and the engineering and social, economic and environmental screening will focus on impact areas and increase in detail as the process progresses.

THE I-81 CHALLENGE

Chapter 4
Social, Economic, & Environmental Concerns

CHAPTER 4 - SOCIAL, ECONOMIC & ENVIRONMENTAL CONDITIONS

4.1 Introduction

In order to gauge and compare the relative sensitivity of the study strategies (alternatives) for the I-81 Corridor, social, economic and environmental conditions within a general study area around I-81 have been researched and documented. These resources are provided in order to consider social, economic and environmental constraints to the development of study strategies (alternatives) at the earliest stage. Subsequent to the development of study strategies (alternatives), the resource maps will be used to gauge the relative effect of the strategies (alternatives) on identified social, economic and environmental resources. These impact studies will be documented in subsequent phases of *The I-81 Challenge*.

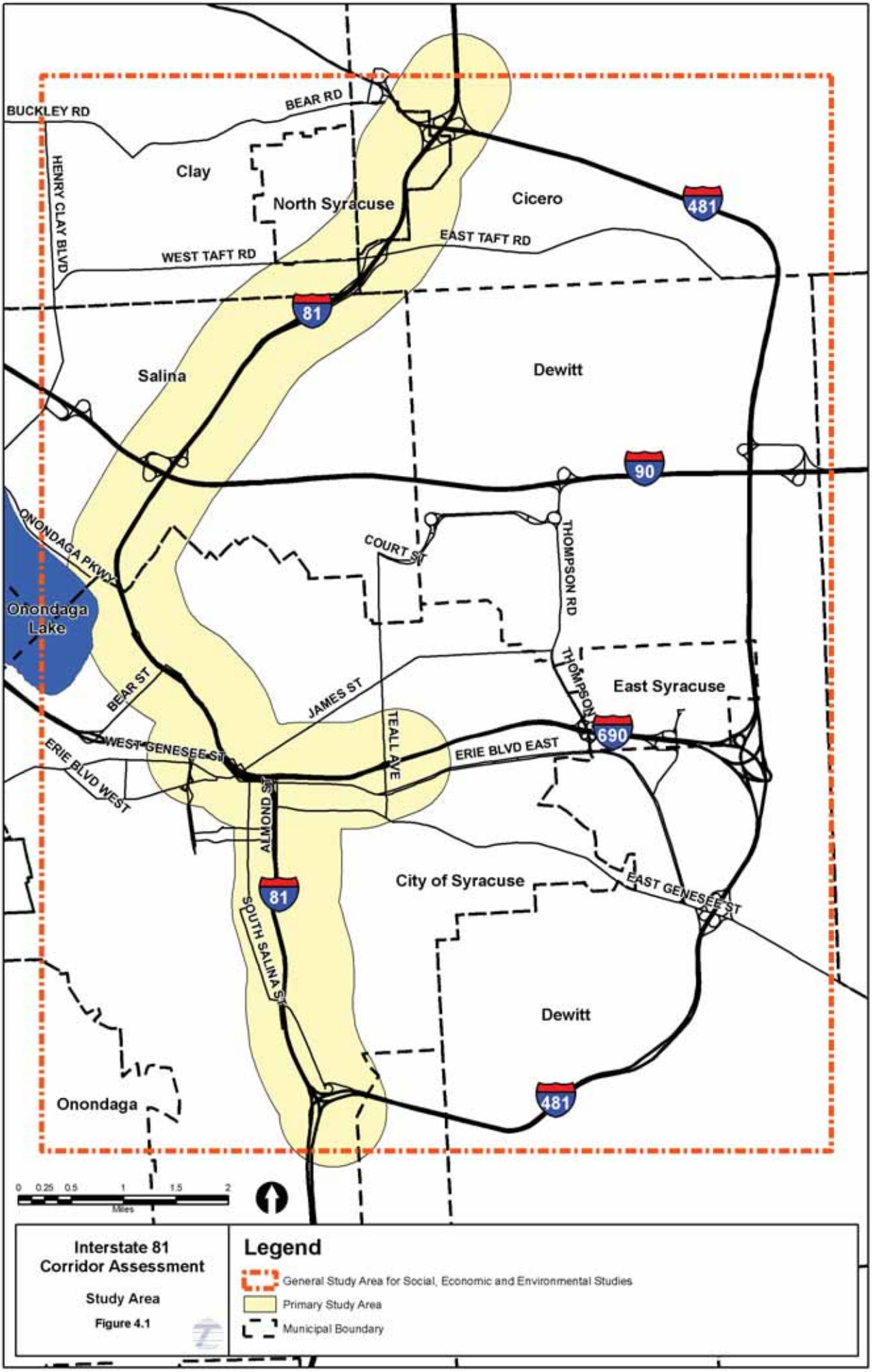
The General Study Area for the Social Economic and Environmental Studies (SEE Study Area) has been defined to be geographically broader than the Primary Study Area. This area encompasses the initially assumed general area where study strategies (alternatives) could potentially be considered for the I-81 Corridor, related facilities on I-690 and I-481 and the local access system, see Figure 4.1. The SEE Study Area includes multiple municipalities within Onondaga County, including the City of Syracuse, Town of Cicero, Town of Clay, Town of Dewitt, Town of Salina, Village of East Syracuse, and Village of North Syracuse. Additional data collection has been performed for the City of Syracuse limits of I-81 including a review of downtown area land use, traffic and pedestrian circulation, and development plans.

The study area limits for Social, Economic and Environmental factors vary somewhat by subject matter and the coverage limits of the particular resource study. Some subject areas use, for example, countywide or citywide information, as it is readily available. Others use census track or zip code information. Each study identifies its data limits and source as appropriate. Social, Economic and Environmental study areas will be adjusted as needed as the study progresses.

4.1.1 Environmental Classification and Lead Agencies

NEPA Classification and Lead Agency

This corridor study precedes the official initiation of the National Environmental Protection Agency (NEPA) process. In subsequent phases of this study effort, the Project Scoping Report for the Viaduct (which is in the time frame when the I-81 Corridor Study is being completed), the official NEPA process will be initiated as a probable NEPA Class I action in accordance with 23 CFR771.115. NEPA Class I is an Environmental Impact Statement (EIS), which is the classification for the most complex type of project. NYSDOT and FHWA are assumed to be co-lead agencies for future action.


BUCKLEY RD
BEAR RD
HENRY CLAY BLVD
Clay
North Syracuse
Cicero
481
EAST TAFT RD
WEST TAFT RD
81
Salina
Dewitt
90
ONONDAGA PKWY
COURT ST
THOMPSON RD
Onondaga Lake
BEAR ST
JAMES ST
East Syracuse
690
WEST GENESEE ST
ERIE BLVD EAST
ERIE BLVD WEST
TEALL AVE
ALMOND ST
City of Syracuse
EAST GENESEE ST
81
SOUTH SALINA ST
Dewitt
Onondaga
481
0 0.25 0.5 1 1.5 2
Miles
Interstate 81
Corridor Assessment
Study Area
Figure 4.1
Legend
General Study Area for Social, Economic and Environmental Studies
Primary Study Area
Municipal Boundary

SEQR Classification and Lead Agency
This corridor study also precedes the official initiation of the State Environmental Quality Review Act (SEQRA) process. In subsequent phases of this study effort, the official SEQR process will be initiated as a SEQR non-Type II (EIS) action under 17 NYCRR Part 15. NYSDOT will be the SEQR Lead Agency.

4.1.2 Cooperating, Participating, and Involved Agencies

NEPA Cooperating and Agencies
Cooperating agencies in accordance with 23 CFR 771, will be identified as the study strategies are developed and initiated into the official NEPA process (Project Scoping Report Phase).

SEQR Involved and Interested Agencies
Involved and Interested Agencies, under SEQR, will be identified as the study process is developed into subsequent phases.

4.2 Social Environment

4.2.1 Overall Land Use and Transportation Framework

The purpose of this section is to document the land use and economic conditions in the general vicinity of the project corridor and specifically land use directly adjacent to I-81 along the Primary Study Area. This information is reference information for developing and evaluating strategies in the future stages of this corridor study as study strategies (alternatives) are generated. This information, particularly the land use information, will help identify "constraints" to modifying the corridor like neighborhoods, parks and community facilities. It will be used as baseline data for evaluating possible impacts to land use and economic centers.

The data herein describes existing conditions for land use and discusses future land use planning efforts prepared by the adjacent municipalities. Information on land use provides an understanding as to how the distribution and character of development affects traffic patterns. Drivers traveling to and from areas of homes or businesses generate traffic. The more concentrated the area of homes and/or businesses and the further the distance between them, the more traffic can be expected. As land use changes over time, travel conditions such as the degree of congestion and travel times, can be affected. Heavy traffic on the highways or expressways feeding on to local roads in the study area affects the quality of life in the corridor communities.

The land use and economic assessment for this study examined the following information:

- existing land use, policy and zoning within the corridor,
- how the roads connect and provide access to the community,
- areas where land use is expected to change, and
- the local economy

Data on land use and development potential was derived from:

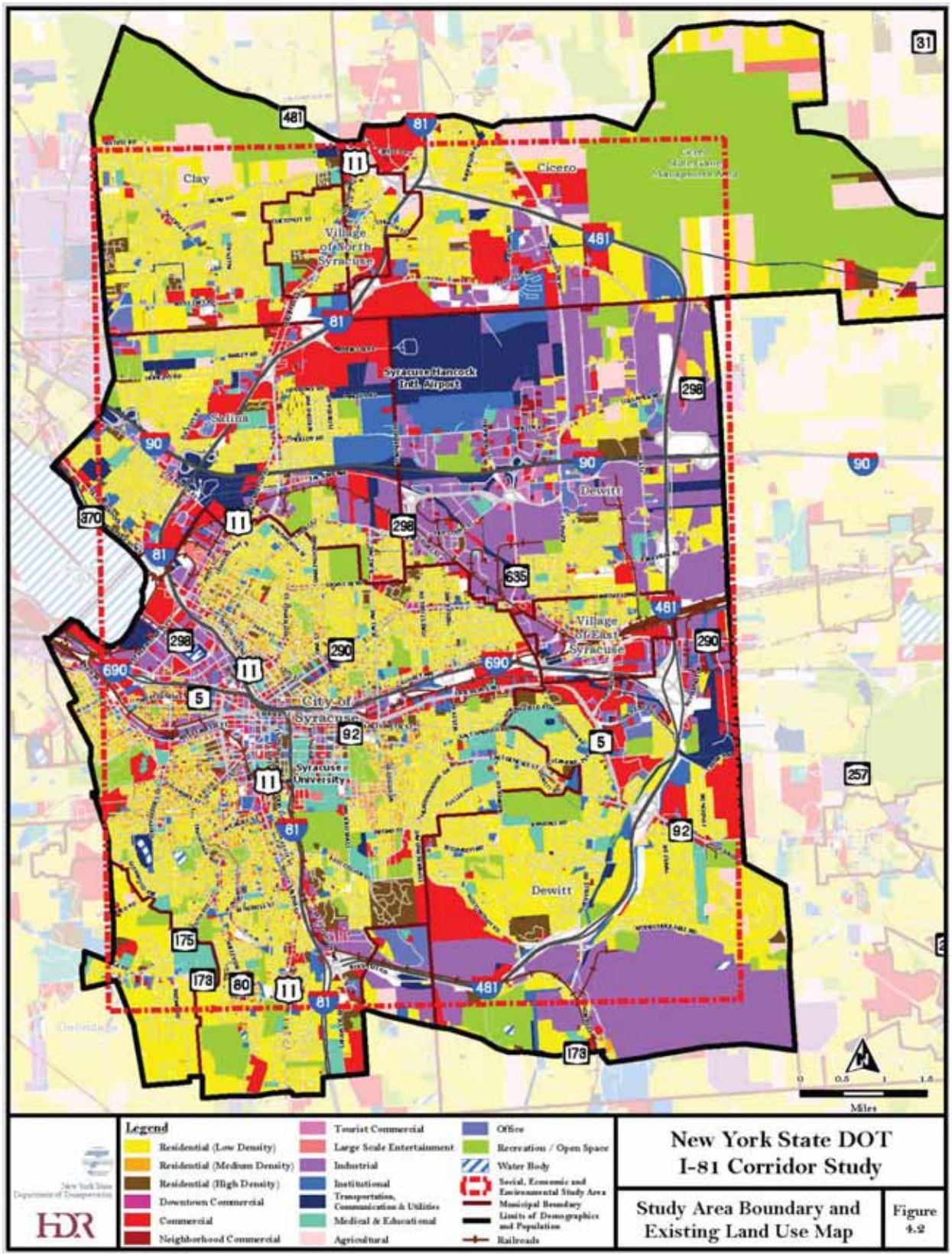
- Interviews with local professional planning staff of demographic study area municipalities,
- field observation,
- development of Geographic Information System (GIS) mapping of the corridor,
- literature review and analysis, and
- future land use plans.

The project Social, Economic and Environmental study area is principally situated in the center of Onondaga County, which stands at the northeast corner of the Finger Lakes region of New York State. The demographic study area for land use, shown on Figure 4.2, is generally rectangular with a north-south orientation, encompassing 95.4 sq. miles (61,076 acres). The demographic study area is generally consistent with the social, economic and environmental study area, shown for comparison in Figure 4.2 with a dashed red line. The demographic study area boundary is slightly irregular as it is comprised of a series of census tracks. The boundary was selected so the existing and future conditions could be compared once the SMTC's travel demand model update is complete. While the core of the demographic study area is the City of Syracuse, there are six other jurisdictions – the Town of Salina, the Town of Clay, the Village of North Syracuse, the Town of Cicero, the Town of DeWitt, and the Village of East Syracuse. Within the demographic study area is the full range of urban, suburban, town, village, rural and open space lands. Although the central part of Syracuse is flat, many of its neighborhoods are located on small hills such as University Hill and Tipperary Hill. Land to the north of Syracuse is generally flat, while land to the south is hilly. The topography of the area has influenced infrastructure location (particularly limiting sanitary sewer and water services in the south) which has influenced the settlement patterns of the region.

The City of Syracuse functions as the region's center and contains the majority of places that typically define a center – universities, hospitals, institutions, cultural and civic uses. Beyond Syracuse, the development shows towns and villages with well defined edges, separated 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 as suburban residential subdivisions and commercial strips.

A review of the existing land use structure finds the region's form is clearly defined by its transportation network – highways, rail and air. This includes the traditional land use structure, as well as the more recent suburban development to the north and southeast. As illustrated in Figure 4.2, generally the existing land use displays a typical pattern of higher intensity commercial, tourist and industrial land uses at the confluence of major

Figure 4.2 – Demographic Study Area



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 the central city, along I-90 and between I-90 and I-81. For the towns, the interstates offer accessibility and connectivity to the larger region. As such, it is a major influence on the location of employment, shopping and residential uses. 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. The following describes the general land use centers using the principal highways as the framework, beginning with I-81, then I-690, followed by I-481 and finally I-90:

- **I-81** - From the north to the south, I-81 demonstrates diverse commercial and employment activity centers. The I-81/I-481 north interchange reflects a new commercial area responding to the accompanying residential development. As it nears the airport and the confluence with US 11 at the Village of North Syracuse, another major activity commercial center parallels the interstate on the east. Another, smaller center is found at Salina to the west. Where I-81 intersects with I-90, an institutional and commercial crossroads occurs, before I-81 bends southeast. Here it passes the Carousel Center and the proposed Destiny project, backed by the proposed Harbor West redevelopment, as identified in the Lakefront TNT plan, which abuts Onondaga Lake. When it crosses I-690, I-81 becomes the front door to downtown and the University Hill area. As it approaches I-481 to the south, the employment center turns more toward an industrial character before entering the rural areas south of the city.

- **I-690** – From east to west, while industrial uses anchor the east and west ends of this corridor, the middle section – Exit 11 West Street to Exit 14 Teall Avenue, I-690 has a more urban commercial and service face. As it crosses the top of downtown, the highway transitions thru the heart of the city with a series of local/city exits before it transitions to a more open road section. This segment is dominated by the I-690/I-81 Interchange and access needs for the City/Region. The highway proceeds east past Onondaga Lake and then opens up into open areas and a mix of commercial/industrial, institutional (State Fair Grounds) and residential neighborhoods as it approaches the Thruway Exit 39 (I-90) which is the Corridor study limit.

- **I-481**- Again, from north to south, this portion of the intrastate is dominated by commercial, office and industrial uses. After leaving the commercial node at the I-81 interchange, it provides an activity center at Cicero. I-481 turns south just before entering Dewitt, and interchanges with SR 298 and I-90, as well as crossing the railroad. The uses are consistently employment-oriented. In fact, Dewitt's zoning code identifies the areas that saddle I-481 as High Tech, emphasizing its desire to broaden the economic base. However, when it interchanges with I-690, adjacent to the Village of East Syracuse, the character becomes more multi-use. Here, commercial and office uses predominate over industrial ones. That pattern continues down to SR 92. After passing

through a residential concentration, I-481 begins a westward turn until it reunites with I-81. That stretch has an industrial, high tech character, along with a more rolling and opens topography.

- **I-90** – When the Thruway crosses I-481, from east to west, its previous open character markedly changes as it traverses a wide swath of industrial and employment uses south of the airport, until it reaches SR 298 (Kinne Street). From that point until it enters Salina, and interchanges with I-81, the land use pattern is more institutional, tourist and commercial, then transitioning to residential to rural character as it continues west of I-690.

4.2.2 The Highways and the Neighborhoods

I-81 and I-690 form the boundaries of numerous city neighborhoods and I-81 passes through Salina, Clay and Cicero. Most notably, I-81 physically defines the border between all the city TNT neighborhoods east to west. For the towns, the interstates offer accessibility and connectivity to the larger region. As such, it is a major influence on the location of employment, shopping and residential uses.

I-81 and I-690 both offer residents convenient access to and from many abutting neighborhoods and the larger Syracuse metro area. Eight of the nine neighborhoods or towns that abut the highways have an interchange within the project study limits. Clay is the exception and it has access via the I-81 Taft Road interchange and SR 481 northwest of the primary study limits. Based on the review of existing traffic operations, the University Hill neighborhood, which is part of the Eastside TNT, is noteworthy as being somewhat underserved by the expressway system with most of the traffic concentrated at the East Adams/Harrison Street exit on I-81.

Overall the interstate highway system provides functional access to the City and adjoining towns and neighborhoods, with the possible exception of University Hill. The highway system is a boundary to many of the neighborhoods and communities and in some locations inhibits access and the social connection between them.

4.2.3 Demographics and Population

Since 1990, the populations of the City of Syracuse and Onondaga County have been steadily declining, as shown in Table 4.1. The population in the City decreased from 163,860 in 1990 to 138,068 in 2008, a reduction of 15.7 percent. The county population also decreased, though less significantly. Onondaga County's 1990 population was 468,973 and 452,633 by 2008, a 3.5 percent decline.

Table 4.1 - Population: Syracuse, Onondaga County, NY and US

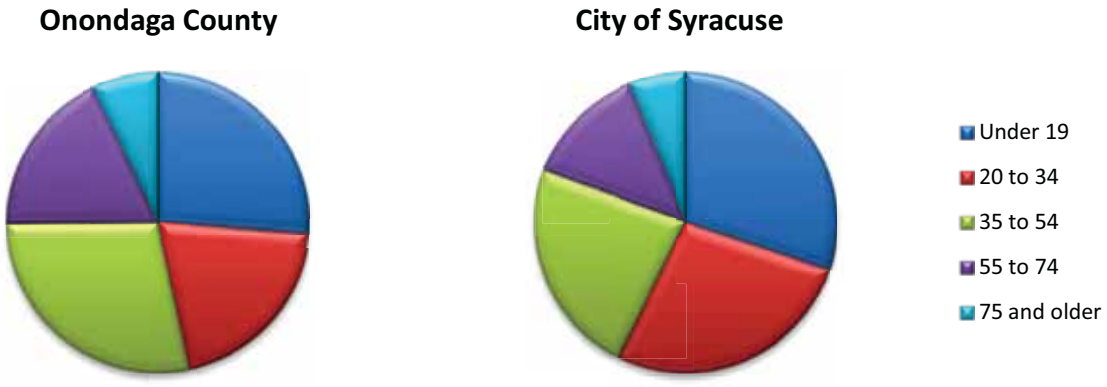
	1990	2000	2008	% Growth from 1990 to 2008
United States	248,709,873	281,421,906	304,374,846	22.4%
New York State	17,990,455	18,976,457	19,541,453	8.6%
Onondaga County	468,973	458,336	452,633	-3.5%
City of Syracuse	163,860	147,306	138,068	-15.7%

In contrast, the population of the State of New York has increased 8.6 percent since 1990, with much of this population growth due to New York City. Since 2000, 69 percent of all growth in the state is attributable to the five boroughs of New York City, and the city represents approximately 40 percent of the state's overall population.[5] The United States population has also increased over the past 18 years, growing by 22.4 percent.

In general, Syracuse and other areas in upstate New York have been impacted by the simultaneous movement of jobs and people to the South and West due to the decline in manufacturing in the northeast, attraction of warmer climates, lower cost of living, and other factors.[6] While the population trend in the City of Syracuse may not be surprising, it is an important consideration when evaluating future economic growth trends and opportunities for the area.

The City of Syracuse has more residents aged 20 to 34 (27%) than the county (20%) see Figure 4.3. Fifty-three percent of Onondaga County residents are aged 35 or older, as compared to 43 percent in the City of Syracuse.

Figure 4.3 - Population by Age Groups



Source: US Bureau of the Census

[5] New York City Department of City Planning, http://www.nyc.gov/html/dcp/html/census/popcur.shtml
[6] *Population Out-Migration from Upstate New York*, Winter 2005, Buffalo Branch Federal Reserve Bank of New York, http://www.newyorkfed.org/research/regional_economy/upstate/winter05.pdf

Although population is decreasing in the City of Syracuse and Onondaga County, out-migration has not been equal across all age groups. According to studies focused on upstate New York, the region is losing its young, prime-age workers. Between 1980 and 2000, upstate New York lost roughly 20 percent of people aged 20 to 34, with most out-migration occurring during the 1990s.[7]

For the City, the greatest decline in population has occurred among 35 to 44 year olds (13.4%) and residents who are aged 65 and older (35.2%). Like the City of Syracuse, the county experienced a significant reduction in its 35 to 44 year old population, a reduction of 16.8 percent since 2000. The data suggest that out-migration is occurring in the Syracuse area. This trend is consistent with the experience of the upstate New York region as a whole and is relevant since a significant out-migration for this age group could erode the workforce available in the City of Syracuse and surrounding area.

The largest increase in population for the City of Syracuse is among 55 to 64 year olds, up 30.8 percent since 2000. Onondaga County also experienced the greatest growth in this age group, 32.1 percent. This trend is consistent with both the state and nation, reflecting the large baby boom population entering this age bracket.

Immigration from abroad introduced many ethnic groups to the city, particularly Germans, Irish, Italians, and Poles. African Americans have lived in Syracuse since Revolutionary War days, but between 1940 and 1960, some of the three million African Americans who migrated from the south to northern cities also settled in Syracuse. In the 1980s, many immigrants from Africa and Central America also moved to Syracuse. However, due to job loss, these new residents could not compensate for the out-migration of Syracuse residents, either to its suburbs or out of state. The city's population has slowly decreased every year since 1950.

Much of the city's fabric changed after World War II. Many of Syracuse's landmark buildings were demolished in the 1950s and 1960s under the federal Urban Renewal program. This corresponds, in part, with the construction of I-81 in 1957. The construction of I-81 is felt to have resulted in the destruction of an historic African-American community, as the demolition of this neighborhood under the Urban Renewal Program was conducted concurrent with the I-81 project construction. As a result of these Urban Renewal programs, large cleared areas have remained undeveloped for many decades.

The manufacturing industry in Syracuse began to falter in the 1970s. Many small businesses failed during this time, which contributed to an already increasing unemployment rate. Rockwell International moved its factory outside New York State. General Electric moved its television manufacturing operations to Suffolk, Virginia and later to Singapore. The Carrier Corporation moved its headquarters out of Syracuse and outsourced manufacturing to

[7] *Population Out-Migration from Upstate New York*, Winter 2005, Buffalo Branch Federal Reserve Bank of New York, http://www.newyorkfed.org/research/regional_economy/upstate/winter05.pdf

Asian locations. Nevertheless, although the City's population declined since 1950, the Syracuse metropolitan area population has remained stable, even growing slightly since 1970. This is consistent with the trend of housing and employment suburbanization. While this growth in the metropolitan area is greater than much of upstate New York, it is far below the national average during that same period.

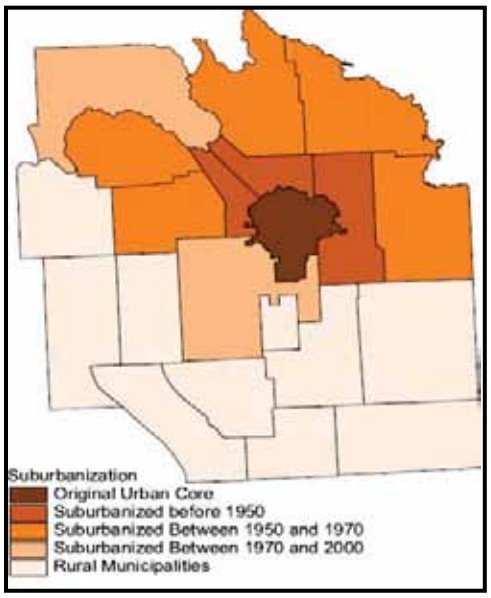


Figure 4.4 – Historic Growth Patterns in Onondaga County
Source: Onondaga County Sustainable Development Plan Presentation

4.2.4 Onondaga County Existing Land Use

As part of its upcoming Sustainable Development Plan update, SOCPA prepared an overview of land use, transportation and infrastructure plans over the past decade. The information helps tell the story of the opportunities and challenges facing the County and its communities. Trends over the past decade include:

- **Expansion of Urbanized Land** – While population growth remained flat, there was a clear suburban trend as population moved outward. Since 1970, urban land increased 92%, totaling 50 square miles (in excess of 32,000 acres). Such a growth rate meant the County absorbed rural lands 3.5 times faster than the 100 largest metropolitan areas. In addition to this general growth vector, the rural towns and villages also saw increases.

- **Housing Unit Growth** – Since 2000, the County absorbed 2,600 acres of rural lands to accommodate 7,000 new housing units in 147 subdivisions. Annually, the County added 160 rural units. With the increases in lot size (.87 acres for an "urban" lot) and home size (up 40%) is factored, the trend toward suburbanization is significant.

- **Transportation** - With this growth, the pressure to improve the transportation network also increased. Since 2000, 61 miles of new road were added, and, as might be expected with a strong suburbanization trend, vehicle miles traveled (VMT) saw a 43% increase. Understandably, County residents now spend more time in the commute drive, which now approaches and sometimes exceeds 20 minutes. During this same period, public transit has remained as a small share of transportation trips.

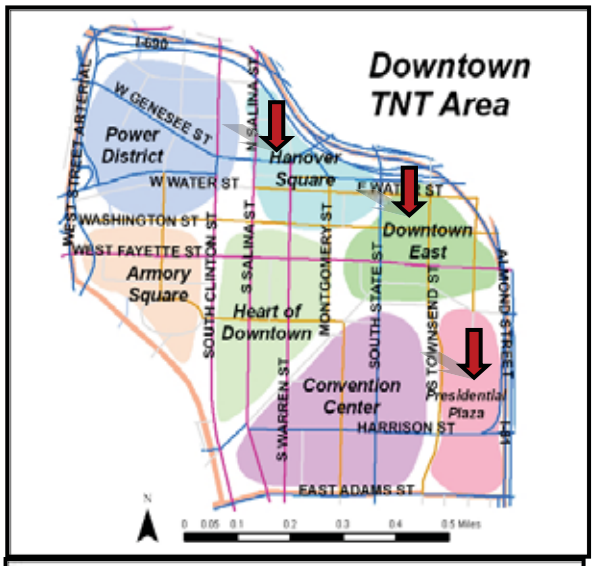
- **Infrastructure Expansion** - During the last decade water service was expanded, especially to the north and northwest. As a result, the cost per 1,000 gallons of water rose 78%, while the amount of water delivered annually dropped by some 11%. The same general geographic area saw a commensurate expansion of the wastewater and stormwater facilities and services. In a little more than a decade, 12,550 acres were added to the Sanitary District, due to aging infrastructure, stormwater mandates and septic limitations.

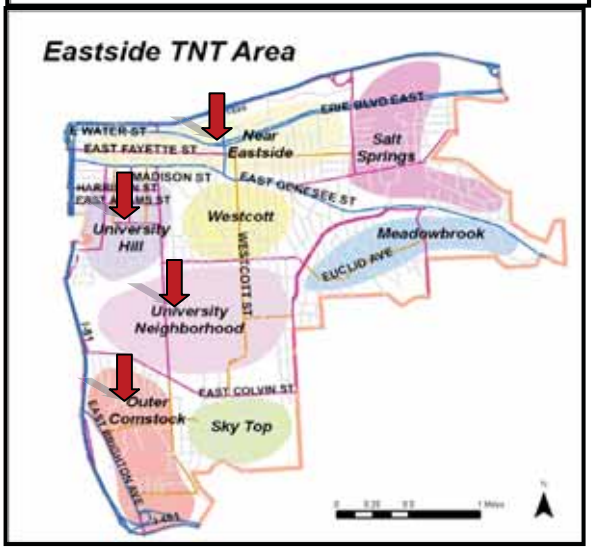
4.2.5 City of Syracuse Existing Land Use

The City of Syracuse Land Use Plan 2025 (Draft) was the main information source for the assessment of existing land use patterns. The plan looks, for planning purposes, at each of the City neighborhoods. These neighborhoods were combined into sectors as part of the City's Tomorrow's Neighborhoods Today (TNT) program. The review of the City's TNT sectors along the I-81 corridor provides a basis for analysis of future improvement strategies as this corridor study progresses. The study of existing conditions was focused on the five TNT sectors shown on Figure 4.5 that abut the I-81 Corridor and included Northside, Lakefront, Downtown, Eastside, and Southside. The latter three are proximate to the existing elevated viaduct portion of I-81.

Figure 4.5 – City of Syracuse TNT Sector Boundaries

Source: City of Syracuse Land Use Plan 2025





<u>The Downtown TNT Sector (Area)</u>

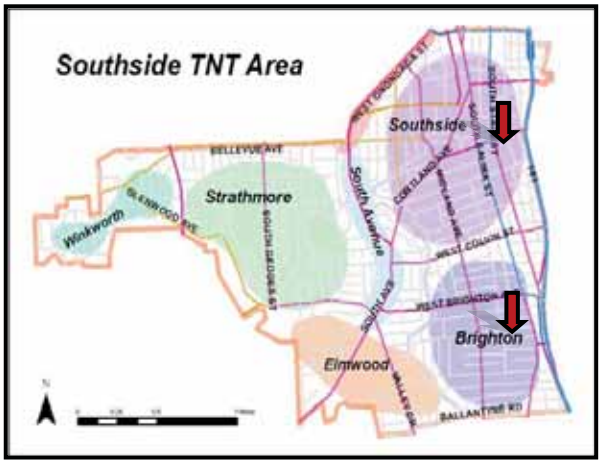
The Downtown TNT Sector (Area) is bound by I-690 to the north, I-81 to the east, E. Adams Street to the south, and West Street to the west. Downtown Syracuse is the region's central business district (CBD). The most prevalent land uses are office buildings, parking lots and civic uses such as City and New York State offices.

<u>Eastside TNT Sector (Area)</u>

The Eastside TNT Sector (Area) has a number of major medical institutions and includes Syracuse University and SUNY-ESF which combined dominate the neighborhood. 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.

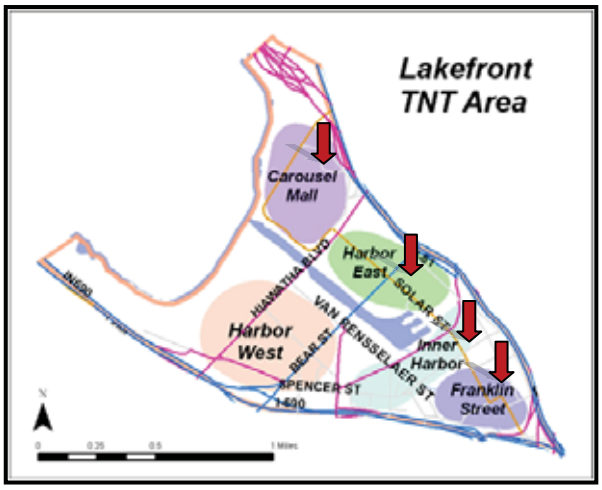
Southside TNT Sector (Area)

The Southside TNT Sector (Area) is located south of Downtown, west of I-81, and immediately south of the Downtown TNT area. Much of the Southside Sector (Area) is covered by housing, ranging from one-family homes on small lots along South Salina Street to the stately homes of the Strathmore area. Onondaga Park and Elmwood Park are located in this neighborhood. Onondaga Creek flows through the central portion of the Southside TNT Sector (Area). Interstate 81 creates a physical barrier between the Southside and the University Hill area, however approximately 10 road crossings connect between them.



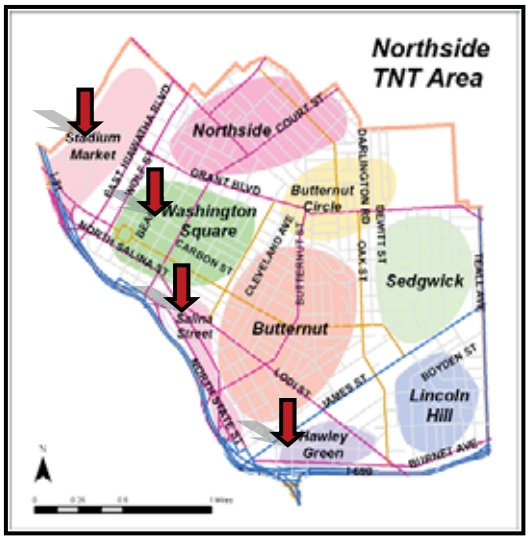
Lakefront TNT Sector (Area)

The Lakefront TNT Sector (Area) is bounded by Onondaga Lake, north and west, I-690 to the south, and I-81 to the east. Vast tracts of underutilized land and buildings provide significant opportunities for redevelopment in the Lakefront area in particular adjacent to the Inner Harbor.



Acknowledged as a Strategic Economic Area within the City's Comprehensive Plan, the Lakefront has opportunities for a major transformation. Much of the land surrounding the Inner Harbor within the Lakefront TNT Sector (Area) is underutilized, consisting of vacant lots and buildings. The Franklin Square area is a successful industrial reuse community that anchors the southeast corner of the neighborhood. During the past decade, three major initiatives were discussed that would have a profound influence on land use patterns within the Lakefront. These initiatives include:

- The Carousel Center expansion/DestiNY USA proposal
- The development of the Inner Harbor that is currently owned and controlled by NYS Canal Corporation, and
- The existing Lakefront Master Plan and accompanying Lakefront land use regulations.



Northside TNT Sector (Area)

The Northside TNT Sector (Area) encompasses the portion of the city located east of I-81, north of I-690, and west of Teall Avenue. The Northside contains some of the city's most diverse residential neighborhoods and commercial districts. Overall, the sector is mostly dominated by residential areas with distinct business districts along some of the major arterials. Three neighborhood business districts exist within the Northside: the Grant Boulevard Business District, Butternut Street Business District, and the Little Italy district along North Salina Street. The historic street grid remains intact, as do many of the neighborhood's historic residential and commercial buildings. The residential portion of Washington Square has experienced high rates of conversions from single and two-family to multiple family units. Overall, this TNT area contains some of the oldest neighborhoods in the City.

The first three are proximate to the existing elevated Viaduct portion of I-81. The existing conditions of these five TNTs are provided in Appendix F.

4.2.6 Towns of Salina, Clay, and Cicero Existing Land Use

Salina, Cicero, Clay and 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 study corridor, I-81. Each of these areas is generally residential, typically with more dense/intense development located near the Interstate interchanges and along other major transportation corridors. The general location of each area in relation to the I-81 corridor is described.

- Established in 1809, Salina is located north of Syracuse along the I-81 corridor. Salina consists of five small suburban communities known as Mattydale, Liverpool, Lyncourt, Galeville and a portion of North Syracuse. I-81 bypasses major population centers and provides access to the town thru a series of I-81 exits. Land use is largely residential along the I-81 corridor.
- Cicero is located on the southern shore of Oneida Lake, a northern suburb of metropolitan Syracuse; Cicero has access via I-81, I-481 and US 11. I-81 bypasses North Syracuse on the east before intersecting with I-481 at the northern project study limit. The Town of Cicero, similar to Salina, is largely residential. The existing land use is most dense or intense in the areas around I-81 and US 11.
- The Town of Clay is the northernmost and largest town of the nineteen towns in Onondaga County. The I-81 corridor just "clips" the southeastern corner of the town just south of North Syracuse and therefore land us has not been investigated.
- The Village of North Syracuse is bisected by the Towns of Clay and Cicero. The I-81 corridor runs along the southeastern edge of the village. The Village of North Syracuse

Comprehensive Plan (2004) is focused on the centers and transition areas identified in the plan, largely along the US 11 corridor that runs through the center of town.

4.2.7 Challenges and Opportunities Facing the County and City

The *Onondaga County Sustainable Development Plan*[8] identifies several important challenges to the region that will influence growth and development within the study area. The County's assessment identified a series of challenges and opportunities over the coming decade. Some of these may relate directly or indirectly to, the potential I-81 project development strategies (alternatives). Among these challenges and opportunities are:

- A reduction in farmland that is 3.5 times the average of the 100 largest metropolitan areas,
- A settlement pattern and transportation network that serves only a small proportion of the population via mass transit,
- How to reduce a larger carbon footprint due to lower density, increasingly suburban development patterns, low transit use and increased VMT. Carbon emissions were reported to be over twice the average of the 100 largest metropolitan areas (even though the area is in conformance to national air quality standards).
- The increased demand for public facilities and services in growth areas,
- How to deal with abandoned neighborhoods, buildings and employment centers.
- Addressing known pockets of poverty; and,
- Restoring the area's economic competitiveness.

4.2.8 Environmental Justice

Title VI of the Civil Rights Act of 1964 specifies that no person in the United States shall, on the grounds of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, issued in 1998, states that each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.

In order to evaluate the I-81 Corridor for the purposes of environmental justice, the 2000 U.S. Census data was used to determine the presence and concentrations of minority and low-income populations within the study area. The findings gained through this data source is qualified by the fact that the Census is now 10 years old and the 2010 Census data will not be available for several years.

The methodology used to identify possible environmental justice populations in the study corridor was that adopted by the Syracuse Metropolitan Transportation Council (SMTC) as documented in the Environmental Justice Analysis, Syracuse Metropolitan Planning Area, Final Report, UPWP 2004-2006. This SMTC study covers the whole SMTC MPA boundary,

[8] Source: http://www.ongov.net/planning/documents/plan_presentation.pdf

however the information included herein focus on the general limits of the Social, Economic and Environmental study area.

The SMTC methodology created demographic thresholds for EJ populations based on the U.S Census Summary File 3 data. These thresholds or parameters included data at the Block Group level for minority persons, low-income persons, disabled persons and senior citizens. The SMTC also examined information provided by the Census Bureau's Census Transportation Planning Package (CTPP) including persons with a disability or in poverty. The SMTC methodology established the following thresholds for defining EJ populations:

- Low-income: Households in which median household income does not exceed 50 percent of the metropolitan area median household income.
- Minority: Any population self-identified as non-white only within the 2000 U.S. Census race classifications, as well as Hispanics who consider themselves white only.
- Seniors: All groups of persons aged 65 years or older, for both males and females.
- Disabled: Persons with a long-lasting physical, mental, or emotional condition that can make it difficult for them to perform activities such as walking, climbing stairs, dressing, bathing, learning, or remembering. This condition can also impede a person from being able to go outside the home alone or to work at a job or business.

SMTC also developed thresholds, relative to the overall Block Group totals, that identify a concentration and a high concentration of EJ populations:

- Minority Concentration:
  - Concentration Area: Block Groups with between 17 percent and 31 percent minority population;
  - High Concentration Area: Block Groups with 32 percent or greater minority population.
- Low-Income Concentration:
  - Concentration Area: Block Groups with between 50 percent and 80 percent of the SMTC region's median household income;
  - High Concentration Area: Block Groups with less than 50 percent of the SMTC region's median household income.
- Senior Citizen Concentration:
  - Concentration Area: Block Groups with between 15 percent and 27 percent population aged 65 years or over;
  - High Concentration Area: Block Groups with 28 percent or greater population aged 65 years or over.
- Disabled Concentration:
  - Concentration Area*:* Block Groups with between 17 percent and 31 percent of the SMTC region's disabled population;
  - High Concentration Area: Block Groups with 32 percent or greater of the SMTC's disabled population.

Environmental Justice Populations Findings

Figures 4.6 through 4.10 depict the concentrations of potential environmental justice populations within the General Social, Economic and Environmental study area. This area corresponds to the demographic study area (by census track) as used for the demographic and population analysis. Figures 4.6, 4.7, 4.8, and 4.9 depict, respectively, concentrations of minorities, low-income, seniors (people 65 years old and over), and disabled persons. Each of these individual factors are combined in Figure 4.10, which presents environmental justice "target areas," prioritized as high, medium, and low.

The data indicates that within the I-81 corridor study area there are extensive areas of EJ populations, primarily in the central core of the study corridor.

- Minority: Figure 4.6 depicts concentrations of minorities. Minority concentrations spread across the central portions of the City of Syracuse, as well as large areas in the southern and eastern portions of the city. Minority populations are also concentrated in some non-central city areas and suburban areas where high-density residential complexes (apartments/mobile home parks) are located.
- Low-Income: Figure 4.7 depicts concentrations of low-income people. The areas of highest concentration of low-income people are found in portions of the City of Syracuse and the Village of East Syracuse. Most of the high concentration areas in the City of Syracuse were clustered around the Downtown neighborhood, with a few others scattered on the outskirts of the city.
- Seniors: Figure 4.8 depicts concentrations of seniors (people 65 years old and over). In general, concentrations of seniors are more decentralized than minority and low-income areas. Most of the high concentration areas were situated in suburban areas adjacent to or on the outskirts of the City of Syracuse. For many of these areas, large senior residential facilities contribute to the high concentrations.
- Disabled Persons: Figure 4.9 depicts concentrations of disabled persons. There are several decentralized high concentrations of disabled persons located throughout the City of Syracuse, as well as in southern DeWitt and western Salina.

The three classifications were determined using a numerical rating system developed by the SMTC.

- High priority environmental justice target areas: Census Block Groups identified as high priority are located within the City of Syracuse, in the Downtown, southeast, near west, and north areas.
- Medium priority environmental justice target areas: Block Groups identified as medium priority environmental justice target areas exhibit less significant concentrations of the target populations than high priority target areas. Medium priority environmental justice target areas are located in the City of Syracuse, southern and northern DeWitt, a portion of the village of North Syracuse, and some areas in Clay and Cicero.
- Low priority environmental justice target areas: Block Groups identified as low-priority environmental justice target areas cover an extensive portion of the study area.

Figure 4.6 – Minority Population

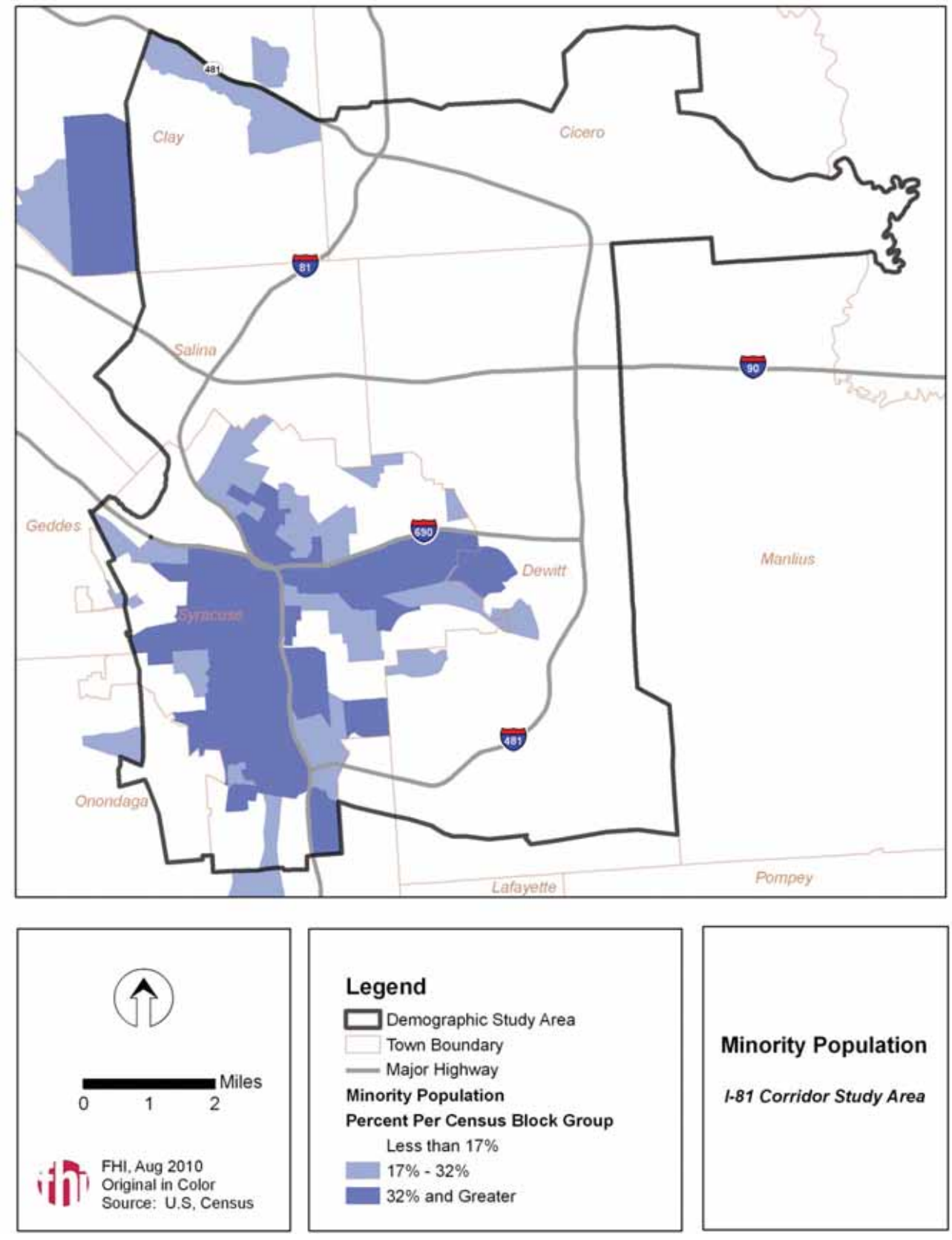


Figure 4.7 – 1999 Median Income

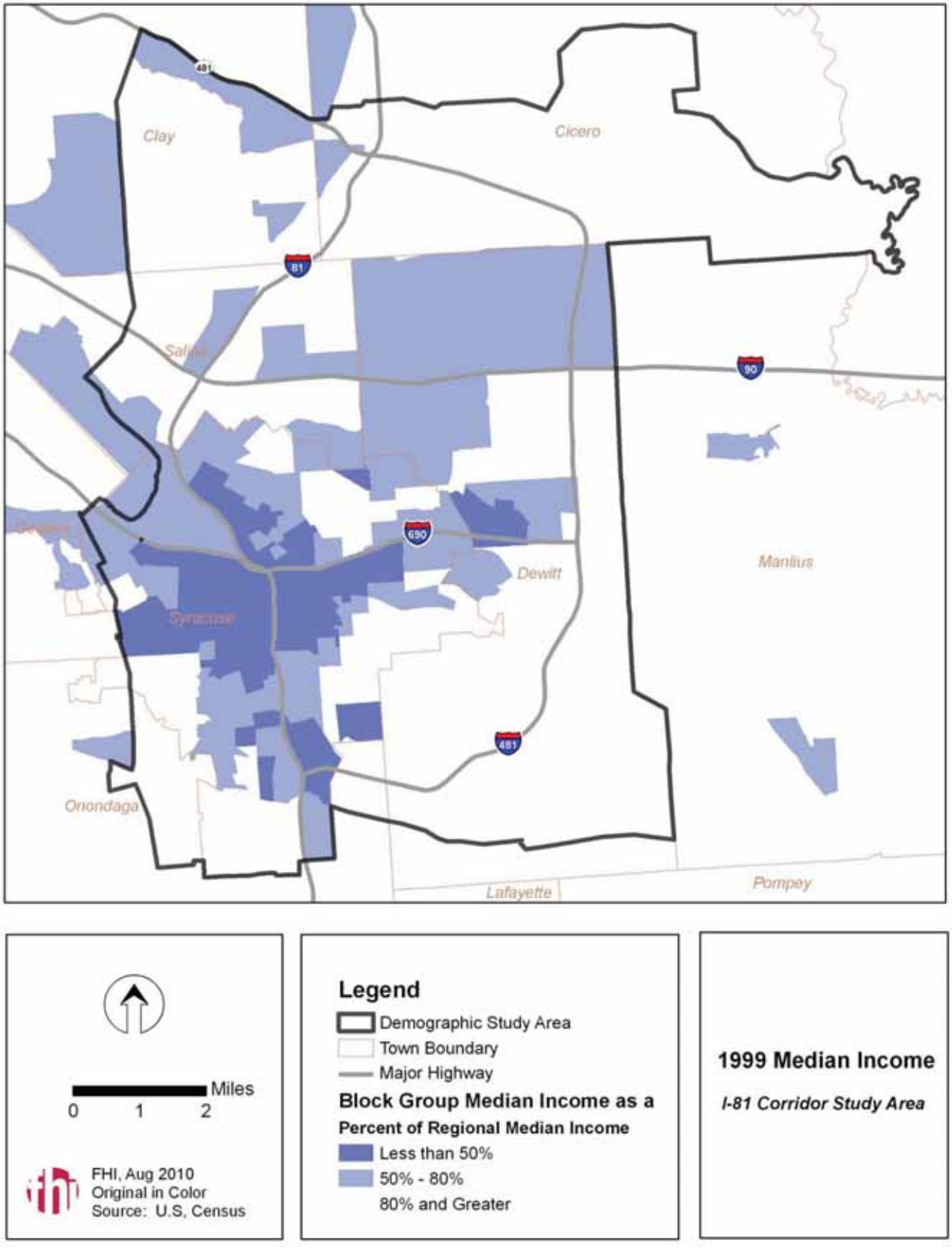


Figure 4.8 –Population Age 65 Years and Over

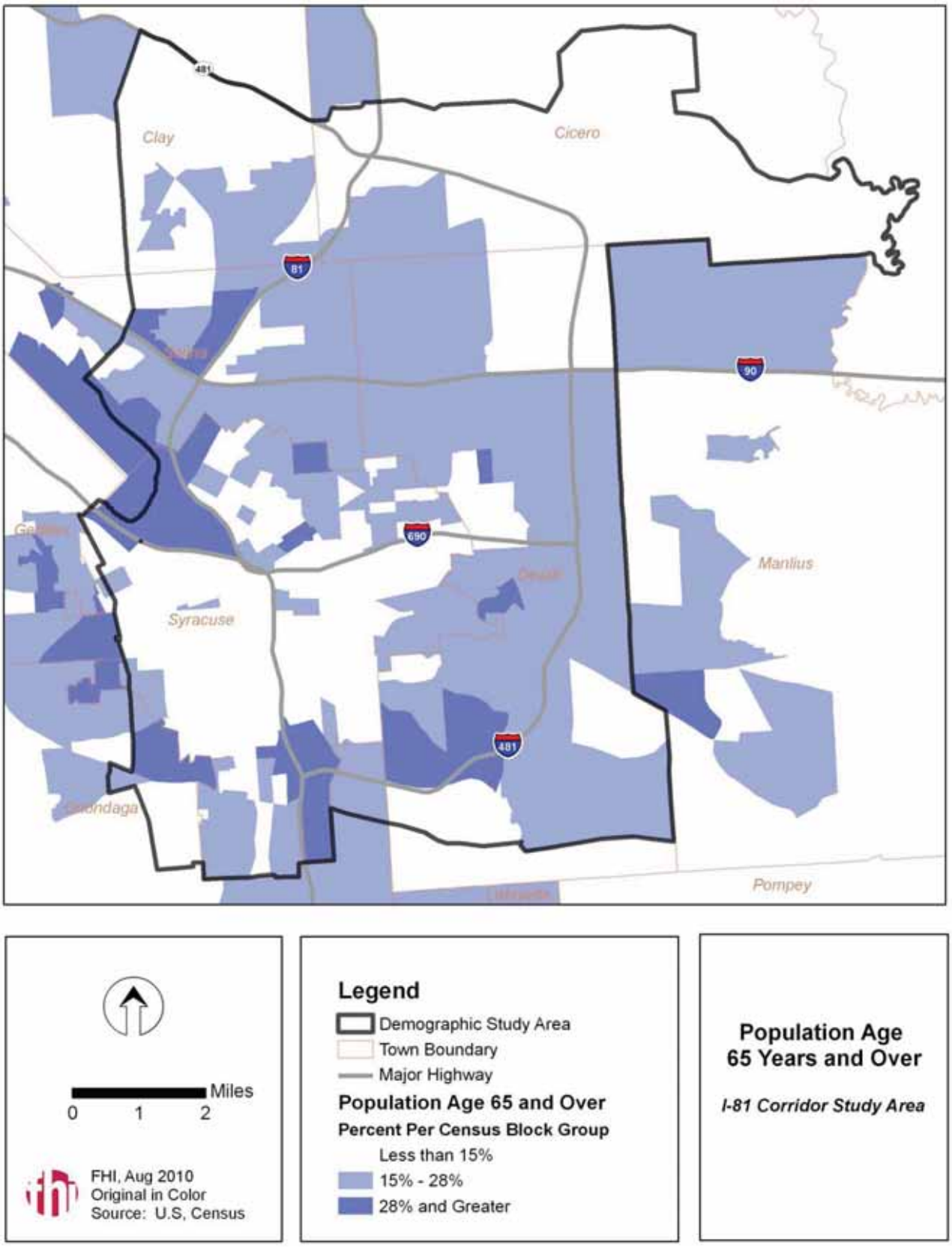
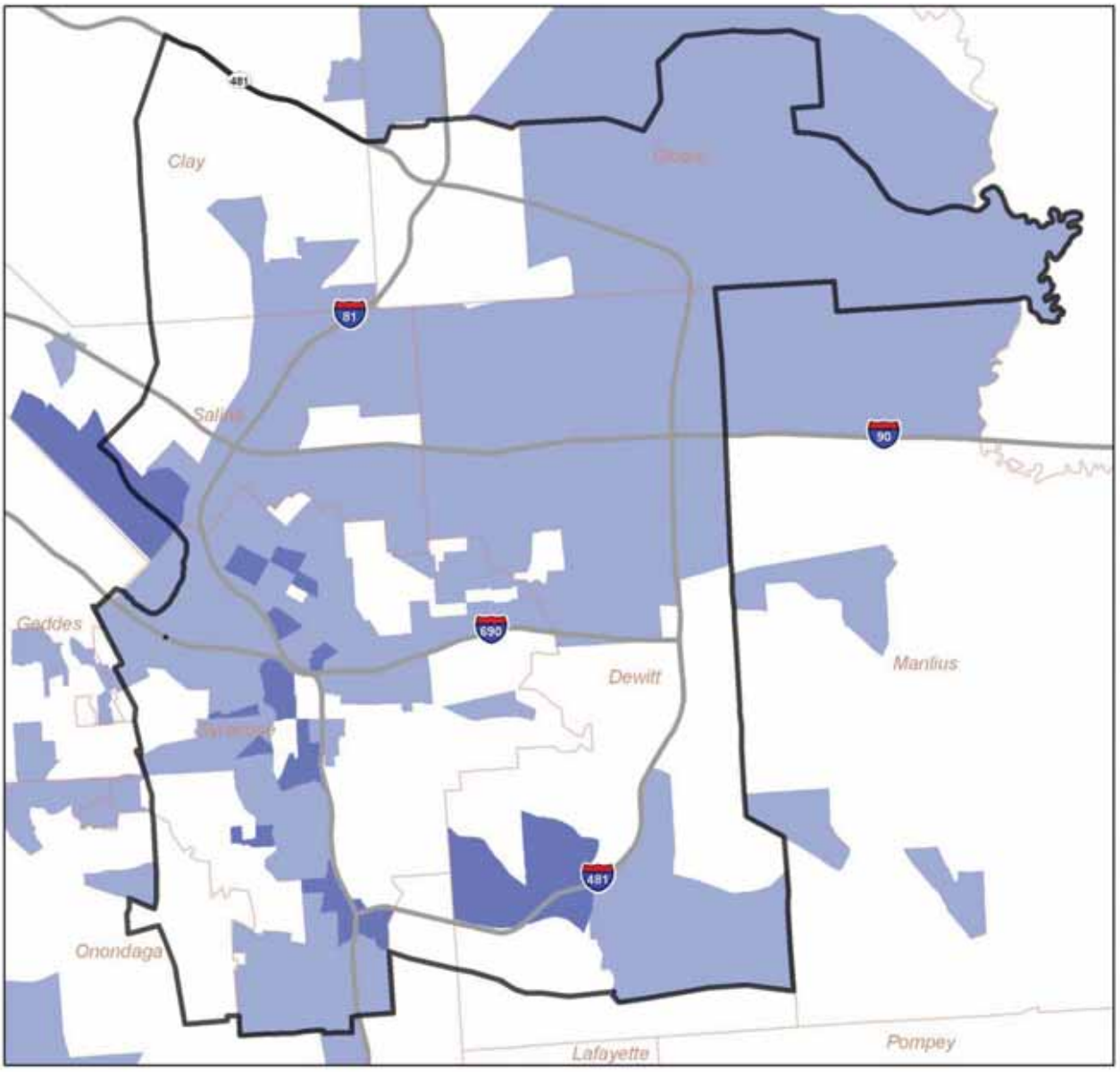


Figure 4.9 – Disabled Population



Miles
0 1 2

FHI, Aug 2010
Original in Color
Source: U.S, Census

Legend

Demographic Study Area
Town Boundary
Major Highway

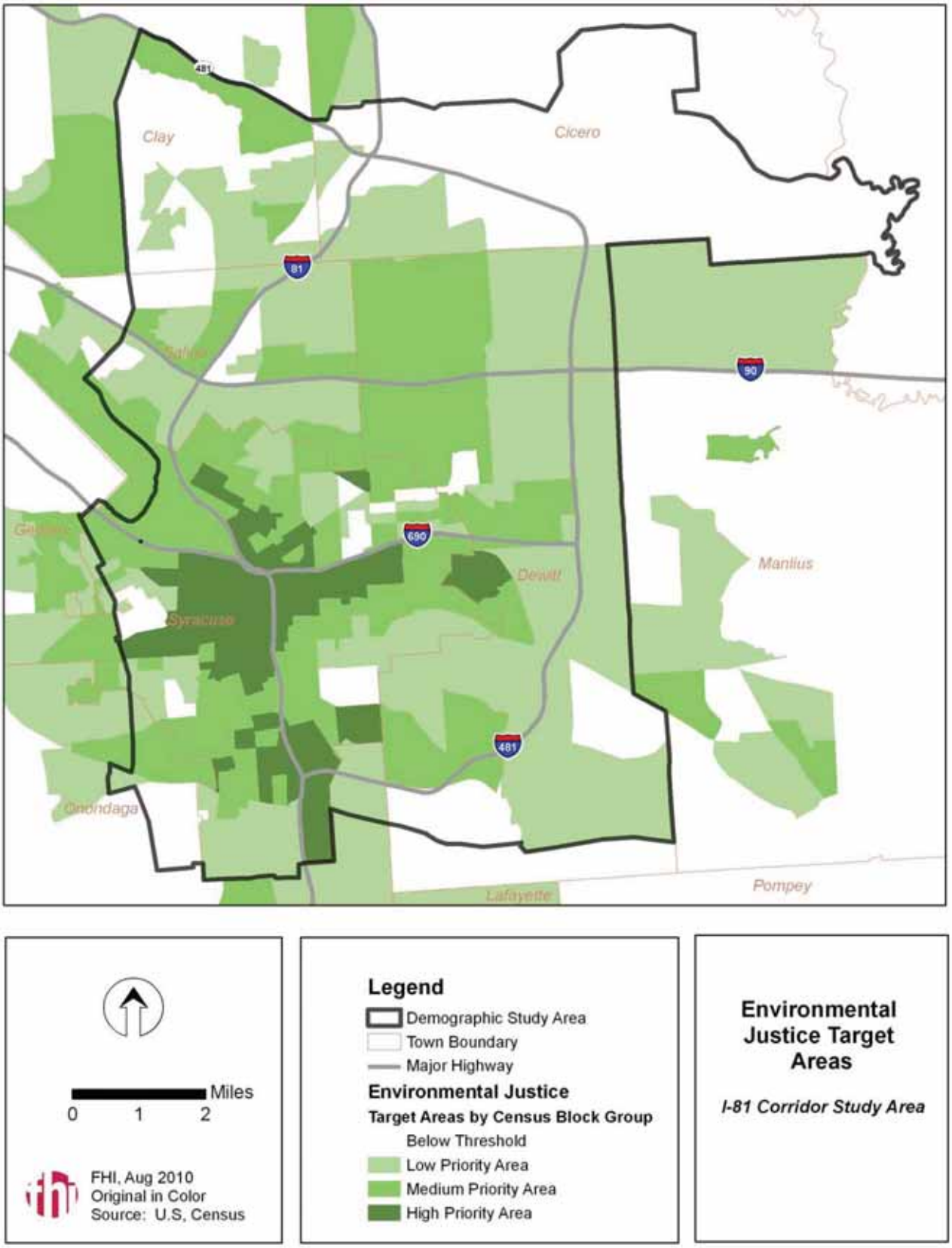
Disabled Population*
Percent Per Census Block Group
Less than 17%
17% - 31%
32% and Greater

*For this analysis, disabled populations are those with a sensory, physical, or mental disability.

Disabled Population

I-81 Corridor Study Area

Figure 4.10 –Environmental Justice Target Areas



4.2.9 Comprehensive Planning – Future Land Use

When considering the potential effects of the I-81 study strategies (alternatives) on the abutting areas, the multiple jurisdictions create a complex planning environment. This section highlights the regional planning efforts of the Syracuse-Onondaga County Planning Agency (SOCPA) and the City of Syracuse.

- **Onondaga County** - There is a regional vision expressed in SOCPA's *Onondaga County Settlement Plan* (see Figure 4.11). The following is extracted from the *Settlement Plan.*

  "Residents of the Syracuse area are governed at the scale of the municipality, but they live their lives at the scale of the metropolis. In recognizing that most planning occurs at the local level, the *Regional Plan* provides a County-wide framework within which individual municipalities can make wise decisions. The *Plan* begins with a section on Intent, which describes the philosophy and principles behind the *Plan*, principles which the County asks its municipalities to embrace. This includes the following four primary principles:

  - Urban Structure and Municipal Framework
  - Open Space Structure
  - Transportation Policies
  - Implementation"

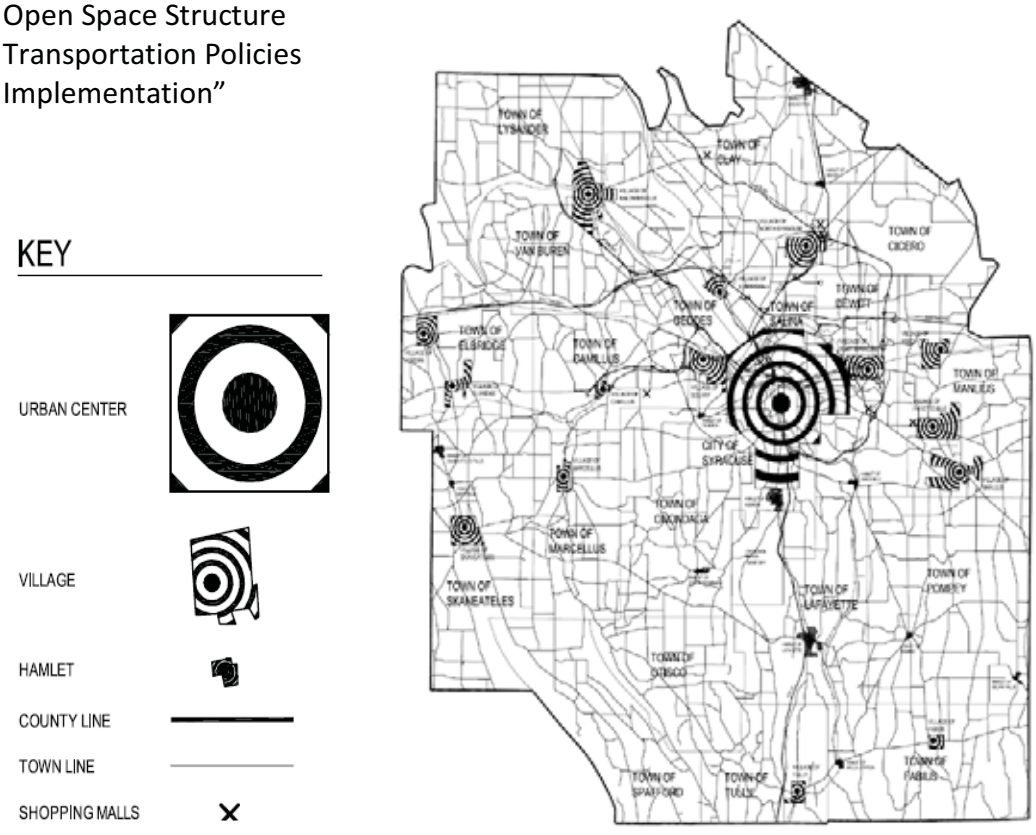


Figure 4.11 Urban Structure and Governance

Source: Onondaga County Settlement Plan and Pilot Projects, 2000.

The concept is based on a hierarchy of centers - Urban Center (Syracuse), Village and Hamlet, as illustrated in Figure 4.11. The Plan is accompanied by a set of guidelines and a proposed code to help implement a more traditional neighborhood design philosophy. The ideas and proposals recommended by the vision are mixed-use oriented and reasonably flexible when considering potential changes the I-81 study strategies (alternatives) might stimulate. Since the Settlement Plan is now a decade old, SOCPA is in the process of updating the 2010 Development Guide with a sustainable development orientation.

4.2.9.1 Onondaga County Overview

The 2010 Development Guide for Onondaga County is the current long range vision and strategy document. SOCPA intends to update the Guide in the coming months to extend it into the next decade. While cities, towns and villages are responsible for controlling land development, the County is responsible for funding, constructing and maintaining a considerable amount of infrastructure. The relationship between the County and constituent jurisdiction, is the reason a coordinated approach is essential. That is the role of the Guide, to establish a shared vision and framework for managing change and supporting growth.

The Guide focuses attention on community assets, articulates a vision regarding settlement patterns and resource protection, sets goals, strategies and policies, and presents a Land Use Vision. A summary of these follows:

County Assets: The Guide identifies eight essential assets that distinguish the region.

- A sense of community
- Rich and diverse natural beauty
- Abundant water resources
- Viable agricultural economy
- A central location at a transportation crossroad
- Economic diversity and a strong knowledge economy
- Sound infrastructure with a capacity for growth
- Quality civic, health and sports facilities

Long-range Goals: The Guide establishes four principal goal areas that drive the vision.

- Economic Growth
- An Attractive Community
- Diversity and Choice
- Fiscal Strength

Strategies for Community Response to Change: Five strategy categories give direction to the Goals.

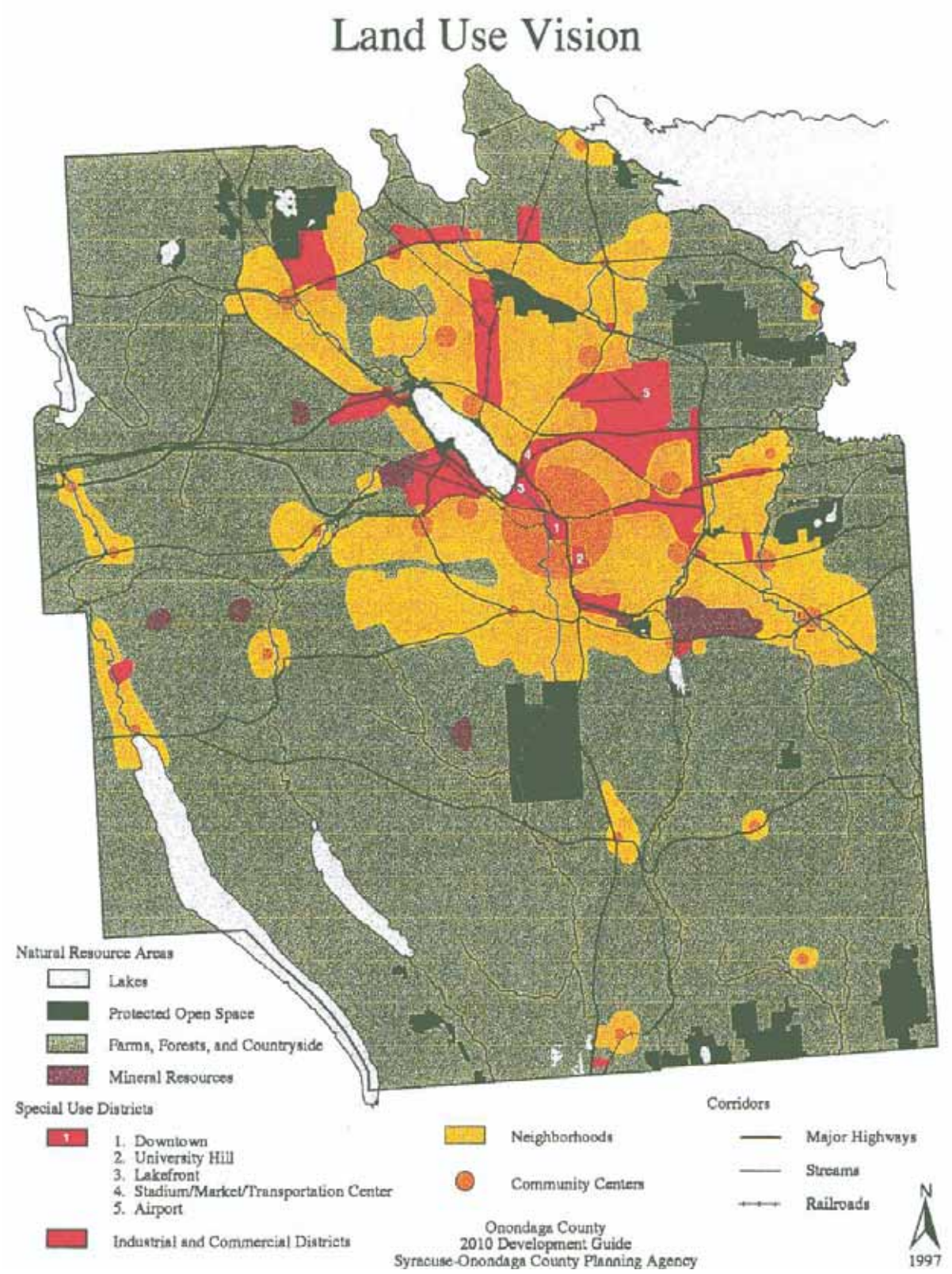
- Good community planning
- Coordinated Community Efforts
- Cost-effective Infrastructure
- Sustainable Development Patterns

- Natural Resource Stewardship

The Land Use Vision: As noted in the Guide, the Land Use Vision (Figure 4.12) focuses on generalized settlement patterns based on natural resource areas, neighborhoods and special use districts. The Land Use Vision captures the best of the community asset, while looking to the future. The Vision includes a description of major uses and a map of the anticipated future form. The Vision, as shown in the accompanying graphic, is based on:

- Natural Resource Areas
  - Protected Open Space
  - Farms, Forests and Countryside
  - Mineral Resources
- Special Use Districts
  - Downtown
  - University Hill
  - Lakefront
  - Stadium, Market and Transportation Center
  - Airport
- Neighborhoods
- Commercial Centers

Figure 4.12 – Onondaga County Land Use Vision



4.2.9.2 City of Syracuse Overview

The City of Syracuse Land Use Plan 2025 (Draft) documents locations where land use in the future could be quite different than today. The plan both notes trends in land development and spells out the vision that the City has for each TNT (Tomorrows Neighborhood Today) areas. The following summarizes the findings from that plan for the five neighborhoods that abut the primary study area, I-81.

Downtown TNT/ Syracuse: Downtown Syracuse is undergoing an urban renaissance. This is due in part to the nation-wide renewed interest in urban living. It is also being caused by the so-called buyer's market where property prices are relatively low. Several new private developments have occurred that changed properties from mostly offices to a mix of housing and retail. Syracuse University worked to bring students and classrooms Downtown by improving the linkages with University Hill through the "Connective Corridor" transit initiative.

Eastside TNT: Land use patterns in the Eastside TNT Sector are strongly influenced by the major medical institutions and universities located on University Hill. This sector is in the midst of an economic boom. More than $700 million in new capital projects are planned to be completed in the near future. Residential and commercial areas nearest to these institutions cater to the local student and professional populations. Major arterial roadways connecting Downtown Syracuse with points east cross the northern portion of the Eastside, and quaint residential neighborhoods cover eastern areas leading to the city's edge. The Eastside was targeted for major institutional investments, ensuring that this area will make essential contributions to the region's future welfare.

Southside TNT: The Southeast Gateway has drawn widespread redevelopment interest. This is because of its prime, central location and its proximity to heavily populated residential neighborhoods. Pioneer Homes, and the Central Village Apartments located at the intersection of University Hill and Downtown, and along South State Street, represent one of the country's oldest public housing complexes. This urban neighborhood is expected to benefit from the upgrades and services available as part of the proposed Southeastern Gateway redevelopment.

Lakefront TNT: Vast tracts of underutilized land and buildings provide significant opportunities for redevelopment in the Lakefront sector. As such, the City of Syracuse has also developed a master plan for the Lakefront sector. The Master Plan envisions the Lakefront as a mixed-use New Urbanism community. A New-Urbanism neighborhood is 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. New York State controls the Barge Canal, its Inner Harbor Terminal, and adjacent lands (approximately 40 acres).

One potential development scenario, the DestiNY USA proposal, envisions much of the Lakefront as a premier retail and entertainment destination.

Although many redevelopment initiatives are still on the drawing board, the sector has experienced development within the past ten to twenty years that give the sector its current character and identity. These initiatives include Carousel and its expansion efforts, the Inner Harbor beautification and infrastructure improvements, and the Franklin Square and Creekwalk initiatives.

Northside TNT: Residential neighborhoods of varying density exist across the Northside sector. Many of the neighborhoods are within walking distance to public parks or green spaces, and include some commercial uses such as small convenience stores and neighborhood dining establishments that contribute to the character of Northside neighborhoods. These neighborhood areas include the Stadium Market Center, Washington Square, Hawley Green and Little Italy.

- The **Stadium Market Center** area has recently developed as a significant commercial area that attracts people from throughout the region. The Regional Market is active year-round, and the Regional Transportation Center is home to Syracuse's Amtrak station and charter bus terminal. Alliance Bank Stadium is located just east of the Regional Transportation Center; industrial and vacant properties comprise the rest of the Stadium Market area.
- The commercial portions of the **Washington Square** neighborhood have experienced a lack of investment, and many industries and businesses have closed operations. Similar to Franklin Square in the Lakefront, opportunities for the adaptive reuse of these structures are promising. Washington Square is one of the oldest neighborhoods in Syracuse.
- The **Hawley Green** neighborhood (also referred to as the LBJ Triangle) is located within the confines of Lodi Street, Burnet Ave., and James Street. Hawley Green has a well preserved eclectic mix of Victorian-style homes, apartments, and row-style townhouses. This neighborhood should continue its evolution as a dense urban neighborhood with neighborhood-scale storefronts and dining establishments to complement its existing development patterns.
- **Little Italy** consists of several **North Salina Street** blocks located south of the Lodi Street intersection, along with immediately surrounding areas. Streetscape improvements have helped to unify the corridor and spur private investment by enhancing its character. Although most street-level storefronts are occupied by retail and dining establishments, the upper floors of many properties are underutilized and provide opportunities for conversion to residential or office space.

4.2.9.3 Towns of Salina, Clay, and Cicero Future Land Use

Salina, Cicero, and Clay (and 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 study corridor, I-81.

- Salina is located north of Syracuse along the I-81 corridor and consists of five small suburban communities which are known as Mattydale, Liverpool, Lyncourt, Galeville and a portion of North Syracuse. Land use in Salina is largely residential in the I-81 corridor. The Village of Liverpool within Salina is one of the pilot projects in the Onandoga Settlement Agreement, and is proposed to reduce speeds and change driver behavior within the village. The village has also adopted a comprehensive plan. This plan includes goals of:
  - **Creating a Range of Housing Opportunities and Choices** by providing quality housing for people of all income levels.
  - **Creating "Walkable" Neighborhoods** as desirable places to live, work, learn, worship and play.
  - **Encouraging Community and Stakeholder Collaboration** to respond to the community's own sense of how and where it wants to grow.
  - **Fostering Distinctive, Attractive Communities with a Strong Sense of Place** by setting standards for development and construction that responds to community values of architectural beauty and distinctiveness, as well as expanded choices in housing and transportation.
  - **Making Development Decisions Predictable, Fair and Cost Effective** by embracing the private sector.
  - **Mixing Land Uses** by integrating mixed land uses into the community as a critical component of achieving better places to live.
  - **Preserving Open Space, Natural Beauty and Sensitive Environmental Areas** that bolsters the local economy, preserves critical environmental areas and improves overall quality of life by guiding new growth into existing communities.
  - **Providing a Variety of Transportation Choices** to people with more choices in housing, shopping and transportation.
  - **Strengthening and Directing Development Towards Existing Communities** and developed areas already served by infrastructure seeking to utilize the resources that existing neighborhoods offer, and conserving open space and irreplaceable natural resources.
  - **Taking Advantage of Compact Building Design** conventional, land consumptive development.
- The Town of Cicero is also a suburb of metropolitan Syracuse; Cicero has access via I-81, I-481, I-90 and US 11. Similar to Salina, Cicero is largely residential, both in the existing and future land use condition. The existing land use is most dense or intense in the areas around I-81 and US 11. The Town of Cicero Comprehensive Plan does identify some land use changes along the I -81 and the I-481 corridor, mostly adding commercial and industrial uses along these corridors.

- The Town of Clay also serves as a suburb to Syracuse metropolitan area. The I-81 primary study area just barely crosses into the southeast corner of the town and therefore future land use has not been investigated.
- 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 Village of North Syracuse Comprehensive Plan (2004) is focused on the centers and transition areas identified in the plan, largely along the US 11 corridor that runs through the center of town.

Summary – Future Land Use

Even with a Countywide Land Use Vision, implementation is up to individual jurisdictions. Each one operates under home rule and makes its own planning decisions. Based on interviews with various planning agencies and stakeholders, this planning autonomy makes coordinated regional planning difficult. Home rule stands as one of the great challenges to effect corridor-driven land use changes, since I-81 spans multiple jurisdictional boundaries. Consequently, local jurisdiction's future land use plans, particularly in the City of Syracuse, are especially important.

4.2.10 Neighborhoods and Community Cohesion

The purpose of this evaluation is to identify existing neighborhood conditions that may be most sensitive to changes to the highway infrastructure in the Social, Economic and Environmental Study Area and should be considered when study strategies (alternatives) are developed. Neighborhood characteristics important to community cohesion include:

- Convenient access within the neighborhood (for vehicles as well as pedestrians or bicyclists);
- Connectivity allowing resident interaction; and
- Community institutions and structures that are important to the cohesive social, architectural or historic fabric of the neighborhood.

As noted above, there are eight sectors of the City of Syracuse identified under the TNT program that represent neighborhoods integral to the study area. The following summarizes the characteristics of the eight study area sectors and the neighborhoods that make them up.

Southside TNT Neighborhoods

Southwest
Brighton
Strathmore
Elmwood

Southside TNT

- *General description*: The Southside TNT is west of I-81 and extends from the northern border of the Downtown Neighborhood at East Adams Street to just north of the juncture of I-81 with I-481. South Salina and South State Streets form its primary north-south spines. The Southside TNT is comprised of four neighborhoods.
- *Community* resources present within the study corridor: Community resources include several community centers, schools, places of worship, Onondaga Park with Onondaga Creek and Hiawatha Lake, Kirk Park and Elmwood Park.

- *Notable Characteristics*: The Southside TNT neighborhoods (Strathmore, Brighton and Southside) are predominantly residential with commercial clusters along the north-south arterial roads. Commercial development on the arterials becomes more prevalent close to Downtown Syracuse.
- *Interface with I-81*: I-81 separates the Southside TNT sector from the Eastside TNT sector to the east of the highway. The Southside and Brighton Neighborhoods have direct access to I-81 at Exits 16 and 17.

Eastwood TNT

- *General description:* This TNT is located north of I-690 and east of Teall Avenue.
- *Community resources present within the study corridor:* Community resources within this neighborhood include the Palace Theatre, Sunnycrest Park, numerous churches, schools, a community center, and a library.
- *Notable Characteristics:* The neighborhood is predominantly one- and two-family residential. There is a major neighborhood retail plaza on Grant Boulevard, and a business district on James Street
- *Interface with I-81:* The neighborhood has no direct interface or access to I-81. It has access to I-690 via Teall Avenue, Burnet Avenue, South Midler Avenue, and Thompson Road (Route 635).

Eastside TNT

- *General description*: The Eastside TNT is east of I-81 and abuts I-690 to the north. It extends to I-481 on the south and it encompasses eight neighborhoods including:
- *Community resources present within the study corridor*: The key community resources in the Eastside TNT are Syracuse University and the State University of New York (SUNY) College of Environmental Science and Forestry. Resources of note in the Syracuse University vicinity include the Carrier Dome sports stadium, as well as university medical complexes and the private Crouse Memorial Hospital.

Eastside TNT Neighborhoods

Near Eastside
Salt Springs
University Hill
Westcott
Meadowbrook
University
Outer Comstock
Skytop (South Campus)

- *Notable characteristics*: Adjacent to I-690, the Near Eastside Neighborhood is a mix of uses, and is generally a distressed neighborhood that is a gateway to downtown Syracuse. However, there have been recent initiatives to redevelop the area with medical-related facilities as the anchor. The University Hill Neighborhood contains the two universities and associated performing arts facilities, athletic facilities, libraries, and student housing. The Outer Comstock Neighborhood is predominantly single-family residential; four signs, painted dark green with gold lettering, erected about 2003, mark the Outer Comstock Neighborhood boundaries
- *Interface with I-81*: I-81 forms the western boundary of the Eastside TNT, separating it from the Downtown. I-690 forms the northern edge of the neighborhood. Access to the

interstates is available at Exit 18 along with access at Exits 16 and 17 on I-81 and Exit 14-Teall Avenue on I-690. Other expressway access is available from I-481 Exits 1 and 2 (Brighton Avenue and Nothingham Road).

Downtown TNT

- *General description*: This is the urban and economic core of the City of Syracuse. The Downtown area is located southwest of the interchange of I-81 and I-690; the TNT includes one neighborhood, the Downtown Neighborhood, which extends as far south as East Adams Street.
- *Community resources present within the study corridor*: Community resources include City Hall, the On Center, Canal Museum, Everson Museum of Art, Empire State College, and numerous places of worship.
- *Notable characteristics* – The Downtown Neighborhood is the economic center of the City and contains a high concentration of government offices/institutions. It is also the location of many 'night-time' destinations (e.g., restaurants and bars). There are several district areas in downtown including the Convention Center area, the Power District, Presidential Plaza and Armory and Hanover Squares.
- *Interface with I-81*: I-81 forms the eastern edge of and effectively separates the Downtown from the Eastside TNT and the Syracuse University campus to the east of I-81. The Downtown has direct access to I-81 at Exit 18, Exit 19 and the West Avenue Exit on I-690.

Lakefront TNT

- *General description*: The Lakefront TNT is comprised of two neighborhoods; the Lakefront Neighborhood which is tucked in a triangle between I-81, I-690 and Onondaga Lake, with the City wastewater treatment facility at the lake and Franklin Square at the far southeast corner.
- *Community resources present within the study corridor*: Community resources include the Carousel Center and the Inner Harbor.
- *Notable characteristics:* The Neighborhood/TNT is predominantly industrial between I-81 and the Lake, with the exception of the Carousel retail and entertainment center. There are more renter-occupied units in Lakefront than owner-occupied units, and these are concentrated in small pockets close to Route 298 and I-690. The general lakefront and the Inner Harbor is a special redevelopment district for the city.
- *Interface with I-81*: I-81 traverses the length of the eastern side of the Lakefront Neighborhood/TNT and bisects its northernmost edge, with the residential portion of the Neighborhood separated from the more industrial area by the Interstate. Access is provided primarily by the Bear Street and Hiawatha Boulevard exits on I-81 and I-690.

Northside TNT

- *General description*: The Northside TNT is situated northwest of I-81 and north of I-690 and includes five neighborhoods. It is east of and abuts the residential portion of the Lakefront Neighborhood.

- *Community resources present within the study corridor*: Notable community resources in the Northside TNT include Schiller Park, Lincoln Park with a community pool, Franklin Elementary School, Our Lady of Pompeii School, Alliance Bank Park/Stadium and Woodlawn Cemetery.
- *Notable characteristics:* This is an urban mixed-use area with notable historic resources. While some Northside business districts are distressed, there have been revitalization efforts in recent years. There are two National Register Historic Districts in the Northside TNT: North Salina Street and Hawley-Green. A substantial amount of gentrification has been going on in the Hawley Green area, including the refurbishment of older distressed properties. The Sedgwick/Highland/James area is also a Local Preservation District.
- *Interface with I-81*: I-81 forms the southwest border to the Northside TNT. Access to the Interstates is available at the interchange of I-81 with I-690 and via I-81 Exits 19 thru 25.

Northside TNT Neighborhoods

Northside
Washington Square
Sedgwick
Lincoln Hill
Near Northeast

Valley TNT

- *General description:* This TNT includes both the North Valley and South Valley neighborhoods. Located between I-81 and Route 80 and along Route 173, Route 11 forms a north-south spine for the TNT.
- *Community resources present within the study corridor:* Community resources include the Bob Cecile Community Center, Webster Pond, Betts Library, as well as schools and places of worship.
- *Notable Characteristics:* The neighborhood is predominantly single-family residential. Businesses are concentrated on South Salina Street and Valley Drive to Seneca Turnpike.
- *Interface with I-81:* I-81 forms the eastern border of the neighborhood and creates the boundary between this neighborhood and Outer Comstock to the west of the highway. The neighborhood has direct access to I-81 at Exit 17 and the interchange of I-81 with I-481.

Westside TNT

- *General description:* The Westside TNT includes five neighborhoods.
- *Community resources present within the study corridor:* Community resources in this TNT include a library, several schools, and parks and recreational areas, such as Burnet Park, Faldo Park, Lewis Park, Skiddy Park, Ward Bakery Site, Pass Arboretum, and Stone Throwers Park. Burnet Park is also home to the Onondaga County Zoo.
- *Notable Characteristics:* This is primarily a residential area. West Genesee Street, in the Far Westside, is a commercial corridor and major thoroughfare in TNT.

Westside TNT Neighborhoods

Tipperary Hill
Skunk City
Near Westside
Park Avenue
Far Westside

- *Interface with I-81:* Although there is no primary access to I-81, Route 5 connects this TNT to the interstate.

As noted above, the highways in the SEE Study Area, as originally built, framed many of the City of Syracuse neighborhoods and created some issues for interaction among neighborhood residents. In particular, the long standing presence of I-81 and I-690 has created physical barriers to neighborhood cohesion along the Primary Study Corridor including:

- 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 boxes in the Lakefront Neighborhood and is a physical barrier between it and adjoining neighborhoods.

The presence of these barriers to social interaction and connectivity among neighborhoods as well as opportunities to overcome them will be considered as the project strategies (alternatives) are developed.

Neighborhoods within the Study Corridor in Cicero, Clay, and Salina

Clay - Galeville Neighborhood

- *General description*: Galeville is a hamlet situated within the Town of Clay, west of I-81.
- *Population*: Approximately 4,400 in 2007.
- *Community resources present within the study corridor*: Community resources in Galeville and within the study corridor are limited and include just Dan Tangredi Memorial Park.
- *Notable characteristics*: Galeville is predominantly a residential area.
- *Interface with I-81*: I-81 forms the eastern boundary of the area; Interchange 25 and 25A on I-81 provides direct access to Galeville.

Salina and the Village of Mattydale and Liverpool

- *General description*: Salina is located on the northeast shore of Onondaga Lake. The Village of Mattydale is located within the Town of Salina, east of I-81.
- *Population*: Approximately 2,500 in 2000.
- *Community resources present within the study corridor*: Community resources include two schools and associated recreational fields, several places of worship, and the Salina Library.
- *Notable characteristics*: Mattydale is located directly southwest of Hancock International Airport. It is also a primarily residential area.
- *Interface with I-81*: I-81 forms the western edge of Mattydale. The village has no direct access to/from I-81; however, I-81 separates Mattydale from most of the Town of Salina. Route 11 bisects Mattydale.

Cicero and the Village of North Syracuse

- *General description*: North Syracuse is a village straddling the Towns of Clay and Cicero.
- *Population*: Approximately 6,800 in 2000.

- *Community resources present within the study corridor*: Community resources include the North Syracuse Village Hall, several places of worship and the North Onondaga Public Library.
- *Notable characteristics*: The *2004 City of Syracuse Comprehensive Plan* notes that almost one-third of the workforce in North Syracuse works in the City of Syracuse; it has emerged as largely a bedroom community where residents commute elsewhere to work.
- *Interface with I-81*: I-81 and I-90 intersect in the northeast corner of North Syracuse; as such I-81 bisects the northeast corner, physically separating the northeastern-most residential area of North Syracuse from the remainder of the community.

In particular, the long standing presence of I-81 and I-690 has created the following physical barriers to neighborhood cohesion along the Primary Study Corridor.

- I-81 is a visual barrier between the Downtown and University Hall
- I-690 is a physical barrier between the Lincoln Hill and Near Eastside neighborhoods
- I-81 along with I-690 boxes in the lakefront neighborhood and is a physical barrier between it and adjoining neighborhoods.

I-81 north of the City of Syracuse passes west of Mattydale in the Town of Salina and the east of North Syracuse which straddles the Towns of Clay and Cicero.

4.2.11 Zoning Codes

After meeting with stakeholders and contacting various jurisdictions, three zoning codes were identified – City of Syracuse, Town of Dewitt and the Village of North Syracuse. In large part, the codes and maps mirror the existing land use. In the case of Syracuse, as mentioned earlier, when its Draft Future Land Use 2025 is adopted, the City will need to revise the Code. With the more mixed-use/multi-use approach, the traditional zoning code is not appropriate. In these areas specifically, the City might consider a Form-based Code (FBC), which deals not so much with uses but the form development should take to accept the recommended mixed uses.

4.2.12 Social Groups Benefited or Harmed

The groups benefitted or harmed will be identified as corridor study strategies are developed and refined.

4.2.13 School Districts, Recreational Areas, Places of Worship

A list of the School Districts, Recreational Areas, and Places of Worship within the Social, Economic and Environmental Study Area is provided in Appendix F.

4.3 Existing Economic Conditions

This section summarizes and compares the overall economic condition of the City of Syracuse as compared to Onondaga County, the Syracuse Metropolitan Statistical Area

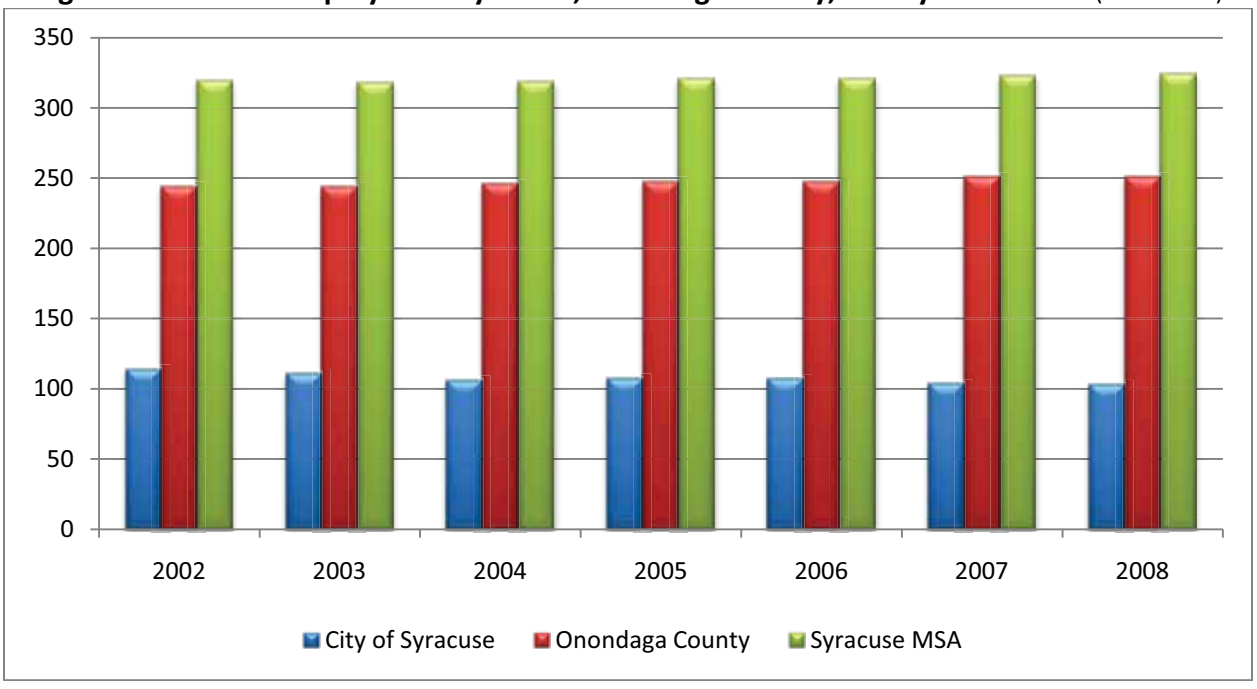
(MSA), New York State, other upstate New York cities and MSAs, and the nation as a whole. A more detailed analysis is included in Appendix F of this document. It also describes the exiting real estate market conditions of the Syracuse area. The Syracuse MSA is comprised of Onondaga, Oswego, and Madison counties. Data for the MSA is provided when City of Syracuse data is not available or to provide a comparison between the City of Syracuse and the larger metropolitan area. The appendix materials are organized with major sections on the:

- Economic and demographic conditions and trends in the Syracuse and Onondaga County areas; and
- Syracuse region real estate market in terms of office, industrial, retail, and residential uses.

The City of Syracuse and Onondaga County are faced with some economic and demographic challenges, including very little growth in population and some out-migration of working aged residents. However, the region's relatively well-educated residents, a number of well-established employers in the city, and a relatively low cost of living are attributes for future economic and business growth. Available and affordable commercial and industrial real estate also presents an opportunity for new business or business expansion.

Total employment in the City of Syracuse has decreased 9.6 percent between 2002 and 2008, from 114,134 to 103,227 employees. As shown in Figure 4.13, Onondaga County's employment increased from 244,613 in 2002 to 251,169 in 2008. This represents an increase of 2.7 percent over the time period. The Syracuse MSA has increased employment by 1.5 percent, from 319,700 to 324,600 employees during the time period.

Figure 4.13 - Total Employees – Syracuse, Onondaga County, and Syracuse MSA (thousands)



Source for Onondaga County and Syracuse MSA: Bureau of Labor Statistics, Total nonfarm employees, not seasonally adjusted. Note: data are for nonfarm employees.
Source for City of Syracuse: Bureau of the Census, LED OnTheMap Origin-Destination Database.

Ninety four percent of Onondaga County's working residents also work in the county, as shown in Table 4.2. Those Onondaga County residents who do not work in the county are most likely to work in Oswego, Cayuga, Madison, or Oneida Counties.

Table 4.2 - Workplace Locations of Onondaga County Residents

Workplace Location	Count
Onondaga Co. NY	94.1%
Oswego Co. NY	1.4%
Cayuga Co. NY	1.0%
Madison Co. NY	1.0%
Oneida Co. NY	0.5%

Source: US Bureau of the Census, Journey to Work data for 2000.

As presented in Table 4.3, nearly 81 percent of Onondaga County workers also live in the county. Onondaga County employers draw 16 percent of their employees from Oswego, Madison, or Cayuga Counties, suggesting that the City of Syracuse and the county as a whole are employment centers for the area.

Table 4.3 - Residence of Onondaga County Employees

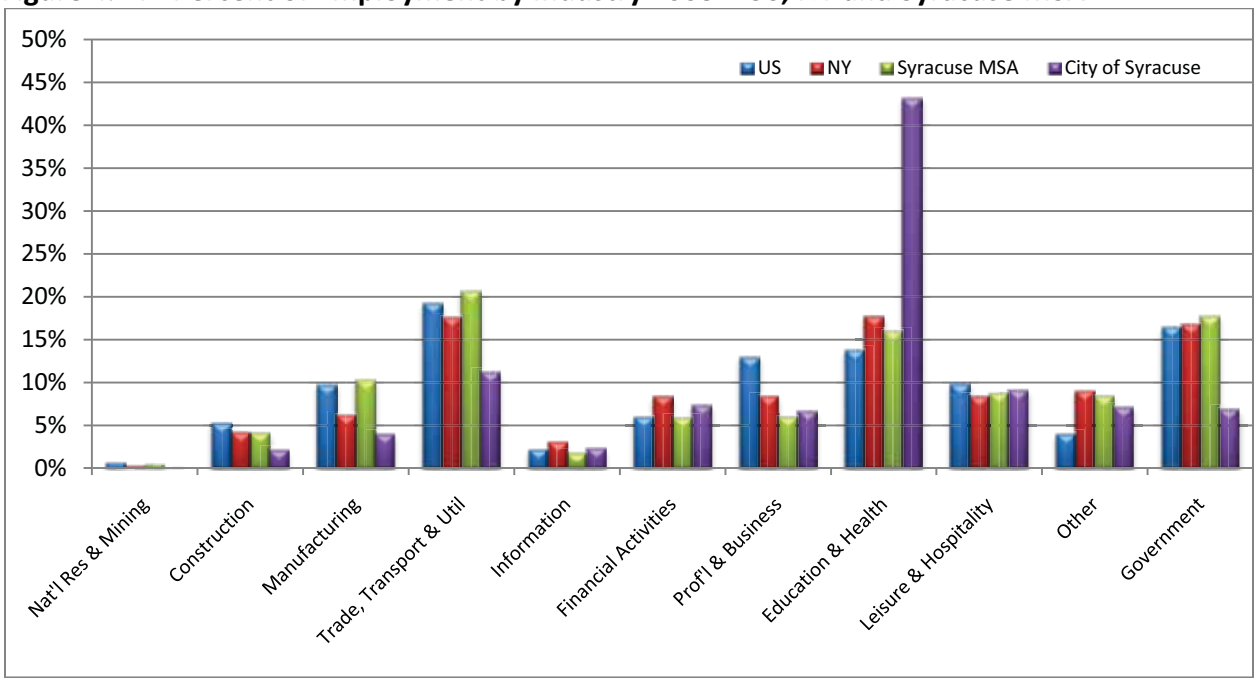
Residence Location	Percent
Onondaga Co. NY	80.7%
Oswego Co. NY	7.4%
Madison Co. NY	4.2%
Cayuga Co. NY	3.1%
Oneida Co. NY	1.3%
Cortland Co. NY	0.8%
Jefferson Co. NY	0.3%
Wayne Co. NY	0.2%
Herkimer Co. NY	0.1%
Chenango Co. NY	0.1%

Source: US Bureau of the Census, Journey to Work data for 2000.

As shown in Figure 4.14, the education and health sector represents 43.2 percent of total employment in the City of Syracuse, or 44,590 employees. This is a considerably larger proportion of total employment than represented in the MSA (16%), state (17.7%) or nation (13.8%) as a whole. This is consistent with the largest employers in the Syracuse area, which are shown in Table 4.4. St. Joseph's Hospital Health Center employs 3,150 people and Crouse Hospital employs 2,400 people. Other large employers in this sector include Syracuse University with 5,925 employees and the State University of New York (SUNY) Upstate Medical University, which is the largest employer in the City with 6,400 employees.

Medical education facilities and hospitals represent half of the top six employers in the Syracuse area, helping to explain the large percentage of employment in this industry.

Figure 4.14 - Percent of Employment by Industry 2008 – US, NY and Syracuse MSA



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.

The remaining industry categories combined account for less than half of total employment in the City. Trade, transport and utilities represent the next largest share of total employment in the City of Syracuse after education and health, 11.3 percent or 11,634 employees. The leisure and hospitality sector represents 9.1 percent of total employment in the City (9,379 employees). The financial activities sector accounts for 7.4 percent of total employment (7,609 employees), and government represents 6.9 percent of total employment (7,105 employees). Professional and business services employ 6.6 percent in the City of Syracuse (6,829 employees). Manufacturing accounts for another four percent or 4,118 employees, and information services employ 2.3 percent (2,381 employees). Construction accounts for another 2.1 percent (2,176 employees).

Within the Syracuse MSA, trade, transport, and utilities represent the largest employment category, 20.7 percent. Wegmans Food Markets, which is included in this industry sector, employs 3,760 people and is one of the Syracuse area's largest employers as presented in Table 4.4. At the state level, 17.6 percent of total employment is represented by this sector and nationally, 19.2 percent of employees work for businesses in this sector. Government employees represent 17.7 percent of total employment in the MSA. Education and health employment accounts for 16 percent of MSA employment, as mentioned above, and another 10.3 percent is in the manufacturing sector.

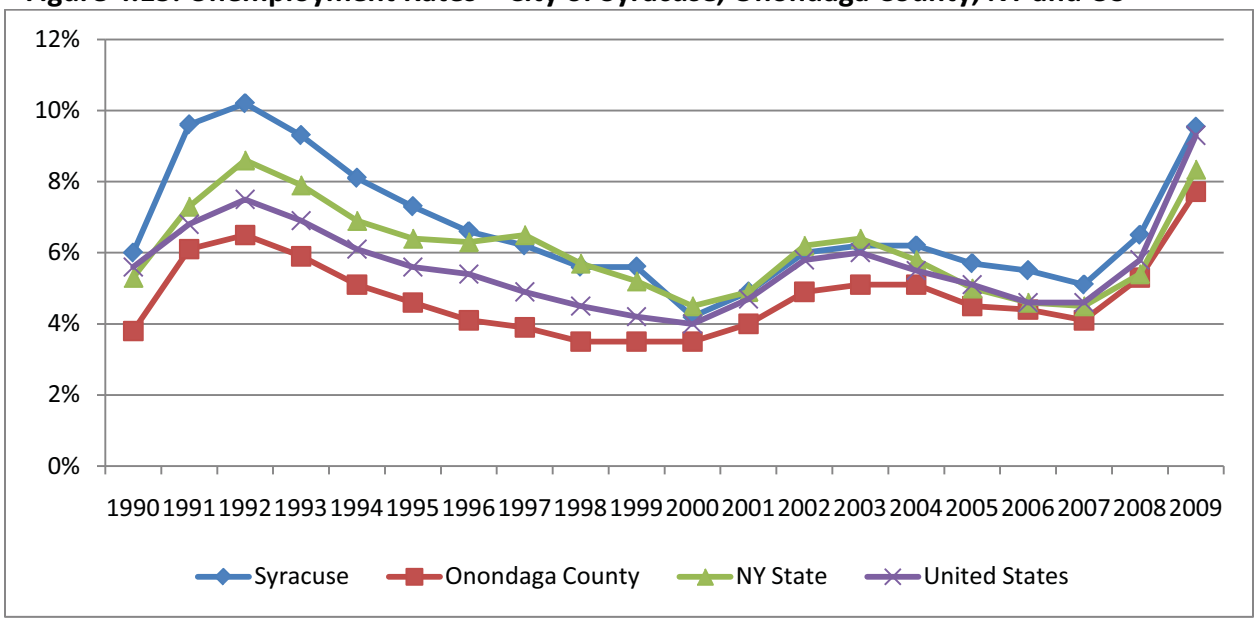
Table 4.4 - Top 25 Syracuse Metropolitan Area Employers by Number of Employees

Firm	Location	Employees	Industry
SUNY Upstate Medical University	Syracuse	6,400	Education & Health
Syracuse University	Syracuse	5,925	Education & Health
Wegmans Food Markets, Inc.	Liverpool	3,760	Trade, Transport & Utilities
St. Joseph's Hospital Health Center	Syracuse	3,150	Education & Health
Magna Drivetrain - New Process Gear Inc.	East Syracuse	2,600	Manufacturing
Crouse Hospital	Syracuse	2,400	Education & Health
Lockheed-Martin MS2	Syracuse	2,350	Manufacturing
National Grid	Syracuse	1,860	Trade, Transport & Utilities
Loretto	Syracuse	1,825	Education & Health
Empire Expo Center Home of the Greater NYS Fair	Syracuse	1,575	Leisure & Hospitality
Carrier Corporation	Syracuse	1,500	Manufacturing
L.& J. G. Stickley, Inc.	Manlius	1,445	Manufacturing
United Parcel Service	East Syracuse	1,230	Trade, Transport & Utilities
Roman Catholic Diocese of Syracuse, NY	Syracuse	1,200	Other
The Hartford Financial Services Group Inc.	Syracuse	1,200	Financial Activities
Syracuse VA Medical Center	Syracuse	1,150	Government
Verizon	Syracuse	1,100	Trade, Transport & Utilities
Welch Allyn, Inc.	Skaneateles Falls	1,100	Manufacturing
Excellus Blue Cross and Blue Shield, Central NY Region	Syracuse	985	Financial Activities
Community-General Hospital	Syracuse	970	Education & Health
Anheuser-Busch Inc.	Baldwinsville	940	Trade, Transport & Utilities
Bank of New York	East Syracuse	850	Financial Activities
Eagle Comtronics	Clay	800	Manufacturing
McLane Northeast	Baldwinsville	800	Trade, Transport & Utilities

Since 1990, the unemployment rate for the City of Syracuse has consistently been higher than the Onondaga County rate as shown in Figure 4.15. From 1997 through 2003, the City experienced unemployment rates comparable to the New York rates but Syracuse's unemployment rate has generally been higher than the national rate for the past decade.

The 2008 unemployment rate for the City of Syracuse was 6.5 percent, as compared to the county unemployment rate of 5.3 percent and the state rate of 5.4 percent. Although official average rates of unemployment for 2009 are not yet available, estimates based on available data suggest that the 2009 rate for Syracuse is likely to be 9.5 percent. Onondaga County's estimated rate is 7.6 percent, and the state's estimated rate is 8.3 percent.[9] When compared to the national unemployment rates for the same time period, the City of Syracuse rates were quite similar from 2000 to 2003. Since 2003, the City's rate has been higher than the national rate of unemployment. The 2009 rate for the City of Syracuse, estimated to be 9.5 percent, is just slightly higher than the national rate of 9.3 percent.

Figure 4.15: Unemployment Rates – City of Syracuse, Onondaga County, NY and US



For the past year, the City and national unemployment rates have been converging. Although this may not appear to be good news, it does indicate that the City of Syracuse is no worse off than the rest of the country during this economic recession. Furthermore, the change in the unemployment rate from 2008 to 2009 has been less significant in the City of Syracuse than it has been for the rest of the nation.

Focusing on 2009 the City's unemployment rate was higher than the state or county rates. The peak unemployment rate for both the county and City occurred in June of last year, at which point the rates began to decline until August. They increased slightly into the fall but decreased again in October and November.

The December 2009 rate for the City of Syracuse was 9.0 percent, slightly lower than the national rate of 9.7 percent for that same month. [10] The December rates for the county and

[9] Estimates calculated by HDR based on monthly, not seasonally adjusted, unemployment rates provided by the NY State Department of Labor for all months in 2009.
[10] Bureau of Labor Statistics, http://www.bls.gov/news.release/pdf/empsit.pdf.

state were 7.6 percent and 8.8 percent, respectively. It is worth noting that the City's unemployment rate has been decreasing since September. Onondaga County's rate also had been decreasing since September, but it increased slightly in December. The statewide rate increased since November, reflecting the continuing impact of the national recession.

The average annual wage for the Syracuse metro area (MSA) employees in 2008 was $40,551 (see Table 4.5). This was lower than the statewide average of $60,384, but New York City wages push the average state wage upward. New York City's greater concentration in higher paying industries such as Financial Services and Information contributes to this higher average wage. Compared to other upstate New York metro areas, the Syracuse MSA's wages are relatively in line. The Albany area reported an annual wage that was $3,000 more than the wages in Syracuse. The national average wage for MSAs of $47,194 is higher than the wages reported in the upstate New York MSAs.

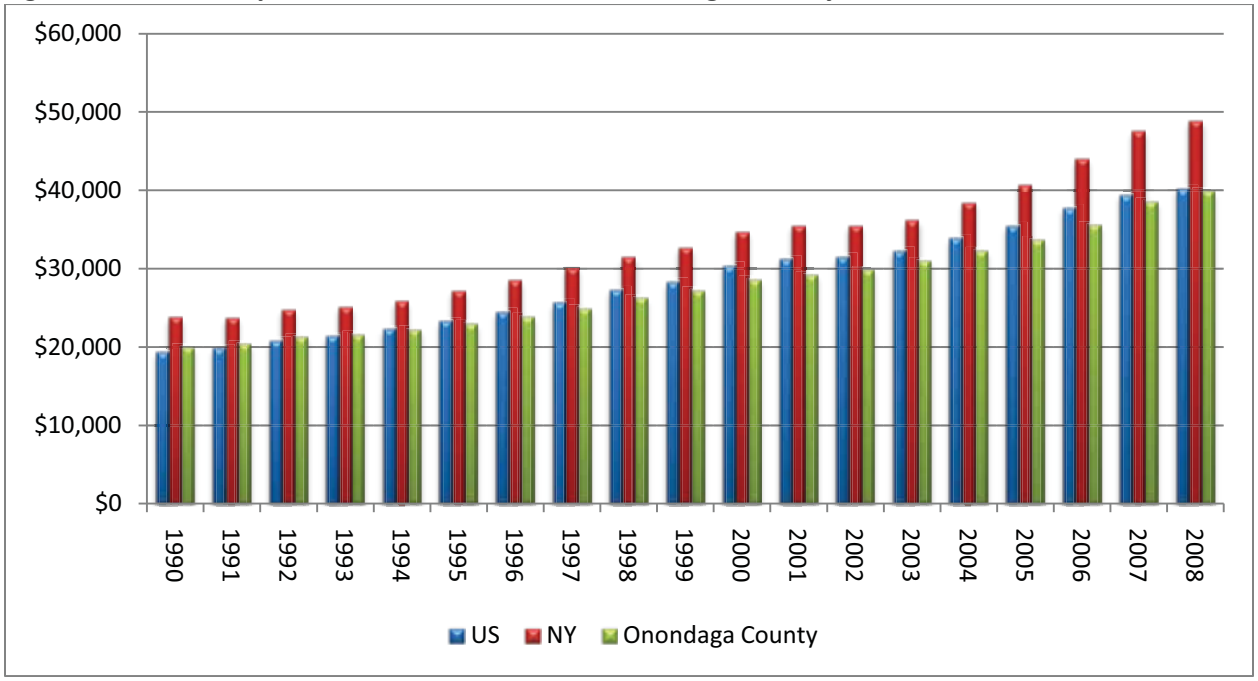
Table 4.5 - 2008 Wages for Syracuse, Upstate NY MSAs and US

	2008 Average Annual Wages
Syracuse MSA	$40,551
Rochester MSA	$41,821
Albany-Schenectady-Troy MSA	$43,941
Buffalo-Niagara Falls MSA	$39,018
New York State	$60,384
United States – Total MSAs	$47,194

Sources: NY State Department of Labor, NAICS based industry employment and wages; Bureau of Labor Statistics.

As shown in Figure 4.16, Onondaga County's 2008 per capita income was $39,814, as compared to New York's $48,809 and the national per capita income of $40,166. The state's per capita income is affected by the relatively higher incomes available in New York City, which is why it is significantly higher than the county per capita income. In 1990, the county per capita income was 103 percent of the national per capita income. This share decreased steadily to 93 percent in 2001. Since then, the share has fluctuated but represented 99 percent of the national per capita income in 2008. When compared to the statewide value, Onondaga County's per capita income has been between 81 and 86 percent of the New York State income.

Figure 4.16 - Per Capita Income – US, NY and Onondaga County



Source: Bureau of Economic Analysis

Commercial Real Estate - Office

The assessment of the commercial real estate market (office, retail and industrial) is based on a series Annual Market Reviews prepared by Pyramid Brokerage Company for the years between 2008 and 2010 as well as a few other sources. Overall vacancy in the Syracuse area's office market reached 20 percent in 2009, up from 18.3 percent in 2008.[11] For the third quarter of 2009, the national office vacancy rate was 16.5 percent and indications are that it will continue to trend upward.[12] The Syracuse area's 2009 vacancy rate reflects the national recession and the overall trend in many US cities of higher vacancy rates in response to this poor economic climate.

Another contributing factor to the area's relatively high office vacancy rate is that the overall rate is based on vacancies for all classes of office space, including Class C space, which is typically more than 20 years old, in need of renovation, and located in less desirable areas. In Syracuse's Central Business District (CBD), the Class C vacancy rate was 54.9 percent as compared to the Class

Office Space Classes Defined

Class A: The highest quality buildings in their market. They are generally the best looking with the best construction, and their building infrastructure is of high quality. They are well-located, have good access, and are professionally managed. They attract the highest quality tenants and also command the highest rents.

Class B: Buildings are generally a little older than Class A, but they still are well managed with good quality tenants. These buildings are generally well maintained and not functionally obsolete.

Class C: The lowest classification of office building and space. They are usually more than 20 years old and are located in less desirable areas. They usually need extensive renovation and the building infrastructure and technology is out-dated. Class C buildings have the lowest rental rates, take the longest time to lease, and are often targeted as re-development opportunities.

[11] *Annual Market Review*, Pyramid Brokerage Company, 2008-2009.
[12] http://www.calculatedriskblog.com/2009/10/reis-us-office-vacancy-rate-hits-165-in.html

A rate of 16.3 percent. Classes of space and associated vacancy rates are described in greater detail later in this section.

In addition to aggregate data for the Syracuse area, data also are available for certain submarkets. These submarkets are shown in Figure 4.17 and include:

- Syracuse Central Business District (CBD): Area south of I-690, west of I-81, north of East Adams Street, and west of Onondaga Creek.
- Syracuse - North: Area north of I-90 (New York State Thruway), east of I-690, and includes Salina, Clay, Cicero, extending into parts of Lysander and the Village of Baldwinsville.
- Syracuse - East: Area includes some eastern portions of City of Syracuse south of I-90. Also includes the Town of Dewitt, and both the Town and Village of Manlius.
- Syracuse - West: Area west of I-81 in the City of Syracuse, including the Franklin Square area just outside the defined CBD north of Onondaga Boulevard. The area extends west to include Camillus, Fairmount, Geddes, and Solvay.
- Syracuse - South: Area within Syracuse City limits, south of CBD Adams Street and Onondaga Streets, west of I-81 to Colvin Street, north of southern boundary of City of Syracuse limits. [13]

As shown in Figure 4.18, vacancy rates were highest in the CBD for both the 2008-2009 and 2009-2010 time periods at about 25 percent. For the period 2008-2009, vacancy rates in areas other than the CBD were similar between a low of 13.2 percent to a high of 14.7 percent with most markets experiencing more variation as the recession continues. From 2009-2010, however, vacancy rates varied considerably from one submarket to the next. In the southern area of Syracuse, vacancy rates were 9.7 percent, a decrease of 5 percentage points from the previous year. In the western portion of the Syracuse area, vacancy rates jumped to 21.4 percent from 14.7 percent the year before. The north and east submarkets also experienced increased vacancy rates, albeit a less significant change.

Much of this increase can be attributed to a few large moves in the office market. The company AXA downsized considerably, freeing up more than 200,000 square feet of space, and Excellus relocated to the suburbs leaving another 200,000 square feet of vacancy.[14] Vacancy rates also vary by class of space.

The Class A, B, C combined vacancy rate shown in Figure 4.18 is quite high for the CBD. This is primarily because Class C vacancy rates are very high, approaching 55 percent in 2009. Class A and B space vacancy rates for the CBD were 16.3 percent and 22.7 percent, respectively. A complete discussion of the vacancy rates by class of space for the Syracuse submarkets is provided in the appendix to this report.

[13] *Office Market Overview, Pyramid Brokerage Company, 2009-2010.*
[14] *Annual Office Market Review*, Pyramid Brokerage Company, 2009-2010.

Figure 4.17 - Syracuse Area Real Estate Submarkets

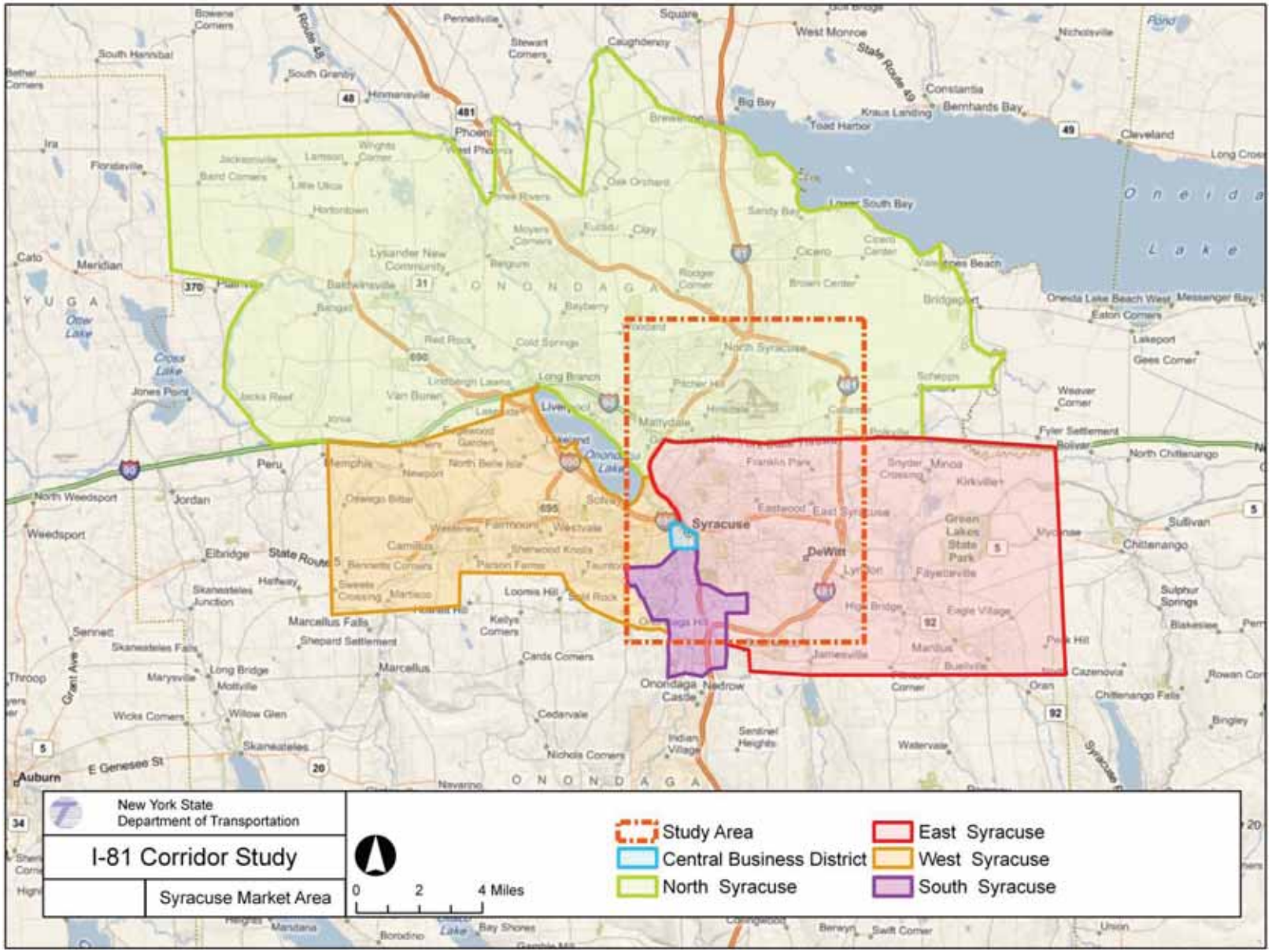
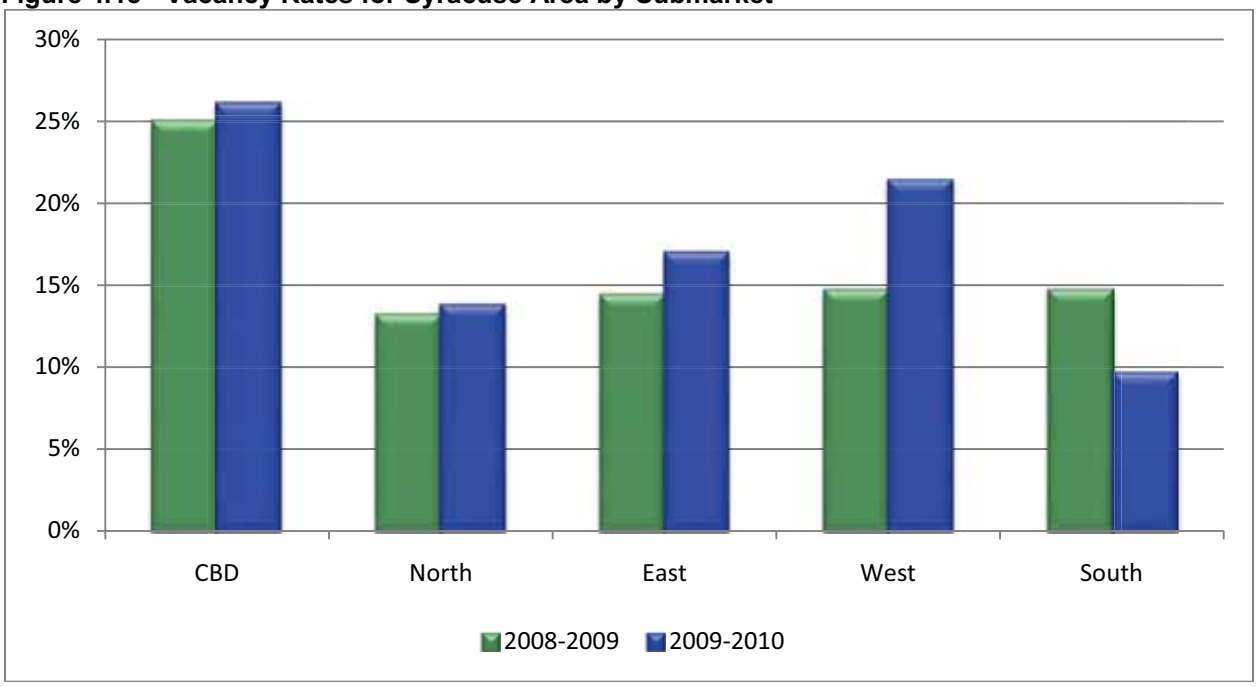


Figure 4.18 - Vacancy Rates for Syracuse Area by Submarket



Source: Annual Market Reviews, 2008-2009 and 2009-2010, Pyramid Brokerage Company; Please note that vacancy rates incorporate rates for Class A, B, and C office space.

Syracuse Central Business District (CBD)

The Central Business District of Syracuse experienced some new real estate development activity in 2009, despite the poor economy. Some of the new development has been leased in the submarket, and both the SUNY Upstate CNY Biotechnology Research Center and the Washington Station offices in Armory Square have broken ground.

As shown in Table 4.6, Class A space has the lowest vacancy rate, 16.3 percent, while Class C is the highest with 54.9 percent. The largest class of space in terms of square footage is Class B with 70 of the CBD's 103 office buildings. In 2009, total inventory was 3.9 million square feet for Class B space. Most of the buildings in the CBD are of Class B or C quality. These are also the properties with the highest vacancy rates. These factors suggest that the City of Syracuse may need to upgrade its portfolio of office buildings.

Table 4.6 - Office Space Inventory – Syracuse CBD

Classification	Total Inventory (SF)	Vacancy (SF)	Percent Vacant	# of Buildings
Class A	1,794,279	293,190	16.3%	8
Class B	3,886,887	880,584	22.7%	70
Class C	1,081,778	594,355	54.9%	25
Total	**6,762,994**	**1,768,129**	**100%**	**103**

Commercial Real Estate – Retail

For 2009, there was approximately 10 million square feet of retail space in the Syracuse area. This is virtually unchanged from 2008, but retailers have begun to take an interest in

the Syracuse market over the past year. One popular downtown restaurant is expanding, a national clothing retailer is moving into the Armory Square district downtown, and the CENTRO bus hub is being relocated. This relocation will invite some ground level redevelopment, and additional redevelopment of several nearby office buildings into apartments and street level retail space is expected to follow.

As shown in Table 4.7, vacancy rates for the retail sector vary considerably. Power Centers[15] reported the lowest vacancy rates in 2009, 10 percent. This is a slight increase from the 2009 vacancy rate. The highest rates were experienced by Community Centers, 18.5 percent, a decrease from the 2009 rate of 20 percent.

A triple net lease (Net Net Net or NNN) is a lease that includes real estate taxes, building insurance, and maintenance on the property in addition to normal lease fees. Since 2009, vacancy rates in downtown Syracuse have decreased by 24 percent. Rental rates have also changed from the previous year. On the low NNN end of the spectrum, rental rates decreased by $1 per square foot. On the upper end of the range, however, per square foot rates in downtown Syracuse have increased by $7 per square foot.

Table 4.7 shows the inventory, overall vacancy and a range of NNN rental rates for retail areas that include: Downtown, Neighborhood Service Centers, Community Centers and Power Centers.

Table 4.7 - Retail Space Inventory

Type	Inventory	Overall Vacancy	Low NNN Rental Rates psf/yr	High NNN Rental Rates psf/yr
Downtown	927,343	15.0%	$9	$15
Neighborhood Service Centers	3,650,172	14.3%	$10	$22
Community Centers	3,017,488	20.0%	$6	$25
Power Centers	2,432,434	9.6%	$10	$22

Source: Annual Market Overview, Pyramid Brokerage Company, 2009-2010.

Commercial Real Estate – Industrial

The Industrial market continued to contract last year. Some Syracuse area based businesses have relocated; Syracuse China moved their operations overseas leaving 641,000 square feet of office, warehouse and manufacturing space.[16] Magna Powertrain, which provides 2,600 jobs, is also scheduled to close its 1.7 million square foot facility.[17]

[15] According to the International Council of Shopping Centers, a Power Center is "dominated by several large anchors, including discount department stores, off-price stores, warehouse clubs, or stores that offer tremendous selection in a particular merchandise category at low prices. The center typically consists of several freestanding (unconnected) anchors and only a minimum amount of small specialty tenants." http://www.icsc.org/srch/lib/SCDefinitions99.pdf

[16] *Syracuse Real Estate Market Faring Better than Other Parts of Country*, Integra Realty Resources, November 2, 2009, http://www.irr.com/Publication/PressRelease/asp?Ref=412&~=.

The Syracuse industrial market includes 48.5 million square feet of space. Most of this industrial space is located in the northern and eastern portions of the metropolitan area.

In addition to aggregate data for the Syracuse area, industrial market data also are available for certain submarkets. These submarkets include:

- North Industrial Market: Area located north of I-90, including the Towns of Salina and Cicero and extending west to parts of Lysander and the Village of Baldwinsville.
- East Industrial Market: Area south of I-90 and east of I-81 including the eastern portion of the City of Syracuse, parts of the Towns of Salina and Dewitt, as well as the Villages of Fayetteville and Manlius.
- West Industrial Market: Area south of I-90 and west of I-81, including western sections of the City of Syracuse, and Towns of Camillus, Onondaga and Geddes.
- South Industrial Market: Area south of I-90, primarily located in the City of Syracuse south of Adams Street and West Onondaga Boulevard.[18]

The lowest vacancy rate for industrial space in Syracuse, 9.01 percent, is for space located in the south industrial area of Syracuse. As shown in Table 4.8, the highest rate is found in the eastern submarket of the Syracuse area. This rate is 17.25 percent, based on 2009 data.

Table 4.8 - Industrial Space Inventory by Syracuse Area Submarket

Submarket	Total Inventory (SF)	Vacancy Rate
SYR-North	19,294,485	10.24%
SYR-East	20,365,890	17.25%
SYR-South	1,823,349	9.01%
SYR-West	7,056,266	10.24%
TOTAL	48,539,990	13.49%

Source: Industrial Market Overview, Pyramid Brokerage Company, 2009-2010.

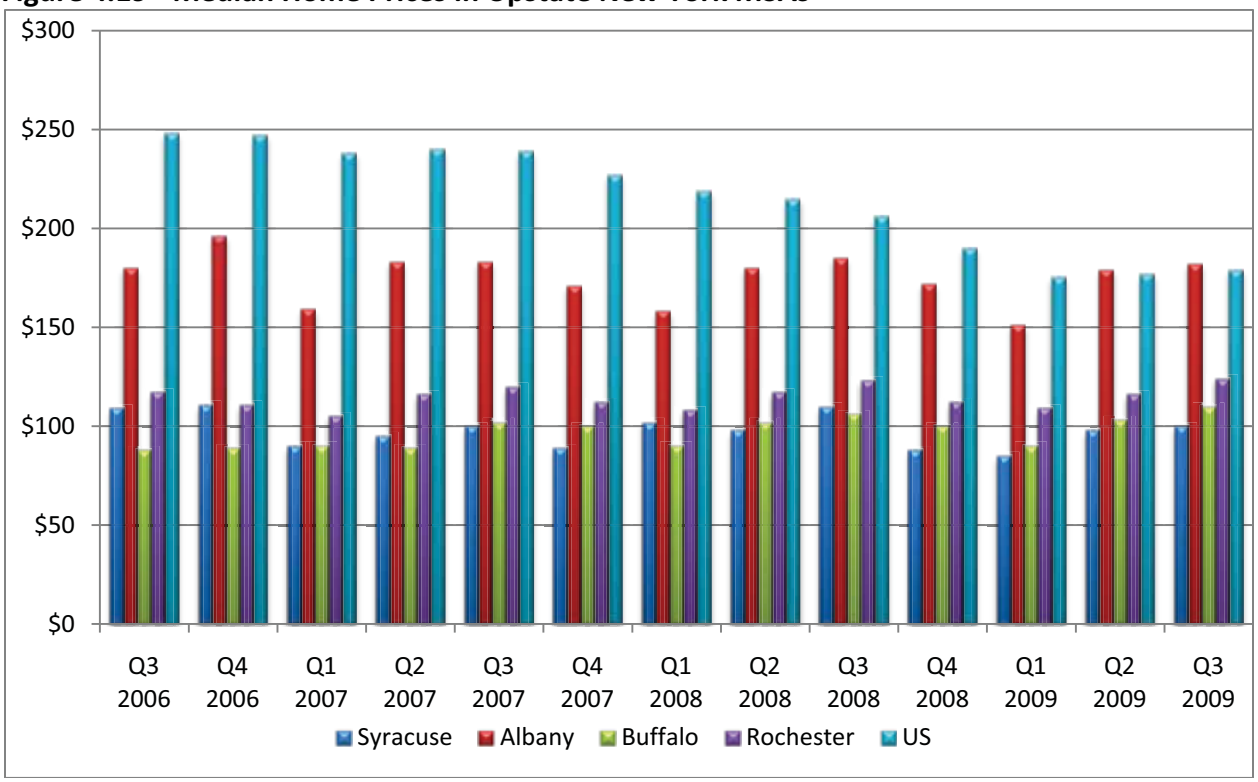
Residential

The median home price in Syracuse MSA is approximately $100,000 and has been for several years, as shown in Figure 4.19. The Rochester MSA's median home price was $124,000 in the third quarter of 2009. Buffalo MSA's median price of $110,000 at the end of 2009 is also quite similar to the prices in the Syracuse and Rochester MSAs. The Albany MSA has significantly higher median home prices, above $150,000 and fluctuating to nearly $200,000 at different times during the past three years. The national median home price of $179,000 in the third quarter of 2009 is a significant reduction from the previous year's median price of $205,900. Since the third quarter of 2006, median home prices in the

[17] *Syracuse Real Estate Market Faring Better than Other Parts of Country*, Integra Realty Resources, November 2, 2009, http://www.irr.com/Publication/PressRelease/asp?Ref=412&~=.
[18] *Industrial Market Overview, Pyramid Brokerage Company, 2009-2010.*

Syracuse MSA have decreased 8.3 percent. In contrast, the median home price in the US has decreased 27.8 percent. Relatively speaking, Syracuse MSA home prices have weathered the real estate crisis relatively well when compared to the national experience.

Figure 4.19 - Median Home Prices in Upstate New York MSAs



Source: National Association of Homebuilders (NAHB) Housing Opportunity Price Index; Note: data were not available for the Syracuse MSA from the fourth quarter of 2003 through the first quarter of 2006.

After housing market prices began to decline and the market became saturated with housing units "for sale," the number of building permits declined for the nation, State of New York, and Syracuse MSA as shown in Table 4.9. On a percentage basis, the state experienced a significant decline in building permits from November 2008 to November 2009, a 70 percent reduction during that time period. In contrast, the decrease experienced in the Syracuse MSA was about half what was experienced by the nation as a whole and less than one third of the decrease experienced at the state level. Much of the reduction in building permits may be attributable to the current economic recession.

Table 4.9 - Building Permits, US, NY and Syracuse Metro Area (thousands)

	YTD Nov-08	YTD Nov-09	Percent Change	Total 2008
United States	852.5	524.2	-39%	905.4
New York	51.96	15.75	-70%	51.64
Syracuse	0.63	0.50	-21%	1.13

Source: National Association of Homebuilders (NAHB)

As shown in Table 4.10, building permits for multifamily homes actually increased from November 2008 to November 2009 by three percent in the Syracuse MSA. In contrast, the Buffalo MSA experienced a decrease of 46 percent and the Albany MSA's building permits declined by 73 percent. The Rochester MSA experienced significant growth during the time period, 171 percent.[19] Single family home building permits decreased in each of these upstate New York MSAs; the reduction in Syracuse was largest. Only the Rochester MSA achieved an overall increase in building permits, eight percent.

Table 4.10 - Building Permit Percent Change in Upstate NY MSA's (November 2008 - November 2009)

	Single Family	Multi Family	Total
Syracuse	-26%	3%	-21%
Albany	-10%	-73%	-41%
Buffalo	-6%	-46%	-17%
Rochester	-17%	171%	8%

Existing Conditions Interviews

As part of the existing conditions assessment conducted for this project, the project team met with land use, economic development, and real estate development professionals in Syracuse. The section that follows provides summaries of those interviews.

Syracuse Area Existing Conditions - Economic Development Interview Summary

Fourteen organizations were interviewed that were involved with economic and/or real estate development in the Syracuse area as part of its existing conditions assessment. These organizations were:

1. CenterState Corporation for Economic Opportunity (CEO) (formerly the Metropolitan Development Association [MDA] of Syracuse)
2. City of Syracuse Mayor's Office
3. City of Syracuse Department of Neighborhood and Business Development
4. City of Syracuse Planning Department
5. Onondaga County Office of Economic Development
6. Syracuse-Onondaga County Planning Agency (SOCPA)
7. Central NY Regional Planning and Development Board
8. Empire State Development Corporation
9. Syracuse University Economic Development
10. Franklin Properties, LLC
11. Armory Development
12. Sutton Real Estate
13. Pioneer Companies
14. Pyramid Brokerage

[19] National Association of Homebuilders (NAHB), Building Permits data.

Information related to the current economic and real estate development climate in the Syracuse area was collected from key individuals in these organizations and is summarized below.

Economic Development

According to the professionals interviewed, manufacturing has been in decline in the Syracuse area for a number of years. Despite this overall decrease, this sector still represents 15 percent of total employment, which is larger than the US average. Specialized and smaller manufacturing businesses have remained in the area, and most are located to the northwest of the City of Syracuse.

An existing cluster of hospitals, universities and related businesses (i.e., "Meds and Eds") is also located in the City of Syracuse and is a strong employment base for the area. Many of these businesses and institutions are on University Hill, which is located 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.

In response, Syracuse University (SU) has acquired space downtown, most notably the warehouse building, to meet some of their expansion requirements. The warehouse redevelopment currently houses SU's visual and performing arts programs and SU has other downtown redevelopment initiatives in the planning and development stage as the Chancellor of SU firmly believes that a strong university needs a strong and vibrant city. 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. Hospitals in the area also continue to grow, although there has been a trend in medical office buildings moving to the suburbs because of the availability of parking, low land costs, and new facilities.

General finance and call centers, advanced engineering and defense technology also remain strong in the area, and firms in these sectors represent some of the largest employers in Syracuse. Sensis Corporation and Lockheed Martin are two of the firms located in Syracuse that are part of this sector and were repeatedly mentioned as strong employers during the interviews.

Based on the interviews, some of the strengths of Syracuse include an unlimited water supply and a skilled, hard-working workforce. Other utilities are also in place, the transportation infrastructure is generally strong, and the City is centrally located in the state. There was some concern about the level of air service and the lack of direct connections at Syracuse Hancock International Airport, but the presence of an airport was also considered a strength of the area by some respondents. Less quantifiable "pros" of Syracuse include a low cost of living, high quality of life, recreational opportunities and ease of commute.

The declining population was mentioned in every interview conducted. This is a serious concern to those organizations and individuals involved with the area economic development. Retention of existing residents and students who attend the universities in the City were two goals mentioned consistently throughout the interview process. Encouraging individuals who grew up in the area and moved away to return to Syracuse is another objective mentioned by several of the interviewees. Along with population, it was noted that the rate of poverty has changed over the past 25 years. It has been increasing, and the City of Syracuse public schools are considered "tough" by several individuals interviewed.

Other constraints include the relatively high cost of doing business in New York State. High taxes and energy costs in the state were mentioned on several occasions as impediments to economic growth. A lack of incentives was also cited as a difficulty in drawing new business to the area. There is a perception that other regions of the country do a better job luring businesses to their communities.

Real Estate Development

The housing stock in the Syracuse area is generally affordable. Average rental rates are relatively low city-wide, and single-family housing in the area is reasonably priced. Some of the newer residential development in downtown Syracuse is able to charge higher rental rates, however, contributing to the relatively more expensive *downtown* Syracuse rental market. Prospective residents paying these higher rental rates must weigh the pros and cons of paying for an apartment when they could afford a single family home. The cost of buying a single-family home in the Syracuse area is relatively low; homes in the suburbs are generally more expensive than homes in the City but are still very affordable. Additionally, there is an ample supply of single-family homes available in the City of Syracuse.

Most residential developments have been renovations of existing buildings that can leverage historic tax credits and other public subsidies to lower the costs of development. That said, there are some success stories of residential development in the City as some of the newest residential development (e.g., Franklin Square) is completely occupied. Many of the individuals who choose to live in downtown Syracuse are "empty nesters" or young professionals who are choosing an urban lifestyle. Students with the universities are also living downtown. Rental rates are $600-$1,800 per month, with the average one bedroom charging rent of $750-$800 per month. The condominium market in Syracuse is very small at the present time.

There are a number of completely vacant office buildings in downtown Syracuse, which could theoretically be redeveloped. However, the downtown office market is generally considered weak. There are few new large office opportunities available, other than the expansion of "Meds and Eds." One exception is O'Brien and Gere's decision to relocate downtown, bringing with it 300 jobs in the engineering sector.

Salina Street, which is the "Main Street" of downtown Syracuse, is a mix of lower rent retail space on the first floor with primarily vacant office and residential space on the floors above. The existence of this empty space is a signal of the City's continued economic struggles downtown.

Armory Square is one of the most recent commercial redevelopment projects in Syracuse and is considered a true success story. The space is completely occupied, offering mostly retail and restaurant space, some smaller office uses, and some residential rental units. The spaces in Armory Square are 700-1000 square feet in size.

Although Class A space tends to go for $25 per square foot, there are a relatively small number of tenants willing to pay those rental rates. Class B space is considered more affordable at $11 per square foot, but there is relatively low demand for this space. As a result, rents have remained roughly the same as they were 15 years ago and there is very little incentive to develop additional office space.

4.4 Environmental

The following discussions of environmental constraints and related maps are based on data from secondary sources. Geographic Information Systems (GIS) data was obtained from the Syracuse Metropolitan Transportation Council (SMTC) and the Syracuse-Onondaga County Planning Agency (SOCPA). This data was supplemented with information obtained from the Natural Heritage Program of the New York State Department of Environmental Conservation (NYSDEC). Potential noise-sensitive land uses along I-81, I-481, I-690, I-90, and East Genesee Street, for example, were obtained from the SOCPA database and were verified in a field survey on October 30, 2009. Data on historic and archaeological resources was obtained from the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP), and the New York State Museum. Overall this information is reference information for future phases of *The I-81 Challenge* (Strategy Development – Alternatives).

4.4.1 Wetlands

National Wetland Inventory (NWI) freshwater wetlands and New York State Department of Environmental Conservation (NYSDEC) wetlands are mapped in Figure 4.20. I-481 goes through large NWI and NYSDEC wetlands along major portions of its length. Some wetlands identified by NYSDEC and on the NWI maps are located adjacent to I-81 and I-690. NWI wetlands would likely be under the jurisdiction of the U.S. Army Corps of Engineers (USACE). Additional potential jurisdictional wetlands may be located within the SEE Study Area that would need to be identified by site reconnaissance. Relevant wetland boundaries will be field verified as study strategies (alternatives) are developed.

4.4.2 Surface Waterbodies and Watercourses

Waterbodies and watercourses in the SEE Study Area are mapped in Figure 4.20, based on data from NYSDEC. Several of these streams are outflows to Onondaga Lake, which is located immediately west of I-81 near Interchange 23A. All of the currently identified

watercourses located within the corridor study are classified by the NYSDEC as either protected or as a Class C Stream, indicating waters supporting fisheries and suitable for non-contact activities. Protected streams include Beartrap Creek and portions of Butternut Creek, Ley Creek, Onondaga Creek and Harbor Creek. Class C streams include Mud Creek, parts of Ley Creek, and Onondaga Creek, along with portions of Butternut Creek and Meadow Brook.

Onondaga Creek flows under I-690, near the West Street / I-81 interchange. Butternut Creek and Meadow Brook flow under I-481 near the East Genesee Street interchange. North of I-690, Beartrap Creek runs alongside and underneath I-81. Mud Creek flows under I-81 at Interchange 29 with I-481. Ley Creek flows under I-81 near Onondaga Lake and continues to flow along and under I-90. North of I-90, I-481 is crossed by North Branch Ley Creek at two locations.

4.4.3 Wild, Scenic, and Recreational Rivers

There are no state Wild, Scenic, or Recreational river segments within the indicated SEE Study Area.

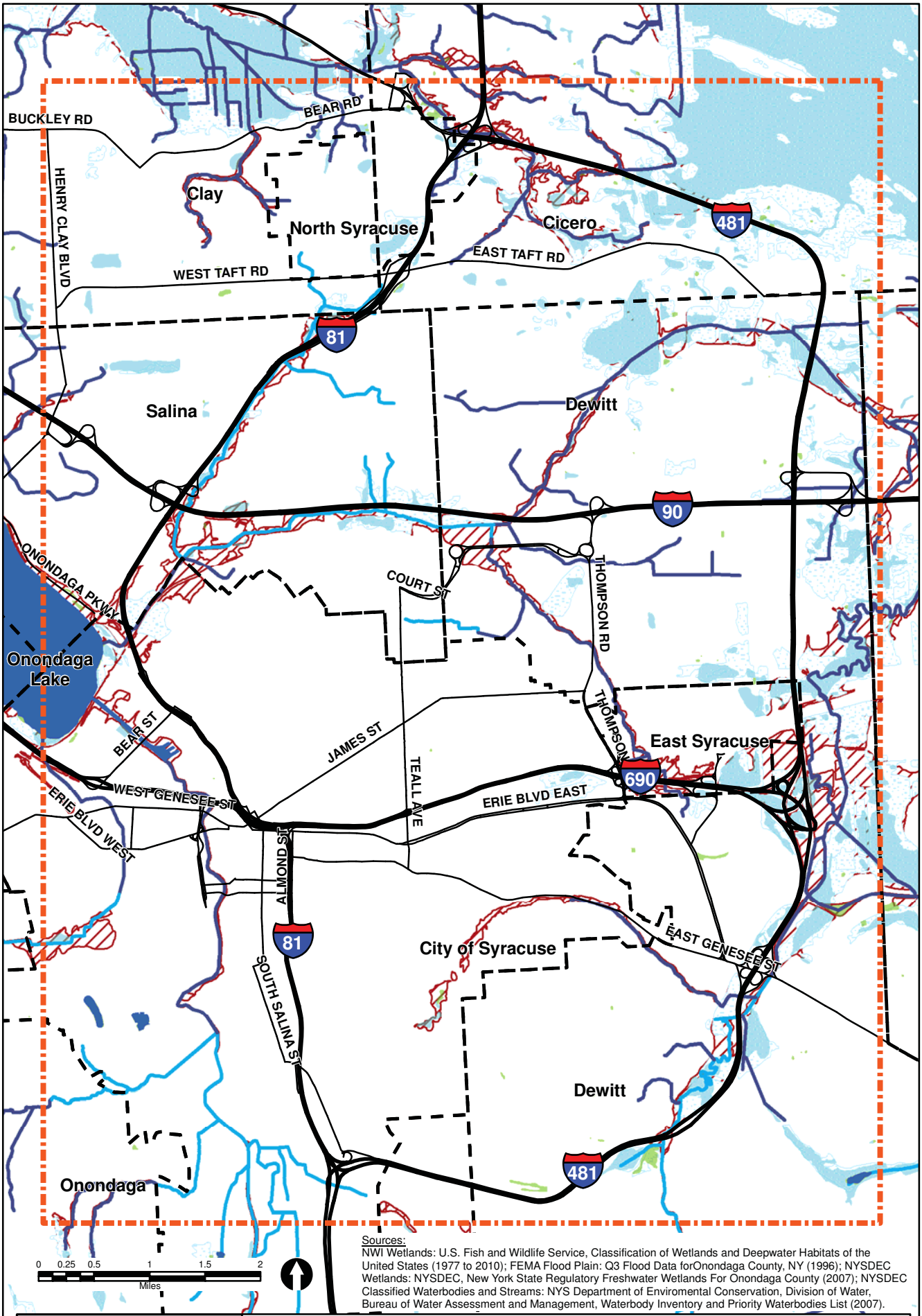
4.4.4 Navigable Waters

Onondaga Lake and Erie Canal (from its confluence with the Niagara River to its westerly confluence with the Mohawk River at Rome, NY) are identified as "navigable waterways" in that they support commerce.[2]

The study area also includes other "waters of the United States"—in addition to navigable waterways—as defined under the Clean Water Act. [3] Both of these water resource types are under the jurisdiction of the USACE and will need to be considered when evaluating the study strategies (alternatives).

Both of these resource types are depicted on Figure 4.21, but visually differentiated based on the controlling regulation.

[2] Source: http://www.lrb.usace.army.mil/regulatory/waterway_ny.pdf
[3] Definition of Waters of the United States:
http://www.usace.army.mil/CECW/Documents/cecwo/reg/materials/33cfr328.pdf



Sources:
NWI Wetlands: U.S. Fish and Wildlife Service, Classification of Wetlands and Deepwater Habitats of the United States (1977 to 2010); FEMA Flood Plain: Q3 Flood Data forOnondaga County, NY (1996); NYSDEC Wetlands: NYSDEC, New York State Regulatory Freshwater Wetlands For Onondaga County (2007); NYSDEC Classified Waterbodies and Streams: NYS Department of Enviromental Conservation, Division of Water, Bureau of Water Assessment and Management, Waterbody Inventory and Priority Waterbodies List (2007).

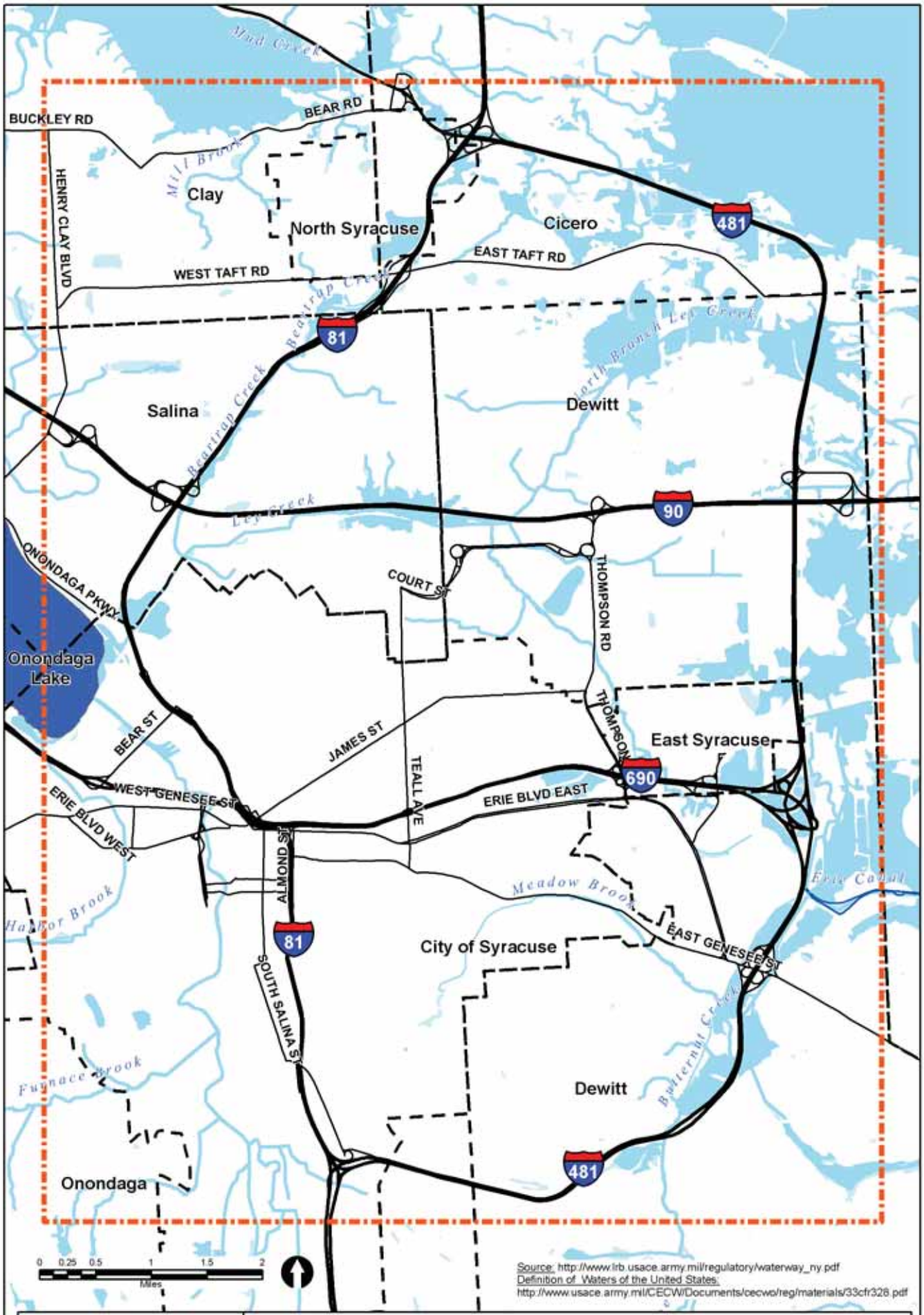
Interstate 81 Corridor Assessment

Surface Water/ Flood Plain

Figure 4.12A

Legend

- SEE Study Area
- Municipal Boundary
- FEMA Flood Plain
- NYSDEC Wetlands
- NWI Wetlands
- Freshwater Wetlands
- Pond or Lake
- NYSDEC Classified Stream
- Protected Stream
- C Stream


Mud Creek
BUCKLEY RD
BEAR RD
HENRY CLAY BLVD
Mill Brook
Clay
North Syracuse
Cicero
481
EAST TAFT RD
WEST TAFT RD
Bearcrap Creek
81
North Branch Ley Creek
Salina
Dewitt
Ley Creek
90
ONONDAGA PKWY
COURT ST
THOMPSON RD
Onondaga Lake
BEAR ST
JAMES ST
TEALL AVE
East Syracuse
690
WEST GENESEE ST
ERIE BLVD EAST
ERIE BLVD WEST
ALMOND ST
Meadow Brook
Erie Canal
Harbor Brook
81
City of Syracuse
EAST GENESEE ST
SOUTH SALINA ST
Butternut Creek
Furnace Brook
Dewitt
481
Onondaga
0 0.25 0.5 1 1.5 2
Miles
Source: http://www.lrb.usace.army.mil/regulatory/waterway_ny.pdf
Definition of Waters of the United States:
http://www.usace.army.mil/CECW/Documents/cecwo/reg/materials/33cfr328.pdf
Interstate 81
Corridor Assessment
Surface Water/ Flood Plain
Figure 4.12B
Legend
SEE Study Area
Municipal Boundary
Navigable Waters
Other Potential Waters of the US

4.4.5 Floodplains

Areas located within the 100-year floodplain as defined by the Federal Emergency Management Agency (FEMA) are identified in Figure 4.20. Floodplains in the SEE Study Area are located adjacent to Onondaga Lake and existing watercourses, including Onondaga Creek (west of I-81), Beartrap Creek (along I-81, north of I-90), Ley Creek (along I-90), Butternut Creek (along I-481), and Meadow Brook (near East Genesee Street). Should the alignment of the I-81 corridor change as part of future strategy considerations, the affects to existing floodplains will need to be identified.

4.4.6 Coastal Resources

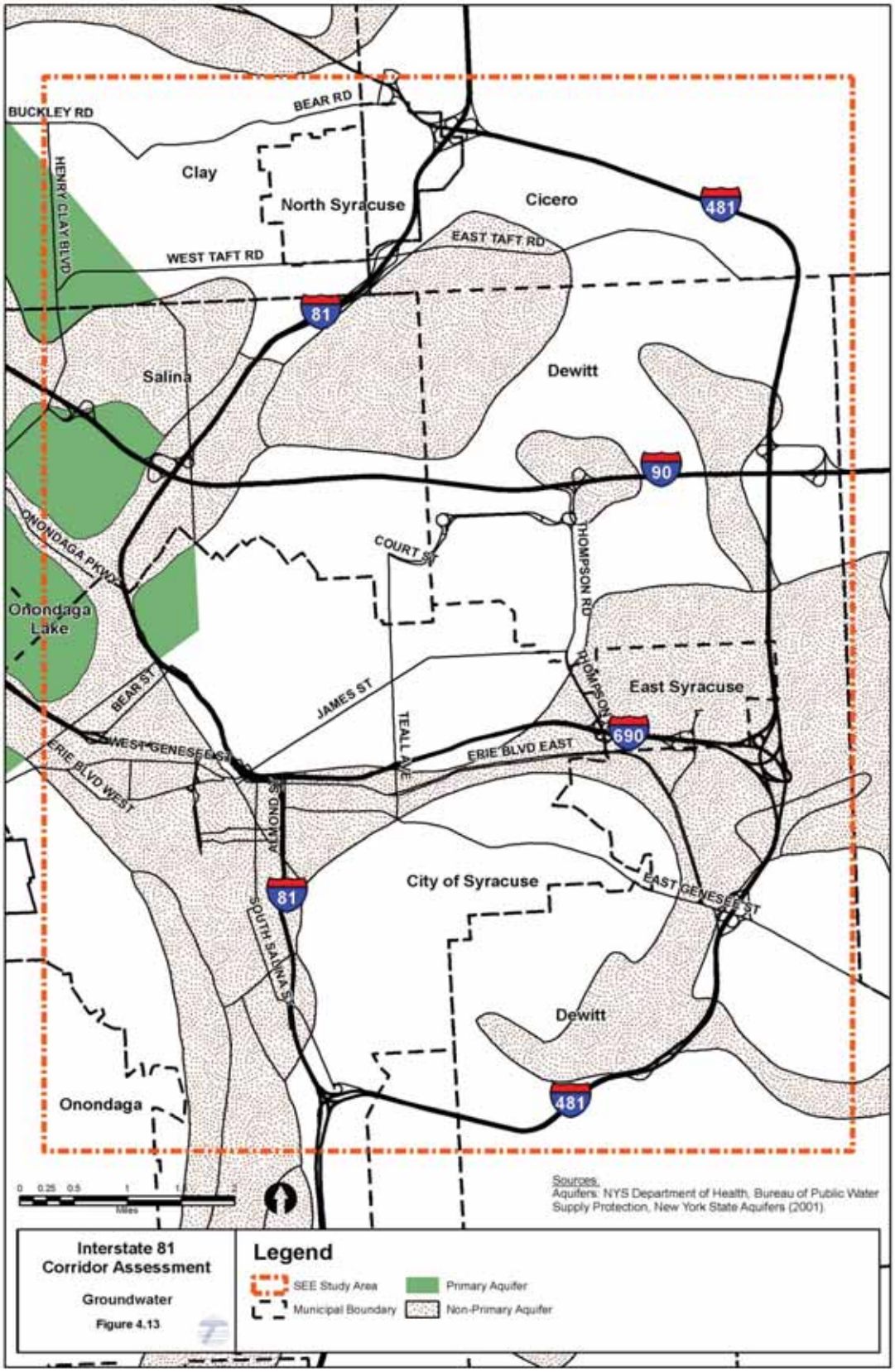
The proposed project is not located in a State Coastal Zone Management (CZM) area, according to the Coastal Zone Area Map from the NYS Department of State's Coastal Zone Management Unit. There are no Local Waterfront Revitalization Programs (LWRPs) in the SEE Study Area.[4]

4.4.7 Aquifers, Wells, and Reservoirs

Primary and non-primary aquifers in the SEE Study Area are mapped in Figure 4.22.[5] The four primary aquifers, including Onondaga Lake, are located north of I-690 and adjacent to or west of I-81. There are no Federal designated Sole Source Aquifers or water supply wells in the SEE Study Area. Once project strategies (alternatives) are developed more detailed site-specific information will be collected.

[4] LWRP refers to both a planning document prepared by a community, as well as the program established to implement the plan. As a planning document, a LWRP is a locally prepared, land and water use plan and strategy for a community's natural, public, working, or developed waterfront through which critical issues are addressed. In partnership with the Division of Coastal Resources, a municipality develops community consensus regarding the future of its waterfront and refines State waterfront policies to reflect local conditions and circumstances. Once approved by the New York Secretary of State, the Local Program serves to coordinate State and federal actions needed to assist the community achieve its vision. As a program, a LWRP is the organizational structure, local laws, projects, and on-going partnerships that implement the planning document. (Source: New York State Department of State – Division of Coastal Resources) (Source: http://www.nyswaterfronts.com/maps_regions.asp)

[5] According to the NYSDOT Environmental Procedures Manual, Primary Aquifers are highly productive aquifers presently being utilized as sources of water supply by major municipal water supply systems. Generally, primary aquifers are the permeable valley fill materials within a primary aquifer zone, as seen in paper maps or GIS datasets. Confined aquifers that are predominantly recharged in land areas that are outside the aquifer area are not primary or principal aquifers.


BUCKLEY RD
BEAR RD
HENRY CLAY BLVD
Clay
North Syracuse
Cicero
481
EAST TAFT RD
WEST TAFT RD
81
Salina
Dewitt
90
ONONDAGA PKWY
COURT ST
THOMPSON RD
Onondaga Lake
BEAR ST
JAMES ST
East Syracuse
690
WEST GENESEE ST
ERIE BLVD WEST
TEALL AVE
ERIE BLVD EAST
ATKINS ST
City of Syracuse
EAST GENESEE ST
81
SOUTH SALINA ST
Dewitt
Onondaga
481
0 0.25 0.5 1 1.5 2
Miles
Sources:
Aquifers: NYS Department of Health, Bureau of Public Water Supply Protection, New York State Aquifers (2001).
Interstate 81
Corridor Assessment
Groundwater
Figure 4.13
Legend
SEE Study Area
Municipal Boundary
Primary Aquifer
Non-Primary Aquifer

4.4.8 Stormwater Management

In response to the 1987 Amendments to the Clean Water Act (CWA), the U.S. Environmental Protection Agency (EPA) developed Phase I of the National Pollutant Discharge Elimination System (NPDES) Storm Water Program in 1990. The Phase I program addressed sources of storm water runoff that had the greatest potential to negatively impact water quality. The Department of Environmental Conservation (DEC) is responsible for administering the program in New York State as part of the State Pollutant Discharge Elimination System (SPDES) permit program. Under Phase I, SPDES permit coverage was required for stormwater discharges from medium and large Municipal Separate Storm Sewer Systems (MS4s) located in incorporated places or counties, eleven categories of industrial activity and construction activity that disturbed five or more acres of land.

The Phase II Final Rule, published in the Federal Register on December 8, 1999, expanded the stormwater permit program to include stormwater discharges from certain regulated small MS4s and construction activity that disturbs between 1 and 5 acres of land. On January 8, 2003, the DEC finalized two new permits for stormwater discharges in NYS as required by the Federal EPA; the small MS4 and small construction permits.

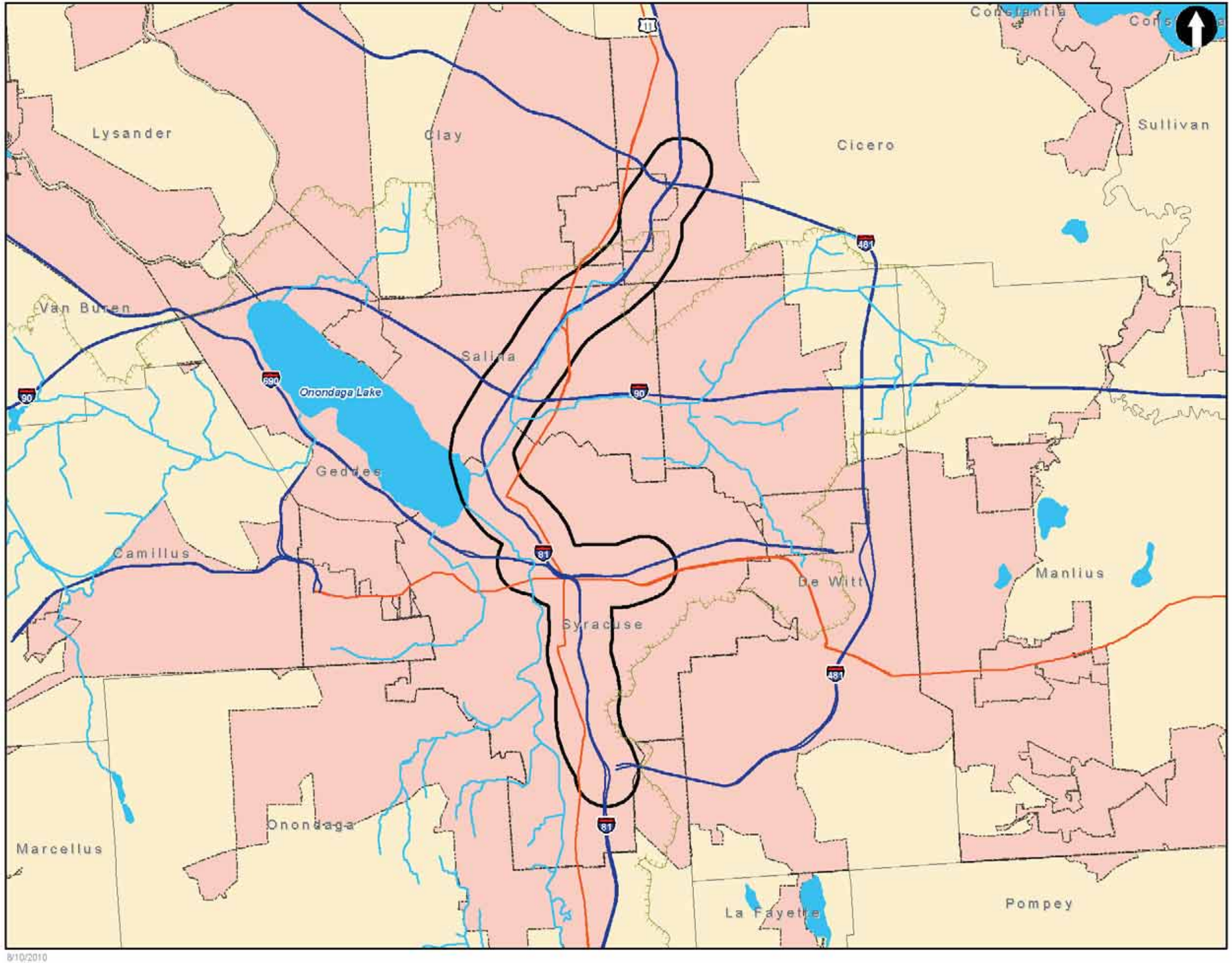
The Syracuse Urbanized Area (SUA), which includes portions of Onondaga County, fits the population threshold and density criteria regulated under Phase II of the Storm Water Program and therefore the 35 municipalities that fall within the boundaries of the urbanized area are required to obtain coverage under the SPDES MS4 stormwater permit and comply with requirements of the permit. Figure 4.23 shows the boundary of the SUA MS4 in relation to the Primary I-81 Corridor SEE Study Area.

NYSDOT is a regulated small Municipal MS4. Within the primary I-81 SEE Study Area, the MS4 has been designated by NYSDEC as “Automatic” for the SUA because of the sensitivity of Onondaga Lake, Onondaga Creek, and other critical surface waterways and water bodies. Because of the types and severity of pollutants that can be transported by stormwater runoff and deposited into local surface waters, MS4s in urbanized areas are required to obtain a SPDES permit to control discharges from sewage and wastewater treatment plants, as well as from construction activities. As a first step toward obtaining SPDES permit coverage, NYSDOT submitted a Notice of Intent (NOI) form to DEC on March 10, 2003. The NOI provided an initial outline of planned management practices and identified measurable goals to assess annual progress toward the full implementation of an appropriate stormwater management program.

The latest Annual Report prepared by NYSDOT covers the period from March 2009 through March 2010; this report serves as an evaluation of the NYSDOT’s statewide storm water program, including operations in highway planning, design, construction and maintenance. It provides information regarding the development and implementation of stormwater pollution prevention activities conducted statewide by NYSDOT.

Interstate 81 Corridor Assessment

Storm Water



Legend

- Primary Study Area
- MS4 Boundary
- Onondaga Lake Watershed Improvement Strategy Area
- Municipal Boundary
- Open Water

DRAFT

0 1 2 3 Miles

8/10/2010

Original in Color FHI

The Annual Report describes NYSDOT's efforts to protect the public's interest in the environment while maintaining the safety of the traveling public and discusses specific measures NYSDOT has taken to implement the strategies to control pollutants during the planning, design, construction and maintenance of projects. Regulated MS4s are required to develop a Stormwater Management Program (SWMP) that includes six Minimum Control Measures, including:

1. Public Education and Outreach on Stormwater Impacts
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management
6. Pollution Prevention/Good Housekeeping For Municipal Operations

NYSDOT has also taken several other steps to control stormwater discharges and minimize water pollution. Some of the NYSDOT programs and policies are highlighted below:

- NYSDOT Outfall Inventory – consists of an inventory of all sewer and culvert outfalls not only within the state, but also within the SUA. This inventory includes field verification (with GPS) and GIS mapping of each outfall and culverts as well as a description of discharges into receiving waters. As of March 2010, 18,184 outfalls (or 100 percent) across the state had been mapped. It should be noted that outfalls are inspected on a regular basis.
- Highway Design Manual, Chapter 8 - This manual describes NYSDOT's policies and procedures regarding drainage on NYSDOT's construction projects. These policies ensure that NYSDOT's drainage systems are designed and constructed to protect the highway, adjacent landowners, and the traveling public from the hazards associated with water, while maintaining water quality and protecting other environmental, social, and cultural resources. Guidelines for the creation of Stormwater Pollution Prevention Plans (SWPPPs) are contained in this chapter.
- ECOPAC - NYSDOT has a policy that requires all projects to complete an "Environmental Commitments and Obligations Package (ECOPAC). ECOPAC requires all project designers to verify that all environmental considerations on a project have been addressed, to convey this information to Construction staff and for Construction staff to verify that all environmental commitments have been addressed. The ECOPAC Engineering Bulletin has been reissued as an Engineering Instruction and has been updated to include Designer consideration of Illicit Discharge Detection and Elimination during project development, Construction consideration during project construction and reporting, as appropriate, in the State Agency Environmental Audit.
- Model Regional Erosion & Sediment Control Program - NYSDOT has identified how its Erosion and Sediment Control Program (including the design, implementation, and quality control of its Erosion and Sediment Control Plans) is conducted within each region. In order to improve its program at both the state and regional level, NYSDOT has taken the best components of all of the various regional programs to create a draft

model Regional Erosion and Sediment Control Program. The model provides a shell of a program that each region can modify to fit it into the region's internal structure.

- Construction Inspection Manual (CIM), Section 209 – This portion of the CIM provides guidance to construction field staff on the proper implementation of SWPPPs. This guidance is currently being revised to include procedures to address SPDES Phase II requirements. This guidance is intended for all projects that require Erosion and Sediment Control Plans, including projects that do not require coverage under the SPDES General Permit GP-02-01. Included in this guidance are standardized certification and report forms to be used by regional field staff to ensure compliance with permit requirements.
- Quality Control/Quality Assurance Construction Reviews – These reviews are conducted by Main Office and regional staff on NYSDOT construction projects, and serve many purposes:
  - To assess the project's compliance with SPDES general permit requirements
  - To identify strengths and weaknesses in NYSDOT's implementation of its Erosion and Sediment Control and Stormwater Management Program from the planning stage through design and construction stages
  - To provide feedback to people in the Main Office that develop policy on erosion and sediment control and stormwater management, with the intent of improving subsequent policy/specification development.

Adopted in August 2010, the New York State Department of Environmental Conservation's (NYSDEC) *New York State Stormwater Management Design Manual* provides designers with a general overview on how to size, design, select, and locate stormwater management practices at a development site to comply with State stormwater performance standards. This manual is a key component of the Phase II State Pollution Discharge Elimination System (SPDES) general permit for stormwater runoff from construction activities from all sizes of disturbance. Permits that are issued in the future for construction site runoff will rely heavily on this newly adopted version of the manual and the practices that are described therein. Adherence to the criteria and practices described in the manual will better ensure a successful implementation of stormwater controls and compliance with the SPDES general permit(s) issued for construction site runoff and maintaining water quality.

The purpose of the manual is threefold:

1. To protect the waters of the State of New York from the adverse impacts of urban stormwater runoff.
2. To provide design standards on the most effective stormwater management approaches including:
   - Incorporation of green infrastructure achieved by infiltration, groundwater recharge, reuse, recycle, evaporation/evapotranspiration through the use of green infrastructure techniques as a standard practice;
   - Design and implementation of standard stormwater management practices (SMPs);
   - Implementation of a good operation, inspection, and maintenance program.

3. To improve the quality of green infrastructure and SMPs constructed in the State, specifically about their performance, longevity, safety, ease of maintenance, community acceptance and environmental benefit.

Changes from the previous version of the manual include the incorporation of green infrastructure design criteria, specific performance criteria and specifications for the design of the structural SMPs, guidance regarding SMP selection and practices, alternatives approaches to stormwater management from redevelopment projects, as well as design standards for "enhanced phosphorus removal" for projects in phosphorus-limited watersheds.

Relative to the I-81 Corridor Study, the manual includes the following:

- Stormwater runoff volumes from new development or redevelopment projects cannot be greater than pre-construction conditions. The manual presents techniques for determining the best practices and green infrastructure that can be used to reduce stormwater volumes from urban development and redevelopment projects.
- Performance criteria for each of the five groups (e.g., ponds, wetlands, infiltration practices, filtering systems, and open channels) of structural SMPs to meet water treatment goals.
- Several matrices that can assist the designer in screening SMPs for various proposed land uses, including the best practices to treat runoff from major roads and highway systems. This section also identifies which SMPs are most effective at removing or filtering phosphorous runoff before it enters lakes.
- Approaches to stormwater management for redevelopment projects. Per the manual redevelopment projects include the reconstruction of or modification to any existing, previously developed land such as residential, commercial, industrial, institutional or road/highway, which involves soil disturbance; redevelopment specifically applies to constructed areas with impervious surface. Stormwater management practices in redevelopment should follow an approach to balance between 1) maximizing improvements in site design that can reduce the impacts of stormwater runoff, and 2) providing a maximum level of on-site treatment that is feasible given the redevelopment project site constraints.

The manual also includes a special section regarding design standards for "enhanced phosphorus removal" for projects in phosphorus-limited watersheds. The manual encourages the use of upstream controls as a primary means for reducing runoff volumes and their associated pollutant loads. Enhanced phosphorus treatment specifically refers to a measurable, significant improvement in phosphorus-treatment performance over the design methodology used for standard stormwater management practices. The manual presents design criteria, sizing standards, performance criteria for each of the structural SMPs. The following goals have been established as metrics for determining appropriate criteria for enhanced phosphorus removal:

- Goal 1 - Reduce runoff volumes by requiring that each project assess the feasibility of hydrological source controls and, where feasible, implement those source controls. For each proposed plan, provide the reasons for acceptance and rejection of the various controls.
- Goal 2 - Achieve less than 15 percent treatment bypass of the long-term runoff volume. This goal is defined by running a continuous simulation model that ensures that the SMP does not effectively bypass more than 15 percent of the runoff from the site.
- Goal 3 - For flows that are treated by the system (i.e., flows that are not effectively bypassed), median effluent concentration of particulate phosphorus shall be at or below 0.1 mg/L. This effluent concentration of particulate phosphorus is equivalent to a net removal of particulate phosphorus of 80 percent, given a median influent concentration of 0.5 mg/L.
- Goal 4 - For flows that are treated by the system (i.e., flows that are not effectively bypassed) the median effluent concentration of dissolved phosphorus shall be at or below 0.06 mg/L. This effluent concentration of dissolved phosphorus is equivalent to a net removal of dissolved phosphorus of 60 percent, given a median influent concentration of 0.15 mg/L.

The alternative sizing criteria and design standards/criteria presented in Chapter 10 of the manual are intended to serve as an acceptable means for achieving the above stated goals.

Onondaga County has developed, and is implementing, a Stormwater Management Program designed to address pollutants of concern (POCs) and reduce the discharge of pollutants from the MS4 to the maximum extent practicable (MEP), protect water quality, satisfy water quality requirements of the NYS Environmental Conservation Law and Federal Clean Water Act.

The current Phase II MS4 Stormwater General Permit became effective May 1, 2008. In the new permit, Onondaga County and the other regulated MS4s in the Onondaga Lake Watershed are also required to implement a Watershed Improvement Strategy (limits as shown in Figure 4.23). Additional stormwater management practices in the portion of the MS4 within the Onondaga Lake Watershed – toward achieving compliance with Total Maximum Daily Load (TMDL) requirements established by the DEC and approved by the U.S. Environmental Protection Agency to meet waste load allocations of the pollutant of concern, phosphorus, to Onondaga Lake.

In 2009, Onondaga County initiated the “Save the Rain” campaign to educate the public and enhance urban settings by building and developing green infrastructure throughout the community. The campaign aims to raise the public’s awareness and understanding of what they can do to help reduce storm water runoff and improve the environment through the use of:

- Rain barrels;
- Rain gardens;
- Porous pavement;

- Green roofs;
- Cisterns and
- Bioswale

Since 1998, the County has completed over 30 "gray" projects to improve sewage conveyance and treatment at a cost of over $300 million to date. As a result, the community has seen major improvements in the water quality of Onondaga Lake with dramatically reduced levels of phosphorus and ammonia resulting in increased water clarity, increased oxygen levels and decreased algae.

As part of its "Save the Rain" Program Onondaga County is embarking on a two-year demonstration program, the Green Improvement Fund ("GIF"), to provide financial assistance for the installation of Green Infrastructure projects on eligible privately owned properties (commercial, business, and 501(c)3 owned properties) in the Clinton/Harbor Brook combined sewersheds in the City of Syracuse.

- Eligible property owners in the Clinton, Harbor Brook and Midland sewersheds can apply to receive grant funding in the amount of:
- Up to 100 percent of Eligible Costs, with a maximum assistance of $100,000 per applicant for a single project and no more than $250,000 per applicant for multiple projects.
- Grant funding will ONLY cover costs for the installation of Green Infrastructure solutions above and beyond traditional (not green) construction practices including: design and engineering costs, maintenance plan and construction costs.
- Onondaga County will select projects that closely meet GIF program goals based on selection criteria.

Other activities and programs undertaken by Onondaga County to reduce stormwater discharge and improve water quality include but are not limited to:

- The County implemented an Urban Best Management Practices (UBMP) project funded by the Onondaga Lake Partnership. The program was comprised of the following three elements: 1) Work with educators in the Syracuse City School District; 2) Media; and 3) Expanded UBMP website. In 2006, the County purchased billboards and newspaper ads to provide the public with a list of practices to keep debris out of storm drains and help keep Onondaga Lake clean.
- The County continues to implement the three-point plan initiated in 2001 to reduce litter in the community. Referred to as "Cleaner & Greener," the program is intended to set an example, promote community awareness and stimulate projects and activities to reduce litter in the community. While the program focus is appealing to many in the community for the aesthetic benefits it produces, there is a direct benefit to receiving waters due to a reduction in floatables.
- The County continues to promote public awareness with its policies for litter and pet waste control in Onondaga Lake, Jamesville Beach and Oneida Shores Parks. The

Onondaga County Parks Department maintains its programs of providing bags for pet waste, pet waste receptacles and informational displays in these parks to encourage sound pet waste management practices. The Department also maintains displays in the parks explaining the "Carry in/Carry out" policy to promote proper handling of trash.

- Each year, the County carries out its annual Free Leaf Bag program to reduce sources of urban pollution to Onondaga Lake. Use of the biodegradable leaf bags keeps leaves out of the city sewers where they take up space, clog storm drains, disrupt treatment processes and cause discharges from combined sewer overflows into Onondaga Creek and Harbor Brook. Since the program began in 2002, over 100,000 leaf bags have been distributed to City of Syracuse residents.
- The County Department of Water Environment Protection (WEP) conducts weekly inspections of critical areas along drainage district channels and flood retention basins to identify and remove blockages, litter and debris, and report unusual discharges of water to the NYSDEC Division of Water. The Department deploys laboratory field technicians to sample the source of unusual discharges.
- GIS outfall mapping along County highway infrastructure and with County parks in the SUA was initiated in 2005 and completed in 2006.

4.4.9 General Ecology and Wildlife Resources

Information related to wildlife resources was developed based on the database of the NYSDEC Natural Heritage Program (NHP). The resources were not mapped due to the sensitive nature of the information per NYSDEC Division of Natural Resources. The NHP provided a report of rare or state-listed animals and plants, significant natural communities and other significant habitats, which may potentially exist on or in the immediate vicinity of the I-81 Corridor Study. Based on information received from Natural Heritage, the most sensitive area, where sensitive plant and/or animal species have been identified is along the I-81 corridor, from south of I-690 to south of I-481 along with the area between I-690/I-81/Thruway including Onondaga Lake. Six Federally listed species (including one candidate species) and additional State-listed species have been identified in the NHP database as potentially found within or in close proximity to the study area.

4.4.10 Critical Environmental Areas

There are no designated Critical Environmental Areas located within the study area.

4.4.11 Historic and Cultural Resources

In many ways, Onondaga Lake and, later, the Erie Canal, shaped the cultural and economic history of the City of Syracuse and surrounding communities. As such, a variety of historic and archaeological resources have been previously reported in the SEE Study Area, particularly in the vicinity of these historic waterways. These resources range from prehistoric villages and encampments to historic buildings and structures that date to the early 20th century (U.S. Army Corps of Engineers [Corps] 1996).

4.4.11.1 Legislation and Regulatory Framework

Federal, state, and local statutes governing the protection of historic properties have applicability to the potential study strategies (alternatives) which will be under consideration for the I-81 Corridor. The following statutes are listed to provide an overview of the regulatory and legislative framework that provides protection for historic and cultural properties. See Appendix F for a brief discussion of each statute.

- *The National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq.) (as amended)*
- *36 CFR § 800-The Protection of Historic Properties*
- *American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996) (as amended)*
- *Section 4(f) of the United States Department of Transportation Act (49 U.S.C. 303) (as amended)*
- *New York State Historic Preservation Act of 1980 (Article 14 of the New York State Parks, Recreation and Historic Preservation Law)*
- *Section 233 of the New York State Education Law*
- *City of Syracuse Zoning Ordinance (Part C, Section VII–Historic Preservation)*

4.4.11.2 National Heritage Areas

National Heritage Areas are designated by Congress and administered through a partnership between the U.S. National Park Service (NPS) and local coordinating entities. The goal of the National Heritage Area Program is to expand on traditional approaches to conservation by supporting large-scale, community centered initiatives that engage citizens in the preservation and planning process. While National Heritage Areas contain historic resources listed in or eligible for inclusion in the National Register, the heritage areas themselves are not considered historic properties as defined in 36 CFR § 800.16(l).

The Erie Canalway National Heritage area encompasses the SEE Study Area and includes all 234 municipalities adjoining the 524 miles of navigable waterway that comprise the New York State Canal System. Considered one of the most successful and significant works of civil engineering in North America, the Erie Canal served as a vital artery for the transportation of goods and people during 19th and early 20th centuries (NPS 2006). A map of the area can be found at www.eriecanalway.gov.

Today, the historic Erie Canalway provides opportunities for heritage tourism and recreation. Many of the historic buildings and structures within the City of Syracuse and nearby communities are clustered along the former alignment of the canal. Several of these resources, including Franklin Square and the Syracuse Inner Harbor, are located adjacent to I-81 and I-690 in downtown Syracuse. One of the most significant attractions associated with the Erie Canalway National Heritage Corridor–the Erie Canal Museum (ECM)–is located just south of I-81 in the former Weighlock Building, along Erie Boulevard East in downtown Syracuse.

Maintaining the historic character of the Canalway is an important component of the Heritage Area Program. The Erie Canalway National Heritage Corridor Commission is the

managing body for this National Heritage Area. The Erie Canalway National Heritage Corridor Commission should be contacted in the future to determine if the project is compatible with the existing Erie Canalway National Heritage Corridor Preservation and Management Plan (NPS 2007).

4.4.11.3 New York State Heritage Areas

The SEE Study Area also includes the Syracuse Heritage Area, a New York State Heritage Area designated under Article 35 of the New York State Parks, Recreation and Historic Preservation Law. The State Heritage Area system was created by state legislation in 1982 with the mission to develop, preserve, and promote the state's cultural and natural resources (OPRHP 2007). Although the State Heritage System is delegated to the OPRHP, State Heritage Areas are managed through a unique partnership among state and local governments, non-governmental organizations (NGOs), and the private sector, with guidance from the state Heritage Advisory Council (OPRHP 2007). Similar to the National Heritage Areas, State Heritage Areas also contain properties listed in or eligible for inclusion in the National Register, but the areas themselves are not considered historic properties.

The Syracuse Heritage Area focuses on the original trade and banking centers in present-day downtown Syracuse and highlights the unique historical and cultural features of downtown Syracuse. These features are located in areas that were the economic and cultural center of the region during the height of the Erie Canal. Features that comprise the Heritage Area include Clinton Square, Hanover Square, Columbus Circle, Salina Street, and Armory Square. Clinton Square, Hanover Square, and Columbus Circle are located almost immediately south of I-690 in downtown Syracuse. Salina Street includes a recognized historic district north of the elevated roadway. Armory Square is located further south of I-690 in downtown Syracuse.

4.4.11.4 Syracuse Local Preservation Districts and Local Protected Sites

At a local level, the City of Syracuse has designated several Local Preservation Districts and Protected Sites (individually listed properties) that include historic buildings and structures. The Syracuse Landmark Preservation Board is authorized by the City of Syracuse Zoning Ordinance to regulate any material changes to the appearance of these protected properties.

Several City of Syracuse Local Preservation Districts are located within the SEE Study Area, but are not adjacent to the viaduct. These resources include the Sedgwick/Highland/James Preservation District, and the Berkeley Park Preservation District. Both the Columbus Circle Preservation District and the Hanover Square Preservation District are located south of I-690 in downtown Syracuse. See Appendix F for maps of the area.

4.4.11.5 Section 106 of the National Historic Preservation Act/Section 14.09 of the New York State Historic Preservation Act

Although previous studies have identified several historic and archaeological resources in the SEE Study Area, the varying levels of analyses and investigation conducted for these

studies have resulted in vastly different degrees of reporting and evaluation from study to study. At one end of this spectrum, resources within the SEE Study Area include "historic properties" that have been listed in or determined to be eligible for inclusion in the National Register of Historic Places (National Register). The National Register Criteria for Evaluation (36 CFR § 60.4) provides that a building, structure, site, district, or individual object may be considered eligible for the National Register if it is significant in American history, architecture, archaeology, engineering, or culture. The quality of significance is present in historic properties that possess integrity of location, design, setting, materials, workmanship, feeling, or association and:

- That are associated with events that have made a significant contribution to the broad patterns of our history; or
- That are associated with the lives of persons significant in our past; or
- That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant or distinguishable entity whose components may lack individual distinction; or
- That have yielded or may be likely to yield, information important in prehistory or history.

Section 106 of the National Historic Preservation Act, as amended (Section 106), requires federal agencies to consider the effects of their undertakings on historic properties that have been listed in or determined to be eligible for inclusion in the National Register. Within the SEE Study Area, these properties include:

- Prehistoric and historic period archaeological sites;
- Historic districts and their contributing resources; and
- Individual buildings, structures, and objects.

Resources within the SEE Study Area also include properties listed in or eligible for inclusion in the New York State Register of Historic Places (State Register), established under Section 14.09 of the New York State Historic Preservation Act of 1980 (Section 14.09). The State Register is maintained by the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP). All historic properties within the State of New York listed in or nominated for inclusion in the National Register are concurrently listed in the State Register. The State Register also includes a limited number of properties that have not been listed on the National Register but have been recognized as significant by New York State.

Other sites reported within in the SEE Study Area have not been subject to the same level of study or evaluation, in the past, as properties listed in or determined eligible for inclusion in the State or National Registers. The nature and quality of available data regarding these unevaluated sites often varies significantly. In several instances, documentation regarding the integrity or geographical boundaries of these sites was not collected or is not presently available. Several archaeological sites recorded by professional or vocational archaeologists during the early 20th century (prior to the enactment of the National Historic Preservation Act of 1966) fall into this category. In some instances, these resources may potentially be

eligible for inclusion in the National Register. However, in many cases, the integrity of these reported sites may be compromised or their geographical extents inaccurately reported. In either case, there is insufficient information currently available regarding these sites to make a recommendation or determination regarding their eligibility.

Archaeological Resources

Archaeological resources within the SEE Study Area include identified and reported historic and prehistoric archaeological sites. Appendix F includes an overview of the prehistoric and historic periods to provide a context for site types that occur or are likely to occur within the Social, Economic and Environmental Study Area.

In total, 54 archaeological sites have been reported within the Social, Economic and Environmental Study Area. Of these sites, 4 have been determined by the SHPO to be eligible for inclusion in the National Register, and 17 have been previously evaluated as ineligible for inclusion. The National Register eligibility of the remaining 33 sites reported in both the NYSM and OPRHP site files has not been determined. Archaeological sites reported in the NYSM and OPRHP sites files have been compiled; however, information regarding the location and nature of historic properties is considered confidential. The National Historic Preservation Act and the New York State Historic Preservation Act protect detailed information regarding these resources from public distribution. Consequently, specific data regarding the location and nature of historic properties within the study area have been included in a separate and confidential appendix to this report (Attachment-F). At the discretion of the NYSDOT, Attachment F may be made available to appropriate parties upon request.

Additional studies may be necessary to identify historic properties that may be affected by this proposed project. The viaduct is located in what is considered an archaeologically sensitive area, thus may require further investigation.

Future Archaeological resource investigations should be conducted in accordance with the requirements of 36 CFR § 800 and the New York Archaeological Council's 1994 Standards for Cultural Resource Investigation and the Curation of Archaeological Collections in New York State (adopted by the SHPO). At minimum, these studies should include a Phase IA Literature Search and Sensitivity Assessment and Phase IB Subsurface Investigations of those sections that may be directly affected by ground-disturbing activities. Pursuant to Section 106, the SHPO, the Onondaga Nation, and the public should be consulted regarding these studies. The NYSDOT, in consultation with the aforementioned parties, should develop appropriate measures to avoid, minimize, or mitigate the project's adverse effects to properties listed in or eligible for inclusion in the National Register should they be encountered.

The American Indian Religious Freedom Act (AIRFA) of 1978 (42 U.S.C. 1996) establishes a policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian,

Eskimo, Aleut, and Native Hawaiians. This includes but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites. In contrast to Section 106, AIRFA protects the rights of Native Americans to access sacred religious sites regardless of a site's National Register status.

Architectural Resources

The City of Syracuse is home to several historic buildings, structures, and districts that reflect elements of major architectural movements spanning a period of over 100 years. Many of these significant resources were constructed during the heyday of the Erie Canal, and they reflect the city's important role as a center of commerce and capital during the mid-to-late 1800s and early 1900s. Examples of architectural styles on display within the SEE Study Area range from 1830s Greek Revival buildings along East Water Street to the modernist Onondaga County War Memorial (Hardin 1993). Other notable buildings within the city include the I.M. Pei-designed Everson Museum of Art and the Niagara Mohawk Building (a *tour-de-force* of Art Deco design) near Armory Square.

Several historic buildings, structures, and districts are concentrated west of I-81 in an area of downtown Syracuse roughly bounded by I-690 to the north, East Adams Street to the south, and Onondaga Creek to the west. Historic architectural resources that are listed in the National Register border this section of the corridor. East of I-81, several historic properties are located along portions of East Genesee Street and in the University Hill neighborhood of Syracuse. These resources include Oakwood Cemetery, Thornden Park, and historic buildings and structures associated with Syracuse University. A smaller concentration of significant historic properties is located north of I-690 in an area bounded by I-81 to the west and Lodi Street to the east and north. A Map presenting the location historic buildings, structures, and districts listed in the National Register shown in Figure 4.24.

As the I-81 corridor passes through the city, it passes over the route of the historic Erie Canal. Many of the buildings and structures that border the highway corridor were constructed between 1830 and 1890 and evidence the economic prosperity of Syracuse during the canal period. In total, 59 historic buildings, structures, districts, and objects within the Social, Economic and Environmental Study Area have been listed in the National Register.

On March 10, 2005 the National Advisory Council of Historic Preservation adopted the Section 106 exemption regarding effects to the Interstate highway system. This exemption excludes the majority of the 46,700 mile Interstate System from consideration as a historic property under Section 106. Some exemptions to the exemption were made with this legislation however; none are located in the Primary Study Area.

Historic Canals

The Erie Canal is eligible for inclusion in the National Register. A formal National Register nomination for this resource is currently in preparation. While extant portions of the canal

exist within the SEE Study Area, these remnants are primarily located south of the I-81 corridor in downtown Syracuse.

4.4.11.6 Section 4(f) Resources

Section 4(f) of the United States Department of Transportation Act of 1966 prohibits the FHWA and other U.S. Department of Transportation agencies from approving the use of publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply:

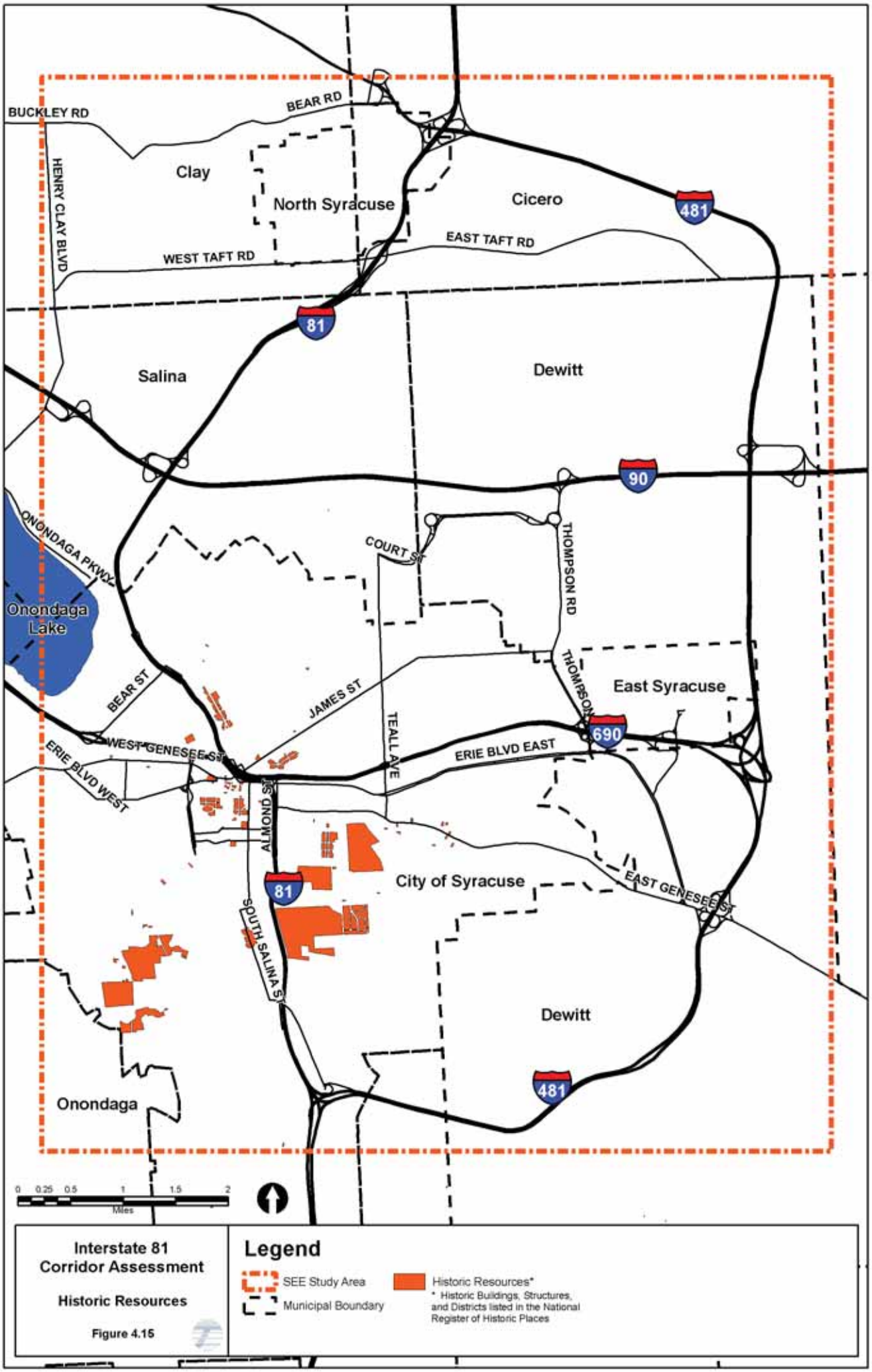
- There is no prudent and feasible alternative to using that land;
- The program or project includes all possible planning to minimize harm to the public park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use; and
- The use, including any measures to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures) will have a de minimis impact on the property.

Historic properties within the SEE Study Area that are listed in or are eligible for inclusion in the National Register are subject to the provisions of Section 4(f). During the design phase (Phase I-IV), a Section 4(f) evaluation of historic resources will be performed. This evaluation may be affected by this undertaking to (a) identify prudent and feasible alternative to activities that may affect identified resources; (b) document planning measures undertaken to minimize harm to historic sites resulting from the use; or (c) identify any measures to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures) that will result in a *de minimis* impact on the property. For this corridor study, this information will be used as "constraints" in the strategy (alternative) development process.

On August 10, 2005 the Safe Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETY-LU) become public law and included a provision (Section 6007) that exempts the bulk of the Interstate Highway System from consideration as a historic resource under Section 4(f) of the Department of Transportation Act.

4.4.12 Parks and Recreational Resources

The City of Syracuse and adjacent municipalities within the SEE Study Area have an extensive park system. Most public parks and recreational areas are not located adjacent to the interstate highways or arterial roads within the Social, Economic and Environmental Study Area. Major parks in the Social, Economic and Environmental Study Area include Burnet Park, Elmwood Park, Kirk Park, Meachem Field, Onondaga Park, Schiller Park, Sunnycrest Park, Thornden Park, and Clark Reservation State Park (Social, Economic and Environmental Figure 4.25). A full list is shown in Table 4.11.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ONONDAGA PKWY
COURT ST
THOMPSON RD
Onondaga Lake
BEAR ST
JAMES ST
East Syracuse
THOMPSON
690
WEST GENESEE ST
ERIE BLVD EAST
ERIE BLVD WEST
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City of Syracuse
EAST GENESEE ST
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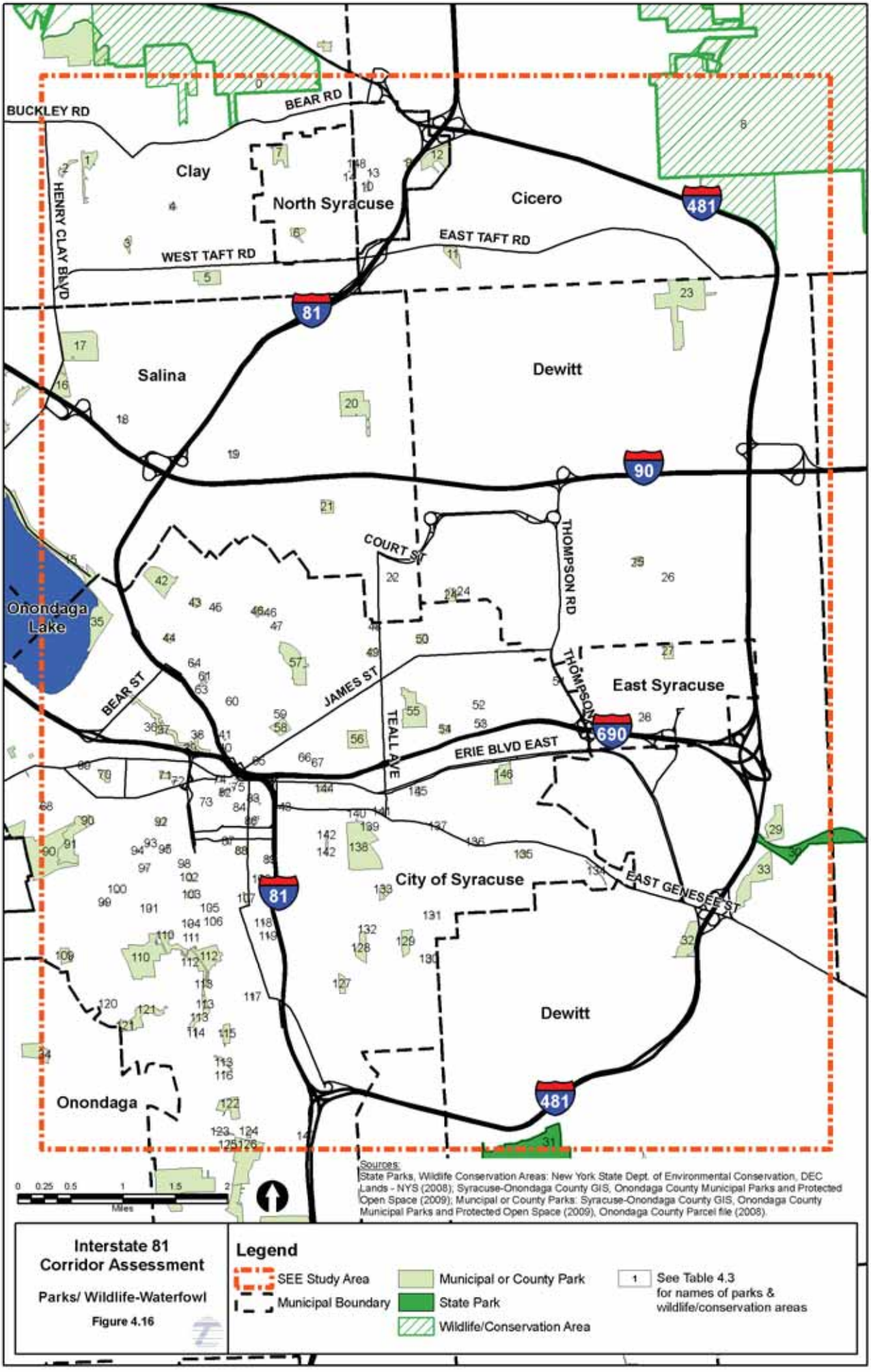
SOUTH SALINA ST
Dewitt
481
Onondaga
0 0.25 0.5 1 1.5 2
Miles
Interstate 81
Corridor Assessment
Historic Resources
Figure 4.15
Legend
SEE Study Area
Municipal Boundary
Historic Resources*
* Historic Buildings, Structures, and Districts listed in the National Register of Historic Places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Onondaga Lake
BEAR ST
JAMES ST
TEALL AVE
ERIE BLVD EAST
East Syracuse
City of Syracuse
EAST GENESEE ST
Onondaga
481
81
90
690
Sources:
State Parks, Wildlife Conservation Areas: New York State Dept. of Environmental Conservation, DEC Lands - NYS (2008); Syracuse-Onondaga County GIS, Onondaga County Municipal Parks and Protected Open Space (2009); Muncipal or County Parks: Syracuse-Onondaga County GIS, Onondaga County Municipal Parks and Protected Open Space (2009), Onondaga County Parcel file (2008).
0 0.25 0.5 1 1.5 2
Miles
Interstate 81
Corridor Assessment
Parks/ Wildlife-Waterfowl
Figure 4.16
Legend
SEE Study Area
Municipal Boundary
Municipal or County Park
State Park
Wildlife/Conservation Area
1 See Table 4.3 for names of parks & wildlife/conservation areas

Table 4.11 Parks & Wildlife / Conservation Areas

Map Reference	Name
0	CLAY MARSH STATE WILDLIFE MANAGEMENT AREA
1	CLEARVIEW PARK
2	CLAIRMONT PARK
3	MERRILL FARMS PARK
4	BRIARWOOD PARK
5	CLAY PARK SOUTH
6	LONERGAN PARK
7	HERITAGE PARK
8	CICERO SWAMP STATE WILDLIFE MANAGEMENT AREA
9	KENNEDY PARK
10	CENTERVILLE PARK
11	SKYWAY PARK
12	SLEETH PARK
13	MEMORIAL PARK
14	GOETTEL PARK
15	ONONDAGA LAKE PARK
16	ELECTRONICS PARKWAY PARK
17	HOPKINS ROAD PARK
18	PRIMROSE PARK
19	RICHFIELD PARK
20	BURNHAM PARK
21	SEHR PARK
22	SCHAFFER PARK
23	MAXWELL PARK
24	NORWOOD PARK
25	FRANKLIN PARK
26	DUNROVIN PARK
27	ELLIS PARK
28	BAGG STREET PARK
29	RYDER PARK
30	CEDAR BAY PARK
31	CLARK RESERVATION STATE PARK
32	RICHARDS PARK
33	BUTTERNUT CREEK NATURE AREA
34	SANTARO PARK
35	ONONDAGA LAKE PARK
36	WHITE OAKS PARK
37	CREEKWALK AREA
38	FRANKLIN SQUARE PARK
39	PLUM ST. CIRCLE
40	ASHLAND PARK
41	SCHLOSSER PARK
42	ALLIANCE BANK STADIUM
43	FIRST WARD CEMETERY
44	WASHINGTON SQUARE PARK
45	ALVORD PARK
46	MCCHESNEY PARK
47	DUGUID PARK
48	FEIGEL PARK
49	GRAY AVENUE PARK
50	CUMMINGS FIELD
51	GLENCOVE PARK
52	EASTWOOD SENIOR CENTER
53	SHERIDAN PLAYGROUND
54	HUNTINGTON PARK
55	SUNNYCREST PARK
56	LINCOLN PARK
57	SCHILLER PARK
58	ROSE HILL
59	HIGHLAND PARK
60	AMOS PARK
61	DEMONG PARK
62	UPPER UNION PARK
63	UNION PARK
64	GROSSO PARK
65	BAGG PLACE PARK
66	CLINTON PLAYGROUND
67	FINNEGAN PARK
68	TIPPERARY HILL PARK
69	PULASKI & KOSCIUSKO PARK
70	FRAZER PARK
71	LEAVENWORTH PARK
72	BARKER SQUARE
73	ARMORY SQUARE PARK
74	CLINTON SQUARE
75	CITY PLACE
76	BRUCE PARK
77	VANDERBILT SQUARE
78	PERSEVERANCE PARK
79	LINCOLN PLAZA
80	PITTS PARK
81	HANOVER SQUARE
82	IDA BENDERSON SENIOR CENTER
83	FAYETTE FIREFIGHTERS MEMORIAL PARK
84	COLUMBUS CIRCLE
85	GENESEE TOWNSEND PLAZA

Map Reference	Name
86	COMMUNITY PLAZA
87	BILLINGS PARK
88	ROESLER PARK
89	WILSON PARK
90	BURNET PARK
91	ROSAMOND GIFFORD ZOO
92	SKIDDY PARK
93	SEYMOUR PLAYGROUND
94	SHONNARD PLAYSCAPE
95	WARD BAKERY PARK
96	SHONNARD STREET CENTER
97	GRACE PLAYSCAPE
98	TRINITY PARK
99	ONONDAGA-GEDDES PLAYGROUND
100	ELLIOTT PARK
101	MERRY WIDOW PARK
102	JUBILEE PARK
103	SOUTHWEST COMMUNITY CENTER
104	ONONDAGA CREEK PARK
105	BLAINE PLAYLOT
106	FURMAN PARK
107	CASTLE & STATE PARK
108	CENTRAL VILLAGE YOUTH CENTER
109	WADSWORTH PARK
110	ONONDAGA PARK
111	CITY PARK
112	KIRK PARK
113	ONONDAGA CREEK BLVD. PARK
114	ONONDAGA CREEK PARK
115	MCKINLEY PARK
116	ABBOTT PARK

Map Reference	Name
117	CANNON STREET PARK
118	DANFORTH PARK
119	BAKER PLAYGROUND
120	GLENWOOD PARK
121	ELMWOOD PARK
122	VAN DUYN FIELD
123	ONONDAGA VILLAGE GREEN
124	BOB CECILE SR. CENTER AND PLAYGROUND
125	ACADEMY GREEN PARK
126	MEACHEM FIELD
127	COMFORT TYLER PARK
128	MORNINGSIDE HEIGHTS PARK
129	BARRY PARK
130	SHERMAN FIELD
131	CUMBERLAND PARK
132	BERKELEY PARK
133	WESTMINSTER PARK
134	DEWITT PARK
135	NOTTINGHAM COURTS
136	EDGEHILL PARK
137	SALT SPRINGS PARK
138	THORNDEN PARK
139	LODI CEMETERY
140	FORBES PARK
141	COLUMBUS PARK
142	COMSTOCK PARK
143	FORMAN PARK
144	SPENCER PARK
145	WESTMORELAND PARK
146	HOMER WHEATON PARK
147	ARSENAL PARK
148	VETERANS MEMORIAL PARK

4.4.13 Visual Resources

The I-81 Corridor in the City of Syracuse is a significant visual element within the primary study area. It is particularly prominent in downtown where the I-81 / I-690 interchange rises well above the surface street network and most downtown buildings. Similarly, the Viaduct is an elevated highway, which runs between downtown, and University Hill with Almond Street running underneath and numerous east-west cross streets. The visual environment for the I-81 corridor can be reviewed by looking first at the "viewshed" areas within the corridor and then analyzing these viewsheds relative to the viewer groups (residents, pedestrians/bicyclists and visitors/tourists) and the viewer sensitivity. We have identified 5 distinct viewsheds for the I-81 corridor as follows:

View of I-81/I-690 Interchange

Viaduct looking south

- **Southern Section**: I-481 South interchange to the Viaduct: this area is typified as an open highway with views of the highway more visible from the west than the east due to the rising terrain (west to east).
- **Viaduct Section**: This section is an elevated highway with Almond Street and its connecting ramps (Adams/Harrison interchange) running parallel and underneath I-81 for most of its length. 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.
- **I-81/I-690 Interchange Area:** this area is elevated approximately 20 feet above the downtown area terrain, occupies a significant land mass and accommodates numerous local street crossings underneath.
- **I-81/I-690 Interchange to Carousel Center**: This area transitions to a "sunken" roadway section where the highway is below the adjacent terrain and typically "out of view". The land use is industrial and open space (Harbor) on the west and commercial; residential on the east.
- **Carousel Center to I-481 North Interchange**: As the highway crosses the north city line, it transitions to open highway section. User views are not prominent in this section of the highway, excluding highway users, and the land use is open/semi-rural.

4.4.14 Farmlands

A major portion of the Social, Economic and Environmental Study Area is an urban area with no prime or unique farmland, or farmland of statewide importance.[6] The entire length of I-690 within the Social, Economic and Environmental Study Area is also within these urban limits. The USDA soil types are shown in Figure 4.26 and areas with soils comprising prime farmland or farmland of statewide importance are located along portions of I-81, especially north of the I-690 interchange (Social, Economic and Environmental Figure 4.27). Table 4.4 in the appendix provides a listing of the USDA soils within the study area.

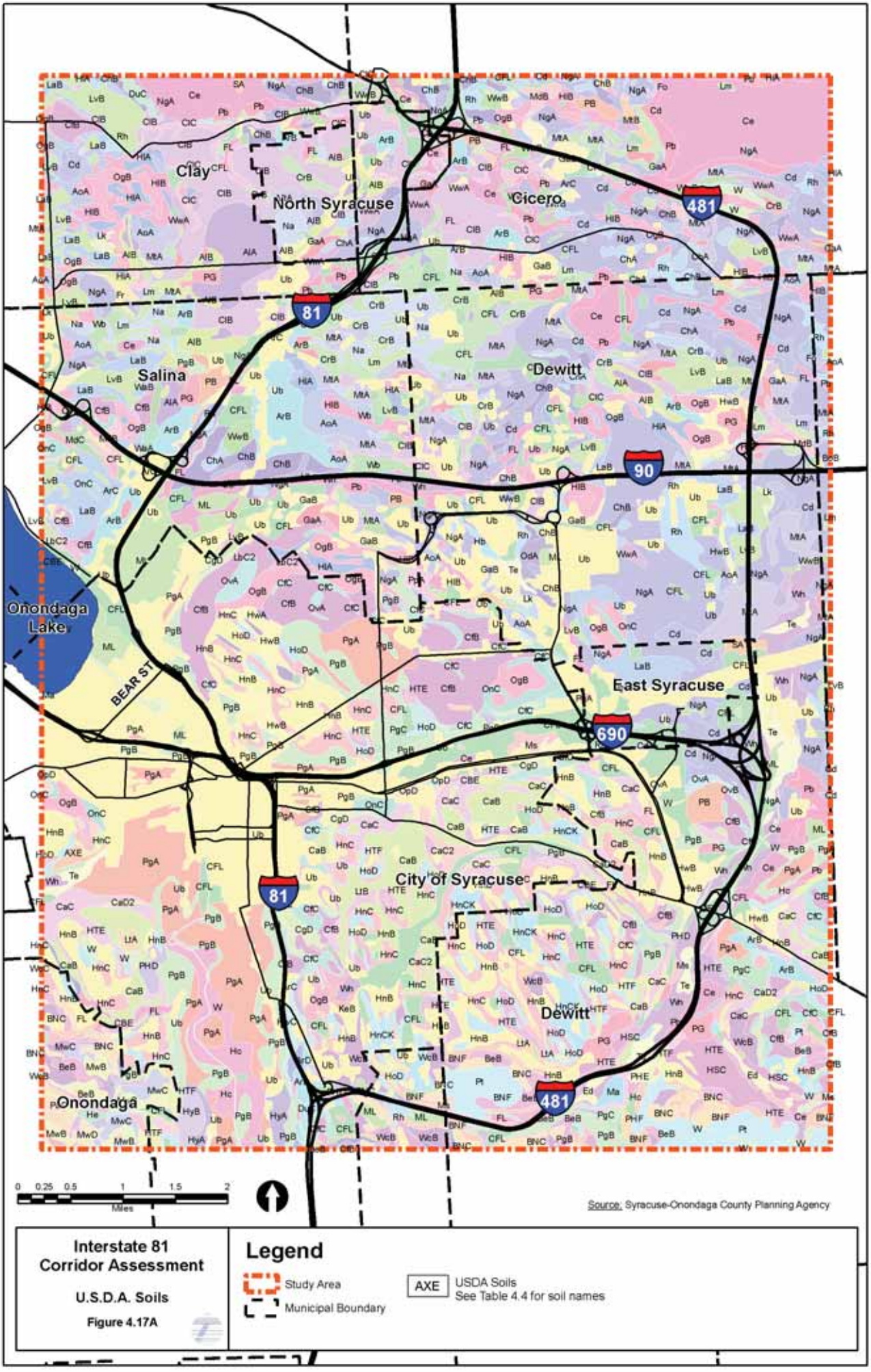
4.4.15 Air Quality

Since the corridor improvements will most likely modify the transportation network, the principal concern for the effect on air quality is related to mobile sources of emissions in relation to sensitive land use. According to the NYSDOT Environmental Procedures Manual, public open spaces—including sidewalks, playgrounds, athletic fields, outdoor sports facilities, and public parks—residential buildings, educational facilities, and health facilities are considered especially sensitive to air quality. Such sites within the Social, Economic and Environmental Study Area are mapped in Figure 4.28, based on the 2008 real property database maintained by SOCPA. Residential land uses are located along portions of I-81, I-690 and I-481. Major healthcare and educational facilities are located east of I-81 in an area bounded by East Genesee Street to the north, Oakwood Cemetery to the south and Thornden Park to the east. We have also collected information from two NYSDEC Air Monitoring Locations and plotted them on the figure.

Refined studies of air and noise conditions will be developed as *The I-81 Challenge* study progresses. Air quality studies will be reviewed on a regional basis to maintain and/or improve the Syracuse MPA's status as a maintenance area. When an area transitions from a non-attainment to an attainment designation as Syracuse has, it is subject to two 10 year maintenance plans that demonstrate the area will remain in attainment for the 10 year periods of each plan. The air quality screening will be developed using the SMTC Regional Travel Demand Model outputs to approximate and compare the existing and future no build scenario to possible development strategies. These will be presented on a region wide basis per the SMTC model. This information will document air quality and green house gas information.

These screenings will include a review of construction impacts and will identify procedural requirements for future air quality studies in the future preliminary engineering and EIS phases.

[6] Source: http://www.ongov.net/planning/documents/farm_plan_1997/Appendix%20A1%20-%20Soils%20Map.pdf


Clay
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East Syracuse
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481
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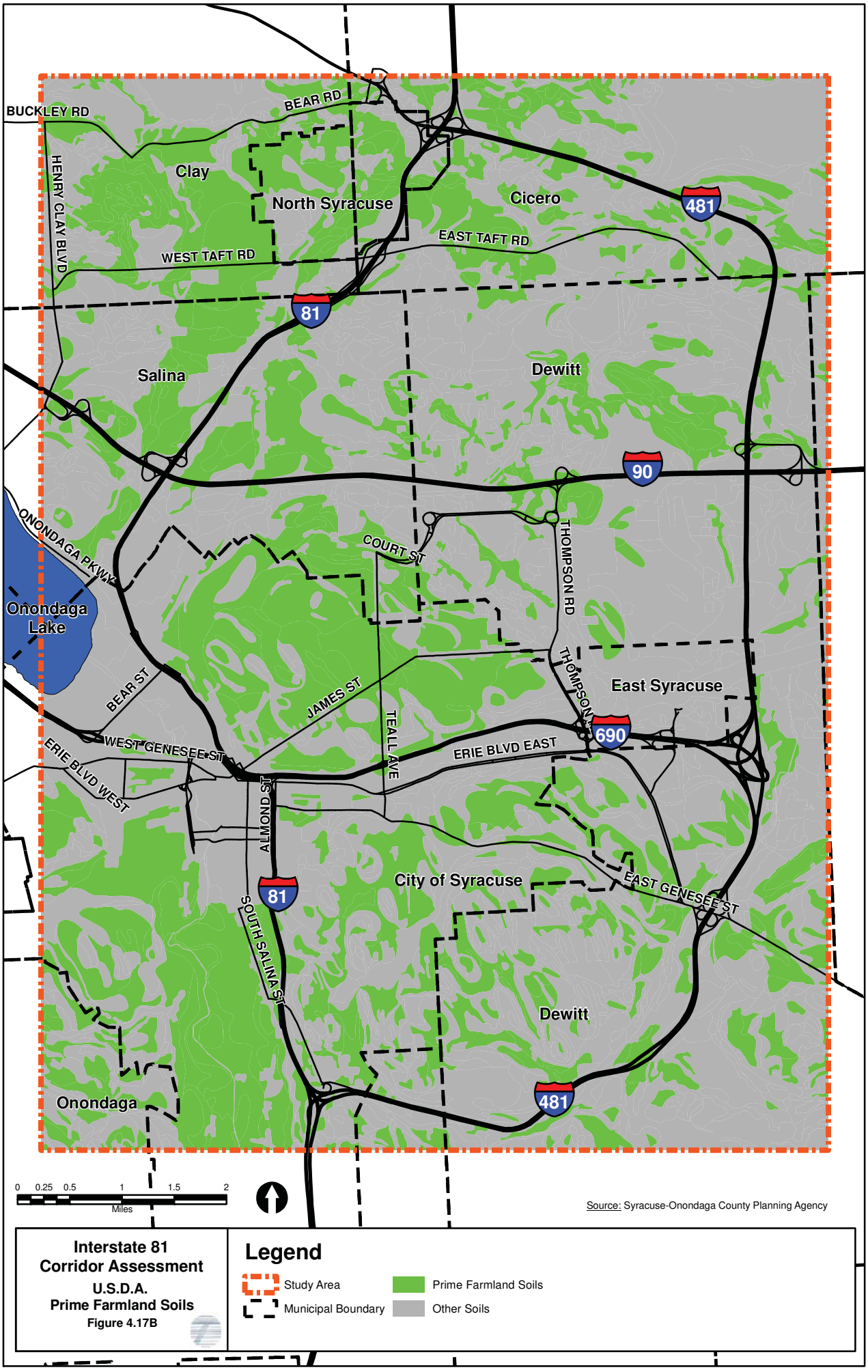
0 0.25 0.5 1 1.5 2
Miles
Source: Syracuse-Onondaga County Planning Agency
Interstate 81 Corridor Assessment
U.S.D.A. Soils
Figure 4.17A
Legend
Study Area
Municipal Boundary
AXE
USDA Soils
See Table 4.4 for soil names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Dewitt
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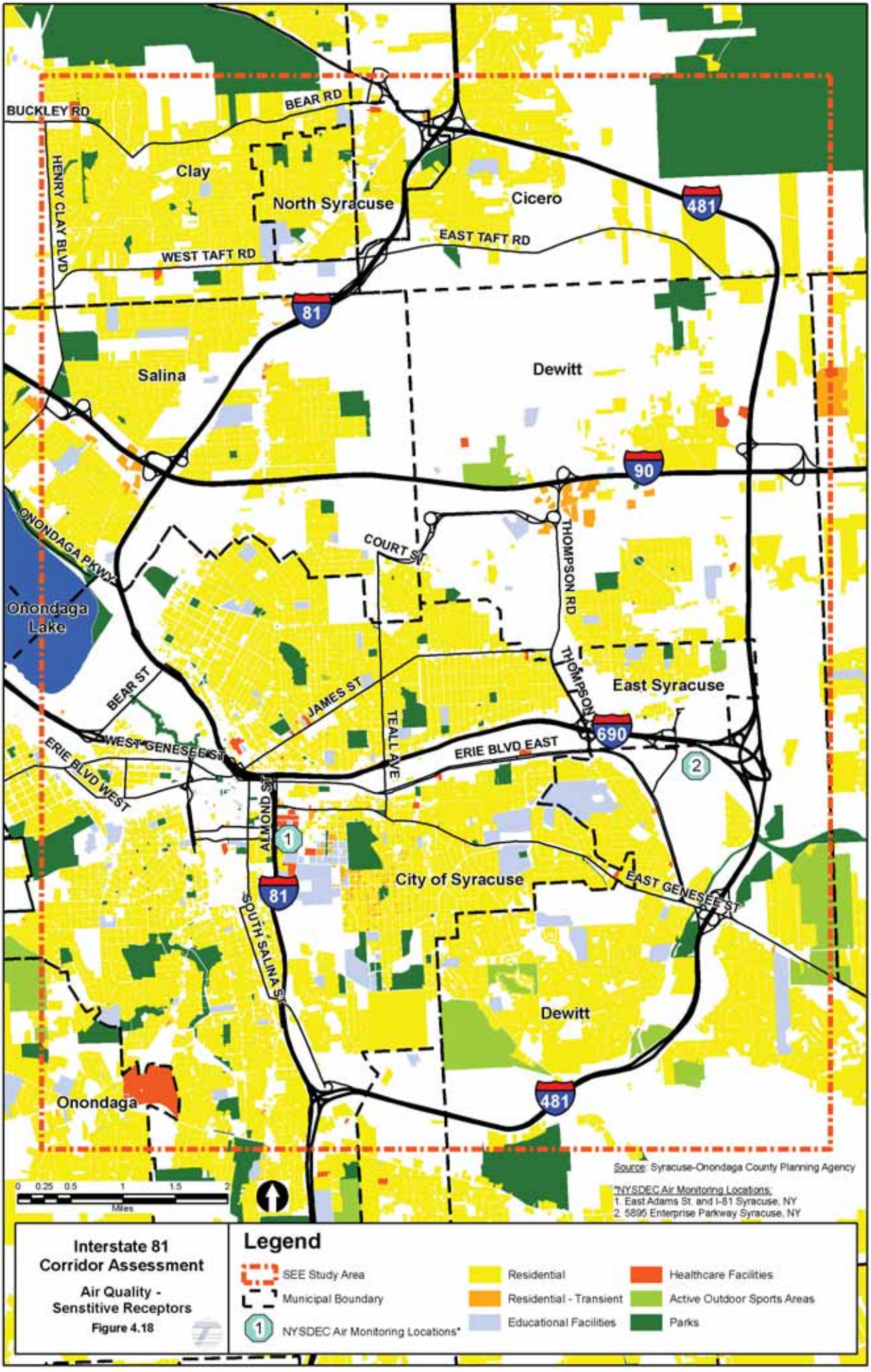
COURT ST
THOMPSON RD
Onondaga Lake
BEAR ST
JAMES ST
TEALL AVE
East Syracuse
690
WEST GENESEE ST
ERIE BLVD EAST
ERIE BLVD WEST
ALMOND ST
City of Syracuse
EAST GENESEE ST
SOUTH SALINA ST
Dewitt
Onondaga
481
0 0.25 0.5 1 1.5 2
Miles
Source: Syracuse-Onondaga County Planning Agency
Interstate 81
Corridor Assessment
U.S.D.A.
Prime Farmland Soils
Figure 4.17B
Legend
Study Area
Municipal Boundary
Prime Farmland Soils
Other Soils


BUCKLEY RD
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Onondaga Lake
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JAMES ST
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East Syracuse
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City of Syracuse
EAST GENESEE ST
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SOUTH SALINA ST
Dewitt
Onondaga
481
0 0.25 0.5 1 1.5 2
Miles
Source: Syracuse-Onondaga County Planning Agency
*NYSDEC Air Monitoring Locations:
1. East Adams St. and I-81 Syracuse, NY
2. 5895 Enterprise Parkway Syracuse, NY
Interstate 81
Corridor Assessment
Air Quality -
Senstitive Receptors
Figure 4.18
Legend
SEE Study Area
Municipal Boundary
1 NYSDEC Air Monitoring Locations*
Residential
Residential - Transient
Educational Facilities
Healthcare Facilities
Active Outdoor Sports Areas
Parks

4.4.16 Energy

Energy Assessment will be developed using the SMTC Regional Travel Demand Model outputs and a region wide comparison of conditions comparing development scenarios (alternatives) to existing and the future no build alternative. In addition to increased vehicle miles per travel (VMT) approximate fuel consumption and respective pricing will be examined along with travel times for each alternative.

4.4.17 Noise

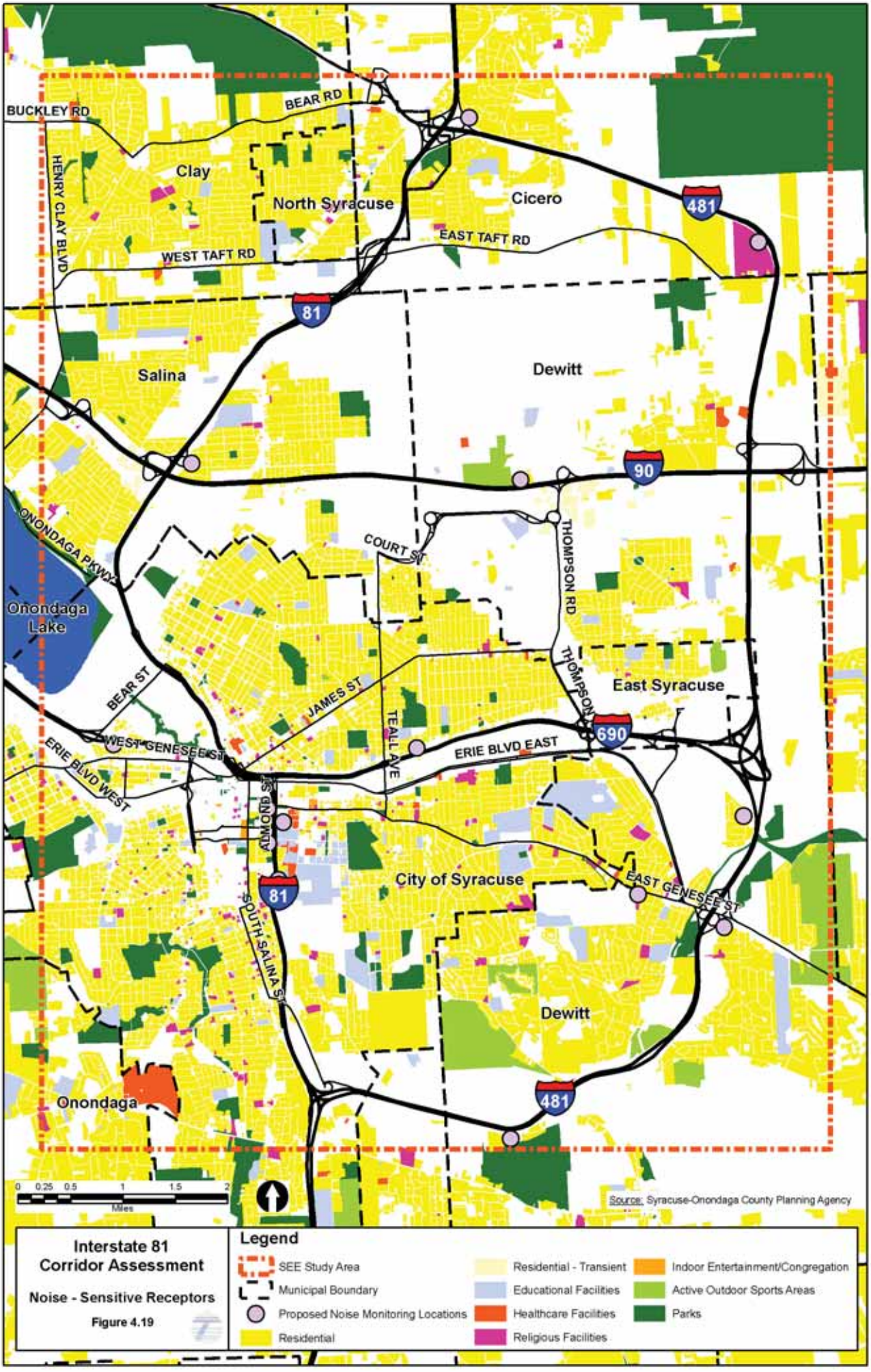
Noise sensitive receptors were identified in conformance with the NYSDOT Environmental Procedures Manual. These predominantly included residential land uses throughout the Social, Economic and Environmental Study Area. Residential land uses are located along portions of I-81, I-690, I-481, and Genesee Street. Healthcare and educational facilities are concentrated east of I-81 in an area bound by East Genesee Street to the north, Oakwood Cemetery to the south and Thornden Park to the east. Noise-sensitive land uses in the Social, Economic and Environmental Study Area are mapped in Figure 4.29, based on the 2008 real property database maintained by SOCPA. Such land uses along I-81, I-481, I-690, I-90, and East Genesee Street were verified in a field survey on October 30, 2009. A noise measurement program has been recently approved by the NYSDOT and includes collecting existing noise locations along the corridor. These measurements will be taken in the fall of 2010 and the proposed locations are shown on Figure 4.29. This information will be modeled and used to screen noise effects in strategic development phases of this study.

The data in the table below is reference information for future use and shows the L_{eq} noise levels above which noise abatement may be considered. The L_{eq} is a one hour duration of noise based on decibel readings from a noise meter. Since the existing noise level information has not been collected yet, no existing condition comparison can be performed at this time.

Table 4.12 – Federal Highway Administration - Noise Abatement Criteria

Activity Category	L_{eq} for Noisiest Traffic Hour	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purposes.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: Highway Traffic Noise in the United States, USDOT, FHWA, April 1986.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ERIE BLVD WEST
ONONDAGA ST
City of Syracuse
EAST GENESEE ST
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SOUTH SALINA ST
Dewitt
Onondaga
481
0 0.25 0.5 1 1.5 2
Miles
Source: Syracuse-Onondaga County Planning Agency
Interstate 81
Corridor Assessment
Noise - Sensitive Receptors
Figure 4.19
Legend
SEE Study Area
Municipal Boundary
Proposed Noise Monitoring Locations
Residential
Residential - Transient
Educational Facilities
Healthcare Facilities
Religious Facilities
Indoor Entertainment/Congregation
Active Outdoor Sports Areas
Parks

4.4.18 Asbestos

A detailed asbestos investigation has not been prepared for the project study area. It is anticipated that asbestos may be encountered in the course of future bridge construction. Common areas where asbestos may be present on bridges of this era include sheet packing, tarpaper wrap, caulking compounds, "Dum-Dum" paint on steel members, and utility pipes and conduits. In the event that bridge or building modification or demolition is required, a detailed asbestos assessment will be performed on the specific structures removed during the preliminary engineering (Phase I-IV) phase of the project.

4.4.19 Contaminated and Hazardous Materials

This Hazardous Waste/Contaminated Materials Screening report has been prepared for the Interstate 81 Corridor Assessment, located in the Town of Cicero, Village of North Syracuse, Town of Clay, Town of Salina, and City of Syracuse, Onondaga County, New York. This preliminary screening follows guidelines set forth in Chapter 5.1 of the New York State Department of Transportation (NYSDOT) Environmental Procedures Manual, excepting that no site visit was conducted as part of the Corridor Assessment. The full screening report is included in Appendix F.

This Hazardous Waste/Contaminated Materials Screening involved the following sources of data collection:

- Past Land Use Research–including a review of historical aerial photographs.
- An environmental regulatory database report, prepared by EDR, was obtained to assist in identifying recognized environmental conditions at the site. This database covers Federal, State and Local registry data.

Historic Land Use (Primary Study Area and Adjacent Properties) – the following sources of data collection were used:

- Historical Aerial Photographs
- Historic Sanborn Fire Insurance Maps
- Historic Topographic Maps

A detailed Hazardous Waste / Contaminated Materials Screening is provided in Appendix F.

Summary: Review of the Primary Study Area indicates there are a significant number of identified environmental database sites located in the general area of the I-81/I-690 interchange and this extends north to Onondaga Lake and south along the Viaduct and further south to I-481, see Figure 4.30. From a review of this information, we have identified sites of potential concern that consider their location, pollution source and their position relative to the probable ground water gradient.

Based on their proximity, there are several sites of potential concern located near the I-81 Corridor:

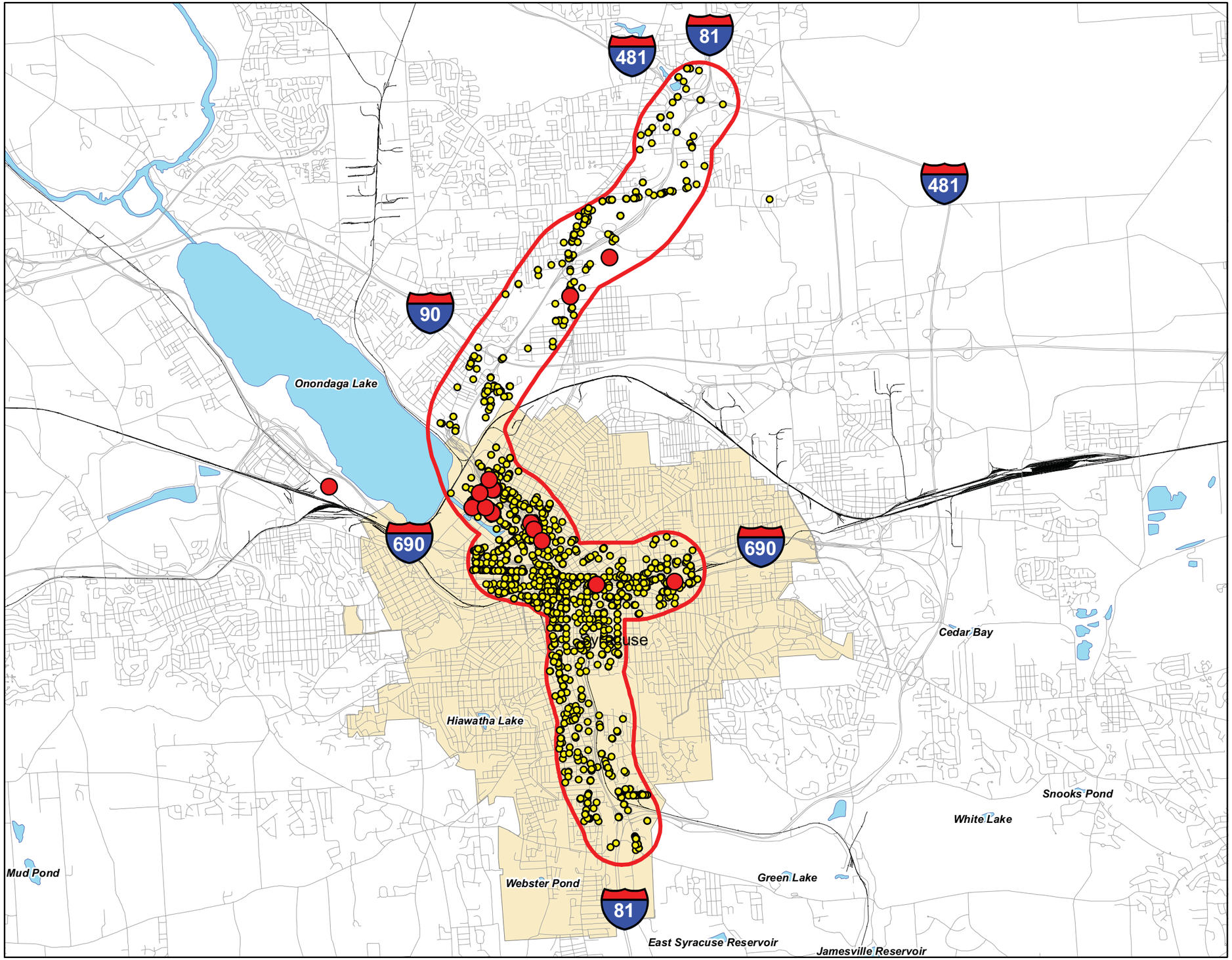
- The Onondaga Lake Sediments located at Onondaga Lake, 1,200± feet west of the primary study area. Based on topographic gradient, it is anticipated that groundwater flow in the vicinity of this facility will be to the west, away from the primary study area.
- Quanta Resources Site – USEPA Region 2 located at 2802-2810 Lodi Street, adjacent to the east and up-gradient from the primary study area.
- The Winkleman Property located at 101-113 Greenway Avenue, adjacent to the south and up-gradient from the primary study area.
- Triad Technologies Inc located at 105 Spencer Street, adjacent and down-gradient from the primary study area.
- Former Greyhound Bus Terminal located at 815 Erie Boulevard East, adjacent to the south and up-gradient from the primary study area.
- PBS Towing located at 1201 N State Street, adjacent to the northeast and up-gradient from the primary study area.
- US Air Fuel Storage Facility located at Hancock International Airport, adjacent to the southeast and up-gradient from the primary study area.
- Several Major Oil Storage Facility sites (Sun Syracuse Marketing Terminal located at 301 W. Hiawatha Boulevard, Syracuse Atlantic Terminal located at 540 Solar Street, and Mobil Oil Corporation Syracuse located at 502 Solar Street) are located adjacent to the southwest and down-gradient from the primary study area.
- Exxon Mobil #11915 located at 2723 Brewerton Rd, adjacent and upgradient from the primary study area.
- Andys Cycle located at 921 N State Street, adjacent and upgradient from the primary study area. Andys cycle building was demolished in Spring of 2010. No additional information is currently available on the site contamination.

Detailed information on each of these concern sites is provided in Appendix F that includes a list of the identified environmental database sites and EPA ID numbers. Additional areas of concern identified based on the Historic Land Use Screening will likely be in the following general areas – such as the Erie Canal Corridor, the Oil City Area, or the New York Central Rail Yard area. Once strategies are under development an in-depth review of the past land use specific to each alternative will be conducted.

Given the numerous orphan sites in close proximity to the primary study area, there is the potential that historic or current activities within the areas identified in the preceding list may have impacted soil and/or groundwater within or adjacent to the primary study area. Further investigations in these areas are warranted in future phases of the project. The information collected herein will be used to screen future development scenarios (alternatives) for hazardous waste considerations.

Interstate 81 Corridor Assessment

Identified Environmental Database Sites



Legend

- Areas of Concern
- Identified Environmental Database Sites
- Railroad
- Waterways
- City

Note: Areas of Concern do not include the Erie Canal Corridor or the New York Central Railroad Areas

0 0.5 1 2

Miles

OVERALL FIGURE 1

Stantec

4/16/2010

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