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# Memo

**To:** Exit 20 Corridor Advisory Committee  
**From:** Don Adams, P.E., Wendy Cimino, P.E.  
**CC:**  
**Date:** December 11, 2009  
**Re:** US Route 9/Glen Lake Road/Six Flags Drive  
**Project:** Exit 20 Corridor Management Plan

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Since the publication of the *Exit 20 Corridor Management Plan* in September 2009, it was brought to Creighton Manning Engineering's (CME) attention that the New York State Department of Transportation (NYSDOT) made adjustments to the traffic signal at the US Route 9/Glen Lake Road/Six Flags Drive intersection. The need to make adjustments to the signal system at this intersection was noted during CME's field observations and was also brought to the Committee's attention during first public workshop held in September 2008. Prior to the initiation of the public process, the existing conditions at this intersection were documented in the report. However, modifications were made to the intersection by NYSDOT shortly after the September 2008 public workshop and reported to the advisory committee and public at the second public meeting in February 2009.

The purpose of this memorandum is to amend the statements made in the report indicating that the existing signal system is in need of modification. It was not the intention of the document to state that the NYSDOT was not properly maintaining the signal system, only that traffic conditions may have changed to the extent that required updates. After NYSDOT made modifications to the intersection and advised the committee, the report was inadvertently left as originally drafted.

Please attach this memorandum to your copy of the document to provide the proper updated information on this intersection.

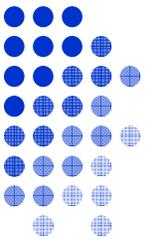
# Exit 20 Corridor Management Plan

Town of Queensbury,  
Warren County, New York

*Prepared For:*

**A/GFTC**

Adirondack/Glens Falls Transportation Council  
Washington County Municipal Center, A-231  
383 Broadway  
Fort Edward, NY 12828



*Prepared By:*

*September 2009*



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## Executive Summary

The Adirondack/Glens Falls Transportation Council (A/GFTC) initiated this *Corridor Management Study for the Exit 20 Interchange Area* (Exit 20 Corridor Management Plan) within Warren County, New York. The study focuses on the US Route 9 corridor in and around Interstate 87 (I-87) Exit 20 in the Town of Queensbury, New York. The study area corridor encompasses an approximate 2-mile segment of US Route 9, from Round Pond Road to ¼ mile north of NY Route 149. It also includes Gurney Lane from West Mountain Road to US Route 9. The key study area corridor has been identified as the area of US Route 9 from the Exit 20 Northbound (NB) Ramps to NY Route 149.

Key issues include traffic safety and capacity along the corridor; access management, the seasonal nature of traffic, and known and proposed development in the area. Long-term capacity issues are identified, although large scale corridor widening is not considered a viable alternative due to the potential for significant property impacts, environmental impacts, construction costs, and degradation to the character of the area.

The goal of the study is to develop a comprehensive and implementable recommendation plan consistent with local planning and development objectives that includes evaluation and recommendations for study area intersections, improved accommodations for pedestrians, bicyclists, and public transit, congestion and accident mitigation strategies. The study recommendations shall consider future development of the corridor consistent with current zoning. The study will identify a comprehensive list of smaller-scale improvements to improve traffic circulation in the corridor in addition to a conceptual level of detail for larger-scale improvements.

### Existing Conditions

Traffic volumes through the study area are highly seasonal due to the recreational nature of the surrounding area with the Great Escape within the project corridor and Lake George to the north. Traffic volumes peak during the summer months on Saturday during heavy regional arrival periods. Although other peak travel times occur through the study corridor as a result of other special events (i.e., Adirondack Balloon Festival) or seasonal travel (i.e., ski traffic to/from Vermont), the peak summer conditions formed the basis for the study.

The results of the existing conditions assessment indicate that there is a need to identify capacity and operational improvements within the corridor, specifically in the key corridor along US Route 9 between the I-87 Exit 20 NB Ramps and NY Route 149. It is noted that the existing Saturday peak hour traffic volumes are similar to Friday peak hour traffic volumes based on automatic traffic recorder (ATR) data indicating that poor intersection operations exist during other weekday and weekend periods during the peak conditions.

### Future Development Volumes

The Exit 20 corridor has been subject to recent and on-going development pressure. The Queensbury Planning Department identified six individual development projects that are under consideration by the Town. In addition, six potential future development areas were identified. Both short-term (5 year) and long-term (20 year) projections were assessed in the study with the estimated time of completion (ETC) considered the existing 2008 condition. The study evaluated three future land use/traffic volume scenarios that included a combination of background growth and the approved/potential future developments and are as follows:

- A short-term, ETC +5 year condition including growth expected from approved development projects.
- A long-term, ETC +20 year condition including growth expected from approved development projects (low-growth).
- A long-term, ETC +20 year condition expanded to include additional potential growth from future potential development projects in the corridor (high-growth).

A review of the volumes indicate that when compared to the 2008 Existing traffic volumes, the 2013 Future traffic volumes show an increase in volumes of approximately 10%. In the 2028 Future traffic volume scenarios, the volumes increase by approximately 27% in the Low Growth scenario and range from 33% to 48% in the High Growth scenario.

## Potential Improvements

**Intersection and Corridor Improvements** – The study identifies a number of short and long-term capacity and safety alternatives for the 2-mile segment of US Route 9. The study included analysis of seven intersections; four signalized and three unsignalized. Table E.1 outlines specific intersection and corridor related improvements identified in the study corridor. Each improvement alternative is described in more detail in the main report. The project recommendations were developed to preserve and improve the safety and capacity of area roadways through arterial management and context sensitive improvements. Final improvements should be multi-modal and also support pedestrians, bicyclists and transit.

The study also outlines four improvement alternatives for the Gurney Lane intersection with the I-87 southbound ramps which includes an option for reconfiguring the interchange.

Two other interchange options were assessed and determined to not be feasible options for the corridor. These interchange options included a direct access into the Great Escape and a new interchange at NY Route 149.

**Other Feasible Improvements** – As part of the study, other feasible lower cost improvements were identified that should be considered in the study corridor to meet the goals of the project. Below is a brief summary of the potential improvements.

**Transit** – In the short-term, it is recommended that visible trolley stops for the seasonal trolleys be established in the key corridor. The trolley stops should feature benches and lighting that fit the character of the area with designated “trolley stop” signing. The more defined trolley stops will result in more efficient runs while visibly enhancing the pedestrian/transit friendliness of the corridor. This option is an enhancement to the current trolley system operated by the Greater Glens Falls Transit. Additional transit enhancement options may include the addition of park-and-ride lots to the north and south of the key corridor to capture passenger vehicles onto the transit system before traveling into the key corridor. It would be beneficial to use existing parking lots to avoid the creation of additional parking areas and would thus require lot agreements to be undertaken with individual property owners. This option could be pursued in numerous ways by both public or private entities.

**Table E.1- Summary of Intersection Related Improvements**

Intersection/ Corridor	Summary of Issues	Description of Alternative/Improvement	Cost	Advocacy Responsibility	Timing/ Priority
<b>Key Study Area Improvement Alternatives</b>					
US Route 9 Median Alternative	Conflicts from numerous driveways along Route 9 impact traffic flow through the corridor.	Install a raised median along the entire Route 9 corridor from Route 149 to the I-87 Exit 20 NB Ramp. This improvement would require that the roundabout option be pursued for each of the Key Study Corridor intersections.	\$5-6 Million	State/Fed, Town, Property Owners	Long-term
Back Access Alternative	Congestion on Route 9 will increase during peak conditions in the Key Study Area corridor due to approved and potential developments.	Construct a public road on the east side of Route 9 that connects Route 149 to I-87 Exit 20 NB Ramp. This corridor alternative assumes roundabout control at the two signalized intersections and unsignalized control at the Route 9/French Mountain Commons Drwy/Adirondack Factory Outlets Drwy intersection.	\$3.5-4 Million	Town, Property Owners, State/Fed	Long-term
Access Management Alternative	Conflicts from numerous driveways, lack of connectivity between parcels	Apply access management techniques in key corridor to include closure of driveways, consistent driveway layouts, cross-connections for vehicles and pedestrians	\$1.5 – 2 Million	Property Owners, Town, State/Fed	Short-term
<b>Individual Intersection Improvement Alternatives</b>					
US Route 9/NY Route 149	Intersection has existing capacity concerns. Capacity concerns continue through the 20 year condition.	Signalized Option - Construct additional WB left-turn lane, widen SB Route 9 departure to accommodate two left-turn movements, and re-stripe Route 9 for a NB left-turn lane.	\$1.5-2 Million	State/Federal, Town	Short-term
		Roundabout Option - Construct a two lane roundabout.	\$2-2.5 Million	State/Federal, Town	Short-term
US Route 9/French Mountain Commons Dwy/ Adirondack Factory Outlets Dwy	Minor street approaches have short-term (2008) and long-term capacity concerns (2028). Heavy pedestrian crossing.	Unsignalized Option - Do not change current intersection control and accept poor levels of service on the minor street approaches.	\$0	Property Owners, State/Fed	Short-term
		Roundabout Option - Construct a single lane roundabout.	\$1-1.5 Million	Property Owners, State/Fed	Long-term
US Route 9/I-87 Exit 20 NB Ramp	Intersection has existing capacity concerns. Capacity concerns continue through the 20 year condition.	Signalized Option - Construct additional EB left-turn lane, widen NB Route 9 departure to accommodate two left-turn movements, and convert the SB Route 9 right-turn lane into a shared through/right-turn lane.	\$1.5-2 Million	State/Federal, Town	Short-term
		Roundabout Option - Construct a two lane roundabout	\$2-2.5 Million	State/Federal, Town	Short-term

Intersection/ Corridor	Summary of Issues	Description of Alternative/Improvement	Cost	Advocacy Responsibility	Timing/ Priority
<b>Southern Study Area Improvement Alternatives</b>					
Gurney Lane/I-87 Exit 20 SB Ramp	Intersection has existing capacity concerns. Capacity concerns continue through the 20 year condition.	Signalized Option - (Low Growth) Provide separate SB left and right turn lanes and construct an exclusive WB left-turn lane on Gurney Lane by widening the bridge structure over I-87. (High Growth) Widen the I-87 On Ramp to accommodate two left-turn movements.	\$3.5-4 Million	Town (Development Conditions), State/Fed	Long-term
		Signalized Right-In/Right-Out Option - Modify intersection to provide only right-turns exiting the I-87 Exit 20 SB Off-Ramp and only right-turns movements onto the I-87 Exit 20 SB On-Ramp. This would require the construction of a roundabout at the Gurney Lane/West Mountain Road intersection.	\$2-2.5 Million	Town (Development Conditions), State/Fed	Long-term
		All-Way Stop Option - Install stop signs on all approaches. This intersection will continue to fail.	\$7,500	State/Federal, Town	Short-term
		Reconfigure SB Ramps with new SPI interchange	\$40-50 Million	State/Fed	Long-term
US Route 9/Gurney Lane	Intersection has long-term capacity concerns (beyond 2028).	Convert the SB Route 9 right-turn lane into a shared through/right-turn lane and extend it to the Glen Lake Road intersection.	\$350,000-400,000	Town, State/Fed	Long-term
US Route 9/Glen Lake Rd/Six Flags Dr	Intersection signal is not optimized	Improve signal timing.	\$0	State/Fed	Short-term
US Route 9/Round Pond Road	Intersection has long-term capacity concerns (2028).	Unsignalized Option – Construct separate SB left and right turn lanes on Round Pond Rd	\$75,000	Town (Development Conditions), State/Fed	Long-Term
		Signalized Option – Install an actuated traffic signal.	\$225,000-300,000	Town (Development Conditions), State/Fed	Long-Term

**Access Management** – Although an access management alternative has been defined in the corridor, it is important to maintain access management techniques throughout the corridor as development continues. Currently, the Town of Queensbury codes include guidelines on Access Management. These current standards provide specifics on the layout, location, and design of driveways as well as the number of driveways and spacing. These guidelines should be strictly adhered to by the Town in the approval and development of new sites and redevelopment of sites in the project corridor. It is further recommended that the Town of Queensbury adopt A/GFTC's *Access Management Study* as an additional support mechanism for the implementation of access management principles through the corridor.

**Signing Improvements** – The use of additional signing in the corridor to provide clearer directions for vehicles accessing areas/sites outside of the project corridor is a potential low cost alternative to assist in reducing congestion in the corridor. Potential areas of signing include variable message boards for use during times of excessive congestion leading vehicles destined to locations north of the site to use Exit 21, permanent signs indicating that it is not necessary to use Exit 20 to get to Lake George, and signing on NY Route 149 westbound encouraging people heading north to use Exit 21.

## Implementation

The implementation of the recommendations outlined in the study can occur in different stages and will take commitment and the coordinated effort on the part of the various agencies and land owners in the study area as outlined in Table E.1. The implementation of the larger scale long term improvements will require solicitation for funding. There may be the potential for NYSDOT to work with the Town and private land owners to identify funding sources for the capacity improvements at the study area intersections through the corridor. Implementation in this way would likely result from the advocacy of the Town or private land owners reaching out to NYSDOT for assistance and guidance. The funding could be obtained through means such as a Transportation Improvement Program (TIP) or a grant. This process will require applications to be submitted by either the Town or A/GFTC. Funding through public/private partnerships is also an option that could be pursued.

Other shorter-term recommendations could be implemented with a less defined process. For example, capacity improvements recommended at the US Route 9/Round Pond Road intersection may be the responsibility of the Great Escape as described in their Environmental Impact Statement (EIS). The Great Escape monitors the traffic conditions in the corridor annually to determine the need for this improvement based on their site generated traffic. However, if volumes in the project corridor increase due to other factors, this improvement may be initiated separately by the Town or NYSDOT. Improvements to accommodate increased transit ridership on the trolleys should be advanced directly by the Town of Queensbury in association with the Greater Glens Falls Transit.

# I. Introduction

## Study Overview

The Adirondack/Glens Falls Transportation Council (A/GFTC) initiated this *Corridor Management Study for the Exit 20 Interchange Area* (Exit 20 Corridor Management Plan) within Warren County, New York. The study focuses on the US Route 9 corridor in and around Interstate 87 (I-87) Exit 20 in the Town of Queensbury, New York. The study will result in a comprehensive list of smaller-scale improvements to improve traffic circulation in the corridor and a conceptual level of detail for larger-scale improvements.

The consultant team for the Project, Creighton Manning Engineering, LLP (CME) and GMB Engineers and Planners, Inc., P.C. (GMB), is responsible for organizing the vision and completing the *Exit 20 Corridor Management Plan*.

## Study Area

The Exit 20 Interchange area is located along US Route 9 east of I-87 just south and east of the Adirondack Park borders. The study area corridor encompasses an approximate 2-mile segment of US Route 9, from Round Pond Road to ¼ mile north of NY Route 149, in the Town of Queensbury as shown on Figure I-1. It also includes Gurney Lane from West Mountain Road to US Route 9. The key study area corridor has been identified as the area of US Route 9 from the Exit 20 Northbound (NB) Ramps to NY Route 149. The study will also investigate the feasibility of a new interchange for I-87 at the Great Escape and at NY Route 149. Figure I-2 outlines the project boundaries and key study area locations.

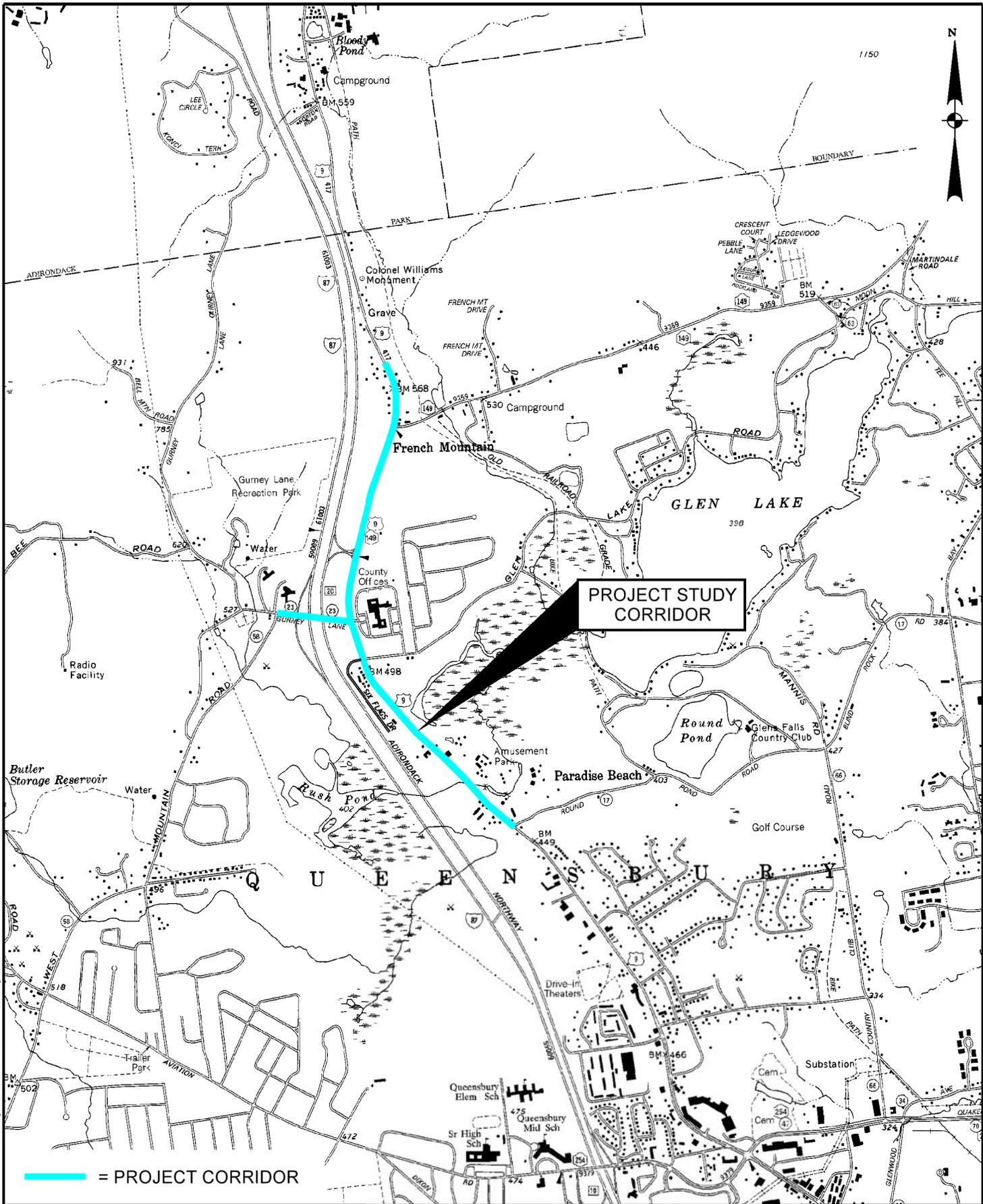
Key characteristics of the study area include the retail outlet shops along the stretch of US Route 9 referred to as “The Million Dollar Half-Mile”, the Great Escape amusement park and Lodge, and access to several campgrounds. Additionally, the northern end of the study area corridor is a connector link between I-87 and NY Route 149 for travel to and from Vermont and northern New England, a route commonly used by truck traffic.

## Study Goals

The goal of the study is to develop a comprehensive and implementable recommendation plan, consistent with local planning and development objectives that includes the following:

- Improved accommodations for pedestrians, bicyclists, and public transit
- Evaluation and recommendations for signalized intersections
- Congestion and accident mitigation strategies

The study will focus on strategies such as access management, land use recommendations, and roadway/interchange reconfigurations to meet the study goals. Both small and large scale recommendations plans will be provided in the study.



— = PROJECT CORRIDOR

REGIONAL STUDY AREA MAP

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK

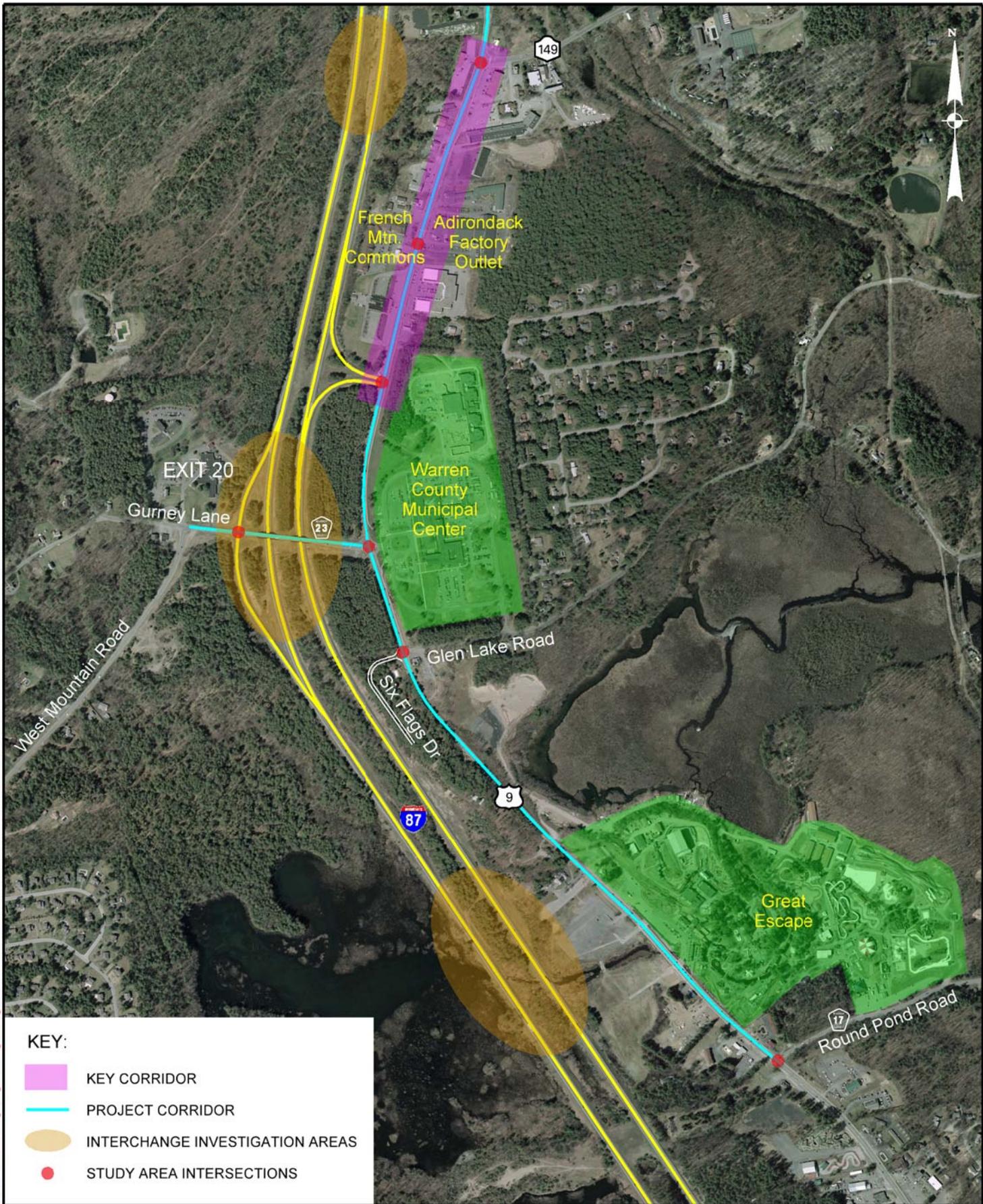


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DATE: 9/09

FIGURE: I.1

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**KEY:**

- KEY CORRIDOR
- PROJECT CORRIDOR
- INTERCHANGE INVESTIGATION AREAS
- STUDY AREA INTERSECTIONS

**PROJECT BOUNDARY MAP**

**EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK**



PROJECT: 08-081d

DATE: 9/09

FIGURE: 1.2

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## History & Relevant Efforts

As part of a continuing effort by A/GFTC, the Town of Queensbury, and the New York State Department of Transportation (NYSDOT) to provide a safe, efficient, and marketable corridor for residents, business owners, and visitors, several studies have been conducted in recent years. These projects and studies include:

- Corridor Management and Traffic Circulation Plan for the Million Dollar Half Mile – 1997
- A/GFTC Bicycle and Pedestrian Plan – 2001
- Town of Queensbury Population Projections & Buildout Study – 2005
- A/GFTC Access Management Study – 2006
- Town of Queensbury Comprehensive Plan – 2007

The ***Corridor Management and Traffic Circulation Plan for the Million Dollar Half-Mile*** was a traffic study prepared by Buckhurst Fish & Jacquemart, Inc. (BFJ) to provide short-term and long-term plans for the corridor. The goals of this study were similar to the current study, but its focus was on a smaller area. This study resulted in the implementation of some access management and cross access connections in the study area.

A/GFTC's ***Bicycle and Pedestrian Plan*** was prepared to provide municipalities with the tools to preserve and enhance the area bicycling and pedestrian network and to improve the safety, attractiveness, and the viability of cycling and walking as alternatives to vehicular transportation modes. The study made recommendations for geometric standards for bicycle and pedestrian facilities and made specific recommendations for enhancements within the A/GFTC jurisdictional area.

The ***Town of Queensbury Population Projection & Build-out Study*** provides data on demographic, housing and population projections in the Town as well as the resulting public school enrollment trends. Although this study is not directly related to the scope of the corridor Management Plan it does provide a detailed summary of the residential and commercial development potentials in the Town.

A/GFTC's ***Access Management Study*** was prepared to provide municipalities with a guidebook on access management strategies. The study also provided four case studies of existing corridors and future vision plans using access management. None of the four corridors studied were within this project's limits; however the US Route 9 corridor from the City of Glens Falls to Round Pond Road was included. Potential access management strategies identified in this corridor consisted of sharing/consolidating curb cuts, median treatments, and potential future re-circulating traffic to alternate routes.

The ***Town of Queensbury Comprehensive Plan*** was adopted by the Town on August 6, 2007 and provides an implementation plan to shape future development of the Town. The Comprehensive Plan includes planning objectives for neighborhoods, the natural environment, neighborhood commercial centers, commercial corridors, industrial corridors, and historical and cultural places. The Comprehensive Plan was an important tool in the development of the *Exit 20 Corridor Management Plan*.

In addition, numerous traffic studies were prepared for private development projects within and adjacent to the project study area corridor. Many of these private developer studies were conducted by CME and as a result have broadened CME's knowledge of the future vision of the study area.

The *Exit 20 Corridor Management Plan* is another step in the efforts by A/GFTC with support from the Town, County and NYSDOT to provide a plan that ensures that the US Route 9 corridor provides adequate service to residents, patrons, and visitors to the area.

## **Approach**

In order to accomplish the study goals, the study involved several major tasks including:

- Development of an existing conditions inventory and needs assessment
- Review of other relevant studies and the zoning code
- Develop land use alternatives for development of future volume projections in the study corridor
- Identify and analyze corridor improvement alternatives
- Evaluate Interchange options at Great Escape, NY Route 149 and Gurney Lane
- Develop recommendations
- Develop the Draft and Final Corridor Management plans
- Involve the public through a variety of outlets including three public meetings/workshops

Elected officials, local government, NYSDOT, the Advisory Committee, and community residents and property owners have worked together to define the transportation plan and future land use scenarios that represent the vision for the corridor. The *Exit 20 Corridor Management Plan* has greatly benefited from the dedication and involvement by all of the Study Advisory Committee at all of the committee meetings and public workshops. A list of the Advisory Committee is included at the front of this document and a summary of the public workshops is included in Appendix A.

## II. Existing Conditions

### General Environment

#### 1. Land Use and Zoning

A mix of land uses exist within the study area corridor. The majority of land use is commercial, recreation commercial, and residential with dedicated open space interspersed through the corridor. The southern end of the corridor is more recreational in nature while the middle to northern end of the corridor is more a business setting with County office buildings and retail centers.

Zoning district boundaries for the study area were obtained from the Warren County Planning Department and are illustrated on Figure II.1. The study area includes residential zones (*Moderate Density Residential, and Rural Residential*), mixed use zones (*Mixed Use 9 North, Mixed Use Bay Road and Mixed Use Intensive*) which house the French Mountain Commons outlet stores and the Adirondack Factory Outlet, a recreation commercial zone to the south (*Recreation Commercial*) which houses The Six Flags Great Escape Fun Park, and a dedicated land conservation zone (*Land Conservation*). Existing land uses are consistent with current zoning as outlined in the *Town of Queensbury Comprehensive Plan* adopted August 6, 2007.

#### 2. Environmental Features

Natural features such as wetlands and forest lands are present within the study area. As noted in Figure II.2, there are a number of wetlands in the study area that are regulated by the New York State Department of Environmental Conservation (DEC). Just east of the Warren County Municipal Building, the study area includes an area with land conservation zoning (LC-42A) which limits development to one dwelling per 42 acres. According to the Town Zoning Ordinance, these districts encompass areas where the land has limitations or unique characteristics that warrant the restricted development densities.

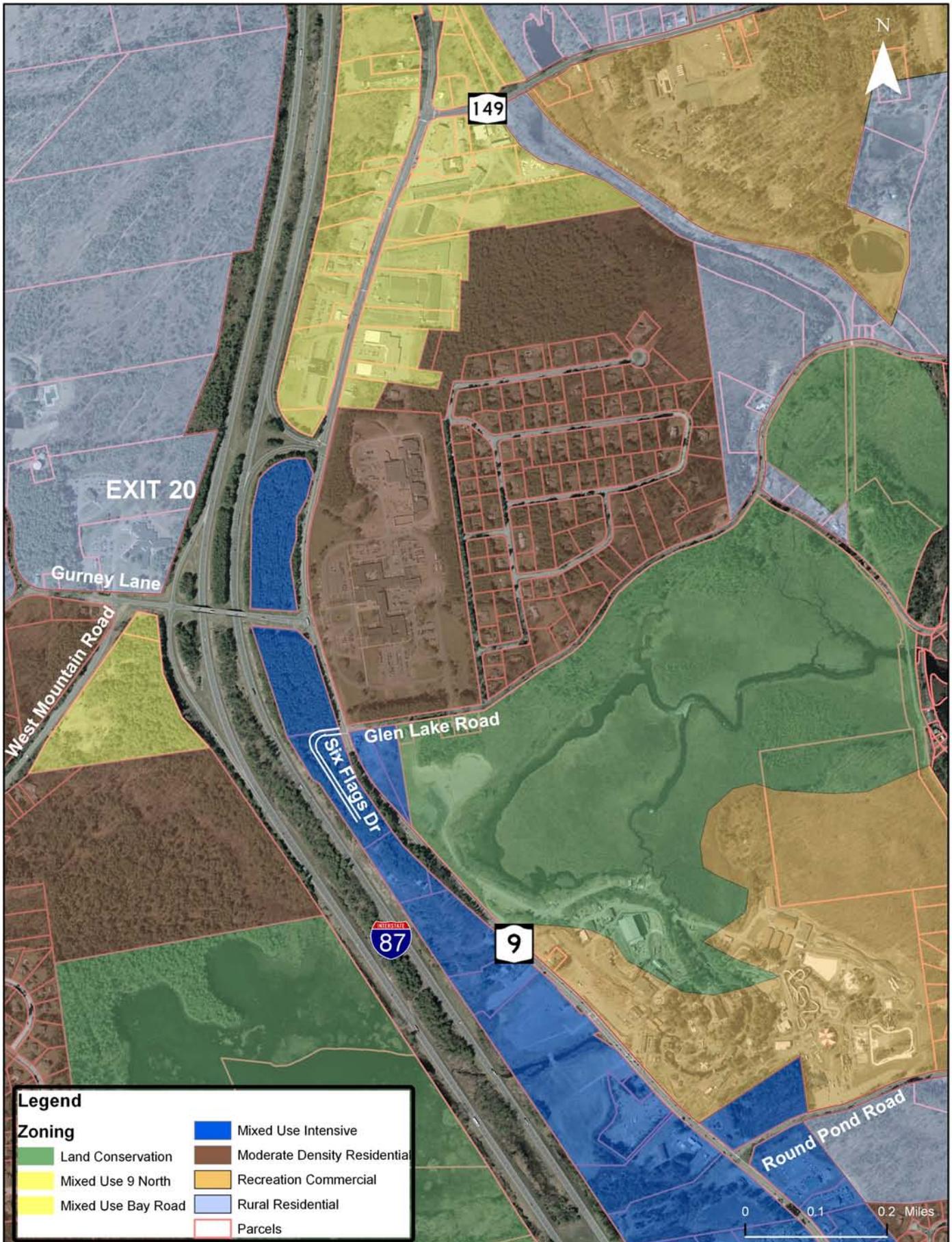
#### 3. Historic and Cultural Features

No historic or cultural features were found in the project corridor.

### Transportation

#### 1. Existing Roadway Conditions

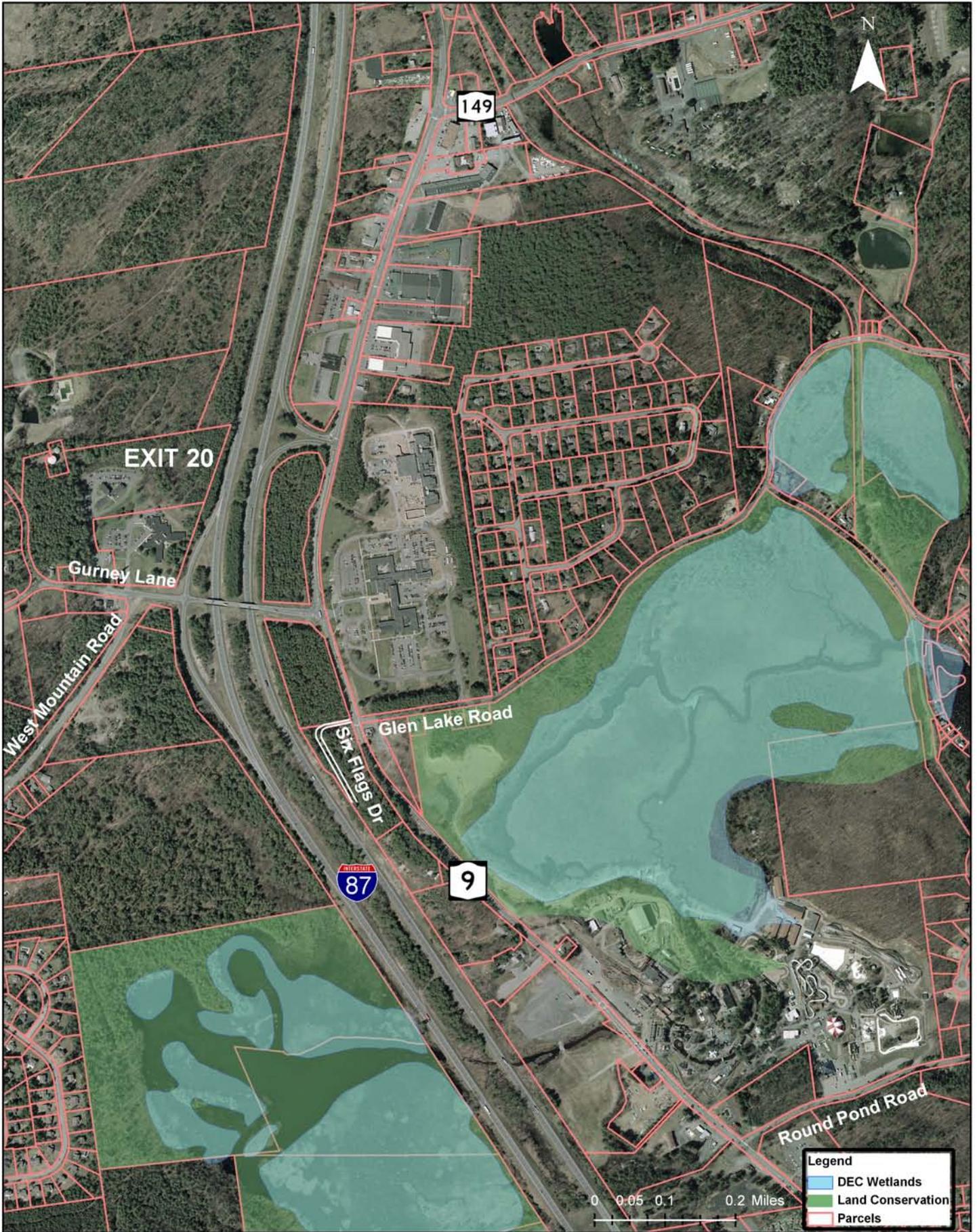
US Route 9 provides north/south travel through the Town of Queensbury and is classified as a Principal Arterial. In the key study corridor, US Route 9 overlaps with NY Route 149 and is part of the National Highway System (NHS). The NHS roadways are identified as such due to their importance to the nation's economy, defense, and mobility. This section of US Route 9 and NY Route 149 provide access between Interstate 87 and Vermont and is known as a route for heavy vehicle traffic.



Legend	
Zoning	
<span style="color: green;">■</span> Land Conservation	<span style="color: brown;">■</span> Moderate Density Residential
<span style="color: yellow;">■</span> Mixed Use 9 North	<span style="color: tan;">■</span> Recreation Commercial
<span style="color: lightyellow;">■</span> Mixed Use Bay Road	<span style="color: lightblue;">■</span> Rural Residential
<span style="color: red;">■</span> Parcels	

**Town of Queensbury Zoning**  
 EXIT 20 CORRIDOR MANAGEMENT PLAN  
 TOWN OF QUEENSBURY, NEW YORK

 <small>CREIGHTON MANNING ENGINEERING, LLP</small>		
PROJECT: 08-081D	DATE: 9/09	FIGURE: II.1



## Environmental Features

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK



PROJECT: 08-081D | DATE: 9/09 | FIGURE: II.2

In the key study corridor, US Route 9 consists of two 12-foot travel lanes with a center two-way left turn lane (TWLTL), 5-foot wide sidewalks and maintenance strips along both sides of the roadway. The right-of-way within the key study corridor varies between 66-78 feet. According to the 2008 Highway Sufficiency Ratings published by the NYSDOT, the pavement is rated in good condition along the study area corridor. The posted speed limit within the key corridor on US Route 9 is 40 mph.

## 2. Primary Intersections

The traffic control and geometry of the seven primary study area intersections are as follows:

- US Route 9/NY Route 149 – This is a four-way intersection controlled with a traffic signal. The northbound US Route 9 approach provides an exclusive right turn lane and a shared through/left turn lane while the southbound US Route 9 approach provides an exclusive left turn lane and a shared through/right turn lane. The NY Route 149 westbound approach provides an exclusive right turn lane and a shared through/left turn lane. On the west side of US Route 9 at this intersection is a driveway entrance to a retail business. This low volume driveway provides a single lane for shared travel movements. Crosswalks and pedestrian accommodations are provided on the northbound US Route 9 approach and on the westbound NY Route 149 approach.
- US Route 9/I-87 Exit 20 NB Ramp – This is a three-way intersection operating under traffic signal control. The northbound approach of US Route 9 provides an exclusive left turn lane and a through lane while the southbound approach provides a through travel lane and an exclusive right turn separated by a raised island. The eastbound I-87 Exit 20 NB Ramp approach provides separate left and right turn lanes. Crosswalks and pedestrian accommodations are provided on the southbound US Route 9 approach.
- I-87 Exit 20 Southbound Ramp/Gurney Lane (County Road 23) – This is a four-way intersection operating under stop sign control on the I-87 Exit 20 Southbound (SB) Ramp approach. The I-87 Exit 20 SB Ramp approach (north leg) provides a single lane for shared left and right turn movements for southbound vehicles exiting I-87 while the south leg provides a single, one-way travel lane for vehicles to access I-87 southbound. It is noted that while the southbound approach only provides a single lane for shared travel movements, field observations indicate that drivers currently use the existing large shoulder to stack side-by-side thus providing a defacto right-turn lane. The eastbound Gurney Lane approach provides a single lane for shared through and right-turn movements while the westbound Gurney Lane approach provides a single lane for shared left-turn and through movements. No crosswalks or pedestrian accommodations are provided at this intersection. This intersection was not included in the initial scope of services, but it was added to the project based on public comments.
- US Route 9/Gurney Lane (NY Route 149 & County Road 23) – This is a signalized four-way intersection. US Route 9 provides exclusive left turn, through, and right turn lanes northbound and southbound. Gurney Lane provides an exclusive right turn lane and a shared through/left turn lane. Opposite Gurney Lane is the main entrance to the Warren County Municipal Center, which provides a shared left-turn/through lane and an exclusive right turn lane separated by a raised island.

- US Route 9/Glen Lake Road/Six Flags Drive – This four-way intersection operates under traffic signal control. The northbound US Route 9 approach provides an exclusive left turn lane and a shared through/right turn lane while the southbound US Route 9 approach provides an exclusive left turn, a through lane and a free-flow right turn lane. Six Flags Drive and Glen Lake Road both provide an exclusive right turn lane and a shared left-turn/through lane.
- US Route 9/Round Pond Road (County Road 17) – This is a T-intersection operating under stop-sign traffic control on the westbound Round Pond Road intersection approach. The northbound approach of US Route 9 provides a single lane for shared travel movements, while the southbound approach provides an exclusive left turn lane and a separate through travel lane. Round Pond Road provides a single lane for shared left and right turn travel movements.

Two of the busier offset driveways along US Route 9 at the outlet centers in the key corridor were also included as a primary intersection in the study area. The driveways include the French Mountain Commons Driveway on the west side of US Route 9 and the Adirondack Factory Outlets Driveway on the east side of US Route 9. The French Mountain Commons Driveway is approximately 50-feet south of the Adirondack Factory Outlets Driveway. US Route 9 provides a single lane in each direction with a center two-way left-turn lane. (TWLTL). Both driveways provide a single lane for shared travel movements. A heavily used pedestrian crosswalk is located approximately 40-feet to the north of the Adirondack Factory Outlets Driveway.

### 3. Existing Traffic Characteristics

Typical peak season daily traffic volumes were determined based on July 2008 Automatic Traffic Recorder (ATR) information recorded by CME. A total of four ATRs were placed in the study area at the following locations:

- On US Route 9 between Gurney Lane and I-87 Exit 20 NB Ramp
- On US Route 9 in the vicinity of the French Mountain Commons Driveway
- On US Route 9 north of NY Route 149
- On NY Route 149 east of US Route 9

Figure II.3 summarizes the ATR data collected. The raw ATR data is included in Appendix B and was used to determine the peak weekend travel period in the study area. Based on a review of the data, it was determined that Saturday between 2:30 and 4:30 p.m. represented peak conditions at the four corridor locations analyzed. Additionally, the following can be stated based on a review of the data for peak weekend traffic in the study area:

- The daily traffic volumes in the key corridor are approximately 18,600 vehicles per day (vpd).
- In the southern end of the study corridor, daily traffic volumes are between 20,500 and 22,000 vpd. The 22,000 vpd was determined based on previously conducted counts in the study area.
- North of NY Route 149, traffic volumes on US Route 9 are approximately 13,400 vpd.
- NY Route 149 experiences approximately 11,200 vpd.
- In general, there are consistently high daily volumes in the key study area from 9:00 a.m. to 9:00 p.m. with more than 1,000 vehicles per hour (vph).

The data collected in the summer (July 2008) was compared to average daily traffic volume information recorded by NYSDOT to confirm that the collected summer data represents peak travel rates. For information, the NYSDOT data recorded in the 2007 Traffic Volume Report indicates that the average daily traffic on US Route 9 in the study corridor is 17,680 vpd from Aviation Road to the I-87 Exit 20 NB Ramps and 12,770 vpd from the I-87 Exit 20 NB Ramps to NY Route 149. A comparison of the two data sets indicates that the July daily volumes are between 25% and 45% higher than the average daily volumes recorded by NYSDOT.

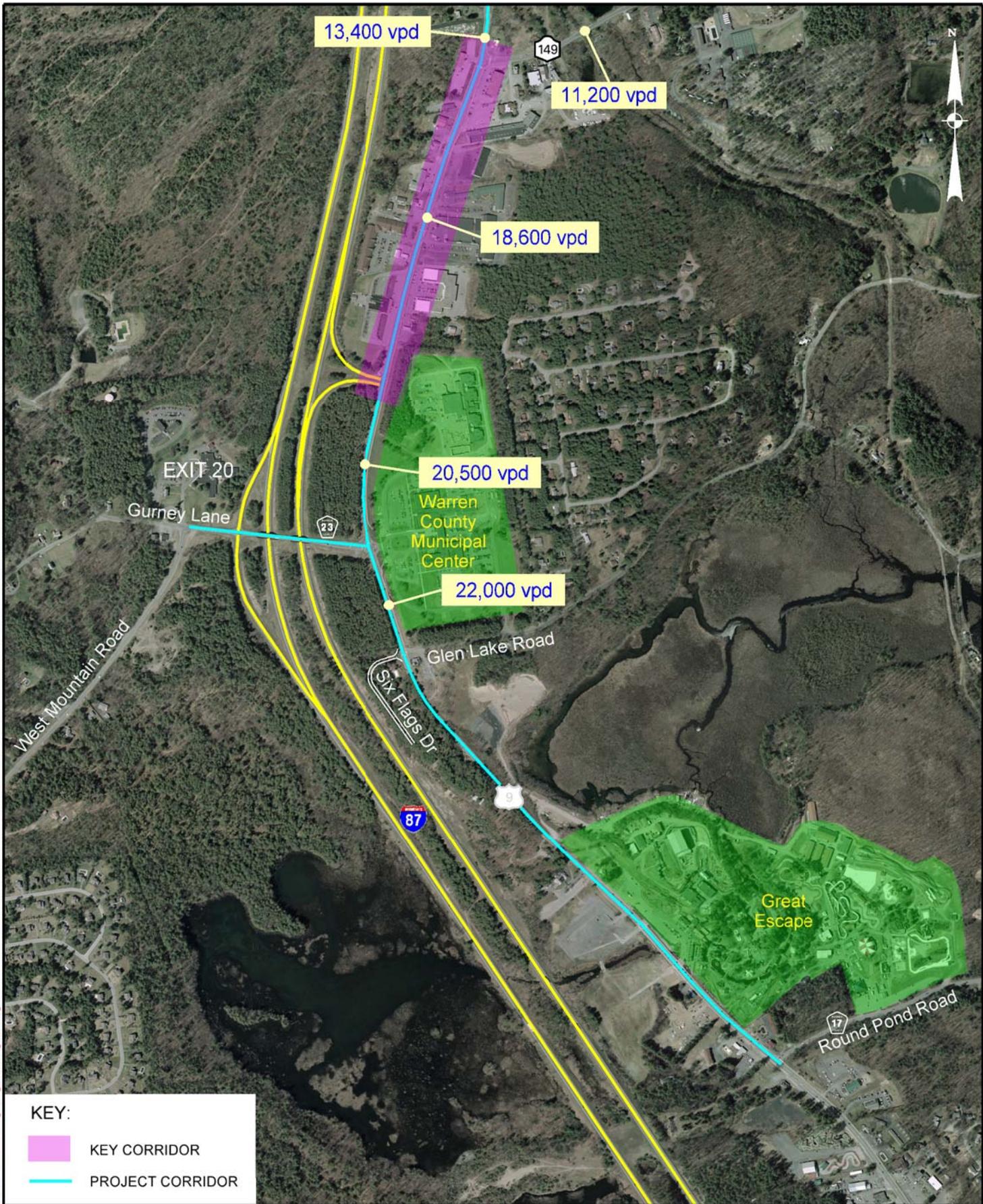
In addition to ATR data, intersection turning movement counts were conducted at the six primary study area intersections by CME during the Saturday peak hour from 2:30 to 4:30 p.m. on Saturday, July 26, 2008 and August 2, 2008. Intersection turning movement counts at the I-87 Exit 20 SB Ramp/Gurney Lane intersection were obtained from a PM peak hour count conducted on August 1, 2007 from 4:00 to 6:00 p.m. A comparison of traffic volumes between the 2007 PM peak hour count and 2008 Saturday peak hour counts on Gurney Lane indicate that the 2007 traffic volumes are comparable to the 2008 counts and represent a worst case operating condition. Figure II.4 summarized the 2008 Existing Saturday PM peak hour traffic volumes at the study area intersections. The raw turning movement count data are included in Appendix C. The following was apparent based on the turning movement count data:

- The Saturday afternoon peak hour typically occurred from 3:00 to 4:00 p.m.
- The two-way traffic volumes on the study area roadways are shown on Table II-1.
- Heavy vehicle traffic ranged between 1% and 10%. It is noted that the key corridor experiences the highest volume of heavy vehicle traffic.

**Table II-1 – Roadway Character Summary (Saturday Peak Hour)**

Segment	Two-Way Peak Hour Traffic Volume (vehicles per hour)
Round Pond Road (East of Route 9)	315
Glen Lake Road (East of Route 9)	210
Gurney Lane (West of Route 9)	975
I-87 Exit 20 NB Ramp (West of Route 9)	695
NY Route 149 (East of Route 9)	920
US Route 9 (North of Route 149)	1,180
US Route 9 (between Exit 20 NB Ramp and Route 149)	1,550
US Route 9 (between Gurney Lane and I-87 Exit 20 NB Ramp)	1,595
US Route 9 (between Glen Lake Road and Gurney Lane)	1,645
US Route 9 (between Round Pond Road and Glen Lake Road)	1,415
US Route 9 (South of Round Pond Road)	1,215

- The pedestrian volumes observed at the study area intersections during the Saturday peak hour are shown on Table II-2. The total number of pedestrians shown in the table includes the total number across all legs of the intersection with the exception of the crosswalk location which only includes travel across US Route 9.



**KEY:**

- KEY CORRIDOR
- PROJECT CORRIDOR

**PEAK SUMMER  
DAILY TRAFFIC VOLUMES**

**EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK**



PROJECT: 08-081d

DATE: 9/09

FIGURE: 11.3

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**Table II-2 – Pedestrians (Saturday Peak Hour)**

Location	Pedestrians per hour
US Route 9/NY Route 149	34 plus 2 bicyclists
Crosswalk on US Route 9 North of Adirondack Factory Outlet Drwy	353 plus 1 bicyclist
Route 9/French Mountain Commons Drwy/Adirondack Factory Outlets Drwy	345
US Route 9/I-87 Exit 20 NB Ramp	0
US Route 9/Gurney Lane	1
US Route 9/Glen Lake Road/Six Flags Drive	4 plus 3 bicyclists
US Route 9/Round Pond Road	53 plus 2 bicyclists

Note: Total pedestrians on all approaches to the intersection or mid-block crosswalk where applicable.

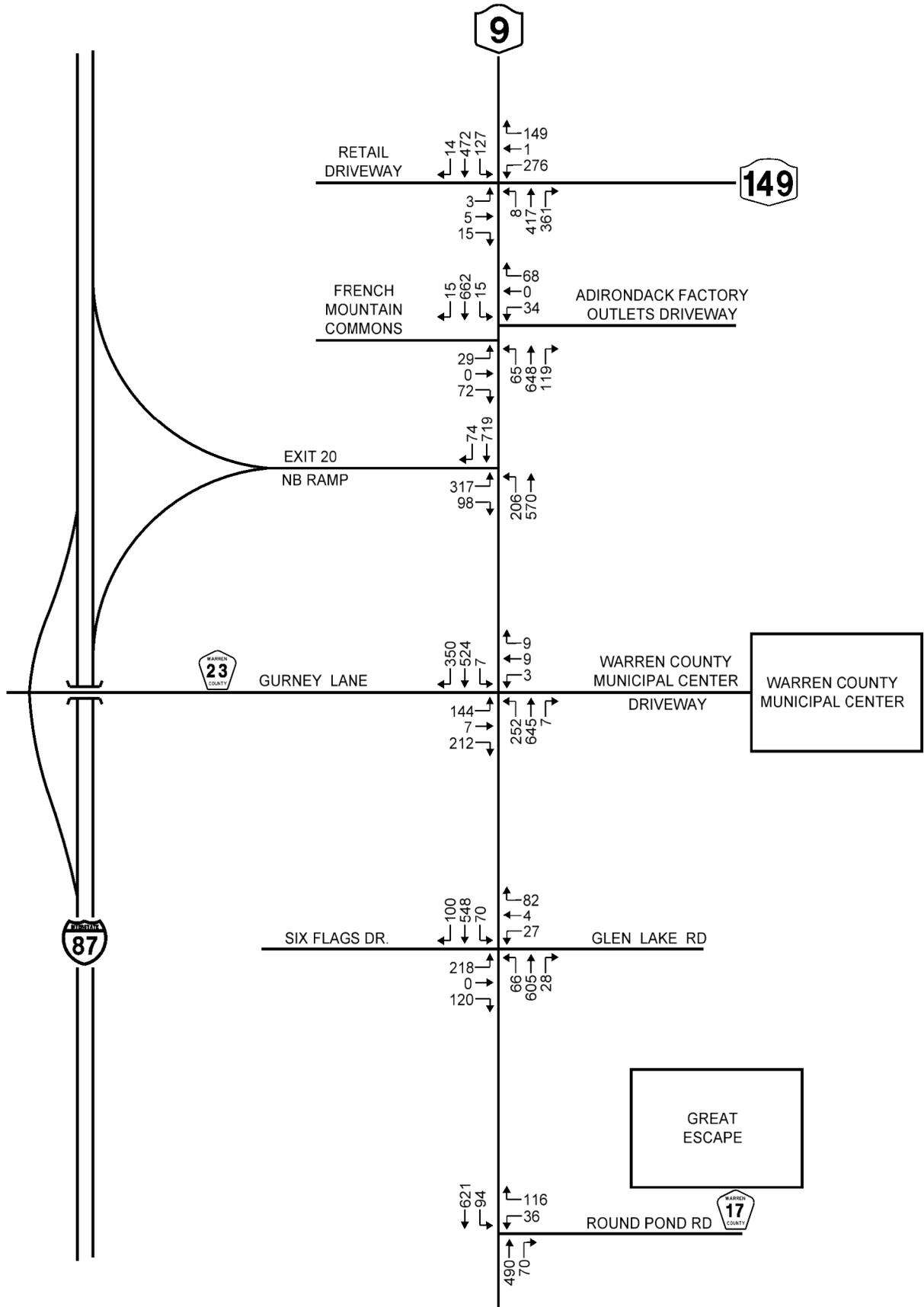
#### 4. Traffic Operations

The study area intersection operations were evaluated using Synchro 6 Software, which automates the procedures contained in the *2000 Highway Capacity Manual*. Operations are expressed in terms of “Level of Service” (LOS), which is a measure of delay ranging from LOS A (indicating little or no delay) to LOS F (indicating long delays). It is noted that the intersections of US Route 9 with the French Mountain Commons Driveway and the Adirondack Factory Outlets Driveway were analyzed as a single, four-way intersection due to their close spacing. Appendix D contains detailed descriptions of LOS criteria for unsignalized, roundabout, and signalized intersections and the detailed HCS LOS reports. Table II-3 documents the result of the level of service evaluation for the existing conditions.

The following observations are evident from the existing conditions evaluation:

- US Route 9/NY Route 149 – The analysis indicates that this signalized intersection currently operates at an overall LOS D during the Saturday peak hour, with the eastbound left-turn/through approach and the westbound approach operating at a LOS E with approximately 74 and 79 seconds of delay, respectively.
- US Route 9/French Mountain Commons Driveway/Adirondack Factory Outlets Driveway – As an unsignalized intersection, the eastbound and westbound driveways operate at a LOS F, with long vehicle delays. With the center TWLTL, left-turning traffic experiences little delay and does not result in additional delays to through traffic.

It is noted that during the peak travel times, vehicles at this intersection and at other driveways along the corridor rely on courtesy gaps to turn to and from US Route 9. In general, the friction in the corridor with the number of driveways, the high volume of traffic, and numerous pedestrian conflicts results in slow moving traffic from the I-87 Exit 20 NB ramps to NY Route 149. It is also not uncommon for the congestion to continue north and south on US Route 9 in and outside of the study area corridor.



2008 EXISTING  
TRAFFIC VOLUMES  
SATURDAY PEAK HOUR

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK



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**Table II-3 – Existing Level of Service (Saturday Peak Hour)**

Intersection		Control	Existing 2008		
Route 9/Route 149		S	E (79.0) E (73.9) C (36.7) D (47.1) B (12.4) D (49.0) C (32.0)		
Driveway EB	LTR				
Route 149 WB	LT R				
Route 9 NB	LT R				
Route 9 SB	L TR				
Overall				D (41.1)	
Route 9/French Mountain Commons Drwy/Adirondack Factory Outlets Drwy		TW	E (44.2) F (57.1) A (9.7) B (10.3)		
French Mountain Drwy EB	LTR				
Adirondack Factory Drwy WB	LTR				
Route 9 NB	L				
Route 9 SB	L				
Route 9/I-87 Exit 20 NB Ramps		S	E (72.2) D (43.1) E (63.5) B (15.6) F (86.0) A (0.1)		
I-87 Exit 20 NB Ramp EB	L R				
Route 9 NB	L T				
Route 9 SB	T R				
Overall				E (57.0)	
I-87 Exit 20 SB Ramp/Gurney Lane				TW	A (7.7) F (*) B (10.5)
Gurney Ln WB	L				
I-87 Exit 20 SB Ramp SB	L R				
Route 9/Gurney Lane		S	C (31.0) C (22.4) C (21.8) C (21.6) B (10.7) A (5.6) A (3.0) A (7.2) B (11.3) A (8.4)		
Gurney Ln EB	LT R				
Municipal Center Dwy WB	LT R				
Route 9 NB	L T R				
Route 9 SB	L T R				
Overall				B (11.6)	
Route 9/Glen Lake Rd/Six Flags Dr				S	D (39.2) C (27.5) C (25.5) C (26.5) A (9.0) B (17.6) B (10.2) B (15.4) A (0.1)
Six Flags Dr EB	LT R				
Glen Lake Rd WB	LT R				
Route 9 NB	L TR				
Route 9 SB	L T R				
Overall		B (19.5)			
Route 9/Round Pond Rd		TW	C (21.0) A (9.2)		
Round Pond Rd WB	LR				
Route 9 SB	L				

Key: TW, AW, S, R = Two-way stop, All-way stop, Signal, or Roundabout controlled intersection  
 NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound intersection approaches  
 L, T, R = Left-turn, through, and/or right-turn movements, -- = Not applicable  
 L[T]R = LR represents the existing geometry, LTR represents the future geometry  
 X (Y.Y) = Level of Service (Average delay in seconds per vehicle), \* = delay exceeds 1,000 seconds

- US Route 9/I-87 Exit 20 NB Ramps – This intersection currently operates at an overall LOS E, with long vehicle delays. The eastbound left-turn movement and northbound left-turn movement operate at a LOS E with approximately 72 and 64 seconds of delay, respectively. The southbound through movement on US Route 9 operates at poor levels of service with delays in excess of 80 seconds.
- I-87 Exit 20 Southbound Ramp/Gurney Lane – The unsignalized level of service analysis indicates that the westbound Gurney Lane left-turn movement currently operates at a LOS A. The analysis also indicates that the southbound left-turn movement fails during the peak hour and experiences long delays while drivers look for adequate gaps in traffic. The southbound right turn movement that utilizes the existing shoulder as a right-turn lane operates at a LOS B with less than 11 seconds of delay. Right-turn vehicles that do not utilize the shoulder experience long vehicle delays waiting behind left-turning vehicles.
- US Route 9/Gurney Lane – This signalized intersection currently operates at an overall LOS B, with approximately 12 seconds of delay. All approaches operate at a LOS C or better, with acceptable vehicle delays.

It is noted that the east leg of this intersection provides access to the Warren County Municipal Center. During a Saturday, the municipal center experiences a very low volume of traffic allowing the Gurney Lane approach to operate more efficiently. It is expected that during a typical commuter peak period, this intersection would experience more delay as the east leg would operate with higher volumes.

- US Route 9/Glen Lake Road – The analysis indicates that this intersection operates at an overall LOS B, with all approaches operating at a LOS D or better. The eastbound approach operates at a LOS D with approximately 35 seconds of delay, while the westbound Glen Lake Road approach operates at a LOS C with approximately 26 seconds of delay. The average delay for drivers traveling on US Route 9 is less than 18 seconds.

It is our understanding the NYSDOT is currently reviewing the signal phasing and timings at this intersection. This review was a result of concerns expressed by the public that the signal could better adjust to the changing flow of traffic. As currently operating, the level of service on the intersection approaches range from A to D indicating that it may be reasonable for timing adjustments to even out the intersection operation. Improved timings will be reviewed and considered in the assessment of future conditions at this intersection.

It was also noted in the public workshop meeting that the southbound right turn lane from US Route 9 onto Six Flags Drive does not always operate as a free flow movement as it is designed. Likely this is caused by the field conditions, since the free flow movement is not separated by a raised median which is a more typical design. The lack of a raised median likely causes confusion to drivers which results in less efficient movements on this approach.

- US Route 9/Round Pond Road – The analysis indicates that the unsignalized, westbound Round Pond Road approach operates at a LOS C during the Saturday peak hour with average vehicle delays of approximately 21 seconds or less. The southbound left-turn movement from US Route 9 southbound operates at good levels of service with little delay to vehicles.

Although the overall levels of service at this intersection are acceptable, it was observed in the field and noted by the public that the single lane approach on Round Pond Road can often create longer delays for right-turning vehicles that are held up by vehicles waiting to turn left onto US Route 9 southbound. These delays can create longer queues during peak travel times on Round Pond Road.

The results of the existing conditions assessment indicate that there is a need to identify capacity and operational improvements within the corridor, specifically in the key corridor along US Route 9 between the I-87 Exit 20 NB Ramps and NY Route 149. It is noted that the existing Saturday peak hour traffic volumes are similar to Friday peak hour traffic volumes based on ATR data collected by CME indicating that poor intersection operations exist during other weekday and weekend periods.

### **Bicycle and Pedestrian Access**

A substantial amount of pedestrians and cyclists were recorded in the key study area corridor during field visits and while conducting the turning movement counts as shown in Table II-2. Sidewalks are present on both sides of US Route 9 between the I-87 Exit 20 NB Ramps and NY Route 149, where the majority of the pedestrians were recorded. The sidewalks are separated from the roadway by small buffers (brick pavers or grass maintenance strips). Other amenities such as lighting and street trees are also present creating an inviting and walkable environment along US Route 9. It is noted that there are some inconsistencies within the corridor with sidewalks and landscape design that take away from the attractiveness of the walkable corridor. It is also noted that patrons of the retail and commercial businesses along the key study area corridor typically do not travel out to the existing sidewalks along US Route 9 when walking between storefronts on either side of the street. This is evident by the numerous worn dirt walking paths located closer to the businesses. Improved pedestrian connectivity can be provided between local businesses to ensure safe and efficient travel.

Marked crosswalks are located at the US Route 9/I-87 Exit 20 NB Ramps and US Route 9/NY Route 149 intersections. In addition, two mid-block pedestrian crossings also exist within the key study area; one located just north of the Adirondack Factory Outlets Driveway and the second located approximately half-way between the Adirondack Factory Outlets Driveway and NY Route 149. However, field observations indicate that not all pedestrians traverse US Route 9 at the marked crossings. Refer to Photographs 1 and 2 for existing pedestrian accommodations in the key corridor.



**Photograph 1 – Crosswalks at the Route 9/I-87 Exit 20 NB Ramp Intersection**



**Photograph 2 – Pedestrians crossing mid-block crossing on US Route 9**

The Warren County Bikeway runs parallel to US Route 9 just east of the corridor. The trail serves a variety of uses, including biking, walking, cross-country skiing, and in-line skating. It is also wheelchair accessible. Figure II.5 shows the location of the Bikeway and other pedestrian accommodations in the study area corridor.

South of the key study area corridor sidewalks continue along the east side of US Route 9 through the Glen Lake Road intersection. There are no pedestrian accommodations along US Route 9 for approximately 1/3 mile south of Glen Lake Road. Sidewalks are again provided on both sides of US Route 9 from the Great Escape Lodge south through the study area beyond the Round Pond Road intersection.

There are no pedestrian accommodations on Gurney Lane in the study area.

### **Existing Public Transportation**

The primary regional transit service provider that operates in the Exit 20 Corridor is the Greater Glens Falls Transit (GGFT). The GGFT fixed bus route #19 provides year round service along US Route 9. No service is provided on Sundays or on holidays. There are minor variations in the northbound service limits depending on the time of year. Buses travel to Exit 21 on request only between October and May. From May to June, the buses routinely travel to Exit 21. Buses stop at the Warren County Municipal Center between June and Labor Day, with trolley service continuing further north.

Seasonal trolleys are run in the corridor from the end of June through Labor Day. The seasonal trolleys run every 30 minutes along US Route 9 from the City of Glens Falls to the Village of Lake George with separate north and south routes. The trolleys run from 8:30 a.m. to 11:30 p.m. seven days a week. It was noted by the director of the GGFT that often times the runs are delayed due to traffic congestion (typically Friday, Saturday, and Sunday). It was further noted that in 2008, the occupancy of the trolleys was up by approximately 20%. This was likely attributed to high gas prices and the overall economy. During busier times, extra trolleys are sometimes added into the system to help accommodate the demand. The GGFT is also considering the purchase of larger capacity trolleys to accommodate the increase in transit use.

For those with disabilities, the Freedom and Mobility Express (F.A.M.E.) service is provided. This service will pick-up eligible patrons and drop them off at destinations within ¾ of a mile from a designated transit route.

The available transit routes are shown on Figure 11.6.

### Crash History

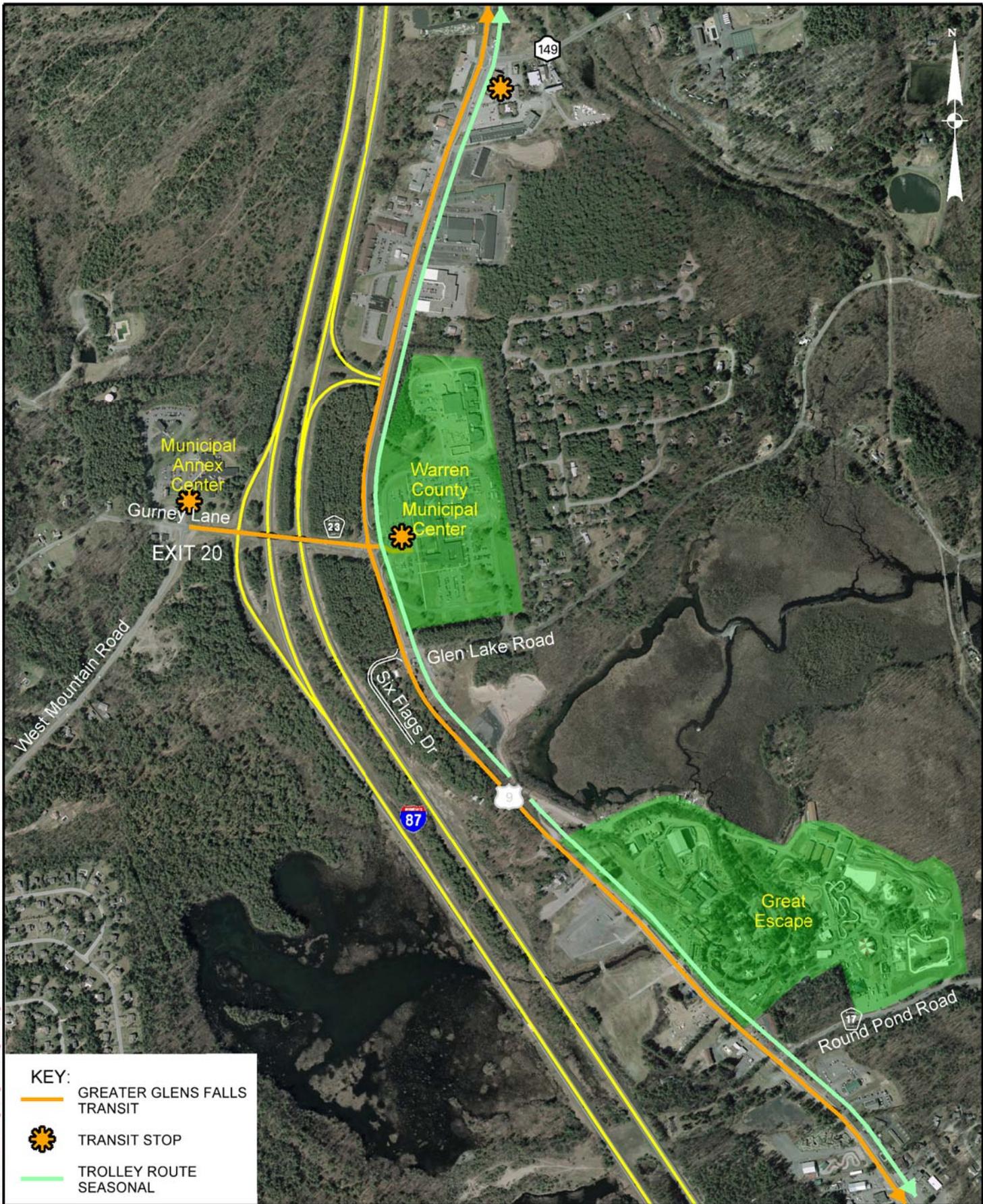
Crash data was obtained to determine crash trends along the study area roadways. Crash summaries and details were provided by the NYSDOT Safety and Information Management System for the latest three years of available data from the period between January 1, 2005 and December 31, 2007 for the road segment of US Route 9 in the study area. Table II-4 summarized the accident data at the study area intersections and roadway segments.

**Table II-4 – Crash History – January 2005 to December 2007**

Segment/Intersection	Fatality	Injury	Property Damage Only	Non Reportable*	Total No. of Crashes
US Route 9/Round Pond Rd	0	0	2	1	3
US Route 9 from Round Pond Rd to Glen Lake Rd	0	9	10	1	20
US Route 9/Glen Lake Rd/Six Flags Dr	0	4	1	0	5
US Route 9 from Glen Lake Rd to Gurney La	0	3	1	0	4
US Route 9/Gurney La	0	4	6	4	14
US Route 9 from Gurney La to Exit 20 NB Ramps	0	1	0	1	2
US Route 9/I-87 Exit 20 NB Ramps	0	7	3	2	12
US Route 9 from I-87 Exit 20 NB Ramps to NY Route 149	0	11	8	2	21
US Route 9/NY Route 149	0	0	0	2	2

\*Non-Reportable Crashes are crashes that have property damage under \$1,000





- KEY:**
- GREATER GLENS FALLS TRANSIT
  - TRANSIT STOP
  - TROLLEY ROUTE SEASONAL

**EXISTING TRANSIT ROUTES**

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FIGURE: 11.6

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The following observations are evident from a review of the latest three years of data:

- No fatalities were reported at any of the intersections/road segments.
- Five or less accidents occurred at the intersections of US Route 9/Round Pond Road, US Route 9/Glen Lake Road/Six Flags Drive, and US Route 9/NY Route 149 over the three year period.
- Less than 5 accidents occurred on the US Route 9 segments between Glen Lake Road and Gurney Lane and between Gurney Lane and the Exit 20 NB Ramps during the three year period.
- Of the 20 accidents on the segment of US Route 9 from Round Pond Road to Glen Lake Road, 14 were rear end accidents caused by slowed or stopped traffic with the apparent factor of following too closely. One of the recorded personal injury accidents involved two vehicles and a pedestrian. The report did not detail the exact involvement of the pedestrian in the incident. The crash rate on this segment of 1.26 accidents per million vehicle miles (acc/mvm) is less than the statewide average of 1.39 acc/mvm.
- Of the 14 accidents at the US Route 9/Gurney Lane intersection, 6 were rear end accidents while the remaining accidents were collisions at the intersection due to vehicles failing to yield to the right-of-way (i.e., left-turn, right angle). The crash rate of 0.73 accidents per million entry vehicles (acc/mev) is higher than the statewide average rate of 0.39 acc/mev.
- Seven of the 12 accidents at the US Route 9/I-87 Exit 20 NB Ramp intersection were rear end accidents. The calculated accident rate of 0.71 acc/mev is significantly higher than the statewide average rate of 0.22 acc/mev.
- A total of 21 accidents occurred on the segment of US Route 9 from the I-87 Exit 20 NB Ramps to NY Route 149. Ten of the accidents were rear end accidents while another six accidents were related to right or left turning vehicles. The calculated accident rate of 3.0 acc/mvm is higher than the statewide average rate of 1.71 acc/mvm for a similar type roadway. It is noted that the *Corridor Management and Traffic Circulation Plan* conducted in 1997 recorded 100 accidents on this corridor for the years 1993 through 1995; more than four times the current number of accidents for the latest three year period. Since completion of the 1997 study, the TWLTL has been installed in the corridor. Based on a review of the accident history, it appears that the installation of the center turn lane has substantially reduced the occurrence of accidents in the corridor.

## Area Parking

A parking study was conducted in the key corridor at the off-site parking lots. The purpose of the assessment was to determine if any of the congestion along US Route 9 in the key corridor is due to capacity issues in the existing parking lots resulting in delays and back-ups on the mainline. The parking study was conducted on Saturday, August 16, 2008 between 2:00 and 4:30 p.m. An inventory of the parking lots indicated that there are 1,600 available parking spaces, 510 on the west side and 1,090 on the east side of US Route 9. Figure II.7 shows the location and size of existing parking lots in the key study area corridor. At the time of the parking study there were several vacant buildings along the west side of the corridor. These buildings are detailed on Table II-5 and on Figure II-8 in the Driveway Inventory. The following was noted based on the study:

- The highest occupancy on the west side of US Route 9 was at the French Mountain Commons Lot with an average of 85% occupancy.

- The highest occupancy on the east side of US Route 9 was at the Ralph Lauren outlets with an average of 78% occupancy. Not including the rear parking area at this center, the average occupancy was 99%.
- The Adirondack Factory Outlets Lot on the east side of US Route 9 average occupancy was 58% in the front lot. If the additional 99 stalls in the rear of the building are added into the calculation, the occupancy is reduced to approximately 41%.
- Numerous vacant buildings exist on the west side of US Route 9. A handful of vehicles were parked at each of the vacant lots.
- During the study time, the overall demand ranged from 760 to 820 or 48% to 51%.
- The peak parking demand in the key corridor occurred between 2:00 and 3:00 p.m. with 820 occupied stalls.

The parking inventory indicated that the busiest parking locations are focused at the three larger outlet centers in the corridor; French Mountain Commons, Adirondack Factory Outlets, and the Ralph Lauren outlets. Further, the parking inventory indicated that there is some congestion in the front parking lot of the Ralph Lauren outlets with it operating at full capacity during the study period. In general, however, additional capacity for parking exists with the use of back parking lots and further use of adjacent parking lots. Figure II.7 and Appendix E contains a detailed breakdown of the parking lot inventory.

### Driveway Inventory

A driveway inventory was conducted in the key corridor to assess the number of curb cuts along US Route 9. There are currently 26 commercial driveways ranging in width from 23 to 63 feet. Of the 26 driveways, approximately 40% provide shared access between parcels. Table II-5 and Figure II.8 summarize the driveway inventory for the key study area corridor.

**Table II-5 – Key Study Area Corridor Driveway Inventory**

West Side of US Route 9				East Side of US Route 9			
Drwy #	Width (feet)	Business Served	Other Connected Drwys	Drwy #	Width (feet)	Business Served	Other Connected Drwys
1	37	Montcalm Restaurant	5,6	2	49	Mobil Gas	3
5	44	Montcalm Restaurant	1,6	3	45	Mobil Gas	2
6	46	Montcalm Restaurant	1,5	4	51	Lake George Plaza Outlet Center	7
8	44	Sunoco	9	7	36	Lake George Plaza Outlet Center	4
9	41	Sunoco	8	11	36	Adirondack Factory Outlets	13,14,16,18
10	44	French Mountain Commons	12	13	44	Adirondack Factory Outlets	11,14,16,18
12	63	Roadway Inn	10	14	54	Olde Post Grill, Days Inn	11,13,16,18
15	32	VACANT BUILDING	17	16	39	Olde Post Grill, Days Inn, Reebok, Rockport, The Evergreens	11,13,14,18
17	53	VACANT BUILDING, Scooters Rentals	15	18	42	Reebok, Rockport, The Evergreens	11,13,14,16
19	40	VACANT BUILDING, Scooters Rentals		20	25	Log Jam Outlet Center	23,24,25
21	34	VACANT BUILDING		23	23	Log Jam Outlet Center	20,24,25
22	36	Franks Pasta and Pizza Restaurant		24	23	Log Jam Outlet Center	20,23,25
26	41	Super Shoes		25	23	Family Footwear, Dominoes, Casual Male XL, The Sox Market	20,23,24



XX = NUMBER OF PARKING STALLS  
 XX% = AVG. OCCUPANCY 2-4 PM ON A PEAK SUMMER SATURDAY

KEY CORRIDOR PARKING LOT INVENTORY

EXIT 20 CORRIDOR MANAGEMENT PLAN  
 TOWN OF QUEENSBURY, NEW YORK



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1 = DRIVEWAY NUMBER REFERENCE IN TABLE II-5  
 MATCHING COLORS REPRESENT DRIVEWAYS  
 PER PARCEL

KEY CORRIDOR DRIVEWAY INVENTORY

EXIT 20 CORRIDOR MANAGEMENT PLAN  
 TOWN OF QUEENSBURY, NEW YORK



PROJECT: 08-081d

DATE: 9/09

FIGURE: 11.8

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### III. Land Use Scenarios

For this study, three future land use/traffic volume scenarios were analyzed for both short-term and long term projections with the estimated time of completion (ETC) considered the existing 2008 condition. The following scenarios were analyzed:

- A short-term, ETC +5 year condition including growth expected from approved development projects.
- A long-term, ETC +20 year condition including growth expected from approved development projects (low-growth).
- A long-term, ETC +20 year condition expanded to include additional potential growth from development projects in the corridor (high-growth).

Based on coordination with the Town of Queensbury Planning Department, the following projects under consideration by the Town were included in all three development scenarios:

- Expansion of the Lake George Campground with an additional 46 RV sites.
- Expansion of Aviation Mall to include a movie theater, restaurant, mixed use building, and a big box retail building.
- Redevelopment of the Monroe Muffler site to a Chili's restaurant.
- Development of the Warren County Social Services Building on Glen Lake Road.
- Redevelopment of the Mobil Gas station on the corner of US Route 9/NY Route 254 to a Jolley Store with gas pumps and a convenience store.
- Redevelopment of the Mobil Gas station on US Route 9 north of the I-87 Exit 20 NB Ramps. (This station was under construction at the time of data collection)

The location and traffic volumes associated with the above projects under consideration by the Town, are shown on Figure III.1 and Figure III.2, respectively. Since the development of the future volumes, some of the plans at the noted parcels have been modified. Most of the changes have reduced the size of the proposed developments which may result in lower trip generation in the corridor; therefore, the projected volumes would still account for the expected growth in the corridor. Although the volumes may be a little conservative based on recent site plan modifications, the variation in traffic is not expected to alter the results of the study and therefore the volumes were not recalculated.

Additional coordination with the Town of Queensbury was undertaken to identify more long-term potential future development projects to include in the ETC +20 higher growth scenario. Five additional sites were identified and are as follows:

- Development of the Schermerhorn parcel with an approximate 80,000 square foot (SF) office building located south of Gurney Lane.
- Development of the two Warren County parcels currently for sale on US Route 9. Based on the current zoning, one parcel was assumed to be developed with a 150-room hotel and the second with 90,000 SF of mixed use with 50% office and 50% general retail.
- Development of the McCormack and Kenny parcels located on the eastern side of US Route 9 at the northern end of the study corridor. Based on the current zoning, it was assumed that 43 single family homes and a 150-room hotel could be constructed on the McCormack and Kenny parcels, respectively.
- Re-development of the Montcalm restaurant property on US Route 9 with 75,000 SF of general retail.

The assumed land use and size of the potential future developments are consistent with the zoning detailed in the recently completed Town Comprehensive Plan. The location and traffic volumes associated with the future potential growth project sites are shown on Figure III.3 and Figure III.4, respectively.

In addition to the specific development growth included in the three land development scenarios, a general background growth rate was included in the development of future volumes. Based on a review of historical traffic volume data published by the NYSDOT and a review of other studies conducted in and adjacent to the project corridor, an annual growth rate of 1% per year was applied to the study area intersection volumes. This general growth rate accounts for general increases in traffic volumes and resulted in an increase of 1.05 between 2008 and 2013 (ETC +5) volumes and an increase of 1.22 between 2008 and 2028 (ETC +20) volumes. This general growth rate also accounts for growth in traffic in the corridor as a result of other development projects outside the immediate study corridor or in other municipalities. Figures III.5 and III.6 summarize the projected traffic volumes in 2013 and 2028 with the general background growth rate.

The land development growth scenarios were added to the traffic volumes with the projected general background growth to develop the future traffic volume conditions assessed in the study. The future volume conditions are summarized as follows:

- Figure III.7 - 2013 Future Traffic Volumes
- Figure III.8 - 2028 Future Traffic Volumes - Low Growth
- Figure III.9 - 2028 Future Traffic Volumes - High Growth

A review of the volumes indicate that when compared to the 2008 Existing traffic volumes, the 2013 Future traffic volumes show an increase in volumes of approximately 10%. In the 2028 Future traffic volume scenarios, the volumes increase by approximately 27% in the Low Growth scenario and range from 33% to 48% in the High Growth scenario.



DEVELOPMENT PROJECTS  
UNDER CONSIDERATION BY THE TOWN

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK

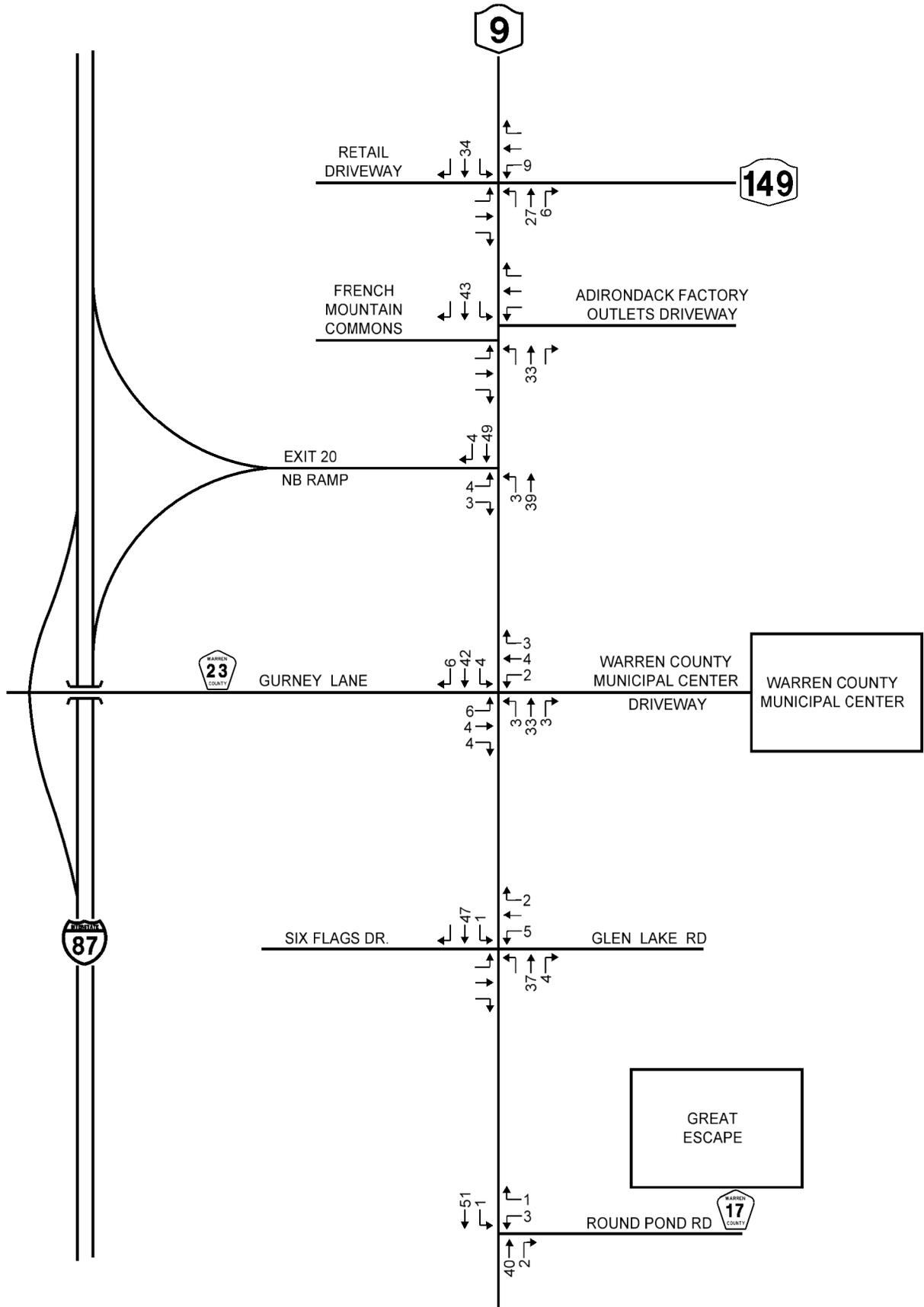


PROJECT: 08-081d

DATE: 9/09

FIGURE: III.1

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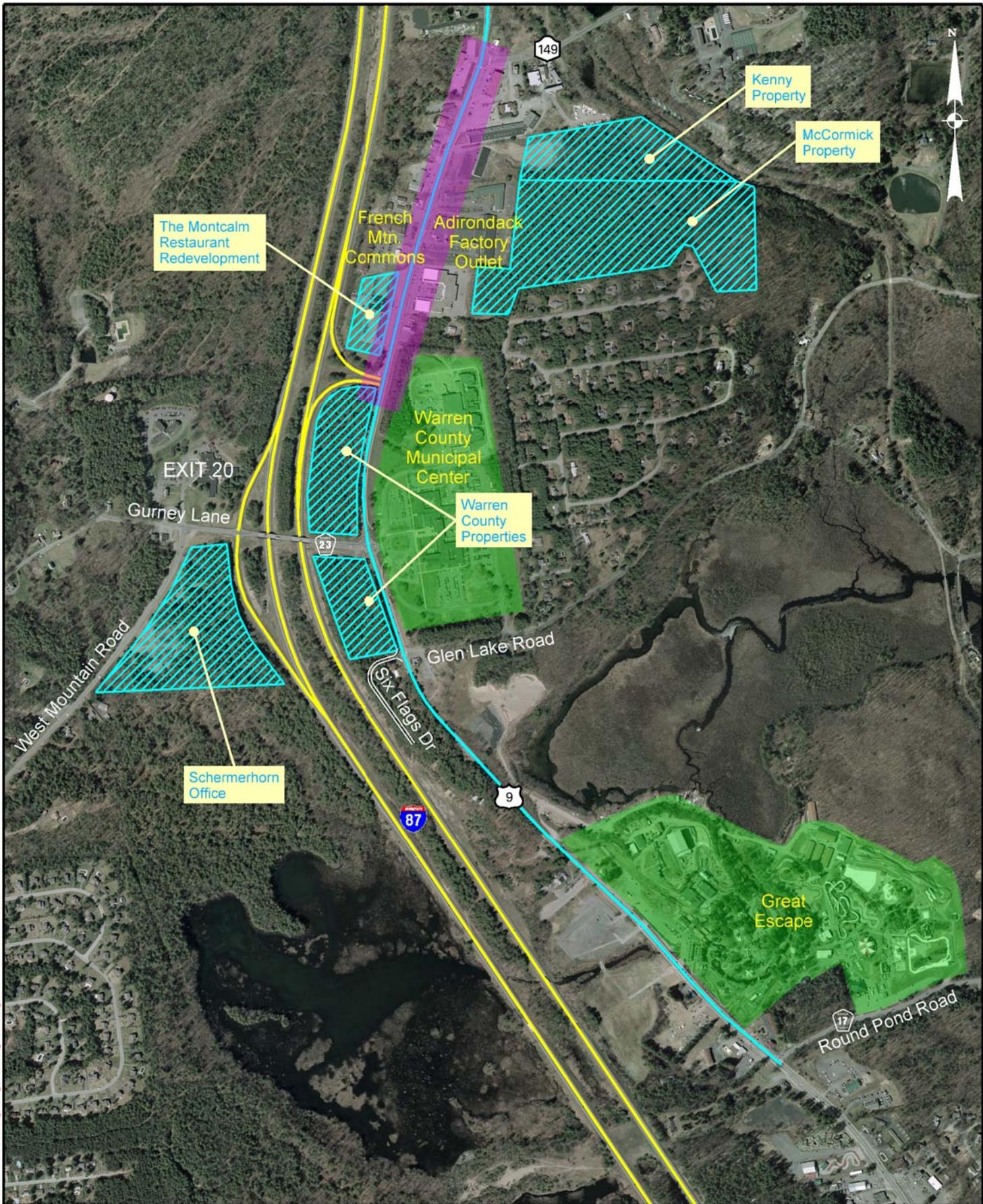


APPROVED DEVELOPMENT PROJECTS  
TRAFFIC VOLUMES  
SATURDAY PEAK HOUR

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK



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POTENTIAL FUTURE DEVELOPMENT PROJECTS

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK

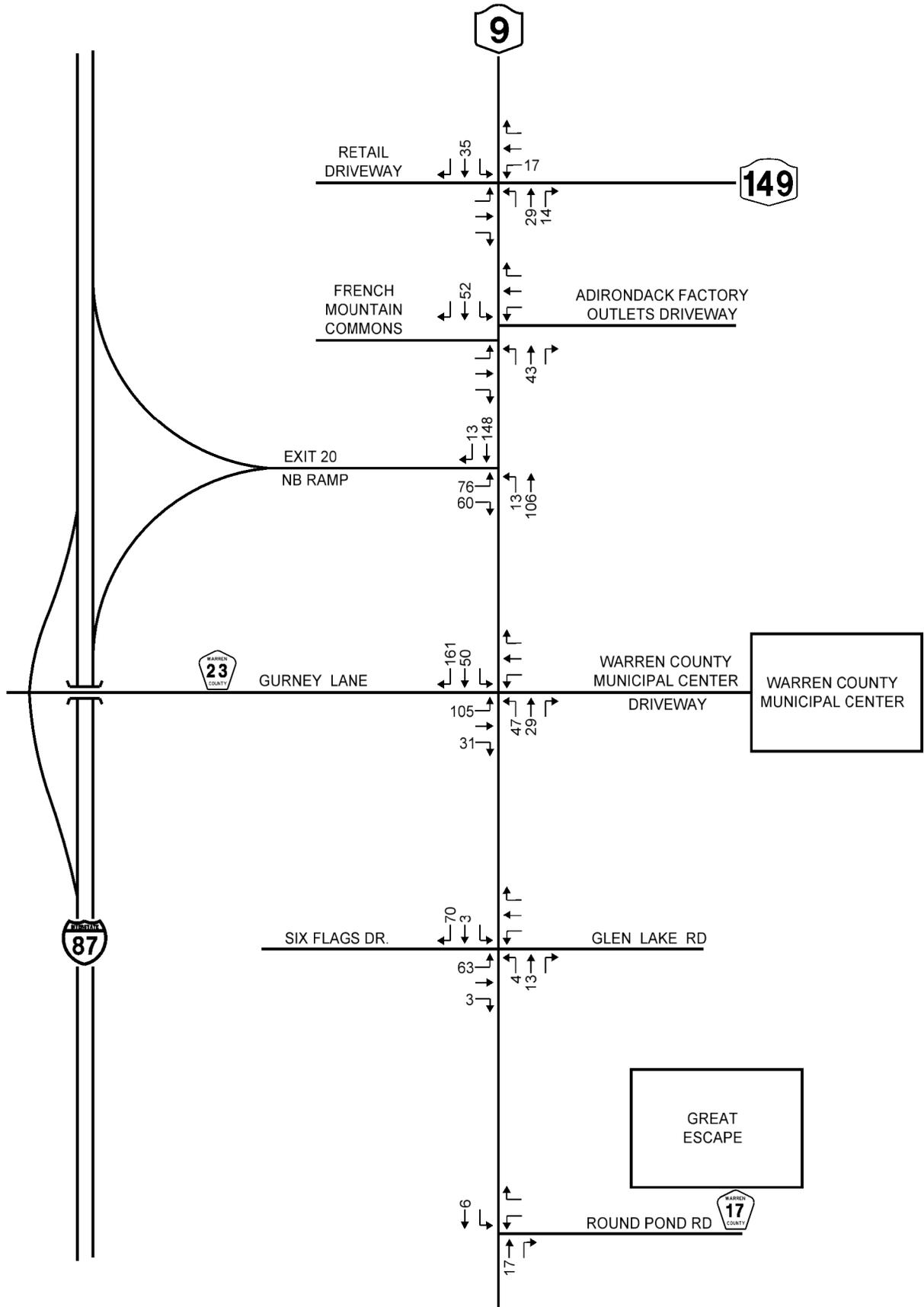


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DATE: 9/09

FIGURE: III.3

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POTENTIAL FUTURE DEVELOPMENT  
TRAFFIC VOLUMES  
SATURDAY PEAK HOUR

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK

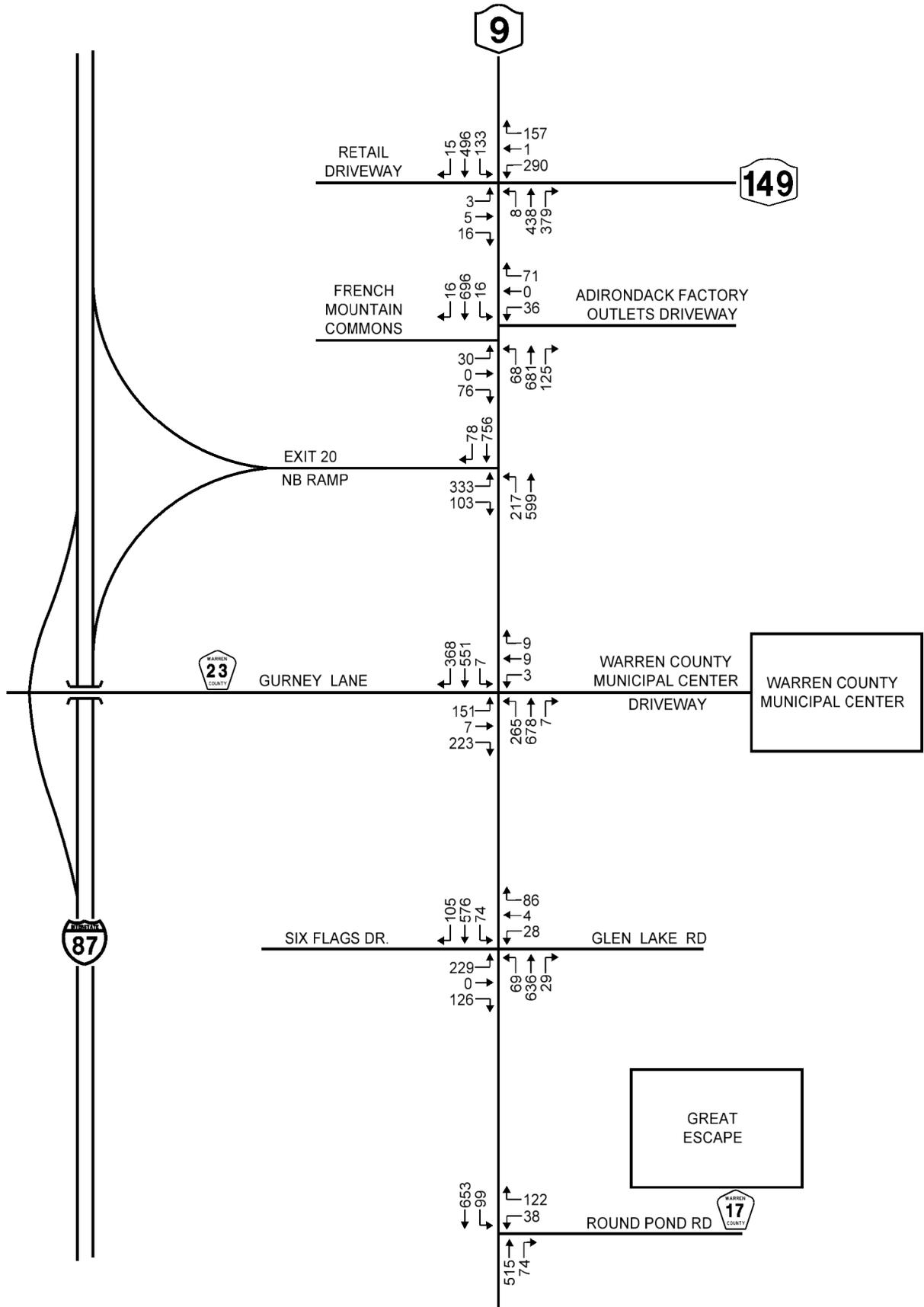


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FIGURE: III.4

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2013 BACKGROUND  
TRAFFIC VOLUMES  
SATURDAY PEAK HOUR

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK

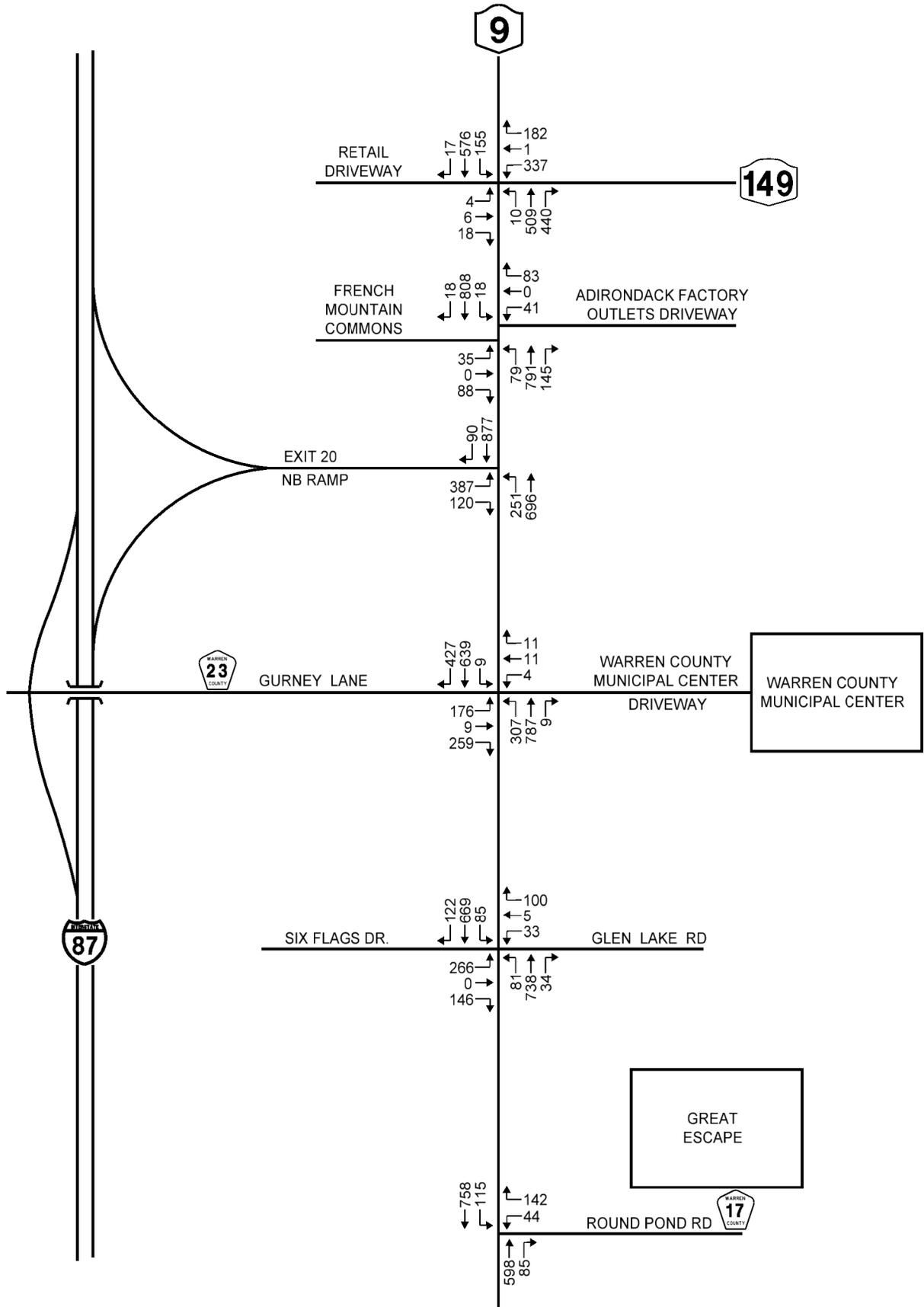


PROJECT: 08-081d

DATE: 9/09

FIGURE: III.5

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2028 BACKGROUND  
TRAFFIC VOLUMES  
SATURDAY PEAK HOUR

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK

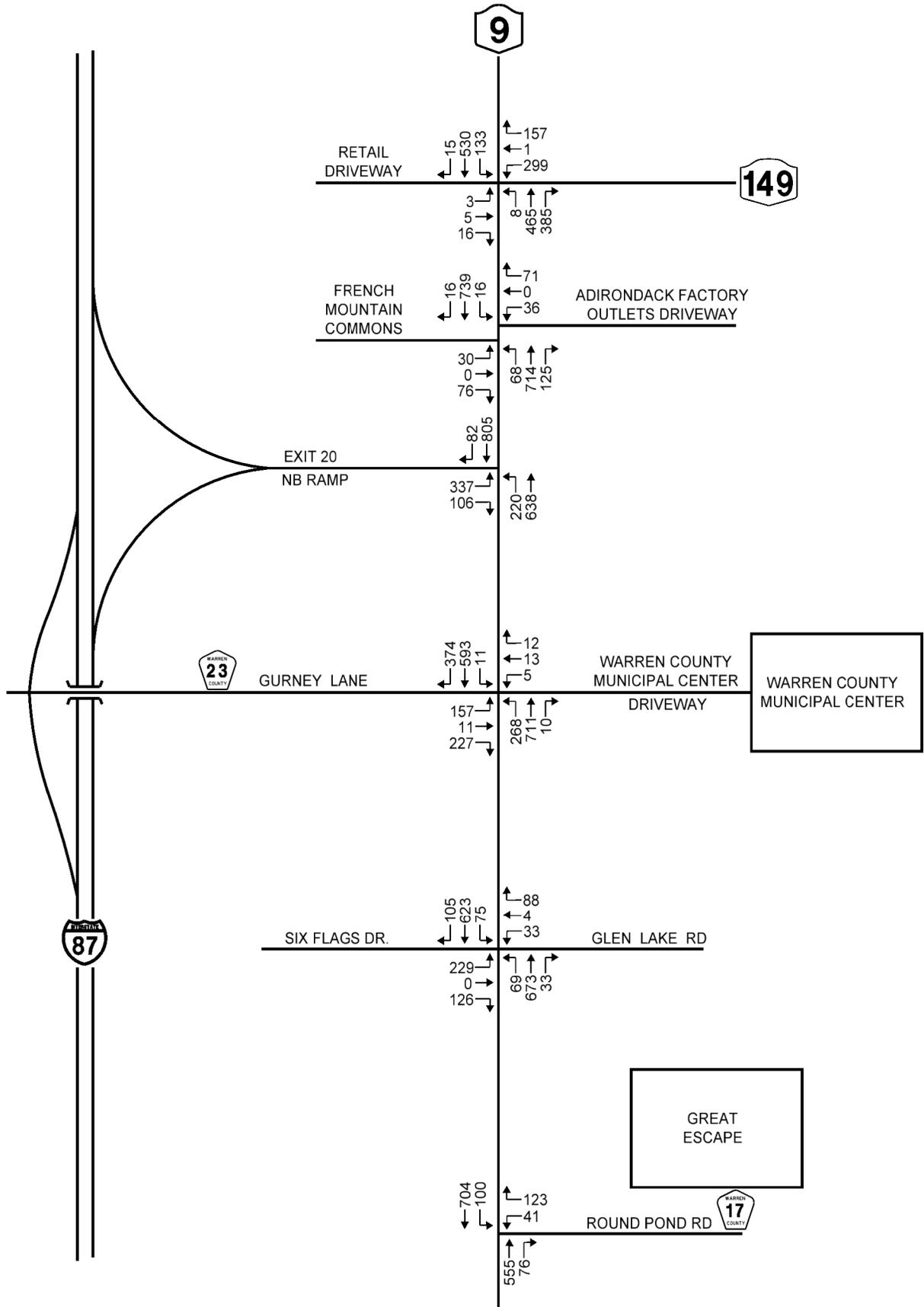


PROJECT: 08-081d

DATE: 9/09

FIGURE: III.6

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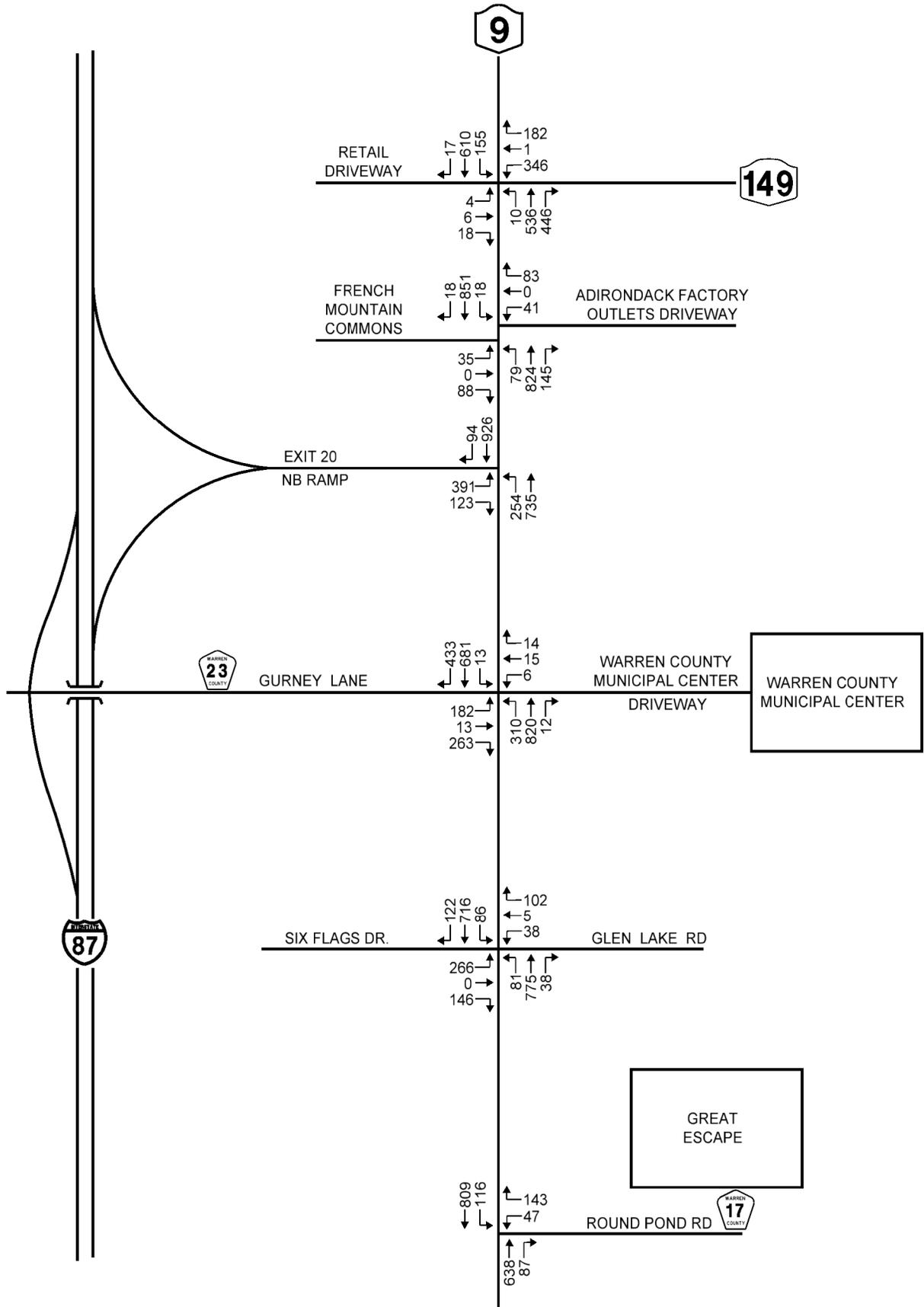


2013 FUTURE TRAFFIC VOLUMES SATURDAY PEAK HOUR

EXIT 20 CORRIDOR MANAGEMENT PLAN TOWN OF QUEENSBURY, NEW YORK



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2028 FUTURE  
TRAFFIC VOLUMES - LOW GROWTH  
SATURDAY PEAK HOUR

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK

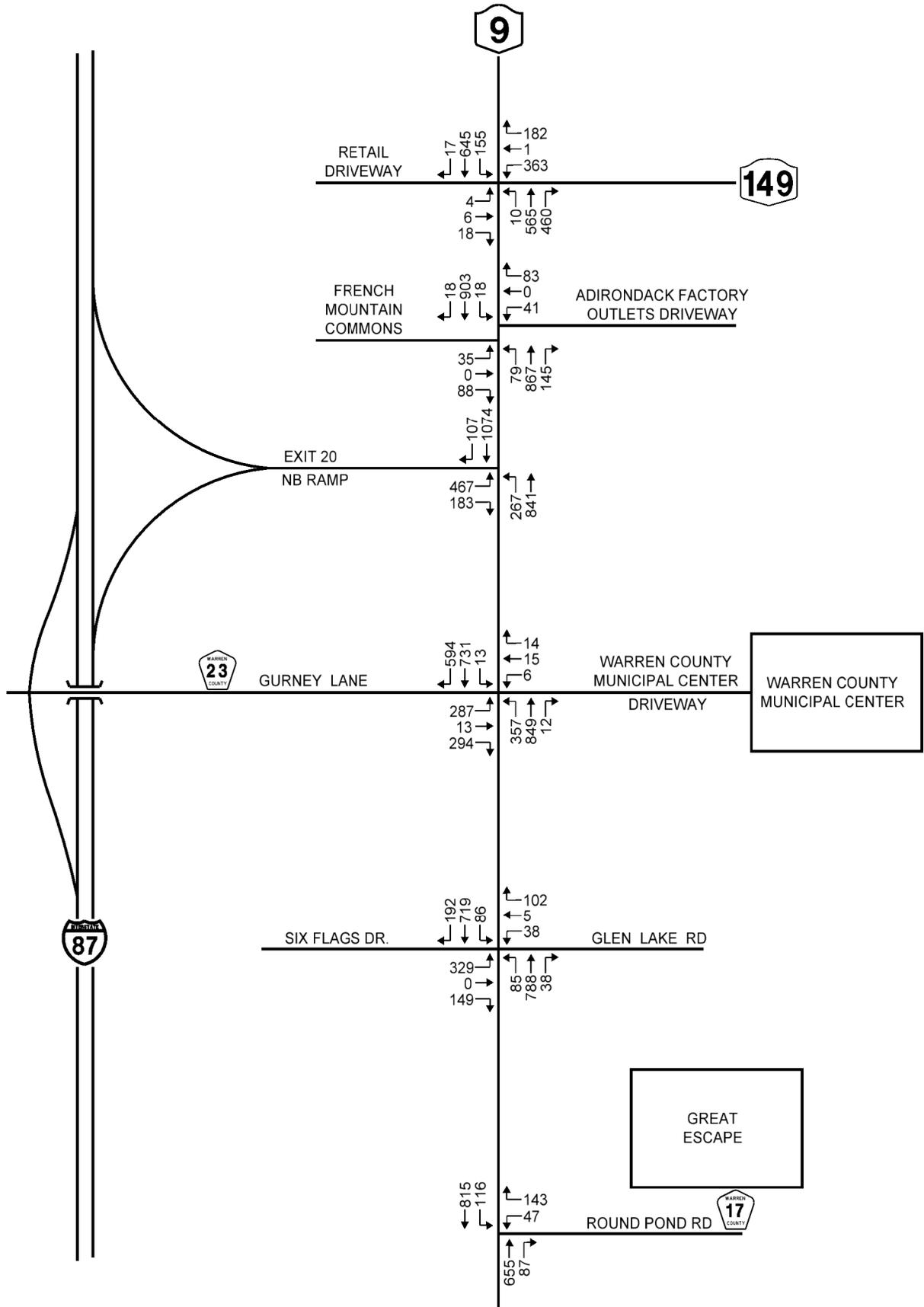


PROJECT: 08-081d

DATE: 9/09

FIGURE: III.8

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2028 FUTURE  
TRAFFIC VOLUMES - HIGH GROWTH  
SATURDAY PEAK HOUR

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK



PROJECT: 08-081d

DATE: 9/09

FIGURE: III.9

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## IV. Improvement Alternatives

Improvement alternatives were identified to address the development pressures that are anticipated with the three development scenarios listed in Chapter III. The following development scenarios are discussed in detail in this chapter:

- A 2013 analysis illustrating the short-term impacts at the studied intersections in the corridor associated with growth from known development projects.
- A 2028 analysis of the key corridor including several design alternative options and low growth and high growth volume scenarios.
- A 2028 assessment of the southern corridor study area intersections limiting improvements to the studied intersections.
- A discussion of low cost improvements for the corridor.
- A discussion of the interchange alternatives.

A table is included in Appendix F that summarized all of the alternatives that were considered. A qualitative rating system was developed to evaluate various aspects of each alternative including constructability, cost, affect on pedestrians, affect on traffic, and environmental impacts.

### Short-Term 2013 Level of Service Analysis

A level of service analysis was conducted at all of the study area intersections for the short-term 2013 Future traffic volume condition using the Synchro 6 Software which automates the procedures contained in the *2000 Highway Capacity Manual*. The relative impact of traffic growth in the project corridor can be determined by comparing the 2008 Existing operations to the 2013 Future traffic volume condition. Appendix G contains the detailed HCS LOS reports for the 2013 Future volume condition. Table IV-1 shows the results of the level of service analysis.

The analysis indicates the key study area corridor intersections and unsignalized driveways currently operating at poor levels of service will continue to degrade as additional traffic is added to the traffic network. Additional large increases in delay are expected on the US Route 9 southbound approach at the Exit 20 Northbound ramp intersections. Overall the increase in traffic volumes is expected to continue to impact the flow of traffic through the key corridor and impact traffic entering and exiting I-87.

The 2013 Future traffic volume condition indicates that the study area intersections located in the Southern Corridor along US Route 9 will continue to operate adequately with the anticipated growth in the project area through 2013. The intersection of Gurney Lane with the I-87 Exit 20 southbound ramps will continue to operate with long vehicle delays on the southbound intersection approach.

The following sections address potential improvements that could be implemented at the study area intersections that would maintain or improve intersection operations through the 2028 Future traffic volume conditions.

**Table IV-1 – Future 2013 Level of Service (Saturday Peak Hour)**

Intersection		Control	Existing 2008	Future 2013
Key Corridor Intersections	Route 9/Route 149	S	E (79.0) E (73.9) C (36.7) D (47.1) B (12.4) D (49.0) C (32.0)	F (83.3) F (80.5) D (35.5) E (70.8) B (14.0) E (59.5) D (36.6)
	Driveway EB   LTR			
	Route 149 WB   LT			
	Route 9 NB   LT			
	Route 9 SB   L			
	Route 9 SB   L			
	Route 9 SB   TR			
	Overall		D (41.1)	D (49.6)
	Route 9/French Mountain Commons Drwy/ Adirondack Factory Outlets Drwy	TW	E (44.2) F (57.1) A (9.7) B (10.3)	F (76.1) F (114.5) B (10.1) B (11.1)
	French Mountain Drwy EB   LTR			
Adirondack Factory Drwy WB   LTR				
Route 9 NB   L				
Route 9 SB   L				
Route 9/I-87 Exit 20 NB Ramps	S	E (72.2) D (43.1) E (63.5) B (15.6) F (86.0) A (0.1)	E (76.5) D (42.9) E (67.2) B (18.1) F (138.0) A (0.1)	
I-87 Exit 20 NB Ramp EB   L				
Route 9 NB   R				
Route 9 NB   T				
Route 9 SB   T				
Route 9 SB   R				
Overall		E (57.0)	E (77.7)	
Southern Corridor Intersections	I-87 Exit 20 SB Ramp/Gurney Lane	TW	A (7.7) F (*) B (10.5)	A (8.4) F (*) B (10.7)
	Gurney Ln WB   L			
	I-87 Exit 20 SB Ramp SB   L			
	I-87 Exit 20 SB Ramp SB   R			
	Route 9/Gurney La	S	C (31.0) C (22.4) C (21.8) C (21.6) B (10.7) A (5.6) A (3.0) A (7.2) B (11.3) A (8.4)	C (30.2) C (23.9) C (23.2) C (22.9) B (20.0) A (7.9) A (4.0) B (11.0) B (19.5) B (12.2)
	Gurney La EB   LT			
	Gurney La EB   R			
	Municipal Center Dwy WB   LT			
	Municipal Center Dwy WB   R			
	Route 9 NB   L			
Route 9 NB   T				
Route 9 NB   R				
Route 9 SB   L				
Route 9 SB   T				
Route 9 SB   R				
Overall		B (11.6)	B (16.1)	
Route 9/Glen Lake Rd/Six Flags Dr	S	D (39.2) C (27.5) C (25.5) C (26.5) A (9.0) B (17.6) B (10.2) B (15.4) A (0.1)	D (39.8) C (27.3) C (25.5) C (26.3) B (10.9) C (21.6) B (12.7) B (18.3) A (0.1)	
Six Flags Dr EB   LT				
Six Flags Dr EB   R				
Glen Lake Rd WB   LT				
Glen Lake Rd WB   R				
Route 9 NB   L				
Route 9 NB   TR				
Route 9 SB   L				
Route 9 SB   T				
Route 9 SB   R				
Overall		B (19.5)	C (21.8)	
Route 9/Round Pond Rd	TW	C (21.0) A (9.2)	D (26.9) A (1.2)	
Round Pond Rd WB   LR				
Route 9 SB   L				

Key: TW, AW, S, R = Two-way stop, All-way stop, Signal, or Roundabout controlled intersection  
 NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound intersection approaches  
 L, T, R = Left-turn, through, and/or right-turn movements, -- = Not applicable  
 L|T|R = LR represents the existing geometry, LTR represents the future geometry  
 X (Y.Y) = Level of Service (Average delay in seconds per vehicle)

## Key Study Area Corridor Alternatives

As described previously, the key study area corridor along US Route 9 extends from the NY Route 149 intersection to the I-87 Exit 20 NB Ramp intersection. This area has been identified as a critical component of the *Exit 20 Corridor Management Plan* due to current retail and business demands of existing corridor traffic capacity on US Route 9 and the potential future growth and/or economic opportunities that could be limited as a result of traffic congestion. Therefore, a level of service analysis was conducted at each of the key study area corridor intersections to determine impacts to the transportation network with future growth. The analysis indicates that all of the studied intersections in the key corridor will require mitigation once 2028 future conditions are met (both low growth and high growth). Table IV-2 outlines the future operating conditions and potential mitigation options for each intersection. It is noted that the intersection improvements can be implemented independent of one another; however, individual intersection improvements to provide additional capacity is only one step in mitigating congestion issues along the entire corridor.

In addition to Synchro 6 Software, SIDRA software was used to assess the roundabout alternatives. Appendix H contains the detailed HCS LOS reports for the 2028 Build condition. A level of service comparison of the proposed intersection improvements is shown on Table IV-2.

**Table IV-2 – Key Study Area Intersection Level of Service (Saturday Peak Hour)**

Intersection	Control	Low Growth		High Growth		
		Future 2028	Future 2028 w/Imp	Future 2028	Future 2028 w/Imp	
Route 9/Route 149		S				
Driveway EB	LTR		F (89.1)	D (44.9)	F (89.1)	D (44.9)
Route 149 WB	LT		F (92.5)	--	F (104.7)	--
	R		C (33.8)	--	C (34.0)	--
	[LL]		--	D (44.3)	--	D (47.6)
	[TR]		--	C (32.4)	--	C (32.4)
Route 9 NB	[L]		--	B (17.7)	--	B (18.2)
	[T]		--	D (35.5)	--	D (40.6)
	LT		F (394.4)	--	F (569.3)	--
	R		B (16.2)	B (10.6)	B (16.3)	B (10.7)
Route 9 SB	L	E (79.8)	C (29.8)	F (85.6)	C (31.7)	
	TR	D (47.8)	B (18.0)	D (52.3)	B (19.6)	
Overall			F (128.2)	C (27.4)	F (172.2)	C (29.6)
Route 9 NB		R	--	A (7.7)	--	A (7.7)
Route 149 WB	LTR		--	B (18.8)	--	C (20.7)
Route 9 SB	LTR		--	B (12.3)	--	B (13.4)
Driveway EB	LTR		--	B (13.1)	--	B (13.8)
Overall			--	B (12.1)	--	B (13.0)
Route 9/French Mountain Commons Drwy/ Adirondack Factory Outlets Drwy		TW				
French Mountain Drwy EB	LTR		F (479.6)	--	F (*)	--
Adirondack Factory Drwy WB	LTR		F (695.3)	--	F (*)	--
Route 9 NB	L		B (10.8)	--	B (11.2)	--
Route 9 SB	L		B (13.0)	--	B (14.3)	--
French Mountain Drwy EB		S	--	E (68.3)	--	E (68.3)
	TR		--	D (49.3)	--	D (49.3)
Adirondack Factory Drwy WB	L		--	F (99.5)	--	F (99.5)
	TR		--	D (49.2)	--	D (49.2)
Route 9 NB	L		--	C (34.3)	--	E (65.0)
	TR		--	D (45.8)	--	E (58.3)
Route 9 SB	L		--	B (17.5)	--	B (17.5)
	TR		--	E (59.0)	--	E (77.4)
Overall			--	D (52.1)	--	E (66.1)
Route 9 NB		R	--	C (24.3)	--	C (34.5)
Adirondack Factory Drwy WB	LTR		--	D (37.9)	--	D (40.5)
Route 9 SB	LTR		--	C (28.0)	--	D (39.9)
French Mountain Drwy EB	LTR		--	D (39.3)	--	D (43.6)
Overall			--	C (27.6)	--	D (37.6)
Route 9/I-87 Exit 20 NB Ramps		S				
I-87 Exit 20 NB Ramp EB	[LL]		--	C (34.5)	--	D (41.0)
	L		F (98.9)	--	F (166.4)	--
	R		D (42.8)	B (16.3)	D (44.8)	B (19.9)
Route 9 NB	L		E (77.3)	C (25.8)	F (81.4)	D (42.0)
	T		C (23.0)	A (9.8)	C (27.8)	B (14.6)
Route 9 SB	[TTR]		--	C (24.5)	--	C (33.7)
	T		F (230.1)	--	F (328.7)	--
	R		A (0.1)	--	A (0.1)	--
Overall				F (117.7)	C (22.0)	F (167.1)
Route 9 NB		R	--	B (17.4)	--	B (18.0)
Back Access Rd WB	[L]R		--	--	--	--
Route 9 SB	[L]TR		--	A (8.2)	--	A (9.8)
I-87 Exit 20 NB Ramp EB	L[T]R		--	C (33.9)	--	D (46.8)
Overall			--	B (17.6)	--	C (22.1)

Key: TW, AW, S, R = Two-way stop, All-way stop, Signal, or Roundabout controlled intersection  
 NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound intersection approaches  
 L, T, R = Left-turn, through, and/or right-turn movements, -- = Not applicable  
 L[T]R = LR represents the existing geometry, LTR represents the future geometry  
 X (Y.Y) = Level of Service (Average delay in seconds per vehicle)  
 \* = Delay exceeds 1,000 seconds

The following intersection observations are evident from the evaluation:

- US Route 9/NY Route 149 – The level of service analysis indicates that this signalized intersection will operate at an overall LOS F during the Saturday peak hour with several movements operating at a LOS F during the 2028 Future traffic volume condition for both growth scenarios under existing geometric conditions. Two alternative traffic control improvement options were evaluated at this location.

*Signalized Control* – The levels of service analysis indicates that this signalized intersection can be improved if the existing hatched area located opposite the southbound US Route 9 left-turn lane is restriped to provide an exclusive northbound left-turn lane and if the westbound NY Route 149 approach is widened to accommodate two exclusive left-turn lanes with a shared through/right-turn lane. The level of service analysis indicates that this intersection will operate at an overall LOS C during the 2028 Future traffic volume condition for both growth scenarios with all movements operating at a LOS D or better with these signalized improvements. It is noted that US Route 9 would have to be widened south of NY Route 149 to accommodate the two left-turn lanes from NY Route 149. The following pros and cons are associated with this improvement alternative:

Pros

- Increase capacity and improved levels of service.
- Red and green phases of a traffic signal result in vehicle platoon that maintain gaps in traffic for pedestrians and business driveways along corridor.

Cons

- Increase pavement width for pedestrian crossings at signalized intersections.
- Vehicle queues at intersections remain long.
- Property impacts.
- Cost.

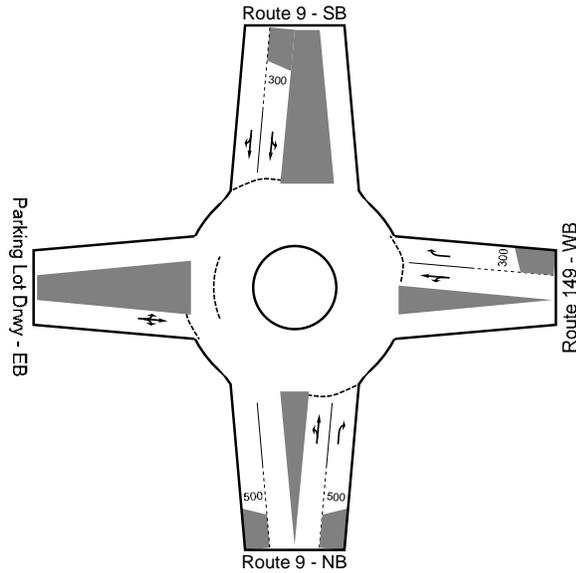


Route 9 southbound at Rt 9/Rt 149 as a signalized intersection



Route 149 westbound at Rt 9/Rt 149 as a signalized intersection

*Roundabout Control* – With the construction of a two lane roundabout at this intersection, vehicle delays will be substantially reduced. A roundabout designed for 2028 Future traffic volumes for both growth scenarios will require a single lane on the eastbound retail parking lot driveway approach and two lanes on the remaining approaches as shown on the following page. The level of service analysis indicates that this intersection will operate at an overall LOS B with all approaches operating at a LOS C or better during the 2028 Future traffic volume condition for either growth scenario.



**Roundabout geometry required at the Rt 9/Rt 149 intersection for the 2028 Future Traffic Volumes**

The following pros and cons are associated with this improvement alternative:

Pros

- Increase capacity and improved levels of service.
- Decreased vehicular queues on the mainline.
- Safety benefits associated with less severe accidents and slower speeds.
- Reductions in speed as vehicles enter the key corridor.
- Staged pedestrian crossings on each intersection approach.

Cons

- Fewer gaps in mainline traffic flow at driveways and for pedestrian crossing due to removal of traffic signal which creates vehicle platooning.
- Property impacts.
- Cost.



**Route 9 southbound at Rt 9/Rt 149 as a roundabout controlled intersection**



**Route 149 westbound at Rt 9/Rt 149 as a roundabout controlled intersection**

- US Route 9/French Mountain Commons Driveway/Adirondack Factory Outlets Driveway  
The level of service analysis indicates that the eastbound and westbound driveway approaches to this offset unsignalized intersection will continue to operate poorly during the 2028 Future traffic volume conditions for either growth scenario. The northbound and southbound US Route 9 left-turn movements that use the TWLTL will continue to operate at a LOS B during the Saturday peak hour. Vehicles that exit the driveways at this intersection and at other driveways located along US Route 9 will continue to rely on courtesy gaps. Two alternative traffic control improvement options were evaluated at this location.

*Signalized Control* – The levels of service analysis indicates that delay on the minor street approaches to this unsignalized intersection can be improved if they were widened to accommodate exclusive left-turn lanes and a traffic signal was installed. Constraints with the existing parking lots and building locations would make it difficult to create three lane approaches at both driveways. The installation of a traffic signal would also result in vehicle delays on the northbound and southbound US Route 9 approaches and long vehicle queues extending into adjacent intersections. The level of service analysis indicates that this intersection will operate at an overall LOS D/E during the 2028 Future traffic volume condition for Low Growth and High Growth scenarios with some movements operating at a LOS E/F after the installation of a traffic signal. The following pros and cons are associated with this improvement alternative:

Pros

- Improved levels of service for the Outlet Driveways.
- Protected pedestrian accommodations would be provided for existing heavy flows.

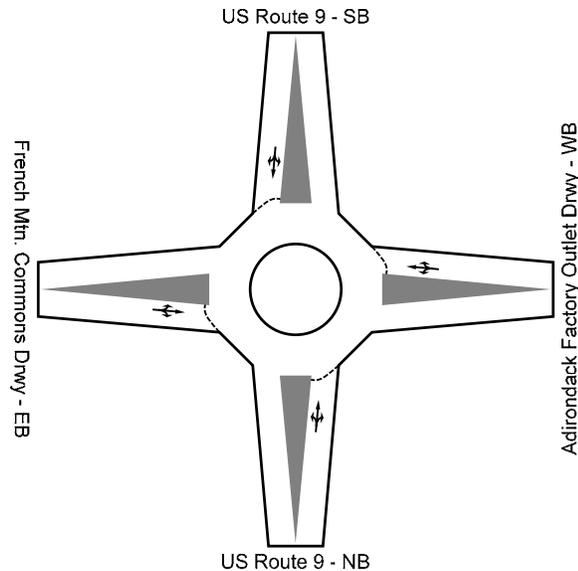
Cons

- Mainline US Route 9 delay will increase.
- Vehicles on US Route 9 will queue through adjacent intersections.
- Design constraints on driveway approaches creating impacts to businesses.
- Overall intersection operation still constrained with improvement.

It is noted that there were over 600 pedestrians observed crossing US Route 9 and the side streets in and around this intersection during the Saturday peak hour data collection. Therefore, the pedestrian warrant for the installation of a traffic signal is met based on the criteria found in the *Federal Manual of Traffic Control Devices (FMUTCD)*. However, installation of a traffic signal with an exclusive pedestrian phase to accommodate the heavy flow causes the mainline queues on US Route 9 to extend through the adjacent intersections at NY Route 149 and the I-87 Exit 20 NB Ramp. A review of the accident history on US Route 9 indicates that there were no pedestrian accidents reported through the Key Study Area Corridor. A separate traffic signal located mid-block on US Route 9 to facilitate pedestrian crossings or traffic exiting out of the outlets would create long vehicular queues along US Route 9 extending back into the adjacent intersections. It is noted that the pedestrian traffic should continually be monitored in the key corridor. Some of the improvement options have the potential to increase traffic flow and vehicle speed in the corridor that may result in more difficult pedestrian movements.

*Roundabout Control* – The evaluation also indicates that the construction of single lane roundabout as shown below will relieve congestion at this intersection. The level of

service analysis indicates that a single lane roundabout at this intersection will operate at an overall LOS C/D with all approaches operating at a LOS D or better during the 2028 Future traffic volume condition for the Low and High Growth scenario.



**Roundabout geometry required at the Rt 9/French Mountain Commons/Factory Outlets intersection for the 2028 Future Traffic Volumes**

The following pros and cons are associated with this improvement alternative:

Pros

- Increase capacity and improved levels of service.
- Decreased vehicular queues on the Outlet Driveways.
- Safety benefits associated with less severe accidents and slower speeds.
- Improved pedestrian accommodations.

Cons

- Construction will require right-of-way and impact existing parking lots.
- Cost.
- US Route 9/I-87 Exit 20 NB Ramps – The level of service analysis indicates that this intersection will operate at an overall LOS F with several travel movements operating at a LOS E/F during the 2028 Future traffic volume condition for either growth scenario under existing geometric conditions. Two alternative traffic control improvement options were evaluated at this location.

*Signalized Control* – The levels of service analysis indicates that this signalized intersection can be improved if the existing southbound right-turn lane is converted to a shared through/right-turn lane and if the eastbound I-87 Exit 20 NB Ramp approach is widened to accommodate two exclusive left-turn lanes with a separate right-turn lane. The level of service analysis indicates that this intersection will operate at an overall LOS C during the 2028 Future traffic volume condition for both growth scenarios with all

movements operating at a LOS D or better with these signalized improvements. It is noted that US Route 9 would have to be widened north of the ramp to accommodate two exclusive left-turn lanes. The existing right turn lane from the US Route 9/Gurney Lane intersection located to the south would also have to be extended back to the I-87 Exit 20 NB Ramp intersection to accommodate the two southbound through lanes. The following pros and cons are associated with this improvement alternative:

Pros

- Increase capacity and improved levels of service.
- Maintains gaps in traffic for pedestrians and business driveways along corridor.
- Signalized control allows for the potential to control any back-ups onto I-87 with signal detection.

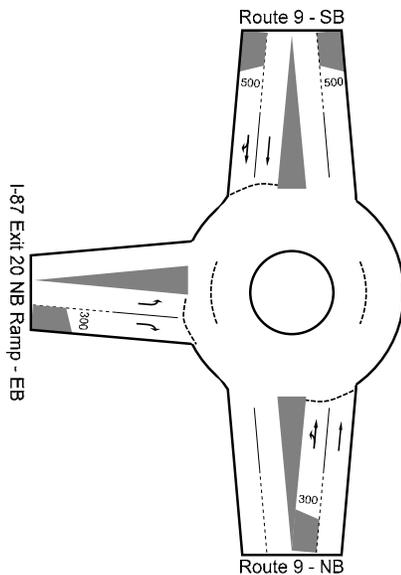
Cons

- Increase pavement width for pedestrian crossings at signalized intersections.
- Vehicle queues at intersections remain long.
- Cost.

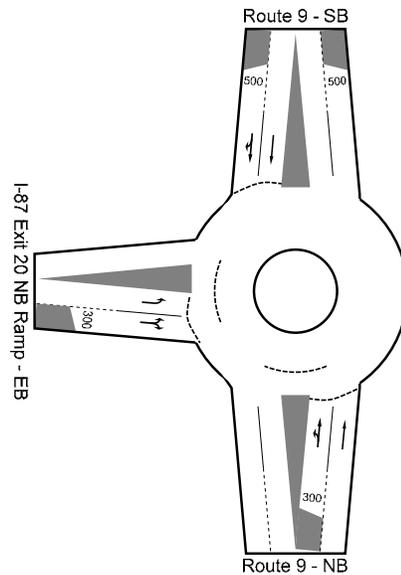


Signalized geometry required at the Rt 9/I-87 Exit 20 NB Ramp and Rt 9/Gurney Lane intersections for the 2028 Future Traffic Volumes

*Roundabout Control* – The analysis indicates that a two-lane roundabout would be required to accommodate future traffic volumes at this intersection. The geometry required at this intersection is shown below and indicates slightly different geometry on the eastbound ramp approach for the two growth scenarios. Future traffic volumes for both growth scenarios will require two through lanes with a shared left-turn lane on the northbound US Route 9 approach. It is noted that the two northbound through lanes should merge back into one lane before entering the key study area corridor. The southbound US Route 9 approach will require two through lanes with a shared right-turn lane. The two southbound through lanes should be extended to the Gurney Lane intersection located to the south to create smooth flow of traffic between these two closely spaced intersections. The level of service analysis indicates that this intersection will operate at an overall LOS B with all approaches operating at a LOS B or better in the Low Growth scenario and a LOS C with all approaches operating at a LOS D or better in the High Growth scenario.



**Roundabout geometry required at the Rt 9/I-87 Exit 20 intersection for the 2028 Future Traffic Volumes – Low Growth**



**Roundabout geometry required at the Rt 9/I-87 Exit 20 intersection for the 2028 Future Traffic Volumes – High Growth**

The following pros and cons are associated with this improvement alternative:

Pros

- Increase capacity and improved levels of service.
- Decreased vehicular queues on the mainline.
- Safety benefits associated with less severe accidents and slower speeds.
- Reductions in speed as vehicles enter the key corridor.

Cons

- Fewer gaps in mainline traffic flow at driveways and for pedestrian crossing.
- Unable to control back-ups onto I-87 without signal detection.
- Cost.

In addition to the specific intersection improvement alternatives, three corridor wide improvement alternatives were evaluated. These alternatives are summarized below and include a median alternative, a back access alternative, and an access management alternative.

### 1. US Route 9 Median Alternative

The *US Route 9 Median Alternative* includes the installation of a raised median along the entire US Route 9 corridor from NY Route 149 to the I-87 Exit 20 NB ramp. The median would restrict all left-turn movements in and out of the driveways located on US Route 9. This alternative requires that roundabout control be provided at the NY Route 149 and I-87 Exit 20 NB ramp intersections so that traffic can utilize the roundabouts to make U-turns at the end of the corridor. In addition, the option includes a single lane roundabout at the US Route 9/French Mountain Commons Driveway/ Adirondack Factory Outlets Driveway located at the midway point of the corridor. The midway roundabout will improve the driveway access at two of the larger outlet centers and will provide another point for vehicles to make U-turns. If the center median is not included in the alternative, all vehicles in the corridor will utilize the NY Route 149 or Exit 20 NB ramp intersections for turning movements. This concept is shown on Figure IV.1.

The pros and cons associated with this alternative are similar to what is listed for the roundabout alternatives for the individual intersections. Additional pros and cons include the following:

#### Pros

- Center median provides a protected refuge for pedestrians.
- Reduction in left-turn conflicts with driveway restrictions.

#### Cons

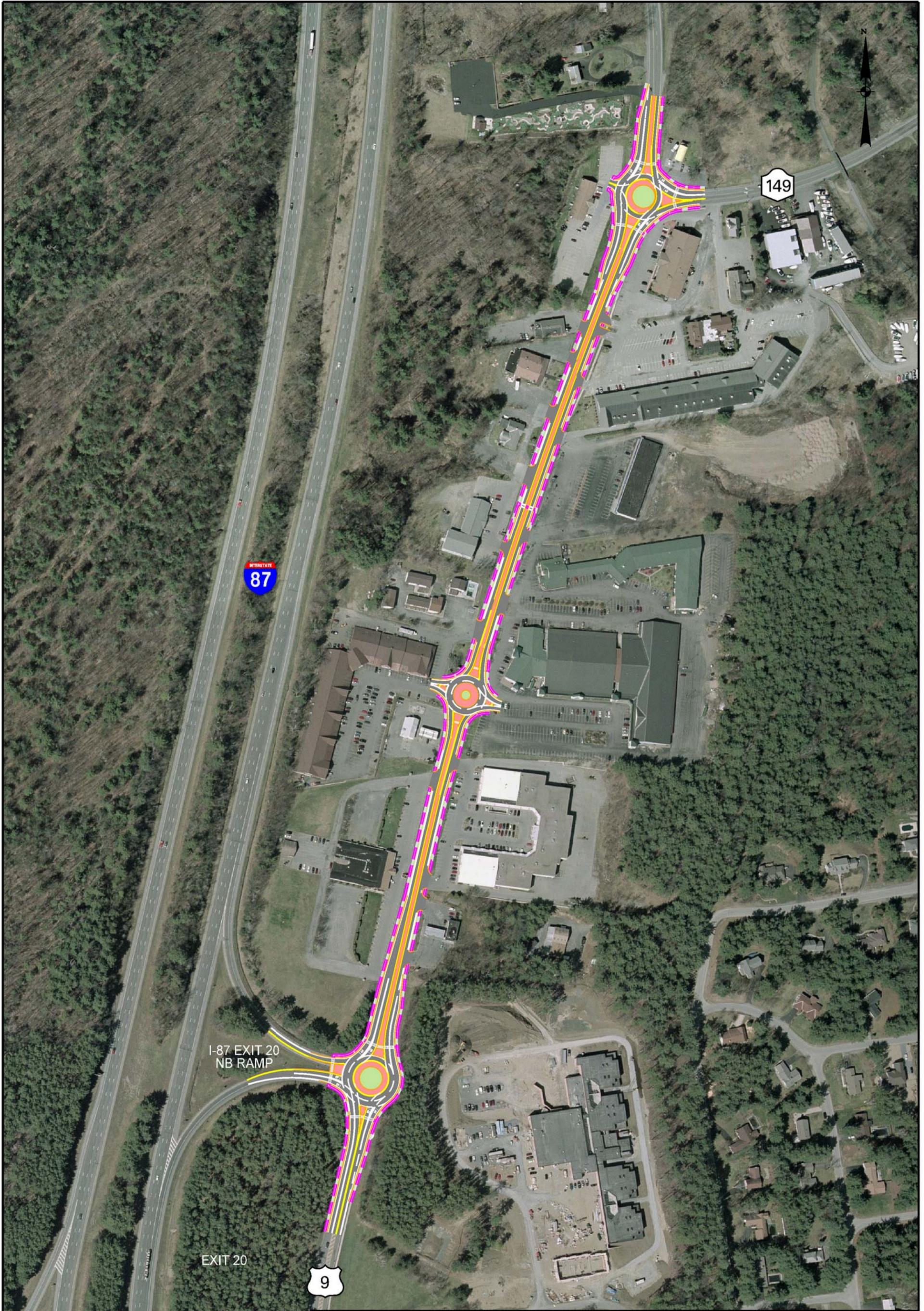
- Change in access patterns to businesses along the corridor.



Route 9 northbound with a concrete median



Route 9 northbound with a concrete median



I-87 EXIT 20  
NB RAMP

EXIT 20

9

149

ROUTE 9 MEDIAN  
ALTERNATIVE CONCEPT

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK

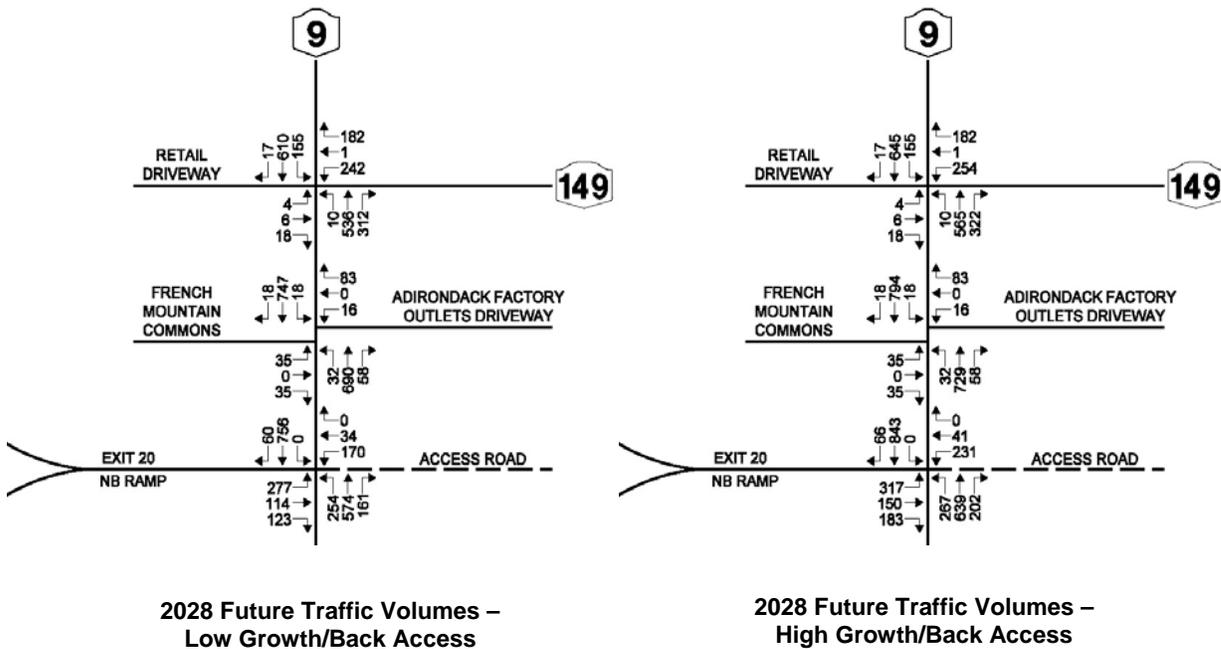


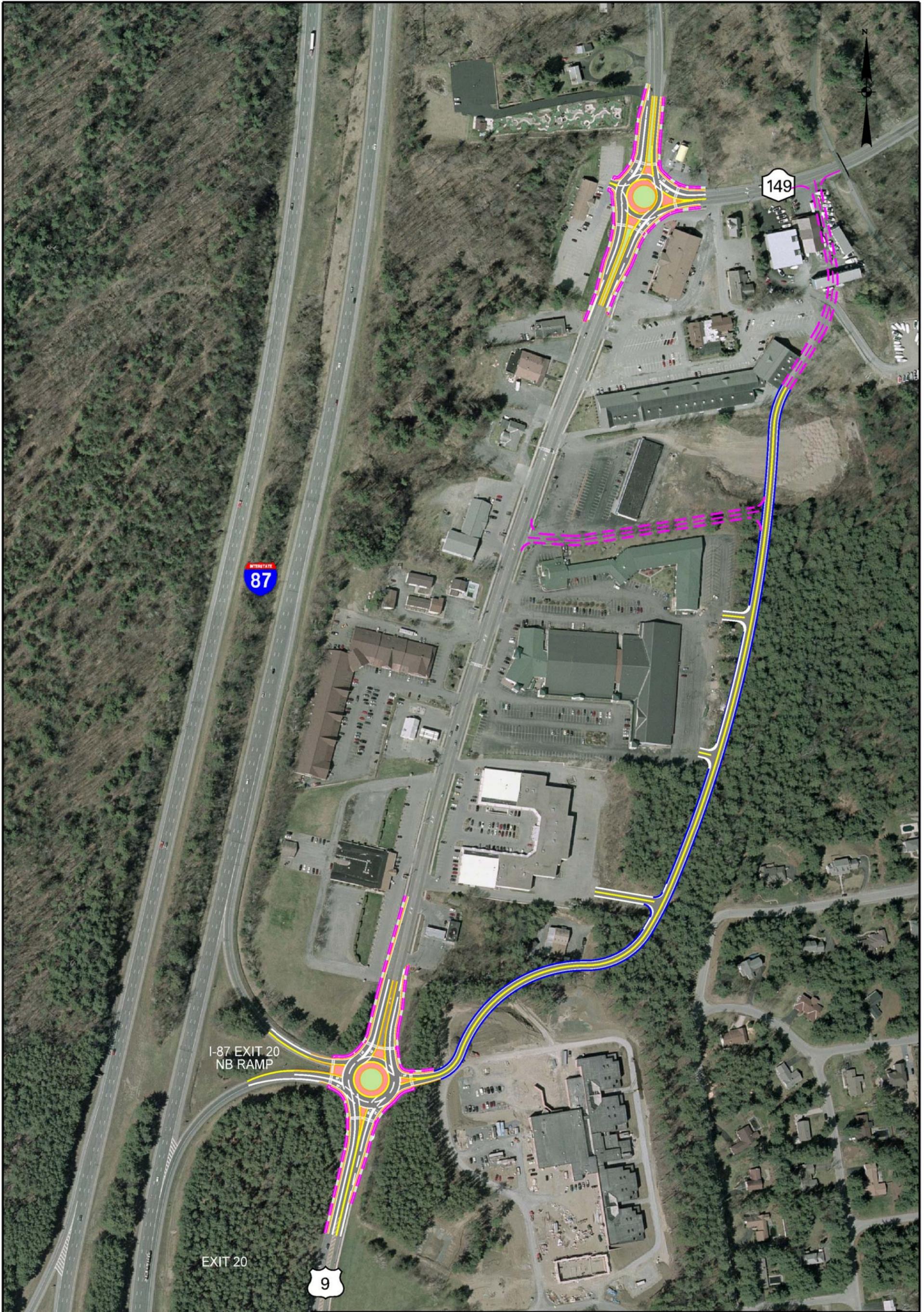
The accident history indicated that approximately 30% of the accidents were related to turning vehicles. The access management recommended with this alternative will reduce the vehicle conflicts from turning vehicles and has the potential to reduce accidents in the corridor. Overall, this alternative provides the most affective means of access management by providing consistent left-turn limitations to the driveways along the corridor. Since a center turn lane currently exists through the key corridor, widening would not be required to construct a center raised median. Providing additional internal connections between parcels will further reduce the flow of traffic of US Route 9 in the corridor and further enhance the access management already provided with this alternative.

## 2. Back Access Alternative

The *Back Access Alternative* assumes that a public road will be constructed on the east side of US Route 9 that connects from the I-87 Exit 20 NB Ramp intersection and runs parallel to US Route 9. In order to meet the FHWA break in access criteria at the I-87 northbound ramp intersection, the back access connection would need to provide connectivity and therefore would need to provide a connection either to NY Route 149 or to US Route 9 as shown on Figure IV.2. In addition to connectivity through the corridor, the back access alternative will provide secondary access to the backside of the existing outlet buildings.

The construction of the back access road would reduce the traffic through the Key Study Area Corridor resulting from the diversion of vehicles. It was assumed that patrons accessing shops on both the east and west side of US Route 9 will take advantage of the back access. It is noted that the back access would be considered the primary access to the development of the McCormack and Kenny properties included in the High Growth scenario. A back access connection to NY Route 149 will result in the highest diversion of traffic through the US Route 9 key corridor. The revised 2028 Future traffic volumes for the Low and High Growth scenarios at the three key affected intersections with a connection to NY Route 149 is shown below.





BACK ACCESS ALTERNATIVE CONCEPT

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK

 CREIGHTON MANNING ENGINEERING, LLP		
PROJECT: 08-081d	DATE: 9/09	FIGURE: IV.2

A level of service analysis was conducted for the *Back Access Alternative* at the Key Study Area intersections on US Route 9 with a connection to NY Route 149. The alternative assumes unsignalized traffic control at the French Mountain Commons Driveway/Adirondack Factory Outlet Driveway intersection, roundabout control at the NY Route 149 intersection, and assumes that a fourth leg will be added to the proposed roundabout at the I-87 Exit 20 NB Ramp intersection. Appendix H contains the detailed HCS LOS reports for the 2028 Build condition. The level of service analysis for the *Back Access Alternative* is shown on Table IV-3.

**Table IV-3 – Back Access Drwy Alternative Level of Service (Saturday Peak Hour)**

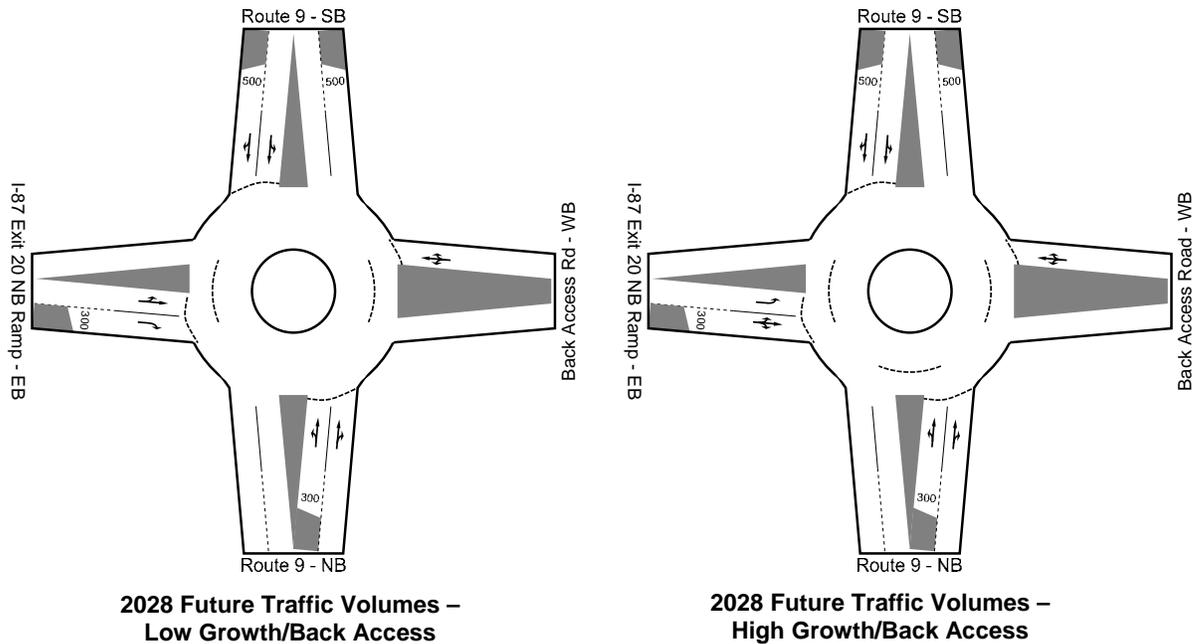
Intersection	Control	Future 2028 w/Imp	
		Low Growth	High Growth
Route 9/Route 149	R		
Route 9 NB LTR		A (7.6)	A (7.6)
Route 149 WB LTR		B (15.5)	B (16.5)
Route 9 SB LTR		A (9.5)	A (9.5)
Driveway EB LTR		B (11.2)	B (11.7)
Overall		B (10.2)	B (10.5)
Route 9/French Mountain Commons Drwy/ Adirondack Factory Outlets Drwy	TW		
French Mountain Drwy EB LTR		F (62.4)	F (71.9)
Adirondack Factory Drwy WB LTR		D (33.7)	E (36.8)
Route 9 NB L		A (9.9)	B (10.1)
Route 9 SB L		B (10.5)	B (10.6)
Route 9/I-87 Exit 20 NB Ramps	R		
Route 9 NB LTR		B (16.5)	B (16.9)
Back Access WB LTR		C (25.7)	D (42.5)
Route 9 SB LTR		B (11.5)	B (15.9)
I-87 Exit 20 NB Ramp EB LTR		C (30.8)	D (45.3)
Overall		B (19.0)	C (26.1)

Key: TW, AW, S, R = Two-way stop, All-way stop, Signal, or Roundabout controlled intersection  
 NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound intersection approaches  
 L, T, R = Left-turn, through, and/or right-turn movements, -- = Not applicable  
 L|T|R = LR represents the existing geometry, LTR represents the future geometry  
 X (Y.Y) = Level of Service (Average delay in seconds per vehicle)  
 \* = Delay exceeds 1,000 seconds  
 NA = Not Applicable

The following observations are evident from the *Back Access Alternative* evaluation:

- US Route 9/NY Route 149 – The level of service analysis indicates that this intersection will operate at an overall LOS B during 2028 Future traffic conditions for the Low and High Growth scenarios with all approaches operating at a LOS B or better. It is recommended that the proposed roundabout be constructed similarly to the option detailed earlier in this section.
- US Route 9/French Mountain Commons Driveway/Adirondack Factory Outlets Driveway The level of service summary indicates that delay on the minor street approaches will improve due to the construction of a back access road from the I-87 Exit 20 NB Ramp intersection and diversion of traffic from the US Route 9 corridor. However, the eastbound and westbound driveway approaches will continue to operate with poor levels of service during the 2028 Future traffic volume conditions for both growth scenarios as uncontrolled accesses.
- US Route 9/I-87 Exit 20 NB Ramps – The level of service analysis indicates that this intersection will operate at an overall LOS B/C during 2028 Future traffic conditions for the Low and High Growth scenarios with all approaches operating at a LOS D or better.

It is recommended that the proposed roundabout be constructed similarly to the option detailed earlier in this section with the addition of a single lane on the westbound back access road approach as shown below.



The pros and cons associated with the study area intersection improvements are similar to the discussions above. Additional pros and cons associated with the alternative include the following:

Pros

- Reduction in traffic on US Route 9 with diversions.
- Increased capacity and improved operation at commercial driveways on US Route 9.
- Reduced flow of traffic on driveways with back access driveways.
- Better utilization of existing available parking lots at outlets.

Cons

- Design constraints associated with back access connector including offsets to the Warren County Correctional Facility and offsets to the adjacent residential neighborhoods.
- Improvements will be required to back of businesses.
- Potential environmental impacts, i.e., wetlands.
- FHWA break in access approval process.
- Potential property and ROW impacts.
- Potential impacts to the trail bridge with NY Route 149 connection.

As noted, a mid-block connection to US Route 9 from the back access is another option to this alternative. This connection would not divert as much traffic off of US Route 9, however, would still provide benefits to the corridor. It is also noted that the back access alternative allows for the opportunity for changes to the vision of the US Route 9 corridor by allowing for access if parking for the commercial developments in the corridor were shifted to the back of the buildings

and the building frontages were shifted closer to US Route 9. This type of corridor has been implemented in Manchester, Vermont.

### 3. Access Management Alternative

The access management alternative will utilize key access management techniques to improve the flow of traffic in the key corridor; including, elimination of driveways, consolidation of driveways, providing consistent driveway cross-sections, and improving cross-connectivity between parcels. A conceptual access management plan outlining potential modifications in the corridor is provided on Figure IV-3. Access management provides an important means of maintaining mobility by systematically controlling the location, spacing, design and operation of driveways and street connections in a corridor. Access management balances mobility and access in order to maximize the value of a land parcel while ensuring efficient traffic flow. Well coordinated access management can reduce crash potential, preserve roadway capacity and decrease congestion.

In addition to access management reducing vehicular conflict it also reduces conflicts with pedestrian and bicycle traffic. The access management alternative would include the implementation of improvements to the US Route 9 intersections with NY Route 149 and the Exit 20 NB Ramps. Since implementation of access management in the corridor will not change the traffic volumes in the corridor, the intersection analysis will be consistent with the analysis presented earlier in this chapter. The intersection improvements could include the implementation of either the roundabout or signalized improvements.

Regarding access management, it is noted that the current Town of Queensbury Codes include guidelines on Access Management as included in Chapter 179, Article 19 of the Town of Queensbury Code Book. A copy of Article 19 is included in Appendix I. These current standards provide specifics on the layout, location, and design of driveways as well as the number of driveways and spacing. These standards should be used during the implementation of the access management alternative and in the future as growth continues in the corridor. These guidelines should be strictly adhered to by the Town in the approval and development of new sites and redevelopment sites in the project corridor. It is further recommended that the Town of Queensbury adopt A/GFTC's *Access Management Study* as an additional support mechanism for the implementation of access management principles through the corridor. Adhering to standards for consolidation of driveways or limiting the number of curb cuts will result in a better defined access plan for the corridor as changes are made to individual parcels beyond the implementation of the proposed alternative plan. In addition, a sample access management checklist is included in Appendix I which could be used by the Town as an additional reminder during the site plan review process. A table listing types of Access Management Tools with typical advantages and disadvantages is also included in Appendix I. Lastly, an article entitled *Safe Access is Good for Business*, published by the Federal Highway Administration (FHWA), is provided in Appendix I. This article provides good information for the Town to use and could be used as a tool to further educate the public.



**KEY:**

-  PARCELS WITH MULTIPLE ACCESS DRIVEWAYS  
POTENTIAL SITES FOR CONSOLIDATION
-  POTENTIAL VEHICULAR CROSS-SECTIONS
-  POTENTIAL LOCATIONS FOR IMPROVED PEDESTRIAN CONNECTIONS

**KEY CORRIDOR  
ACCESS MANAGEMENT CONCEPTS**

**EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK**



PROJECT: 08-081d

DATE: 9/09

FIGURE: IV.3

bdilberbeck  
 F:\pfr\project\08-081d\exit\_20\ecad\dm\fig\ures\fig\_IV-3.dgn

A challenge in the implementation of this alternative is to improve the existing conditions that do not adhere to current access management principles. Focus in the key corridor should include reducing the number of curb cuts, providing consistency in the driveway designs, and enhancement of cross-connections. This plan aims to provide more consistent curb cut widths which currently range between 23 and 63 feet and provide additional vehicular and pedestrian cross-connections. The following implementation guidelines are presented to assist in the success of this alternative.

*Step 1* – Review the alternative concept and the current access management codes and standards in place for the Town. This would include review of the codes contained in Article 19 and the Town Comprehensive Plan. Adopting A/GFTC's *Access Management Study* should also be considered at this step in the process.

*Step 2* – Hold Workshops with the Stakeholders to identify problem areas and present ideas for solutions. In a process where the Stakeholders are not looking for changes to their parcels, education and “buy in” is a critical step in the process especially for the implementation of changes within the private property limits. Education could include providing stakeholders with documentation on access management success stories such as information contained in FHWA's article entitled *Safe Access is Good for Business*.

*Step 3* – Form committees which include Agency representation (NYSDOT and the Town) as well as stakeholders. During this step in the process details on the vision in the corridor need to be identified. The development of this vision should include a rating system on the positive and negative impacts that can be used in development of the final plan for the corridor.

*Step 4* – Summarize Step 3 into a detailed plan. Part of this step includes focusing on the need for regulations and/or approvals in order to construct the improvements. This step also includes definition of responsibility and the financial implications of the plan.

### **Southern Corridor Study Area Intersection Improvements**

The southern corridor study area along US Route 9 extends from the Gurney Lane intersection to the Round Pond Road intersection and includes the I-87 Exit 20 SB Ramp/Gurney Lane intersection. The analysis and evolution of future traffic conditions at these intersections are not impacted by the improvement alternatives discussed above for the key study area corridor. A level of service analysis was conducted in the southern corridor to identify specific intersection improvements necessary based on the increase in volumes expected with the growth in the Low Growth and High Growth scenarios. Appendix H contains the detailed HCS LOS reports for the 2028 Build condition. Table IV-4 summarizes the level of service analysis.

The following observations are evident from the Southern Corridor evaluation:

- Gurney Lane/I-87 Exit 20 Southbound Ramps – The level of service analysis indicates that the southbound left-turn movement at this unsignalized intersection will operate at an overall LOS F during the 2028 Future traffic volume condition for both growth scenarios under existing geometric conditions. Three alternative traffic control improvement options were evaluated at this location.

*All-Way Stop Control* – The level of service analysis indicates that for the 2028 Future traffic volume conditions, the eastbound Gurney Lane approach will operate at a LOS E/F during the Low and High Growth scenarios while the westbound Gurney Lane approach will operate at a LOS F during both growth scenarios. This alternative intersection control will not provide adequate traffic operations at this intersection for either future growth scenario.

*Signalized Control* – The level of service analysis indicates that this intersection will operate adequately during the Future 2028 Low Growth traffic volume scenario if an actuated traffic signal is installed and if the westbound Gurney Lane approach is widened to provide a separate left-turn lane. However, it is noted that the existing bridge structure over I-87 is not wide enough to accommodate an additional lane and would need to be replaced to provide the recommended exclusive left-turn lane. If this traffic control alternative is progressed, it is also recommended that actual separate left and right turn lanes be constructed on the southbound I-87 Exit 20 SB Off Ramp so that drivers do not utilize the existing shoulder as a travel lane. The level of service analysis indicates that this intersection would operate at an overall LOS C with all movements operating at a LOS D or better with this improvement.

The analysis indicates that this intersection will operate at adequate levels of service during the Future 2028 High Growth traffic volume scenario if, in addition to the improvements required for the low-growth scenario, left-turn movements westbound are also allowed as a shared movement on the through lane. It is noted that the I-87 Exit 20 SB On Ramp would need to be widened to accommodate two left-turn movements from the westbound approach. The level of service analysis indicates that this intersection will operate at an overall LOS D with all movements operating at a LOS D or better with these signalized improvements.

*Signalized Right-In/Right-Out Control* – The evaluation also indicates that this intersection could be modified to provide only right-turn movements exiting the I-87 Exit 20 SB Off-Ramp and only right-turn movements entering the I-87 Exit 20 On-Ramp. This intersection control would necessitate the construction of a roundabout at the Gurney Lane/West Mountain Road intersection located approximately 450-feet to the west so that drivers could use the roundabout to make u-turns and access US Route 9 or the SB On-Ramp. The level of service analysis indicates that this intersection will operate at an overall LOS A/B during the 2028 Future traffic volume conditions for the Low and High Growth scenarios. A separate eastbound right-turn lane should be constructed on Gurney Lane to provide adequate capacity at the intersection.

A third alternative for this intersection includes reconstruction of the interchange. This alternative is discussed in more detail later in this chapter.

**Table IV-4 – South Corridor Level of Service (Saturday Peak Hour)**

Intersection	Control	Low Growth		High Growth	
		Build 2028	Build 2028 w/lmp	Build 2028	Build 2028 w/lmp
I-87/Exit 20 SB Ramp/Gurney Lane		TW			
Gurney Ln WB	L	A (10.0)	--	C (17.0)	--
I-87 Exit 20 SB Ramp SB	L	F (*)	--	F (*)	--
	R	B (11.4)	--	B (12.9)	--
Gurney Ln EB	TR	--	E (36.5)	--	F (117.7)
Gurney Ln WB	LT	--	F (266.2)	--	F (486.6)
I-87 Exit 20 SB Ramp SB	L	--	C (24.6)	--	D (33.2)
	R	--	B (11.8)	--	B (12.3)
Overall		--	F (138.6)	--	F (272.9)
Gurney Ln EB	TR	--	C (27.6)	--	D (54.1)
Gurney Ln WB	L	--	C (27.0)	--	D (49.5)
	T	--	A (4.7)	--	--
	(LT)	--	--	--	D (53.0)
I-87 Exit 20 SB Ramp SB	L	--	D (37.2)	--	D (50.2)
	R	--	C (22.3)	--	C (27.2)
Overall		--	C (24.7)	--	D (49.8)
Gurney Ln EB	T	--	A (0.2)	--	A (0.1)
	R	--	A (1.0)	--	A (0.8)
Gurney Ln WB	T	--	B (16.1)	--	C (29.1)
I-87 Exit 20 SB Ramp SB	R	--	C (21.0)	--	C (31.9)
Overall		--	A (8.6)	--	B (15.6)
Route 9/Gurney La (Route 149)		S			
Gurney La EB	LT	D (41.7)	--	D (54.9)	D (53.9)
	R	C (30.0)	--	C (29.9)	C (29.3)
Municipal Center Dwy WB	LT	C (29.1)	--	C (28.5)	C (27.9)
	R	C (28.7)	--	C (28.1)	C (27.5)
Route 9 NB	L	C (31.8)	--	F (127.3)	D (54.8)
	T	B (10.2)	--	B (16.6)	B (16.6)
	R	A (4.4)	--	A (6.8)	A (6.8)
Route 9 SB	L	B (14.2)	--	B (19.7)	C (23.4)
	T	C (28.3)	--	D (42.8)	--
	R	B (15.4)	--	C (20.2)	--
	[TTR]	--	--	--	D (53.6)
Overall		C (22.3)	--	D (40.6)	D (41.1)
Route 9/Glen Lake Rd/Six Flags Dr		S			
Six Flags Dr EB	LT	D (42.0)	D (50.7)	D (43.8)	D (54.6)
	R	C (26.9)	C (31.5)	C (24.9)	C (29.0)
Glen Lake Rd WB	LT	C (25.0)	C (29.5)	C (23.2)	C (27.3)
	R	C (25.9)	C (30.3)	C (23.9)	C (27.8)
Route 9 NB	L	B (16.3)	B (16.1)	C (21.7)	C (21.5)
	TR	D (40.4)	C (32.2)	E (71.5)	D (51.7)
Route 9 SB	L	B (20.0)	C (20.9)	C (24.2)	C (26.3)
	T	C (27.6)	C (24.8)	D (41.4)	C (33.8)
	R	A (0.1)	A (0.1)	A (0.2)	A (0.2)
Overall		C (31.3)	C (29.6)	D (44.7)	D (38.5)
Route 9/Round Pond Rd		TW			
Round Pond Rd WB	LR	E (45.3)	--	E (47.9)	--
	[L]	--	D (33.9)	--	D (34.6)
	[R]	--	C (20.7)	--	C (21.3)
Route 9 SB	L	B (10.2)	B (10.2)	B (10.3)	B (10.3)
Round Pond Rd WB	LR	--	B (19.0)	--	B (19.2)
Route 9 NB	TR	--	A (6.0)	--	A (6.2)
Route 9 SB	L	--	A (4.5)	--	A (4.6)
	T	--	A (6.9)	--	A (7.0)
Overall		--	A (7.8)	--	A (7.9)

Key: TW, AW, S, R = Two-way stop, All-way stop, Signal, or Roundabout controlled intersection  
 NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound intersection approaches  
 L, T, R = Left-turn, through, and/or right-turn movements  
 L[T]R = LR represents the existing geometry, LTR represents the future geometry  
 X (Y.Y) = Level of Service (Average delay in seconds per vehicle)  
 \* = Delay exceeds 1,000 seconds  
 -- = Not Applicable

- US Route 9/Gurney Lane – The level of service analysis indicates that this intersection will operate adequately during the 2028 Future traffic volume low growth scenario. However, the northbound US Route 9 left-turn movement will operate poorly during the 2028 future traffic volume high growth scenario. In order to improve the operating conditions, the southbound US Route 9 separate right-turn lane should be converted into a shared through/right-turn lane to provide two southbound through lanes at this intersection. To provide consistency, the two southbound lanes should be extended to the intersection of Glen Lake Road with the westerly lane becoming the free-flow right turn lane at Six Flags Drive. The level of service analysis indicates that this intersection will operate adequately for this condition with this improvement.
- US Route 9/Glen Lake Road/Six Flags Drive – The level of service analysis indicates that this intersection will operate adequate during the 2028 Future volume condition for either growth scenario with minor signal timing adjustments. As noted previously in this study, based on comments made at the first public workshop, NYSDOT is currently reviewing the signal phasing and timings at this intersection. It is also noted that if the Great Escape provides a southern access to their parking lots at the US Route 9/Round Pond Road, traffic entering the Great Escape from the south will shift from this intersection to the Round Pond Road intersection creating additional future capacity at this intersection.
- US Route 9/Round Pond Road – The level of service analysis indicates that the westbound Round Pond Road approach will operate at a LOS E during the 2028 Future volume condition for either growth scenario. The analysis also indicates that this unsignalized intersection will operate adequately if separate left and right turn lanes are provided on the westbound approach which was recommended during the public meetings. In addition, this intersection will meet peak hour signal warrant criteria during 2028 Future traffic conditions for either growth scenario and that the intersection would operate at very good levels of service after installation of a traffic signal. It is noted that The Great Escape is responsible for the installation of a traffic signal at this intersection based on a traffic evaluation and volume threshold analysis for expansion of the amusement park site. In the event that Great Escape installs a traffic signal, this intersection would become a 4-way intersection with a west leg providing access to the Great Escape Parking lot from the south.

## **Low Cost Improvement Options**

Numerous feasible lower cost improvements should be considered in the study corridor to meet the goals of the project. These proposed improvements could be considered individually or in combination with each other. It is noted that while these lower cost improvement options may not necessarily result in a noticeable reduction in the congestion during peak traffic conditions throughout the corridor, they will meet other project goals and help improve access during off-peak traffic conditions. It is however noted that the combination of several lower cost improvements could result in a large benefit to the study corridor.

### **1. Transit**

In the short-term, it is recommended that visible trolley stops for the seasonal trolleys be established in the key corridor. Currently, the trolleys stop at random locations within the key corridor based on the demand and patron needs. This pattern can result in additional trolley

stops and delays to motorists that could be avoided by consolidating the majority of the stops. The trolley stops should be accommodated with benches and lighting that fit the character of the area with designated “trolley stop” signing. The purpose of these stops is not to eliminate the flexibility of the trolley stopping at specific locations, but to consolidate a percentage of the stops to result in more efficient runs while visibly enhancing the pedestrian/transit friendliness of the corridor. This option is an enhancement to the existing trolley system currently operated by the Greater Glens Falls Transit.

An additional improvement option for transit in the corridor is to provide park-and-ride lots to the north and south of the key corridor to capture passenger vehicles onto the transit system before traveling into the key corridor. For this system to be most effective, parking lots on the north and south ends of the corridor should be provided to capture vehicles traveling in both directions along US Route 9. This option would require lot agreements to be undertaken with individual property owners to provide the parking lots. It would be beneficial to use existing parking lots to avoid the creation of additional parking areas. Potential options would be the Municipal Center to the south and the Magic Forest to the north. This option could be implemented by numerous different means; including the Greater Glens Falls Transit, Town of Queensbury, business owners, or by a separate private party.

## 2. Signing Improvements

The use of additional signing in the corridor to provide clearer directions for vehicles accessing areas/sites outside of the project corridor is a potential low cost alternative to assist in reducing congestion in the corridor. Potential areas of signing include:

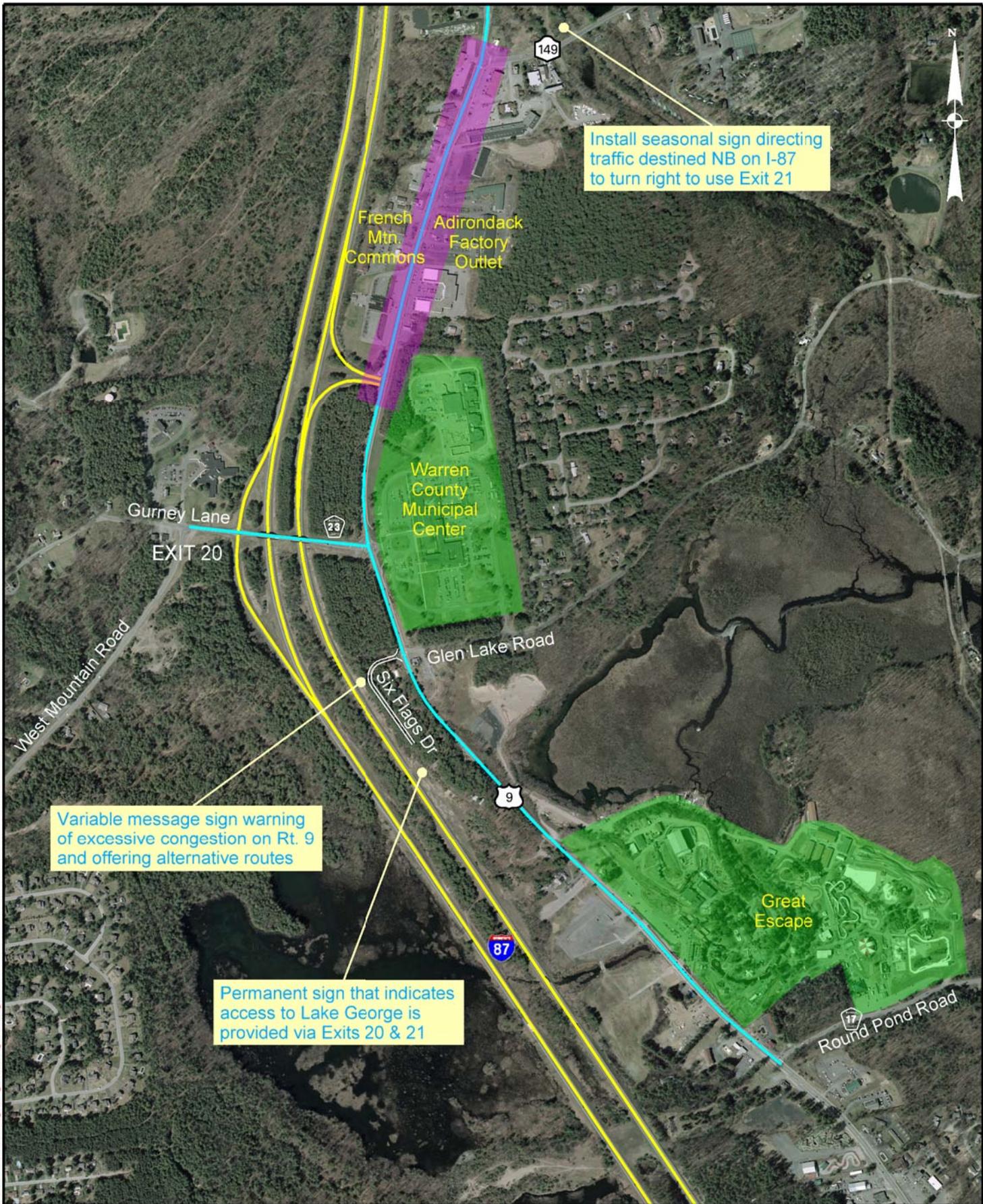
- Variable message boards for use during times of excessive congestion leading vehicles destined to locations north of the site to use Exit 21.
- Permanent signs more clearly indicating to people not familiar to the area, that they do not have to use Exit 20 to get to Lake George. It is believed that people tend to use the first exit they see when unfamiliar with the area.
- Signing on NY Route 149 westbound encouraging people heading north to travel north on US Route 9 to access I-87 at Exit 21.

A conceptual signing improvement plan is shown on Figure IV-4.

At the first public meeting, several area residents pointed out that additional way-finding signs for the Great Escape would help direct vehicles onto Six Flags Drive. It was noted that some patrons coming from the north on US Route 9 travel past Six Flags Drive and are forced to turn around to properly access the parking lot.

## 3. Other Considerations

Numerous other improvement alternatives were considered as part of this study. During the first public workshop, a suggestion was made to use police to control the signalized intersections of US Route 9 with Gurney Lane and NY Route 149 during busy times. Although this low cost alternative could improve flow through the intersections, it would be difficult to implement and schedule to create a consistent condition and there are numerous safety concerns with this improvement alternative; therefore, it was not considered further as part of this study.



Install seasonal sign directing traffic destined NB on I-87 to turn right to use Exit 21

Variable message sign warning of excessive congestion on Rt. 9 and offering alternative routes

Permanent sign that indicates access to Lake George is provided via Exits 20 & 21

STUDY AREA SIGNING CONCEPT

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK



Concerns were also raised by the public regarding existing commercial parking lots that have converted to “pay” parking lots for Great Escape patrons. These off-site parking lots create additional conflicts on US Route 9 with a larger number of vehicles entering and exiting these establishments than normal and also result in pedestrian traffic along US Route 9 that cross at-grade instead of utilizing the pedestrian walkway. It is recommended that the Town reconsider giving approvals to local commercial facilities along US Route 9 to utilize their parking lots in such a manner. Elimination of the off-site parking lots will create better movement of traffic along US Route 9 in the area surrounding the Great Escape. It is also noted that the Town consider addressing the existing “VIP” parking lot located on the east side of US Route 9 creating conflicting traffic movements along US Route 9. It may be beneficial to the corridor to limit this parking to handicapped to reduce the volume and conflicting movements in the corridor.

## **Interchange Options**

The evaluation of three interchange alternatives was included in this study. The interchange options included a direct access into the Great Escape, an interchange at NY Route 149, and reconstruction of the existing Exit 20 interchange as a Single Point Interchange (SPI). Below are the findings of the evaluations.

### **1. Great Escape Interchange**

Providing an interchange at the Great Escape is difficult since both the Federal Highway Administration (FHWA) and the NYSDOT have policies that require interchanges to connect to public roadways. Providing a direct access from I-87 into the Great Escape would violate this policy and therefore would be very difficult to accomplish.

In general, the approval of an access modification to I-87 would require that the National Environmental Policy Act (NEPA) process be followed. A full Environmental Impact Statement (EIS) would be required which would take a minimum of four years to complete. A cursory review of the area indicated several environmental design constraints exist in the area including Rush Pond and other wetland and streams. The connection from I-87 northbound to the Great Escape would have minimal impacts; however, the remaining ramp connections would have environmental impacts as well as impacts to commercial businesses and potential impacts to school district property. The interchange at Great Escape would be located approximately 1 mile from the existing Exit 19 and less than one mile from the existing Exit 20 at Gurney Lane and would not meet the Federal and State requirement for interchange spacing. Therefore, this interchange would likely require changes to these existing access ramps.

A single off-ramp connection to the Great Escape would cost approximately 1 million dollars. Providing other connections would increase the cost up to 10 to 15 million dollars. Based on the premise for the ramp to provide access into a private property which would be difficult to obtain, the seasonal nature of the Great Escape operations, the impact to other existing interchanges, potential environmental impacts, and cost, this interchange was not considered a feasible alternative for the corridor.

### **2. NY Route 149 Interchange**

The most critical design consideration for this alternative is topography. I-87 in this area is located along the side of a hill which rises approximately 50 feet from US Route 9 to the northbound lanes and another 25 feet to the southbound lanes. West of I-87 the topography continues to rise. An interchange at this location would require the southbound off/on ramps to be constructed in deep cuts and would tie into the NY Route 149 at a non-standard 12% grade. It is anticipated that substantial rock will be encountered that would require blasting creating

additional design challenges and additional construction costs. Further, the interchange would impact numerous businesses along US Route 9 adjacent to NY Route 149.

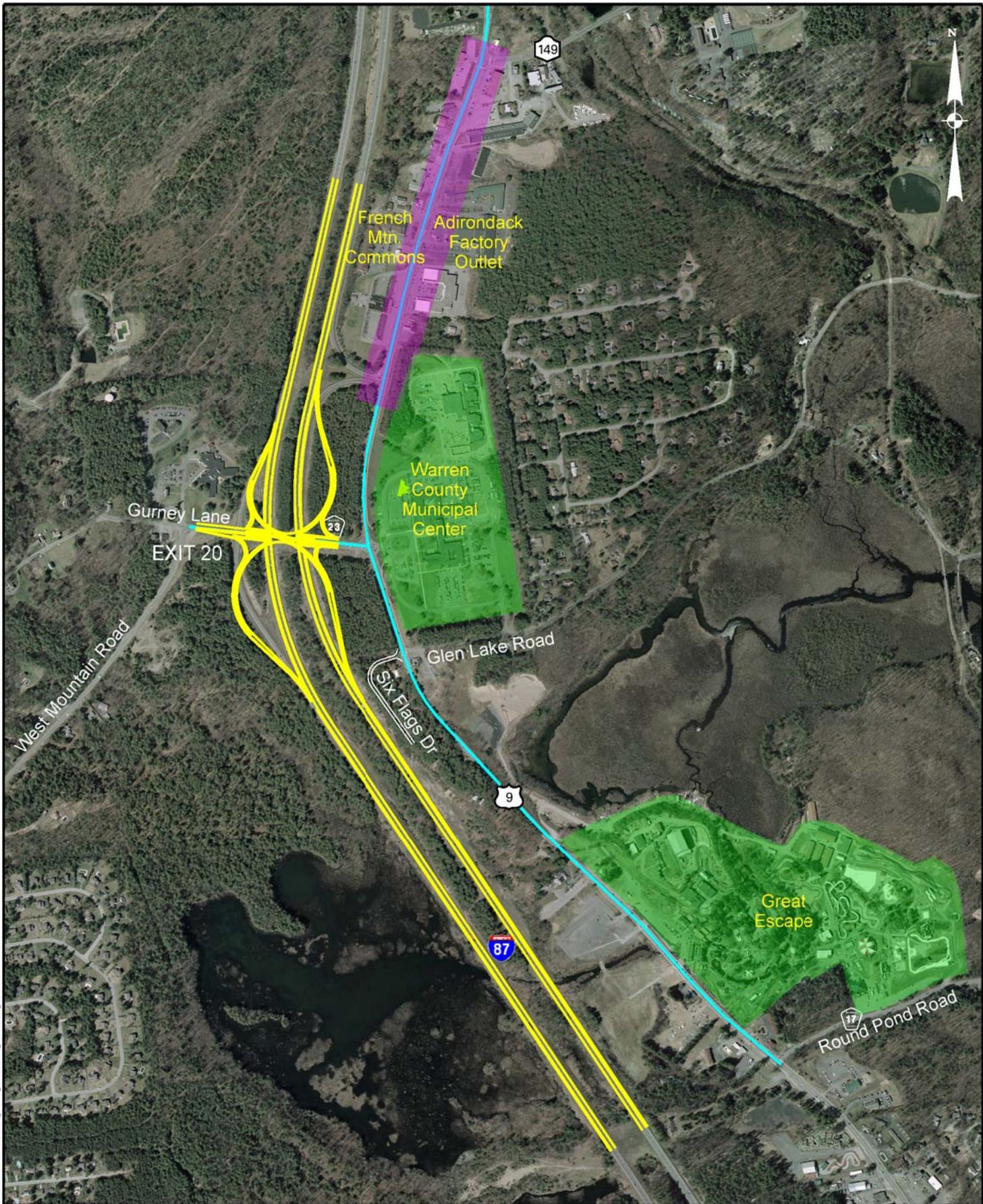
Providing a new interchange at NY Route 149 would violate the Federal and State interchange spacing requirements with the existing Exit 20 Northbound ramps. Relocation of the interchange to NY Route 149 would result in I-87 northbound traffic heading south (i.e., Great Escape, Municipal Center) to travel south on US Route 9 through the key corridor. The National Environmental Policy Act (NEPA) process would need to be followed which would require a full EIS and would take a minimum of 4 years to complete.

The extensive construction resulting from the topographical design constraints requiring extensive cutting and the construction of structures for the ramp connections would result in a cost greater than 25 million dollars. Due to the major topographical constraints for this design alternative including the potential need to close the existing Exit 20 northbound ramp interchange and excessive costs; this interchange alternative was not considered a feasible alternative for the corridor.

### 3. Reconstruction of Exit 20 as a Single Point Interchange (SPI)

Reconstruction of the existing I-87 Exit 20 interchange as a SPI would require the removal of the current Northbound and Southbound Ramp intersections located on US Route 9 and Gurney Lane, respectively. A SPI interchange located on Gurney Lane would be beneficial to users as it would bring all travel movements together at one location and eliminate the split interchange currently provided at Exit 20. However, the proximity of the ramps to US Route 9 may be too close for the required weaving movements. In addition, the large ramp approaches will significantly impact adjacent properties and will require right-of-way takings. It is also anticipated that the new bridge structure on Gurney lane over I-87 would be extremely large to accommodate traffic demand. The NEPA process would need to be followed which would require a full EIS and would take a minimum of 4 years to complete.

The extensive right-of-way impacts necessary to develop the long ramps and the construction of a new bridge structure over I-87 would result in a cost greater than 18 million dollars. However, this interchange alternative may be considered a feasible alternative for the corridor in the future as conditions deteriorate (20 years plus). A conceptual layout of this interchange alternative is illustrated on Figure IV-5.



SINGLE POINT INTERCHANGE CONCEPT

EXIT 20 CORRIDOR MANAGEMENT PLAN  
TOWN OF QUEENSBURY, NEW YORK



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## V. Implementation

This planning study identified a number of short and long-term capacity and safety alternatives for the 2-mile segment of US Route 9 in Warren County that extends from the intersection of NY Route 149 to Round Pond Road.

Table V.1 summarizes the projects and recommendations described in Chapter IV of this report. These recommendations were developed to preserve and improve the safety and capacity of area roadways, through arterial management and context sensitive improvements. Final improvements should be multi-modal and also support pedestrians, bicyclists and transit. The table is intended to serve as a guide for potential future improvement projects in the corridor.

The implementation of the recommendations outlined in the study can occur in different stages and will take commitment and the coordinated effort on the part of the various agencies and land owners in the study area as outlined in Table V.1. The implementation of the larger scale long term improvements will require solicitation for funding. There may be the potential for NYSDOT to work with the Town and private land owners to identify funding sources for the capacity improvements at the study area intersections through the corridor. Implementation in this way would likely result from the advocacy of the Town or private land owners reaching out to NYSDOT for assistance and guidance. The funding could be obtained through means such as a Transportation Improvement Program (TIP) or a grant. This process will require applications to be submitted by either the Town or A/GFTC. Funding through public/private partnerships is also an option that could be pursued.

Other shorter-term recommendations could be implemented with a less defined process. For example, capacity improvements recommended at the US Route 9/Round Pond Road intersection may be the responsibility of the Great Escape as described in their EIS. The Great Escape monitors the traffic conditions in the corridor annually to determine the need for this improvement based on their site generated traffic. However, if volumes in the project corridor increase due to other factors, this improvement may be initiated separately by the Town or NYSDOT. Improvements to accommodate increased transit ridership on the trolleys should be advanced directly by the Town of Queensbury in association with the Greater Glens Falls Transit.

**Table V.1- Summary of Intersection Related Improvements**

Intersection/ Corridor	Summary of Issues	Description of Alternative/Improvement	Cost	Advocacy Responsibility	Timing/ Priority
<b>Key Study Area Improvement Alternatives</b>					
US Route 9 Median Alternative	Conflicts from numerous driveways along Route 9 impact traffic flow through the corridor.	Install a raised median along the entire Route 9 corridor from Route 149 to the I-87 Exit 20 NB Ramp. This improvement would require that the roundabout option be pursued for each of the Key Study Corridor intersections.	\$5-6 Million	State/Fed, Town, Property Owners	Long-term
Back Access Alternative	Congestion on Route 9 will increase during peak conditions in the Key Study Area corridor due to approved and potential developments.	Construct a public road on the east side of Route 9 that connects Route 149 to I-87 Exit 20 NB Ramp. This corridor alternative assumes roundabout control at the two signalized intersections and unsignalized control at the Route 9/French Mountain Commons Drwy/Adirondack Factory Outlets Drwy intersection.	\$3.5-4 Million	Town, Property Owners, State/Fed	Long-term
Access Management Alternative	Conflicts from numerous driveways, lack of connectivity between parcels	Apply access management techniques in key corridor to include closure of driveways, consistent driveway layouts, cross-connections for vehicles and pedestrians	\$1.5 – 2 Million	Property Owners, Town, State/Fed	Short-term
<b>Individual Intersection Improvement Alternatives</b>					
US Route 9/NY Route 149	Intersection has existing capacity concerns. Capacity concerns continue through the 20 year condition.	Signalized Option - Construct additional WB left-turn lane, widen SB Route 9 departure to accommodate two left-turn movements, and re-stripe Route 9 for a NB left-turn lane.	\$1.5-2 Million	State/Federal, Town	Short-term
		Roundabout Option - Construct a two lane roundabout.	\$2-2.5 Million	State/Federal, Town	Short-term
US Route 9/French Mountain Commons Driveway/Adirondack Factory Outlets Driveway	Minor street approaches have short-term (2008) and long-term capacity concerns (2028). Heavy pedestrian crossing.	Unsignalized Option - Do not change current intersection control and accept poor levels of service on the minor street approaches.	\$0	Property Owners, State/Fed	Short-term
		Roundabout Option - Construct a single lane roundabout.	\$1-1.5 Million	Property Owners, State/Fed	Long-term
US Route 9/I-87 Exit 20 NB Ramp	Intersection has existing capacity concerns. Capacity concerns continue through the 20 year condition.	Signalized Option - Construct additional EB left-turn lane, widen NB Route 9 departure to accommodate two left-turn movements, and convert the SB Route 9 right-turn lane into a shared through/right-turn lane.	\$1.5-2 Million	State/Federal, Town	Short-term
		Roundabout Option - Construct a two lane roundabout	\$2-2.5 Million	State/Federal, Town	Short-term

Intersection/ Corridor	Summary of Issues	Description of Alternative/Improvement	Cost	Advocacy Responsibility	Timing/ Priority
<b>Southern Study Area Improvement Alternatives</b>					
Gurney Lane/I-87 Exit 20 SB Ramp	Intersection has existing capacity concerns. Capacity concerns continue through the 20 year condition.	Signalized Option - (Low Growth) Provide separate SB left and right turn lanes and construct an exclusive WB left-turn lane on Gurney Lane by widening the bridge structure over I-87. (High Growth) Widen the I-87 On Ramp to accommodate two left-turn movements.	\$3.5-4 Million	Town (Development Conditions), State/Fed	Long-term
		Signalized Right-In/Right-Out Option - Modify intersection to provide only right-turns exiting the I-87 Exit 20 SB Off-Ramp and only right-turns movements onto the I-87 Exit 20 SB On-Ramp. This would require the construction of a roundabout at the Gurney Lane/West Mountain Road intersection.	\$2-2.5 Million	Town (Development Conditions), State/Fed	Long-term
		All-Way Stop Option - Install stop signs on all approaches. This intersection will continue to fail.	\$7,500	State/Federal, Town	Short-term
		Reconfigure SB Ramps with new SPUI interchange	\$40-50 Million	State/Fed	Long-term
US Route 9/Gurney Lane	Intersection has long-term capacity concerns (beyond 2028).	Convert the SB Route 9 right-turn lane into a shared through/right-turn lane and extend it to the Glen Lake Road intersection.	\$350,000- 400,000	Town, State/Fed	Long-term
US Route 9/Glen Lake Rd/Six Flags Dr	Intersection signal is not optimized	Improve signal timing.	\$0	State/Fed	Short-term
US Route 9/Round Pond Road	Intersection has long-term capacity concerns (2028).	Unsignalized Option – Construct separate SB left and right turn lanes on Round Pond Rd	\$75,000	Town (Development Conditions), State/Fed	Long-Term
		Signalized Option – Install an actuated traffic signal.	\$225,000- 300,000	Town (Development Conditions), State/Fed	Long-Term

# **Appendix A – Advisory Committee and Public Workshop Summary**

**Exit 20 Corridor Management plan  
Town of Queensbury, Warren County, New York**

## **Acknowledgements Invited Advisory Committee**

Town Supervisor Daniel Stec – Town of Queensbury  
Stuart Baker – Town of Queensbury Planning  
Anthony Metivier – Town of Queensbury Planning Board  
John Strough – Town of Queensbury Planning Board  
Scott Sopczyk – greater Glens Falls Transit System  
Kathy Varney – Glens Falls Hospital  
Jeff Tennyson – Warren County Department of Public Works  
William Lamy – Warren County Department of Public Works  
Kevin Hajos – Warren County Department of Public Works  
Laura Moore – Warren County Planning Department  
Mike Wyatt – New York State Department of Transportation  
Rob Fitch – New York State Department of Transportation  
Len Fosbrook – Economic Development Council of Warren County  
Sharon Henderson – Representing State Senator Betty Little  
David Kenny – Business/Property Owner  
John McCormack – Business/Property Owner  
Todd Shimkus – Adirondack Chamber of Commerce  
Wayne LaMothe – Warren County Planning Department  
Dave Wick – Warren County Soil and Water Conservation District  
Rob Cherry – New York State Department of Transportation  
Lisa Manzi – Representing US Congresswoman Kirsten Gillibrand  
Ed Moore – Business/Property Owner

## **Exit 20 Corridor Management Plan**

### **Public Workshop #1 September 4, 2009**

#### **PUBLIC MEETING SUMMARY**

The first Public Meeting for the *Exit 20 Corridor Management Plan* was held on September 4, 2009 at 6:00 pm at the Great Escape Lodge in Queensbury, NY. The purpose of the meeting was to present existing conditions and to gather public comments. The meeting was advertised online on the Project website, through postcard mailings and flyers and through local news publications. The workshop was attended by approximately 40 people, including several advisory committee members.

The meeting was facilitated by Aaron Frankenfeld from the Adirondack/Glens Falls Transportation Council (A/GFTC) and Don Adams and Wendy Cimino of Creighton Manning Engineering, LLP (CME). The meeting included a technical presentation outlining the project goals and summarizing the existing conditions. The meeting included group breakout sessions where input and comments from the public participants were recorded. Below is a summary of the general themes, comments, and concerns that were noted during the group breakout session.

#### **General Themes, Comments, and Concerns**

##### General

Participants discussed the existing traffic characteristics, noting that congestion, though worse during the summer months (specifically between Memorial Day to Labor Day) is not truly seasonal and occurs throughout the year. Other noted times of congestions include holiday weekends, winter ski traffic, and special local events such as the balloon festival and Great Escape events. General discussions of the corridor included truck traffic, length of turn lanes, and informational signing concerns. Details on the discussions for the northern, middle, and southern corridors are outlined below.

##### Northern Corridor

In the northern corridor between the Exit 20 Northbound ramps and Route 149, participants noted the following comments and/or issues:

- Pedestrian bridge or tunnel needed at outlets
- Re-routing of trucks to/from Vermont
- Additional signage routing traffic to Lake George via Exit 21
- Signing to re-route trucks out of the corridor
- Bus turnouts needed
- Center median is used as a through lane during times of congestion
- More signs indicating need to yield to pedestrians (out of town visitors are not familiar with laws)
- Retailers welcome pass-by traffic
- Need more cross connections in parking lots

- Use of back parking lots at outlets would allow more connections and access management (example used was Manchester, Vermont)
- Add an additional lane north on Route 9 to encourage NB traffic to go north from Route 149 to avoid congestion
- Extend turn lane northbound on Route 9 at Exit 20 NB Ramp intersection
- Use traffic cops at Route 149 intersection to control traffic during congestion
- Potential roundabout at Route 149/Route 9
- Interchange at Route 149

### Middle Corridor

In the middle corridor between Gurney Road and the NB Ramps, participants noted the following comments and/or issues:

- An access to cut-through the municipal center would avoid congestion on Glen Lake Road
- The Exit 20 Southbound ramps experience heavy queues year round
- The Exit 20 interchange should be moved to the north to connect to Route 149
- Improve bike and pedestrian accommodations from the bike trail across I-87 on Gurney Lane bridge
- Install a roundabout at West Mountain Road and limit access at SB ramps
- Install a roundabout in front of the municipal center
- Lane delineation needed in Route 9 between Gurney Lane and the Exit 20 NB ramps
- Concern with accidents on the SB ramps
- What are traffic implications of Lake George campground development
- Pedestrians are not accommodated on Gurney Lane bridge
- Northbound left-turn lane at Gurney Lane is short, people drive in median

### Southern Corridor

In the southern corridor between Glen Lake Road and Round Pond Road, the following comments and/or issues are noted:

- Left-turns on Round Pond Road block right turning vehicles
- Direct access to Great Escape from I-87 should be constructed
- Congestion is caused by vehicles entering/exiting Great Escape it better than it was, but additional signs are still needed since vehicles often pass Six Flags Drive and then have to turn around
- Trolley drops off Great Escape employees on Route 9, then employees do not use pedestrian bridge-dangerous
- Vehicles go around stopped trolleys
- Signal timing at Glen Lake Road intersection does not appear to address summer peaks-in general timing at this intersection seems off
- Traffic is high around 3:00 during Great Escape season and around 4:30 Route 9 northbound toward Gurney Lane is backed up

- Left arrow needed at Municipal Center for southbound traffic
- Pedestrian accommodations needed at Round Pond Road
- Off-site parking areas for Great Escape causing congestion and pedestrian issues

### **Written Comments**

In addition to comments noted during the meeting there were a number of written comments that were received. Below is a summary of the received comments:

1. There should be a pull off lane area for transit buses at pickup stops. Stop lights should be traffic activated. Better signage related to parking for "Great Escape", including private parking lots should be installed.
2. An unpaved bicycle path behind the present Warren County Social Services Building accesses the Gurney Lane. Recreation/Pool Area. Little to no signing exists to direct cyclists to the recreation area, resulting in most cyclists using the dangerous, lower, curved portion of Gurney Lane to the vehicle entrance to the Rec. Area. Efforts should be addressed to improve a safer access by pedestrians and cyclists to enter and exit the recreation area, in particular, better signing and paving of the existing path.
3. Traffic rotaries could be helpful at the junction of Route 9/Gurney Lane at the entrance to Warren County Municipal Center. A second traffic circle could ease traffic flow at Gurney Lane & the Exit 20 southbound entrance ramps. I would like to see a full interchange for Exit 20 at the 149 & Rte 9 junction.
4. There is heavy traffic northbound on Route 9 from Round Pond due to exiting cars from Great Escape. Illegal turns are common. Rerouting traffic from 149 to Oxbow Hill Road to Glen Lake Road – too small a road. Use traffic cops at heaviest times. Adjust lights for summer use. Maintain rural character west of 87. Better use of Exit 21 for Route 149 vehicles turning north. Better signage.
5. We know the traffic movement is slow to stop. I would believe some reduction of traffic load should have been presented to suggest better movement. Not much said about effect of taking away the Rt 149 load. Be interested in the % of truck to car traffic.
6. Please include traffic issues (vehicle counts, features of intersections, rights of way, etc.) for West Mountain Road and Mountainview Lane in both the Exit 20 and Aviation Rd. corridor studies. Residents of these roads are concerned that their problems and area traffic impacts often fall through the cracks when, in fact, these 2 roads link 2 heavily traveled corridors.

## Exit 20 Corridor Management Plan

### Public Workshop #2

February 11, 2009

### PUBLIC MEETING SUMMARY

The second Public Meeting for the *Exit 20 Corridor Management Plan* was held on February 11, 2009 at 6:00 pm at the Ramada Inn – Exit 19. The purpose of the meeting was to present and receive comments on the draft alternatives. The meeting was advertised online on the Project website, through postcard mailings and flyers and through local news publications. The workshop was attended by approximately 40 people including several members of the advisory committee.

The meeting was facilitated by Aaron Frankenfeld of the Adirondack/Glens Falls Transportation Council (A/GFTC) and Don Adams and Wendy Cimino of Creighton Manning Engineering, LLP (CME). The meeting included a technical presentation and question and answer session. Alternatives for the corridor were also on display for participants to review. CME staff and A/GFTC representatives were present to respond to any questions.



The presentation reviewed project goals and gave details on the analysis conducted and resulting design alternatives for the corridor. In addition to intersection and corridor alternatives, details on the three interchange alternatives were presented. Additional details on low-cost improvements including access management, transit, and signing were presented.

A question and answer period followed the presentation. Below is a summary of the general themes and comments that were noted during the meeting.

## **General Themes, Comments, and Concerns**

### **Northern Section of the Corridor**

Several design options were presented for the northern section of the corridor, referred to as the “key corridor” of the study. After a review of the improvement alternatives, participants questioned what would happen when the two lanes at the intersections merge into one. There was concern that improvements to the two intersections would not solve the current traffic issue. CME staff noted that adding lanes at the intersections, even though they will merge down to single lanes in the key corridor, would allow for increased capacity at the intersections increasing the flow of vehicles. It was also noted that making Route 9 a four-lane section was not an option.

There was also discussion of truck traffic being a major issue for the corridor. Trucks travel from I-87 to Route 9 and use Route 149 to go to Vermont. CME noted that heavy vehicle traffic was accounted for in the traffic analysis.

Regarding the roundabout options, participants questioned the diameter of the roundabouts and impacts to property owners. Specific concerns were raised regarding the mid-block roundabout proposed near the outlets. CME noted that the size of the each roundabout was taken into consideration and is based on specific design criteria.

Participants questioned how the proposed roundabout compared to the one in Greenwich. There was also concern with constructing a roundabout in a tourist area. There was concern that there would be increased safety issues due to drivers not knowing where they are going. CME staff was not familiar with the roundabout at Greenwich, but noted that roundabouts were noted to increase safety both for vehicles and pedestrians.

Participants discussed the design work CME conducted in Glens Falls. There was concern that there was more available space in Glen Falls and that the lack of space in the corridor would be an issue. After reviewing the alternatives noting the two lane roundabouts, there was discussion regarding the need and safety of constructing a two lane roundabout. One participant noted that it is difficult for trucks (specifically 48 foot tracker trailers) to get through a two lane roundabout. Cars try to pass the truck as it needs to swing into both lanes to maneuver through the roundabout. CME staff noted that two left lanes can cause the same type of issue. Another participant noted that RVs (usually 45 feet in length with a 25 foot car attached) travel through the corridor frequently and may experience similar issues when traveling through a roundabout.

A question was raised regarding the transport of wind turbines and the ability for trucks carrying the turbines to travel through the roundabouts. CME staff noted that trucks carrying wind turbines travel on specific routes that are able to accommodate needed turning radius. Movement of turbines is part of a construction plan and does not occur randomly in any corridor.

### **Median Alternative**

As noted, concerns with this alternative focused primarily around the mid-block roundabout at the outlet driveways.

### **Back Access Road**

The alternative detailing the construction of an access road east of the outlets connecting Route 9 to 149 was discussed in detail. Many participants noted this access road (which would create a four-leg intersection with the I-87 northbound exit ramp/Route 9 intersection and would create a direct route for traffic specifically destined for Route 149) as a viable option. Participants questioned if the road could be designed in such a way to not affect private property and CME noted the potential for both property and environmental impacts. There was some concern that a bypass would hurt the local business by diverting pass-by traffic.

### **Access Management**

There was detailed discussion regarding access management for the key corridor. Participants noted their desire to reduce driveways and consolidate parking areas. There was discussion regarding meeting with the current business owners to create an understanding of the advantages of access management. CME noted that there has been outreach to local business. One participant noted that business owners should realize that gridlock is not good for business and that outreach should continue.

### **Pedestrian Activity**

There was discussion of pedestrian activity; specifically at the outlet area and on the Gurney Lane Bridge. It was suggested that a pedestrian tunnel mid-block at the outlets be considered. The tunnel would be utilized during the peak outlet period (Memorial Day to Labor Day) and could be closed during the winter months. CME noted that making a pedestrian bridge or tunnel ADA compliant would likely result in substantial impacts to properties. There was also discussion regarding the Gurney Lane bridge and its need for repair. It was noted that pedestrian accommodations should be considered when this bridge is repaired or replaced. A/GFTC representatives noted that there are currently no funds dedicated to repairing/upgrading the Bridge.

### **Interchange Alternatives**

Participants questioned the federal and state government involvement in the planning and design of a new interchange. CME staff noted that there are strict federal/state guidelines that must be followed when designing a new interchange and detailed some of the guidelines.

Community members noted that an Interchange at Route 149 would alleviate traffic on Route 9, but it might also hurt businesses by diverting traffic. Placing an interchange half mile north of Route 149 was proposed.

### **Written Comments**

In addition to comments noted during the meeting there were a number of written comments that were received. Below is a summary of the received comments:

- The best bang for the buck is a right turn lane expansion for Route 149 westbound. It would also send a message to the business owners in the Corridor that the matter needs their full cooperation.
- One thing that backs up traffic during the summer season is the Great Escape parking lot entrance on the Park side. Traffic coming southbound on Route 9 is backed up because the Great Escape parking attendance must collect fees and direct cars to parking. While that process is going on the traffic on Route 9 is waiting and backing up to the Route 9/Gureney Lane intersection. I do not think this was anticipated in the original concept of their site plan. Traffic was supposed to use the ring road at the Glen Lake traffic light.
- We like the option of the bypass on the eastside of the outlets.
- We would rather see signalized intersections. We do not like roundabouts, in particular at the Route 9/Route 149 intersection.
- Push for interconnected driveways
- Absolutely no median.
- Avoid an anti-merchant feeling if you are looking for cooperation.
- Sidewalks are currently too close to the street and do not allow for proper snow storage.

## **Exit 20 Corridor Management Plan**

### **Public Workshop #3**

**July 1, 2009**

### **PUBLIC MEETING SUMMARY**

The third Public Meeting for the *Exit 20 Corridor Management Plan* was held on July 1, 2009 at 6:00 pm at the Ramada Inn – Exit 19. The purpose of the meeting was to present and receive comments on the alternatives and share changes made in the plans with the public. The meeting was advertised online on the Project website, through postcard mailings and flyers and through local news publications. The workshop was attended by approximately 25 people including several members of the advisory committee.

The meeting was facilitated by Aaron Frankenfeld of the Adirondack/Glens Falls Transportation Council (A/GFTC) and Don Adams and Wendy Cimino of Creighton Manning Engineering, LLP (CME). The meeting included a technical presentation and question and answer session. Alternatives for the corridor were also on display for participants to review. CME staff and A/GFTC representatives were present to respond to any questions.

The presentation reviewed the analysis conducted and resulting design alternatives for the corridor and potential implementation strategies. In the key corridor, the “median alternative” and “back access alternative” were reviewed. In addition, a third alternative in the key corridor addressing access management was presented. This alternative was focused on based on comments made at the 2<sup>nd</sup> public workshop meeting. Discussions of improvement alternatives on Gurney Lane were also presented. Details on potential costs for each improvement option were presented. Additional discussions regarding project implementation were included in the presentation.

A question and answer period followed the presentation. Below is a summary of the general themes and comments that were noted during the meeting.

#### **General Themes, Comments, and Concerns**

A discussion took place regarding the economy, lack of funding, and how to proceed with the document and concepts that will be a product of this study. This led to a discussion on how the Town can prepare the corridor to plan for the future. It was noted that whatever the Town can do now will prepare the corridor for future larger scale improvements and will potentially put the corridor a “step ahead” of others. This discussion noted the importance of having a champion for the project.

It was noted that this project will not provide a single recommendation for the corridor and that the exact solution will be determined with additional studies. The additional

studies would include a more detailed look on the design and would include detailed engineering and environmental studies.

Some attendees stressed that the corridor should not be changed too much. However, it was agreed that improvement is needed.

**Written Comments:**

In addition to comments noted during the meeting there were a number of written comments that were received. Below is a summary of the received comments:

- Would like to see a short-term solution for under \$200,000
- Town needs to be pro-active with property owners
- Would like additional bike/pedestrian lanes
- Town needs to adopt the completed plan and use it to modify zoning to prepare the corridor-potential overlay district
- Provide current zoning regulations and make recommendations to modify based on improvements

# **Appendix B – Automatic Traffic Recorder Data**

**Exit 20 Corridor Management plan  
Town of Queensbury, Warren County, New York**

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

①

VirtWeeklyVehicle-557 -- English (ENU)

**Datasets:**

**Site:** [08-081d] US Route 9, South of Exit 20  
**Direction:** 7 - North bound A>B, South bound B>A., Lane: 0  
**Survey Duration:** 11:48 Thursday, July 17, 2008 => 13:50 Tuesday, July 22, 2008  
**File:** C:\Documents and Settings\dreynolds\Desktop\ATR Unload\08-081d22Jul2008Rt9BtwnExits.EC0  
 (Plus)  
**Identifier:** S1328N62-MC56-L5-[MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default  
**Data type:** Axle sensors - Paired (Class, Speed, Count)

**Profile:**

**Filter time:** 16:00 Thursday, July 17, 2008 => 12:00 Tuesday, July 22, 2008  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 5 - 100 mph  
**Direction:** North, South (bound)  
**Separation:** All - (Headway)  
**Name:** Factory default profile  
**Scheme:** Vehicle classification (Scheme F2)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 96954 / 99319 (97.62%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-557

Site: 08-081d.OSN  
 Description: **US Route 9, South of Exit 20**  
 Filter time: 16:00 Thursday, July 17, 2008 => 12:00 Tuesday, July 22, 2008  
 Scheme: Vehicle classification (Scheme F2)  
 Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NS) Sp(5,100) Sep(>0)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	127.0	110.0	*	*	211.0	192.0	244.0	149.3	176.8
0100-0200	66.0	87.0	*	*	97.0	139.0	194.0	83.3	116.6
0200-0300	30.0	44.0	*	*	49.0	67.0	55.0	41.0	49.0
0300-0400	44.0	52.0	*	*	40.0	50.0	57.0	45.3	48.6
0400-0500	72.0	71.0	*	*	78.0	41.0	43.0	73.7	61.0
0500-0600	167.0	156.0	*	*	156.0	96.0	91.0	159.7	133.2
0600-0700	401.0	369.0	*	*	355.0	258.0	194.0	375.0	315.4
0700-0800	512.0	582.0	*	*	575.0	401.0	392.0	556.3	492.4
0800-0900	802.0	797.0	*	*	887.0	788.0	574.0	828.7	769.6
0900-1000	1088.0	1118.0	*	*	1171.0	1378.0	1081.0	1125.7	1167.2
1000-1100	1306.0	1386.0<	*	*	1581.0	1787.0<	1496.0	1424.3	1511.2
1100-1200	1449.0<	1285.0	*	*	1676.0<	1729.0	1529.0<	1470.0<	1533.6<
1200-1300	1344.0	*	*	*	1582.0	1650.0<	1332.0	1463.0	1477.0
1300-1400	1401.0	*	*	*	1526.0	1543.0	1061.0	1463.5	1382.8
1400-1500	1490.0	*	*	*	1629.0	1501.0	1111.0	1559.5	1432.8
1500-1600	1419.0	*	*	*	1543.0	1574.0	1126.0	1481.0	1415.5
1600-1700	1545.0<	*	*	1599.0	1585.0	1544.0	1224.0	1576.3<	1499.4<
1700-1800	1408.0	*	*	1489.0	1634.0<	1420.0	1341.0<	1510.3	1458.4
1800-1900	1234.0	*	*	1358.0	1410.0	1454.0	1239.0	1334.0	1339.0
1900-2000	1149.0	*	*	1274.0	1299.0	1471.0	999.0	1240.7	1238.4
2000-2100	946.0	*	*	1017.0	1214.0	1256.0	716.0	1059.0	1029.8
2100-2200	833.0	*	*	826.0	1000.0	1176.0	536.0	886.3	874.2
2200-2300	492.0	*	*	754.0	684.0	860.0	300.0	643.3	618.0
2300-2400	299.0	*	*	410.0	503.0	534.0	217.0	404.0	392.6
<b>Totals</b>									
0700-1900	14998.0	*	*	*	16799.0	16769.0	13506.0	15792.7	15478.8
0600-2200	18327.0	*	*	*	20667.0	20930.0	15951.0	19353.7	18936.6
0600-0000	19118.0	*	*	*	21854.0	22324.0	16468.0	20401.0	19947.2
0000-0000	19624.0	*	*	*	22485.0	22909.0	17152.0	20953.3	20532.4
AM Peak	1100	1000	*	*	1100	1000	1100		
	1449.0	1386.0	*	*	1676.0	1787.0	1529.0		
PM Peak	1600	*	*	*	1700	1200	1700		
	1545.0	*	*	*	1634.0	1650.0	1341.0		

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-557 -- English (ENU)

**Datasets:**

**Site:** [08-081d] US Route 9, South of Exit 20  
**Direction:** 7 - North bound A>B, South bound B>A., Lane: 0  
**Survey Duration:** 11:48 Thursday, July 17, 2008 => 13:50 Tuesday, July 22, 2008  
**File:** C:\Documents and Settings\dreynolds\Desktop\ATR Unload\08-081d22Jul2008Rt9BtwnExits.EC0  
 (Plus)  
**Identifier:** S1328N62 MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default  
**Data type:** Axle sensors - Paired (Class, Speed, Count)

**Profile:**

**Filter time:** 16:00 Thursday, July 17, 2008 => 12:00 Tuesday, July 22, 2008  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 5 - 100 mph.  
**Direction:** [A>B] North (bound)  
**Separation:** All - (Headway)  
**Name:** Factory default profile  
**Scheme:** Vehicle classification (Scheme F2)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 44874 / 99319 (45.18%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-557

Site: 08-081d.0SN  
 Description: US Route 9 South of Exit 20  
 Filter time: 16:00 Thursday, July 17, 2008 => 12:00 Tuesday, July 22, 2008  
 Scheme: Vehicle classification (Scheme F2)  
 Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13 ) DirAB(N).Sp(5,100) Sep(>0)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	72.0	55.0	*	*	103.0	93.0	116.0	76.7	87.8
0100-0200	36.0	51.0	*	*	56.0	73.0	105.0	47.7	64.2
0200-0300	10.0	18.0	*	*	21.0	24.0	17.0	16.3	18.0
0300-0400	12.0	19.0	*	*	15.0	14.0	16.0	15.3	15.2
0400-0500	19.0	16.0	*	*	22.0	14.0	12.0	19.0	16.6
0500-0600	44.0	48.0	*	*	52.0	36.0	32.0	48.0	42.4
0600-0700	143.0	161.0	*	*	138.0	109.0	74.0	147.3	125.0
0700-0800	202.0	249.0	*	*	232.0	178.0	161.0	227.7	204.4
0800-0900	326.0	337.0	*	*	377.0	365.0	264.0	346.7	333.8
0900-1000	495.0	499.0	*	*	460.0	534.0	464.0	484.7	490.4
1000-1100	524.0	505.0	*	*	586.0	609.0	523.0	538.3	549.4
1100-1200	602.0<	562.0<	*	*	707.0<	713.0<	665.0<	623.7<	649.8<
1200-1300	577.0	*	*	*	718.0	725.0	679.0<	647.5	674.8
1300-1400	652.0	*	*	*	691.0	690.0	467.0	671.5	625.0
1400-1500	707.0	*	*	*	785.0	681.0	562.0	746.0	683.8
1500-1600	699.0	*	*	*	783.0	772.0<	602.0	741.0	714.0
1600-1700	820.0<	*	*	794.0	837.0	770.0	620.0	817.0<	768.2<
1700-1800	711.0	*	*	759.0	839.0<	718.0	580.0	769.7	721.4
1800-1900	667.0	*	*	728.0	693.0	712.0	522.0	696.0	664.4
1900-2000	636.0	*	*	730.0	629.0	770.0	487.0	665.0	650.4
2000-2100	483.0	*	*	584.0	624.0	652.0	348.0	563.7	538.2
2100-2200	417.0	*	*	406.0	446.0	568.0	249.0	423.0	417.2
2200-2300	234.0	*	*	241.0	316.0	414.0	145.0	263.7	270.0
2300-2400	150.0	*	*	161.0	268.0	253.0	118.0	193.0	190.0
<b>Totals</b>									
0700-1900	6982.0	*	*	*	7708.0	7467.0	6109.0	7309.7	7079.3
0600-2200	8661.0	*	*	*	9545.0	9566.0	7267.0	9108.7	8810.1
0600-0000	9045.0	*	*	*	10129.0	10233.0	7530.0	9565.3	9270.1
0000-0000	9238.0	*	*	*	10398.0	10487.0	7828.0	9788.3	9514.3
AM Peak	1100	1100	*	*	1100	1100	1100		
	602.0	562.0	*	*	707.0	713.0	665.0		
PM Peak	1600	*	*	*	1700	1500	1200		
	820.0	*	*	*	839.0	772.0	679.0		

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

.irtWeeklyVehicle-557 -- English (ENU)

**Datasets:**

**Site:** [08-081d] US Route 9, South of Exit 20  
**Direction:** 7 - North bound A>B, South bound B>A., Lane: 0  
**Survey Duration:** 11:48 Thursday, July 17, 2008 => 13:50 Tuesday, July 22, 2008  
**File:** C:\Documents and Settings\dreynolds\Desktop\ATR Unload\08-081d22Jul2008Rt9BtwnExits.EC0  
 (Plus)  
**Identifier:** S1328N62 MC56-L5 [MC55] (c)Microcom-19Oct04  
**Algorithm:** Factory default  
**Data type:** Axle sensors - Paired (Class, Speed, Count)

**Profile:**

**Filter time:** 16:00 Thursday, July 17, 2008 => 12:00 Tuesday, July 22, 2008  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 5 - 100 mph  
**Direction:** [B-A] South (bound)  
**Separation:** All - (Headway)  
**Name:** Factory default profile  
**Scheme:** Vehicle classification (Scheme F2)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 52080 / 99319 (52.44%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-557

Site: 08-081d.0SN  
 Description: US Route 9, South of Exit 20  
 Filter time: 16:00 Thursday, July 17, 2008 => 12:00 Tuesday, July 22, 2008  
 Scheme: Vehicle classification (Scheme F2)  
 Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13 ) DirBA(S) Sp(5,100) Sep(>0)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	55.0	55.0	*	*	108.0	99.0	128.0	72.7	89.0
0100-0200	30.0	36.0	*	*	41.0	66.0	89.0	35.7	52.4
0200-0300	20.0	26.0	*	*	28.0	43.0	38.0	24.7	31.0
0300-0400	32.0	33.0	*	*	25.0	36.0	41.0	30.0	33.4
0400-0500	53.0	55.0	*	*	56.0	27.0	31.0	54.7	44.4
0500-0600	123.0	108.0	*	*	104.0	60.0	59.0	111.7	90.8
0600-0700	258.0	208.0	*	*	217.0	149.0	120.0	227.7	190.4
0700-0800	310.0	333.0	*	*	343.0	223.0	231.0	328.7	288.0
0800-0900	476.0	460.0	*	*	510.0	423.0	310.0	482.0	435.8
0900-1000	593.0	619.0	*	*	711.0	844.0	617.0	641.0	676.8
1000-1100	782.0	881.0<	*	*	995.0<	1178.0<	973.0<	886.0<	961.8<
1100-1200	847.0<	723.0	*	*	969.0	1016.0	864.0	846.3	883.8
1200-1300	767.0	*	*	*	864.0<	925.0<	653.0	815.5<	802.3<
1300-1400	749.0	*	*	*	835.0	853.0	594.0	792.0	757.8
1400-1500	783.0<	*	*	*	844.0	820.0	549.0	813.5	749.0
1500-1600	720.0	*	*	*	760.0	802.0	524.0	740.0	701.5
1600-1700	725.0	*	*	805.0	748.0	774.0	604.0	759.3	731.2
1700-1800	697.0	*	*	730.0	795.0	702.0	761.0<	740.7	737.0
1800-1900	567.0	*	*	630.0	717.0	742.0	717.0	638.0	674.6
1900-2000	513.0	*	*	544.0	670.0	701.0	512.0	575.7	588.0
2000-2100	463.0	*	*	433.0	590.0	604.0	368.0	495.3	491.6
2100-2200	416.0	*	*	420.0	554.0	608.0	287.0	463.3	457.0
2200-2300	258.0	*	*	513.0	368.0	446.0	155.0	379.7	348.0
2300-2400	149.0	*	*	249.0	235.0	281.0	99.0	211.0	202.6
<b>Totals</b>									
0700-1900	8016.0	*	*	*	9091.0	9302.0	7397.0	8483.0	8399.5
0600-2200	9666.0	*	*	*	11122.0	11364.0	8684.0	10245.0	10126.5
0600-0000	10073.0	*	*	*	11725.0	12091.0	8938.0	10835.7	10677.1
0000-0000	10386.0	*	*	*	12087.0	12422.0	9324.0	11165.0	11018.1
AM Peak	1100	1000	*	*	1000	1000	1000		
	847.0	881.0	*	*	995.0	1178.0	973.0		
PM Peak	1400	*	*	*	1200	1200	1700		
	783.0	*	*	*	864.0	925.0	761.0		

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

②

.irtWeeklyVehicle-560 -- English (ENU)

**Datasets:**

**Site:** [LG] Route 9 South of Route 149  
**Direction:** 7 - North bound A>B, South bound B>A., Lane: 0  
**Survey Duration:** 10:00 Thursday, July 17, 2008 => 13:32 Tuesday, July 22, 2008  
**File:** C:\Documents and Settings\dreynolds\Desktop\ATR Unload\LG22Jul2008Rt9S.EC0 (Plus)  
**Identifier:** E148J98W MC56-6 [MC55] (c)Microcom 02/03/01  
**Algorithm:** Factory default  
**Data type:** Axle sensors - Paired (Class, Speed, Count)

**Profile:**

**Filter time:** 14:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 5 - 100 mph  
**Direction:** North, South (bound)  
**Separation:** All - (Headway)  
**Name:** Factory default profile  
**Scheme:** Vehicle classification (Scheme F2)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 89458 / 91738 (97.51%)

## Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-560

Site: LG.0SN  
 Description: Route 9 South of Route 149  
 Filter time: 14:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
 Scheme: Vehicle classification (Scheme F2)  
 Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NS) Sp(5,100) Sep(>0)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	140.0	113.0	*	*	203.0	213.0	247.0	152.0	183.2
0100-0200	60.0	79.0	*	*	99.0	157.0	168.0	79.3	112.6
0200-0300	49.0	60.0	*	*	67.0	87.0	75.0	58.7	67.6
0300-0400	61.0	68.0	*	*	67.0	61.0	61.0	65.3	63.6
0400-0500	95.0	107.0	*	*	100.0	64.0	52.0	100.7	83.6
0500-0600	221.0	194.0	*	*	198.0	100.0	99.0	204.3	162.4
0600-0700	416.0	409.0	*	*	390.0	271.0	203.0	405.0	337.8
0700-0800	548.0	561.0	*	*	616.0	442.0	375.0	575.0	508.4
0800-0900	720.0	717.0	*	*	801.0	788.0	549.0	746.0	715.0
0900-1000	900.0	953.0	*	*	1007.0	1162.0	996.0	953.3	1003.6
1000-1100	1153.0	1200.0	*	*	1310.0	1226.0	1313.0<	1221.0	1240.4
1100-1200	1322.0<	*	*	*	1340.0<	1258.0<	1263.0	1331.0<	1295.8<
1200-1300	1288.0	*	*	*	1349.0	1309.0	1063.0	1318.5	1252.3
1300-1400	1273.0	*	*	*	1360.0	1297.0	950.0	1316.5	1220.0
1400-1500	1308.0	*	*	1336.0	1358.0	1422.0	893.0	1334.0	1263.4
1500-1600	1348.0<	*	*	1355.0	1321.0	1507.0<	945.0	1341.3	1295.2
1600-1700	1332.0	*	*	1372.0	1381.0	1376.0	972.0	1361.7<	1286.6
1700-1800	1213.0	*	*	1336.0	1476.0<	1393.0	1240.0<	1341.7	1331.6<
1800-1900	1105.0	*	*	1279.0	1367.0	1387.0	1172.0	1250.3	1262.0
1900-2000	990.0	*	*	1202.0	1343.0	1367.0	1031.0	1178.3	1186.6
2000-2100	922.0	*	*	971.0	1188.0	1217.0	722.0	1027.0	1004.0
2100-2200	706.0	*	*	730.0	1026.0	1020.0	555.0	820.7	807.4
2200-2300	408.0	*	*	698.0	655.0	785.0	322.0	587.0	573.6
2300-2400	293.0	*	*	412.0	521.0	488.0	229.0	408.7	388.6
<b>Totals</b>									
0700-1900	13510.0	*	*	*	14686.0	14567.0	11731.0	14090.3	13674.2
0600-2200	16544.0	*	*	*	18633.0	18442.0	14242.0	17521.3	17010.0
0600-0000	17245.0	*	*	*	19809.0	19715.0	14793.0	18517.0	17972.2
0000-0000	17871.0	*	*	*	20543.0	20397.0	15495.0	19177.3	18645.2
AM Peak	1100	*	*	*	1100	1100	1000		
	1322.0	*	*	*	1340.0	1258.0	1313.0		
PM Peak	1500	*	*	*	1700	1500	1700		
	1348.0	*	*	*	1476.0	1507.0	1240.0		

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

### .irtWeeklyVehicle-560 -- English (ENU)

#### Datasets:

**Site:** [LG] Route 9 South of Route 149  
**Direction:** 7 - North bound A>B, South bound B>A., Lane: 0  
**Survey Duration:** 10:00 Thursday, July 17, 2008 => 13:32 Tuesday, July 22, 2008  
**File:** C:\Documents and Settings\dreynolds\Desktop\ATR Unload\LG22Jul2008Rt9S.EC0 (Plus)  
**Identifier:** E148J98W MC56-6 [MC55] (c)Microcom 02/03/01  
**Algorithm:** Factory default  
**Data type:** Axle sensors - Paired (Class, Speed, Count)

#### Profile:

**Filter time:** 14:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 5 - 100 mph  
**Direction:** [A-B] North (bound)  
**Separation:** All - (Headway)  
**Name:** Factory default profile  
**Scheme:** Vehicle classification (Scheme F2)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 45114 / 91738 (49.18%)

## Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-560

**Site:** LG.0SN  
**Description:** Route 9 South of Route 149  
**Filter time:** 14:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
**Scheme:** Vehicle classification (Scheme F2)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) DirAB(N) Sp(5,100) Sep(>0)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	98.0	57.0	*	*	103.0	122.0	128.0	86.0	101.6
0100-0200	37.0	44.0	*	*	61.0	97.0	93.0	47.3	66.4
0200-0300	30.0	38.0	*	*	43.0	43.0	33.0	37.0	37.4
0300-0400	29.0	35.0	*	*	40.0	27.0	19.0	34.7	30.0
0400-0500	39.0	51.0	*	*	42.0	34.0	19.0	44.0	37.0
0500-0600	95.0	86.0	*	*	98.0	50.0	43.0	93.0	74.4
0600-0700	167.0	198.0	*	*	178.0	132.0	91.0	181.0	153.2
0700-0800	245.0	263.0	*	*	273.0	218.0	159.0	260.3	231.6
0800-0900	338.0	334.0	*	*	380.0	388.0	268.0	350.7	341.6
0900-1000	386.0	406.0	*	*	418.0	497.0	416.0	403.3	424.6
1000-1100	470.0	484.0	*	*	559.0	550.0	485.0	504.3	509.6
1100-1200	567.0<	*	*	*	595.0<	631.0<	567.0<	581.0<	590.0<
1200-1300	606.0	*	*	*	659.0	678.0	554.0	632.5	624.3
1300-1400	665.0	*	*	*	712.0	678.0	515.0	688.5	642.5
1400-1500	665.0	*	*	700.0	700.0	749.0	503.0	688.3	663.4
1500-1600	661.0	*	*	676.0	695.0	796.0<	553.0	677.3	676.2
1600-1700	699.0<	*	*	725.0	761.0	734.0	555.0	728.3<	694.8
1700-1800	653.0	*	*	732.0	788.0<	791.0	608.0	724.3	714.4<
1800-1900	641.0	*	*	725.0	722.0	719.0	609.0<	696.0	683.2
1900-2000	554.0	*	*	723.0	737.0	721.0	555.0	671.3	658.0
2000-2100	478.0	*	*	591.0	659.0	663.0	394.0	576.0	557.0
2100-2200	383.0	*	*	376.0	558.0	550.0	291.0	439.0	431.6
2200-2300	189.0	*	*	247.0	330.0	354.0	172.0	255.3	258.4
2300-2400	136.0	*	*	169.0	296.0	227.0	137.0	200.3	193.0
<b>Totals</b>									
0700-1900	6596.0	*	*	*	7262.0	7429.0	5792.0	6935.0	6796.1
0600-2200	8178.0	*	*	*	9394.0	9495.0	7123.0	8802.3	8595.9
0600-0000	8503.0	*	*	*	10020.0	10076.0	7432.0	9258.0	9047.3
0000-0000	8831.0	*	*	*	10407.0	10449.0	7767.0	9600.0	9394.1
<b>AM Peak</b>	1100	*	*	*	1100	1100	1100		
	567.0	*	*	*	595.0	631.0	567.0		
<b>PM Peak</b>	1600	*	*	*	1700	1500	1800		
	699.0	*	*	*	788.0	796.0	609.0		

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

virtWeeklyVehicle-560 -- English (ENU)

Datasets:

**Site:** [LG] Route 9 South of Route 149  
**Direction:** 7 - North bound A>B, South bound B>A., Lane: 0  
**Survey Duration:** 10:00 Thursday, July 17, 2008 => 13:32 Tuesday, July 22, 2008  
**File:** C:\Documents and Settings\dreynolds\Desktop\ATR Unload\LG22Jul2008Rt9S.EC0 (Plus)  
**Identifier:** E148J98W MC56-6 [MC55] (c)Microcom 02/03/01  
**Algorithm:** Factory default  
**Data type:** Axle sensors - Paired (Class, Speed, Count)

Profile:

**Filter time:** 14:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 5 - 100 mph.  
**Direction:** [B-A] South (bound)  
**Separation:** All - (Headway)  
**Name:** Factory default profile  
**Scheme:** Vehicle classification (Scheme F2)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 44344 / 91738 (48.34%)

## Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-560

**Site:** LG.0SN  
**Description:** Route 9 South of Route 149  
**Filter time:** 14:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
**Scheme:** Vehicle classification (Scheme F2)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) DirBA(S) Sp(5,100) Sep(>0)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	42.0	56.0	*	*	100.0	91.0	119.0	66.0	81.6
0100-0200	23.0	35.0	*	*	38.0	60.0	75.0	32.0	46.2
0200-0300	19.0	22.0	*	*	24.0	44.0	42.0	21.7	30.2
0300-0400	32.0	33.0	*	*	27.0	34.0	42.0	30.7	33.6
0400-0500	56.0	56.0	*	*	58.0	30.0	33.0	56.7	46.6
0500-0600	126.0	108.0	*	*	100.0	50.0	56.0	111.3	88.0
0600-0700	249.0	211.0	*	*	212.0	139.0	112.0	224.0	184.6
0700-0800	303.0	298.0	*	*	343.0	224.0	216.0	314.7	276.8
0800-0900	382.0	383.0	*	*	421.0	400.0	281.0	395.3	373.4
0900-1000	514.0	547.0	*	*	589.0	665.0	580.0	550.0	579.0
1000-1100	683.0	716.0	*	*	751.0<	676.0<	828.0<	716.7	730.8<
1100-1200	755.0<	*	*	*	745.0	627.0	696.0	750.0<	705.8
1200-1300	682.0	*	*	*	690.0<	631.0	509.0	686.0<	628.0<
1300-1400	608.0	*	*	*	648.0	619.0	435.0	628.0	577.5
1400-1500	643.0	*	*	636.0	658.0	673.0	390.0	645.7	600.0
1500-1600	687.0<	*	*	679.0	626.0	711.0<	392.0	664.0	619.0
1600-1700	633.0	*	*	647.0	620.0	642.0	417.0	633.3	591.8
1700-1800	560.0	*	*	604.0	688.0	602.0	632.0<	617.3	617.2
1800-1900	464.0	*	*	554.0	645.0	668.0	563.0	554.3	578.8
1900-2000	436.0	*	*	479.0	606.0	646.0	476.0	507.0	528.6
2000-2100	444.0	*	*	380.0	529.0	554.0	328.0	451.0	447.0
2100-2200	323.0	*	*	354.0	468.0	470.0	264.0	381.7	375.8
2200-2300	219.0	*	*	451.0	325.0	431.0	150.0	331.7	315.2
2300-2400	157.0	*	*	243.0	225.0	261.0	92.0	208.3	195.6
<b>Totals</b>									
0700-1900	6914.0	*	*	*	7424.0	7138.0	5939.0	7155.3	6878.1
0600-2200	8366.0	*	*	*	9239.0	8947.0	7119.0	8719.0	8414.1
0600-0000	8742.0	*	*	*	9789.0	9639.0	7361.0	9259.0	8924.9
0000-0000	9040.0	*	*	*	10136.0	9948.0	7728.0	9577.3	9251.1
AM Peak	1100	*	*	*	1000	1000	1000		
	755.0	*	*	*	751.0	676.0	828.0		
PM Peak	1500	*	*	*	1200	1500	1700		
	687.0	*	*	*	690.0	711.0	632.0		

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)



./irtWeeklyVehicle-559 -- English (ENU)

**Datasets:**

**Site:** [08-081d] Route 149 East of Route 9  
**Direction:** 8 - East bound A>B, West bound B>A., Lane: 0  
**Survey Duration:** 11:34 Thursday, July 17, 2008 => 13:46 Tuesday, July 22, 2008  
**File:** C:\Documents and Settings\dreynolds\Desktop\ATR Unload\08-081d22Jul2008Rt149.EC0 (Plus)  
**Identifier:** R717H3E2 MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default  
**Data type:** Axle sensors - Paired (Class, Speed, Count)

**Profile:**

**Filter time:** 15:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 5 - 100 mph.  
**Direction:** East, West (bound)  
**Separation:** All - (Headway)  
**Name:** Factory default profile  
**Scheme:** Vehicle classification (Scheme F2)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 53258 / 55707 (95.60%)

## Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-559

**Site:** 08-081d.0WE  
**Description:** Route 149 East of Route 9  
**Filter time:** 15:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
**Scheme:** Vehicle classification (Scheme F2)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 13 ) Dir(EW) Sp(5,100) Sep(>0)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	100.0	76.0	*	*	144.0	137.0	127.0	106.7	116.8
0100-0200	59.0	51.0	*	*	70.0	100.0	97.0	60.0	75.4
0200-0300	51.0	59.0	*	*	58.0	54.0	49.0	56.0	54.2
0300-0400	64.0	82.0	*	*	58.0	48.0	36.0	68.0	57.6
0400-0500	100.0	109.0	*	*	90.0	61.0	38.0	99.7	79.6
0500-0600	224.0	217.0	*	*	181.0	80.0	95.0	207.3	159.4
0600-0700	416.0	417.0	*	*	353.0	220.0	155.0	395.3	312.2
0700-0800	511.0	526.0	*	*	509.0	357.0	247.0	515.3	430.0
0800-0900	535.0	543.0	*	*	616.0	582.0	358.0	564.7	526.8
0900-1000	588.0	549.0	*	*	655.0	786.0<	566.0	597.3	628.8
1000-1100	644.0	675.0	*	*	749.0	756.0	781.0<	689.3	721.0
1100-1200	743.0<	*	*	*	908.0<	719.0	715.0	825.5<	771.3<
1200-1300	688.0	*	*	*	861.0	776.0	589.0	774.5	728.5
1300-1400	714.0	*	*	*	913.0	822.0	573.0	813.5	755.5
1400-1500	681.0	*	*	*	978.0<	838.0	504.0	829.5	750.3
1500-1600	820.0<	*	*	882.0	941.0	839.0<	527.0	881.0<	801.8<
1600-1700	770.0	*	*	875.0	922.0	733.0	528.0	855.7	765.6
1700-1800	721.0	*	*	867.0	946.0	716.0	659.0	844.7	781.8
1800-1900	542.0	*	*	777.0	853.0	672.0	694.0<	724.0	707.6
1900-2000	443.0	*	*	588.0	770.0	585.0	552.0	600.3	587.6
2000-2100	394.0	*	*	469.0	623.0	512.0	430.0	495.3	485.6
2100-2200	321.0	*	*	408.0	531.0	455.0	317.0	420.0	406.4
2200-2300	231.0	*	*	440.0	388.0	391.0	189.0	353.0	327.8
2300-2400	172.0	*	*	263.0	288.0	236.0	147.0	241.0	221.2
<b>Totals</b>									
0700-1900	7957.0	*	*	*	9851.0	8596.0	6741.0	8915.0	8368.9
0600-2200	9531.0	*	*	*	12128.0	10368.0	8195.0	10826.0	10160.7
0600-0000	9934.0	*	*	*	12804.0	10995.0	8531.0	11420.0	10709.7
0000-0000	10532.0	*	*	*	13405.0	11475.0	8973.0	12017.7	11252.7
AM Peak	1100	*	*	*	1100	0900	1000		
	743.0	*	*	*	908.0	786.0	781.0		
PM Peak	1500	*	*	*	1400	1500	1800		
	820.0	*	*	*	978.0	839.0	694.0		

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

./irtWeeklyVehicle-559 -- English (ENU)

### Datasets:

**Site:** [08-081d] Route 149 East of Route 9  
**Direction:** 8 - East bound A>B, West bound B>A., Lane: 0  
**Survey Duration:** 11:34 Thursday, July 17, 2008 => 13:46 Tuesday, July 22, 2008  
**File:** C:\Documents and Settings\dreynolds\Desktop\ATR Unload\08-081d22Jul2008Rt149.EC0 (Plus)  
**Identifier:** R717H3E2 MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default  
**Data type:** Axle sensors - Paired (Class, Speed, Count)

### Profile:

**Filter time:** 15:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 5 - 100 mph.  
**Direction:** [A-B] East (bound)  
**Separation:** All - (Headway)  
**Name:** Factory default profile  
**Scheme:** Vehicle classification (Scheme F2)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 27663 / 55707 (49.66%)

## Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-559

Site: 08-081d.0WE  
 Description: Route 149 East of Route 9  
 Filter time: 15:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
 Scheme: Vehicle classification (Scheme F2)  
 Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) DirAB(E) Sp(5,100) Sep(>0)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	79.0	46.0	*	*	85.0	93.0	87.0	70.0	78.0
0100-0200	31.0	27.0	*	*	44.0	71.0	65.0	34.0	47.6
0200-0300	28.0	35.0	*	*	33.0	37.0	33.0	32.0	33.2
0300-0400	30.0	40.0	*	*	40.0	27.0	19.0	36.7	31.2
0400-0500	39.0	50.0	*	*	37.0	33.0	22.0	42.0	36.2
0500-0600	106.0	107.0	*	*	94.0	36.0	41.0	102.3	76.8
0600-0700	188.0	206.0	*	*	165.0	109.0	71.0	186.3	147.8
0700-0800	209.0	228.0	*	*	198.0	163.0	98.0	211.7	179.2
0800-0900	229.0	248.0	*	*	270.0	286.0	167.0	249.0	240.0
0900-1000	252.0	224.0	*	*	285.0	345.0	260.0	253.7	273.2
1000-1100	278.0	285.0	*	*	322.0	342.0	342.0	295.0	313.8
1100-1200	297.0<	*	*	*	414.0<	361.0<	330.0	355.5<	350.5<
1200-1300	334.0	*	*	*	425.0	408.0	336.0	379.5	375.8
1300-1400	342.0	*	*	*	505.0	454.0	326.0	423.5	406.8
1400-1500	369.0	*	*	*	537.0	454.0	329.0	453.0	422.3
1500-1600	451.0<	*	*	463.0	548.0<	497.0<	365.0	487.3<	464.8<
1600-1700	399.0	*	*	478.0	534.0	415.0	372.0<	470.3	439.6
1700-1800	393.0	*	*	455.0	504.0	398.0	310.0	450.7	412.0
1800-1900	274.0	*	*	372.0	447.0	348.0	345.0	364.3	357.2
1900-2000	232.0	*	*	308.0	400.0	305.0	303.0	313.3	309.6
2000-2100	221.0	*	*	239.0	334.0	271.0	258.0	264.7	264.6
2100-2200	193.0	*	*	234.0	327.0	249.0	186.0	251.3	237.8
2200-2300	133.0	*	*	295.0	249.0	233.0	114.0	225.7	204.8
2300-2400	90.0	*	*	157.0	195.0	152.0	111.0	147.3	141.0
<b>Totals</b>									
0700-1900	3827.0	*	*	*	4989.0	4471.0	3580.0	4393.5	4235.1
0600-2200	4661.0	*	*	*	6215.0	5405.0	4398.0	5409.2	5194.9
0600-0000	4884.0	*	*	*	6659.0	5790.0	4623.0	5782.2	5540.7
0000-0000	5197.0	*	*	*	6992.0	6087.0	4890.0	6099.2	5843.7
AM Peak	1100	*	*	*	1100	1100	1000		
	297.0	*	*	*	414.0	361.0	342.0		
PM Peak	1500	*	*	*	1500	1500	1600		
	451.0	*	*	*	548.0	497.0	372.0		

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

### VirtWeeklyVehicle-559 -- English (ENU)

#### Datasets:

**Site:** [08-081d] Route 149 East of Route 9  
**Direction:** 8 - East bound A>B, West bound B>A., Lane: 0  
**Survey Duration:** 11:34 Thursday, July 17, 2008 => 13:46 Tuesday, July 22, 2008  
**File:** C:\Documents and Settings\dreynolds\Desktop\ATR Unload\08-081d22Jul2008Rt149.EC0 (Plus)  
**Identifier:** R717H3E2 MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default  
**Data type:** Axle sensors - Paired (Class, Speed, Count)

#### Profile:

**Filter time:** 15:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 5 - 100 mph  
**Direction:** [B-A] West (bound)  
**Separation:** All - (Headway)  
**Name:** Factory default profile  
**Scheme:** Vehicle classification (Scheme F2)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 25595 / 55707 (45.95%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-559

Site: 08-081d.0WE  
 Description: Route 149 East of Route 9  
 Filter time: 15:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
 Scheme: Vehicle classification (Scheme F2)  
 Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13 ) DirBA(W) Sp(5,100) Sep(>0)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	21.0	30.0	*	*	59.0	44.0	40.0	36.7	38.8
0100-0200	28.0	24.0	*	*	26.0	29.0	32.0	26.0	27.8
0200-0300	23.0	24.0	*	*	25.0	17.0	16.0	24.0	21.0
0300-0400	34.0	42.0	*	*	18.0	21.0	17.0	31.3	26.4
0400-0500	61.0	59.0	*	*	53.0	28.0	16.0	57.7	43.4
0500-0600	118.0	110.0	*	*	87.0	44.0	54.0	105.0	82.6
0600-0700	228.0	211.0	*	*	188.0	111.0	84.0	209.0	164.4
0700-0800	302.0	298.0	*	*	311.0	194.0	149.0	303.7	250.8
0800-0900	306.0	295.0	*	*	346.0	296.0	191.0	315.7	286.8
0900-1000	336.0	325.0	*	*	370.0	441.0<	306.0	343.7	355.6
1000-1100	366.0	390.0	*	*	427.0	414.0	439.0<	394.3	407.2
1100-1200	446.0<	*	*	*	494.0<	358.0	385.0	470.0<	420.8<
1200-1300	354.0	*	*	*	436.0	368.0	253.0	395.0<	352.8
1300-1400	372.0<	*	*	*	408.0	368.0	247.0	390.0	348.8
1400-1500	312.0	*	*	*	441.0	384.0<	175.0	376.5	328.0
1500-1600	369.0	*	*	419.0	393.0	342.0	162.0	393.7	337.0
1600-1700	371.0	*	*	397.0	388.0	318.0	156.0	385.3	326.0
1700-1800	328.0	*	*	412.0	442.0<	318.0	349.0	394.0	369.8<
1800-1900	268.0	*	*	405.0	406.0	324.0	349.0<	359.7	350.4
1900-2000	211.0	*	*	280.0	370.0	280.0	249.0	287.0	278.0
2000-2100	173.0	*	*	230.0	289.0	241.0	172.0	230.7	221.0
2100-2200	128.0	*	*	174.0	204.0	206.0	131.0	168.7	168.6
2200-2300	98.0	*	*	145.0	139.0	158.0	75.0	127.3	123.0
2300-2400	82.0	*	*	106.0	93.0	84.0	36.0	93.7	80.2
<b>Totals</b>									
0700-1900	4130.0	*	*	*	4862.0	4125.0	3161.0	4521.5	4133.9
0600-2200	4870.0	*	*	*	5913.0	4963.0	3797.0	5416.8	4965.9
0600-0000	5050.0	*	*	*	6145.0	5205.0	3908.0	5637.8	5169.1
0000-0000	5335.0	*	*	*	6413.0	5388.0	4083.0	5918.5	5409.1
AM Peak	1100	*	*	*	1100	0900	1000		
	446.0	*	*	*	494.0	441.0	439.0		
PM Peak	1300	*	*	*	1700	1400	1800		
	372.0	*	*	*	442.0	384.0	349.0		

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

④

/virtWeeklyVehicle-558 -- English (ENU)

**Datasets:**

**Site:** [08-081d] Route 9 North of Route 149 Intersection  
**Direction:** 7 - North bound A>B, South bound B>A., Lane: 0  
**Survey Duration:** 10:00 Thursday, July 17, 2008 => 13:38 Tuesday, July 22, 2008  
**File:** C:\Documents and Settings\dreynolds\Desktop\ATR Unload\08-081d22Jul2008Rt9N.EC0 (Plus)  
**Identifier:** R519M98M MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default  
**Data type:** Axle sensors - Paired (Class, Speed, Count)

**Profile:**

**Filter time:** 15:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 5 - 100 mph.  
**Direction:** North, South (bound)  
**Separation:** All - (Headway)  
**Name:** Factory default profile  
**Scheme:** Vehicle classification (Scheme F2)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 63344 / 65383 (96.88%)

## Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-558

**Site:** 08-081d.0SN  
**Description:** Route 9 North of Route 149 Intersection  
**Filter time:** 15:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
**Scheme:** Vehicle classification (Scheme F2)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 13 ) Dir(NS) Sp(5,100) Sep(>0)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	67.0	81.0	*	*	157.0	148.0	190.0	101.7	128.6
0100-0200	40.0	35.0	*	*	48.0	102.0	110.0	41.0	67.0
0200-0300	15.0	19.0	*	*	20.0	61.0	63.0	18.0	35.6
0300-0400	11.0	18.0	*	*	24.0	27.0	50.0	17.7	26.0
0400-0500	30.0	18.0	*	*	32.0	22.0	33.0	26.7	27.0
0500-0600	93.0	93.0	*	*	93.0	49.0	57.0	93.0	77.0
0600-0700	235.0	220.0	*	*	230.0	164.0	112.0	228.3	192.2
0700-0800	340.0	386.0	*	*	381.0	288.0	227.0	369.0	324.4
0800-0900	480.0	529.0	*	*	516.0	555.0	398.0	508.3	495.6
0900-1000	619.0	714.0	*	*	685.0	772.0	704.0	672.7	698.8
1000-1100	784.0	861.0	*	*	906.0	1044.0<	981.0<	850.3	915.2<
1100-1200	899.0<	*	*	*	944.0<	1031.0	697.0	921.5<	892.8
1200-1300	854.0	*	*	*	952.0	1021.0	702.0	903.0	882.3
1300-1400	846.0	*	*	*	935.0	1003.0	542.0	890.5	831.5
1400-1500	931.0	*	*	*	960.0	1028.0	833.0	945.5	938.0
1500-1600	961.0<	*	*	969.0	928.0	1136.0<	879.0	952.7<	974.6<
1600-1700	923.0	*	*	945.0	951.0	1080.0	881.0<	939.7	956.0
1700-1800	811.0	*	*	898.0	1047.0<	1040.0	791.0	918.7	917.4
1800-1900	844.0	*	*	930.0	935.0	1092.0	752.0	903.0	910.6
1900-2000	742.0	*	*	970.0	932.0	1041.0	657.0	881.3	868.4
2000-2100	693.0	*	*	800.0	915.0	975.0	498.0	802.7	776.2
2100-2200	584.0	*	*	611.0	731.0	816.0	370.0	642.0	622.4
2200-2300	342.0	*	*	660.0	539.0	757.0	242.0	513.7	508.0
2300-2400	223.0	*	*	353.0	390.0	438.0	157.0	322.0	312.2
<b>Totals</b>									
0700-1900	9292.0	*	*	*	10140.0	11090.0	8387.0	9774.8	9737.1
0600-2200	11546.0	*	*	*	12948.0	14086.0	10024.0	12329.2	12196.3
0600-0000	12111.0	*	*	*	13877.0	15281.0	10423.0	13164.8	13016.5
0000-0000	12367.0	*	*	*	14251.0	15690.0	10926.0	13462.8	13377.7
AM Peak	1100	*	*	*	1100	1000	1000		
	899.0	*	*	*	944.0	1044.0	981.0		
PM Peak	1500	*	*	*	1700	1500	1600		
	961.0	*	*	*	1047.0	1136.0	881.0		

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

/irtWeeklyVehicle-558 -- English (ENU)

**Datasets:**

**Site:** [08-081d] Route 9 North of Route 149 Intersection  
**Direction:** 7 - North bound A>B, South bound B>A., Lane: 0  
**Survey Duration:** 10:00 Thursday, July 17, 2008 => 13:38 Tuesday, July 22, 2008  
**File:** C:\Documents and Settings\dreynolds\Desktop\ATR Unload\08-081d22Jul2008Rt9N.EC0 (Plus)  
**Identifier:** R519M98M MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default  
**Data type:** Axle sensors - Paired (Class, Speed, Count)

**Profile:**

**Filter time:** 15:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 5 - 100 mph.  
**Direction:** [A-B] North (bound)  
**Separation:** All - (Headway)  
**Name:** Factory default profile  
**Scheme:** Vehicle classification (Scheme F2)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 31666 / 65383 (48.43%)

## Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-558

Site: 08-081d.OSN  
 Description: **Route 9 North of Route 149 Intersection**  
 Filter time: 15:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
 Scheme: Vehicle classification (Scheme F2)  
 Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13 ) DirAB(N) Sp(5,100) Sep(>0)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	33.0	37.0	*	*	67.0	66.0	81.0	45.7	56.8
0100-0200	26.0	18.0	*	*	27.0	47.0	47.0	23.7	33.0
0200-0300	4.0	8.0	*	*	10.0	19.0	16.0	7.3	11.4
0300-0400	3.0	9.0	*	*	8.0	6.0	13.0	6.7	7.8
0400-0500	13.0	9.0	*	*	10.0	10.0	7.0	10.7	9.8
0500-0600	28.0	27.0	*	*	31.0	23.0	25.0	28.7	26.8
0600-0700	85.0	97.0	*	*	109.0	75.0	54.0	97.0	84.0
0700-0800	176.0	192.0	*	*	192.0	144.0	112.0	186.7	163.2
0800-0900	237.0	248.0	*	*	241.0	267.0	197.0	242.0	238.0
0900-1000	273.0	339.0	*	*	292.0	343.0	299.0	301.3	309.2
1000-1100	313.0	362.0	*	*	406.0	485.0	322.0	360.3	377.6
1100-1200	416.0<	*	*	*	476.0<	512.0<	326.0<	446.0<	432.5<
1200-1300	401.0	*	*	*	487.0	561.0	361.0	444.0	452.5
1300-1400	444.0	*	*	*	475.0	567.0	309.0	459.5	448.8
1400-1500	468.0	*	*	*	480.0	539.0	419.0	474.0	476.5
1500-1600	439.0	*	*	467.0	512.0	544.0	465.0<	472.7	485.4
1600-1700	488.0	*	*	494.0	496.0	564.0	463.0	492.7	501.0
1700-1800	448.0	*	*	484.0	559.0<	570.0<	463.0	497.0	504.8<
1800-1900	492.0<	*	*	559.0	490.0	559.0	423.0	513.7<	504.6
1900-2000	410.0	*	*	601.0	516.0	545.0	337.0	509.0	481.8
2000-2100	363.0	*	*	530.0	509.0	540.0	255.0	467.3	439.4
2100-2200	309.0	*	*	307.0	364.0	447.0	188.0	326.7	323.0
2200-2300	149.0	*	*	159.0	240.0	317.0	129.0	182.7	198.8
2300-2400	102.0	*	*	114.0	185.0	174.0	68.0	133.7	128.6
<b>Totals</b>									
0700-1900	4595.0	*	*	*	5106.0	5655.0	4159.0	4889.8	4894.1
0600-2200	5762.0	*	*	*	6604.0	7262.0	4993.0	6289.8	6222.3
0600-0000	6013.0	*	*	*	7029.0	7753.0	5190.0	6606.2	6549.7
0000-0000	6120.0	*	*	*	7182.0	7924.0	5379.0	6728.8	6695.3
AM Peak	1100	*	*	*	1100	1100	1100		
	416.0	*	*	*	476.0	512.0	326.0		
PM Peak	1800	*	*	*	1700	1700	1500		
	492.0	*	*	*	559.0	570.0	465.0		

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

/irtWeeklyVehicle-558 -- English (ENU)

**Datasets:**

**Site:** [08-081d] Route 9 North of Route 149 Intersection  
**Direction:** 7 - North bound A>B, South bound B>A., Lane: 0  
**Survey Duration:** 10:00 Thursday, July 17, 2008 => 13:38 Tuesday, July 22, 2008  
**File:** C:\Documents and Settings\dreynolds\Desktop\ATR Unload\08-081d22Jul2008Rt9N.EC0 (Plus)  
**Identifier:** R519M98M MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default  
**Data type:** Axle sensors - Paired (Class, Speed, Count)

**Profile:**

**Filter time:** 15:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 5 - 100 mph  
**Direction:** [B-A] South (bound)  
**Separation:** All - (Headway)  
**Name:** Factory default profile  
**Scheme:** Vehicle classification (Scheme F2)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 31678 / 65383 (48.45%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-558

Site: 08-081d.OSN  
 Description: Route 9 North of Route 149 Intersection  
 Filter time: 15:00 Thursday, July 17, 2008 => 11:00 Tuesday, July 22, 2008  
 Scheme: Vehicle classification (Scheme F2)  
 Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) DirBA(S) Sp(5,100) Sep(>0)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	34.0	44.0	*	*	90.0	82.0	109.0	56.0	71.8
0100-0200	14.0	17.0	*	*	21.0	55.0	63.0	17.3	34.0
0200-0300	11.0	11.0	*	*	10.0	42.0	47.0	10.7	24.2
0300-0400	8.0	9.0	*	*	16.0	21.0	37.0	11.0	18.2
0400-0500	17.0	9.0	*	*	22.0	12.0	26.0	16.0	17.2
0500-0600	65.0	66.0	*	*	62.0	26.0	32.0	64.3	50.2
0600-0700	150.0	123.0	*	*	121.0	89.0	58.0	131.3	108.2
0700-0800	164.0	194.0	*	*	189.0	144.0	115.0	182.3	161.2
0800-0900	243.0	281.0	*	*	275.0	288.0	201.0	266.3	257.6
0900-1000	346.0	375.0	*	*	393.0	429.0	405.0	371.3	389.6
1000-1100	471.0	499.0	*	*	500.0<	559.0<	659.0<	490.0<	537.6<
1100-1200	483.0<	*	*	*	468.0	519.0	371.0	475.5	460.3
1200-1300	453.0	*	*	*	465.0	460.0	341.0	459.0	429.8
1300-1400	402.0	*	*	*	460.0	436.0	233.0	431.0	382.8
1400-1500	463.0	*	*	*	480.0	489.0	414.0	471.5	461.5
1500-1600	522.0<	*	*	502.0	416.0	592.0<	414.0	480.0<	489.2<
1600-1700	435.0	*	*	451.0	455.0	516.0	418.0<	447.0	455.0
1700-1800	363.0	*	*	414.0	488.0<	470.0	328.0	421.7	412.6
1800-1900	352.0	*	*	371.0	445.0	533.0	329.0	389.3	406.0
1900-2000	332.0	*	*	369.0	416.0	496.0	320.0	372.3	386.6
2000-2100	330.0	*	*	270.0	406.0	435.0	243.0	335.3	336.8
2100-2200	275.0	*	*	304.0	367.0	369.0	182.0	315.3	299.4
2200-2300	193.0	*	*	501.0	299.0	440.0	113.0	331.0	309.2
2300-2400	121.0	*	*	239.0	205.0	264.0	89.0	188.3	183.6
<b>Totals</b>									
0700-1900	4697.0	*	*	*	5034.0	5435.0	4228.0	4885.0	4843.1
0600-2200	5784.0	*	*	*	6344.0	6824.0	5031.0	6039.3	5974.1
0600-0000	6098.0	*	*	*	6848.0	7528.0	5233.0	6558.7	6466.9
0000-0000	6247.0	*	*	*	7069.0	7766.0	5547.0	6734.0	6682.5
<b>AM Peak</b>	1100	*	*	*	1000	1000	1000		
	483.0	*	*	*	500.0	559.0	659.0		
<b>PM Peak</b>	1500	*	*	*	1700	1500	1600		
	522.0	*	*	*	488.0	592.0	418.0		

\* - No data.

# **Appendix C – Turning Movement Count Data**

**Exit 20 Corridor Management plan  
Town of Queensbury, Warren County, New York**



Project: 08-081d  
 Counted By: JMK  
 Location: Queensbury, NY  
 Other:

File Name : tm8081s4  
 Site Code : 08-081-4  
 Start Date : 7/26/2008  
 Page No : 1

Groups Printed- Pass Veh - Heavy Veh - School Bus

Start Time	US Route 9 Southbound					NY Route 149 Westbound					US Route 9 Northbound					Shoe Store Driveway Eastbound					Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:30 PM	27	91	4	0	122	79	0	37	7	123	3	108	86	18	215	1	2	3	2	8	468
02:45 PM	20	109	2	1	132	67	0	34	9	110	4	57	94	9	164	1	0	5	5	11	417
Total	47	200	6	1	254	146	0	71	16	233	7	165	180	27	379	2	2	8	7	19	885
03:00 PM	26	85	2	0	113	84	0	30	15	129	2	106	71	9	188	1	2	5	4	12	442
03:15 PM	24	123	0	0	147	59	0	26	13	98	3	110	91	11	215	1	2	2	1	6	466
03:30 PM	36	127	6	1	170	48	0	25	11	84	1	106	85	5	197	1	0	4	1	6	457
03:45 PM	32	126	3	0	161	67	1	29	7	104	2	107	65	5	179	0	0	1	1	2	446
Total	118	461	11	1	591	258	1	110	46	415	8	429	312	30	779	3	4	12	7	26	1811
04:00 PM	35	96	3	1	135	102	0	30	8	140	2	94	93	6	195	1	3	4	1	9	479
04:15 PM	27	73	3	0	103	84	0	35	2	121	0	106	101	3	210	0	0	0	0	0	434
Grand Total	227	830	23	3	1083	590	1	246	72	909	17	794	686	66	1563	6	9	24	15	54	3609
Apprch %	21	76.6	2.1	0.3		64.9	0.1	27.1	7.9		1.1	50.8	43.9	4.2		11.1	16.7	44.4	27.8		
Total %	6.3	23	0.6	0.1	30	16.3	0	6.8	2	25.2	0.5	22	19	1.8	43.3	0.2	0.2	0.7	0.4	1.5	
Pass Veh	226	821	23	3	1073	567	1	244	72	884	17	787	664	64	1532	6	9	24	15	54	3543
% Pass Veh	99.6	98.9	100	100	99.1	96.1	100	99.2	100	97.2	100	99.1	96.8	97	98	100	100	100	100	100	98.2
Heavy Veh	0	5	0	0	5	19	0	1	0	20	0	1	17	1	19	0	0	0	0	0	44
% Heavy Veh	0	0.6	0	0	0.5	3.2	0	0.4	0	2.2	0	0.1	2.5	1.5	1.2	0	0	0	0	0	1.2
School Bus	1	4	0	0	5	4	0	1	0	5	0	6	5	1	12	0	0	0	0	0	22
% School Bus	0.4	0.5	0	0	0.5	0.7	0	0.4	0	0.6	0	0.8	0.7	1.5	0.8	0	0	0	0	0	0.6

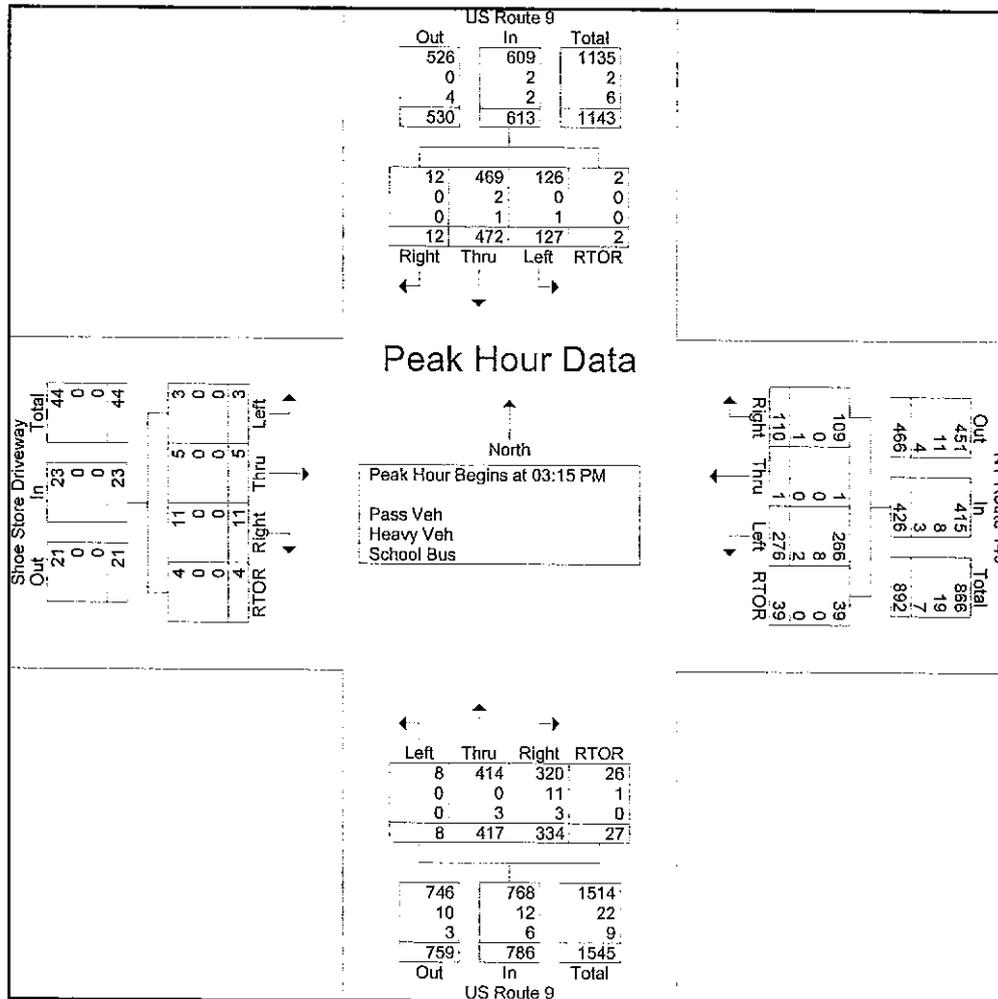


Project: 08-081d  
 Counted By: JMK  
 Location: Queensbury, NY  
 Other:

File Name : tm8081s4  
 Site Code : 08-081-4  
 Start Date : 7/26/2008  
 Page No : 2

Start Time	US Route 9 Southbound					NY Route 149 Westbound					US Route 9 Northbound					Shoe Store Driveway Eastbound					Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	
Peak Hour Analysis From 2:30:00 PM to 4:15:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 3:15:00 PM																					
3:15:00 PM	24	123	0	0	147	59	0	26	13	98	3	110	91	11	215	1	2	2	1	6	466
3:30:00 PM	36	127	6	1	170	48	0	25	11	84	1	106	85	5	197	1	0	4	1	6	457
3:45:00 PM	32	126	3	0	161	67	1	29	7	104	2	107	65	5	179	0	0	1	1	2	446
4:00:00 PM	35	96	3	1	135	102	0	30	8	140	2	94	93	6	195	1	3	4	1	9	479
Total Volume	127	472	12	2	613	276	1	110	39	426	8	417	334	27	786	3	5	11	4	23	1848
% App. Total	20.7	77	2	0.3		64.8	0.2	25.8	9.2		1	53.1	42.5	3.4		13	21.7	47.8	17.4		
PHF	.882	.929	.500	.500	.901	.676	.250	.917	.750	.761	.667	.948	.898	.614	.914	.750	.417	.688	1.000	.639	.965
Pass Veh	126	469	12	2	609	266	1	109	39	415	8	414	320	26	768	3	5	11	4	23	1815
% Pass Veh	99.2	99.4	100	100	99.3	96.4	100	99.1	100	97.4	100	99.3	95.8	96.3	97.7	100	100	100	100	100	98.2
Heavy Veh	0	2	0	0	2	8	0	0	0	8	0	0	11	1	12	0	0	0	0	0	22
% Heavy Veh	0	0.4	0	0	0.3	2.9	0	0	0	1.9	0	0	3.3	3.7	1.5	0	0	0	0	0	1.2
School Bus	1	1	0	0	2	2	0	1	0	3	0	3	3	0	6	0	0	0	0	0	11
% School Bus	0.8	0.2	0	0	0.3	0.7	0	0.9	0	0.7	0	0.7	0.9	0	0.8	0	0	0	0	0	0.6

Bank 2 = Trolley



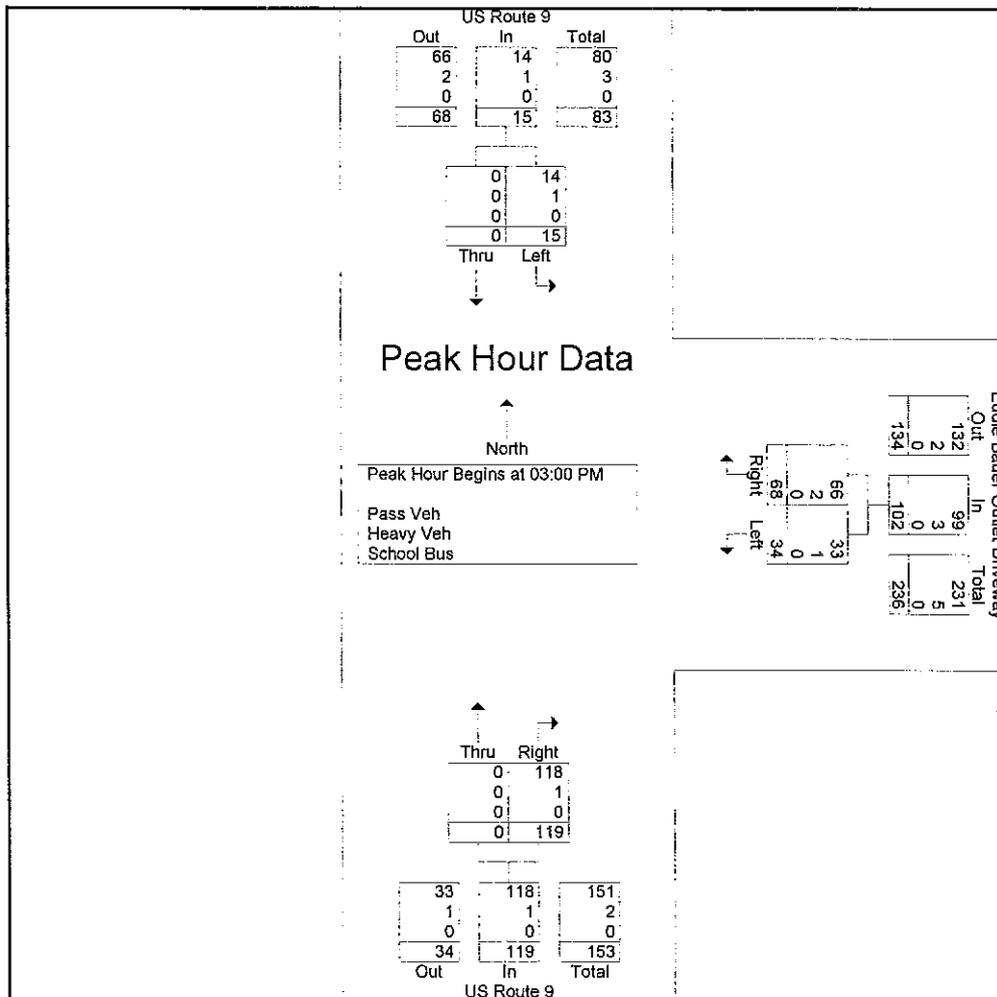




Project: 08-081d  
 Counted By: DDD  
 Location: Queensbury, NY  
 Other:

File Name : tm8081s7  
 Site Code : 08-081-7  
 Start Date : 8/2/2008  
 Page No : 2

Start Time	US Route 9 Southbound			Eddie Bauer Outlet Driveway Westbound			US Route 9 Northbound			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 2:30:00 PM to 4:15:00 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 3:00:00 PM										
3:00:00 PM	6	0	6	8	22	30	0	34	34	70
3:15:00 PM	6	0	6	11	10	21	0	28	28	55
3:30:00 PM	2	0	2	11	12	23	0	28	28	53
3:45:00 PM	1	0	1	4	24	28	0	29	29	58
Total Volume	15	0	15	34	68	102	0	119	119	236
% App. Total	100	0		33.3	66.7		0	100		
PHF	.625	.000	.625	.773	.708	.850	.000	.875	.875	.843
Pass Veh	14	0	14	33	66	99	0	118	118	231
% Pass Veh	93.3	0	93.3	97.1	97.1	97.1	0	99.2	99.2	97.9
Heavy Veh	1	0	1	1	2	3	0	1	1	5
% Heavy Veh	6.7	0	6.7	2.9	2.9	2.9	0	0.8	0.8	2.1
School Bus	0	0	0	0	0	0	0	0	0	0
% School Bus	0	0	0	0	0	0	0	0	0	0



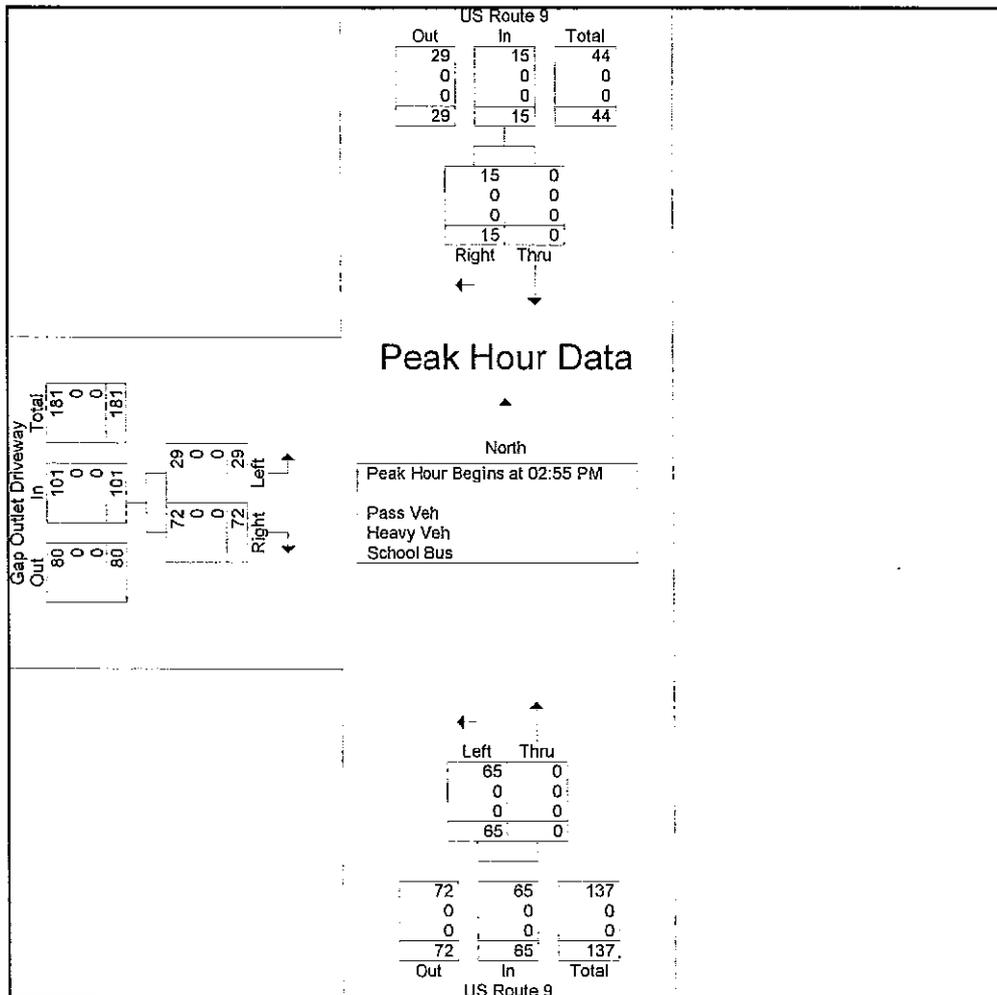




Project: 08-081d  
 Counted By: BD  
 Location: Queensbury, NY  
 Other:

File Name : tm8081s6  
 Site Code : 08-081-6  
 Start Date : 8/2/2008  
 Page No : 2

Start Time	US Route 9 Southbound			US Route 9 Northbound			Gap Outlet Driveway Eastbound			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 2:40:00 PM to 4:25:00 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 2:55:00 PM										
2:55:00 PM	0	2	2	17	0	17	6	27	33	52
3:10:00 PM	0	5	5	16	0	16	8	16	24	45
3:25:00 PM	0	3	3	16	0	16	5	13	18	37
3:40:00 PM	0	5	5	16	0	16	10	16	26	47
Total Volume	0	15	15	65	0	65	29	72	101	181
% App. Total	0	100		100	0		28.7	71.3		
PHF	.000	.750	.750	.956	.000	.956	.725	.667	.765	.870
Pass Veh	0	15	15	65	0	65	29	72	101	181
% Pass Veh	0	100	100	100	0	100	100	100	100	100
Heavy Veh	0	0	0	0	0	0	0	0	0	0
% Heavy Veh	0	0	0	0	0	0	0	0	0	0
School Bus	0	0	0	0	0	0	0	0	0	0
% School Bus	0	0	0	0	0	0	0	0	0	0





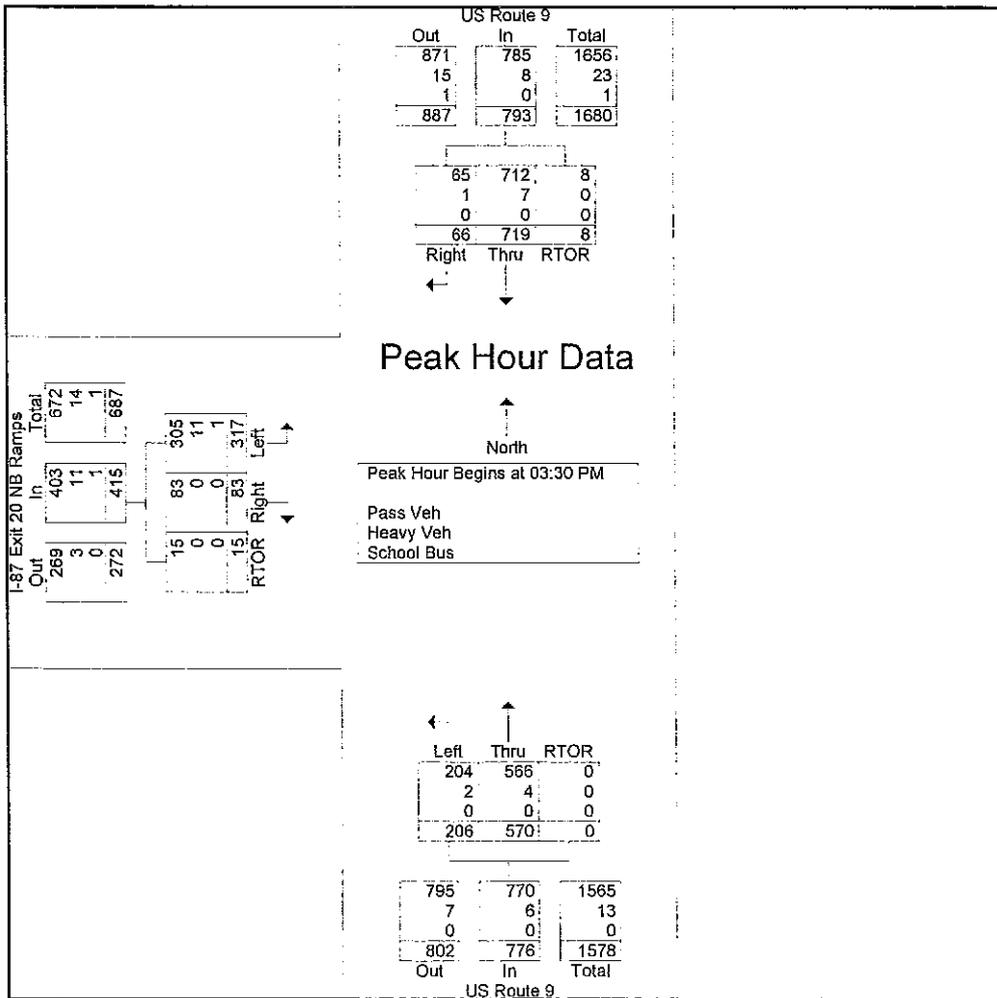
Project: 08-081d  
 Counted By: DPR  
 Location: Queensbury, NY  
 Other:

File Name : tm8081s3  
 Site Code : 08-081-3  
 Start Date : 7/26/2008  
 Page No : 1

Groups Printed- Pass Veh - Heavy Veh - School Bus

Start Time	US Route 9 Southbound				US Route 9 Northbound				I-87 Exit 20 NB Ramps Eastbound				Int. Total
	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
02:30 PM	187	25	0	212	51	131	0	182	82	30	1	113	507
02:45 PM	198	19	0	217	37	117	0	154	88	32	0	120	491
Total	385	44	0	429	88	248	0	336	170	62	1	233	998
03:00 PM	174	13	0	187	42	107	0	149	85	14	2	101	437
03:15 PM	180	15	0	195	45	117	0	162	93	21	0	114	471
03:30 PM	167	11	0	178	60	110	0	170	107	32	2	141	489
03:45 PM	209	21	0	230	43	166	0	209	63	20	4	87	526
Total	730	60	0	790	190	500	0	690	348	87	8	443	1923
04:00 PM	181	18	0	199	50	151	0	201	75	10	4	89	489
04:15 PM	162	16	8	186	53	143	0	196	72	21	5	98	480
Grand Total	1458	138	8	1604	381	1042	0	1423	665	180	18	863	3890
Apprch %	90.9	8.6	0.5		26.8	73.2	0		77.1	20.9	2.1		
Total %	37.5	3.5	0.2	41.2	9.8	26.8	0	36.6	17.1	4.6	0.5	22.2	
Pass Veh	1431	136	8	1575	378	1031	0	1409	642	180	18	840	3824
% Pass Veh	98.1	98.6	100	98.2	99.2	98.9	0	99	96.5	100	100	97.3	98.3
Heavy Veh	27	2	0	29	3	11	0	14	22	0	0	22	65
% Heavy Veh	1.9	1.4	0	1.8	0.8	1.1	0	1	3.3	0	0	2.5	1.7
School Bus	0	0	0	0	0	0	0	0	1	0	0	1	1
% School Bus	0	0	0	0	0	0	0	0	0.2	0	0	0.1	0

Start Time	US Route 9 Southbound				US Route 9 Northbound				I-87 Exit 20 NB Ramps Eastbound				Int. Total
	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	
Peak Hour Analysis From 2:30:00 PM to 4:15:00 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 3:30:00 PM													
3:30:00 PM	167	11	0	178	60	110	0	170	107	32	2	141	489
3:45:00 PM	209	21	0	230	43	166	0	209	63	20	4	87	526
4:00:00 PM	181	18	0	199	50	151	0	201	75	10	4	89	489
4:15:00 PM	162	16	8	186	53	143	0	196	72	21	5	98	480
Total Volume	719	66	8	793	206	570	0	776	317	83	15	415	1984
% App. Total	90.7	8.3	1		26.5	73.5	0		76.4	20	3.6		
PHF	.860	.786	.250	.862	.858	.858	.000	.928	.741	.648	.750	.736	.943
Pass Veh	712	65	8	785	204	566	0	770	305	83	15	403	1958
% Pass Veh	99.0	98.5	100	99.0	99.0	99.3	0	99.2	96.2	100	100	97.1	98.7
Heavy Veh	7	1	0	8	2	4	0	6	11	0	0	11	25
% Heavy Veh	1.0	1.5	0	1.0	1.0	0.7	0	0.8	3.5	0	0	2.7	1.3
School Bus	0	0	0	0	0	0	0	0	1	0	0	1	1
% School Bus	0	0	0	0	0	0	0	0	0.3	0	0	0.2	0.1





Project: 08-081d  
 Counted By: CF  
 Location: Queensbury, NY  
 Other:

File Name : tm8081s2  
 Site Code : 08-081-2  
 Start Date : 7/26/2008  
 Page No : 1

Groups Printed- Pass Veh - Heavy Veh - School Bus

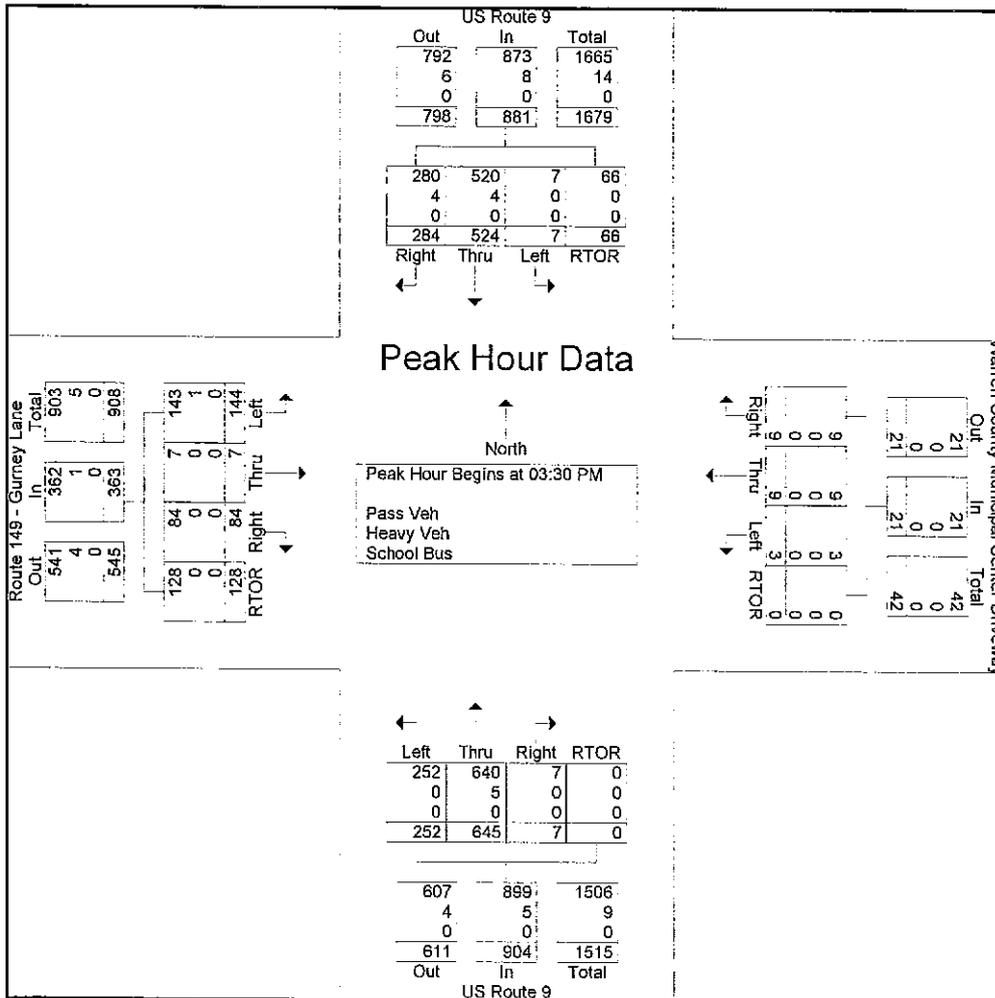
Start Time	US Route 9 Southbound					Warren County Municipal Center Driveway Westbound					US Route 9 Northbound					Route 149 - Gurney Lane Eastbound					Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:30 PM	3	126	59	26	214	0	1	2	0	3	41	126	1	0	168	34	0	25	20	79	464
02:45 PM	3	154	54	17	228	1	2	0	0	3	33	121	0	0	154	37	0	37	19	93	478
Total	6	280	113	43	442	1	3	2	0	6	74	247	1	0	322	71	0	62	39	172	942
03:00 PM	2	132	75	15	224	6	3	9	0	18	31	123	2	0	156	34	0	23	29	86	484
03:15 PM	2	142	67	15	226	1	1	0	0	2	36	122	0	0	158	26	0	15	31	72	458
03:30 PM	0	134	51	20	205	1	3	1	0	5	45	150	2	0	197	34	3	30	32	99	506
03:45 PM	4	150	77	9	240	0	4	2	0	6	68	154	1	0	223	39	0	25	25	89	558
Total	8	558	270	59	895	8	11	12	0	31	180	549	5	0	734	133	3	93	117	346	2006
04:00 PM	3	126	96	11	236	1	2	3	0	6	67	179	0	0	246	26	2	21	45	94	582
04:15 PM	0	114	60	26	200	1	0	3	0	4	72	162	4	0	238	45	2	8	26	81	523
Grand Total	17	1078	539	139	1773	11	16	20	0	47	393	1137	10	0	1540	275	7	184	227	693	4053
Apprch %	1	60.8	30.4	7.8		23.4	34	42.6	0		25.5	73.8	0.6	0		39.7	1	26.6	32.8		
Total %	0.4	26.6	13.3	3.4	43.7	0.3	0.4	0.5	0	1.2	9.7	28.1	0.2	0	38	6.8	0.2	4.5	5.6	17.1	
Pass Veh	17	1070	523	135	1745	11	16	20	0	47	393	1126	10	0	1529	272	7	184	227	690	4011
% Pass Veh	100	99.3	97	97.1	98.4	100	100	100	0	100	100	99	100	0	99.3	98.9	100	100	100	99.6	99
Heavy Veh	0	8	16	4	28	0	0	0	0	0	0	11	0	0	11	3	0	0	0	3	42
% Heavy Veh	0	0.7	3	2.9	1.6	0	0	0	0	0	0	1	0	0	0.7	1.1	0	0	0	0.4	1
School Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% School Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Project: 08-081d  
 Counted By: CF  
 Location: Queensbury, NY  
 Other:

File Name : tm8081s2  
 Site Code : 08-081-2  
 Start Date : 7/26/2008  
 Page No : 2

Start Time	US Route 9 Southbound					Warren County Municipal Center Driveway Westbound					US Route 9 Northbound					Route 149 - Gurney Lane Eastbound					Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	
Peak Hour Analysis From 2:30:00 PM to 4:15:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 3:30:00 PM																					
3:30:00 PM	0	134	51	20	205	1	3	1	0	5	45	150	2	0	197	34	3	30	32	99	506
3:45:00 PM	4	150	77	9	240	0	4	2	0	6	68	154	1	0	223	39	0	25	25	89	558
4:00:00 PM	3	126	96	11	236	1	2	3	0	6	67	179	0	0	246	26	2	21	45	94	582
4:15:00 PM	0	114	60	26	200	1	0	3	0	4	72	162	4	0	238	45	2	8	26	81	523
Total Volume	7	524	284	66	881	3	9	9	0	21	252	645	7	0	904	144	7	84	128	363	2169
% App. Total	0.8	59.5	32.2	7.5		14.3	42.9	42.9	0		27.9	71.3	0.8	0		39.7	1.9	23.1	35.3		
PHF	.438	.873	.740	.635	.918	.750	.563	.750	.000	.875	.875	.901	.438	.000	.919	.800	.583	.700	.711	.917	.932
Pass Veh	7	520	280	66	873	3	9	9	0	21	252	640	7	0	899	143	7	84	128	362	2155
% Pass Veh	100	99.2	98.6	100	99.1	100	100	100	0	100	100	99.2	100	0	99.4	99.3	100	100	100	99.7	99.4
Heavy Veh	0	4	4	0	8	0	0	0	0	0	0	5	0	0	5	1	0	0	0	1	14
% Heavy Veh	0	0.8	1.4	0	0.9	0	0	0	0	0	0	0.8	0	0	0.6	0.7	0	0	0	0.3	0.6
School Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% School Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



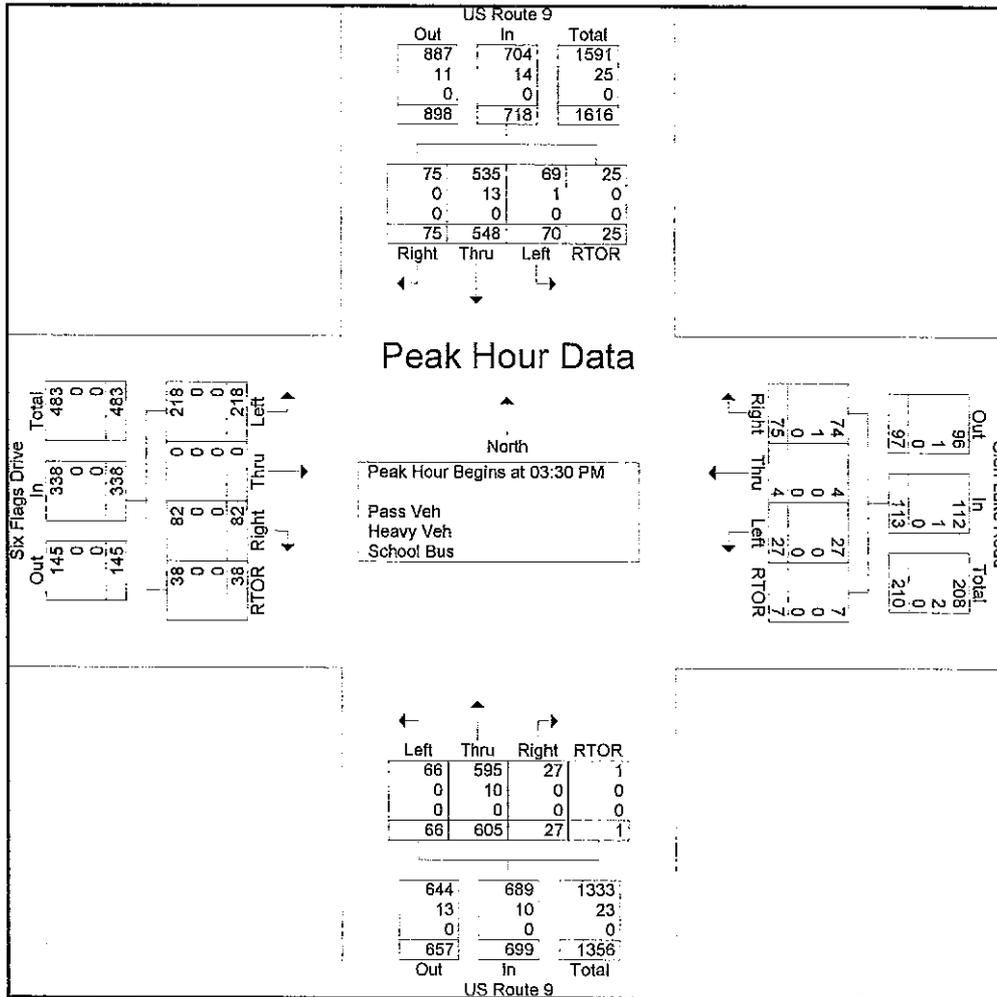




Project: 08-081d  
 Counted By: KLB  
 Location: Queensbury, NY  
 Other:

File Name : tm8081s1  
 Site Code : 08-081-1  
 Start Date : 7/26/2008  
 Page No : 2

Start Time	US Route 9 Southbound					Glen Lake Road Westbound					US Route 9 Northbound					Six Flags Drive Eastbound					Inl. Total	
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total		
Peak Hour Analysis From 2:30:00 PM to 4:15:00 PM - Peak 1 of 1																						
Peak Hour for Entire Intersection Begins at 3:30:00 PM																						
3:30:00 PM	25	145	15	3	188	6	0	10	3	19	18	146	5	0	169	27	0	16	6	49	425	
3:45:00 PM	14	150	24	10	198	7	1	27	1	36	20	148	9	0	177	56	0	12	15	83	494	
4:00:00 PM	14	149	25	7	195	7	2	20	2	31	23	160	4	1	188	64	0	32	8	104	518	
4:15:00 PM	17	104	11	5	137	7	1	18	1	27	5	151	9	0	165	71	0	22	9	102	431	
Total Volume	70	548	75	25	718	27	4	75	7	113	66	605	27	1	699	218	0	82	38	338	1868	
% App. Total	9.7	76.3	10.4	3.5		23.9	3.5	66.4	6.2		9.4	86.6	3.9	0.1		64.5	0	24.3	11.2			
PHF	.700	.913	.750	.625	.907	.964	.500	.694	.583	.785	.717	.945	.750	.250	.930	.768	.000	.641	.633	.813	.902	
Pass Veh	69	535	75	25	704	27	4	74	7	112	66	595	27	1	689	218	0	82	38	338	1843	
% Pass Veh	98.6	97.6	100	100	98.1	100	100	98.7	100	99.1	100	98.3	100	100	98.6	100	0	100	100	100	98.7	
Heavy Veh	1	13	0	0	14	0	0	1	0	1	0	10	0	0	10	0	0	0	0	0	25	
% Heavy Veh	1.4	2.4	0	0	1.9	0	0	1.3	0	0.9	0	1.7	0	0	1.4	0	0	0	0	0	1.3	
School Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% School Bus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



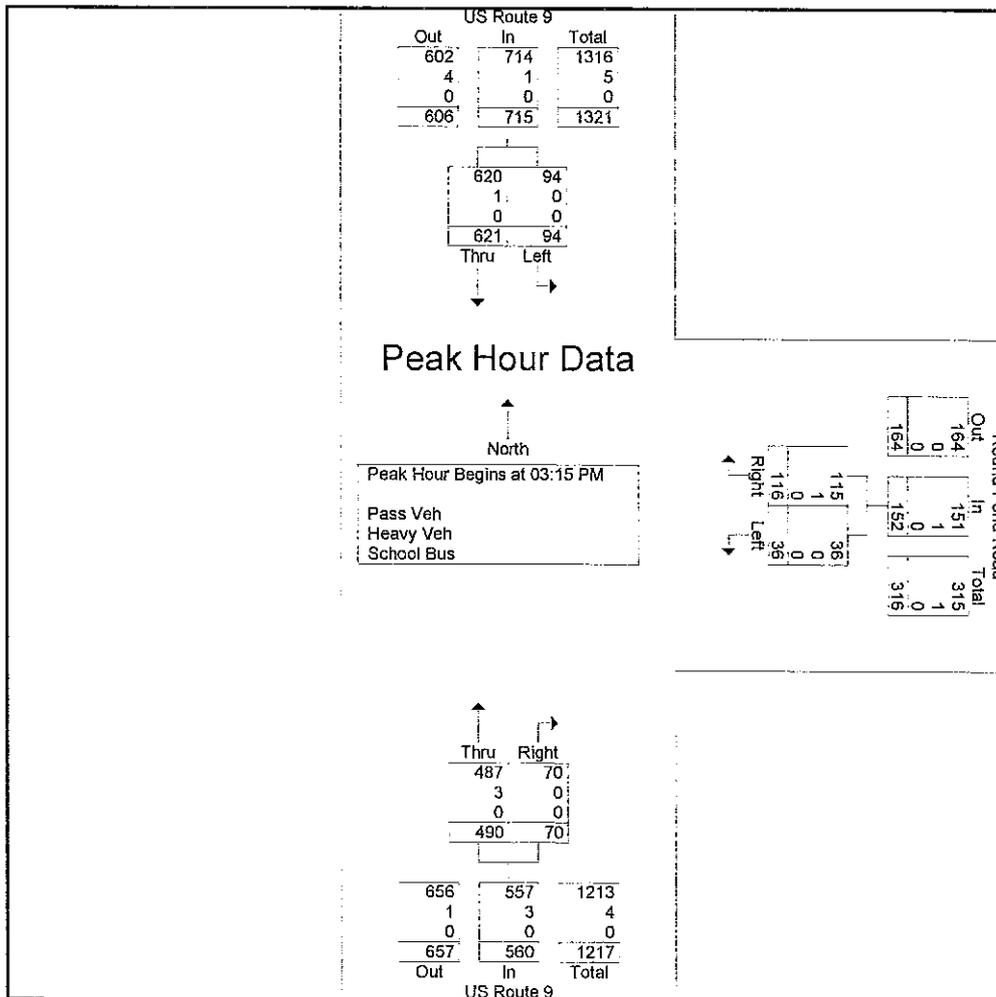




Project: 08-081d  
 Counted By: DL  
 Location: Queensbury, NY  
 Other:

File Name : tm8081s5  
 Site Code : 08-081-5  
 Start Date : 7/26/2008  
 Page No : 2

Start Time	US Route 9 Southbound			Round Pond Road Westbound			US Route 9 Northbound			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 2:30:00 PM to 4:15:00 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 3:15:00 PM										
3:15:00 PM	25	154	179	9	21	30	123	27	150	359
3:30:00 PM	24	138	162	10	22	32	120	20	140	334
3:45:00 PM	28	165	193	11	36	47	123	8	131	371
4:00:00 PM	17	164	181	6	37	43	124	15	139	363
Total Volume	94	621	715	36	116	152	490	70	560	1427
% App. Total	13.1	86.9		23.7	76.3		87.5	12.5		
PHF	.839	.941	.926	.818	.784	.809	.988	.648	.933	.962
Pass Veh	94	620	714	36	115	151	487	70	557	1422
% Pass Veh	100	99.8	99.9	100	99.1	99.3	99.4	100	99.5	99.6
Heavy Veh	0	1	1	0	1	1	3	0	3	5
% Heavy Veh	0	0.2	0.1	0	0.9	0.7	0.6	0	0.5	0.4
School Bus	0	0	0	0	0	0	0	0	0	0
% School Bus	0	0	0	0	0	0	0	0	0	0



# **Appendix D – Existing Level of Service Analysis**

**Exit 20 Corridor Management plan  
Town of Queensbury, Warren County, New York**

## LOS Definitions

The following is an excerpt from the 2000 Highway Capacity Manual (HCM).

### Level of Service for Signalized Intersections

Level of service for a signalized intersection is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions: in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group. Levels of service are defined to represent reasonable ranges in control delay.

**LOS A** describes operations with low control delay, up to 10 s/veh. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay.

**LOS B** describes operations with control delay greater than 10 and up to 20 s/veh. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.

**LOS C** describes operations with control delay greater than 20 and up to 35 s/veh. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

**LOS D** describes operations with control delay greater than 35 and up to 55 s/veh. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

**LOS E** describes operations with control delay greater than 55 and up to 80 s/veh. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.

**LOS F** describes operations with control delay in excess of 80 s/veh. This level, considered unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also be contribute significantly to high delay levels.

## LOS Definitions

The following is an excerpt from the 2000 Highway Capacity Manual (HCM).

### Level of Service Criteria for Unsignalized Intersections

Four measures are used to describe the performance of two-way stop controlled intersections: control delay, delay to major street through vehicles, queue length, and v/c ratio. The primary measure that is used to provide an estimate of LOS is control delay. This measure can be estimated for any movement on the minor (i.e., stop-controlled) street. By summing delay estimates for individual movements, a delay estimate for each minor street movement and minor street approach can be achieved. The level of service criteria is given in Exhibit 17-2/22.

For all-way stop controlled (AWSC) intersections, the average control delay (in seconds per vehicle) is used as the primary measure of performance. Control delay is the increased time of travel for a vehicle approaching and passing through an AWSC intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

**Exhibit 17-2/22: Level-of-Service Criteria for Stop Controlled Intersections**

Level of Service	Control Delay (sec/veh)
A	$\leq 10.0$
B	$>10.0$ and $\leq 15.0$
C	$>15.0$ and $\leq 25.0$
D	$>25.0$ and $\leq 35.0$
E	$>35.0$ and $\leq 50.0$
F	$>50.0$

# HCM Signalized Intersection Capacity Analysis

11: Pkg. Lot & US Route 9

10/24/2008

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0	4.0	4.0		
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00		
Frbp, ped/bikes		0.88			1.00	1.00		1.00	1.00	1.00	1.00		
Flpb, ped/bikes		1.00			1.00	1.00		1.00	1.00	1.00	1.00		
Frt		0.91			1.00	0.85		1.00	0.85	1.00	1.00		
Flt Protected		0.99			0.95	1.00		1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1523			1646	1468		1729	1468	1640	1723		
Flt Permitted		0.99			0.95	1.00		0.99	1.00	0.27	1.00		
Satd. Flow (perm)		1523			1646	1468		1708	1468	474	1723		
Volume (vph)	3	5	15	276	1	149	8	417	361	127	472	14	
Peak-hour factor, PHF	0.64	0.64	0.64	0.76	0.76	0.76	0.91	0.91	0.91	0.90	0.90	0.90	
Adj. Flow (vph)	5	8	23	363	1	196	9	458	397	141	524	16	
RTOR Reduction (vph)	0	22	0	0	0	103	0	0	134	0	0	0	
Lane Group Flow (vph)	0	14	0	0	364	93	0	467	263	141	540	0	
Confl. Peds. (#/hr)			19	19			5		8	8		5	
Confl. Bikes (#/hr)									3			1	
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	0%	10%	10%	10%	10%	0%	
Turn Type	Split			Split		pt+ov	Perm		pt+ov	pm+pt			
Protected Phases	4	4		3	3	3 2		1	1 3	2	6		
Permitted Phases							1			6			
Actuated Green, G (s)		6.0			41.9	61.0		65.4	107.3	84.5	84.5		
Effective Green, g (s)		10.0			45.9	65.0		69.4	115.3	88.5	88.5		
Actuated g/C Ratio		0.06			0.26	0.37		0.40	0.66	0.51	0.51		
Clearance Time (s)		8.0			8.0			8.0		8.0	8.0		
Vehicle Extension (s)		3.0			3.0			5.0		3.0	3.0		
Lane Grp Cap (vph)		87			434	548		680	972	342	875		
v/s Ratio Prot		c0.01			c0.22	0.06			0.18	0.04	c0.31		
v/s Ratio Perm								c0.27		0.17			
v/c Ratio		0.16			0.84	0.17		0.69	0.27	0.41	0.62		
Uniform Delay, d1		78.1			60.7	36.5		43.4	12.1	48.2	30.7		
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00		
Incremental Delay, d2		0.9			13.3	0.1		3.7	0.3	0.8	1.3		
Delay (s)		79.0			73.9	36.7		47.1	12.4	49.0	32.0		
Level of Service		E			E	D		D	B	D	C		
Approach Delay (s)		79.0			60.9			31.2			35.5		
Approach LOS		E			E			C			D		
<b>Intersection Summary</b>													
HCM Average Control Delay			41.1									HCM Level of Service	D
HCM Volume to Capacity ratio			0.68										
Actuated Cycle Length (s)			174.2									Sum of lost time (s)	29.8
Intersection Capacity Utilization			80.1%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 23: Gap Driveway & US Route 9

10/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↖		↗	↖	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	29	0	72	34	0	68	65	648	119	15	662	15
Peak Hour Factor	0.77	0.77	0.77	0.85	0.85	0.85	0.91	0.91	0.91	0.90	0.90	0.90
Hourly flow rate (vph)	38	0	94	40	0	80	71	712	131	17	736	17
Pedestrians		15						60			60	
Lane Width (ft)		12.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		1						5			5	
Right turn flare (veh)												
Median type		TWLT			TWLT							
Median storage veh		1			1							
Upstream signal (ft)								1118				
pX, platoon unblocked	0.88	0.88		0.88	0.88	0.88					0.88	
vC, conflicting volume	1787	1778	819	1843	1721	837	767				843	
vC1, stage 1 conf vol	792	792		920	920							
vC2, stage 2 conf vol	995	986		922	801							
vCu, unblocked vol	1894	1883	819	1957	1819	815	767				822	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.2	
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.3	
p0 queue free %	66	100	74	59	100	75	92				98	
cM capacity (veh/h)	110	161	355	98	163	314	845				693	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>						
Volume Total	131	120	71	843	17	752						
Volume Left	38	40	71	0	17	0						
Volume Right	94	80	0	131	0	17						
cSH	217	181	845	1700	693	1700						
Volume to Capacity	0.61	0.66	0.08	0.50	0.02	0.44						
Queue Length 95th (ft)	87	98	7	0	2	0						
Control Delay (s)	44.2	57.1	9.7	0.0	10.3	0.0						
Lane LOS	E	F	A		B							
Approach Delay (s)	44.2	57.1	0.8		0.2							
Approach LOS	E	F										
<b>Intersection Summary</b>												
Average Delay			7.0									
Intersection Capacity Utilization			67.7%		ICU Level of Service						C	
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
 8: I-87 Exit 20 NB On/Off Ramp & US Route 9

10/24/2008



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↗	↙	↑	↑	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	13	11	13	13	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1641	1669	1728	1785	1785	1419
Flt Permitted	0.95	1.00	0.05	1.00	1.00	1.00
Satd. Flow (perm)	1641	1669	91	1785	1785	1419
Volume (vph)	317	98	206	570	719	74
Peak-hour factor, PHF	0.74	0.74	0.93	0.93	0.86	0.86
Adj. Flow (vph)	428	132	222	613	836	86
RTOR Reduction (vph)	0	72	0	0	0	0
Lane Group Flow (vph)	428	60	222	613	836	86
Heavy Vehicles (%)	10%	0%	1%	10%	10%	10%
Turn Type	Prot pm+pt			Free		
Protected Phases	3	3	6	1	5	
Permitted Phases				Free		
Actuated Green, G (s)	45.9	45.9	106.0	106.0	72.2	167.9
Effective Green, g (s)	49.9	49.9	110.0	110.0	76.2	167.9
Actuated g/C Ratio	0.30	0.30	0.66	0.66	0.45	1.00
Clearance Time (s)	8.0	8.0	8.0	8.0	8.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	488	496	350	1169	810	1419
v/s Ratio Prot	0.26	0.04	0.11	0.34	0.47	
v/s Ratio Perm				0.30	0.06	
v/c Ratio	0.88	0.12	0.63	0.52	1.03	0.06
Uniform Delay, d1	56.1	43.0	59.8	15.2	45.9	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.1	0.1	3.7	0.4	40.2	0.1
Delay (s)	72.2	43.1	63.5	15.6	86.0	0.1
Level of Service	E	D	E	B	F	A
Approach Delay (s)	65.4			28.4	78.0	
Approach LOS	E			C	E	

Intersection Summary			
HCM Average Control Delay	57.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	167.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
 1: Gurney Ln (Route 149) & I-87 Exit 20 SB Off Ramp

2/23/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔					↖		↗
Sign Control		Free			Free					Stop		Stop
Grade		0%			0%					0%		0%
Volume (veh/h)	0	235	31	376	214	0	0	0	0	201	0	121
Peak Hour Factor	0.69	0.69	0.69	0.88	0.88	0.88	0.92	0.92	0.92	0.83	0.83	0.83
Hourly flow rate (vph)	0	341	45	427	243	0	0	0	0	242	0	146
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type											None	None
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	243			386			1607	1461	363	1461	1483	243
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	243			386			1607	1461	363	1461	1483	243
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			64			100	100	100	0	100	82
cM capacity (veh/h)	1323			1178			50	82	682	77	80	801
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	386	670	242	146								
Volume Left	0	427	242	0								
Volume Right	45	0	0	146								
cSH	1700	1178	77	801								
Volume to Capacity	0.23	0.36	3.15	0.18								
Queue Length 95th (ft)	0	42	Err	17								
Control Delay (s)	0.0	7.7	Err	10.5								
Lane LOS		A	F	B								
Approach Delay (s)	0.0	7.7	6.2	45.6								
Approach LOS			F									
<b>Intersection Summary</b>												
Average Delay			1681.7									
Intersection Capacity Utilization			67.5%	ICU Level of Service	C							
Analysis Period (min)			15									

# HCM Signalized Intersection Capacity Analysis

## 2: Gurney Ln (Route 149) & US Route 9

10/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1797	1615		1878	1615	1805	1881	1615	1804	1881	1599
Flt Permitted		0.73	1.00		0.93	1.00	0.33	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)		1369	1615		1767	1615	633	1881	1615	568	1881	1599
Volume (vph)	144	7	212	3	9	9	252	645	7	7	524	350
Peak-hour factor, PHF	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	157	8	230	3	10	10	274	701	8	8	570	380
RTOR Reduction (vph)	0	0	188	0	0	8	0	0	2	0	0	178
Lane Group Flow (vph)	0	165	42	0	13	2	274	701	6	8	570	202
Confl. Peds. (#/hr)									1	1		
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	1%
Turn Type	Perm		Prot	Perm		Prot	pm+pt		Prot	Perm		Prot
Protected Phases		3	3		7	7	1	6	6		2	2
Permitted Phases	3			7			6			2		
Actuated Green, G (s)		10.7	10.7		10.7	10.7	43.7	43.7	43.7	33.3	33.3	33.3
Effective Green, g (s)		11.7	11.7		11.7	11.7	44.7	44.7	44.7	34.3	34.3	34.3
Actuated g/C Ratio		0.18	0.18		0.18	0.18	0.69	0.69	0.69	0.53	0.53	0.53
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)		249	293		321	293	556	1306	1121	303	1002	852
v/s Ratio Prot			0.03			0.00	0.05	0.37	0.00		0.30	0.13
v/s Ratio Perm		0.12			0.01		0.29			0.01		
v/c Ratio		0.66	0.14		0.04	0.01	0.49	0.54	0.00	0.03	0.57	0.24
Uniform Delay, d1		24.5	22.1		21.7	21.6	10.0	4.8	3.0	7.1	10.1	8.1
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		6.5	0.2		0.1	0.0	0.7	0.8	0.0	0.1	1.2	0.3
Delay (s)		31.0	22.4		21.8	21.6	10.7	5.6	3.0	7.2	11.3	8.4
Level of Service		C	C		C	C	B	A	A	A	B	A
Approach Delay (s)		26.0			21.7			7.0			10.1	
Approach LOS		C			C			A			B	
<b>Intersection Summary</b>												
HCM Average Control Delay		11.6		HCM Level of Service		B						
HCM Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		64.4		Sum of lost time (s)		8.0						
Intersection Capacity Utilization		71.5%		ICU Level of Service		C						
Analysis Period (min)		15										
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 14: Six Flags Dr & US Route 9

10/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr <sub>t</sub>		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Fl <sub>t</sub> Protected		0.95	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1805	1615		1821	1599	1805	1852		1787	1863	1615
Fl <sub>t</sub> Permitted		0.73	1.00		0.65	1.00	0.28	1.00		0.22	1.00	1.00
Satd. Flow (perm)		1390	1615		1244	1599	541	1852		416	1863	1615
Volume (vph)	218	0	120	27	4	82	66	605	28	70	548	100
Peak-hour factor, PHF	0.81	0.81	0.81	0.79	0.79	0.79	0.93	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	269	0	148	34	5	104	71	651	30	77	602	110
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	269	148	0	39	104	71	680	0	77	602	110
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	2%	0%	1%	2%	0%
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		Free
Protected Phases		3			7		1	6		5	2	
Permitted Phases	3		3	7		7	6			2		Free
Actuated Green, G (s)		21.7	21.7		21.7	21.7	50.6	45.1		51.2	45.4	88.6
Effective Green, g (s)		22.7	22.7		22.7	22.7	53.6	47.1		54.2	47.4	88.6
Actuated g/C Ratio		0.26	0.26		0.26	0.26	0.60	0.53		0.61	0.53	1.00
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		356	414		319	410	420	985		360	997	1615
v/s Ratio Prot							0.01	c0.37		c0.02	0.32	
v/s Ratio Perm		c0.19	0.09		0.03	0.07	0.09			0.11		c0.07
v/c Ratio		0.76	0.36		0.12	0.25	0.17	0.69		0.21	0.60	0.07
Uniform Delay, d <sub>1</sub>		30.4	27.0		25.3	26.2	8.9	15.4		9.9	14.2	0.0
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d <sub>2</sub>		8.8	0.5		0.2	0.3	0.2	2.3		0.3	1.2	0.1
Delay (s)		39.2	27.5		25.5	26.5	9.0	17.6		10.2	15.4	0.1
Level of Service		D	C		C	C	A	B		B	B	A
Approach Delay (s)		35.1			26.2			16.8			12.7	
Approach LOS		D			C			B			B	
<b>Intersection Summary</b>												
HCM Average Control Delay		19.5		HCM Level of Service				B				
HCM Volume to Capacity ratio		0.67										
Actuated Cycle Length (s)		88.6		Sum of lost time (s)				12.0				
Intersection Capacity Utilization		66.4%		ICU Level of Service				C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 16: Round Pond Rd & US Route 9

10/24/2008

	↙	↘	↑	↗	↙	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘		↑	↙		↘
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	36	116	490	70	94	621
Peak Hour Factor	0.81	0.81	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	44	143	527	75	101	668
Pedestrians	21		2			
Lane Width (ft)	12.0		12.0			
Walking Speed (ft/s)	4.0		4.0			
Percent Blockage	2		0			
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh	1					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1457	586			623	
vC1, stage 1 conf vol	586					
vC2, stage 2 conf vol	872					
vCu, unblocked vol	1457	586			623	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	72			89	
cM capacity (veh/h)	256	503			951	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>	<b>SB 2</b>		
Volume Total	188	602	101	668		
Volume Left	44	0	101	0		
Volume Right	143	75	0	0		
cSH	410	1700	951	1700		
Volume to Capacity	0.46	0.35	0.11	0.39		
Queue Length 95th (ft)	58	0	9	0		
Control Delay (s)	21.0	0.0	9.2	0.0		
Lane LOS	C		A			
Approach Delay (s)	21.0	0.0	1.2			
Approach LOS	C					
<b>Intersection Summary</b>						
Average Delay			3.1			
Intersection Capacity Utilization			54.6%	ICU Level of Service	A	
Analysis Period (min)			15			

# **Appendix E – Parking Lot Inventory**

**Exit 20 Corridor Management plan  
Town of Queensbury, Warren County, New York**

## Existing Parking Lot Spaces for Exit 20 Key Corridor

West Side			
Vendor/Store Business:	Capacity	# Occupied	% Occupied
<b>Montcalm Restaurant -</b>	68		
2:20 PM		13	19.1%
3:05 PM		9	13.2%
3:55 PM		4	5.9%
Average		9	12.7%
<b>Tommy Hilfiger, Sunglasses Hut, Gap, Jockey, Nine West, Banana Republic, Pfaltzgraff</b>	211		
2:12 PM		190	90.0%
3:00 PM		178	84.4%
3:50 PM		168	79.6%
Average		179	84.7%
<b>Sunoco</b>	15		
2:15 PM		4	26.7%
3:05 PM		10	66.7%
3:50 PM		15	100.0%
Average		10	64.4%
<b>Rodeway Inn</b>	25		
2:05 PM		6	24.0%
3:05 PM		7	28.0%
3:45 PM		8	32.0%
Average		7	28.0%
<b>VACANT BUILDING - Spirit Halloween Store Coming Soon</b>	52		
2:00 PM		3	5.8%
3:00 PM		2	3.8%
3:40 PM		2	3.8%
Average		2	4.5%
<b>Scooters Rentals</b>	2		
2:00 PM		2	100.0%
2:55 PM		1	50.0%
3:40 PM		1	50.0%
Average		1	66.7%
<b>VACANT BUILDING - Designer Warehouse Home &amp; Garden</b>	27		
2:00 PM		2	7.4%
2:55 PM		3	11.1%
3:40 PM		4	14.8%
Average		3	11.1%
<b>Franks Pasta and Pizza Restaurant</b>	25		
2:00 PM		10	40.0%
2:50 PM		13	52.0%
3:40 PM		11	44.0%
Average		11	45.3%
<b>Super Shoes</b>	85		
2:00 PM		15	17.6%
2:50 PM		15	17.6%
3:40 PM		17	20.0%
Average		16	18.4%
<b>Total</b>	<b>510</b>	<b>238</b>	<b>46.7%</b>

## Existing Parking Lot Spaces for Exit 20 Key Corridor (Continued)

East Side			
Vendor/Store Business:	Capacity	# Occupied	% Occupied
<b>Mobil Gas</b>			
NA	NA	NA	NA
<b>Ralph Lauren, Yankee Candle, KasperPerfumania, Jones NY, Bass, IZOD, Timberland, Nautica, Lane Bryant, Harry and David, Pacsun</b>	102		
2:20 PM		102	100.0%
3:10 PM		102	100.0%
4:00 PM		100	98.0%
		101	99.3%
<b>Covered Parking Lot in Rear of Outlets</b>	110		
2:26 PM		66	60.0%
3:10 PM		72	65.5%
4:00 PM		55	50.0%
Average		64	58.5%
<b>Eddie Bauer, Big Dogs, Factory Brand Shoes, Ck's Eatery, Dress Barn, Corning Ware</b>	209		
2:40PM		119	56.9%
3:20PM		130	62.2%
4:05 PM		115	55.0%
Average		121	58.1%
<b>Lined Parking Lot in Rear of Outlets</b>	99		
2:30 PM		6	6.1%
3:20 PM		8	8.1%
4:05 PM		8	8.1%
Average		7	7.4%
<b>Olde Pose Grill, Clarion Suites</b>	198		
2:35 PM		80	40.4%
3:20 PM		71	35.9%
4:05 PM		71	35.9%
Average		74	37.4%
<b>Reebok Outlet</b>	100		
2:45 PM		35	35.0%
3:20 PM		26	26.0%
4:10 PM		26	26.0%
Average		29	29.0%
<b>Brooks Brothers, Carter's, Orvis, Olympia Sports, Log Jam Restaurant</b>	205		
2:50 PM		115	56.1%
3:30 PM		101	49.3%
4:15 PM		116	56.6%
Average		111	54.0%
<b>Family Footwear, Dominoes, Casual Male XL, The Sox Market</b>	67		
2:51 PM		49	73.1%
3:30 PM		45	67.2%
4:20 PM		40	59.7%
Average		45	66.7%
<b>Total</b>	<b>1090</b>	<b>552</b>	<b>50.6%</b>

**East/West Side Parking Lot Summary**

**1600**

**790**

**49.3%**

# **Appendix F – Alternative Evaluation Matrix**

**Exit 20 Corridor Management plan  
Town of Queensbury, Warren County, New York**

Improvement	Improvement timeframe	Constructability	Cost	ROW	Effect on Pedestrian Access/ Accommodations	Effect on Traffic Flow	Anticipated Environmental Impacts	Meets Project Objectives
<b>Key Study Area Corridor Alternatives:</b>								
<b>Alternative 1</b> Install roundabouts at Exit 20 NB Ramps and Route 149	Long-term	Complex staging to maintain traffic	\$\$\$	Yes	At intersections shorter crossing distances	More efficient traffic flow through intersections	Will decrease emissions connected with idling vehicles	Yes
<b>Alternative 2-</b> Alternative 1 plus center median and mid-block roundabout	Long-term	Complex staging to maintain traffic	\$\$\$	Yes	Center median refuge area for pedestrians	Less conflicts with driveway traffic in corridor	Will decrease emissions connected with idling vehicles	Yes
<b>Alternative 3-</b> Alternative 1 plus a back connection at outlets	Long-term	Minor Staging for back connection	\$\$	Yes	Reduce vehicular traffic on Route 9 will improve pedestrian access	Reduce vehicular traffic/congestion on Route 9	Potential wetland impacts, increase traffic/emissions adjacent to residential homes	Yes
Maintain signalized intersection at Route 9/Exit 20 Northbound Ramps	Short-term	Minor Staging	\$\$	Yes	Longer crossing distances with additional vehicular lanes.	Additional lanes required/limited capacity available	Limited capacity would still exist, additional through lanes on Route 9 needed	No
Maintain signalized intersection at Route 9/NY Route 149	Short-term	Minor Staging	\$\$	Yes	Longer crossing distances with additional vehicular lanes.	Major geometric improvements would be needed with limited available capacity	Limited capacity would still exist, additional through lanes on Route 9 needed	No
Use police to control signal at Route 149 intersection with Route 9	Short-term	None	\$	No	Could be improved when police present	Could be improved/could cause confusion and inconsistency	Safety concerns	No
<b>Southern Corridor Study Area Intersection Improvements:</b>								
Construct westbound left-turn lane on Round Pond Road at Route 9	Long-Term	Moderate staging to maintain traffic	\$\$	Yes	Increase cross distance on Round Pond Road	Improve queue on Round Pond Road, decrease delay for right-turn vehicles	Minimal	No
Install traffic signal at Round Pond Road	Long-Term	Minor staging to maintain traffic	\$\$	No	Improved pedestrian accommodations at signal	Increased capacity at intersection, better accessibility for Round Pond Road	Additional queued vehicles on mainline	Partially

Improvement	Improvement timeframe	Constructability	Cost	ROW	Effect on Pedestrian Access/ Accommodations	Effect on Traffic Flow	Anticipated Environmental Impacts	Meets Project Objectives
Adjust signal timings at Glen Lake Road to better accommodate peak hour flows	Short-Term	None	\$	No	Existing pedestrian accommodations maintained	Improve flow through intersection	None	Partially
Use police to control signal at Gurney Lane intersection with Route 9	Short-Term	None	\$	No	Could be improved when police present	Could be improved/could cause confusion and inconsistency	Safety concerns	No
Construct free flow right turn lane on Gurney Lane with exclusive lane on Route 9 directly into Six Flags Drive	Long-term	Moderate staging to maintain traffic	\$\$	Yes	Existing pedestrian accommodations maintained	Additional capacity provided for vehicles traveling to private development	None	Partially
<b>Low Cost Improvement Options:</b>								
Provide visible transit stops on Route 9 with amenities	Short-Term	Minor	\$	Yes	Better accommodate pedestrians in corridor	Minimal	Reduced emissions with less stops for transit between designated stops	Yes
Provide shuttle bus loop exclusively for the outlets from the municipal building lot to a lot north of Route 149	Short-Term	None	\$\$	No	Less conflict on Route 9 with reduced passenger vehicle travel	Decrease passenger vehicle travel in corridor	Reduced emissions with increased transit use	Yes
Install additional pedestrian crossings on Route 9 (clearly marked crosswalks)	Short-Term	Minor	\$	No	Improved access and visibility	Minimal effect	None	Partially
Consolidate Outlet driveways	Short-Term	Minor	\$	No	Less conflicts with driveway traffic	Less conflicts with turning vehicles	None	Partially
Improve cross access between parking lots in outlet area	Short-Term	Moderate	\$	No	Less conflict on Route 9/more internal conflicts	Reduces traffic turning to/from Route 9	None	Partially
Use VMS signs during peak travel times/seasons	Short-Term	None	\$	No	Reduced traffic will reduce conflicts with vehicles	Reduce congestion by redirecting traffic out of corridor	Maintenance concerns	Yes
Additional signing in corridor to better direct traffic	Short-Term	Minor	\$	No	Minimal	Reduce congestion by better directing traffic	None	Yes
Increase pedestrian signing throughout corridor	Short-term	Minor	\$	No	Improved knowledge and visibility for	Minimal effect	None	Partially

Improvement	Improvement timeframe	Constructability	Cost	ROW	Effect on Pedestrian Access/ Accommodations	Effect on Traffic Flow	Anticipated Environmental Impacts	Meets Project Objectives
					pedestrians			
Provide pedestrian bridge over Route 9 in the northern section of the corridor adjacent to the outlets	Long-Term	Complex staging to maintain traffic	\$\$\$\$	Yes	Improved safety for those who use bridge. Character of area makes defined use difficult	Improved flow with less pedestrian conflicts	None	Yes
Install traffic signal at I-87 Exit 20 SB Ramps	Long-Term	Moderate staging to maintain traffic	\$\$\$	No	Improved pedestrian accommodations at signal	Increased capacity at intersection	Additional queued vehicles on mainline	Partially
Restrict 'outside' private parking lots for the Great Escape	Short-Term	None	No	No	Better streamlines pedestrian use the pedestrian bridge	Reduce turning movements in/out of adjacent business lots	None	Partially
<b>Interchange Options:</b>								
Construct additional interchange to allow direct access into Great Escape from I-87	Long-Term	Complex staging to maintain traffic	\$\$\$\$	Yes	Reduced vehicular conflict in corridor	Reduce congestion by removing traffic from Route 9 corridor	Geometric issues with grades	Yes
Construct additional interchange at Route 149	Long-Term	Complex staging to maintain traffic	\$\$\$\$	Yes	Reduced vehicular conflict in corridor	Reduce congestion by removing traffic from Route 9 corridor	Major impacts to undeveloped land, Geometric issues with grades	Yes

# **Appendix G – 2013 Future Level of Service Analysis**

**Exit 20 Corridor Management plan  
Town of Queensbury, Warren County, New York**

# HCM Signalized Intersection Capacity Analysis

11: Pkg. Lot & US Route 9

10/23/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↗		↔	↗	↖	↖	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		0.88			1.00	1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frft		0.91			1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1507			1646	1468		1728	1468	1640	1723	
Flt Permitted		0.99			0.95	1.00		0.89	1.00	0.20	1.00	
Satd. Flow (perm)		1507			1646	1468		1532	1468	345	1723	
Volume (vph)	3	5	16	299	1	157	8	465	385	133	530	15
Peak-hour factor, PHF	0.64	0.64	0.64	0.76	0.76	0.76	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	5	8	25	393	1	207	9	511	423	148	589	17
RTOR Reduction (vph)	0	24	0	0	0	96	0	0	147	0	0	0
Lane Group Flow (vph)	0	14	0	0	394	111	0	520	276	148	606	0
Confl. Peds. (#/hr)			19	19			5		8	8		5
Confl. Bikes (#/hr)									3			1
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	0%	10%	10%	10%	10%	0%
Turn Type	Split			Split		pt+ov	Perm		pt+ov	pm+pt		
Protected Phases	4	4		3	3	3 2		1	1 3	2	6	
Permitted Phases							1			6		
Actuated Green, G (s)		6.1			45.9	69.4		65.1	111.0	88.6	88.6	
Effective Green, g (s)		10.1			49.9	73.4		69.1	119.0	92.6	92.6	
Actuated g/C Ratio		0.06			0.27	0.40		0.38	0.65	0.51	0.51	
Clearance Time (s)		8.0			8.0			8.0		8.0	8.0	
Vehicle Extension (s)		3.0			3.0			5.0		3.0	3.0	
Lane Grp Cap (vph)		83			450	590		580	957	313	874	
v/s Ratio Prot		c0.01			c0.24	0.08			0.19	0.05	c0.35	
v/s Ratio Perm								c0.34		0.19		
v/c Ratio		0.17			0.88	0.19		0.90	0.29	0.47	0.69	
Uniform Delay, d1		82.3			63.4	35.3		53.4	13.6	58.4	34.2	
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.0			17.1	0.2		17.4	0.3	1.1	2.4	
Delay (s)		83.3			80.5	35.5		70.8	14.0	59.5	36.6	
Level of Service		F			F	D		E	B	E	D	
Approach Delay (s)		83.3			65.0			45.3			41.1	
Approach LOS		F			E			D			D	

## Intersection Summary

HCM Average Control Delay	49.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	182.6	Sum of lost time (s)	30.0
Intersection Capacity Utilization	87.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
 23: Gap Driveway & US Route 9

10/24/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↖	↗		↖	↗	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	0	76	36	0	71	68	714	125	16	739	16
Peak Hour Factor	0.77	0.77	0.77	0.85	0.85	0.85	0.91	0.91	0.91	0.90	0.90	0.90
Hourly flow rate (vph)	39	0	99	42	0	84	75	785	137	18	821	18
Pedestrians		15						60			60	
Lane Width (ft)		12.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		1						5			5	
Right turn flare (veh)												
Median type		TWLT			TWLT							
Median storage (veh)		1			1							
Upstream signal (ft)								1118				
pX, platoon unblocked	0.83	0.83		0.83	0.83	0.83				0.83		
vC, conflicting volume	1958	1952	905	2018	1892	913	854			922		
vC1, stage 1 conf vol	881	881		1003	1003							
vC2, stage 2 conf vol	1078	1071		1015	889							
vCu, unblocked vol	2151	2143	905	2223	2072	896	854			906		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	52	100	69	41	100	69	90			97		
cM capacity (veh/h)	82	132	317	71	134	267	784			608		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	138	126	75	922	18	839
Volume Left	39	42	75	0	18	0
Volume Right	99	84	0	137	0	18
cSH	174	139	784	1700	608	1700
Volume to Capacity	0.79	0.91	0.10	0.54	0.03	0.49
Queue Length 95th (ft)	131	152	8	0	2	0
Control Delay (s)	76.1	114.5	10.1	0.0	11.1	0.0
Lane LOS	F	F	B		B	
Approach Delay (s)	76.1	114.5	0.8		0.2	
Approach LOS	F	F				

Intersection Summary	
Average Delay	12.2
Intersection Capacity Utilization	71.7%
ICU Level of Service	C
Analysis Period (min)	15

HCM Signalized Intersection Capacity Analysis  
 8: I-87 Exit 20 NB On/Off Ramp & US Route 9

10/23/2008



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	13	11	13	13	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1641	1669	1728	1785	1785	1419
Flt Permitted	0.95	1.00	0.05	1.00	1.00	1.00
Satd. Flow (perm)	1641	1669	91	1785	1785	1419
Volume (vph)	337	106	220	638	805	82
Peak-hour factor, PHF	0.74	0.74	0.93	0.93	0.86	0.86
Adj. Flow (vph)	455	143	237	686	936	95
RTOR Reduction (vph)	0	73	0	0	0	0
Lane Group Flow (vph)	455	70	237	686	936	95
Heavy Vehicles (%)	10%	0%	1%	10%	10%	10%
Turn Type		Prot	pm+pt			Free
Protected Phases	3	3	6	1	5	
Permitted Phases			1			Free
Actuated Green, G (s)	48.1	48.1	106.1	106.1	72.1	170.2
Effective Green, g (s)	52.1	52.1	110.1	110.1	76.1	170.2
Actuated g/C Ratio	0.31	0.31	0.65	0.65	0.45	1.00
Clearance Time (s)	8.0	8.0	8.0	8.0	8.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	502	511	347	1155	798	1419
v/s Ratio Prot	c0.28	0.04	c0.12	0.38	c0.52	
v/s Ratio Perm			0.32			0.07
v/c Ratio	0.91	0.14	0.68	0.59	1.17	0.07
Uniform Delay, d1	56.7	42.8	61.7	17.2	47.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	19.8	0.1	5.5	0.8	90.9	0.1
Delay (s)	76.5	42.9	67.2	18.1	138.0	0.1
Level of Service	E	D	E	B	F	A
Approach Delay (s)	68.5			30.7	125.3	
Approach LOS	E			C	F	

Intersection Summary			
HCM Average Control Delay	77.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	170.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
 1: Gurney Ln (Route 149 & I-87 Exit 20 SB Off Ramp)

2/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign. Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	253	33	403	230	0	0	0	0	219	0	127
Peak Hour Factor	0.69	0.69	0.69	0.88	0.88	0.88	0.92	0.92	0.92	0.83	0.83	0.83
Hourly flow rate (vph)	0	367	48	458	261	0	0	0	0	264	0	153
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None				None	
Median storage veh												
Upstream signal (ft)					1030							
pX, platoon unblocked												
vC, conflicting volume	261			414			1721	1568	391	1568	1592	261
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	261			414			1721	1568	391	1568	1592	261
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			59			100	100	100	0	100	80
cM capacity (veh/h)	1303			1128			39	66	658	62	64	782
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>	<b>SB 2</b>								
Volume Total	414	719	264	153								
Volume Left	0	458	264	0								
Volume Right	48	0	0	153								
cSH	1700	1128	62	782								
Volume to Capacity	0.24	0.41	4.29	0.20								
Queue Length 95th (ft)	0	50	Err	18								
Control Delay (s)	0.0	8.4	Err	10.7								
Lane LOS		A	F	B								
Approach Delay (s)	0.0	8.4	6332.8									
Approach LOS			F									
<b>Intersection Summary</b>												
Average Delay			1706.3									
Intersection Capacity Utilization			71.9%		ICU Level of Service					C		
Analysis Period (min)			15									

# HCM Signalized Intersection Capacity Analysis

## 2: Gurney Ln (Route 149) & US Route 9

10/23/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↘	↕	↗	↘	↕	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fl <sub>t</sub> Protected		0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1798	1615		1873	1615	1805	1881	1615	1804	1881	1599
Fl <sub>t</sub> Permitted		0.72	1.00		0.92	1.00	0.23	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)		1364	1615		1747	1615	431	1881	1615	421	1881	1599
Volume (vph)	157	11	227	5	13	12	268	711	10	11	593	374
Peak-hour factor, PHF	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	171	12	247	6	15	14	291	773	11	12	645	407
RTOR Reduction (vph)	0	0	193	0	0	11	0	0	3	0	0	215
Lane Group Flow (vph)	0	183	54	0	21	3	291	773	8	12	645	192
Conf. Peds. (#/hr)									1	1		
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	1%
Turn Type	Perm		Prot	Perm		Prot	pm+pt		Prot	Perm		Prot
Protected Phases		3	3		7	7	1	6	6		2	2
Permitted Phases	3			7			6			2		
Actuated Green, G (s)		15.3	15.3		15.3	15.3	49.5	49.5	49.5	34.3	34.3	34.3
Effective Green, g (s)		16.3	16.3		16.3	16.3	50.5	50.5	50.5	35.3	35.3	35.3
Actuated g/C Ratio		0.22	0.22		0.22	0.22	0.68	0.68	0.68	0.47	0.47	0.47
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)		297	352		381	352	497	1270	1090	199	888	755
v/s Ratio Prot			0.03			0.00	0.09	0.41	0.00		0.34	0.12
v/s Ratio Perm		0.13			0.01		0.31			0.03		
v/c Ratio		0.62	0.15		0.06	0.01	0.59	0.61	0.01	0.06	0.73	0.25
Uniform Delay, d <sub>1</sub>		26.4	23.7		23.2	22.9	18.2	6.7	4.0	10.7	15.9	11.9
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d <sub>2</sub>		3.8	0.2		0.1	0.0	1.8	1.2	0.0	0.3	3.7	0.4
Delay (s)		30.2	23.9		23.2	22.9	20.0	7.9	4.0	11.0	19.5	12.2
Level of Service		C	C		C	C	B	A	A	B	B	B
Approach Delay (s)		26.6			23.1			11.1			16.6	
Approach LOS		C			C			B			B	

### Intersection Summary

HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	74.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
 14: Six Flags Dr & US Route 9

10/23/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↖	↗		↖	↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr <sub>t</sub>		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Fl <sub>t</sub> Protected		0.95	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1805	1615		1819	1599	1805	1852		1787	1863	1615
Fl <sub>t</sub> Permitted		0.73	1.00		0.60	1.00	0.22	1.00		0.16	1.00	1.00
Satd. Flow (perm)		1380	1615		1140	1599	411	1852		300	1863	1615
Volume (vph)	229	0	126	33	4	88	69	673	33	75	623	105
Peak-hour factor, PHF	0.81	0.81	0.81	0.79	0.79	0.79	0.93	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	283	0	156	42	5	111	74	724	35	82	685	115
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	283	156	0	47	111	74	758	0	82	685	115
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	2%	0%	1%	2%	0%
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		Free
Protected Phases		3			7		1	6		5	2	
Permitted Phases	3		3	7		7	6			2		Free
Actuated Green, G (s)		23.0	23.0		23.0	23.0	50.8	45.2		51.2	45.4	90.0
Effective Green, g (s)		24.0	24.0		24.0	24.0	53.8	47.2		54.2	47.4	90.0
Actuated g/C Ratio		0.27	0.27		0.27	0.27	0.60	0.52		0.60	0.53	1.00
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		368	431		304	426	348	971		293	981	1615
v/s Ratio Prot							0.02	c0.41		c0.02	0.37	
v/s Ratio Perm		c0.21	0.10		0.04	0.07	0.11			0.15		c0.07
v/c Ratio		0.77	0.36		0.15	0.26	0.21	0.78		0.28	0.70	0.07
Uniform Delay, d <sub>1</sub>		30.4	26.8		25.2	26.0	10.6	17.2		12.2	15.9	0.0
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d <sub>2</sub>		9.3	0.5		0.2	0.3	0.3	4.4		0.5	2.4	0.1
Delay (s)		39.8	27.3		25.5	26.3	10.9	21.6		12.7	18.3	0.1
Level of Service		D	C		C	C	B	C		B	B	A
Approach Delay (s)		35.3			26.1			20.7		15.4		
Approach LOS		D			C			C		B		
<b>Intersection Summary</b>												
HCM Average Control Delay		21.8		HCM Level of Service				C				
HCM Volume to Capacity ratio		0.73		Sum of lost time (s)				12.0				
Actuated Cycle Length (s)		90.0		ICU Level of Service				C				
Intersection Capacity Utilization		70.9%		Analysis Period (min)				15				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 16: Round Pond Rd & US Route 9

10/23/2008



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↑	↘	↙	↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	41	123	555	76	100	704
Peak Hour Factor	0.81	0.81	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	51	152	597	82	108	757
Pedestrians	21		2			
Lane Width (ft)	12.0		12.0			
Walking Speed (ft/s)	4.0		4.0			
Percent Blockage	2		0			
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh	1					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1633	659			699	
vC1, stage 1 conf vol	659					
vC2, stage 2 conf vol	974					
vCu, unblocked vol	1633	659			699	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	67			88	
cM capacity (veh/h)	222	457			891	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	202	678	108	757
Volume Left	51	0	108	0
Volume Right	152	82	0	0
cSH	362	1700	891	1700
Volume to Capacity	0.56	0.40	0.12	0.45
Queue Length 95th (ft)	82	0	10	0
Control Delay (s)	26.9	0.0	9.6	0.0
Lane LOS	D		A	
Approach Delay (s)	26.9	0.0	1.2	
Approach LOS	D			

Intersection Summary			
Average Delay		3.7	
Intersection Capacity Utilization	59.5%		ICU Level of Service B
Analysis Period (min)		15	

# **Appendix H – 2028 Future Level of Service Analysis**

**Exit 20 Corridor Management plan  
Town of Queensbury, Warren County, New York**

## **Key Study Area Intersection Level of Service**

HCM Signalized Intersection Capacity Analysis

11: Pkg. Lot & US Route 9

10/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		0.87			1.00	1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.91			1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1504			1646	1468		1729	1468	1641	1723	
Flt Permitted		0.99			0.95	1.00		0.58	1.00	0.07	1.00	
Satd. Flow (perm)		1504			1646	1468		1010	1468	130	1723	
Volume (vph)	4	6	18	346	1	182	10	536	446	155	610	17
Peak-hour factor, PHF	0.64	0.64	0.64	0.76	0.76	0.76	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	6	9	28	455	1	239	11	589	490	172	678	19
RTOR Reduction (vph)	0	26	0	0	0	90	0	0	175	0	1	0
Lane Group Flow (vph)	0	17	0	0	456	149	0	600	315	172	696	0
Confl. Peds. (#/hr)			19	19			5		8	8		5
Confl. Bikes (#/hr)									3			1
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	0%	10%	10%	10%	10%	0%
Turn Type	Split			Split		pt+ov	Perm		pt+ov	pm+pt		
Protected Phases	4	4		3	3	3 2		1	1 3	2	6	
Permitted Phases							1			6		
Actuated Green, G (s)		6.4			53.3	81.7		63.5	116.8	91.9	91.9	
Effective Green, g (s)		10.4			57.3	85.7		67.5	124.8	95.9	95.9	
Actuated g/C Ratio		0.05			0.30	0.44		0.35	0.64	0.49	0.49	
Clearance Time (s)		8.0			8.0			8.0		8.0	8.0	
Vehicle Extension (s)		3.0			3.0			5.0		3.0	3.0	
Lane Grp Cap (vph)		81			486	648		351	944	254	852	
v/s Ratio Prot		c0.01			c0.28	0.10			0.21	0.09	c0.40	
v/s Ratio Perm								c0.59		0.25		
v/c Ratio		0.20			0.94	0.23		1.71	0.33	0.68	0.82	
Uniform Delay, d1		87.8			66.6	33.6		63.2	15.7	72.9	41.6	
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.2			25.9	0.2		331.1	0.4	7.0	6.1	
Delay (s)		89.1			92.5	33.8		394.4	16.2	79.8	47.8	
Level of Service		F			F	G		F	B	E	D	
Approach Delay (s)		89.1			72.3			224.4			54.1	
Approach LOS		F			E			F			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			128.2									
HCM Volume to Capacity ratio			1.18									
Actuated Cycle Length (s)			194.0						30.4			
Intersection Capacity Utilization			97.8%							F		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

11: Pkg. Lot & US Route 9

12/2/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		0.97	1.00		1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes		0.90		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.91		1.00	0.85		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1556		3183	1470		1802	1727	1468	1640	1723	
Flt Permitted		0.99		0.95	1.00		0.16	1.00	1.00	0.20	1.00	
Satd. Flow (perm)		1556		3183	1470		311	1727	1468	339	1723	
Volume (vph)	4	6	18	346	1	182	10	536	446	155	610	17
Peak-hour factor, PHF	0.64	0.64	0.64	0.76	0.76	0.76	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	6	9	28	455	1	239	11	589	490	172	678	19
RTOR Reduction (vph)	0	27	0	0	196	0	0	0	206	0	0	0
Lane Group Flow (vph)	0	16	0	455	44	0	11	589	284	172	697	0
Confl. Peds. (#/hr)			19	19			5		8	8		5
Confl. Bikes (#/hr)									3			1
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	0%	10%	10%	10%	10%	0%
Turn Type	Split			Split			Perm		pt+ov	pm+pt		
Protected Phases	4	4		3	3			1	13	2	6	
Permitted Phases							1			6		
Actuated Green, G (s)		2.8		15.4	15.4		36.0	36.0	51.4	50.2	50.2	
Effective Green, g (s)		3.8		16.4	16.4		37.0	37.0	53.4	51.2	51.2	
Actuated g/C Ratio		0.04		0.18	0.18		0.40	0.40	0.58	0.56	0.56	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0		5.0	5.0		3.0	3.0	
Lane Grp Cap (vph)		64		567	262		125	694	851	333	958	
v/s Ratio Prot		c0.01		c0.14	0.03			c0.34	0.19	0.06	c0.40	
v/s Ratio Perm							0.04			0.23		
v/c Ratio		0.25		0.80	0.17		0.09	0.85	0.33	0.52	0.73	
Uniform Delay, d1		42.8		36.3	32.1		17.1	25.0	10.1	28.4	15.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.1		8.0	0.3		0.6	10.4	0.5	1.4	2.8	
Delay (s)		44.9		44.3	32.4		17.7	35.5	10.6	29.8	18.0	
Level of Service		D		D	C		B	D	B	C	B	
Approach Delay (s)		44.9			40.2			24.1			20.3	
Approach LOS		D			D			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			27.4				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			92.1				Sum of lost time (s)			20.7		
Intersection Capacity Utilization			72.2%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

# Movement Summary

## Route 9/Route 149/Parking Lot

### 2028 Build - Saturday Peak Hour - Low Growth Alt 1

Roundabout

#### Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	Mean Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
<b>Route 9 - NB</b>										
3L	L	11	8.3	0.522	11.9	LOS B	49	0.60	0.68	27.0
8T	T	589	10.0	0.527	6.8	LOS A	49	0.60	0.56	31.0
8R	R	490	10.0	0.474	8.7	LOS A	41	0.58	0.63	30.2
<b>Approach</b>		<b>1091</b>	<b>10.0</b>	<b>0.527</b>	<b>7.7</b>	<b>LOS A</b>	<b>49</b>	<b>0.59</b>	<b>0.59</b>	<b>30.6</b>
<b>Route 149 - WB</b>										
1L	L	455	10.1	0.637	21.4	LOS C	71	0.93	1.07	25.4
6T	T	1	50.0	0.667	12.8	LOS B	71	0.93	1.06	27.9
6R	R	239	10.0	0.426	13.8	LOS B	32	0.82	0.93	28.7
<b>Approach</b>		<b>698</b>	<b>10.2</b>	<b>0.637</b>	<b>18.8</b>	<b>LOS B</b>	<b>71</b>	<b>0.89</b>	<b>1.02</b>	<b>26.4</b>
<b>Route 9 - SB</b>										
7L	L	172	9.9	0.575	17.9	LOS B	59	0.86	0.93	27.0
4T	T	678	10.0	0.576	10.9	LOS B	59	0.86	0.90	30.4
4R	R	19	5.0	0.556	11.3	LOS B	54	0.85	0.90	28.9
<b>Approach</b>		<b>870</b>	<b>9.9</b>	<b>0.576</b>	<b>12.3</b>	<b>LOS B</b>	<b>59</b>	<b>0.86</b>	<b>0.91</b>	<b>29.6</b>
<b>Parking Lot Drwy - EB</b>										
5L	L	6	14.3	0.135	18.6	LOS B	6	0.78	0.93	22.7
2T	T	9	10.0	0.135	11.3	LOS B	6	0.78	0.85	24.9
2R	R	28	3.4	0.135	12.3	LOS B	6	0.78	0.78	24.4
<b>Approach</b>		<b>46</b>	<b>6.5</b>	<b>0.135</b>	<b>13.1</b>	<b>LOS B</b>	<b>6</b>	<b>0.78</b>	<b>0.82</b>	<b>24.2</b>
<b>All Vehicles</b>		<b>2705</b>	<b>9.9</b>	<b>0.667</b>	<b>12.1</b>	<b>LOS B</b>	<b>71</b>	<b>0.76</b>	<b>0.81</b>	<b>28.9</b>

Symbols which may appear in this table:

Following Degree of Saturation

# x = 1.00 for Short Lane with resulting Excess Flow

\* x = 1.00 due to minimum capacity

Following LOS

# - Based on density for continuous movements

Following Queue

# - Density for continuous movement



HCM Signalized Intersection Capacity Analysis  
 11: Pkg. Lot & US Route 9

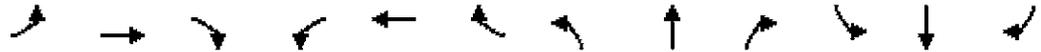
10/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0	4.0	4.0		
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00		
Frbp, ped/bikes		0.87			1.00	1.00		1.00	1.00	1.00	1.00		
Flpb, ped/bikes		1.00			1.00	1.00		1.00	1.00	1.00	1.00		
Frt		0.91			1.00	0.85		1.00	0.85	1.00	1.00		
Flt Protected		0.99			0.95	1.00		1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1504			1645	1468		1728	1468	1641	1723		
Flt Permitted		0.99			0.95	1.00		0.50	1.00	0.06	1.00		
Satd. Flow (perm)		1504			1645	1468		864	1468	97	1723		
Volume (vph)	4	6	18	363	1	182	10	565	460	155	645	17	
Peak-hour factor, PHF	0.64	0.64	0.64	0.76	0.76	0.76	0.91	0.91	0.91	0.90	0.90	0.90	
Adj. Flow (vph)	6	9	28	478	1	239	11	621	505	172	717	19	
RTOR Reduction (vph)	0	26	0	0	0	85	0	0	180	0	1	0	
Lane Group Flow (vph)	0	17	0	0	479	154	0	632	325	172	735	0	
Confl. Peds. (#/hr)			19	19			5		8	8		5	
Confl. Bikes (#/hr)									3			1	
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	0%	10%	10%	10%	10%	0%	
Turn Type	Split			Split		pt+ov	Perm		pt+ov	pm+pt			
Protected Phases	4	4		3	3	3	2		1	1	3	2	
Permitted Phases								1				6	
Actuated Green, G (s)		6.4			53.3	81.7		63.5	116.8	91.9	91.9		
Effective Green, g (s)		10.4			57.3	85.7		67.5	124.8	95.9	95.9		
Actuated g/C Ratio		0.05			0.30	0.44		0.35	0.64	0.49	0.49		
Clearance Time (s)		8.0			8.0			8.0		8.0	8.0		
Vehicle Extension (s)		3.0			3.0			5.0		3.0	3.0		
Lane Grp Cap (vph)		81			486	648		301	944	242	852		
v/s Ratio Prot		c0.01			c0.29	0.10			0.22	0.09	c0.43		
v/s Ratio Perm								c0.73		0.26			
v/c Ratio		0.20			0.99	0.24		2.10	0.34	0.71	0.86		
Uniform Delay, d1		87.8			67.9	33.8		63.2	15.9	76.1	43.3		
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.2			36.8	0.2		506.0	0.5	9.4	9.0		
Delay (s)		89.1			104.7	34.0		569.3	16.3	85.6	52.3		
Level of Service		F			F	G		F	B	F	D		
Approach Delay (s)		89.1			81.2			323.7			58.6		
Approach LOS		F			F			F			E		
<b>Intersection Summary</b>													
HCM Average Control Delay			172.2									HCM Level of Service	F
HCM Volume to Capacity ratio			1.37										
Actuated Cycle Length (s)			194.0									Sum of lost time (s)	30.4
Intersection Capacity Utilization			102.1%									ICU Level of Service	G
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

11: Pkg. Lot & US Route 9

12/1/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕↕	↕		↕	↕	↕	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		0.97	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.90		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.91		1.00	0.85		1.00	1.00		0.85	1.00	1.00
Flt Protected		0.99		0.95	1.00		0.95	1.00		1.00	0.95	1.00
Satd. Flow (prot)		1556		3183	1470		1802	1727		1468	1640	1724
Flt Permitted		0.99		0.95	1.00		0.13	1.00		1.00	0.17	1.00
Satd. Flow (perm)		1556		3183	1470		251	1727		1468	289	1724
Volume (vph)	4	6	18	363	1	182	10	565	460	155	645	17
Peak-hour factor, PHF	0.64	0.64	0.64	0.76	0.76	0.76	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	6	9	28	478	1	239	11	621	505	172	717	19
RTOR Reduction (vph)	0	27	0	0	196	0	0	0	212	0	0	0
Lane Group Flow (vph)	0	16	0	478	44	0	11	621	293	172	736	0
Confl. Peds. (#/hr)			19	19			5		8	8		5
Confl. Bikes (#/hr)									3			1
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	0%	10%	10%	10%	10%	0%
Turn Type	Split			Split			Perm		pt+ov	pm+pt		
Protected Phases	4	4		3	3			1	1 3	2	6	
Permitted Phases							1			6		
Actuated Green, G (s)		2.8		15.4	15.4		36.0	36.0	51.4	50.2	50.2	
Effective Green, g (s)		3.8		16.4	16.4		37.0	37.0	53.4	51.2	51.2	
Actuated g/C Ratio		0.04		0.18	0.18		0.40	0.40	0.58	0.56	0.56	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0		5.0	5.0		3.0	3.0	
Lane Grp Cap (vph)		64		567	262		101	694	851	310	958	
v/s Ratio Prot		c0.01		c0.15	0.03			c0.36	0.20	0.06	c0.43	
v/s Ratio Perm							0.04			0.25		
v/c Ratio		0.25		0.84	0.17		0.11	0.89	0.34	0.55	0.77	
Uniform Delay, d1		42.8		36.6	32.1		17.2	25.7	10.2	29.5	15.8	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.1		11.0	0.3		1.0	14.9	0.5	2.1	3.7	
Delay (s)		44.9		47.6	32.4		18.2	40.6	10.7	31.7	19.6	
Level of Service		D		D	C		B	D	B	C	B	
Approach Delay (s)		44.9			42.5			27.1			21.9	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	92.1	Sum of lost time (s)	20.7
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

# Movement Summary

## Route 9/Route 149/Parking Lot

### 2028 Build - Saturday Peak Hour - High Growth Alt 1

Roundabout

#### Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	Mean Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
<b>Route 9 - NB</b>										
3L	L	11	8.3	0.545	11.9	LOS B	54	0.62	0.68	26.9
8T	T	621	10.0	0.554	6.9	LOS A	54	0.62	0.57	30.8
8R	R	505	10.1	0.492	8.7	LOS A	43	0.60	0.63	30.2
<b>Approach</b>		<b>1139</b>	<b>10.0</b>	<b>0.554</b>	<b>7.7</b>	<b>LOS A</b>	<b>54</b>	<b>0.61</b>	<b>0.60</b>	<b>30.5</b>
<b>Route 149 - WB</b>										
1L	L	478	10.0	0.696	23.7	LOS C	87	0.97	1.14	24.4
6T	T	1	50.0	0.667	15.1	LOS B	87	0.97	1.13	26.6
6R	R	239	10.0	0.452	14.9	LOS B	35	0.85	0.97	28.0
<b>Approach</b>		<b>720</b>	<b>10.1</b>	<b>0.695</b>	<b>20.7</b>	<b>LOS C</b>	<b>87</b>	<b>0.93</b>	<b>1.08</b>	<b>25.5</b>
<b>Route 9 - SB</b>										
7L	L	172	9.9	0.623	19.0	LOS B	69	0.91	0.98	26.5
4T	T	717	10.0	0.623	12.1	LOS B	69	0.90	0.96	29.8
4R	R	19	5.0	0.606	12.5	LOS B	63	0.90	0.96	28.1
<b>Approach</b>		<b>909</b>	<b>9.9</b>	<b>0.623</b>	<b>13.4</b>	<b>LOS B</b>	<b>69</b>	<b>0.90</b>	<b>0.96</b>	<b>29.0</b>
<b>Parking Lot Drwy - EB</b>										
5L	L	6	14.3	0.146	19.3	LOS B	7	0.80	0.94	22.4
2T	T	9	10.0	0.145	12.0	LOS B	7	0.80	0.86	24.6
2R	R	28	3.4	0.145	13.1	LOS B	7	0.80	0.79	24.1
<b>Approach</b>		<b>46</b>	<b>6.5</b>	<b>0.145</b>	<b>13.8</b>	<b>LOS B</b>	<b>7</b>	<b>0.80</b>	<b>0.83</b>	<b>23.9</b>
<b>All Vehicles</b>		<b>2814</b>	<b>10.0</b>	<b>0.696</b>	<b>13.0</b>	<b>LOS B</b>	<b>87</b>	<b>0.79</b>	<b>0.84</b>	<b>28.3</b>

Symbols which may appear in this table:

Following Degree of Saturation

# x = 1.00 for Short Lane with resulting Excess Flow

\* x = 1.00 due to minimum capacity

Following LOS

# - Based on density for continuous movements

Following Queue

# - Density for continuous movement



HCM Unsignalized Intersection Capacity Analysis  
 23: Gap Driveway & US Route 9

10/24/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↖	↗		↖	↗	
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Volume (veh/h)	35	0	88	41	0	83	79	824	145	18	851	18
Peak Hour Factor	0.77	0.77	0.77	0.85	0.85	0.85	0.91	0.91	0.91	0.90	0.90	0.90
Hourly flow rate (vph)	45	0	114	48	0	98	87	905	159	20	946	20
Pedestrians	15						60			60		
Lane Width (ft)	12.0						12.0			12.0		
Walking Speed (ft/s)	4.0						4.0			4.0		
Percent Blockage	1						5			5		
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh	1			1								
Upstream signal (ft)							1118					
pX, platoon unblocked	0.75	0.75		0.75	0.75	0.75				0.75		
vC, conflicting volume	2247	2249	1031	2319	2179	1045	981			1065		
vC1, stage 1 conf vol	1011	1011		1159	1159							
vC2, stage 2 conf vol	1237	1238		1160	1021							
vCu, unblocked vol	2663	2665	1031	2758	2572	1060	981			1086		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	0	100	57	0	100	49	88			96		
cM capacity (veh/h)	33	88	268	28	92	193	703			468		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	160	146	87	1065	20	966						
Volume Left	45	48	87	0	20	0						
Volume Right	114	98	0	159	0	20						
cSH	89	66	703	1700	468	1700						
Volume to Capacity	1.80	2.22	0.12	0.63	0.04	0.57						
Queue Length 95th (ft)	334	349	11	0	3	0						
Control Delay (s)	479.6	695.3	10.8	0.0	13.0	0.0						
Lane LOS	F	F	B		B							
Approach Delay (s)	479.6	695.3	0.8		0.3							
Approach LOS	F	F										

Intersection Summary		
Average Delay	73.4	
Intersection Capacity Utilization	78.9%	ICU Level of Service D
Analysis Period (min)	15	

# HCM Signalized Intersection Capacity Analysis

## 23: Gap Driveway & US Route 9

2/20/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.66		1.00	0.66		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.74	1.00		0.76	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.85		1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1336	1059		1332	1028		1805	1709		1684	1725	
Flt Permitted	0.55	1.00		0.48	1.00		0.06	1.00		0.06	1.00	
Satd. Flow (perm)	780	1059		670	1028		111	1709		111	1725	
Volume (vph)	35	0	88	41	0	83	79	824	145	18	851	18
Peak-hour factor, PHF	0.77	0.77	0.77	0.85	0.85	0.85	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	45	0	114	48	0	98	87	905	159	20	946	20
RTOR Reduction (vph)	0	104	0	0	89	0	0	4	0	0	0	0
Lane Group Flow (vph)	45	10	0	48	9	0	87	1060	0	20	966	0
Confl. Peds. (#/hr)	60		60	60		60	15			15		
Heavy Vehicles (%)	0%	2%	0%	3%	2%	3%	0%	10%	1%	7%	10%	0%
Turn Type	Perm		Perm		pm+pt		Perm					
Protected Phases		4			8		5	2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.6	9.6		9.6	9.6		72.3	72.3		63.5	63.5	
Effective Green, g (s)	10.6	10.6		10.6	10.6		73.3	73.3		64.5	64.5	
Actuated g/C Ratio	0.09	0.09		0.09	0.09		0.63	0.63		0.55	0.55	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	71	96		61	93		139	1072		61	952	
v/s Ratio Prot		0.01			0.01		0.03	0.62			0.56	
v/s Ratio Perm	0.06			0.07			0.37			0.18		
v/c Ratio	0.63	0.11		0.79	0.10		0.63	0.99		0.33	1.01	
Uniform Delay, d1	51.3	48.8		52.0	48.8		25.8	21.4		14.3	26.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.0	0.5		47.5	0.4		8.5	24.4		3.1	32.8	
Delay (s)	68.3	49.3		99.5	49.2		34.3	45.8		17.5	59.0	
Level of Service	E	D		F	D		C	D		B	E	
Approach Delay (s)		54.7			65.8			44.9			58.1	
Approach LOS		D			E			D			E	

### Intersection Summary

HCM Average Control Delay	52.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	116.9	Sum of lost time (s)	33.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

# Movement Summary

## US Route 9/Outlet Drwys

### Build 2028 - Saturday Peak Hour - Low Growth

Roundabout

### Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
<b>US Route 9 - NB</b>										
3L	L	131	0.0	1.008	29.9	LOS C	1376	1.00	0.86	18.1
8T	T	905	10.0	1.008	23.6	LOS C	1376	1.00	0.86	20.6
8R	R	159	1.2	1.006	23.7	LOS C	1376	1.00	0.83	18.9
<b>Approach</b>		<b>1197</b>	<b>7.8</b>	<b>1.008</b>	<b>24.3</b>	<b>LOS C</b>	<b>1376</b>	<b>1.00</b>	<b>0.86</b>	<b>20.1</b>
<b>Adirondack Factory Outlet Drwy - WB</b>										
1L	L	48	2.1	0.640	41.9	LOS D	173	1.00	1.19	9.8
6T	T	1	50.0	0.667	33.2	LOS C	173	1.00	1.17	8.0
6R	R	98	3.1	0.636	36.0	LOS D	173	1.00	1.10	9.5
<b>Approach</b>		<b>148</b>	<b>3.4</b>	<b>0.638</b>	<b>37.9</b>	<b>LOS D</b>	<b>173</b>	<b>1.00</b>	<b>1.13</b>	<b>9.6</b>
<b>US Route 9 - SB</b>										
7L	L	64	1.6	1.000	35.4	LOS D	1108	1.00	1.11	19.2
4T	T	946	10.0	0.993	27.5	LOS C	1108	1.00	1.12	21.2
4R	R	20	0.0	1.000	27.6	LOS C	1108	1.00	1.07	19.8
<b>Approach</b>		<b>1030</b>	<b>9.3</b>	<b>0.992</b>	<b>28.0</b>	<b>LOS C</b>	<b>1108</b>	<b>1.00</b>	<b>1.12</b>	<b>21.1</b>
<b>French Mtn. Commons Drwy - EB</b>										
5L	L	45	0.0	0.672	43.6	LOS D	186	1.00	1.22	9.5
2T	T	1	50.0	0.667	35.0	LOS D	186	1.00	1.19	7.7
2R	R	114	0.0	0.675	37.7	LOS D	186	1.00	1.13	9.2
<b>Approach</b>		<b>161</b>	<b>0.6</b>	<b>0.674</b>	<b>39.3</b>	<b>LOS D</b>	<b>186</b>	<b>1.00</b>	<b>1.15</b>	<b>9.3</b>
<b>All Vehicles</b>		<b>2536</b>	<b>7.7</b>	<b>1.008</b>	<b>27.6</b>	<b>LOS C</b>	<b>1376</b>	<b>1.00</b>	<b>1.00</b>	<b>19.2</b>

Symbols which may appear in this table:

Following Degree of Saturation

# x = 1.00 for Short Lane with resulting Excess Flow

\* x = 1.00 due to minimum capacity

Following LOS

# - Based on density for continuous movements

Following Queue

# - Density for continuous movement



HCM Unsignalized Intersection Capacity Analysis  
 23: Gap Driveway & US Route 9

10/24/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↖	↖		↖	↖	
Sign Control	Stop			Stop			Free	Free		Free	Free	
Grade	0%			0%			0%	0%		0%	0%	
Volume (veh/h)	35	0	88	41	0	83	79	867	145	18	903	18
Peak Hour Factor	0.77	0.77	0.77	0.85	0.85	0.85	0.91	0.91	0.91	0.90	0.90	0.90
Hourly flow rate (vph)	45	0	114	48	0	98	87	953	159	20	1003	20
Pedestrians	15							60			60	
Lane Width (ft)	12.0							12.0			12.0	
Walking Speed (ft/s)	4.0							4.0			4.0	
Percent Blockage	1							5			5	
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh	1			1								
Upstream signal (ft)								1118				
pX, platoon unblocked	0.70	0.70		0.70	0.70	0.70				0.70		
vC, conflicting volume	2352	2354	1088	2424	2284	1092	1038			1112		
vC1, stage 1 conf vol	1068	1068		1206	1206							
vC2, stage 2 conf vol	1284	1286		1218	1078							
vCu, unblocked vol	2935	2937	1088	3037	2837	1132	1038			1160		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	0	100	54	0	100	40	87			95		
cM capacity (veh/h)	18	73	248	16	78	163	669			409		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	160	146	87	1112	20	1023						
Volume Left	45	48	87	0	20	0						
Volume Right	114	98	0	159	0	20						
cSH	52	41	669	1700	409	1700						
Volume to Capacity	3.05	3.54	0.13	0.65	0.05	0.60						
Queue Length 95th (ft)	Err	Err	11	0	4	0						
Control Delay (s)	Err	Err	11.2	0.0	14.3	0.0						
Lane LOS	F	F	B		B							
Approach Delay (s)	Err	Err	0.8		0.3							
Approach LOS	F	F										

Intersection Summary

Average Delay	1199.9
Intersection Capacity Utilization	81.1%
ICU Level of Service	D
Analysis Period (min)	15

HCM Signalized Intersection Capacity Analysis

23: Gap Driveway & US Route 9

2/20/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.66		1.00	0.66		1.00	1.00		1.00	1.00	
Fipb, ped/bikes	0.74	1.00		0.76	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.85		1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1336	1059		1332	1028		1805	1710		1684	1725	
Flt Permitted	0.55	1.00		0.48	1.00		0.06	1.00		0.06	1.00	
Satd. Flow (perm)	780	1059		670	1028		111	1710		110	1725	
Volume (vph)	35	0	88	41	0	83	79	867	145	18	903	18
Peak-hour factor, PHF	0.77	0.77	0.77	0.85	0.85	0.85	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	45	0	114	48	0	98	87	953	159	20	1003	20
RTOR Reduction (vph)	0	104	0	0	89	0	0	4	0	0	0	0
Lane Group Flow (vph)	45	10	0	48	9	0	87	1108	0	20	1023	0
Confl. Peds. (#/hr)	60		60	60		60	15			15		
Heavy Vehicles (%)	0%	2%	0%	3%	2%	3%	0%	10%	1%	7%	10%	0%
Turn Type	Perm		Perm		pm+pt		Perm					
Protected Phases		4			8		5	2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.6	9.6		9.6	9.6		72.3	72.3		63.5	63.5	
Effective Green, g (s)	10.6	10.6		10.6	10.6		73.3	73.3		64.5	64.5	
Actuated g/C Ratio	0.09	0.09		0.09	0.09		0.63	0.63		0.55	0.55	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	71	96		61	93		139	1072		61	952	
v/s Ratio Prot		0.01			0.01		0.03	c0.65			c0.59	
v/s Ratio Perm	0.06			c0.07			0.37			0.18		
v/c Ratio	0.63	0.11		0.79	0.10		0.63	1.03		0.33	1.07	
Uniform Delay, d1	51.3	48.8		52.0	48.8		56.5	21.8		14.3	26.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.0	0.5		47.5	0.4		8.5	36.5		3.1	51.2	
Delay (s)	68.3	49.3		99.5	49.2		65.0	58.3		17.5	77.4	
Level of Service	E	D		F	D		E	E		B	E	
Approach Delay (s)		54.7			65.8			58.8			76.2	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM Average Control Delay	66.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	116.9	Sum of lost time (s)	37.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

# Movement Summary

## US Route 9/Outlet Drwys

### Build 2028 - Saturday Peak Hour - High Growth

Roundabout

#### Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
<b>US Route 9 - NB</b>										
3L	L	131	0.0	1.040	40.1	LOS D	1640	1.00	1.01	15.4
8T	T	953	10.0	1.039	33.8	LOS C	1640	1.00	1.01	17.0
8R	R	159	1.2	1.039	33.8	LOS C	1640	1.00	0.98	15.5
<b>Approach</b>		<b>1243</b>	<b>7.8</b>	<b>1.039</b>	<b>34.5</b>	<b>LOS C</b>	<b>1640</b>	<b>1.00</b>	<b>1.01</b>	<b>16.7</b>
<b>Adirondack Factory Outlet Drwy - WB</b>										
1L	L	48	2.1	0.658	44.5	LOS D	181	1.00	1.21	9.4
6T	T	1	50.0	0.667	35.9	LOS D	181	1.00	1.18	7.6
6R	R	98	3.1	0.658	38.6	LOS D	181	1.00	1.11	9.0
<b>Approach</b>		<b>148</b>	<b>3.4</b>	<b>0.656</b>	<b>40.5</b>	<b>LOS D</b>	<b>181</b>	<b>1.00</b>	<b>1.14</b>	<b>9.2</b>
<b>US Route 9 - SB</b>										
7L	L	64	1.6	1.032	47.3	LOS D	1394	1.00	1.32	16.4
4T	T	1003	10.0	1.036	39.4	LOS D	1394	1.00	1.32	17.6
4R	R	20	0.0	1.053	39.5	LOS D	1394	1.00	1.27	16.4
<b>Approach</b>		<b>1087</b>	<b>9.3</b>	<b>1.036</b>	<b>39.9</b>	<b>LOS D</b>	<b>1394</b>	<b>1.00</b>	<b>1.32</b>	<b>17.5</b>
<b>French Mtn. Commons Drwy - EB</b>										
5L	L	45	0.0	0.703	47.9	LOS D	198	1.00	1.24	8.9
2T	T	1	50.0	0.667	39.3	LOS D	198	1.00	1.21	7.1
2R	R	114	0.0	0.704	42.0	LOS D	198	1.00	1.15	8.5
<b>Approach</b>		<b>161</b>	<b>0.6</b>	<b>0.702</b>	<b>43.6</b>	<b>LOS D</b>	<b>198</b>	<b>1.00</b>	<b>1.18</b>	<b>8.6</b>
<b>All Vehicles</b>		<b>2639</b>	<b>7.7</b>	<b>1.053</b>	<b>37.6</b>	<b>LOS D</b>	<b>1640</b>	<b>1.00</b>	<b>1.15</b>	<b>16.2</b>

Symbols which may appear in this table:

Following Degree of Saturation

# x = 1.00 for Short Lane with resulting Excess Flow

\* x = 1.00 due to minimum capacity

Following LOS

# - Based on density for continuous movements

Following Queue

- Density for continuous movement



HCM Signalized Intersection Capacity Analysis  
 8: I-87 Exit 20 NB On/Off Ramp & US Route 9

10/24/2008

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	13	11	13	13	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd Flow (prot)	1641	1669	1728	1785	1785	1419
Flt Permitted	0.95	1.00	0.05	1.00	1.00	1.00
Satd Flow (perm)	1641	1669	91	1785	1785	1419
Volume (vph)	391	123	254	735	926	94
Peak-hour factor, PHF	0.74	0.74	0.93	0.93	0.86	0.86
Adj. Flow (vph)	528	166	273	790	1077	109
RTOR Reduction (vph)	0	71	0	0	0	0
Lane Group Flow (vph)	528	95	273	790	1077	109
Heavy Vehicles (%)	10%	0%	1%	10%	10%	10%
Turn Type	Prot pm+pt			Free		
Protected Phases	3	3	6	1	5	
Permitted Phases				1		
Actuated Green, G (s)	52.0	52.0	106.4	106.4	72.0	174.4
Effective Green, g (s)	56.0	56.0	110.4	110.4	76.0	174.4
Actuated g/C Ratio	0.32	0.32	0.63	0.63	0.44	1.00
Clearance Time (s)	8.0	8.0	8.0	8.0	8.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	527	536	343	1130	778	1419
v/s Ratio Prot	0.32	0.06	0.14	0.44	0.60	
v/s Ratio Perm				0.37	0.08	
v/c Ratio	1.00	0.18	0.80	0.70	1.38	0.08
Uniform Delay, d1	59.2	42.6	65.2	21.1	49.2	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	39.7	0.2	12.0	1.9	180.9	0.1
Delay (s)	98.9	42.8	77.3	23.0	230.1	0.1
Level of Service	F	D	E	C	F	A
Approach Delay (s)	85.5			36.9	209.0	
Approach LOS	F			D	F	
<b>Intersection Summary</b>						
HCM Average Control Delay			117.7	HCM Level of Service		F
HCM Volume to Capacity ratio			1.12			
Actuated Cycle Length (s)			174.4	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			101.2%	ICU Level of Service	G	
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis  
 8: I-87 Exit 20 NB On/Off Ramp & US Route 9

12/2/2008



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↗	↖	↑	↑↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	13	11	13	13	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3183	1669	1728	1785	3344	
Flt Permitted	0.95	1.00	0.12	1.00	1.00	
Satd. Flow (perm)	3183	1669	211	1785	3344	
Volume (vph)	391	123	254	735	926	94
Peak-hour factor, PHE	0.74	0.74	0.93	0.93	0.86	0.86
Adj. Flow (vph)	528	166	273	790	1077	109
RTOR Reduction (vph)	0	21	0	0	6	0
Lane Group Flow (vph)	528	145	273	790	1180	0
Heavy Vehicles (%)	10%	0%	1%	10%	10%	10%

Turn Type	pm+ov		pm+pt			
Protected Phases	3	6	6	1	5	
Permitted Phases		3	1			
Actuated Green, G (s)	20.1	35.9	59.6	59.6	38.8	
Effective Green, g (s)	21.1	37.9	60.6	60.6	39.8	
Actuated g/C Ratio	0.24	0.42	0.68	0.68	0.44	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	749	780	427	1206	1484	
v/s Ratio Prot	c0.17	0.03	0.12	c0.44	c0.35	
v/s Ratio Perm		0.05	0.31			
v/c Ratio	0.70	0.19	0.64	0.66	0.80	
Uniform Delay, d1	31.4	16.2	22.7	8.5	21.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.0	0.1	3.1	1.3	3.0	
Delay (s)	34.5	16.3	25.8	9.8	24.5	
Level of Service	C	B	C	A	C	
Approach Delay (s)	30.1			13.9	24.5	
Approach LOS	C			B	C	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	89.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

# Movement Summary

## Rt 9/I-87 Exit 20 NB Ramp

### 2028 Build - Saturday Peak Hour - Low Growth

Roundabout

### Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
<b>Route 9 - NB</b>										
3L	L	273	1.1	0.767	21.2	LOS C	324	1.00	1.17	20.4
8T	T	790	10.0	0.767	16.0	LOS B	324	1.00	1.13	25.4
<b>Approach</b>		<b>1063</b>	<b>7.7</b>	<b>0.767</b>	<b>17.4</b>	<b>LOS B</b>	<b>324</b>	<b>1.00</b>	<b>1.14</b>	<b>23.8</b>
<b>Route 9 - SB</b>										
4T	T	1077	10.0	0.597	8.1	LOS A	187	0.75	0.69	28.5
4R	R	109	10.1	0.596	8.4	LOS A	187	0.75	0.71	27.0
<b>Approach</b>		<b>1186</b>	<b>10.0</b>	<b>0.597</b>	<b>8.2</b>	<b>LOS A</b>	<b>187</b>	<b>0.75</b>	<b>0.69</b>	<b>28.3</b>
<b>7 Exit 20 NB Ramp - EB</b>										
5L	L	528	10.0	0.983	40.3	LOS D	459	1.00	1.73	12.2
2R	R	166	1.2	0.483	13.7	LOS B	74	0.81	0.96	19.5
<b>Approach</b>		<b>696</b>	<b>7.9</b>	<b>0.983</b>	<b>33.9</b>	<b>LOS C</b>	<b>459</b>	<b>0.95</b>	<b>1.54</b>	<b>13.3</b>
<b>All Vehicles</b>		<b>2945</b>	<b>8.7</b>	<b>0.983</b>	<b>17.6</b>	<b>LOS B</b>	<b>459</b>	<b>0.89</b>	<b>1.05</b>	<b>22.1</b>

Symbols which may appear in this table:

Following Degree of Saturation  
 # x = 1.00 for Short Lane with resulting Excess Flow  
 \* x = 1.00 due to minimum capacity

Following LOS  
 # - Based on density for continuous movements

Following Queue  
 # - Density for continuous movement



Site: Rt 9/I-87 Exit 20 NB Ramp - Sat Peak - 2028 Build - Low Growth  
 F:\Projects\2008\08-081d exit 20\traffic\SIDRA\RT9EX20.aap  
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HCM Signalized Intersection Capacity Analysis  
 8: I-87 Exit 20 NB On/Off Ramp & US Route 9

10/24/2008



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↘	↙	↑	↑	↘
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	13	11	13	13	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1641	1669	1728	1785	1785	1419
Flt Permitted	0.95	1.00	0.05	1.00	1.00	1.00
Satd. Flow (perm)	1641	1669	91	1785	1785	1419
Volume (vph)	467	183	267	841	1074	107
Peak-hour factor, PHF	0.74	0.74	0.93	0.93	0.86	0.86
Adj. Flow (vph)	631	247	287	904	1249	124
RTOR Reduction (vph)	0	88	0	0	0	0
Lane Group Flow (vph)	631	159	287	904	1249	124
Heavy Vehicles (%)	10%	0%	1%	10%	10%	10%
Turn Type	Prot pm+pt			Free		
Protected Phases	3	3	6	1	5	
Permitted Phases				1 Free		
Actuated Green, G (s)	52.0	52.0	106.6	106.6	72.0	174.6
Effective Green, g (s)	56.0	56.0	110.6	110.6	76.0	174.6
Actuated g/C Ratio	0.32	0.32	0.63	0.63	0.44	1.00
Clearance Time (s)	8.0	8.0	8.0	8.0	8.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	526	535	345	1131	777	1419
v/s Ratio Prot	0.38	0.10	0.15	0.51	0.70	
v/s Ratio Perm				0.38 0.09		
v/c Ratio	1.20	0.30	0.83	0.80	1.61	0.09
Uniform Delay, d1	59.3	44.5	65.8	23.8	49.3	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	107.1	0.3	15.6	4.0	279.4	0.1
Delay (s)	166.4	44.8	81.4	27.8	328.7	0.1
Level of Service	F	D	F	C	F	A
Approach Delay (s)	132.2			40.7	299.0	
Approach LOS	F			D	F	

Intersection Summary

HCM Average Control Delay	167.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	174.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	113.2%	ICU Level of Service	H
Analysis Period (min)	15		
c - Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
 8: I-87 Exit 20 NB On/Off Ramp & US Route 9

12/1/2008



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙↘	↗	↙	↑	↑↘	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	13	11	13	13	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	0.99	
Frt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3183	1669	1728	1785	3345	
Frt Permitted	0.95	1.00	0.08	1.00	1.00	
Satd. Flow (perm)	3183	1669	140	1785	3345	
Volume (vph)	467	183	267	841	1074	107
Peak-hour factor, PHF	0.74	0.74	0.93	0.93	0.86	0.86
Adj. Flow (vph)	631	247	287	904	1249	124
RTOR Reduction (vph)	0	11	0	0	6	0
Lane Group Flow (vph)	631	236	287	904	1367	0
Heavy Vehicles (%)	10%	0%	1%	10%	10%	10%
Turn Type		pm+ov	pm+pt			
Protected Phases	3	6	6	1	5	
Permitted Phases		3	1			
Actuated Green, G (s)	26.0	43.4	69.5	69.5	47.1	
Effective Green, g (s)	27.0	45.4	70.5	70.5	48.1	
Actuated g/C Ratio	0.26	0.43	0.67	0.67	0.46	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	815	782	371	1193	1525	
v/s Ratio Prot	0.20	0.05	0.14	0.51	0.41	
v/s Ratio Perm		0.09	0.38			
v/c Ratio	0.77	0.30	0.77	0.76	0.90	
Uniform Delay, d1	36.4	19.7	32.4	11.8	26.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.6	0.2	9.7	2.8	7.3	
Delay (s)	41.0	19.9	42.0	14.6	33.7	
Level of Service	D	B	D	B	C	
Approach Delay (s)	35.1			21.2	33.7	
Approach LOS	D			C	C	

Intersection Summary

HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	105.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
Critical Lane Group			

# Movement Summary

## Rt 9/I-87 Exit 20 NB Ramp

### 2028 Build - Saturday Peak Hour - High Growth

Roundabout

### Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
<b>Route 9 - NB</b>										
3L	L	287	1.0	0.864	21.6	LOS C	320	0.98	1.28	20.4
8T	T	904	10.0	0.863	16.9	LOS B	320	0.97	1.21	25.0
<b>Approach</b>		<b>1191</b>	<b>7.8</b>	<b>0.864</b>	<b>18.0</b>	<b>LOS B</b>	<b>320</b>	<b>0.97</b>	<b>1.23</b>	<b>23.6</b>
<b>Route 9 - SB</b>										
4T	T	1249	10.0	0.697	9.8	LOS A	271	0.85	0.80	28.0
4R	R	124	9.7	0.697	10.0	LOS B	271	0.85	0.79	26.5
<b>Approach</b>		<b>1373</b>	<b>10.0</b>	<b>0.697</b>	<b>9.8</b>	<b>LOS A</b>	<b>271</b>	<b>0.85</b>	<b>0.80</b>	<b>27.8</b>
<b>7 Exit 20 NB Ramp - EB</b>										
5L	L	631	10.0	1.003	49.1	LOS D	457	1.00	1.76	10.8
2R	R	247	0.8	1.004	40.8	LOS D	457	1.00	1.79	10.8
<b>Approach</b>		<b>878</b>	<b>7.4</b>	<b>1.003</b>	<b>46.8</b>	<b>LOS D</b>	<b>457</b>	<b>1.00</b>	<b>1.77</b>	<b>10.8</b>
<b>All Vehicles</b>		<b>3442</b>	<b>8.6</b>	<b>1.004</b>	<b>22.1</b>	<b>LOS C</b>	<b>457</b>	<b>0.93</b>	<b>1.19</b>	<b>20.2</b>

Symbols which may appear in this table:

Following Degree of Saturation  
 # x = 1.00 for Short Lane with resulting Excess Flow  
 \* x = 1.00 due to minimum capacity

Following LOS  
 # - Based on density for continuous movements

Following Queue  
 # - Density for continuous movement



SIDRA SOLUTIONS

Site: Rt 9/I-87 Exit 20 NB Ramp - Sat Peak - 2028 Build - High Growth  
 F:\Projects\2008\08-081d exit 20\traffic\SIDRA\RT9EX20.aap  
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A1763, Creighton Manning Engineering, Small Office  
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## **Back Access Alternative Level of Service**

# Movement Summary

## Route 9/Route 149/Parking Lot

### 2028 Build - Saturday Peak Hour - Low Growth - Back Access

Roundabout

#### Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
<b>Route 9 - NB</b>										
3L	L	11	8.3	0.522	11.9	LOS B	146	0.59	0.68	27.0
8T	T	589	10.0	0.524	6.8	LOS A	146	0.59	0.56	31.0
8R	R	343	9.9	0.364	8.7	LOS A	83	0.52	0.62	30.5
<b>Approach</b>		<b>944</b>	<b>10.0</b>	<b>0.523</b>	<b>7.6</b>	<b>LOS A</b>	<b>146</b>	<b>0.56</b>	<b>0.58</b>	<b>30.8</b>
<b>Route 149 - WB</b>										
1L	L	318	10.0	0.445	17.8	LOS B	112	0.83	0.92	27.1
6T	T	1	50.0	0.500	9.2	LOS A	112	0.83	0.89	30.2
6R	R	239	10.0	0.383	12.3	LOS B	85	0.80	0.87	29.6
<b>Approach</b>		<b>561</b>	<b>10.2</b>	<b>0.445</b>	<b>15.5</b>	<b>LOS B</b>	<b>112</b>	<b>0.82</b>	<b>0.90</b>	<b>28.1</b>
<b>Route 9 - SB</b>										
7L	L	172	9.9	0.485	15.1	LOS B	124	0.71	0.78	28.1
4T	T	678	10.0	0.485	8.1	LOS A	124	0.71	0.67	31.1
4R	R	19	5.0	0.465	8.4	LOS A	116	0.71	0.72	30.1
<b>Approach</b>		<b>870</b>	<b>9.9</b>	<b>0.484</b>	<b>9.5</b>	<b>LOS A</b>	<b>124</b>	<b>0.71</b>	<b>0.69</b>	<b>30.4</b>
<b>Parking Lot Drwy - EB</b>										
5L	L	6	14.3	0.113	16.7	LOS B	16	0.73	0.91	23.3
2T	T	9	10.0	0.114	9.4	LOS A	16	0.73	0.81	25.7
2R	R	28	3.4	0.114	10.5	LOS B	16	0.73	0.75	25.2
<b>Approach</b>		<b>46</b>	<b>6.5</b>	<b>0.114</b>	<b>11.2</b>	<b>LOS B</b>	<b>16</b>	<b>0.73</b>	<b>0.79</b>	<b>25.0</b>
<b>All Vehicles</b>		<b>2421</b>	<b>9.9</b>	<b>0.524</b>	<b>10.2</b>	<b>LOS B</b>	<b>146</b>	<b>0.68</b>	<b>0.70</b>	<b>29.8</b>

Symbols which may appear in this table:

Following Degree of Saturation

# x = 1.00 for Short Lane with resulting Excess Flow

\* x = 1.00 due to minimum capacity

Following LOS

# - Based on density for continuous movements

Following Queue

# - Density for continuous movement

# Movement Summary

## Route 9/Route 149/Parking Lot

### 2028 Build - Saturday Peak Hour - High Growth - Back Access

Roundabout

#### Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
<b>Route 9 - NB</b>										
3L	L	11	8.3	0.545	11.9	LOS B	158	0.61	0.68	26.9
8T	T	621	10.0	0.551	6.9	LOS A	158	0.61	0.57	30.9
8R	R	354	9.9	0.377	8.7	LOS A	87	0.53	0.62	30.4
<b>Approach</b>		<b>986</b>	<b>9.9</b>	<b>0.550</b>	<b>7.6</b>	<b>LOS A</b>	<b>158</b>	<b>0.58</b>	<b>0.59</b>	<b>30.7</b>
<b>Route 149 - WB</b>										
1L	L	334	9.9	0.484	18.9	LOS B	130	0.86	0.96	26.6
6T	T	1	50.0	0.500	10.2	LOS B	130	0.86	0.95	29.6
6R	R	239	10.0	0.405	13.2	LOS B	93	0.83	0.91	29.0
<b>Approach</b>		<b>576</b>	<b>10.1</b>	<b>0.484</b>	<b>16.5</b>	<b>LOS B</b>	<b>130</b>	<b>0.85</b>	<b>0.94</b>	<b>27.5</b>
<b>Route 9 - SB</b>										
7L	L	172	9.9	0.517	15.5	LOS B	140	0.75	0.81	28.0
4T	T	717	10.0	0.517	8.5	LOS A	140	0.74	0.71	31.0
4R	R	19	5.0	0.500	8.9	LOS A	130	0.74	0.75	29.9
<b>Approach</b>		<b>909</b>	<b>9.9</b>	<b>0.517</b>	<b>9.8</b>	<b>LOS A</b>	<b>140</b>	<b>0.74</b>	<b>0.73</b>	<b>30.3</b>
<b>Parking Lot Drwy - EB</b>										
5L	L	6	14.3	0.121	17.2	LOS B	18	0.74	0.92	23.2
2T	T	9	10.0	0.120	9.9	LOS A	18	0.74	0.82	25.5
2R	R	28	3.4	0.120	10.9	LOS B	18	0.74	0.76	25.0
<b>Approach</b>		<b>46</b>	<b>6.5</b>	<b>0.120</b>	<b>11.7</b>	<b>LOS B</b>	<b>18</b>	<b>0.74</b>	<b>0.80</b>	<b>24.8</b>
<b>All Vehicles</b>		<b>2517</b>	<b>9.9</b>	<b>0.551</b>	<b>10.5</b>	<b>LOS B</b>	<b>158</b>	<b>0.70</b>	<b>0.72</b>	<b>29.6</b>

Symbols which may appear in this table:

Following Degree of Saturation  
 # x = 1.00 for Short Lane with resulting Excess Flow  
 \* x = 1.00 due to minimum capacity

Following LOS  
 # - Based on density for continuous movements

Following Queue  
 # - Density for continuous movement

HCM Unsignalized Intersection Capacity Analysis  
 23: Gap Driveway & US Route 9

2/24/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↙	↘		↙	↘	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	35	0	35	16	0	83	32	690	58	18	747	18
Peak Hour Factor	0.77	0.77	0.77	0.85	0.85	0.85	0.91	0.91	0.91	0.90	0.90	0.90
Hourly flow rate (vph)	45	0	45	19	0	98	35	758	64	20	830	20
Pedestrians		15			15			60			60	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			1			5			5	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		1			1							
Upstream signal (ft)								1118				
pX, platoon unblocked	0.86	0.86		0.86	0.86	0.86				0.86		
vC, conflicting volume	1881	1802	915	1851	1780	865	865			837		
vC1, stage 1 conf vol	895	895		875	875							
vC2, stage 2 conf vol	986	907		975	905							
vCu, unblocked vol	2019	1928	915	1984	1902	844	865			811		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
fF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	53	100	85	84	100	67	95			97		
cM capacity (veh/h)	96	162	313	121	164	293	777			678		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	91	116	35	822	20	850
Volume Left	45	19	35	0	20	0
Volume Right	45	98	0	64	0	20
cSH	147	239	777	1700	678	1700
Volume to Capacity	0.62	0.49	0.05	0.48	0.03	0.50
Queue Length 95th (ft)	82	62	4	0	2	0
Control Delay (s)	62.4	33.7	9.9	0.0	10.5	0.0
Lane LOS	F	D	A		B	
Approach Delay (s)	62.4	33.7	0.4		0.2	
Approach LOS	F	D				

Intersection Summary						
Average Delay			5.2			
Intersection Capacity Utilization		60.3%		ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 23: Gap Driveway & US Route 9

2/24/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↖	↗		↖	↗	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	35	0	35	16	0	83	32	729	58	18	794	18
Peak Hour Factor	0.77	0.77	0.77	0.85	0.85	0.85	0.91	0.91	0.91	0.90	0.90	0.90
Hourly flow rate (vph)	45	0	45	19	0	98	35	801	64	20	882	20
Pedestrians		15			15			60			60	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			1			5			5	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage (veh)		1			1							
Upstream signal (ft)								1118				
pX, platoon unblocked	0.89	0.89		0.89	0.89	0.89				0.89		
vC, conflicting volume	1976	1897	967	1946	1876	908	917			880		
vC1, stage 1 conf vol	947	947		918	918							
vC2, stage 2 conf vol	1029	950		1028	957							
vCu, unblocked vol	2099	2010	967	2064	1985	896	917			865		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	49	100	84	83	100	65	95			97		
cM capacity (veh/h)	90	155	292	112	155	281	743			665		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	91	116	35	865	20	902						
Volume Left	45	19	35	0	20	0						
Volume Right	45	98	0	64	0	20						
cSH	137	226	743	1700	665	1700						
Volume to Capacity	0.66	0.52	0.05	0.51	0.03	0.53						
Queue Length 95th (ft)	91	67	4	0	2	0						
Control Delay (s)	71.9	36.8	10.1	0.0	10.6	0.0						
Lane LOS	F	E	B		B							
Approach Delay (s)	71.9	36.8	0.4		0.2							
Approach LOS	F	E										
<b>Intersection Summary</b>												
Average Delay			5.6									
Intersection Capacity Utilization			62.7%		ICU Level of Service				B			
Analysis Period (min)			15									

# Movement Summary

## Rt 9/I-87 Exit 20 NB Ramp

### 2028 Build - Saturday Peak Hour - Low Growth - Back Access

Roundabout

#### Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	Mean Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
<b>Route 9 - NB</b>										
3L	L	273	1.1	0.740	20.1	LOS C	101	1.00	1.13	20.9
8T	T	617	10.0	0.740	15.2	LOS B	101	0.99	1.10	25.9
8R	R	173	1.7	0.718	15.6	LOS B	91	0.99	1.09	24.0
<b>Approach</b>		<b>1063</b>	<b>6.4</b>	<b>0.740</b>	<b>16.5</b>	<b>LOS B</b>	<b>101</b>	<b>0.99</b>	<b>1.11</b>	<b>24.0</b>
<b>Back Access Rd - WB</b>										
1L	L	185	2.2	0.663	27.1	LOS C	47	0.91	1.14	20.1
6T	T	37	2.7	0.661	18.6	LOS B	47	0.91	1.10	20.8
6R	R	1	50.0	0.667	20.8	LOS C	47	0.91	1.10	21.2
<b>Approach</b>		<b>224</b>	<b>2.7</b>	<b>0.663</b>	<b>25.7</b>	<b>LOS C</b>	<b>47</b>	<b>0.91</b>	<b>1.14</b>	<b>20.2</b>
<b>Route 9 - SB</b>										
7L	L	1	50.0	0.667	16.6	LOS B	59	0.84	1.01	23.0
4T	T	879	10.0	0.592	11.5	LOS B	60	0.84	0.91	27.6
4R	R	70	10.0	0.593	11.6	LOS B	60	0.84	0.91	25.7
<b>Approach</b>		<b>951</b>	<b>10.1</b>	<b>0.592</b>	<b>11.5</b>	<b>LOS B</b>	<b>60</b>	<b>0.84</b>	<b>0.91</b>	<b>27.4</b>
<b>I-87 Exit 20 NB Ramp - EB</b>										
5L	L	374	9.9	0.966	38.7	LOS D	154	1.00	1.67	12.6
2T	T	154	1.9	0.969	29.9	LOS C	154	1.00	1.68	11.4
2R	R	166	1.2	0.483	14.2	LOS B	25	0.80	0.96	19.2
<b>Approach</b>		<b>695</b>	<b>6.0</b>	<b>0.966</b>	<b>30.8</b>	<b>LOS C</b>	<b>154</b>	<b>0.95</b>	<b>1.50</b>	<b>13.4</b>
<b>All Vehicles</b>		<b>2933</b>	<b>7.2</b>	<b>0.969</b>	<b>19.0</b>	<b>LOS B</b>	<b>154</b>	<b>0.93</b>	<b>1.14</b>	<b>21.6</b>

Symbols which may appear in this table:

Following Degree of Saturation  
 # x = 1.00 for Short Lane with resulting Excess Flow  
 \* x = 1.00 due to minimum capacity

Following LOS  
 # - Based on density for continuous movements

Following Queue  
 # - Density for continuous movement

# Movement Summary

## Rt 9/I-87 Exit 20 NB Ramp

### 2028 Build - Saturday Peak Hour - High Growth - Back Access

Roundabout

#### Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	Mean Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
<b>Route 9 - NB</b>										
3L	L	287	1.0	0.844	20.6	LOS C	101	0.96	1.24	20.8
8T	T	687	10.0	0.844	15.5	LOS B	101	0.96	1.18	25.7
8R	R	217	1.8	0.838	16.6	LOS B	100	0.96	1.18	24.9
<b>Approach</b>		<b>1191</b>	<b>6.4</b>	<b>0.844</b>	<b>16.9</b>	<b>LOS B</b>	<b>101</b>	<b>0.96</b>	<b>1.19</b>	<b>24.1</b>
<b>Back Access Road - WB</b>										
1L	L	251	2.0	0.896	43.9	LOS D	90	0.97	1.44	16.3
6T	T	45	2.2	0.900	35.3	LOS D	90	0.97	1.43	16.3
6R	R	1	50.0	1.000	37.6	LOS D	90	0.97	1.39	16.8
<b>Approach</b>		<b>298</b>	<b>2.3</b>	<b>0.897</b>	<b>42.5</b>	<b>LOS D</b>	<b>90</b>	<b>0.97</b>	<b>1.44</b>	<b>16.3</b>
<b>Route 9 - SB</b>										
7L	L	1	50.0	0.667	21.2	LOS C	90	0.94	1.13	20.8
4T	T	980	10.0	0.714	15.9	LOS B	93	0.94	1.10	24.6
4R	R	77	10.4	0.713	15.9	LOS B	93	0.94	1.09	22.9
<b>Approach</b>		<b>1059</b>	<b>10.1</b>	<b>0.714</b>	<b>15.9</b>	<b>LOS B</b>	<b>93</b>	<b>0.94</b>	<b>1.10</b>	<b>24.5</b>
<b>I-87 Exit 20 NB Ramp - EB</b>										
5L	L	428	10.0	0.991	50.8	LOS D	162	1.00	1.73	10.5
2T	T	203	2.0	0.990	38.5	LOS D	162	1.00	1.77	9.7
2R	R	247	0.8	0.992	41.1	LOS D	162	1.00	1.77	10.8
<b>Approach</b>		<b>879</b>	<b>5.6</b>	<b>0.992</b>	<b>45.3</b>	<b>LOS D</b>	<b>162</b>	<b>1.00</b>	<b>1.75</b>	<b>10.4</b>
<b>All Vehicles</b>		<b>3427</b>	<b>7.0</b>	<b>1.000</b>	<b>26.1</b>	<b>LOS C</b>	<b>162</b>	<b>0.97</b>	<b>1.33</b>	<b>18.7</b>

Symbols which may appear in this table:

Following Degree of Saturation

# x = 1.00 for Short Lane with resulting Excess Flow

\* x = 1.00 due to minimum capacity

Following LOS

# - Based on density for continuous movements

Following Queue

# - Density for continuous movement



**Southern Corridor Study Area Intersection Level of Service**

HCM Unsignalized Intersection Capacity Analysis  
 1: Gurney Ln (Route 149) & I-87 SB Off Ramp

2/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	293	38	467	266	0	0	0	0	253	0	148
Peak Hour Factor	0.69	0.69	0.69	0.88	0.88	0.88	0.92	0.92	0.92	0.83	0.83	0.83
Hourly flow rate (vph)	0	425	55	531	302	0	0	0	0	305	0	178
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)					1030							
pX, platoon unblocked	0.99						0.99	0.99		0.99	0.99	0.99
vC, conflicting volume	302			480			1994	1816	452	1816	1843	302
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	296			480			2004	1824	452	1824	1851	296
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			50			100	100	100	0	100	76
cM capacity (veh/h)	1254			1067			20	38	607	36	37	741
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	480	833	305	178								
Volume Left	0	531	305	0								
Volume Right	55	0	0	178								
cSH	1700	1067	36	741								
Volume to Capacity	0.28	0.50	8.49	0.24								
Queue Length 95th (ft)	0	71	Err	23								
Control Delay (s)	0.0	10.0	Err	11.4								
Lane LOS		A	F	B								
Approach Delay (s)	0.0	10.0	6312.8									
Approach LOS			F									
<b>Intersection Summary</b>												
Average Delay			1703.0									
Intersection Capacity Utilization			81.6%		ICU Level of Service					D		
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

1: Gurney Ln (Route 149) & I-87 Exit 20 SB Off Ramp

2/23/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖			↖					↖		↖
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	293	38	467	266	0	0	0	0	253	0	148
Peak Hour Factor	0.69	0.69	0.69	0.88	0.88	0.88	0.92	0.92	0.92	0.83	0.83	0.83
Hourly flow rate (vph)	0	425	55	531	302	0	0	0	0	305	0	178
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total (vph)	480	833	305	178								
Volume Left (vph)	0	531	305	0								
Volume Right (vph)	55	0	0	178								
Hadj (s)	-0.05	0.19	0.53	-0.70								
Departure Headway (s)	6.4	6.6	7.9	6.7								
Degree Utilization, x	0.86	1.53	0.67	0.33								
Capacity (veh/h)	547	547	441	525								
Control Delay (s)	36.5	266.2	24.6	11.8								
Approach Delay (s)	36.5	266.2	19.9									
Approach LOS	E	F	C									

## Intersection Summary

Delay	138.6			
HCM Level of Service	F			
Intersection Capacity Utilization	81.6%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis  
 1: Gurney Ln (Route 149) & I-87 Exit 20 SB Off Ramp

2/23/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖		↗	↖					↗		↖
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0		4.0
Lane Util. Factor		1.00		1.00	1.00					1.00		1.00
Flt		0.98		1.00	1.00					1.00		0.85
Flt Protected		1.00		0.95	1.00					0.95		1.00
Satd. Flow (prot)		1850		1719	1881					1770		1615
Flt Permitted		1.00		0.18	1.00					0.95		1.00
Satd. Flow (perm)		1850		323	1881					1770		1615
Volume (vph)	0	293	38	467	266	0	0	0	0	253	0	148
Peak-hour factor, PHF	0.69	0.69	0.69	0.88	0.88	0.88	0.92	0.92	0.92	0.83	0.83	0.83
Adj. Flow (vph)	0	425	55	531	302	0	0	0	0	305	0	178
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	0	140
Lane Group Flow (vph)	0	473	0	531	302	0	0	0	0	305	0	38
Heavy Vehicles (%)	2%	1%	2%	5%	1%	2%	2%	2%	2%	2%	2%	0%
Turn Type				pm+pt						custom		custom
Protected Phases		6		5	2							
Permitted Phases				2						4		4
Actuated Green, G (s)		22.1		46.2	46.2					14.2		14.2
Effective Green, g (s)		23.1		47.2	47.2					15.2		15.2
Actuated g/C Ratio		0.33		0.67	0.67					0.22		0.22
Clearance Time (s)		5.0		5.0	5.0					5.0		5.0
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		607		615	1261					382		349
v/s Ratio Prot		0.26		c0.25	0.16							
v/s Ratio Perm				c0.33						c0.17		0.02
v/c Ratio		0.78		0.86	0.24					0.80		0.11
Uniform Delay, d1		21.4		15.0	4.6					26.1		22.2
Progression Factor		1.00		1.00	1.00					1.00		1.00
Incremental Delay, d2		6.3		12.0	0.1					11.1		0.1
Delay (s)		27.6		27.0	4.7					37.2		22.3
Level of Service		C		C	A					D		C
Approach Delay (s)		27.6			18.9			0.0			31.7	
Approach LOS		C			B			A			C	

Intersection Summary

HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	70.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

1: Gurney Ln (Route 149) & I-87 Exit 20 SB Off Ramp

2/23/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↑							↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0							4.0
Lane Util. Factor		1.00	1.00		1.00							1.00
Fr <sub>t</sub>		1.00	0.85		1.00							0.86
Fl <sub>t</sub> Protected		1.00	1.00		1.00							1.00
Satd. Flow (prot)		1881	1583		1881							1644
Fl <sub>t</sub> Permitted		1.00	1.00		1.00							1.00
Satd. Flow (perm)		1881	1583		1881							1644
Volume (vph)	0	546	505	0	733	0	0	0	0	0	0	401
Peak-hour factor, PHF	0.69	0.69	0.69	0.88	0.88	0.88	0.92	0.92	0.92	0.83	0.83	0.83
Adj. Flow (vph)	0	791	732	0	833	0	0	0	0	0	0	483
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	109
Lane Group Flow (vph)	0	791	732	0	833	0	0	0	0	0	0	374
Heavy Vehicles (%)	2%	1%	2%	5%	1%	2%	2%	2%	2%	2%	2%	0%
Turn Type			Free									custom
Protected Phases		6 4			2							
Permitted Phases			Free									4
Actuated Green, G (s)		51.6	51.6		26.5							15.1
Effective Green, g (s)		51.6	51.6		27.5							16.1
Actuated g/C Ratio		1.00	1.00		0.53							0.31
Clearance Time (s)					5.0							5.0
Vehicle Extension (s)					3.0							3.0
Lane Grp Cap (vph)		1881	1583		1002							513
v/s Ratio Prot		0.42			0.44							
v/s Ratio Perm			0.46									0.23
v/c Ratio		0.42	0.46		0.83							0.73
Uniform Delay, d1		0.0	0.0		10.1							15.8
Progression Factor		1.00	1.00		1.00							1.00
Incremental Delay, d2		0.2	1.0		6.0							5.2
Delay (s)		0.2	1.0		16.1							21.0
Level of Service		A	A		B							C
Approach Delay (s)		0.5			16.1			0.0			21.0	
Approach LOS		A			B			A			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			8.6			HCM Level of Service				A		
HCM Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			51.6			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			70.1%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 1: Gurney Ln (Route 149) & I-87 Exit 20 SB Off Ramp

2/23/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖			↖			↑		↖	↓	↖
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	395	43	579	362	0	0	0	0	287	0	150
Peak Hour Factor	0.69	0.69	0.69	0.88	0.88	0.88	0.92	0.92	0.92	0.83	0.83	0.83
Hourly flow rate (vph)	0	572	62	658	411	0	0	0	0	346	0	181
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)					1030							
pX, platoon unblocked	0.93						0.93	0.93		0.93	0.93	0.93
vC, conflicting volume	411			635			2512	2331	604	2331	2362	411
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	368			635			2623	2429	604	2429	2463	368
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			30			100	100	100	0	100	72
cM capacity (veh/h)	1109			934			5	9	499	9	8	635

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	635	1069	346	181
Volume Left	0	658	346	0
Volume Right	62	0	0	181
cSH	1700	934	9	635
Volume to Capacity	0.37	0.70	39.45	0.28
Queue Length 95th (ft)	0	152	Err	29
Control Delay (s)	0.0	17.0	Err	12.9
Lane LOS		C	F	B
Approach Delay (s)	0.0	17.0	6571.3	
Approach LOS			F	

Intersection Summary

Average Delay	1559.2
Intersection Capacity Utilization	100.4%
Analysis Period (min)	15
ICU Level of Service	G

# HCM Unsignalized Intersection Capacity Analysis

1: Gurney Ln (Route 149) & I-87 Exit 20 SB Off Ramp

2/23/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖			↖					↖		↖
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	395	43	579	362	0	0	0	0	287	0	150
Peak Hour Factor	0.69	0.69	0.69	0.88	0.88	0.88	0.92	0.92	0.92	0.83	0.83	0.83
Hourly flow rate (vph)	0	572	62	658	411	0	0	0	0	346	0	181
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total (vph)	635	1069	346	181								
Volume Left (vph)	0	658	346	0								
Volume Right (vph)	62	0	0	181								
Hadj (s)	-0.03	0.18	0.53	-0.70								
Departure Headway (s)	6.6	6.8	8.1	6.9								
Degree Utilization, x	1.17	2.03	0.78	0.35								
Capacity (veh/h)	547	535	437	518								
Control Delay (s)	117.7	486.6	33.2	12.3								
Approach Delay (s)	117.7	486.6	26.0									
Approach LOS	F	F	D									

## Intersection Summary

Delay	272.9		
HCM Level of Service	F		
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		

# HCM Signalized Intersection Capacity Analysis

1: Gurney Ln (Route 149) & I-87 Exit 20 SB Off Ramp

2/23/2009

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0		4.0	4.0					4.0		4.0	
Lane Util. Factor		1.00		0.95	0.95					1.00		1.00	
Fr <sub>t</sub>		0.99		1.00	1.00					1.00		0.85	
Fl <sub>t</sub> Protected		1.00		0.95	0.99					0.95		1.00	
Satd. Flow (prot)		1840		1633	1746					1770		1615	
Fl <sub>t</sub> Permitted		1.00		0.95	0.99					0.95		1.00	
Satd. Flow (perm)		1840		1633	1746					1770		1615	
Volume (vph)	0	395	43	579	362	0	0	0	0	287	0	150	
Peak-hour factor, PHF	0.69	0.80	0.80	0.92	0.92	0.88	0.92	0.92	0.92	0.83	0.83	0.83	
Adj. Flow (vph)	0	494	54	629	393	0	0	0	0	346	0	181	
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	140	
Lane Group Flow (vph)	0	544	0	488	534	0	0	0	0	346	0	41	
Heavy Vehicles (%)	2%	2%	1%	5%	1%	2%	2%	2%	2%	2%	2%	0%	
Turn Type				Split						custom		custom	
Protected Phases		6		2	2								
Permitted Phases										4		4	
Actuated Green, G (s)		26.5		27.6	27.6					18.9		18.9	
Effective Green, g (s)		27.5		28.6	28.6					19.9		19.9	
Actuated g/C Ratio		0.31		0.33	0.33					0.23		0.23	
Clearance Time (s)		5.0		5.0	5.0					5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0	
Lane Grp Cap (vph)		575		531	567					400		365	
v/s Ratio Prot		c0.30		0.30	c0.31								
v/s Ratio Perm										c0.20		0.03	
v/c Ratio		0.95		0.92	0.94					0.86		0.11	
Uniform Delay, d1		29.5		28.6	28.9					32.8		27.0	
Progression Factor		1.00		1.00	1.00					1.00		1.00	
Incremental Delay, d2		24.6		20.9	24.2					17.4		0.1	
Delay (s)		54.1		49.5	53.0					50.2		27.2	
Level of Service		D		D	D					D		C	
Approach Delay (s)		54.1			51.4			0.0			42.3		
Approach LOS		D			D			A			D		

## Intersection Summary

HCM Average Control Delay	49.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	88.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

1: Gurney Ln (Route 149) & I-87 Exit 20 SB Off Ramp

2/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↑							↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0							4.0
Lane Util. Factor		1.00	1.00		1.00							1.00
Fr't		1.00	0.85		1.00							0.86
Flt Protected		1.00	1.00		1.00							1.00
Satd. Flow (prot)		1863	1599		1881							1644
Flt Permitted		1.00	1.00		1.00							1.00
Satd. Flow (perm)		1863	1599		1881							1644
Volume (vph)	0	682	622	0	941	0	0	0	0	0	0	437
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	741	676	0	1023	0	0	0	0	0	0	475
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	71
Lane Group Flow (vph)	0	741	676	0	1023	0	0	0	0	0	0	404
Heavy Vehicles (%)	2%	2%	1%	5%	1%	2%	2%	2%	2%	2%	2%	0%
Turn Type			Free									custom
Protected Phases		6.4			2							
Permitted Phases			Free									4
Actuated Green, G (s)		58.4	58.4		32.3							16.1
Effective Green, g (s)		58.4	58.4		33.3							17.1
Actuated g/C Ratio		1.00	1.00		0.57							0.29
Clearance Time (s)					5.0							5.0
Vehicle Extension (s)					3.0							3.0
Lane Grp Cap (vph)		1863	1599		1073							481
v/s Ratio Prot		0.40			0.54							
v/s Ratio Perm			0.42									0.25
v/c Ratio		0.40	0.42		0.95							0.84
Uniform Delay, d1		0.0	0.0		11.8							19.4
Progression Factor		1.00	1.00		1.00							1.00
Incremental Delay, d2		0.1	0.8		17.3							12.5
Delay (s)		0.1	0.8		29.1							31.9
Level of Service		A	A		C							C
Approach Delay (s)		0.5			29.1			0.0			31.9	
Approach LOS		A			C			A			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			15.6			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			58.4			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			83.3%			ICU Level of Service				E		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 2: Gurney Ln (Route 149) & US Route 9

10/24/2008

	↖		→		↗		↖		←		↗		↖		↑		↗		↖		↓		↗		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↖	↗		↖	↗	↖	↗	↖	↗	↖	↗		↖	↗		↖	↗	↖	↗	↖	↗	↖	↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected		0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)		1798	1615		1873	1615	1805	1881	1615	1805	1881	1599		1798	1615		1873	1615	1805	1881	1615	1805	1881	1599	
Flt Permitted		0.72	1.00		0.92	1.00	0.14	1.00	1.00	0.15	1.00	1.00		0.72	1.00		0.92	1.00	0.14	1.00	1.00	0.15	1.00	1.00	
Satd. Flow (perm)		1360	1615		1740	1615	275	1881	1615	293	1881	1599		1360	1615		1740	1615	275	1881	1615	293	1881	1599	
Volume (vph)	182	13	263	6	15	14	310	820	12	13	681	433	182	13	263	6	15	14	310	820	12	13	681	433	
Peak-hour factor, PHF	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	198	14	286	7	17	16	337	891	13	14	740	471	198	14	286	7	17	16	337	891	13	14	740	471	
RTOR Reduction (vph)	0	0	223	0	0	12	0	0	3	0	0	247	0	0	223	0	0	12	0	0	3	0	0	247	
Lane Group Flow (vph)	0	212	63	0	24	4	337	891	10	14	740	224	0	212	63	0	24	4	337	891	10	14	740	224	
Confl. Peds. (#/hr)									1	1											1	1			
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	1%	
Turn Type	Perm		Prot	Perm		Prot	pm+pt		Prot	Perm		Prot	Perm		Prot		Prot	pm+pt		Prot	Perm		Prot	Perm	
Protected Phases		3	3		7	7	1	6	6		2	2		3	3		7	7	1	6	6		2	2	
Permitted Phases	3			7			6			2			3			7			6			2			
Actuated Green, G (s)		19.6	19.6		19.6	19.6	64.3	64.3	64.3	43.7	43.7	43.7		19.6	19.6		19.6	19.6	64.3	64.3	64.3	43.7	43.7	43.7	
Effective Green, g (s)		20.6	20.6		20.6	20.6	65.3	65.3	65.3	44.7	44.7	44.7		20.6	20.6		20.6	20.6	65.3	65.3	65.3	44.7	44.7	44.7	
Actuated g/C Ratio		0.22	0.22		0.22	0.22	0.70	0.70	0.70	0.48	0.48	0.48		0.22	0.22		0.22	0.22	0.70	0.70	0.70	0.48	0.48	0.48	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	5.0	5.0	5.0	5.0	5.0		3.0	3.0		3.0	3.0	3.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)		298	354		382	354	462	1308	1123	139	895	761		298	354		382	354	462	1308	1123	139	895	761	
v/s Ratio Prot			0.04			0.00	0.13	0.47	0.01		0.39	0.14			0.04			0.00	0.13	0.47	0.01		0.39	0.14	
v/s Ratio Perm		0.16			0.01		0.38			0.05				0.16			0.01		0.38			0.05			
v/c Ratio		0.71	0.18		0.06	0.01	0.73	0.68	0.01	0.10	0.83	0.29		0.71	0.18		0.06	0.01	0.73	0.68	0.01	0.10	0.83	0.29	
Uniform Delay, d1		33.9	29.8		29.0	28.7	26.1	8.3	4.4	13.5	21.3	15.0		33.9	29.8		29.0	28.7	26.1	8.3	4.4	13.5	21.3	15.0	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		7.8	0.2		0.1	0.0	5.7	1.9	0.0	0.7	7.1	0.5		7.8	0.2		0.1	0.0	5.7	1.9	0.0	0.7	7.1	0.5	
Delay (s)		41.7	30.0		29.1	28.7	31.8	10.2	4.4	14.2	28.3	15.4		41.7	30.0		29.1	28.7	31.8	10.2	4.4	14.2	28.3	15.4	
Level of Service		D	C		C	C	C	B	A	B	C	B		D	C		C	C	C	B	A	B	C	B	
Approach Delay (s)		35.0			28.9			16.0		23.2				35.0			28.9			16.0		23.2			
Approach LOS		C			C			B		C				C			C			B		C			
<b>Intersection Summary</b>																									
HCM Average Control Delay			22.3																						
HCM Volume to Capacity ratio			0.75																						
Actuated Cycle Length (s)			93.9																						
Intersection Capacity Utilization			83.1%																						
Analysis Period (min)			15																						
c Critical Lane Group																									

# HCM Signalized Intersection Capacity Analysis

## 2: Gurney Ln (Route 149) & US Route 9

10/24/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1796	1615		1873	1615	1805	1881	1615	1805	1881	1599
Flt Permitted		0.72	1.00		0.91	1.00	0.08	1.00	1.00	0.09	1.00	1.00
Satd. Flow (perm)		1351	1615		1725	1615	148	1881	1615	166	1881	1599
Volume (vph)	287	13	294	6	15	14	357	849	12	13	731	594
Peak-hour factor, PHF	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	312	14	320	7	17	16	388	923	13	14	795	646
RTOR Reduction (vph)	0	0	230	0	0	12	0	0	3	0	0	349
Lane Group Flow (vph)	0	326	90	0	24	4	388	923	10	14	795	297
Confl. Peds. (#/hr)									1	1		
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	1%
Turn Type	Perm		Prot	Perm		Prot	pm+pt		Prot	Perm		Prot
Protected Phases		3	3		7	7	1	6	6		2	2
Permitted Phases	3			7			6			2		
Actuated Green, G (s)		29.3	29.3		29.3	29.3	68.9	68.9	68.9	48.7	48.7	48.7
Effective Green, g (s)		30.3	30.3		30.3	30.3	69.9	69.9	69.9	49.7	49.7	49.7
Actuated g/C Ratio		0.28	0.28		0.28	0.28	0.65	0.65	0.65	0.46	0.46	0.46
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)		378	452		483	452	344	1215	1043	76	864	734
v/s Ratio Prot			0.06			0.00	0.17	0.49	0.01		0.42	0.19
v/s Ratio Perm		0.24			0.01		0.56			0.08		
v/c Ratio		0.86	0.20		0.05	0.01	1.13	0.76	0.01	0.18	0.92	0.40
Uniform Delay, d1		37.0	29.7		28.4	28.1	39.5	13.3	6.8	17.3	27.4	19.4
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		18.0	0.2		0.0	0.0	87.8	3.3	0.0	2.4	15.4	0.8
Delay (s)		54.9	29.9		28.5	28.1	127.3	16.6	6.8	19.7	42.8	20.2
Level of Service		D	C		C	C	F	B	A	B	D	C
Approach Delay (s)		42.5			28.3			49.0			32.6	
Approach LOS		D			C			D			C	

### Intersection Summary

HCM Average Control Delay	40.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	108.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 2: Gurney Ln (Route 149) & US Route 9

10/24/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↖	↑	↗	↖	↖↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.95	
Frbp, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ftpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected		0.95	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1796	1615		1873	1615	1805	1881	1615	1805	3334	
Flt Permitted		0.72	1.00		0.91	1.00	0.09	1.00	1.00	0.09	1.00	
Satd. Flow (perm)		1351	1615		1725	1615	163	1881	1615	179	3334	
Volume (vph)	287	13	294	6	15	14	357	849	12	13	731	594
Peak-hour factor, PHF	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	312	14	320	7	17	16	388	923	13	14	795	646
RTOR Reduction (vph)	0	0	230	0	0	12	0	0	3	0	120	0
Lane Group Flow (vph)	0	326	90	0	24	4	388	923	10	14	1321	0
Confl. Peds. (#/hr)									1	1		
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	1%
Turn Type	Perm		Prot	Perm		Prot	pm+pt		Prot	Perm		
Protected Phases		3	3		7	7	1	6	6		2	
Permitted Phases	3			7			6			2		
Actuated Green, G (s)		28.8	28.8		28.8	28.8	67.3	67.3	67.3	41.5	41.5	
Effective Green, g (s)		29.8	29.8		29.8	29.8	68.3	68.3	68.3	42.5	42.5	
Actuated g/C Ratio		0.28	0.28		0.28	0.28	0.64	0.64	0.64	0.40	0.40	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)		379	454		484	454	442	1211	1040	72	1335	
v/s Ratio Prot			0.06			0.00	0.18	0.49	0.01		0.40	
v/s Ratio Perm	0.24			0.01		0.38				0.08		
v/c Ratio	0.86	0.20		0.05	0.01	0.88	0.76	0.01	0.19	0.99		
Uniform Delay, d1		36.2	29.1		27.8	27.5	37.2	13.2	6.8	20.7	31.6	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		17.7	0.2		0.0	0.0	17.6	3.4	0.0	2.8	22.0	
Delay (s)		53.9	29.3		27.9	27.5	54.8	16.6	6.8	23.4	53.6	
Level of Service		D	C		C	C	D	B	A	C	D	
Approach Delay (s)		41.7			27.7			27.7			53.3	
Approach LOS		D			C			C			D	

### Intersection Summary

HCM Average Control Delay	41.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	106.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
 14: Six Flags Dr & US Route 9

10/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↖	↗		↖	↗	↖	↗		↖	↗	↖	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)		1805	1615		1819	1599	1805	1851		1787	1863	1615	
Flt Permitted		0.72	1.00		0.55	1.00	0.12	1.00		0.08	1.00	1.00	
Satd. Flow (perm)		1371	1615		1043	1599	220	1851		158	1863	1615	
Volume (vph)	266	0	146	38	5	102	81	775	38	86	716	122	
Peak-hour factor, PHF	0.81	0.81	0.81	0.79	0.79	0.79	0.93	0.93	0.93	0.91	0.91	0.91	
Adj. Flow (vph)	328	0	180	48	6	129	87	833	41	95	787	134	
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	0	
Lane Group Flow (vph)	0	328	180	0	54	129	87	873	0	95	787	134	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	2%	0%	1%	2%	0%	
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		Free	
Protected Phases		3				7		1	6		5	2	
Permitted Phases	3		3	7		7	6			2		Free	
Actuated Green, G (s)		27.2	27.2			27.2	27.2	51.5	45.4		52.1	45.7	95.0
Effective Green, g (s)		28.2	28.2			28.2	28.2	54.5	47.4		55.1	47.7	95.0
Actuated g/C Ratio		0.30	0.30			0.30	0.30	0.57	0.50		0.58	0.50	1.00
Clearance Time (s)		5.0	5.0			5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0			3.0	3.0	3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		407	479			310	475	245	924		219	935	1615
v/s Ratio Prot							0.03	c0.47			c0.03	0.42	
v/s Ratio Perm		c0.24	0.11			0.05	0.08	0.18			0.22		c0.08
v/c Ratio		0.81	0.38			0.17	0.27	0.36	0.94		0.43	0.84	0.08
Uniform Delay, d1		30.9	26.4			24.8	25.5	15.4	22.6		18.6	20.4	0.0
Progression Factor		1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		11.1	0.5			0.3	0.3	0.9	17.8		1.4	7.2	0.1
Delay (s)		42.0	26.9			25.0	25.9	16.3	40.4		20.0	27.6	0.1
Level of Service		D	C			C	C	B	D		B	C	A
Approach Delay (s)		36.6				25.6		38.2			23.3		
Approach LOS		D				C		D			C		

Intersection Summary	
HCM Average Control Delay	31.3
HCM Volume to Capacity ratio	0.85
Actuated Cycle Length (s)	95.0
Intersection Capacity Utilization	79.3%
Analysis Period (min)	15
HCM Level of Service	C
Sum of lost time (s)	12.0
ICU Level of Service	D

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 14: Six Flags Dr & US Route 9

10/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↖	↖		↖	↖	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr't		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1805	1615		1819	1599	1805	1851		1787	1863	1615
Flt Permitted		0.72	1.00		0.51	1.00	0.15	1.00		0.08	1.00	1.00
Satd. Flow (perm)		1371	1615		969	1599	277	1851		152	1863	1615
Volume (vph)	266	0	146	38	5	102	81	775	38	86	716	122
Peak-hour factor, PHF	0.81	0.81	0.81	0.79	0.79	0.79	0.93	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	328	0	180	48	6	129	87	833	41	95	787	134
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	328	180	0	54	129	87	873	0	95	787	134
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	2%	0%	1%	2%	0%
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		Free
Protected Phases		3			7		1	6		5	2	
Permitted Phases	3		3	7		7	6			2		Free
Actuated Green, G (s)		29.7	29.7		29.7	29.7	61.7	55.3		62.3	55.6	107.7
Effective Green, g (s)		30.7	30.7		30.7	30.7	64.7	57.3		65.3	57.6	107.7
Actuated g/C Ratio		0.29	0.29		0.29	0.29	0.60	0.53		0.61	0.53	1.00
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		391	460		276	456	271	985		209	996	1615
v/s Ratio Prot							0.02	c0.47		c0.03	0.42	
v/s Ratio Perm		c0.24	0.11		0.06	0.08	0.17			0.24		c0.08
v/c Ratio		0.84	0.39		0.20	0.28	0.32	0.89		0.45	0.79	0.08
Uniform Delay, d1		36.2	31.0		29.2	29.9	15.4	22.3		19.3	20.2	0.0
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		14.5	0.6		0.3	0.3	0.7	9.9		1.6	4.6	0.1
Delay (s)		50.7	31.5		29.5	30.3	16.1	32.2		20.9	24.8	0.1
Level of Service		D	C		C	C	B	C		C	C	A
Approach Delay (s)		43.9			30.1			30.8			21.1	
Approach LOS		D			C			C			C	

### Intersection Summary

HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	107.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 14: Six Flags Dr & US Route 9

10/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↖	↗	↖	↗	↖	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1805	1615		1819	1599	1805	1852		1787	1863	1615
Flt Permitted		0.72	1.00		0.52	1.00	0.08	1.00		0.08	1.00	1.00
Satd. Flow (perm)		1371	1615		985	1599	161	1852		159	1863	1615
Volume (vph)	329	0	149	38	5	102	85	788	38	86	719	192
Peak-hour factor, PHF	0.81	0.81	0.81	0.79	0.79	0.79	0.93	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	406	0	184	48	6	129	91	847	41	95	790	211
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	406	184	0	54	129	91	887	0	95	790	211
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	2%	0%	1%	2%	0%
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		Free
Protected Phases		3			7		1	6		5	2	
Permitted Phases	3		3	7		7	6			2		Free
Actuated Green, G (s)		35.1	35.1		35.1	35.1	51.8	45.2		52.2	45.4	103.1
Effective Green, g (s)		36.1	36.1		36.1	36.1	54.8	47.2		55.2	47.4	103.1
Actuated g/C Ratio		0.35	0.35		0.35	0.35	0.53	0.46		0.54	0.46	1.00
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		480	565		345	560	207	848		208	857	1615
v/s Ratio Prot							0.03	c0.48		c0.03	0.42	
v/s Ratio Perm		c0.30	0.11		0.05	0.08	0.20			0.21		c0.13
v/c Ratio		0.85	0.33		0.16	0.23	0.44	1.05		0.46	0.92	0.13
Uniform Delay, d1		30.9	24.6		23.0	23.7	20.2	27.9		22.6	26.1	0.0
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		12.9	0.3		0.2	0.2	1.5	43.6		1.6	15.3	0.2
Delay (s)		43.8	24.9		23.2	23.9	21.7	71.5		24.2	41.4	0.2
Level of Service		D	C		C	C	C	E		C	D	A
Approach Delay (s)		37.9			23.7			66.9			32.0	
Approach LOS		D			C			E			C	

### Intersection Summary

HCM Average Control Delay	44.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	103.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 14: Six Flags Dr & US Route 9

10/24/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr <sub>t</sub>		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Fl <sub>t</sub> Protected		0.95	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1805	1615		1819	1599	1805	1852		1787	1863	1615
Fl <sub>t</sub> Permitted		0.72	1.00		0.48	1.00	0.10	1.00		0.07	1.00	1.00
Satd. Flow (perm)		1371	1615		907	1599	187	1852		134	1863	1615
Volume (vph)	329	0	149	38	5	102	85	788	38	86	719	192
Peak-hour factor, PHF	0.81	0.81	0.81	0.79	0.79	0.79	0.93	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	406	0	184	48	6	129	91	847	41	95	790	211
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	406	184	0	54	129	91	887	0	95	790	211
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	2%	0%	1%	2%	0%
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		Free
Protected Phases		3			7		1	6		5	2	
Permitted Phases	3		3	7		7	6			2		Free
Actuated Green, G (s)		37.0	37.0		37.0	37.0	60.9	54.1		61.3	54.3	114.1
Effective Green, g (s)		38.0	38.0		38.0	38.0	63.9	56.1		64.3	56.3	114.1
Actuated g/C Ratio		0.33	0.33		0.33	0.33	0.56	0.49		0.56	0.49	1.00
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		457	538		302	533	215	911		191	919	1615
v/s Ratio Prot							0.03	c0.48		c0.03	0.42	
v/s Ratio Perm		c0.30	0.11		0.06	0.08	0.21			0.25		c0.13
v/c Ratio		0.89	0.34		0.18	0.24	0.42	0.97		0.50	0.86	0.13
Uniform Delay, d <sub>1</sub>		36.0	28.6		27.0	27.6	20.1	28.3		24.2	25.4	0.0
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d <sub>2</sub>		18.5	0.4		0.3	0.2	1.3	23.5		2.0	8.4	0.2
Delay (s)		54.6	29.0		27.3	27.8	21.5	51.7		26.3	33.8	0.2
Level of Service		D	C		C	C	C	D		C	C	A
Approach Delay (s)		46.6			27.7			48.9			26.7	
Approach LOS		D			C			D			C	
<b>Intersection Summary</b>												
HCM Average Control Delay		38.5		HCM Level of Service				D				
HCM Volume to Capacity ratio		0.91										
Actuated Cycle Length (s)		114.1		Sum of lost time (s)				12.0				
Intersection Capacity Utilization		83.4%		ICU Level of Service				E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 16: Round Pond Rd & US Route 9

10/24/2008

	↙	↘	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘ ↗		↑		↗ ↘	↑
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	47	143	638	87	116	809
Peak Hour Factor	0.81	0.81	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	58	177	686	94	125	870
Pedestrians	21		2			
Lane Width (ft)	12.0		12.0			
Walking Speed (ft/s)	4.0		4.0			
Percent Blockage	2		0			
Right turn flare (veh)						
Median type	TWLTL					
Median storage (veh)	1					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1875	754			801	
vC1, stage 1 conf vol	754					
vC2, stage 2 conf vol	1121					
vCu, unblocked vol	1875	754			801	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	68	56			85	
cM capacity (veh/h)	181	404			817	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>	<b>SB 2</b>		
Volume Total	235	780	125	870		
Volume Left	58	0	125	0		
Volume Right	177	94	0	0		
cSH	310	1700	817	1700		
Volume to Capacity	0.76	0.46	0.15	0.51		
Queue Length 95th (ft)	145	0	13	0		
Control Delay (s)	45.3	0.0	10.2	0.0		
Lane LOS	E		B			
Approach Delay (s)	45.3	0.0	1.3			
Approach LOS	E					
<b>Intersection Summary</b>						
Average Delay			5.9			
Intersection Capacity Utilization			66.9%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 16: Round Pond Rd & US Route 9

10/30/2008



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↘	↑	↘	↙	↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	47	143	638	87	116	809
Peak Hour Factor	0.81	0.81	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	58	177	686	94	125	870
Pedestrians	21		2			
Lane Width (ft)	12.0		12.0			
Walking Speed (ft/s)	4.0		4.0			
Percent Blockage	2		0			
Right turn flare (veh)						
Median type	TWLT					
Median storage veh	1					
Upstream signal (ft)						
pX, platoon unblocked						
vC conflicting volume	1875	754			801	
vC1, stage 1 conf vol	754					
vC2, stage 2 conf vol	1121					
vCu, unblocked vol	1875	754			801	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	68	56			85	
cM capacity (veh/h)	181	404			817	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	58	177	780	125	870
Volume Left	58	0	0	125	0
Volume Right	0	177	94	0	0
cSH	181	404	1700	817	1700
Volume to Capacity	0.32	0.44	0.46	0.15	0.51
Queue Length 95th (ft)	33	54	0	13	0
Control Delay (s)	33.9	20.7	0.0	10.2	0.0
Lane LOS	D	C		B	
Approach Delay (s)	23.9		0.0	1.3	
Approach LOS	C				

Intersection Summary	
Average Delay	3.4
Intersection Capacity Utilization	58.9%
ICU Level of Service	B
Analysis Period (min)	15

HCM Signalized Intersection Capacity Analysis  
 16: Round Pond Rd & US Route 9

10/30/2008



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑		↖	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.98		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frft	0.90		0.98		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1646		1845		1797	1900
Flt Permitted	0.99		1.00		0.27	1.00
Satd. Flow (perm)	1646		1845		513	1900
Volume (vph)	47	143	638	87	116	809
Peak-hour factor, PHF	0.81	0.81	0.93	0.93	0.93	0.93
Adj. Flow (vph)	58	177	686	94	125	870
RTOR Reduction (vph)	145	0	6	0	0	0
Lane Group Flow (vph)	90	0	774	0	125	870
Confl. Peds. (#/hr)	2			21	21	
Confl. Bikes (#/hr)		1		1		
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%

Turn Type	Perm				
Protected Phases	8		2		6
Permitted Phases					6
Actuated Green, G (s)	8.3		33.5		33.5
Effective Green, g (s)	9.3		34.5		34.5
Actuated g/C Ratio	0.18		0.67		0.67
Clearance Time (s)	5.0		5.0		5.0
Vehicle Extension (s)	3.0		3.0		3.0
Lane Grp Cap (vph)	296		1229		342
v/s Ratio Prot	c0.05		0.42		c0.46
v/s Ratio Perm					0.24
v/c Ratio	0.30		0.63		0.37
Uniform Delay, d1	18.4		5.0		3.8
Progression Factor	1.00		1.00		1.00
Incremental Delay, d2	0.6		1.1		0.7
Delay (s)	19.0		6.0		4.5
Level of Service	B		A		A
Approach Delay (s)	19.0		6.0		6.6
Approach LOS	B		A		A

Intersection Summary	
HCM Average Control Delay	7.8
HCM Volume to Capacity ratio	0.61
Actuated Cycle Length (s)	51.8
Intersection Capacity Utilization	66.9%
Analysis Period (min)	15
HCM Level of Service	A
Sum of lost time (s)	8.0
ICU Level of Service	C

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
 16: Round Pond Rd & US Route 9

10/24/2008



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙ ↘		↑	↘	↙	↑
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Volume (veh/h)	47	143	655	87	116	815
Peak Hour Factor	0.81	0.81	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	58	177	704	94	125	876
Pedestrians	21		2			
Lane Width (ft)	12.0		12.0			
Walking Speed (ft/s)	4.0		4.0			
Percent Blockage	2		0			
Right turn flare (veh)						
Median type	TWLTL					
Median storage (veh)	1					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1900	772			819	
vC1, stage 1 conf vol	772					
vC2, stage 2 conf vol	1128					
vCu, unblocked vol	1900	772			819	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	67	55			84	
cM capacity (veh/h)	178	394			804	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	235	798	125	876
Volume Left	58	0	125	0
Volume Right	177	94	0	0
cSH	303	1700	804	1700
Volume to Capacity	0.77	0.47	0.16	0.52
Queue Length 95th (ft)	150	0	14	0
Control Delay (s)	47.9	0.0	10.3	0.0
Lane LOS	E		B	
Approach Delay (s)	47.9	0.0	1.3	
Approach LOS	E			

Intersection Summary	
Average Delay	6.2
Intersection Capacity Utilization	67.8%
ICU Level of Service	C
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
 16: Round Pond Rd & US Route 9

10/30/2008



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↑	↘	↙	↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	47	143	655	87	116	815
Peak Hour Factor	0.81	0.81	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	58	177	704	94	125	876
Pedestrians	21		2			
Lane Width (ft)	12.0		12.0			
Walking Speed (ft/s)	4.0		4.0			
Percent Blockage	2		0			
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh	1					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1900	772			819	
vC1, stage 1 conf vol	772					
vC2, stage 2 conf vol	1128					
vCu, unblocked vol	1900	772			819	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	67	55			84	
cM capacity (veh/h)	178	394			804	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	58	177	798	125	876
Volume Left	58	0	0	125	0
Volume Right	0	177	94	0	0
cSH	178	394	1700	804	1700
Volume to Capacity	0.33	0.45	0.47	0.16	0.52
Queue Length 95th (ft)	33	56	0	14	0
Control Delay (s)	34.6	21.3	0.0	10.3	0.0
Lane LOS	D	C		B	
Approach Delay (s)	24.6		0.0	1.3	
Approach LOS	C				

Intersection Summary	
Average Delay	3.5
Intersection Capacity Utilization	59.7%
ICU Level of Service	B
Analysis Period (min)	15

HCM Signalized Intersection Capacity Analysis  
 16: Round Pond Rd & US Route 9

10/30/2008

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↑		↗	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frbp, ped/bikes	0.98		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.90		0.98		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1646		1846		1797	1900
Flt Permitted	0.99		1.00		0.26	1.00
Satd. Flow (perm)	1646		1846		495	1900
Volume (vph)	47	143	655	87	116	815
Peak-hour factor, PHF	0.81	0.81	0.93	0.93	0.93	0.93
Adj. Flow (vph)	58	177	704	94	125	876
RTOR Reduction (vph)	145	0	6	0	0	0
Lane Group Flow (vph)	90	0	792	0	125	876
Confl. Peds. (#/hr)	2			21	21	
Confl. Bikes (#/hr)		1		1		
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	8.3		33.8		33.8	33.8
Effective Green, g (s)	9.3		34.8		34.8	34.8
Actuated g/C Ratio	0.18		0.67		0.67	0.67
Clearance Time (s)	5.0		5.0		5.0	5.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	294		1233		331	1269
v/s Ratio Prot	c0.05		0.43			c0.46
v/s Ratio Perm					0.25	
v/c Ratio	0.30		0.64		0.38	0.69
Uniform Delay, d1	18.6		5.0		3.8	5.3
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.6		1.2		0.7	1.6
Delay (s)	19.2		6.2		4.6	7.0
Level of Service	B		A		A	A
Approach Delay (s)	19.2		6.2			6.7
Approach LOS	B		A			A
<b>Intersection Summary</b>						
HCM Average Control Delay			7.9		HCM Level of Service	A
HCM Volume to Capacity ratio			0.61			
Actuated Cycle Length (s)			52.1		Sum of lost time (s)	8.0
Intersection Capacity Utilization			67.8%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

# **Appendix I – Access Management**

**Exit 20 Corridor Management plan  
Town of Queensbury, Warren County, New York**

## ARTICLE 19, Access Management

### 179-19-010. Commercial driveway standards.

A. Purpose. The Town of Queensbury recognizes that one of the most important objectives of access management is to reduce conflicts along the most heavily traveled roadways to achieve safe and efficient movement of traffic. Conflict points can be reduced through appropriate limitations on the number of driveways, driveway spacing, and by establishing provisions for vehicles to move between parking areas to access abutting properties.

B. General.

(1) The site layout, location and design of driveways, parking, and other access management requirements should be based on full permissible development of a property.

(2) Driveways should be limited to one per property. More than one driveway may be permitted if:

(a) The additional driveway(s) does not degrade traffic operations and safety on state or local roads; and

(b) The additional driveway(s) will improve the safe and efficient movement of traffic between the property and the road.

(3) Driveways to properties with frontage on two or more roads shall be provided to the road with the lowest functional classification serving the proposed use of the property.

(4) Properties with frontage on two or more roads do not have the right to driveways to all roads.

(5) Driveways may be required to be located so as to provide shared driveways and/or cross-access driveways with an abutting property or properties.

(a) Shared driveways and/or cross access driveways shall be of sufficient width (minimum 20 feet, 6.0 meters) to accommodate two-way travel for automobiles and service and loading vehicles. Wider driveways may be required to serve traffic to major generators and/or large vehicles.

(b) Shared driveways, cross-access driveways, interconnected parking, and private roads constructed to provide access to properties internal to a subdivision shall be recorded as an easement and shall constitute a covenant running with the land. Operating and maintenance agreements for these facilities shall be recorded with the deed.

C. Driveway spacing standards.

(1) Driveway spacing standards shall apply to driveways located on the same side of a road.

(2) Driveway spacing is to be measured along the road from the closest edge or curblin of the driveway pavement to the closest edge or curblin of the next driveway.

(3) Driveways shall be located so as to meet or exceed the driveway spacing standards shown in the chart below:

Development Size in Peak Hour Trips, PHT				
		Small	Moderate	Large
Road Classification		0 to 100 PHT	101 to 300 PHT	Great than 300 PHT
Arterial		330 feet	440 feet	550 feet
Collector		220 feet	330 feet	440 feet
Access or development		60% of the minimum frontage requirement		

(a) PHT, peak hour trips, will be determined through the application of the most current Institute of Transportation Engineers (ITE) trip generation methods and statistics.

(b) PHT, peak hour trips, should be based on full build-out of the property.

(c) The larger of the minimum driveway spacing standards for the proposed development or for existing developments at abutting properties will apply. Driveways for infill development must meet the driveway spacing standards to abutting properties on both sides.

(d) The Planning Board may waive the separation standards in the event the applicant can demonstrate that no negative impact on the transportation system will result in the relaxing of this standard and the applicant has provided for future consolidation of curb cuts and cross-easements consistent with the intent of these regulations.

D. Other guidance. The Planning Board shall utilize the NYSDOT Policy and Standards for Entrances to State Highways (February 1998) or its most current version as a guide in establishing other criteria for commercial development.

**§ 179-19-020 Residential lots abutting collector or arterial roads.**

A. Purpose. The Town of Queensbury realizes that unrestricted access onto arterial and collector roads can hinder the safe and efficient movement of traffic. Subdivisions, especially small subdivisions, have tended to provide direct access onto these roadways from each single-family lot. Lots fronting on local roads rather than arterials or collector roads shall be encouraged, while lots fronting on collector or arterial roads shall be discouraged.

B. Designated roads. The following streets, roads and routes have been designated as regional or local arterial roads or collector roads. Land fronting on these roads shall comply with the requirements of this section.

(1) Regional arterial roads:

- (a) Corinth Road.
- (b) Main Street.
- (c) Aviation Road from I-87 east to Route 9.
- (d) Quaker Road.
- (e) Dix Avenue.
- (f) Ridge Road from Quaker Road north to Route 149.
- (g) Route 149.
- (h) Route 9.
- (i) Bay Road.

(2) Local arterial roads:

- (a) West Mountain Road.
- (b) Mountain View Lane.
- (c) Aviation Road from West Mountain Road east to I-87.
- (d) Potter Road.
- (e) East Shore Drive.
- (f) Ridge Road from Route 149 north to East Shore Drive.
- (g) Ridge Road from Glens Falls north to Quaker Road.
- (h) Country Club Road.
- (i) County Line Road.
- (j) Highland Avenue.
- (k) Lower Warren Street.
- (l) River Street.
- (m) Hicks Road.
- (n) Glenwood Avenue.
- (o) Round Pond Road/Blind Rock Road.
- (p) Haviland Road.

(3) Collector roads:

- (a) Pitcher Road.
- (b) Luzerne Road.

- (c) Sherman Avenue.
- (d) Peggy Ann Road.
- (e) Dixon Road.
- (f) Park View Avenue.
- (g) Cronin Road.
- (h) Sweet Road.
- (i) Glen Lake Road.
- (j) Martindale Road.
- (k) Moon Hill Road.
- (l) Sunny Side Road.
- (m) Sunny Side Road East.
- (n) Pickle Hill Road.
- (o) Van Dusen Road.
- (p) Richardson Street.
- (q) Meadowbrook Road.
- (r) Rockwell Road.
- (s) Gurney Lane Road.
- (t) Jenkinsville Road.
- (u) Pilot Knob Road.

C. Regulations. As of the effective date of this chapter, all residential lots fronting on a collector or arterial road identified herein or any new collector or arterial roads shall have two times the lot width permitted in the zone in which the lot is located, except that this requirement shall not apply under circumstances where adjoining residential lots exist or are proposed to be established and the width of each lot meets the required width of the zone and ingress or egress is limited to and provided by a single common driveway, which is documented on a plat and in a written legal document, which is recordable in the Warren County Clerk's office.