STATE ROUTE 13 CORRIDOR STUDY

NOVEMBER 2020

TOMPKINS COUNTY

Barton & Loguidice

HIGHLAND PLANNING

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ACKNOWLEDGMENTS

Many individuals contributed time and effort to help develop the State Route 13 Corridor Study. Their commitment and hard work are greatly appreciated.

STEERING COMMITTEE:

- Julie Baldwin, Region 3 Local Project Liaison, NYSDOT
- Katie Borgella, Commissioner of Planning and Sustainability, Tompkins County
- Ray Burger, Director of Planning, Town of Dryden
- Deborah Dawson, County Legislator, Tompkins County Legislature
- Fernando de Aragón, Executive Director, Ithaca-Tompkins County Transportation Council
- Mark Frechette, Project Director, NYSDOT
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- David McKenna, County Legislator, Tompkins County Legislature
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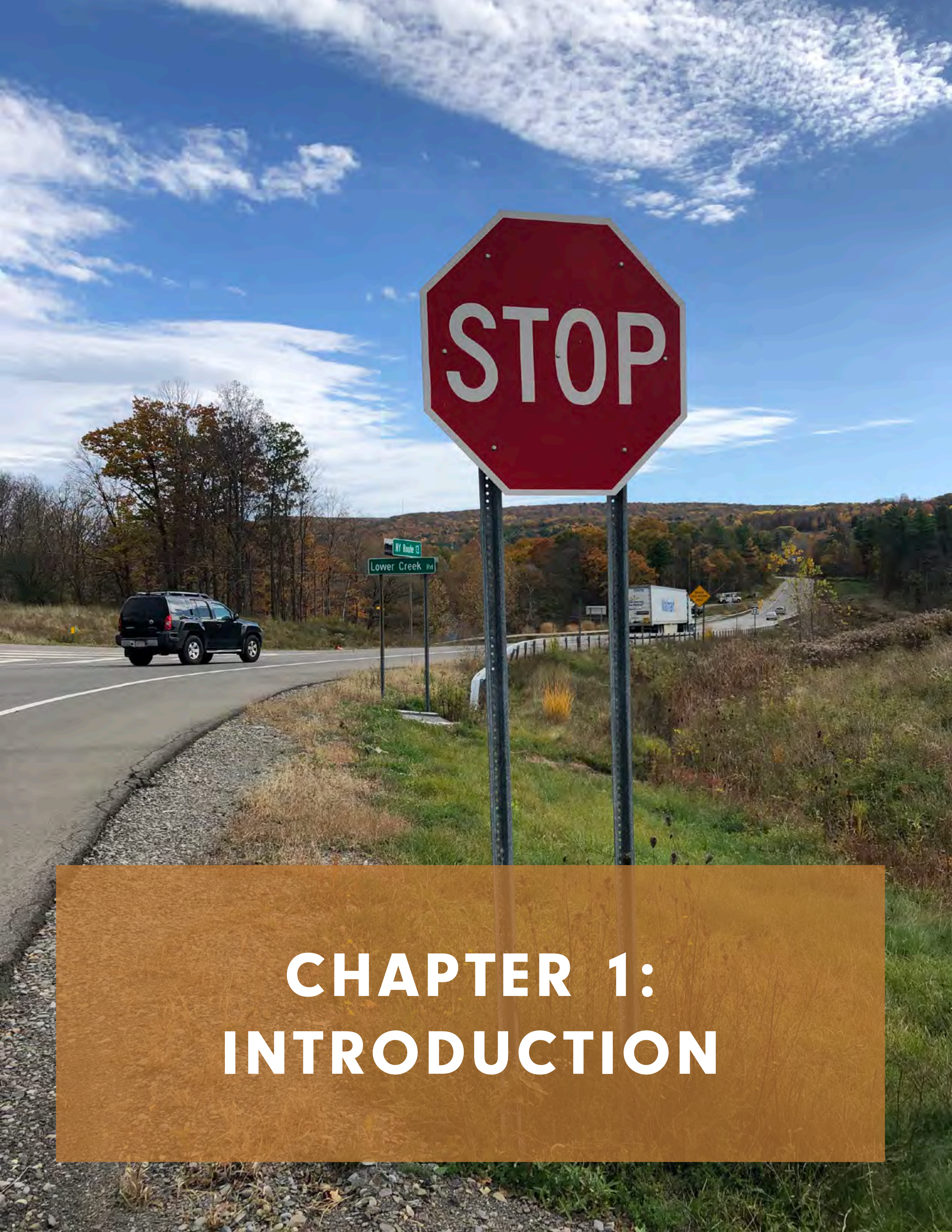
LIST OF COMMONLY USED ACRONYMS

There are numerous agencies, organizations, and planning references used throughout this document. The following list provides the acronyms for the most commonly used names and titles:

AADT: ANNUAL AVERAGE DAILY TRAFFIC
ACC/MVM: ACCIDENTS PER MILLION VEHICLE MILES
ACS: AMERICAN COMMUNITY SURVEY
CRF: CRASH REDUCTION FACTOR
EB: EASTBOUND
FAA: FEDERAL AVIATION ADMINISTRATION
FHWA: FEDERAL HIGHWAY ADMINISTRATION
GIS: GEOGRAPHIC INFORMATION SYSTEM
ISP: INTERNET SERVICE PROVIDERS
ITCTC: ITHACA-TOMPKINS COUNTY TRANSPORTATION COUNCIL
ITE: INSTITUTE OF TRAFFIC ENGINEERS
ITH: ITHACA-TOMPKINS INTERNATIONAL AIRPORT
LOS: LEVEL OF SERVICE
LRTP: LONG RANGE TRANSPORTATION PLAN
MPH: MILES PER HOUR
MPO: METROPOLITAN PLANNING ORGANIZATION
MUTCD: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
NAICS: NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM
NB: NORTHBOUND
NHI: NATIONAL HIGHWAY INSTITUTE
NHS: NATIONAL HIGHWAY SYSTEM
NYSDEC: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NYSDOT: NEW YORK STATE DEPARTMENT OF TRANSPORTATION
NYSEG: NEW YORK STATE ELECTRIC & GAS
ROW: RIGHT-OF-WAY
SB: SOUTHBOUND
SR 13: STATE ROUTE 13
SUP: SPECIAL USE PERMIT
TC3: TOMPKINS COUNTY COMMUNITY COLLAGE
TCAD: TOMPKINS COUNTY AREA DEVELOPMENT
TCAT: TOMPKINS CONSOLIDATED AREA TRANSIT
VIVDS: VIDEO IMAGE VEHICLE DETECTION SYSTEM
WB: WESTBOUND



CHAPTER 1: INTRODUCTION

INTRODUCTION

OVERVIEW

New York State Route 13 (SR 13) is a state owned highway that mainly runs north-south for over 150 miles between I-86 in Horseheads, NY and Route 3 on the eastern shore of Lake Ontario. The most significant traffic volumes on the highway exist in Tompkins County, particularly within the City of Ithaca and its surrounding communities; accommodating almost 40,000 vehicle trips per day in certain areas. SR 13 provides both local and regional connections for Tompkins County, and acts as both a connector to Interstates 81 and 86, as well as a local commuting corridor. Given the significance of SR 13 to the region's economic activity, it is essential that the corridor is analyzed on a regular basis in order to determine how the corridor serves the needs of the residents and stakeholders of Tompkins County, and where deficiencies exist in terms of connectivity, accessibility, mobility, and safety. Therefore, this Study was undertaken for one of the segments of SR 13 east of the City of Ithaca to ensure that the corridor is functioning adequately, and to identify potential improvement strategies for areas of the Corridor where such needs have been identified.

This Study analyzes a 8.5 mile stretch of SR 13 between Warren Road in the Village of Lansing and Spring House Road at the edge of the Village of Dryden, and focuses on the following six key intersections along the Corridor:

- Warren Road
- Sapsucker Woods Road / Brown Road
- Hanshaw Road
- Lower Creek Road
- State Route 366 (Dryden Road)
- State Route 366 (Main Street)

The extent of the Study Corridor, as well as its location within Tompkins County is depicted in Figure 1.1 on the following page. Currently, this stretch of SR 13 is most rural, with some suburban development; particularly along the western half of the Corridor. Economic activity within the Ithaca Urbanized Area has influenced the character and functionality of the Corridor as development pressures have expanded beyond the City boundaries and into adjacent communities, such as Lansing and Dryden. This Study takes into account these factors, and provides recommendations for mitigating traffic impacts while supporting appropriate investment along the Corridor.

STUDY PURPOSE

The primary purpose of the Corridor Study for SR 13 is to raise awareness of operation and safety issues along the roadway between the Villages of Dryden and Lansing, highlight potential solutions for further design study, and gather community consensus to advocate for eventual implementation.

This study is intended to provide strategic guidance in order to protect the functionality of the Corridor, while helping to ensure user safety and operational capacity. The defined planning horizon for this Study is ten years, or between 2020 and 2030. The Corridor Study includes an assessment of current traffic and safety conditions and estimates of future growth based on plans for future land use development and other inputs. This analysis resulted in recommended changes to roadway characteristics, intersection configurations, and safety and traffic flow strategies that will improve corridor operations and safety; as well as ensure tat the SR 13 Corridor will continue to facilitate movement throughout the region and function well as the principal

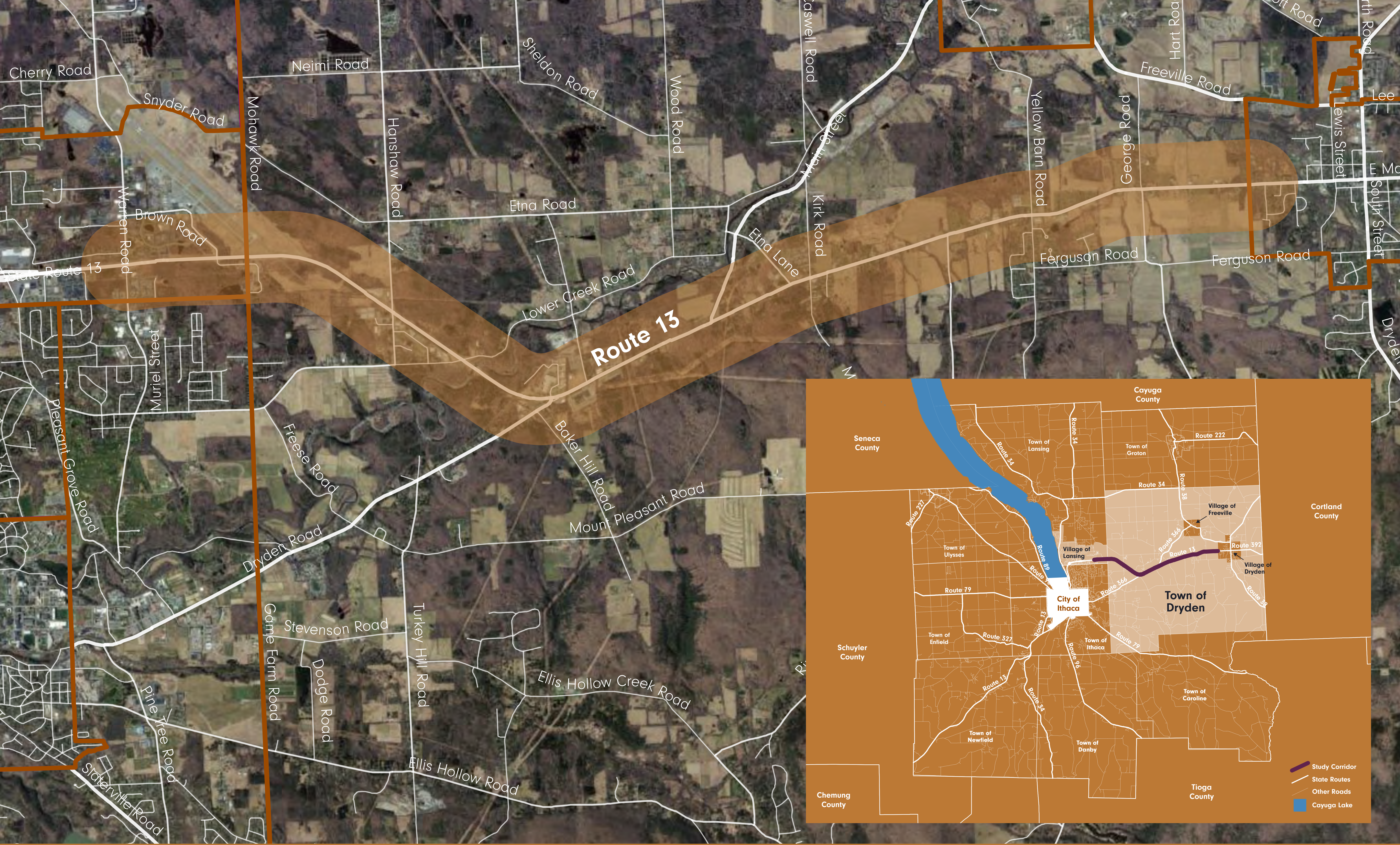


FIGURE 1.1: STUDY CORRIDOR LOCATION

arterial between the Ithaca area and Interstate 81. In addition, zoning recommendations are provided for the Town of Dryden and Village of Lansing to ensure the Corridor's development patterns are consistent with the community's vision for the area and contribute to the long-standing vitality of the Corridor for the next ten years.

STUDY SCOPE

The tie between land use and transportation is well-documented, and the two systems can be seen as one and the same, as the roadway is fundamentally a use of land for transportation purposes. Therefore, this Study takes a holistic approach, analyzing both the roadway itself as well as the surrounding development patterns that significantly influence how the Corridor functions. The format of this report is as follows:

- **Chapter 2: Existing Conditions**. This chapter analyzes the traffic volumes and speeds that currently exist along the Corridor, and how the six key intersections function from a Level of Service (LOS) perspective. This section also includes an in-depth analysis of the five-year crash history of the Corridor; both at each intersection as well as for each segment between the intersections along the Study Corridor. Additionally, the existing land use patterns and the existing zoning codes for both the Town of Dryden and the Village of Lansing are analyzed to determine how development has historically occurred along the Corridor, as well as what kind of development can occur in the future based on the communities' existing regulations.
- **Chapter 3: Future Development Analysis.** Using the results of the land use and zoning analysis in the previous chapter, a future development scenario was developed based on a build-out analysis of developable land along the Study Corridor, as well as a market analysis that informs the development trends and provides realistic expectations for investment within the next ten years. The result of both of these analyses resulted in a "likely-build" development scenario, with two tiers of potential parcels to be developed based on their anticipated likelihood during the ten-year planning horizon.
- **Chapter 4: Improvement Strategies.** The future development analysis provided a basis to determine what future traffic volumes will be given the anticipated level of investment along the Corridor, using the Institute of Traffic Engineer's (ITE) Trip Generation Manual. These new trips were added into the traffic simulation models initially used to analyze existing traffic conditions to understand the potential reductions in LOS along the Corridor in the future. Based upon those results, a set of improvement strategies were identified to address both potential future deficiencies, as well as existing deficiencies along the Corridor. These strategies include several types of improvements; including short-term strategies and reconfiguration alternatives for the six key intersections, corridor-wide improvements, and zoning recommendations.

The results of this Study provide the County with an improved understanding of how the Corridor currently functions, how the character of the Corridor may evolve over the next ten years, and what strategies should be considered to mitigate any adverse impacts of existing or future development activity along the Corridor. It is important to note that many of the improvement strategies outlined in Chapter 4 would require future specific engineering studies, and are only recommended for future analysis should funds become available for improvements along the Corridor. A project timeline is depicted in Figure 1.2 below:

PUBLIC INPUT

Given the vast number of County residents that use the Study Corridor on a frequent basis, it was essential to engage the public consistently and frequently throughout the Study to ensure that the results of the technical analyses performed are consistent with the user experience, and that all issues and opportunities along the Corridor are appropriately identified and addressed within the Study. The forms of engagement ranged from casual in-person drop-in sessions to online surveys, which are summarized on the following pages. For more detail regarding the format and results of the public engagement opportunities for this study, please reference the public input summaries contained in the Appendix.

STAKEHOLDER PRE-ENGAGEMENT INTERVIEWS

In order to gain agency and stakeholder perspectives, interviews were conducted with key community stakeholders at the beginning of the planning process. The findings from these interviews informed the creation of a public engagement plan and ongoing engagement activities. The purpose of pre-engagement interviews was to gain an understanding of how stakeholders are likely to perceive the project and what the likely issues would be.

Interviews of 20-30 minutes were conducted by phone during September and October 2019. Interviewees were asked to respond to several questions about the Corridor, its issues and opportunities, and how to engage the public throughout the project process. Stakeholders included representatives from local agencies, business developers, and representatives from relevant local organizations.

PROJECT ADVISORY COMMITTEE MEETINGS

A Project Advisory Committee (PAC) was convened to provide guidance for the project and help ensure that the study addresses issues relevant to the stakeholders. The PAC was composed of staff members of Tompkins County, NYSDOT, Town of Dryden, Village of Lansing, Cornell University, and Tompkins Consolidated Area Transit (TCAT). Five PAC meetings were held throughout the study process. The members of the PAC included:

- Julie Baldwin, NYSDOT
- Ray Burger, Town of Dryden
- Deborah Dawson, Tompkins County Legislature
- Mark Frechette, NYSDOT
- Reed Huegerich, Cornell University
- Mike Lane, Tompkins County Legislature
- Jason Leifer, Town of Dryden
- David McKenna, Tompkins County Legislature
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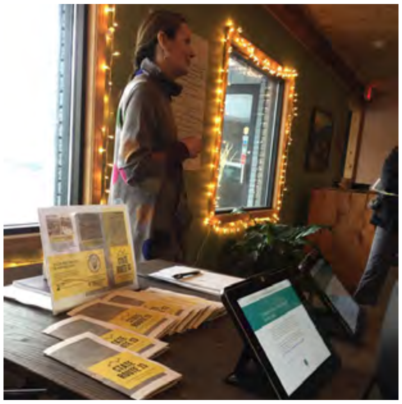
- Fernando de Aragón, Executive Director, Ithaca-Tompkins County Transportation Council
- Katie Borgella, Commissioner of Planning and Sustainability, Tompkins County

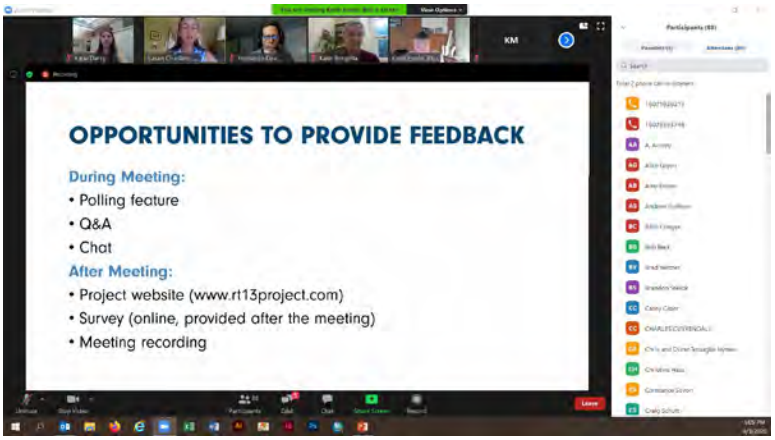


PUBLIC DROP-IN EVENT

A public drop in event was conducted on February 6, 2020 between 11:30 AM and 1:30 PM at Brewer's Cafe and Tap Room at 1384 Dryden Road. The purpose of the event was to introduce residents and stakeholders to the project and inform them of the planning process. A brochure containing information about the project was distributed during the event, and project team members were available to answer questions about the study. Additionally, contact information was gathered in order to notify attendees of future public engagement opportunities for the project.

INITIAL ONLINE SURVEY

In order to understand the issues and opportunities of the Study Corridor as perceived by the public, a public online survey was administered from January 28 to February 28, 2020. The survey was promoted through a several outlets, including a press-release, mailed post cards to local residents, social media, and distributed through local news outlets and community organizations. The survey contained questions about how respondents used the corridor, what issues regarding the Corridor such as safety were most important to them, and what types of improvements they would like to see along the Corridor. The survey received 1,499 responses; providing an excellent database of community opinions which were used to determine key priorities for the Study.



VIRTUAL PUBLIC MEETING

On Thursday, September 3, 2020, a virtual public meeting was held for the State Route 13 Corridor Study from 6:00 to 7:30pm about the preliminary recommendations for improving the corridor. The meeting was held using Zoom Webinar with live polling, Q&A and chat and had a peak of 89 attendees. The team presented information about the project background, public engagement, and preliminary strategies for the SR-13 corridor. Attendees were asked for input on the draft materials presented through the chat and Q&A features of Zoom Webinars, as well as through poll questions presented throughout the presentation. The meeting was promoted through e-blasts, a press release, as well as a variable message sign on SR 13 provided by the County Highway Department. Following the meeting, a recording of the presentation was made available on the project website.

ADDITIONAL ONLINE SURVEY

Given the onset of the COVID-19 pandemic, the ability to receive feedback on the draft improvement strategies through traditional methods such as a public open house was restricted for health and safety reasons. Therefore, a secondary online survey was distributed in order to solicit additional feedback on the draft recommendations in addition to the input received during the live virtual public meeting. The survey was hosted on the project website between September 15 and September 25, 2020, and received 119 responses. The results of the survey were used in addition to the feedback from the public meeting to revise the draft recommendations prior to producing a complete draft report.

CHAPTER 2: EXISTING CONDITIONS

SUMMARY

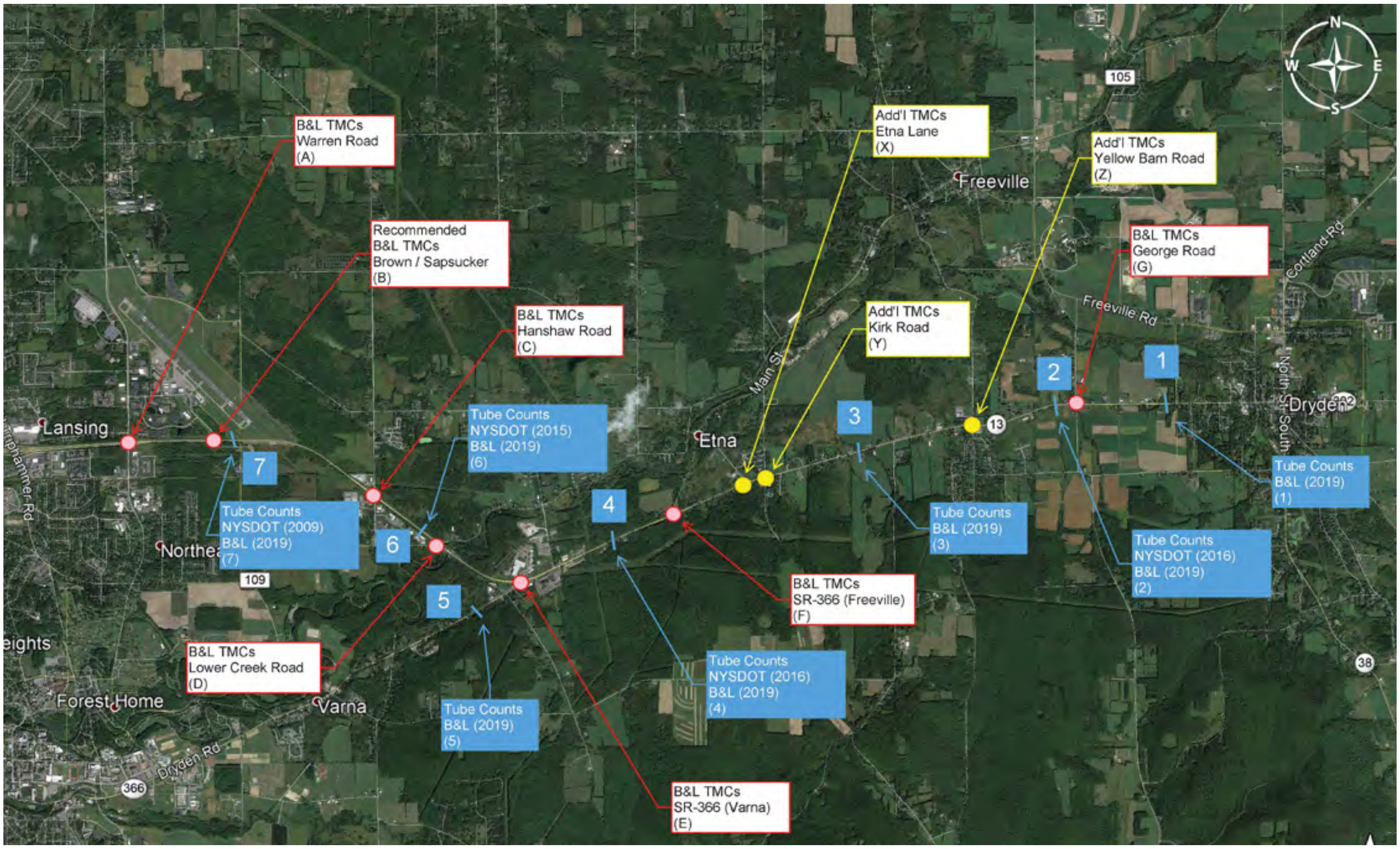
Chapter 2 summarizes the existing roadway characteristics along SR 13, as well as the land use patterns adjacent to the Study Corridor. The intent of this is analysis to provide context of how the corridor functions currently, inform the future development scenario outlined in Chapter 3, and ensure that the improvement strategies proposed in Chapter 4 are tailored to the specific needs and opportunities presented along this segment of SR 13. This chapter is organized in the following manner:

- Traffic Data
- Intersection Performance
- Crash History
- Land Use and Zoning

TRAFFIC DATA

As shown on the traffic count location map below (and attached as an Appendix), current volume, classification, and speed data was collected using dual pneumatic tubes at seven locations along the project corridor in October 2019. In addition, turning movement counts were manually conducted at ten key intersections. This data will be used in further project phases to analyze potential effects to the SR 13 corridor, and can also be compared to historical counts at the same locations to determine anticipated growth rates.

FIGURE 2.1: TUBE COUNT LOCATIONS



TUBE COUNT LOCATIONS

Tube count stations were placed at seven key locations, using dual tube setups to collect volume, speed, and vehicle classification data. By collecting data over a span of nine consecutive days, morning peaks, evening peaks, and weekday averages can be easily identified. Table 2.1 below summarizes the tube count locations.

TABLE 2.1: TUBE COUNT LOCATIONS

Location #	Coordinates	Road-to-Road
1	42°22′22.9″N 76°19′23.9″W	Springhouse Road to George Road
2	42°29′13.5″N 76°20′33.2″W	George Road to Johnson Road
3	42°29′02.5″N 76°21′33.7″W	Johnson Road to Main Street (NY-366)
4	42°28′24.6″N 76°23′44.0″W	Main Street (NY-366) to Hall Road
5	42°27′56.5″N 76°24′52.2″W	(NY-366) SR 13 to Turkey Hill Road
6	42°28′24.7″N 76°25′24.1″W	Hall Road to Hanshaw Road
7	42°28′58.9″N 76°26′58.8″W	Hanshaw Road to Brown Road

TUBE COUNT VOLUMES

Each tube count location gathered directional volume data over the nine-day counting period, allowing for the calculation for Annual Average Daily Traffic (AADT) volumes and the identification of peak hours in each direction. Volume data is summarized in Table 2.2 below:

TABLE 2.2: TRAFFIC VOLUMES (AADT)

Location #	Raw Count	Adjusted	Weekday Average	Eastbound	Westbound
1	10,475	10,842	11,045	5,371	5,674
2	11,095	11,483	11,800	5,751	6,049
3	13,762	14,244	15,330	7,634	7,696
4	17,002	17,597	18,905	9,415	9,490
5	6,324	6,545	7,358	3,597	3,761
6	12,965	13,419	14,052	6,927	7,125
7	14,176	14,672	15,979	8,089	7,890

In addition, comparative historical AADT volumes are available in the Appendix. When correlated to the locations of past County and NYSDOT counts, these adjusted volumes will be used to determine planning-level growth rates for future analyses.

PEAK HOUR VOLUMES

Weekday AADTS are noticeably higher than on weekends, and each segment experiences a morning peak (inbound towards Ithaca) and an evening peak (outbound from Ithaca) – peak hourly volumes are shown in Table 2.3 below.

TABLE 2.3: PEAK HOUR VOLUMES (VEHICLES/HOUR)

Location #	AM Peak Hour	AM Volume	PM Peak Hour	PM Volume
1	7 AM – 8 AM	675	4 PM – 5 PM	477
2	8 AM – 9 AM	572	3 PM – 4 PM	469
3	7 AM – 8 AM	984	4 PM – 5 PM	852
4	7 AM – 8 AM	1,074	4 PM – 5 PM	1,101
5	7 AM – 8 AM	551	4 PM – 5 PM	497
6	8 AM – 9 AM	667	4 PM – 5 PM	724
7	7 AM – 8 AM	813	4 PM – 5 PM	817

VEHICLE CLASSIFICATIONS

The collected traffic data included axle counts and vehicle classifications, based on FHWA/NYSDOT classification codes. Table 2.4 below summarizes the percentage of heavy vehicles (Class F5 through F13) as well as the percentage of trucks and buses (Class F4 through F13):

TABLE 2.4: TRUCK PERCENTAGES (RAW)

Location #	Direction	% Heavy Vehicles (F5- F13)	% Trucks & Buses (F4-F13)
1	EB	11.2%	13%
1	WB	9.5%	11.2%
2	EB	11.4%	13.1%
2	WB	9.6%	11.2%
3	EB	6.3%	7.3%
3	WB	12.8%	14.1%
4	EB	14.4%	15.7%
4	WB	6.0%	6.9%
5	EB	6.8%	8.1%
5	WB	5.4%	6.7%
6	EB	10.6%	12.1%
6	WB	11.8%	13.6%
7	EB	9.8%	11.4%
7	WB	10.3%	12.1%

The tube counts registered high percentages of trucks and buses throughout the corridor.

SPEEDS

Each tube count location gathered speed data, as summarized in Table 2.5 below:

TABLE 2.5: 85TH PERCENTILE SPEEDS (MPH)

Location #	Eastbound	Westbound
1	56	55
2	59	57
3	54	62
4	59	50
5	51	49
6	59	59
7	58	59

INTERSECTION PERFORMANCE

Based on the data collected in previous tasks, each critical intersection along the SR 13 corridor was analyzed for performance under current conditions. Using the AM Peak, Noon Peak, and PM peak traffic volumes as a baseline (along with the existing traffic signal phasing and timing) – each intersection movement was analyzed for delay. For reference, Table 2.6 defines the ratings used for signalized and unsignalized intersections based on average delay per vehicle:

TABLE 2.6: LEVEL OF SERVICE (LOS) CRITERIA FOR INTERSECTIONS

LOS	Description	Delay in Seconds (Signalized)	Delay in Seconds (Unsignalized)
A	Little or no delay	<= 10.0	<= 10.0
B	Minor, Short delay	> 10 to 20	> 10 to 15
C	Average delay	> 20 to 35	> 15 to 25
D	Long, but acceptable delay	> 35 to 55	> 25 to 35
E	Long, Unacceptable delay	> 55 to 80	> 35 to 50
F	Long, Unacceptable delays	> 80	> 50

WARREN ROAD @ SR 13:

As shown in the Table 2.7, the Warren Road intersection generally performs adequately during the peak hours – with one notable exception. During peak morning traffic, the northbound left turning movement (from Warren Road to SR 13 - heading towards the City of Ithaca) experiences average delays in excess of 111 seconds, which correlates to a LOS F. This condition lowers the overall northbound movement (all lanes) to a LOS E during the a.m. peak.

TABLE 2.7: WARREN RD: INTERSECTION DELAY (SECONDS) & EXISTING LEVEL OF SERVICE

AM Peak	Overall Intersection (LOS D)		
	Left	Through	Right
Eastbound Approach	53.1	32.4	26
	D	C	C
Westbound Approach	52.4	49.4	31.7
	D	D	C
Northbound Approach	**111.5**	29.1	16.6
	F	C	B
Southbound Approach	26.5	49.7	17.6
	C	D	B
Noon Peak	**Overall Intersection (LOS C)**		
	Left	**Through**	**Right**
Eastbound Approach	36.9	21.3	14.5
	D	C	B
Westbound Approach	38.1	32.1	21.7
	D	C	C
Northbound Approach	21.3	26.6	20.1
	C	C	C
Southbound Approach	23.5	29.6	17.9
	C	C	B
PM Peak	**Overall Intersection (LOS D)**		
	Left	**Through**	**Right**
Eastbound Approach	49.7	28.5	17.5
	D	C	B
Westbound Approach	47.7	48.3	28.5
	D	D	C
Northbound Approach	30.5	50.2	25.2
	C	D	C
Southbound Approach	30.6	34	16.4
	C	C	B

BROWN / SAPSUCKER WOODS ROAD @ SR 13:

The Sapsucker Woods Road intersection is stop-controlled for the side road approaches only, experiences low turning volumes, and therefore experiences essentially zero delay for the mainline movements. The side-road movements exhibit high delay (and very poor LOS), which may play a role in higher than average accident rates due to driver frustration in waiting for adequate gaps in traffic.

TABLE 2.8: SAPSUCKER WOODS RD: INTERSECTION DELAY (SECONDS) & EXISTING LEVEL OF SERVICE

AM Peak	Overall Intersection (LOS C)		
	Left	Through	Right
Eastbound Approach	-	0.2	-
	-	A	-
Westbound Approach	-	0.5	-
	-	A	-
Northbound Approach	-	**61.8**	-
	-	**F**	-
Southbound Approach	-	**62.1**	-
	-	**F**	-
Noon Peak	**Overall Intersection (LOS A)**		
	Left	Through	Right
Eastbound Approach	-	0.3	-
	-	A	-
Westbound Approach	-	0.2	-
	-	A	-
Northbound Approach	-	36.6	-
	-	E	-
Southbound Approach	-	31.7	-
	-	D	-
PM Peak	**Overall Intersection (LOS B)**		
	Left	Through	Right
Eastbound Approach	-	0.1	-
	-	A	-
Westbound Approach	-	0.2	-
	-	A	-
Northbound Approach	-	**102.3**	-
	-	**F**	-
Southbound Approach	-	**50.5**	-
	-	**F**	-

Note: A turning movement shown as "-" does not have a dedicated turn lane

HANSHAW ROAD @ SR 13:

The Hanshaw Road intersection generally performs well, and also experiences its worst conditions during the morning peak. The southbound through movement (LOS D) is slightly concerning, but overall intersection performance is acceptable.

TABLE 2.9: HANSHAW RD: INTERSECTION DELAY (SECONDS) & EXISTING LEVEL OF SERVICE

AM Peak	Overall Intersection (LOS C)		
	Left	Through	Right
Eastbound Approach	10.4	12.2	-
	B	B	-
Westbound Approach	7.7	25.1	-
	A	C	-
Northbound Approach	-	24	21.9
	-	C	C
Southbound Approach	-	35.9	22.7
	-	D	C
Noon Peak	**Overall Intersection (LOS B)**		
	Left	Through	Right
Eastbound Approach	4.9	10.7	-
	A	B	-
Westbound Approach	6.6	10.7	-
	A	B	-
Northbound Approach	-	23.8	19
	-	C	B
Southbound Approach	-	20.5	19.2
	-	C	B
PM Peak	**Overall Intersection (LOS B)**		
	Left	Through	Right
Eastbound Approach	7.1	20.5	-
	A	C	-
Westbound Approach	11.2	17.7	-
	B	B	-
Northbound Approach	-	31.6	20
	-	C	C
Southbound Approach	-	21.3	20.1
	-	C	C

Note: A turning movement shown as "-" does not have a dedicated turn lane

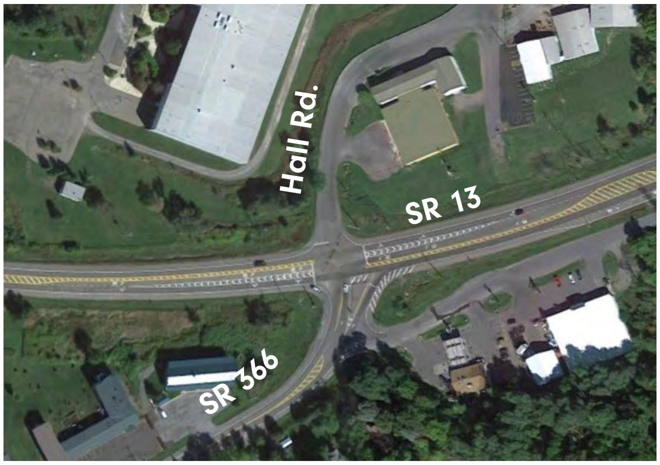
LOWER CREEK ROAD @ SR 13:

The Lower Creek Road intersection is stop-controlled for the side road approaches only and therefore experiences essentially zero delay for the mainline movements. The side-road movements exhibit moderate but acceptable delays during the peak hours, but generally function adequately.

TABLE 2.10: LOWER CREEK RD: INTERSECTION DELAY (SECONDS) & EXISTING LEVEL OF SERVICE

AM Peak	Overall Intersection (LOS D)		
	Left	Through	Right
Eastbound Approach	-	0.5	-
	-	A	-
Westbound Approach	-	3	-
	-	A	-
Northbound Approach	-	15	-
	-	B	-
Southbound Approach	-	22.7	-
	-	C	-
Noon Peak	**Overall Intersection (LOS A)**		
	Left	Through	Right
Eastbound Approach	-	0.3	-
	-	A	-
Westbound Approach	-	1	-
	-	A	-
Northbound Approach	-	16.8	-
	-	C	-
Southbound Approach	-	21.7	-
	-	C	-
PM Peak	**Overall Intersection (LOS B)**		
	Left	Through	Right
Eastbound Approach	-	1.3	-
	-	A	-
Westbound Approach	-	1.3	-
	-	A	-
Northbound Approach	-	28.9	-
	-	D	-
Southbound Approach	-	30	-
	-	D	-

Note: A turning movement shown as "-" does not have a dedicated turn lane



SR 366 (DRYDEN ROAD) @ SR 13:

As shown in Table 2.11 below, the NY-366/Dryden Road intersection performs well during the noon peak, but exhibits signs of stress during both the am and pm peaks. With a heavy directional volume inbound in the morning (and outbound in the evening) turning movement LOS fails. More specifically, the westbound left turn (towards Cornell) receives a LOS "F" during the morning peak, and right turning movements from SR 366 onto SR 13 NB receives the same in the afternoon. This intersection could benefit from signal timing optimization in the short-term, and should warrant considerations for long-term reconfiguration.

TABLE 2.11: SR 366 / DRYDEN RD: INTERSECTION DELAY (SECONDS) & EXISTING LEVEL OF SERVICE

AM Peak	Overall Intersection (LOS E)		
	Left	Through	Right
Eastbound Approach	16	33.6	-
	B	C	-
Westbound Approach	**143.8**	14	-
	F	B	-
Northbound Approach	-	37.6	-
	-	D	-
Southbound Approach	-	32.2	-
	-	C	-
Noon Peak	**Overall Intersection (LOS B)**		
	Left	Through	Right
Eastbound Approach	8.5	14.1	-
	A	B	-
Westbound Approach	9.4	9.2	-
	A	A	-
Northbound Approach	-	23.4	-
	-	C	-
Southbound Approach	-	22.4	-
	-	C	-
PM Peak	**Overall Intersection (LOS D)**		
	Left	Through	Right
Eastbound Approach	6.9	**81.1**	-
	A	**F**	-
Westbound Approach	26.3	7.5	-
	C	A	-
Northbound Approach	-	35.9	-
	-	D	-
Southbound Approach	-	34.4	-
	-	C	-

Note: A turning movement shown as "-" does not have a dedicated turn lane

SR 366 (MAIN STREET) @ SR 13:

As shown in Table 2.12 below, the NY-366/Main Street intersection performs well throughout the day, with one notable exception. The southbound right turning movement fails during the morning peak, with substantial delays and long queue lengths waiting to access SR 13 westbound. This intersection should be considered for future upgrade to reduce delays for vehicles accessing SR 13 from this intersection.

TABLE 2.12: SR 366 / MAIN ST: INTERSECTION DELAY (SECONDS) & EXISTING LEVEL OF SERVICE

AM Peak	Overall Intersection (LOS C)		
	Left	**Through**	**Right**
Eastbound Approach	12.5	0	-
	B	A	-
Westbound Approach	-	0	-
	-	A	-
Northbound Approach	-	-	-
	-	-	-
Southbound Approach	**73.1**	-	**73.1**
	F	-	**F**
Noon Peak	**Overall Intersection (LOS A)**		
	Left	**Through**	**Right**
Eastbound Approach	1.3	0	-
	A	A	-
Westbound Approach	-	0	-
	-	A	-
Northbound Approach	-	-	-
	-	-	-
Southbound Approach	-	-	13.8
	-	-	B
PM Peak	**Overall Intersection (LOS B)**		
	Left	**Through**	**Right**
Eastbound Approach	2.7	0	-
	A	A	-
Westbound Approach	-	0	-
	-	A	-
Northbound Approach	-	-	-
	-	-	-
Southbound Approach	-	-	20.7
	-	-	C

Note: A turning movement shown as "-" does not have a dedicated turn lane

CRASH HISTORY

An analysis of vehicular crashes within the project area was performed to document crash types and severity, as well as to analyze crash patterns, attributing factors and possible countermeasures. Crash data summaries were provided for the five-year period of January 1, 2014 through December 31, 2018. The crash data summaries generally included location (reference marker), time and date, crash type, and weather & pavement conditions. Many of the summaries also included a written description of the crash. A total of 595 crashes occurred along the SR 13 corridor within the five-year analysis period, including intersections and highway segments. Fifty-three (53) of the 595 crash summaries did not include location data (either reference marker or written description) and were excluded from the analysis. Table 2.13 summarizes the 542 crashes analyzed in the overall project area, including crash type and severity.

TABLE 2.13: CRASH TYPE AND SEVERITY

Five-Year Period (1/1/2014 to 12/31/2018) Overall Project Limits		
Type of Crash	**Number**	**Percentage**
Rear End	183	34%
Animal	140	26%
Right Angle	38	7%
Fixed Object	33	6%
Run Off Road	32	6%
Other/Unknown	28	5%
Overtaking	27	5%
Left Turn	24	4%
Head On	13	2%
Sideswipe	12	2%
Right Turn	6	1%
Pedestrian	3	1%
Bicycle	3	1%
Total	**542**	**100%**
Severity	**Number**	**Percentage**
Non-Reportable	129	24%
Property Damage	300	55%
Injury	110	20%
Fatality	3	1%
Total	**542**	**100%**

Crash data was organized by intersection and segment (section of SR 13 between two intersections) Crash rates were calculated for each intersection and segment as a means to compare the SR 13 crash history to statewide average crash rates.

An intersection crash rate is reported as Accidents per Million Entering Vehicles (Acc/MVM), which is calculated by dividing the number of accidents per year by the number of vehicles entering the intersection (all approaches) per year. Traffic volumes were obtained from intersection turning movement counts performed by Barton & Loguidice in November 2019, as well as NYSDOT traffic data. PM peak hour turning counts (the higher of the two peak periods) were used to estimate the number of vehicles per day, assuming that peak hour traffic is 10% of daily traffic.

A segment crash rate is reported as Accidents per Million Vehicle Miles (Acc/MVM), which is calculated by dividing the number of accidents per year by the product of the number of vehicles on the segment per year and the length of the segment in miles. Traffic volumes were obtained from 24 hour counts ("tube counts") performed by Barton & Loguidice in November 2019, as well as NYSDOT traffic data.

Statewide average accident rates were obtained from NYSDOT's Average Accident Rates for State Highways by Facility Type (Based on Accident Data from January 1, 2017 to December 31, 2018). The calculated SR 13 segment crash rates were compared to the average rates based on the type of access control, rural vs. urban functional class, and number of lanes. The calculated SR 13 intersection crash rates were compared to the average rates based on the intersection control (signal / sign), rural vs. urban functional class, and number of lanes.

Table 2.14 below summarizes the calculated intersection and segment crash rates and compares the calculated rates to statewide average rates for similar facilities. A more detailed summary of intersection and segment crash rates is also included in the Appendix. There are some significant implications from the comparison of both crash rates at intersections and roadway segments, as well as the comparison between the Corridor's crash rates and the statewide average rates. Although the crash rates are generally lower at intersections when compared to segments, the crash rates at intersections are all higher than the comparative statewide average. The opposite is true for the segment crash rates; all of the segments studied along the corridor had lower crash rates than the statewide average. This initial observation suggests that the recommendations to be made along the Corridor should prioritize intersection improvements.

TABLE 2.14: INTERSECTION AND SEGMENT CRASH RATES

Five-Year Period (1/1/2014 to 12/31/2018)		
Intersection	**Calculated Rate (Acc/MVM)**	**Statewide Average Rate (Acc/MVM)**
SR 13 & Warren Rd	1.32	0.23
SR 13 & Brown Rd / Sapsucker Woods Rd	0.64	0.31
SR 13 & Hanshaw Rd	1.17	0.54
SR 13 & Lower Creek Rd	0.91	0.31
SR 13 & NY 366 (Dryden Rd)	1.09	0.54
SR 13 & NY 366 (Main St)	0.84	0.31
SR 13 & Kirk Rd / Mineah Rd	0.63	0.35
SR 13 & Ringwood Rd	0.43	0.17
SR 13 & Johnson Rd / Yellow Barn Rd	0.57	0.35
SR 13 & George Rd / Irish Settlement Rd	0.65	0.35
SR 13 & Spring House Rd	0.63	0.17
Segment	**Calculated Rate (Acc/MVM)**	**Statewide Average Rate (Acc/MVM)**
Warren Rd to Brown Rd / Sapsucker	1.19	2.25
Sapsucker Woods Rd to Hanshaw Rd	0.66	2.25
Hanshaw Rd to Lower Creek Rd	1.11	2.25
Lower Creek Rd to NY 366 (Dryden Rd)	0.64	2.25
NY 366 (Dryden Rd) to NY 366 (Main St)	1.17	3.54
NY 366 (Main St) to Kirk Rd / Mineah Rd	1.9	2.66
Kirk Rd / Mineah Rd to Ringwood Rd	1.19	2.11
Ringwood Rd to Johnson Rd / Yellow Barn	1.27	2.11
Johnson Rd / Yellow Barn Rd to George Rd	1.79	2.11
George Rd to Spring House Rd	1.68	2.11

A summary of the crash analysis at each intersection and segment within the project area, including the calculated crash rate is provided on the following pages.

WARREN ROAD @ SR 13:

Seventy-one crashes occurred over the five year period, including 1 Fatality, 19 Injury, 32 Property Damage, and 19 Non-Reportable crashes. Forty-one crashes were rear-end (mostly occurring on the SR 13 approaches), 10 crashes were right angle, and the remaining crash types were left turn (6), other (5), overtaking (i.e. passing) (3), run off road (2), head-on (2), animal (1) and right turn (1).

The fatality occurred as a result of a crash where a driver on SR 13 southbound turned left against a red arrow and was struck by a SR 13 northbound vehicle at a right angle.

Most crashes occurred during daylight hours, fair weather and dry pavement conditions. There were no apparent deficiencies or patterns noted in the crash details, other than the large percentage of rear-end crashes. It is noted that the Warren Rd intersection is the first at-grade intersection heading east from the expressway portion of SR 13 between the City of Ithaca and Lansing. Drivers on SR 13 northbound may be traveling at higher speeds and may not expect to have to stop at this intersection despite the "Signal Ahead" warning signage.

The intersection crash rate was calculated to be 1.32 accidents per million entering vehicles (Acc/MVM). The calculated rate is higher than the statewide average rate for similar facilities which is 0.23 Acc/MVM.

SR 13 SEGMENT:
WARREN RD TO BROWN RD / SAPSUCKER WOODS RD:

Twenty crashes occurred over the five year period, including 5 Injury, 9 Property Damage, and 6 Non-Reportable crashes. Five crashes were rear-end, 5 crashes were overtaking, and the remaining crash types were fixed object (4), animal (3), right turn (1), head-on (1) and other (1). At least two crashes occurred on SR 13 northbound in the vicinity of the lane drop transition from divided highway to two-lane road. Most crashes occurred during daylight hours, fair weather and dry pavement conditions. There were no apparent patterns or deficiencies noted in the crash details.

The segment crash rate was calculated to be 1.19 accidents per million vehicle miles (Acc/MVM). The calculated rate is lower than the statewide average rate for similar facilities which is 2.25 Acc/MVM.

BROWN / SAPSUCKER WOODS RD @ SR 13:

Eighteen crashes occurred over the five year period, including 6 Injury, 9 Property Damage, and 3 Non-Reportable crashes. Seven crashes were rear-end, and the remaining crash types were overtaking (2), run off road (2), fixed object (3), animal (1), bicycle (1), right angle (1), and left turn (1).

Many of the rear-end crashes were attributed to slow or stopped traffic due to vehicles turning from SR 13 to the side streets (no turn lanes present). The bicycle crash occurred as the bicyclist was attempting to cross SR 13 from Brown Rd to Sapsucker Woods Rd. The cyclist was hit by a truck turning left from Sapsucker Woods to SR 13, and the truck was at fault for not yielding the right-of-way.

Most crashes occurred during daylight hours, fair weather and dry pavement conditions. The intersection crash rate was calculated to be 0.64 Acc/MVM, which is higher than the statewide average rate for similar facilities of 0.31 Acc/MVM.

SR 13 SEGMENT: BROWN / SAPSUCKER WOODS RD TO HANSHAW RD:

Twenty-three crashes occurred over the five year period, including 4 Injury, 13 Property Damage, and 6 Non-Reportable crashes. The majority of crashes (13) were animal, and the remaining crash types were run off road (4), overtaking (1), rear end (1), right angle (1), sideswipe (1), fixed object (1) and other (1). Although most crashes occurred during daylight hours, fair weather and dry pavement conditions, a significant percentage (35%) occurred under dark unlighted conditions. Other than the large number of animal crashes which are typical considering the adjacent fields and wooded areas, there were no apparent patterns or deficiencies noted in the crash details.

The segment crash rate was calculated to be 0.66 Acc/MVM, which is lower than the statewide average rate for similar facilities of 2.25 Acc/MVM.

HANSHAW RD @ SR 13:

Thirty-seven crashes occurred over the five year period, including 8 Injury, 18 Property Damage, and 11 Non-Reportable crashes. The predominant crash type was rear-end (21 crashes), of which the majority occurred on the SR 13 northbound and southbound approaches. The remaining crash types were right angle (3), animal (3), overtaking (2), other (2), left turn (2), sideswipe (1), run off road (1), fixed object (1) and head-on (1). At least two crashes occurred at the slip ramps from Hanshaw Rd to SR 13, which are stop control.

Most crashes occurred during daylight hours, fair weather and dry pavement conditions. There were no apparent deficiencies noted in the crash details.

The intersection crash rate was calculated to be 1.17 Acc/MVM, which is higher than the statewide average rate for similar facilities of 0.54 Acc/MVM.

SR 13 SEGMENT: HANSHAW RD TO LOWER CREEK RD:

Sixteen crashes occurred over the five year period, including 1 Injury, 12 Property Damage, and 3 Non-Reportable crashes. The majority of crashes (13) were animal, and the remaining crash types were run off road (2) and other (1). 56% of crashes occurred under dark unlighted conditions, but most occurred during fair weather and dry pavement conditions. Other than the large number of animal crashes which are typical considering the adjacent wooded areas, there were no apparent patterns or deficiencies noted in the crash details.

The segment crash rate was calculated to be 1.11 Acc/MVM, which is lower than the statewide average rate for similar facilities of 2.25 Acc/MVM.

LOWER CREEK RD @ SR 13:

Twenty-three crashes occurred over the five year period, including 10 Injury, 12 Property Damage, and 1 Non-Reportable crash. Rear-end (7) and right angle (5) were the predominant crash types, and the remaining crash types were overtaking (3), fixed object (2), animal (1), sideswipe (1), left turn (1), run off road (1), head-on (1) and bicycle (1). No detail was provided for the bicycle crash.

Most crashes occurred during daylight hours, fair weather and dry pavement conditions. There were no apparent deficiencies or patterns noted in the crash details.

The intersection crash rate was calculated to be 0.91 Acc/MVM, which is higher than the statewide average rate for similar facilities of 0.31 Acc/MVM.

SR13 SEGMENT: LOWER CREEK RD TO SR 366 (DRYDEN RD):

Eleven crashes occurred over the five year period, including 5 Property Damage, and 6 Non-Reportable crashes. Predominant crash types were animal (5) and rear-end (4). The remaining crash types were sideswipe (1) and run off road (1). Most crashes occurred during fair weather and dry pavement conditions, and nearly half (45%) occurred at night.

Many of the rear-end crashes resulted from slow or stopped traffic at adjacent intersections (there are no driveways along this segment). The animal crashes are typical considering the adjacent wooded areas.

The segment crash rate was calculated to be 0.64 Acc/MVM, which is lower than the statewide average rate for similar facilities of 2.25 Acc/MVM.

SR 366 (DRYDEN RD) @ SR 13:

Forty-two crashes occurred over the five year period, including 5 Injury, 26 Property Damage, and 11 Non-Reportable crashes. Nearly half (22) were rear-end crashes, primarily occurring at the NY 366 northbound and SR 13 southbound approaches. The remaining crash types were run off road (5), animal (4), left turn (3), overtaking (2), other (2), fixed object (1), head-on (1), right angle (1) and sideswipe (1).

Several of the rear-end crashes occurred at the slip ramp from SR 366 to SR 13 northbound, which is Yield control. Most crashes occurred during daylight hours, fair weather and dry pavement conditions. The intersection crash rate was calculated to be 1.09 Acc/MVM, which is higher than the statewide average rate for similar facilities of 0.54 Acc/MVM.

SR 13 SEGMENT: SR 366 (DRYDEN RD) TO SR 366 (MAIN ST):

Forty-seven crashes occurred over the five year period, including 9 Injury, 30 Property Damage, and 8 Non-Reportable crashes. Predominant crash types were animal (17) and rear-end (10). The remaining crash types were right angle (5), fixed object (4), other (4), sideswipe (2), head-on (2), left turn (1), right turn (1), and run off road (1). Most crashes occurred during fair weather and dry pavement conditions.

Many rear-end, right angle and turn-related crashes occurred at commercial driveways clustered in the western end of the segment. Trucks were noted in several reports, which is typical for the industrial uses in this area.

The segment crash rate was calculated to be 1.17 Acc/MVM, which is lower than the statewide average rate for similar facilities of 3.54 Acc/MVM.

SR 366 (MAIN ST) @ SR 13:

Twenty-three crashes occurred over the five year period, including 3 Injury, 11 Property Damage, and 9 Non-Reportable crashes. 15 crashes (65%) were rear-end. The remaining crash types were animal (4), run off road (1), overtaking (1), fixed object (1), and head-on (1).

Most of the rear-end crashes occurred at the SR 366 southbound approach. Several crash details noted traffic starting to complete a turn from SR 366, then stopping again to wait for traffic and being hit from behind. Although not specifically noted, the hillcrest on SR 13 may be attributed to some of these rear-end crashes. Most crashes occurred during daylight hours, fair weather and dry pavement conditions.

The intersection crash rate was calculated to be 0.84 Acc/MVM, which is higher than the statewide average rate for similar facilities of 0.31 Acc/MVM.

SR 13 SEGMENT: SR 366 (MAIN ST) TO KIRK RD / MINEAH RD:

Thirty-seven crashes occurred over the five year period, including 6 Injury, 18 Property Damage, and 13 Non-Reportable crashes. The predominant crash type was animal (21 crashes, 57%), and the remaining crash types were rear-end (4), run off road (4), right angle (2), fixed object (2), sideswipe (1), overtaking (1), head-on (1) and other (1). Most crashes occurred during fair weather and dry pavement conditions. Sixteen crashes (43%) occurred with dark unlighted conditions.

Several crash reports referenced congestion and stop-and-go traffic, despite the segment being mostly low-density residential.

The segment crash rate was calculated to be 1.90 Acc/MVM, which is lower than the statewide average rate for similar facilities of 2.66 Acc/MVM.

KIRK / MINEAH RD @ SR 13:

Sixteen crashes occurred over the five year period, including 1 Fatality, 3 Injury, 10 Property Damage, and 2 Non-Reportable crashes. Crash types included animal (5), pedestrian (2), left turn (2), rear-end (2), overtaking (1), right angle (1), fixed object (1), sideswipe (1) and other (1). Most crashed occurred during daylight hours, fair weather and dry pavement conditions.

The fatality occurred when a pedestrian attempted to cross SR 13 from Kirk Rd to Mineah Rd and was struck by a vehicle traveling southbound on SR 13. The other pedestrian crash resulted in injury and occurred when a pedestrian, which was also attempting to cross SR 13 from Kirk Rd, was struck by a vehicle turning from Kirk Rd to SR 13. Both pedestrian crashes occurred at night. The Etna Community Mobile Home Park on Kirk Rd is a likely pedestrian generator, and there are no pedestrian facilities along Kirk Rd or at the SR 13 intersection. The intersection is also a stop on the TCAT bus line.

The intersection crash rate was calculated to be 0.63 Acc/MVM, which is higher than the statewide average rate for similar facilities of 0.35 Acc/MVM.

SR 13 SEGMENT: KIRK / MINEAH RD TO RINGWOOD RD:

Thirty-one crashes occurred over the five year period, including 1 Fatality, 5 Injury, 17 Property Damage, and 8 Non-Reportable crashes. The predominant crash type was rear-end (16 crashes, 52%), with the remaining crash types including animal (4), run off road (2), fixed object (2), head-on (2), other (2), overtaking (1), left turn (1), and sideswipe (1). Most crashes occurred during daylight, fair weather and dry pavement conditions.

Most of the rear-end crashes resulted from traffic turning in and out of driveways along the segment, which include a variety of residential, commercial, religious and service-related land uses. The fatality resulted from a head-on crash; no other detail was provided.

The segment crash rate was calculated to be 1.19 Acc/MVM, which is lower than the statewide average rate for similar facilities of 2.11 Acc/MVM.

RINGWOOD RD @ SR 13:

Eleven crashes occurred over the five year period, including 3 Injury and 8 Property Damage crashes. Crash types included rear-end (4), animal (2), right angle (1), left turn (1), sideswipe (1), run off road (1) and fixed object (1). Most crashes occurred during daylight and fair weather conditions, however 50% of the crashes occurred with wet or snowy & icy pavement conditions. There were no apparent patterns or deficiencies noted in the crash details.

The intersection crash rate was calculated to be 0.43 Acc/MVM, which is higher than the statewide average rate for similar facilities of 0.17 Acc/MVM.

SR 13 SEGMENT: RINGWOOD RD TO YELLOW BARN RD / JOHNSON RD:

Sixteen crashes occurred over the five year period, including 4 Injury, 9 Property Damage, and 3 Non-Reportable crashes. Predominant crash types were rear-end (6) and animal (6), with the remaining crash types including right angle (2), fixed object (1) and other (1). All crashes occurred with fair weather and dry pavement, and most occurred during daylight.

Patterns with the rear-end crashes were not apparent, but many were a result of traffic turning in and out of driveways along the segment, which include a variety of residential and commercial land uses.

The segment crash rate was calculated to be 1.27 Acc/MVM, which is lower than the statewide average rate for similar facilities of 2.11 Acc/MVM.

YELLOW BARN / JOHNSON RD @ SR 13:

Fourteen crashes occurred over the five year period, including 4 Injury, 8 Property Damage and 2 Non-Reportable crashes. Crash types included left turn (3), animal (3), right turn (3), overtaking (2), other (2), and pedestrian (1). Most crashes occurred during daylight and fair weather conditions. There were no apparent patterns or deficiencies noted in the crash details.

The pedestrian crash occurred as the pedestrian attempted to cross SR 13 from Yellow Barn Rd to Johnson Rd and was struck by a SR 13 southbound vehicle. The crash occurred at night and there are no pedestrian facilities at the intersection or along the adjacent roadways.

The intersection crash rate was calculated to be 0.57 Acc/MVM, which is higher than the statewide average rate for similar facilities of 0.35 Acc/MVM.

SR 13 SEGMENT: YELLOW BARN / JOHNSON RD TO GEORGE RD / IRISH SETTLEMENT RD:

Thirty crashes occurred over the five year period, including 2 Injury, 24 Property Damage, and 4 Non-Reportable crashes. The predominant crash type was animal (20 crashes, 67%), with the remaining crash types including rear-end (3), run off road (3), fixed object (3), and other (1). Most crashes occurred with fair weather and dry pavement, but more than half occurred with dark unlighted conditions.

Several run off road and fixed object crashes occurred in the vicinity of Willow Glen Cemetery with snow & ice / slippery pavement conditions. Many of the animal accidents occurred along the cemetery as well.
The segment crash rate was calculated to be 1.79 Acc/MVM, which is lower than the statewide average rate for similar facilities of 2.11 Acc/MVM.

GEORGE / IRISH SETTLEMENT RD @ SR 13:

Seventeen crashes occurred over the five year period, including 6 Injury, 8 Property Damage and 3 Non-Reportable crashes. Crash types included right angle (5), rear-end (3), fixed object (3), overtaking (2), left turn (2), animal (1), and sideswipe (1).

Most crashes occurred during daylight, fair weather and dry pavement conditions. Two crashes involved vehicles striking the guide rail in the northwest corner of the SR 13 & George Rd intersection. The crash details did not indicate any apparent patterns or deficiencies with the remainder of the crashes.

The intersection crash rate was calculated to be 0.65 Acc/MVM, which is higher than the statewide average rate for similar facilities of 0.35 Acc/MVM.

SR 13 SEGMENT: GEORGE / IRISH SETTLEMENT RD TO SPRING HOUSE RD:

Twenty-five crashes occurred over the five year period, including 4 Injury, 14 Property Damage, and 7 Non-Reportable crashes. The predominant crash type was animal (11 crashes, 44%), with the remaining crash types including rear-end (5), run off road (2), fixed object (2), other (2), overtaking (1), right angle (1) and sideswipe (1). Most crashes occurred with fair weather and dry pavement, but 40% (10) occurred with dark unlighted conditions.

There were no apparent patterns or deficiencies noted in the crash details.

The segment crash rate was calculated to be 1.68 Acc/MVM, which is lower than the statewide average rate for similar facilities of 2.11 Acc/MVM.

SPRING HOUSE RD @ SR 13:

Fourteen crashes occurred over the five year period, including 3 Injury, 7 Property Damage and 4 Non-Reportable crashes. The predominant crash type was rear-end (7), with the remaining crash types including other (2), bicycle (1), left turn (1), fixed object (1), head-on (1) and animal (1). Most crashes occurred during daylight, fair weather and dry pavement conditions.

The bicycle crash occurred as the cyclist was riding on the wrong side of the road and was struck by a vehicle turning from Spring House Rd to SR 13 southbound. The crash details did not indicate any apparent patterns or deficiencies in the other crashes.

The intersection crash rate was calculated to be 0.63 Acc/MVM, which is higher than the statewide average rate for similar facilities of 0.17 Acc/MVM.

TWO-YEAR DETAILED CRASH HISTORY

An abbreviated, most recent two-year period (January 1, 2017 to December 31, 2018) crash analysis was completed to investigate changes to accident rates and patterns at intersections along the SR 13 corridor as a result of spot improvements implemented by NYSDOT and/or the local municipalities. The abbreviated analysis included a review of MV-104 crash reports which provided greater detail for many of the crashes compared to the crash data summaries reviewed for the five-year analysis. The analysis also included the preparation of collision diagrams (included in the Appendix) to verify intersection locations, travel directions, and contributing factors. The two-year findings and trends were generally consistent with the full five-year analysis with regard to accident types, patterns and intersection crash rates.

A total of 118 crashes occurred at intersections along the SR 13 corridor during the two-year period. Table 2.15 summarizes the crash type and severity of the two-year crash analysis, and Table 2.16 summarizes the calculated intersection crash rates for the abbreviated two-year analysis and compares the calculated rates to statewide average rates for similar facilities.

TABLE 2.15: CRASH TYPE AND SEVERITY: MOST RECENT TWO-YEAR PERIOD

Two-Year Period (1/1/2017 to 12/31/2018) Intersections Within Overall Project Limits		
Type of Crash	**Number**	**Percentage**
Rear End	58	49%
Animal	8	7%
Right Angle	11	9%
Fixed Object	12	10%
Run Off Road	1	1%
Other/Unknown	2	2%
Overtaking	7	6%
Left Turn	11	9%
Head On	2	2%
Sideswipe	2	2%
Right Turn	2	2%
Pedestrian	1	1%
Bicycle	1	1%
Total	118	100%
Severity	**Number**	**Percentage**
Non-Reportable	23	19%
Property Damage	66	56%
Injury	29	25%
Fatality	0	1%
Total	530	100%

TABLE 2.16: INTERSECTION CRASH RATES: MOST RECENT TWO-YEAR PERIOD

Intersection	Calculated Rate (Acc/MEV)	Statewide Average Rate (Acc/MEV)
SR 13 & Warren Rd	1.02	0.23
SR 13 & Brown Rd / Sapsucker Woods Rd	0.71	0.31
SR 13 & Hanshaw Rd	1.81	0.54
SR 13 & Lower Creek Rd	1.18	0.31
SR 13 & NY 366 (Dryden Rd)	1.3	0.54
SR 13 & NY 366 (Main St)	1.1	0.31
SR 13 & Kirk Rd / Mineah Rd	0.39	0.35
SR 13 & Ringwood Rd	0.3	0.17
SR 13 & Johnson Rd / Yellow Barn Rd	0.61	0.35
SR 13 & George Rd / Irish Settlement Rd	0.65	0.35
SR 13 & Spring House Rd	0.45	0.17

EXISTING LAND USE

An analysis of the existing land use patterns along the Study Corridor creates a better understanding of the types of development that exist, and what implications those land uses may have for traffic generation and circulation along the corridor. Currently, there are eight predominate land uses that can be identified: residential, open space, agriculture, commercial, industrial/public utilities, business and technology, community services, and vacant/undeveloped. These land uses are depicted by parcel on the map below, and the primary characteristics of each land use are described on the following pages.

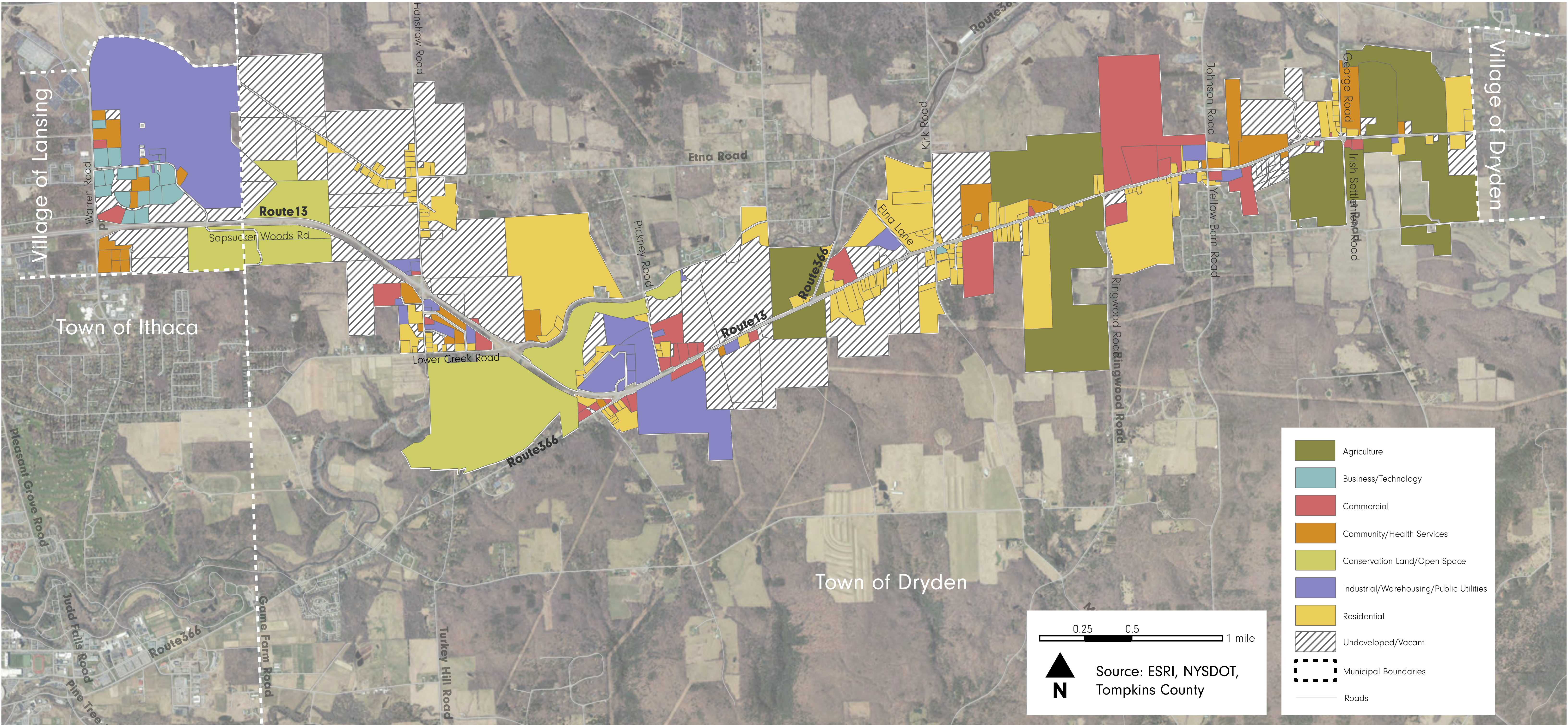


FIGURE 2.2: EXISTING LAND USE

RESIDENTIAL

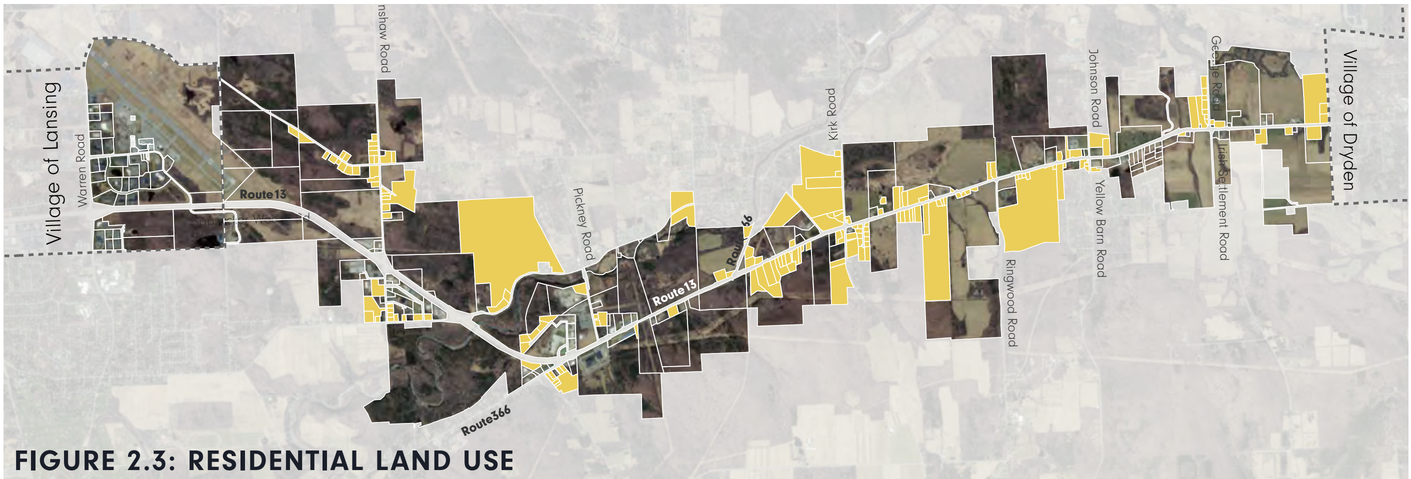


FIGURE 2.3: RESIDENTIAL LAND USE

DESCRIPTION

170 of the 370 parcels analyzed, or 46% of the corridor parcels are identified as residential parcels. Residential development is found along the entire corridor, typically in clusters at major intersections such as at Kirk Road. There are a significant amount of traditional rural residential homes built in the 19th and early 20th century. As these homes were typically multi-generational family homes for farmers along this corridor; these homes are relatively large in square footage, are sited close to SR 13, and are often located on large lots. In addition, over half of the residential parcels in the Study Area were built between the mid- to late-20th century. These homes are more suburban in nature, and often are set back farther on the lot. Both the pre- and post-war homes built along this corridor are situated on relatively large lots, with the average lot size being approximately 1.5 acres. Twelve parcels were identified as multi-family residential development, and they are distributed along the corridor with a concentration near the intersection of SR 366 towards Etna.

KEY CHARACTERISTICS

- Clustered along intersections throughout the Study Area
- 67% of residential parcels are single-family homes
- 19% of residential parcels are two- or three-family homes
- 14% are manufactured homes or apartments
- Mix of historic rural residential and 20th century suburban-style development
- Average Building Age: 1946
- Average Home Size: 1,691 ft^2
- Average Lot Size: 1.5 acres

EXAMPLES

OPEN SPACE / AGRICULTURE

FIGURE 2.4: OPEN SPACE / AGRICULTURAL LAND USE

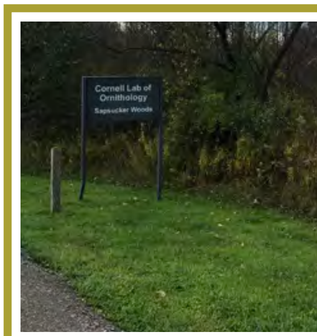
DESCRIPTION

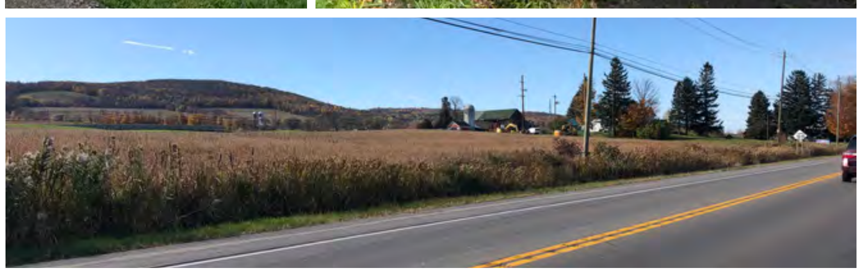
The SR 13 Corridor has historically been a rural highway leading east out of the Ithaca suburbs. While the Corridor has taken on a more developed highway services and suburban residential character over time, it still retains significant swathes of open spaces and agricultural lands and operations. Only 3.2% of parcels within the Study Area are classified as "open space" or "agricultural", but that same classification accounts for 1,311 acres or 27% of the Study Area by acreage. A 90-acre parcel in private ownership straddles SR 13 at SR 366 (Etna) and is classified as "vacant farmland". Nearly 200 acres account for field crops while nearly 500 acres over 3 parcels are devoted to dairy farming. Additionally, nearly 550 acres in the corridor is classified as conservation lands or open space – all of which is owned by Cornell University aside from an 11-acre Town of Dryden park known as the Campbell Meadows Natural Area. The Cornell properties are located along Fall Creek and adjacent to the airport constituting the Cornell Recreation Connection Area, 4-H Acres, and the Cornell Lab of Ornithology.

KEY CHARACTERISTICS

- Ownership of agricultural land among a few private farms
- Conservation lands owned by Cornell University with higher development pressures than lands to the east.
- Six (6) parcels in this classification are 90 acres or greater.
- Hopshire Farm & Brewery classified as "commercial" rather than "agricultural."

EXAMPLES





COMMERCIAL

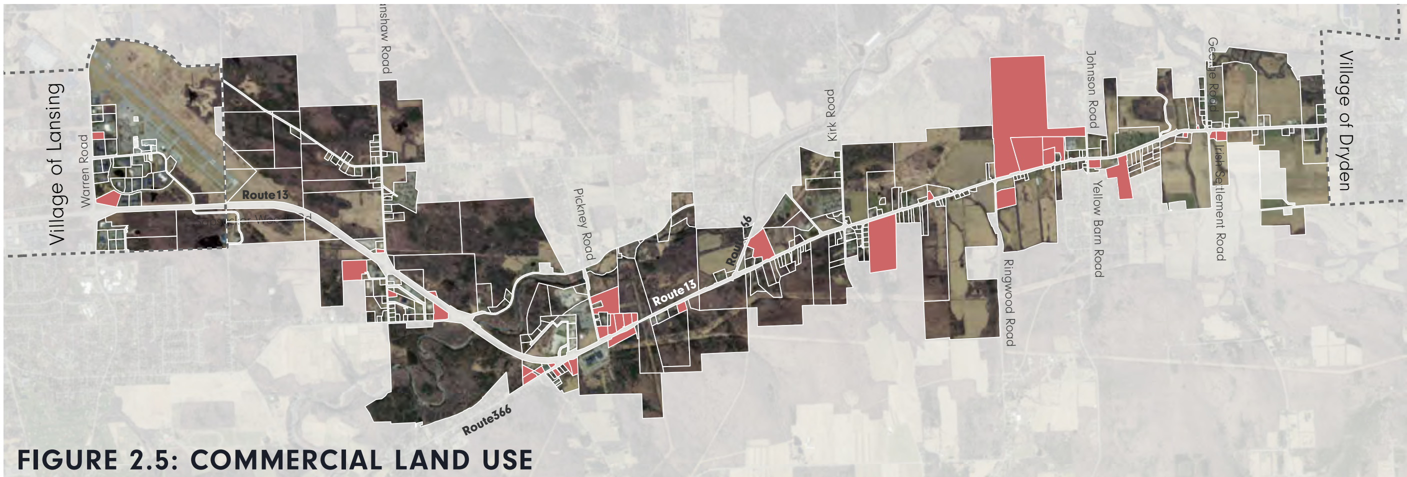


FIGURE 2.5: COMMERCIAL LAND USE

DESCRIPTION

Commercial development has crept out of the northeast Ithaca suburbs – aided by Ithaca-Tompkins International Airport – and out along the SR 13 Corridor. Much of this development has occurred steadily over the 20th century beginning with auto-related services like auto body shops, gas stations, and mini-marts as well as agriculture support services like machinery sales. In more recent years, larger commercial facilities have sought more spacious acreage and proximity to the airport such as storage facilities, office buildings, and the Courtyard by Marriot. Hopshire Farm & Brewery as well as Ringwood Raceway go-kart track are located east of the hamlet of Etna. Highway-style setback commercial development occurs sporadically east of Ringwood Road (County Route 164).

KEY CHARACTERISTICS

- Average Buidling Size: 7,114 ft^2
- Average Lot Size: 9.7 acres
- Average # of Stories: 1.25
- Commercial properties clustered where SR 13 meets SR 366 and County Route 164.
- 9.5% of parcels (35 parcels) and 7% of the acreage (341 acres) in the Study Area are classified as commercial

EXAMPLES

INDUSTRIAL / PUBLIC UTILITIES

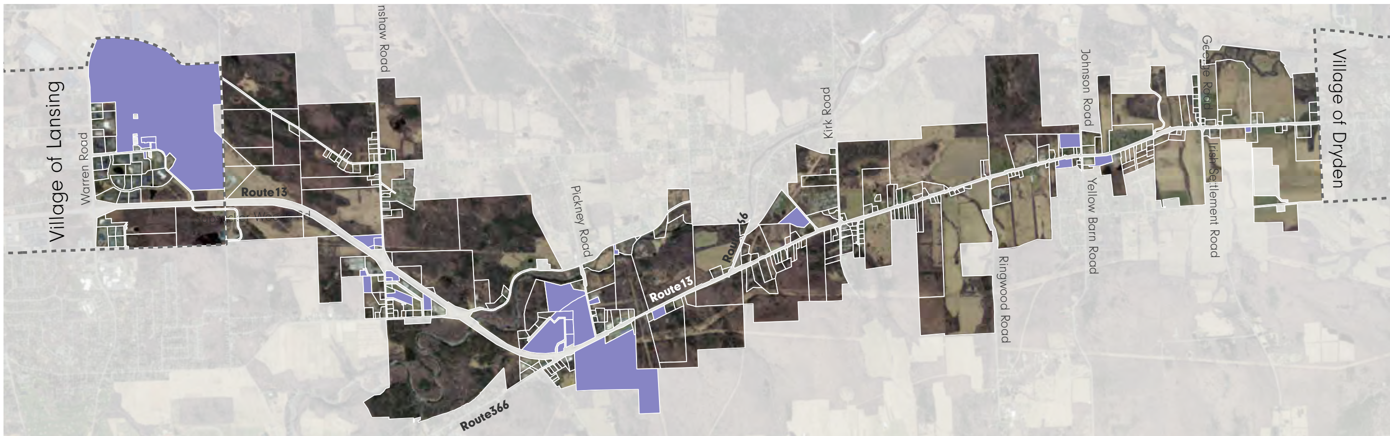


FIGURE 2.6: INDUSTRIAL / PUBLIC UTILITIES LAND USE

DESCRIPTION

Much in the same way as commercial development, industrial development has pushed eastward out of Ithaca along SR 13 and SR 366. 352 acres of the Ithaca-Tompkins International Airport is located at the western end of the Study Area and is a major regional driver of development pressures and opportunities. The other major landholder under this land use classification is New York State Electric & Gas (NYSEG), which has an office facility as well as substations on three (3) parcels totaling nearly 130 acres. A well-occupied industrial park at Hall Road is home to Vanguard Printing, Culligan Water, and Seneca Supply-Duke Company. Adjacent to the industrial park, Hanson Aggregates operates a 20-acre quarry on Pinckney Road. Several warehousing, industrial storage, and other small, light manufacturing operations are presently clustered along SR 366 and the Yellow Bard Rd-Johnson Rd intersections with SR 13.

KEY CHARACTERISTICS

- 7.5% of parcels (28 parcels) and 12.2% of the acreage (590 acres) in the Study Area are classified as industrial/ warehousing or public utilities.
- A significant amount of the industrial lands within the Study Area – 484 of 590 (82%) – is in quasi-public ownership (Airport, NYSEG, Public Utilities).
- 20 of the 28 parcels in this category within the Study Area are in private ownership.

EXAMPLES

BUSINESS & TECHNOLOGY / COMMUNITY SERVICES

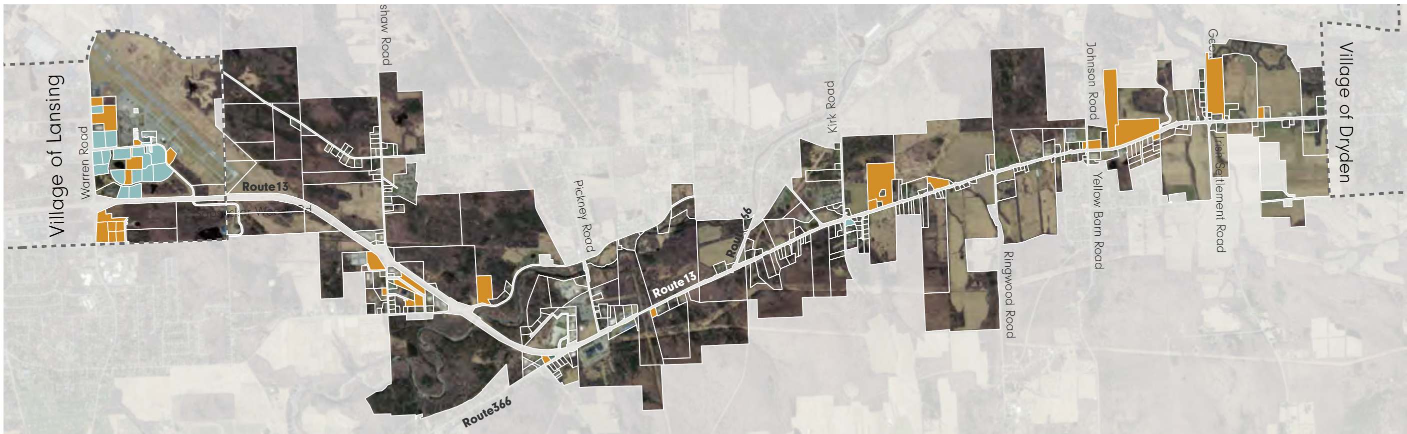


FIGURE 2.7: BUSINESS & TECHNOLOGY / COMMUNITY SERVICE LAND USE

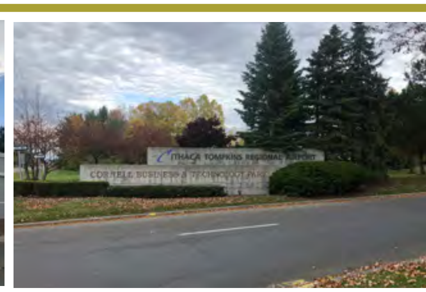
DESCRIPTION

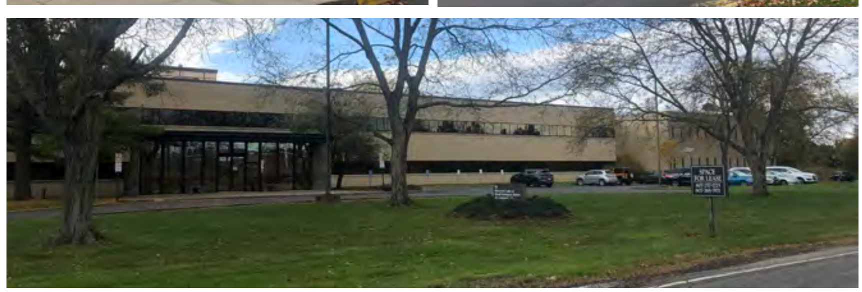
The business and technology land use category pertains to research and development, medical and health services, and technology park office uses. Community services constitute educational, religious, and social institutional uses in addition to local government and some military uses. The uses in this category are concentrated in the Cornell Business & Technology Park on County Routes 121 and 124 adjacent to the airport. There is also a cluster of community services uses at the Hanshaw Rd (CR-109) and Yellow Bard Rd-Johnson Rd intersections with SR 13 which include churches, cemeteries, and social organizations.

KEY CHARACTERISTICS

- 12.7% of parcels (47 parcels) and 5.25% of the acreage (255 acres) in the Study Area are classified as business & technology or community services.
- Ithaca B&T Associates, LLC and Cornell University own 13 of the 17 parcels in this category within the Cornell Business & Technology Park. Technology companies born out of the university often lease buildings in this park as they start-up and expand.

EXAMPLES





VACANT / UNDEVELOPED

FIGURE 2.8: VACANT / UNDEVELOPED LAND USE

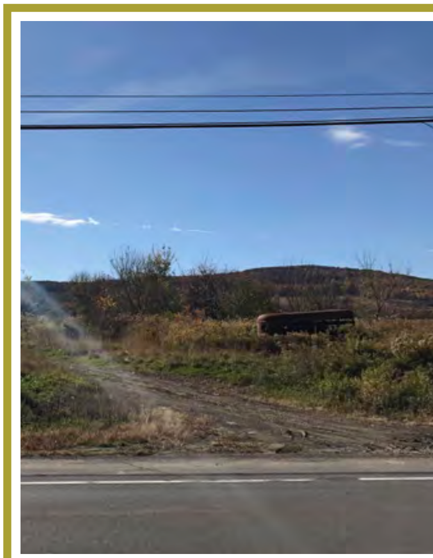
DESCRIPTION

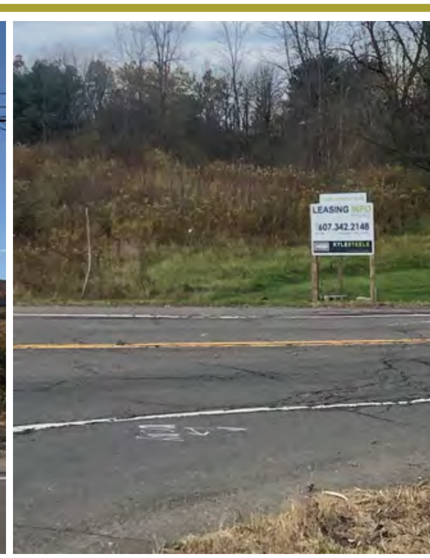
Nearly one-third of the Study Area is classified as vacant or undeveloped. This category of uses accounts for properties without active operations and without land conservation restrictions. Often, these properties were previously classified as other active uses. Vacant or undeveloped properties can be found throughout the corridor. There are a pair of commercial park subdivisions owned by David Moore as well as numerous billboard locations. Cornell University owns several hundred acres of vacant or undeveloped land in the western portion of the corridor adjacent to its other operations.

KEY CHARACTERISTICS

- 21% of parcels (77 parcels) and 32% of acreage (1547 acres) in the Study Area is classified as vacant or undeveloped.
- 36 of the 77 parcels are sub-classified as "vacant commercial" and are almost uniformly less than 4 acres in area.
- There are 9 parcels sub-categorized as "rural vacant, > 10 acres" constituting 540 acres.

EXAMPLES





EXISTING ZONING

There are eleven (11) different zoning districts present along the Study Corridor: seven of which are within the Town of Dryden, and four of which are within the Village of Lansing. The Town of Dryden's districts include Mixed Use Commercial, Light Industrial, Light Industrial/Adult, Conservation, Rural Agriculture, Rural Residential, and Neighborhood Residential. The Village of Lansing's districts include Human Health Services, Business and Technology, Research, and Medium Density Residential. Each district's intended purpose is described in further detail below. In addition, this section compares the permitted uses, bulk and dimensional requirements, and off-street parking requirements for each district in both the Town of Dryden and the Village of Lansing. These requirements, as found in both the Village and Town Codes, are presented in a set of comparative tables to better understand the differing characteristics by municipality as well as by district.

TOWN OF DRYDEN DISTRICT PURPOSES & ALLOWED USES

MIXED USE COMMERCIAL

The Mixed-Use Commercial District's purpose statement is as follows:

"The Mixed Use Commercial (MC) District allows a mix of retail and service businesses, office buildings and research and development businesses such as computer software and equipment design businesses as well as residential development. The district allows for mixed use development. Agriculture is an allowed use in this district."

The majority of retail and service business operations along the Corridor are found within this District. There are clusters of parcels zoned as such along the Corridor, in particular between the two intersections with SR 366, at the intersection of Kirk Road, and between Ringwood Road and Irish Settlement Road. The Mixed Use Commercial District is generally the most permissive of the districts that exist within the Study Area; allowing for a wide range of residential, commercial, and institutional uses.

LIGHT INDUSTRIAL & LIGHT INDUSTRIAL / ADULT

The Light Industrial District's purpose statement is as follows:

"The purpose of the Light Industrial/Office (LIO) District is to define a location in the town for light industrial and warehousing enterprises, office buildings and administrative operations and service enterprises, or research and development enterprises such as computer software and equipment design businesses. Agriculture is an allowed use in this district."

"The Light Industrial / Adult District's purpose statement is as follows:

The purpose of the Light Industrial/Office/Adult Use (LIO-A) District is to define an appropriate location in the town for adult uses that is separated from and minimizes impacts to non-compatible uses such as residential areas, schools, churches and parks. In addition to adult uses, all other uses permitted within the Light Industrial/Office District are permitted within the Light Industrial/Office/Adult Use District. Agriculture is an allowed use in this district."

These two districts have significant overlap, with the exception of adult uses being permitted in the latter. These districts are meant to support industrial and warehousing operations in the Town, while also allowing some commercial development. The parcels zoned as such within this corridor are the only industrially-zoned parcels in the Town, and the two major clusters exist adjacent to the airport and at the intersection of SR 366

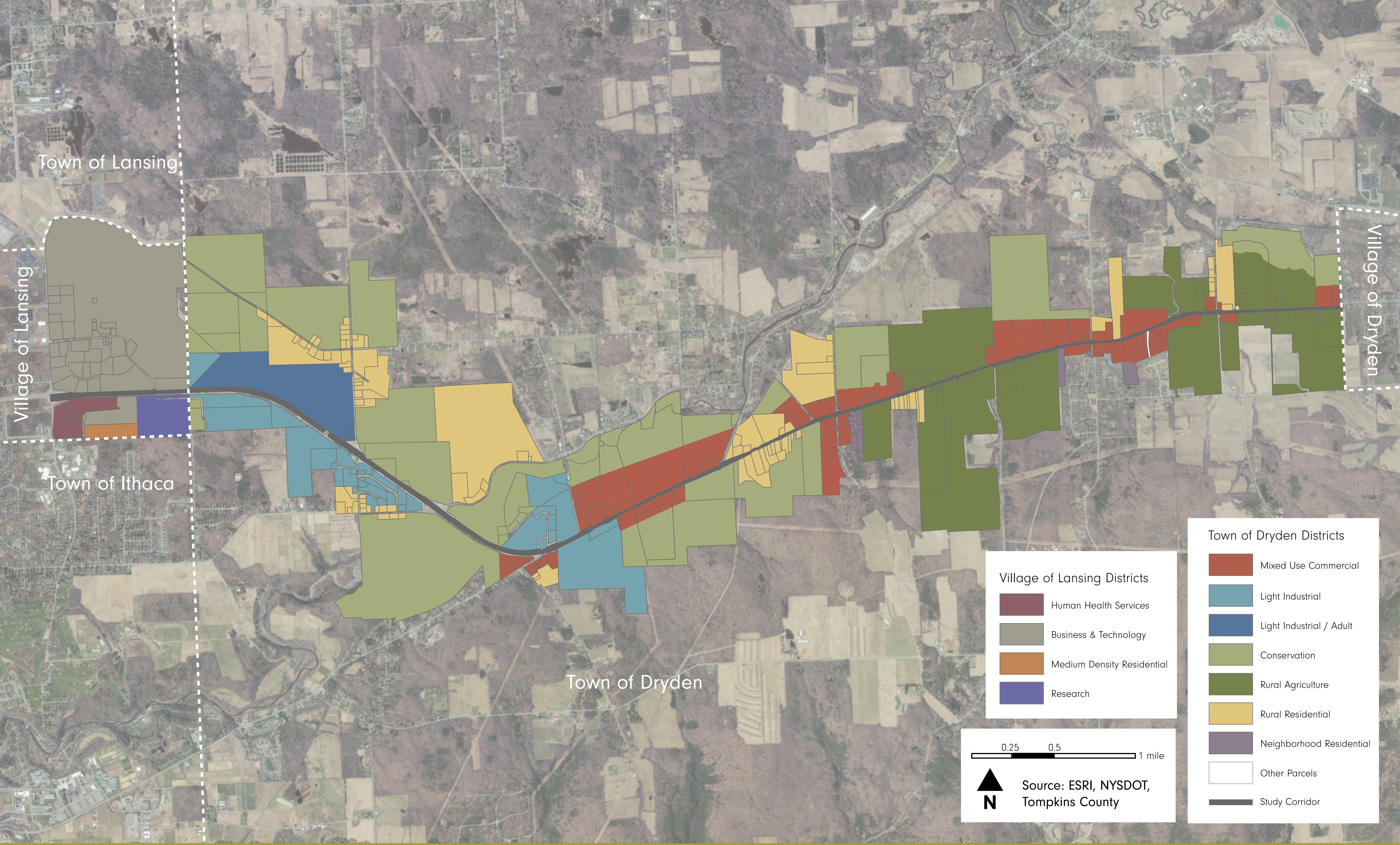


FIGURE 2.9: EXISTING ZONING

(towards Varna). A wide range of commercial, industrial and institutional uses are permitted and specially permitted, but residential development is not allowed in these Districts.

CONSERVATION

The Conservation District's purpose statement is as follows:

"The purpose of the Conservation (CV) District is to protect areas of the town that contain a variety of ecological and Open Space assets that warrant protection from the impacts of development. Residential uses and agriculture will remain the primary land use activities."

This district is intended to mitigate the effects of development along this corridor, and help maintain the rural character of the corridor/Town. However, some limited development is permitted in this district as well. The parcels zoned as such along the corridor are generally located behind commercial or residential parcels that are directly located along SR 13. There are a range of residential, commercial, and other uses permitted, but industrial and high-intensity commercial uses are expressly prohibited.

RURAL AGRICULTURE

The Rural Agriculture District's purpose statement is as follows:

"The purpose of the Rural Agricultural (RA) District is to define an area of the town primarily for agricultural use and associated natural areas protection. The Rural Agricultural District is an area that is intended to remain rural and where agriculture is recognized as the primary land use. Small scale rural businesses which are agriculturally related or supporting may be appropriate in this district."

This district is also intended to maintain the rural character of the Town. Parcels zoned as such are generally located at the eastern portion of the Study Corridor, adjacent to the Village. The intent of this is to encourage development within the Village center and within commercial nodes, while preventing development from sprawling out into the undeveloped portions of the Town. The same residential uses are permitted as in the Rural Residential District, but more commercial uses are permitted in this District.

RURAL RESIDENTIAL

The Rural Residential District's purpose statement is as follows:

"The purpose of the Rural Residential (RR) District is to define an area of the town where residential uses situated in a rural landscape constitute the primary land use. Public water and sewer does not exist in this area. Single-and two-family homes are the predominant form of development. Agriculture is also expected to be a substantial land use well into the future."

This District is intended to preserve the traditional residential development along the corridor and also maintain the rural character of the Town. The majority of the parcels zoned Rural Residential are 19th and early 20th century farm homes on large lots that were formerly or still currently used for agricultural purposes. There are also clusters of more recently built homes that are zoned as Rural Residential; they are consistent with the rural housing character, and are often adjacent to conservation districts that are undeveloped. Some non residential uses are permitted and specially permitted, but industrial uses are expressly prohibited.

NEIGHBORHOOD RESIDENTIAL

The Neighborhood Residential District's purpose statement is as follows:

"The purpose of the Neighborhood Residential (NR) District is to define areas of the town where established neighborhoods are situated in a rural landscape and constitute the primary land use. Single family homes are the predominant form of development, and future development is unlikely. Home Occupations are the primary commercial activity in this district. Agriculture is an allowed use in this district. "

There are few parcels within the Study Area that are zoned Neighborhood Residential. These parcels are developed as more suburban-style residences, and have less of an agrarian character than those in the Rural Residential District. The most significant difference in permitted uses from the Rural Residential District is that there are significantly less non-residential uses allowed through special permitting in the Neighborhood Residential District.

VILLAGE OF LANSING DISTRICT PURPOSES & ALLOWED USES

HUMAN HEALTH SERVICES

The Human Health Services District's intent is as follows:

"The legislative intent of this section is to define and establish standard regulations for the Village in areas where facilities related to the provision of human health services are the desired land use; where public utilities to serve such facilities are available; where both residential and other forms of nonresidential use would be less desirable than use for provision of human health services; and where convenience of location and ease of access render such areas most efficiently used for such purposes of provision of human health services."

The parcels in the Study Area zoned as such are at the western-most edge of the Study area, and are all currently developed as medical offices with the exception of one parcel. This district provides a centralized location for residents to access medical services within the Village. Assisted and special care living facilities are also allowed via special permit. The physical environment in this district is auto-centric, and has a suburban office park development pattern.

BUSINESS AND TECHNOLOGY

The Business and Technology District's intent is as follows:

"The legislative intent of this section is to define and establish standard regulations for the Village where light manufacturing and other specialized uses of a similar business and technological nature are appropriate, together with additional and compatible administrative, governmental, office, studio and service uses; and to protect the value of these areas by discouraging incompatible development and small lot divisions that will reduce the efficient use of land for the purposes provided for in this district."

The parcels that are zoned as Business and Technology in the Study Area encompass the Ithaca Tompkins International Airport, the Cornell Business & Technology Park, and a few adjacent parcels along Warren Road. This district supports a significant amount of technology companies and research/lab facilities, as well as some government-related uses. The development pattern in this district generally consists of suburban-style office buildings with large footprints, and a plethora of off-street parking to support employees and visitors. The district allows limited commercial development through special permitting.

RESEARCH

The Research District's intent is as follows:

"The legislative intent of this section is to define and establish standard regulations for the Village where research and other specialized uses of a similar educational nature are appropriate and to protect the value of these areas by discouraging incompatible development and small lot subdivisions that will reduce the efficient use of land for research."

This district is particularly limited in terms of permitted uses. Only natural parks and underground utilities are expressly permitted without any additional restrictions or special use permit required. There is one parcel zoned as such in this Study Area, and in the Village of Lansing as a whole. This parcel is home to the Cornell Lab Ornithology. There is a research center at the lab as well as a signficant amount of open space with a trail system. This parcel will likely remain as such for the foreseable future, and is compatible with the adjacent conservation and research land uses in the Town of Dryden.

MEDIUM DENSITY RESIDENTIAL

The Medium Density Residential District's intent is as follows:

"The legislative intent of this section is to define and establish standard regulations for the Village where moderately dense residential development can be supported by the road system, the topography, public water and sewer facilities and where such development is the desired predominant land use."

There is one parcel zoned as such in this Study Area. The parcel is currently undeveloped, but is permitted to have one- or two-family residential development. This district is one of the least permissive in the Study Area, and does not allow any form of commercial development.

PERMITTED USE TABLES

Tables 2.17 through 2.22 on the following pages compare the uses permitted, specially permitted, and prohibited by each district in the Town and Village. The following codes are used to describe the permitted/ non permitted uses:

- P: Permitted
- SUP: Special Use Permit
- X: Prohibited
- *: Additional Regulations exist on this use

TABLE 2.17: VILLAGE OF LANSING RESIDENTIAL USES

Use	Human Health Services (HHSD)	Business and Technology (BTD)	Research (RSH)	Medium Density Residential (MDR)
Assisted Living Facility	SUP*	X	X	SUP*
Additional Residential Building	X	X	X	SUP*
Home Occupation	X	X	X	SUP*
One-Unit Residential Building	X	X	X	P
Special Care Facility	SUP*	X	X	SUP*
Two-Unit Residential Building	X	X	X	P

TABLE 2.18: VILLAGE OF LANSING COMMERCIAL USES

Use	Human Health Services (HHSD)	Business and Technology (BTD)	Research (RSH)	Medium Density Residential (MDR)
Commercial Assembly Soft Goods	X	SUP	X	X
Commercial Crop/Animal	X	X	X	SUP*
Bank Administration	X	SUP	X	X
Employee Cafeteria Food and Beverage	P*	X	P*	X
Hospital	X	X	X	X
Low Traffic Food and Beverage	X	SUP*	X	X
Medical Clinic	SUP	X	X	X
Medical Lab	SUP	X	X	X
Medical Office	SUP	X	X	X
Motel/Hotel	X	SUP*	X	X
Office/Studio/Services	X	SUP*	X	X
Pharmacy	SUP*	X	X	X
Research/Design/Prototype Production	X	X	X	X
Temporary Commercial Activities	P*	SUP	P*	X
Transportation Services	X	X	X	X

TABLE 2.19: VILLAGE OF LANSING INDUSTRIAL/OTHER USES

Use	Human Health Services (HHSD)	Business and Technology (BTD)	Research (RSH)	Medium Density Residential (MDR)
Government Building	X	SUP	X	X
Indoor Recreation	X	SUP	X	X
Light Industry/Manufacturing	X	SUP	X	X
Outdoor Recreation/Club	X	SUP	X	SUP
Natural Park	P	P	P	P
Religious Facility	X	X	X	SUP
Research/Design/Prototype Production	X	SUP	SUP	X
School	X	X	X	SUP
Temporary Non-Commercial Activities	P	P	P	X
Utility Service Underground	P	P	P	P
Utility Transmission/Storage/Plant	SUP	SUP	SUP	SUP
Warehousing/Storage/Distribution	X	SUP*	X	X

TABLE 2.20: TOWN OF DRYDEN RESIDENTIAL USES

Use	Neighborhood Residential (NR)	Rural Residential (RR)	Rural Agricultural (RA)	Conservation (CV)	Mixed Use Commercial (MC)	Light Industrial/ Adult (LIO / LIO_A)
Bed & Breakfast Home	P	P	P	SUP	P	X
Bed & Breakfast	X	P	P	P	P	SUP
Boarding House	X	SUP	SUP	X	X	X
Congregate Care Facility	X	P	P	P	P	X
Dwelling, Accessory	P	P	P	P	P	X
Dwelling, Multi-Family	X	SUP	SUP	X	SUP	X
Dwelling, Single	P	P	P	P	P	X
Dwelling, Two-Family	X	P	P	P	P	X
Dwelling-Upper Floor Apartments	X	X	X	X	SUP	X
Elder Cottage	P*	P*	P*	P*	P*	X
Home Occuption (Level 1)	P	P	P	P	P	X
Home Occupation (Level 2)	X	SUP	SUP	SUP	SUP	X
Inn	X	SUP	SUP	SUP	P	X
Manufactured Home	X	P	P	P	SUP	X
Manufactured Home Park	X	SUP*	SUP*	X	SUP*	X
Mobile Home	X	X	X	X	X	X
Senior Housing, Family	SUP	SUP	SUP	SUP	SUP	X
Senior Care Facility	X	SUP	SUP	X	SUP	X

TABLE 2.21: TOWN OF DRYDEN COMMERCIAL USES

Use	Neighborhood Residential (NR)	Rural Residential (RR)	Rural Agricultural (RA)	Conservation (CV)	Mixed Use Commercial (MC)	Light Industrial/ Adult (LIO / LIO_A)
Adult Use	X	X	X	X	X	SUP*
Artist Studio / Craft Workshop	X	SUP	P	P	P	P
Automotive Repair Garage	X	SUP	SUP	SUP	SUP	SUP
Automotive Sales	X	X	X	X	SUP	SUP
Automotive Salvage & Junk Yards	X	X	SUP	SUP	SUP	SUP
Automotive Towing Service	X	X	SUP	X	SUP	SUP
Car Wash	X	P	P	P	SUP	P
Day Care Center, Child	X	SUP	SUP	X	P	P
Day Care Home, Family	P	P	P	P	P	X
Day Care Home, Family Group	P	P	P	P	P	X
Drive-Through Facility	X	X	X	X	SUP	SUP
Farmstand	P	P	P	P	P	P
Gasoline Station	X	X	X	X	SUP	SUP
General Office Building	X	X	X	X	P	P
Hotel / Motel	X	X	X	X	P	SUP
Kennel	X	SUP	SUP	SUP	SUP	X
Large Scale Retail Development	X	SUP	X	X	SUP	SUP
Nursery/Greenhouse, Retail	X	SUP	P	SUP	P	X
Professional Office	X	SUP	P	SUP	P	P
Restaurant	X	SUP	SUP	X	P	SUP
Retail Business	X	X	SUP	X	P	P
Retail Shopping Centers / Plaza	X	X	X	X	SUP	X
Self-Storage	X	X	X	X	SUP	SUP
Service Business	X	SUP	SUP	X	P	P
Theatre	X	X	X	X	P	P

TABLE 2.22: TOWN OF DRYDEN INDUSTRIAL / OTHER USES

Use	Neighborhood Residential (NR)	Rural Residential (RR)	Rural Agricultural (RA)	Conservation (CV)	Mixed Use Commercial (MC)	Light Industrial/ Adult (LIO / LIO_A)
Agricultural Use	P	P	P	P	P	P
Agriculture-Related Enterprise	X	SUP	P	P	P	SUP
Campground	X	SUP	SUP	SUP	X	X
Cemetery	X	P	P	P	P	P
Contractor's Yard	X	SUP	SUP	P	P	P
Educational Use	X	SUP	SUP	SUP	SUP	X
Industry, Light	X	X	X	X	P	P
Industry, Manufacturing	X	X	X	X	SUP	SUP
Library	X	SUP	X	X	SUP	X
Lodge or Club	X	SUP	SUP	SUP	P	X
Mining	X	X	SUP*	SUP*	X	SUP*
Municipal Use	P	P	P	P	P	P
Public Safety Use	X	SUP	SUP	SUP	SUP	SUP
Public Utility	X	SUP	SUP	SUP	SUP	SUP
Religious Institution	SUP	SUP	SUP	SUP	SUP	SUP
Recreation, Active	X	SUP	SUP	SUP	SUP	SUP
Recreation, Passive	P	P	P	P	P	P
Recreation Facility, Amusement	X	X	SUP	X	SUP	SUP
Recreation Facility, Athletic	X	SUP	SUP	SUP	SUP	SUP
Recreation Facility, Motorized	X	X	SUP	SUP	X	X
Retreat or Conference Center	X	SUP	SUP	SUP	SUP	X
Warehouse	X	X	X	X	SUP	P
Workshop/Garage Non-Commercial	P	P	P	P	P	P

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BULK & DIMENSIONAL REQUIREMENTS

MINIMUM LOT SIZE

The dimensional and bulk requirements for each district were compared across the Town and Village, which are presented in Table 2.23, and the key characteristics that differ between districts and the municipalities were identified. The minimum lot size for all districts in the Town is generally smaller than those of the Village, notably in the commercial districts within the Study Area. The Town requires an area of 10,000 square feet for lots with sewer and water, and 1 acre for those without such infrastructure. The Village's minimum lot sizes vary more. Lots zoned as Medium Residential with sewer and water are required to be approximately 0.5 acres, and those without are required to be 1-2 acres, depending on the type of development.

SETBACKS

The front and side yard setback requirements are greater in the Village than those in the Town, in some instances by more almost double the length. This is potentially due to the nature of development occurring in the portion of the Study Area that lies within Village boundaries, but something that the Village and Town should consider reconciling the differences between the two codes to accommodate a consistent development pattern along the corridor. The rear yard setback requirements are generally consistent among all of the districts in the Study Area, with the exception of the Human Health Services and Medium Density Residential Districts which are larger. It should be noted that there are no side or rear setback requirements for accessory uses in several of the Village's districts. The existing rear and side setbacks for accessory uses within the Village's existing code are significantly larger than those in the Town (25 feet vs. 1 foot).

FRONTAGE, WIDTH, & HEIGHT

The lot frontages in the Town and Village's districts are generally consistent, with the Town's being slightly larger in general. There are no minimum lot width requirements in the Village, but there are such requirements in the Town's code. The maximum lot coverage across the districts is generally consistent (between 15-25%), with the exception of the 60% maximum lot requirement for both Mixed Use Commercial and Light Industrial Districts. The Conservation District's maximum lot coverage can be 10% less than that of comparable districts in the Study Area, such as the Rural Residential and Medium Density Residential Districts. The maximum building height in all the districts is also consistent, at 35 feet (or about three stories), with the exception of the Business and Technology and the Research Districts, which allow for an additional ten feet of building height.

TABLE 2.23: DIMENSIONAL AND BULK REQUIREMENTS

			Village of Lansing				Town of Dryden					
			Human Health Services (HHSD)	Business and Technology (BTD)	Research (RSH)	Medium Density Residential (MDR)	Neighborhood Residential (NR)	Rural Residential (RR)	Rural Agricultural (RA)	Conservation (CV)	Mixed Use Commercial (MC)	Light Industrial/ Adult (LIO / LIO_A)
Minimum Lot Area	With Public Sewer and Water Facilities	1-Unit Residential	10,000 sf	40,000 sf	40,000 sf	20,000 sf	10,000 sf	10,000 sf	10,000 sf	10,000 sf	10,000 sf	10,000 sf
		2-Unit Residential				25,000 sf						
		All Other Uses				20,000 sf						
	Without Public Sewer and Water Facilities	1-Unit Residential	10,000 sf	40,000 sf	40,000 sf	60,000 sf	1 acre	1 acre[2]	1 acre[2]	1 acre	1 acre	1 acre
		2-Unit Residential				90,000 sf						
		All Other Uses				60,000 sf						
Minimum Front Yard Setback		1- & 2- Unit Residential	75 ft	75 ft	75 ft	40 ft	50 ft	50 ft	50 ft	50 ft	40 ft	40 ft
		All Other Uses				75 ft						
Minimum Side Yard Setback	With Public Sewer and Water Facilities	Principle Use	25 ft	25 ft	25 ft	20 ft/25 ft[1]	15 ft	15 ft	15 ft	15 ft	15 ft	15 ft
		Accessory Use	N/A	N/A	N/A	10 ft/15 ft[1]	1 ft	1 ft	1 ft	1 ft	1 ft	1 ft
	Without Public Sewer and Water Facilities	Principle Use	25 ft	25 ft	25 ft	25 ft	25 ft	25 ft	25 ft	25 ft	25 ft	25 ft
		Accessory Use	N/A	N/A	N/A	15 ft	1 ft	1 ft	1 ft	1 ft	1 ft	1 ft
Minimum Rear Yard Setback	With Public Sewer and Water Facilities	Principle Use	40 ft	25 ft	25 ft	40 ft	25 ft	25 ft	25 ft	25 ft	25 ft	25 ft
		Accessory Use	25 ft	N/A	N/A	20 ft/25 ft[1]	1 ft	1 ft	1 ft	1 ft	1 ft	1 ft
	Without Public Sewer and Water Facilities	Principle Use	40 ft	25 ft	25 ft	40 ft	25 ft	25 ft	25 ft	25 ft	25 ft	25 ft
		Accessory Use	25 ft			25 ft	1 ft	1 ft	1 ft	1 ft	1 ft	1 ft
Minimum Lot Frontage	With Public Sewer and Water Facilities	1- Unit Residential	100 ft	200 ft	200 ft	100 ft	150 ft	250 ft	250 ft	250 ft	150 ft	150 ft
		2- Unit Residential				125 ft						
		All Other Uses				100 ft						
Minimum Lot Frontage	Without Public Sewer and Water Facilities	1- Unit Residential	100 ft	200 ft	200 ft	150 ft	150 ft	250 ft	250 ft	250 ft	150 ft	150 ft
		2- Unit Residential				200 ft						
		All Other Uses				150 ft						
Minimum Lot Width			N/A	N/A	N/A	N/A	100 ft	100 ft	100 ft	100 ft	125 ft	125 ft
Maximum Lot Coverage			N/A	25%	25%	15%/10%[3]	25%	25%	25%	15%	60%	60%
Maximum Building Height		Principle Use	35 ft	45 ft	45 ft	35 ft	35 ft	35 ft	35 ft	35 ft	35 ft	35 ft
		Accessory Use	15	15 ft	15 ft	15 ft	15 ft	15	15 ft	15 ft	15 ft	15 ft

[1]First measurement is for residential uses; the second is for all other uses.

[2]Except for major subdivision

[3]First percentage is for sewered areas; the second is not non-sewered areas.

OFF-STREET PARKING REQUIREMENTS

ACCESS, LOADING, & LANDSCAPING REQUIREMENTS

The parking requirements of both zoning codes were assessed as a part of the existing zoning analysis. The first notable difference between the parking requirements in each code is that the Village of Lansing has setback requirements for required off-street parking, but the Town does not. Another notable component of the parking requirements is that the Town of Dryden's Planning Board is allowed to require the interconnection of parking areas in adjacent lots via access drives in order to encourage safe and convenient traffic circulation. The Village of Lansing's code does not contain such language. Bike parking is listed as a potential requirement during Site Plan Review for the Town, but there is no mention of requiring any type of bicycle parking or facilities in the Village's code. The Town has specific loading berth requirements based on land use classifications and square footage. The Village's code is less specific, and states that "loading space must be adequate for the proposed use and must not encroach upon public access or parking spaces."

For parking areas with 25 or more spaces, the Town requires that at least 15% of the land within the parking area consists of raised landscaped islands. Adequate pedestrian accommodation also must be provided for in these parkings areas, as well as shade trees, and native plantings. The Village also has a similar requirement, but it is for parking areas with 5 or more spaces. Pedestrian accommodations must be clearly delineated in the Business and Technology and Research Districts, but the code does not explicitly state that they need to exist, only that they need to be well marked.

MINIMUM PARKING REQUIREMENTS

As seen in Table 2.24 on the following page, the parking requirements for each municipality can be somewhat similar, but differ for several uses. For instance, the parking requirements for outdoor recreation facilities and religious facilities are exactly the same. However, the required amount of spaces for a bar or tavern are three times higher in the Village than they are in the Town. In addition, many uses in the Village's code do not have set parking requirements, but are determined on a case-by-case basis by the relevant authoritative board.

In addition to minimum parking requirements, both the Village and the Town require that any parking area does not exceed more than 120% of the required spaces. For mixed-use lots, the Town requires that the owner provides 125% of the required spaces for the most parking-intensive use on the lot. The Village requires that the number of spaces equal the combined required amounts for each use. In both codes, the respective authoritative board has the authority to reduce the number of parking spaces required if they deem appropriate. However, the space in which those additional spaces could be constructed must be maintained as landscaped open ground in the case that additional spaces are necessary.

TABLE 2.24: MINIMUM PARKING REQUIREMENTS

Use Category	Town of Dryden	Village of Lansing
Boarding House / Bed & Breakfast	1 space / bedroom[d]	Based on Site Plan Review
College, Trade School, Post-Secondary Educational Facility	1 space / 2 employees + 1 space / 2 students	Based on Site Plan Review
Commercial Recreation Facility (Indoor)	1 space / 200 sf[a]	1 space / 200 sf; or or 4 space / alley or court if a bowling alley or tennis court
Commercial Recreation Facility (Outdoor)	1 space / 7500 sf[a]	1 space / 5,000 sf[e]
Community / Civic Center	1 space / 250 sf + 1 space / 2 employees	Based on Site Plan Review
Educational Building	1 space / employee + 1 space / 2 students	Based on Site Plan Review
Gasoline Filling Station	1 space / pump island[b]	Based on Site Plan Review
High Traffic Food & Beverage: Bar or Tavern	1 space / 150 sf	2 spaces / 100 sf
High Traffic Food & Beverage: Restaurant	1 space / 150 sf	Based on Site Plan Review
Home Occupation	Based on Special Use Permit Hearing[d]	Based on Site Plan Review
Hospital, Nursing Home, or Similar Use	1 space / 4 beds + 1 space / employee / shift	Based on Site Plan Review
Hotel / Motel	1 space / room + 1 space / 2 employees	1.25 space / room
Low Traffic Food & Beverage: Restaurant with Bar	1 space / 150 sf	2 spaces / 100 sf
Low Traffic Food & Beverage: Restaurant without Bar	1 space / 150 sf	1 space / 100 sf
Lumber, Building Materials, Other Storage Yard	1 space / 2 employees + 1 space / 5,000 sf	Based on Site Plan Review
Machinery Display & Repair	1 space / 2 employees + 1 space / 5,000 sf	Based on Site Plan Review
Manufacturing, Assembly, Other Light Industrial Use	1 space / 2 employees / shift	1 space / 300 sf
Medical & Dental Office & Clinic	1 space / 150 sf	4 spaces / service provider + 1 space / office employee
One- and Two-Family Residential Building	1 space	1 space / dwelling unit
Other Residential	1 space / bedroom	1.5 space / dwelling unit
Professional Office / Studio	1 space / 250 sf	1 space / 200 sf
Park / Playground	Based on Site Plan Review	1 space / 5,000 sf[e]
Religious Facility	1 space / 4 seats in sanctuary	1 space / 4 seats in sanctuary
Research Office / Laboratory	1 space / 200 sf or 1 space / 2 employees on largest shift; whichever is greater	1 space / 300 sf
Retail Shop or Store	5 spaces / 1,000 sf	Based on Site Plan Review
Service Uses	1 space / employee or 1 space / 500 sf; whichever is greater	Based on Site Plan Review
Shopping Center	5 spaces / 1,000 sf[c]	Based on Site Plan Review
Theatres	N/A	1 space / 4 seats
Undertaking	N/A	1 space / 50 sf[f]
Wholesale, Storage, Warehouse Facilities	1 space / 2,000 sf of warehouse space + 1 space / 250 sf of office space	Based on Site Plan Review

VACANT ZONING ANALYSIS

In order to better understand the potential development opportunities in the Study Area, and the subsequent impacts to the traffic operations on SR 13, the zoning for each parcel identified as vacant or undeveloped in the existing land use analysis was highlighted in the map in Figure 2.10. The distribution of vacant land by zoning district is presented by both acreage and number of parcels in Table 2.25 below:

TABLE 2.25: VACANT PARCELS BY ZONING DISTRICT

District	# of Acres	# of Parcels	% of Acres	% of Parcels
Business & Technology	72	4	5%	5%
Human Health Services	16	1	1%	1%
Conservation	1006	23	65%	28%
Mixed Use Commercial	113	29	7%	35%
Light Industrial	174	7	11%	8%
Medium Density Residential	17	1	1%	1%
Rural Agriculture	98	7	6%	8%
Rural Residential	51	12	4%	14%

The vast majority (65%) of vacant acreage in the Study Area is within the Conservation District. This has significant implications for future development, as the district's intent is to preserve critical natural resources and open space within the Town. As mentioned previously, the maximum lot coverage for this District is 15%, and the most intensive uses permitted are single- and two-family dwellings. This implies that any increases in traffic generation due to development in the conservation district will be minimal.

The second most prevalent zoning district for vacant parcels in the Study Area by acreage is Light Industrial. It is important to note that the only vacant parcels zoned for industrial development within the Town are within the Study Area, suggesting that any new industrial development would occur along and impact the traffic operations of the Study Corridor. Any new development in this district has the potential to generate a higher level of traffic than development in the Conservation District, however there is significantly less opportunity for industrial development.

The third largest category of undeveloped land in the Study Area is in the Mixed-Use Commercial district, accounting for 7% of the total acreage, but 35% of total parcels. 10% of these parcels are clustered between Irish Settlement Road and Yellow Barn Road, averaging approximately 1.5 acres in size. There are some larger parcels between Pinckney Road and SR 366 (towards Varna) that are partially zoned as Mixed Use Commercial, providing an opportunity for some larger-scale commercial development along the corridor.

This preliminary look at the potential development opportunities along the SR 13 corridor suggests that there is limited opportunity for intense development, mostly due to the existence of the Conservation District. The opportunities for industrial and commercial development, which may have a more significant impact on traffic operations, are clustered in nodes along the corridor, suggesting an opportunity to consider access management strategies for any such development in the future.

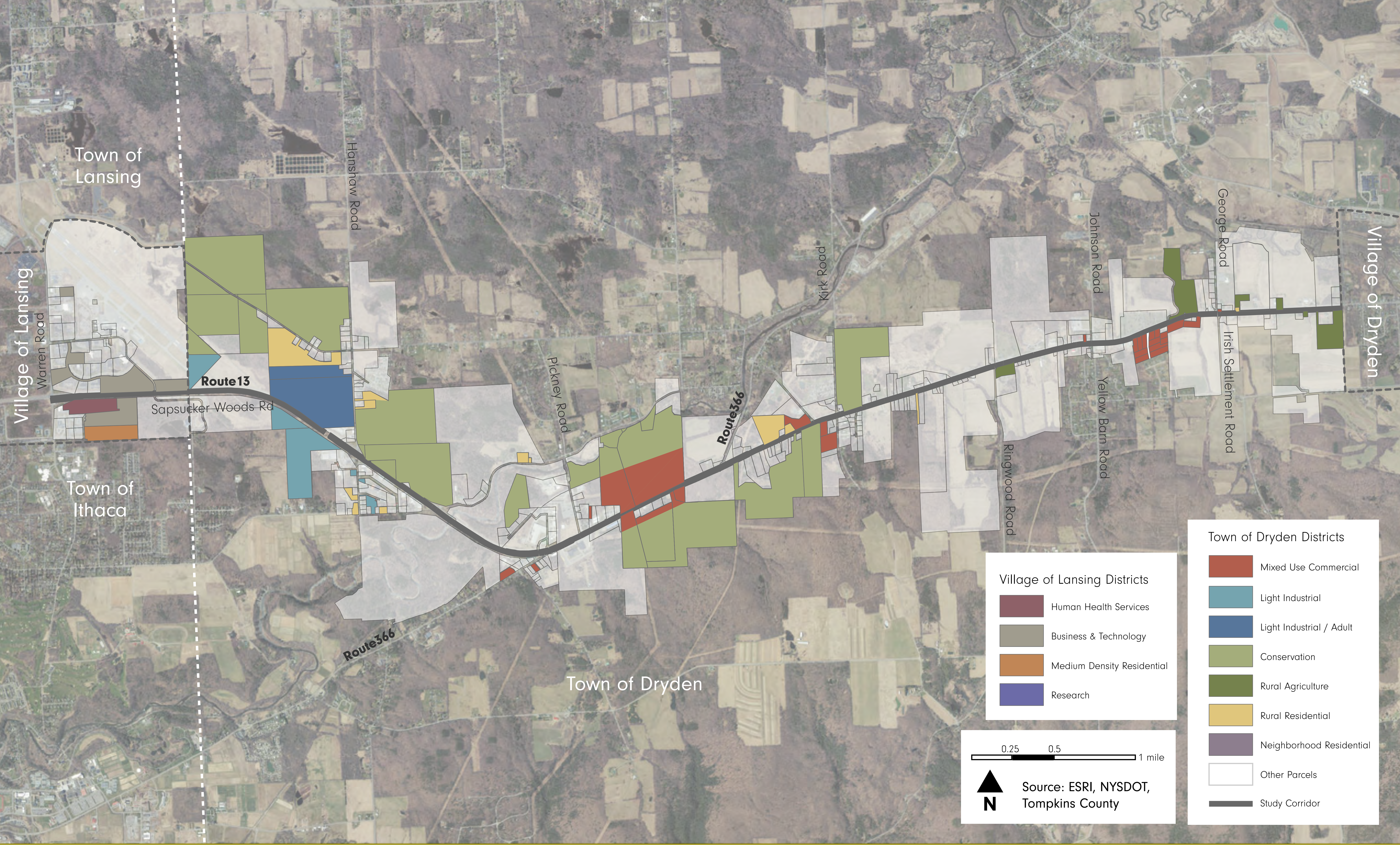

FIGURE 2.10: EXISTING ZONING FOR VACANT PARCELS

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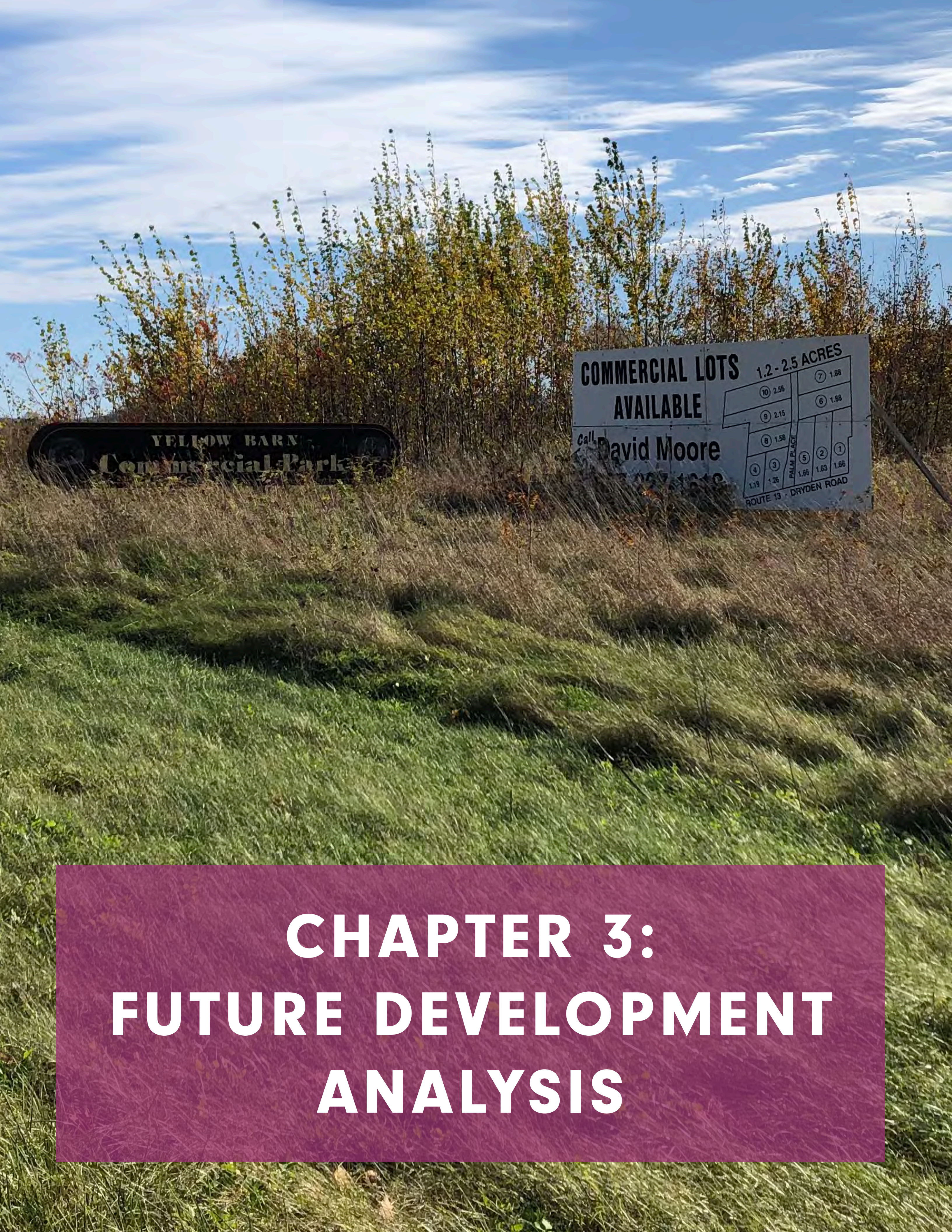


CHAPTER 3: FUTURE DEVELOPMENT ANALYSIS

SUMMARY

In order to accurately assess the future conditions and performance of the SR 13 corridor, is it essential to determine the potential for future development along the corridor, which will dictate additional traffic generation within the Study Area. Often this is accomplished by performing a maximum build-out analysis, in which the total amount of future development is calculated using the maximum parameters of the existing zoning of undeveloped parcels in the Study Area. However, this often results in over-exaggerated results in terms of realistic development potential in a Study Area.

Therefore, this Study took a more nuanced approach to assessing future development potential, and created a "likely-build" scenario in addition to the maximum build out analysis. This "likely-build" scenario is developed based on an initial broad-brush build-out analysis, and then further refined based on a market analysis, stakeholder interviews, and a review of existing plans and studies for the Corridor. This analysis will help identify future intersections and segments of concern in terms of performance, from which potential mitigation measures and strategies can be determined. The flow chart in Figure 3.1 illustrates the methodology that was utilized to develop the future development assessment, and the methodologies of both the maximum build-out and the "likely"build out scenarios are described in further detail within this Chapter.

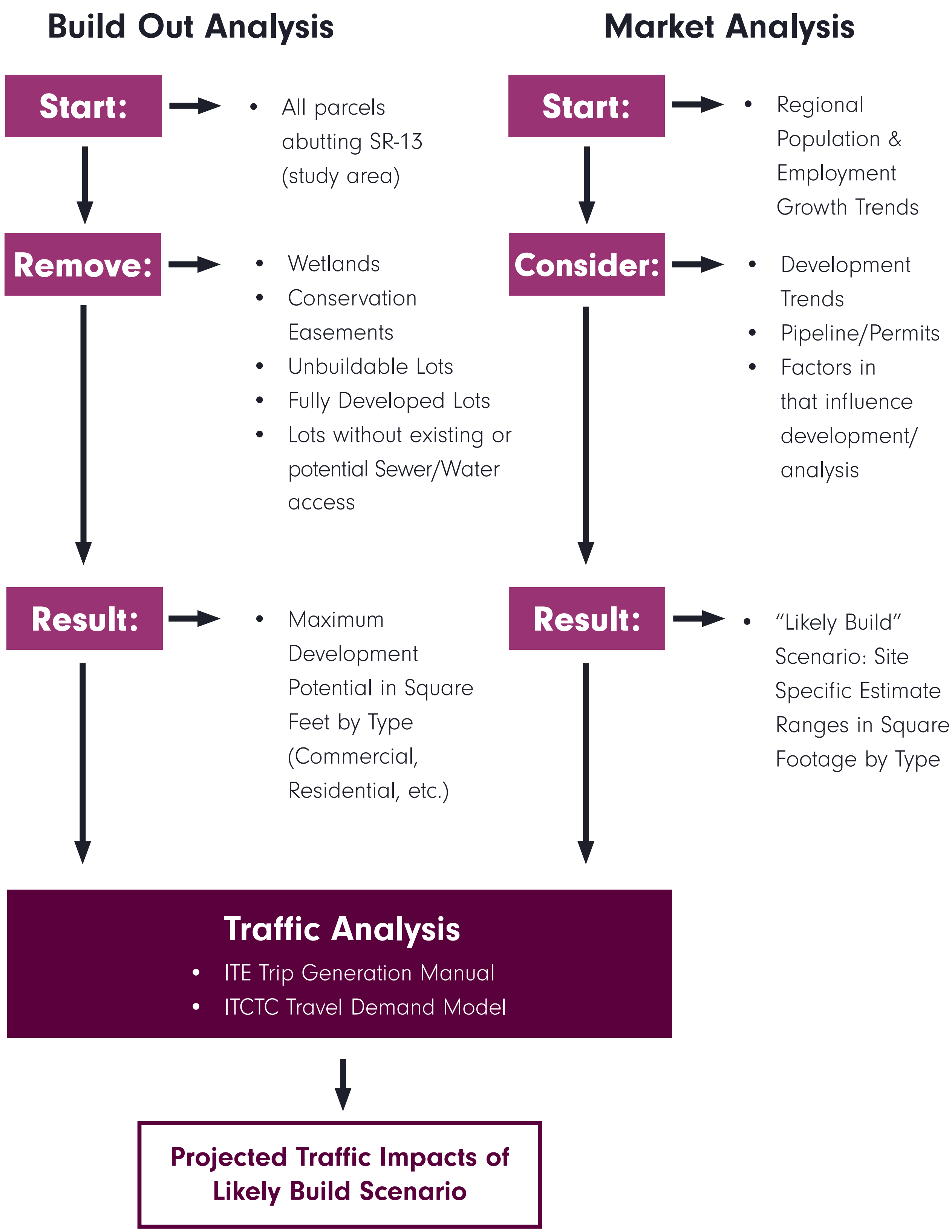
BUILD-OUT ANALYSIS

The following pages present the methodology and results of the maximum build-out analysis undertaken to create a baseline development potential scenario. As seen in the flowchart in Figure 3.1, several attributes were considered for determining which parcels were developable, including presence of wetlands, protections due to agricultural districts, and access to utilities, among others. Table 3.1 below presents a general overview of the land area that was considered to be developable or un-developable based on the analysis performed. The result is a total of 149 acres, or almost 6.5 million square feet of total potential development.

TABLE 3.1: BUILD-OUT ANALYSIS METHODOLOGY

Steps	Acres Removed/ Added	Developable Land (acres)
Step 1: Identify vacant parcels	+1,559	1,559
Step 2: Remove state regulated wetlands	-120	1,439
Step 3: Remove land without sewer and water access	-1,326	113
Step 4: Identify any development restrictions based on agricultural districts	0	113
Step 5: Add parcels that have potential future sewer and water access	+378	491
Step 6: Identify zoning for remaining parcels	-	491
Step 7: Remove residential acreage & calculate potential new residential units	-308	183
Step 8: Calculate maximum buildable land of remaining acres based maximum lot coverage per Town and Village zoning codes.	-117	66
Step 9: Calculate total potential square footage of non-residential development based on maximum building height.	+83	149

FIGURE 3.1: FUTURE DEVELOPMENT ASSESSMENT METHODOLOGY



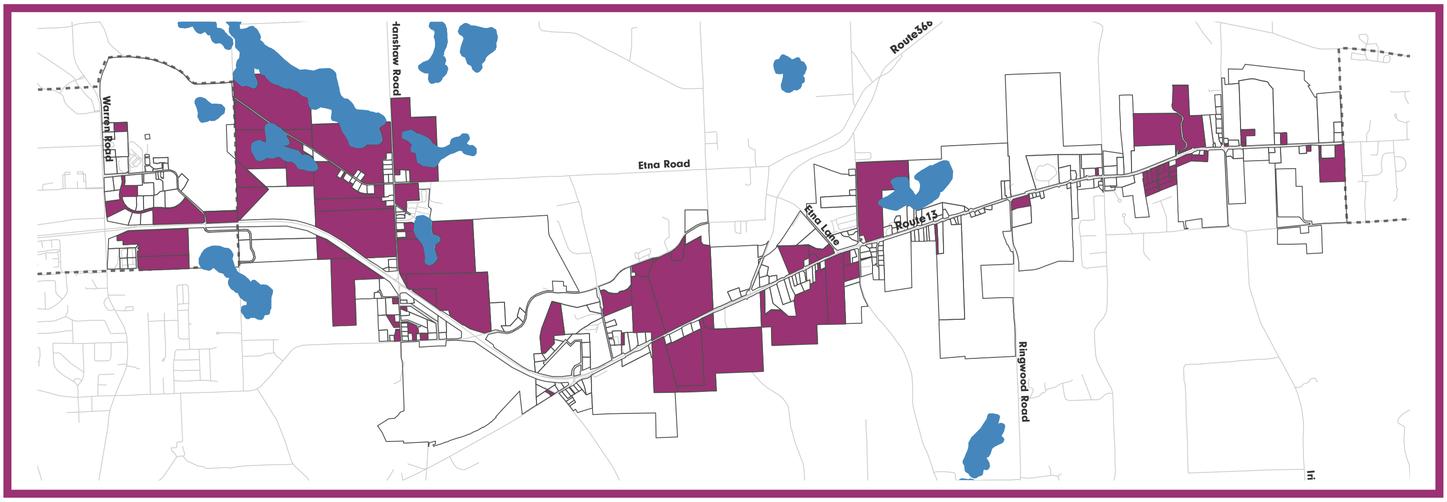
VACANT PARCELS

FIGURE 3.2: VACANT PARCELS

The first set of parcels that were identified as having potential for future development were those identified as vacant or undeveloped in the existing land use section of this report. As mentioned previously, 77 parcels, or 21% of all Study Area parcels are identified as such. This accounts for 32.2% of the total Study Area acreage, and a base level of 1,559 acres of potential development.

STATE REGULATED WETLANDS

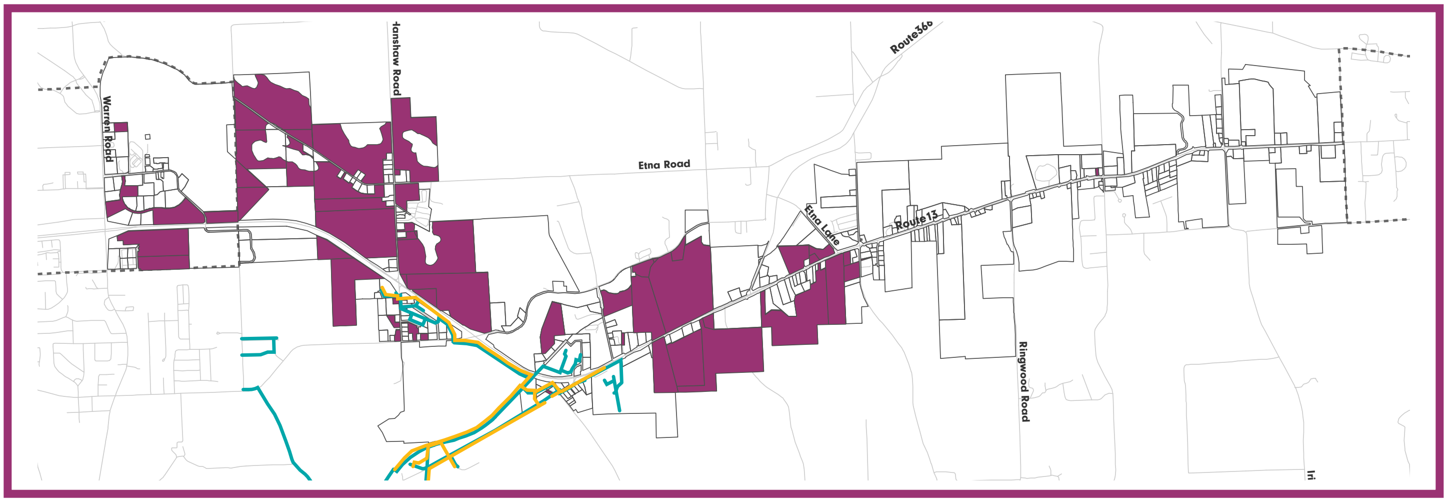
FIGURE 3.3: NYSDEC WETLANDS



The second step in the build-out analysis was to remove all wetlands regulated by the New York State Department of Environmental Conservation (NYSDEC). These wetlands are protected by the Freshwater Wetlands Act of 1975, and thus that area was removed from consideration for future development, as well as a 100-foot buffer surrounding the NYSDEC-delineated wetland. This process was performed by overlaying the vacant parcel layer in GIS software with the NYSDEC delineated wetlands and buffer areas, and removing any overlapping land area from consideration. This step removed 120 acres of the Study Area land from consideration, resulting in a new potentially buildable land area of 1,439 acres.

EXISTING WATER AND SEWER ACCESS

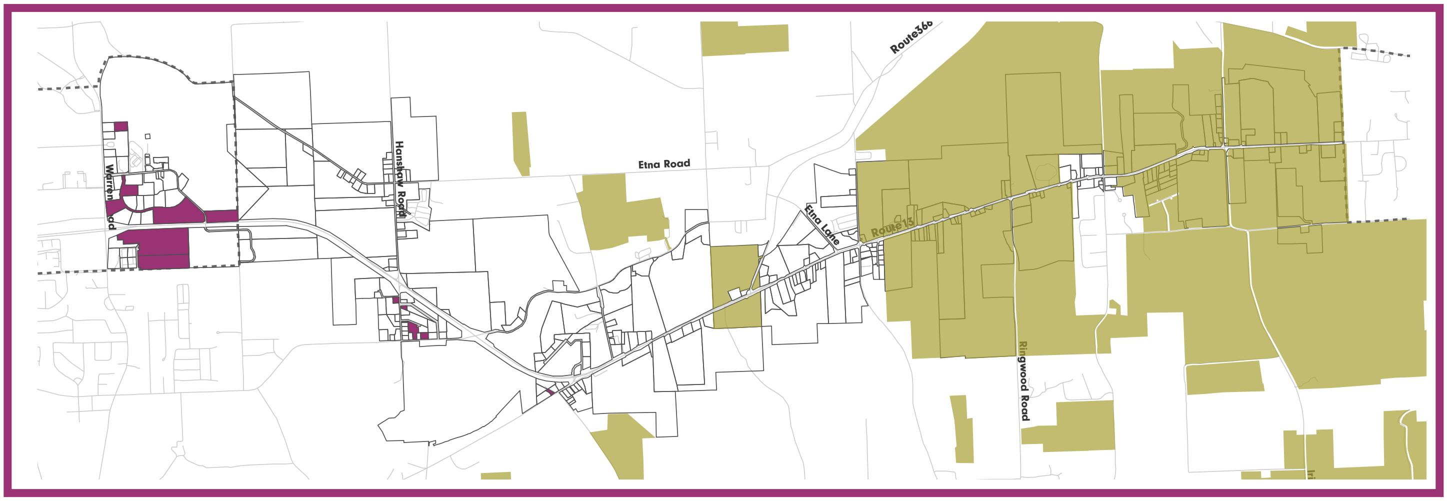
FIGURE 3.4: WATER & SEWER ACCESS



The third step in determining the maximum total future development within the Study Area was to remove those parcels without existing water and sewer access. The planning horizon for this Study is ten years, or to 2030. The Town of Dryden will reasonably not extend sewer and water capacity to the entirety of the Study Corridor during this time period, so therefore any significant development will most likely be restricted to the parcels with existing access to utilities. This significantly reduced the total potential buildable land area by 1,326 acres, resulting in a total potential buildable land area of 113 acres.

AGRICULTURAL DISTRICTS

FIGURE 3.5: AGRICULTURAL DISTRICTS



The fourth step in the maximum build-out analysis was determine if any of the parcels identified thus far in the analysis have restrictions placed against them for conservation or environmental purposes. For this purpose, the agricultural districts designated for Tompkins County were plotted alongside the remaining parcels, and it was confirmed that there are no such restrictions on the parcels in question. Therefore, no additional acreage was removed or added during this step.

POTENTIAL WATER AND SEWER

FIGURE 3.6: POTENTIAL WATER & SEWER EXPANSION

Based on conversations with local officials, it was determined that there is potential for sewer and water system expansion, specifically adjacent to the existing infrastructure at the SR 366 / SR 13 intersection. These parcels were added into the total buildable land in Step 5, and are highlighted in the map above in green. This step resulted in the potential buildable land area to increase by 378 acres for a total of 491 acres.

EXISTING ZONING

FIGURE 3.7: EXISTING ZONING

The sixth step of the build-out analysis was to break down the total buildable land area by zoning district, which is shown in the map above. The distribution of land area by zoning district is presented in Table 3.2 below. Parcels zoned as Conservation districts made up the majority of the land area; the second most prevalent district was Mixed Commercial.

Table 3.2: Distribution of Potential Buildable Land Area by Zoning District

District	Business & Technology	Human Health Services	Medium Density Residential	Rural Residential	Conservation	Mixed Use Commercial	Light Industrial	Total
Acres	72.3	15.9	18.0	1.3	288.3	90.2	4.6	490.7
% of Total Acres	14.7%	3.2%	3.7%	0.3%	58.8%	18.4%	0.9%	100%

RESIDENTIAL PARCELS

The next step in this process was to remove all residential parcels from the total potential buildable area calculations. The only permitted kind of residential development in the Study Area are single- and two-family homes, resulting in more incremental and less significant traffic impacts than non-residential uses. Parcels in the Conservation District were also removed, given that the primary intended uses of the district are residential and agriculture. Regardless of the relative lesser impact individual residential developments typically have on traffic operations, the cumulative impact of new residential development may influence the way the Study Corridor operates. Therefore, the number of potential units were calculated for these parcels, which are presented in Table 3.3 below. Almost 200 new residential units could be potentially built on these parcels.

Table 3.3: Potential New Residential Units

Residential District	Buildable Area (acres)	Maximum Lot Coverage	Buildable Footprint (ft^2)	Minimum Lot Size (ft^2)	Potential New Units*
Conservation	288.3	15%	1,864,134	10,000	182
Rural Residential	1.3	25%	13,756	10,000	1
Medium Density Residential	18.0	15%	117,814	22,500**	5
				Total	**188**

**Calculations were performed for each individual lot.*

*** The average of the minimum lot sizes for one- and two-family dwellings was used for this calculation.*

MAXIMUM LOT COVERAGE

The next step in the maximum build out analysis was to determine how much of the non-residential acreage identified thus far is able to be built upon based on maximum lot coverage requirements per the Town and Village Zoning Codes. However, the maximum lot coverage requirements for the districts within the Town of Dryden were reduced from the actual lot coverage requirements to account for circulation and parking. This is because "lot coverage" as defined in the Town's zoning code includes all impervious surfaces, including surface pavement. The Village of Lansing's lot coverage definition only includes buildings, so the Business and Technology District's lot coverage requirements are unchanged. However, the Human Health Services District's lot requirement per the Village Code is 100%, "except what is required by minimum street frontage, front, side and rear yard setbacks and by front, side and rear parking requirements." Therefore, the lot coverage was reduced to 60%. Based on this analysis, two-thirds of the remaining land area, or approximately 117 acres, was removed, resulting in a total of 65.6 acres that are buildable; the majority of which are zoned as Mixed Use Commercial.

Table 3.4: Maximum Lot Coverage by Zoning District

Zoning District	Total Acres	Maximum Lot Coverage*	Total Buildable Acres
Business and Technology	72.3	25%	18.1
Human Health Services	15.9	60%	9.6
Mixed Use Commercial	90.2	40%	36.1
Light Industrial	4.6	40%	1.8
Total	**183**		**65.6**

** This number was reduced for all districts to account for parking & circulation, aside from Business and Technology.*

MAXIMUM BUILDING HEIGHT

The final step in the maximum build out analysis was to determine how much total floor area of development could be accommodated on the buildable acres calculated thus far based on the maximum building height. To determine this, the total buildable acres were converted to square footage, and then multiplied by the maximum number of allowable building stories. The results of this analysis are presented in Table 3.5 below. The total resulting development potential is about 6.5 million square feet of building area.

Table 3.5: Maximum Building Height by Zoning District

Zoning District	Total Buildable Acres	Total Buildable Square Footage	Maximum Stories	Total Potential Building Floor Area (ft^2)
Business and Technology	18.1	787,565	3	2,362,724
Human Health Services	9.6	418,176	2	833,541
Mixed Use Commercial	36.1	1,572,516	2	3,144,116
Light Industrial	1.8	78,408	2	161,129
Total	**65.6**	**3,088,404**	**-**	**6,501,510**

MARKET ANALYSIS

As mentioned previously, the likely-build scenario uses the maximum build-out analysis as a basis, but qualifies the data by reviewing additional data that helps to supply context for the development environment along the Study Corridor. To do so, we used the following methods:

Review of Previous Plans & Studies

Previously completed plans and studies related to population trends and economic and development in the Tompkins County region were reviewed.

Population and Employment Trends

High level economic and demographic trends for the Study Area and surrounding areas that will influence future traffic growth (such as surrounding Census Tracts, Villages, and the Town of Dryden) were reviewed. The analysis included population trends that will influence future growth along the corridor. The analysis also reviewed total employment by sector (NAICS) unemployment rate and trends. Accepted data sources including ESRI Business Analyst / GIS Mapping Software, Spatial Data Analytics & Location Platform, which provides socio-demographic data from the Census and American Community Survey (ACS), vintage 2012-2016 as well as data from the Bureau of Labor Statistics Consumer Expenditure Survey and proprietary five-year population and household projections were used.

Analysis of Commuting Patterns

An analysis of commuting patterns in the region (and specified municipalities and/or employment centers) was completed that identified the flow of workers as well as the origin of workers for specified employment centers.

Stakeholder Interviews

In Fall 2019, A series of interviews were undertaken with stakeholders to identify opportunities and challenges for development along the portion of the SR 13 Corridor under study. Interviewees were asked about land use plans, development in the pipeline and other questions related to identifying the potential level of build out along the corridor. Findings from this document add a qualitative dimension to the demographic, economic and parcel-based analysis of the portion of SR 13 from Warren Road east to the western boundary of the Village of Dryden. Key findings are discussed in the following sections.

Internal Team Discussions

Staff for the Tompkins County Department of Planning and Sustainability met to discuss the draft findings. These discussions were used to support and revise recommendations.

ANALYSIS GEOGRAPHIES

The Study Area is a 9-mile stretch of the New York State Route 13 (SR 13) corridor in Tompkins County between Warren Road (Village of Lansing) and the Village of Dryden's western boundary. Geographies used in this analysis include the following:

- City of Ithaca
- Town of Dryden
- Village of Dryden
- Village of Lansing
- Tompkins County
- Cortland County

FIGURE 3.8: STUDY CORRIDOR

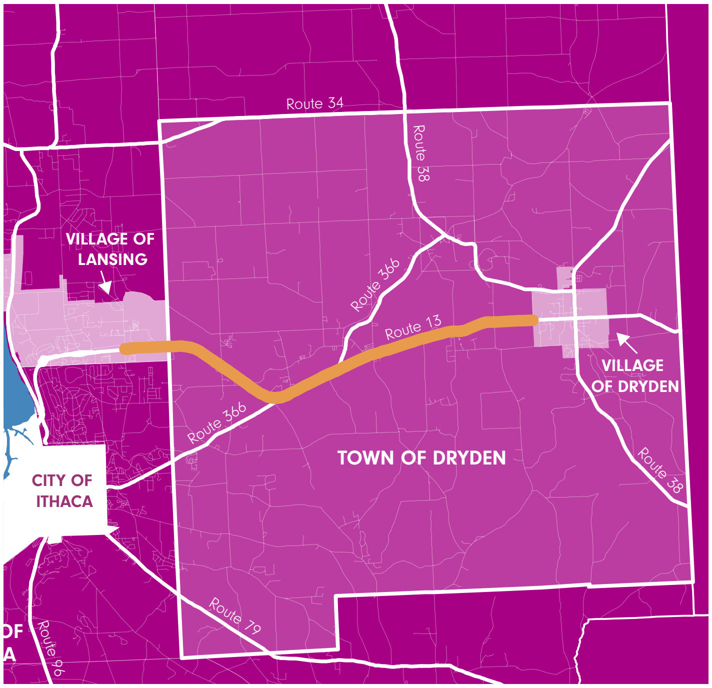
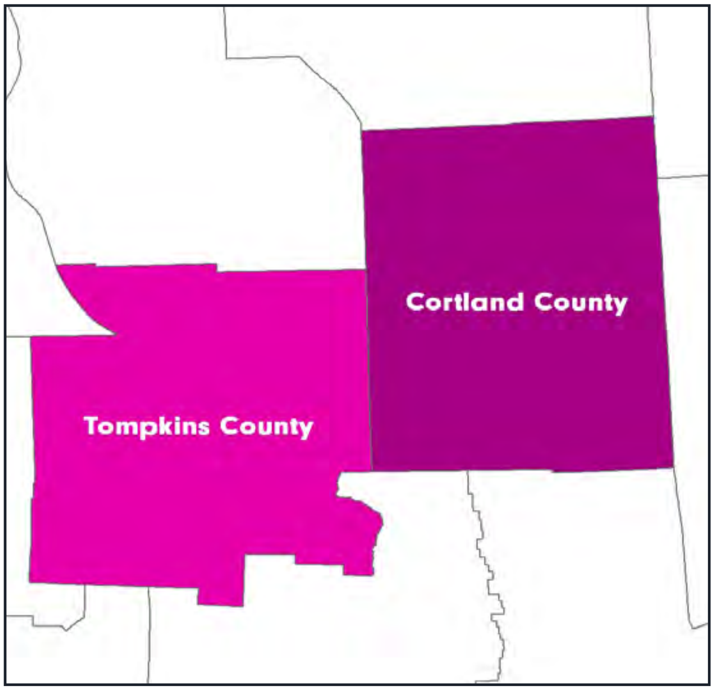


FIGURE 3.9: TOMPKINS AND CORTLAND COUNTIES



REVIEW OF PLANNING DOCUMENTS

NYS Route 13 / 366 Corridor Management Plan (2008). The 2008 Corridor Management Plan examined SR 13 and 366 within the Town of Dryden. Future development scenarios were divided into an Existing Development Scenario in which a full buildout under existing land use regulations with the resulting challenges relating to increased driveway access, signage clutter, congestion and safety. This was contrasted with a Nodal Development Scenario in which development would be concentrated at three nodes (the Hamlet of Varna, the Village of Dryden and the SR 13 and 366 intersection/overlap), only the last of which falls within the boundaries of the current Study Area. This node, containing the NYSEG property, would serve as a point of transition between the rural and undeveloped character of SR 13 east of the 13-366 overlap, and a mixed-use commercial and residential stretch west toward Ithaca. Traffic calming measures at this point would include one or more roundabouts.

Feasibility Study for the Ithaca-Tompkins Regional Airport (ITH) Industrial/Business Park (2016). This study provided an analysis of commercial and light industry development, existing infrastructure, and a possible timeline for a proposed Airport Business Park at ITH. The site would be anchored by a new NYSDOT facility and capitalize on proximity to the airport and the Cornell Business & Technology Park. The study concluded that the remaining capacity for development at the existing Tech Park and projected overabundance of office space in the local real estate market suggest that alternative approaches will need to be pursued to attract development to the site. The study also recommended a phased approach in which the NYSDOT facility is first established and provides the initial access points and utilities that other developments will require.

Ithaca-Tompkins County Transportation Council 2040 Long Range Transportation Plan (2019). The area's Metropolitan Planning Organization (MPO) update to the Long Range Transportation Plan (LRTP), presents a three-point action plan focused on maintaining existing infrastructure, providing and promoting new mobility options, and collaborating with key partners. The FHWA Urbanized Area of Tompkins County that forms the MPO boundaries, extends east along SR 13 as far as Kirk Road in the Town of Dryden, significantly overlapping the current Study Area. Performance indicators relating to motor vehicle safety and congestion show the continuance of negative trends in the MPO area. The goal of managing congestion to maintain adequate system performance on the National Highway System (NHS) roads (SR 13 and SR 79) for example, saw the number of miles of congested roads grow from 13.69 miles in 2012 to 15.61 miles in 2018.

Program on Applied Demographics Tompkins County Profile (2017). The Cornell Population Center Program on Applied Demographics (PAD) profile of Tompkins County provides a projection of social, economic and demographic data to the horizon year of 2040. In contrast to analysis completed for the LRTP, PAD forecasts that the overall population of the County will level off and decline slightly over the next two decades.

Tompkins County Comprehensive Plan: Planning for Our Future (2015). The 2015 Comprehensive Plan for the County provides a snapshot of the economy, housing market, transportation and development patterns, and formulates strategies for each topic area based on the overarching principles of sustainability, regional cooperation and fiscal responsibility. Development patterns noted include the County's urban center (which encompasses the current Study Area's western end), the emerging development node at the NYSEG area and established nodes and rural centers adjacent to SR 13 in Varna, Etna, Freeville and the Village of Dryden.

Tompkins County Economic Development Strategy: 2015-2020. This Tompkins County Area Development (TCAD) document lays out a plan for economic development goals and strategies in the County over a five-year time-frame. Development Focus Areas identified by TCAD largely overlap with the nodes highlighted in the County's 2015 Comprehensive Plan along the SR 13 corridor. Also, relevant to the corridor, TCAD highlights the "gazelle" industry of software, mobile and tech-led services (small but growing quickly), and "elephant" industry of higher education (large but growing slowly).

Town of Dryden Water and Sewer District Consolidation Study (2017). In March 2017, T.G. Miller released the findings of a consolidation study for the water and sewer districts in the Town of Dryden. Consolidation of most of the water and sanitary sewer districts was recommended based on their proximity and status of their debt.

SOCIOECONOMIC CONTEXT

Growth and development typically generate new vehicle trips, which can impact transportation infrastructure. While the expected future impacts of growth on a specific transportation corridor are analyzed in this study, it is important to first understand the nature and scale of potential growth at the regional level. Growth in residential, commercial and industrial development is often tied to regional trends in employment and population. While the presence of major institutional campuses and public investment in remediation or revitalization of properties can influence growth patterns despite population or employment declines, long-term demographic trends are a key factor influencing growth at the regional level. This section describes population and employment growth trends and characteristics within the region.

Population Growth Trends

The population of the Town of Dryden in 2019 was approximately 15,130, 14 percent of Tompkins County's population (106,213). Over the last two decades, the population of Tompkins County has grown by 10.1 percent, a growth rate higher than the surrounding counties in the region. Cortland County has experienced a loss in population since 2010. Since 2000, the Village and the Town of Dryden were the fastest growing municipalities. The Village of Dryden grew by 24.2 percent, while the Town grew by 12.7 percent.

The 2018 Cornell Program on Applied Demographics (PAD)[1] projects that the Tompkins County population will grow by 5.06 percent through 2040, representing an increase of 5,663 people. This is roughly half the rate of growth experienced by Tompkins County in the previous twenty years. (By contrast the 2040 Long-Range Transportation Plan (LRTP)[2] projects the population of Tompkins County will grow by about 10.6 percent over the next 20 years, representing an increase of 11,000 people). The Cornell PAD projections for Cortland County indicate a decline in population by 5.6 percent during the same time frame, representing a loss of 2,619 people.

EMPLOYMENT PROFILE AND TRENDS

Tompkins County has added about 1,004 employees over the last ten years; a 0.23 percent average annual growth rate (compared to almost 1.21 percent nationwide). Figure 3 shows total employment in Tompkins County between 2010 and December 2019 (monthly). Total employment has fluctuated between 54,700 in 2014 and 48,500 in 2018. There were approximately 50,397 employees in December 2019, representing an unemployment rate of 3.2 percent.

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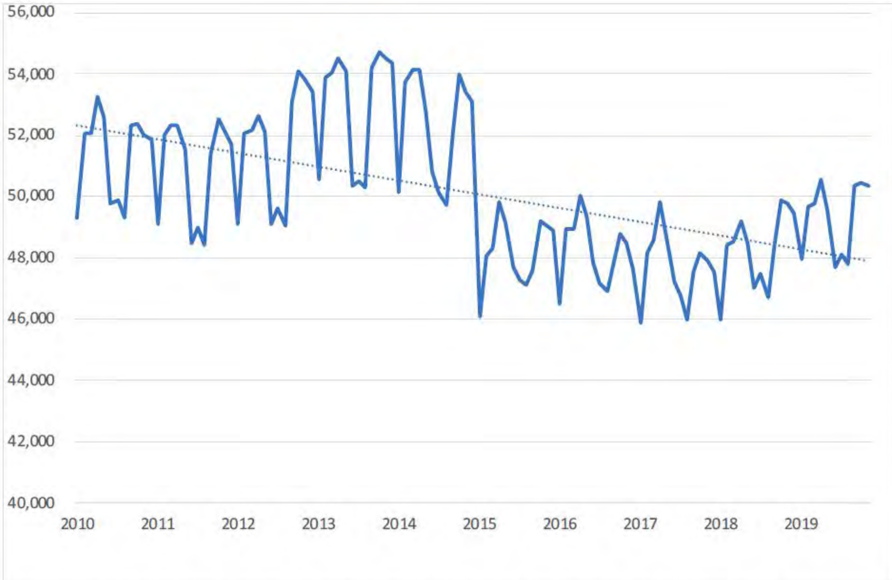
[1]https://pad.human.cornell.edu/counties/projections.cfm

[2] http://tompkinscountyny.gov/files2/itctc/lrtp/2040lrp/FullPlanDraft-11082019.pdf

The New York State Department of Labor projected that total employment in the Southern Tier region would grow by 6.8 percent between 2016 and 2026, representing an annual average growth rate of 0.66 percent. This represents a faster rate of growth than was experienced in Tompkins County over the last ten years and would account for an average of 330 total new employees per year.

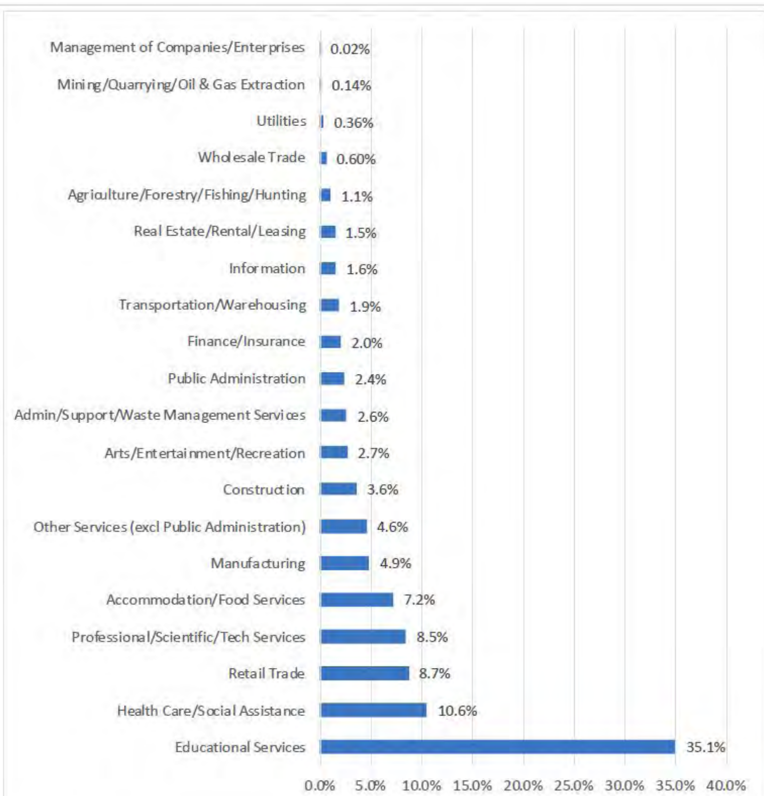
FIGURE 3.10: TOTAL EMPLOYMENT, TOMPKINS COUNTY (2010-2020)



Source: US Bureau of Labor Statistics, Civilian Labor Force Data, 2020, not seasonally adjusted

Approximately 26 percent (13,354 employees) of the county's total employment was in the City of Ithaca, making the City region's major population and employment hub. Figure 3.11 shows the comparative breakdown of employment by industry. The largest sectors are Educational Services and Health Care/Social services, together accounting for 46 percent of jobs in the county (23,500 employees). Retail Trade (8.7%), Professional/Scientific/Tech Services (8.5%) and Accommodation/Food Services (7.2%) make up the remaining top five industries in the county.

FIGURE 3.11: EMPLOYMENT BY INDUSTRY, TOMPKINS COUNTY (2019)



Source: ESRI (2019)

While the Educational Services sector, driven by Cornell University, Ithaca College and TC3, employ the highest proportion of workers in the county, the education sector has experienced slower growth than other sectors (and is projected to continue slower growth). Sectors including Services, Accommodation and Food Services, and Professional, Scientific, and Technical Services have seen higher growth rates than other sectors in Tompkins County over the last ten years. Manufacturing, utilities, and real estate have seen declines.[3] The top ten employers[4] in Tompkins County were identified by the Chamber of Commerce as detailed in Table 3.6 on the following page.

Cornell University is the largest employer in the County with approximately 9,100 employees. The slowing growth of higher education sector has outsized impact on the region due to Cornell University and Ithaca College.

[3] Market Analysis and Feasibility Study for the Airport Business Park, 2016
[4] https://www.tompkinschamber.org/tompkins-county/business-development/

TABLE 3.6: TOP EMPLOYERS IN TOMPKINS COUNTY

Rank	Employer	Employees
1	Cornell University	9,100
2	Ithaca College	1,700
3	BorgWarner Morse TEC	1,500
4	Cayuga Medical Center	1,200
5	Ithaca School District	1,200
6	Tompkins County	840
7	Wegmans	840
8	Franziska Racker Center	465
9	Williams George Agency	425
10	City of Ithaca	410

Source: Tompkins County Chamber of Commerce (2018)

DEVELOPMENT CONTEXT

Factors Influencing Development

The relative desirability of an area from a development perspective is shaped by many factors, some under greater levels of control by local and regional governing entities than others. While municipalities can tailor development through zoning codes and provision of utility infrastructure, other factors, such as location and regional market dynamics, are beyond the reach of local planning boards. Even so, understanding these independent factors influence on development can help policymakers direct resources or take other action to enhance a given site. This section identifies key characteristics of the SR 13 Corridor that encourage or discourage development.

Location. The location of the Study Area offers several advantages for potential businesses that may make parcels along it more attractive to developers than other sites in the region.

Commuting Corridor. The Study Area is situated directly between the major employment centers of Tompkins County (Ithaca) and Cortland County (Cortland) as well as two population centers within Tompkins County: the City of Ithaca and the Village of Dryden. Those commuting into Ithaca from the northeast portion of Tompkins County, or from Cortland County or I-81, often use SR 13. Approximately 6.5 percent of workers in Tompkins County originate from Cortland County, for which SR 13 is the primary route[5]. This may create potential opportunities for limited convenience and service retail that would serve commuters in need of services such as coffee, breakfast, gas, dry-cleaning or other "on-the-go" services.

Proximity to Airport. The Ithaca Tompkins International Airport (ITH) is an important destination for travelers, many of whom may be seeking the same "on-the-go" services that commuters require. The Airport also creates a natural market for hotels, car rental locations, sit-down restaurants and other business traveler amenities. Additionally, the ability to ship cargo out of ITH may make nearby SR 13 an attractive site for businesses looking to quickly bring goods to market.

Proximity to Cornell Business & Technology Park. The Cornell Business & Technology Park represents an important cluster of businesses and facilities in the areas of technology, manufacturing, aviation, office, education and recreation. The Business and Technology Park is a primary potential redevelopment site with approximately 170 acres available. The site is also connected to a medical district with physicians' offices and Cayuga Medical Center facilities.

Proximity to Downtown Ithaca. The continuing increase in housing costs in the City and Town of Ithaca may enhance the value of residential development in the Study Corridor with its short commute times.

[5] US Census OnTheMap, Longitudinal Employer-Household Dynamics, 2017 dataset for Tompkinscounty

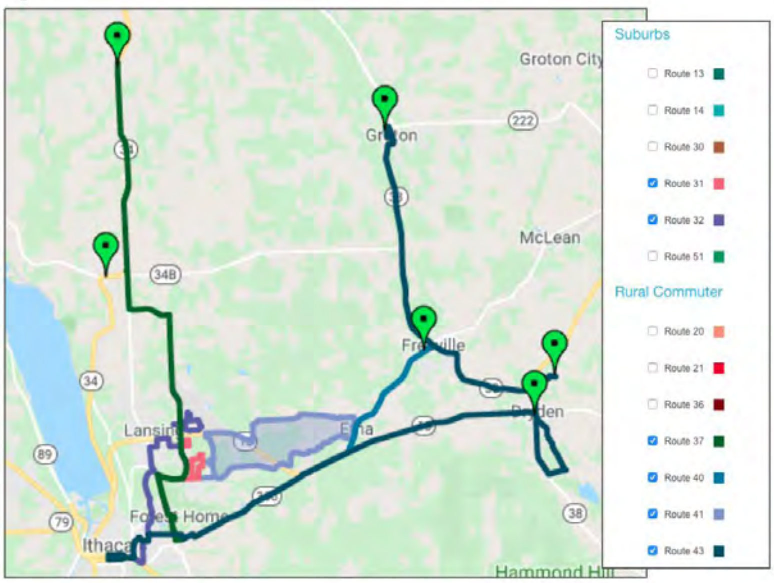
Infrastructure and Amenities

The likelihood of future development in an area is influenced by the presence of infrastructure and the ability of existing infrastructure to serve new development. Likewise, barriers to providing infrastructure, such as cost and regulatory or political barriers, can influence whether development occurs (and where it occurs). Local governing bodies often have the power to shape infrastructure. For example, municipal water and sewer can be extended to a site and roads and bridges can be improved. However, decisions regarding infrastructure are often spread across multiple entities and jurisdictions, requiring collaboration and a shared vision for improvements.

Transportation

Truck Freight. SR 13 is an active freight corridor and is abutted by several freight-trip generators, including BorgWarner, the Airport and others. The area is primarily a destination rather than generator of freight cargo[6] and steep topography and narrow approaches in the Urbanized Area prompted a safety audit by the Federal Highway Administration (FHWA) and NYSDOT.

FIGURE 3.12: TCAT BUS ROUTES AND PARK & RIDES



Source: TCAT, 2019

Transit. The region's transit authority, TCAT, has several routes which serve the Corridor to varying degrees. Rural Commuter Routes 40, 41 and 43 serve portions of the corridor and Suburban Routes 31 and 32 connect the Airport and Village of Lansing with Ithaca. Route 40 follows SR 366 through overlap of SR 13, connecting Groton, Freeville, Etna and Varna with Ithaca. Route 41 provides demand responsive service on local roads between the Airport and Etna. Route 43 follows SR 13 east of the overlap with 366 and connects the Village of Dryden, TC3, Freeville and Groton with Ithaca. These routes also intersect park & rides at several points outside the Study Area, as shown in Figure 5.

Proximity to transit is often seen as a benefit for development, adding another reliable transportation option to the mix as well as creating the potential for consistent customer presence at a fixed location such as a bus stop or transit hub. While the imposition of development impact fees is unconstitutional in New York State, TCAT has expressed interest in exploring how some portion of the value created by the availability of a transit line for a development can be captured and re-purposed to support the organization's operational and capital costs. The future outcome of this policy discussion may influence the type and scale of development within the Study Area.

Aviation. As noted, the Corridor is abutted by Ithaca Tompkins International Airport (ITH). The Airport has recently undergone renovations and began allowing international air travel. Direct connections are offered to Charlotte, Philadelphia, Detroit and Washington-Dulles. Renovations have paralleled study of the relocation of the Region's NYSDOT maintenance and office facilities to a proposed business park, discussed below. While proximity to an airport has benefits for businesses in terms of offering an additional transportation option, and shares with transit oriented development the potential for a reliable, stationary

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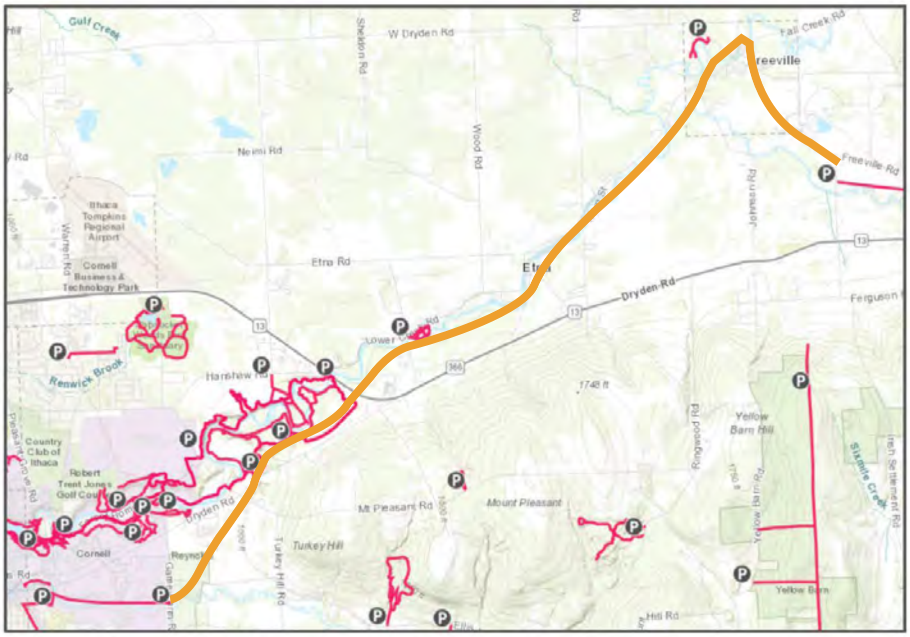
[6] http://tompkinscountyny.gov/files2/itctc/lrtp/2040lrp/FullPlanDraft-11082019.pdf

customer base for restaurants, retail and lodging, compliance with Federal Aviation Administration (FAA) regulations regarding noise, building heights, lighting and some renewable energy infrastructure are also a consideration for future development in this context.

FIGURE 3.13: TRAIL NETWORK AND PARKING ACCESS



Source: "Out on the Trails – Ithaca & Tompkins County" (2019)

Trail Network. Several trail systems are accessible from SR 13. Plans for expansion of these systems have been identified by the ITCTC in the 2040 Long-Range Transportation Plan (LRTP). Trails are an attractive amenity for residential development and could make sites along SR 13 more appealing to certain types of retail geared toward outdoor activities such as hiking and recreational cycling. The Dryden Rail Trail is currently being developed through Dryden, Freeville, Etna, and Varna; and is depicted in Figure 3.13 in orange.

Utilities

The presence of quality municipal water and sewer infrastructure enhances the attractiveness of a given site for development. Cost and reliability are also important factors with respect to water and sewer, and as with many such systems in Upstate New York, much of the current infrastructure is approaching the time when additional capital investments will need to be made, and the fragmented nature of the districts deprives communities of the economies of scale that could make needed repairs more affordable. Development is more likely to move forward along the Corridor if there is consistent and cost-effective water and sewer infrastructure in place.

Water and Sewer. Portions of the corridor lack municipal water and sewer infrastructure. The western portion of SR 13 and SR 366 within the Town of Dryden includes a patchwork of interconnected and interdependent water districts, that while varying significantly in age and the number of units served, all had retired capital indebtedness easing the way for consolidation. The Town ultimately consolidated these six districts in December 2019. In the Study Area's eastern portion, the Yellow Barn Water District is far more recently established and is not connected to water infrastructure in the Town's other districts.[7] Sanitary sewer districts in the Town of Dryden along SR 13 largely overlap the water districts and are at a similar point in their lifecycle, with capital indebtedness fully retired.

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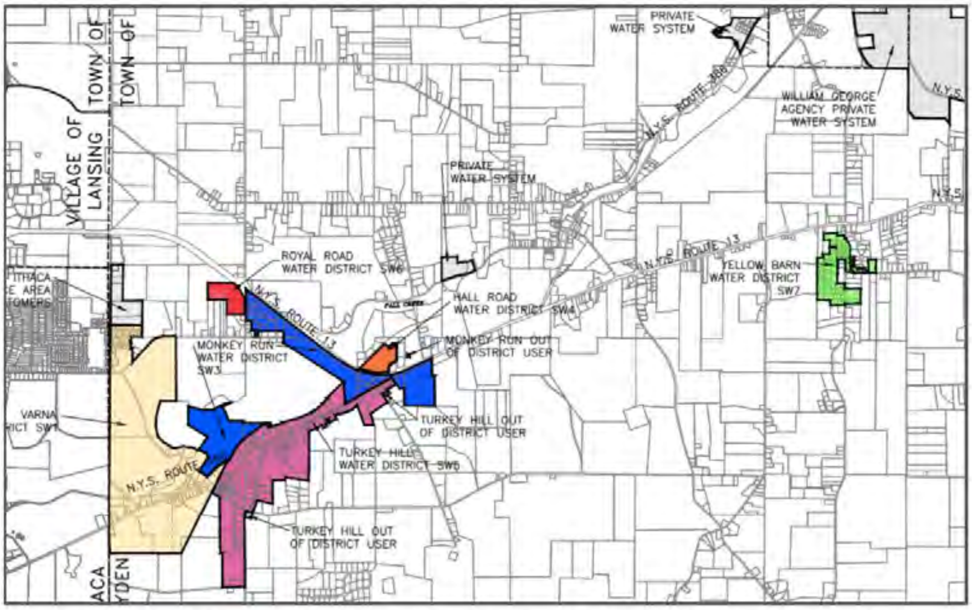
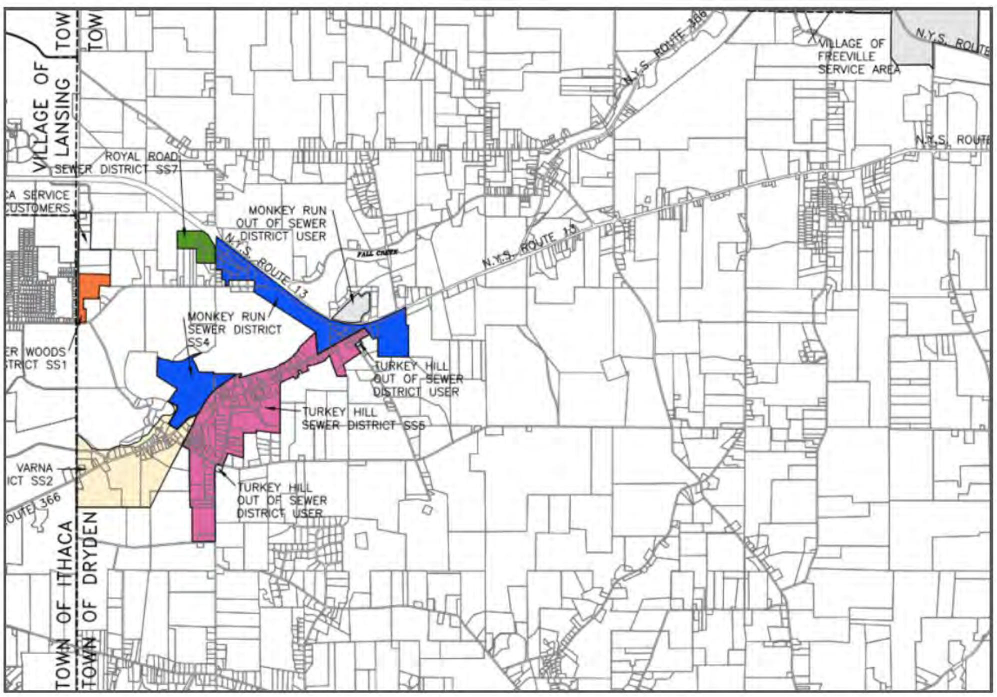
[7]Town of Dryden Water And Sewer District Consolidation Study
http://dryden.ny.us/wpcontent/uploads/2018/12/Final-Water-and-Sewer-District-Consolidation-Study-2017-03-06.pdf

FIGURE 3.14: TOWN OF DRYDEN WATER DISTRICTS



Source: Town of Dryden Water and Sewer District Consolidation Study (2017)

FIGURE 3.15: TOWN OF DRYDEN SANITARY SEWER DISTRICTS



Source: Town of Dryden Water and Sewer District Consolidation Study (2017)

Broadband. Fast and reliable internet is an increasingly important component of a community's infrastructure. The Town of Dryden is considering the possibility of a municipally owned fiber optic network that residents and businesses could access via a subscription service. With the conclusion of a survey of residents and overview of local Internet Service Providers (ISP) in 2019, the Town is moving forward to install public broadband begining in 2021.

Existing Land Use

Of the 370 parcels within the Study Corridor, 170 (46%) are residential. Open space and agricultural uses, while making up a small proportion of parcels (3.2%), account for 1311 acres or 27% of the Study Area. The proportion of parcels used for commercial purposes is 9.5% or 7% of the total Study Area acreage. The percentage of parcels used for industrial and public utility purposes is 7.5% or 12.2% of Study Area acreage. Vacant or undeveloped land accounts for 77 parcels (21%) and 1560 acres (32.25%).

Some parcels may have development prescribed for the purposes of preserving the rural or natural character of an area. Such uses include conservation easements and agricultural districts, both of which are present within the Study Corridor. These restrictions may result in a more concentrated, nodal form of development along the corridor.

TABLE 3.7: MAXIMUM BUILDING HEIGHT BY ZONING DISTRICT

	US Census						Cornell PAD Projections	
Location	2000	2010	2019	2000 - 2019 # Change	2000-2019 % Change	2000 - 2019 AAGR	2040	2040 AAGR
Dryden Village, NY	1,646	1,890	2,045	399	24.2%	1.15%		
Lansing Village, NY	3,350	3,529	3,563	213	6.4%	0.32%		
Dryden Town, NY	13,429	14,435	15,130	1,701	12.7%	0.63%		
Ithaca City, NY	29,564	30,014	31,648	2,084	7.0%	0.36%		
Cortland County, NY	48,599	49,336	49,111	512	1.1%	0.06%	46,492	-0.26%
Tompkins County, NY	96,501	101,564	106,213	9,712	10.1%	0.51%	111,876	0.25%

Source: ESRI (2019)

Notes: AAGR = Average Annual Growth Rate

Cornell PAD projections provided at the county level only.

Regulatory Environment

Zoning. Municipal zoning can have a strong influence on development by shaping the kind of development that occurs (e.g. residential, commercial, industrial, etc.) and presenting a barrier to entry for potential developers. Zoning bylaws in the Town of Dryden and the Village of Lansing apply to parcels in the Study Area. The implications of zoning for specific sites or portions of the corridor is discussed below. The Existing Land Use and Zoning Analysis provides a more in-depth discussion of these factors throughout the corridor.

The Comprehensive Plan update that the Town of Dryden is conducting at the time this Study is being conducted is likely to maintain the character of SR 13 as a mixed-use commercial corridor. Existing residential will remain, but because of noise and traffic speeds, additional residential directly along SR 13 is unlikely to be planned for. Industrial uses at NYSEG and closer to the Airport may also be included in the Plan update.

The portion of the Study Corridor within the Village of Lansing is divided into the following districts: Business & Technology (including the Cornell Business & Technology Park and Airport), Research (Cornell Lab of Ornithology), Human Health Services and Medium Density Residential. Zoning is perceived as restrictive with narrowly tailored allowed uses and the requirement of acquisition of Special Use Permits (SUP) for most of those. This is in keeping with the Village's history as specifically incorporated to protect homeowners via zoning regulations[8].

Deed Restrictions. Property deeds may limit future development by delineating appropriate uses, setback standards and other restrictions. The Study Corridor includes parcels with deed restrictions on driveway access that will shape both future development as well as traffic flow along SR 13.

Anchor Institutions. Major non-profit and government campuses such as hospitals, colleges, public sector offices and facilities offer an element of stability and potential concentration of customers and employment that can augment an area's desirability for development.

The Airport represents one such anchor, and with recent investments and the potential for relocation of NYSDOT and TCAT facilities to the site (discussed below), developers can have greater confidence in a continued institutional presence that provides a consistent customer base in employees and travelers. Additionally, Cornell University is in close proximity to the Corridor, and future investment by the institution may likely be within close proximity to or directly along the Study Corridor.

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[8] http://tompkinscountyny.gov/historian/lansing-village

Demand for Office and Manufacturing Space

Demand for Commercial Space. The region is expected to need approximately 204,000 square feet of office space in the next five to ten years. However, previous studies have documented plans and expected pipeline for just over 600,000 square feet (primarily within the Cornell Business Park, the South Hill business Campus, the Chain Works District, and Downtown Ithaca).[9] The Cornell Business and Technology Park contains approximately 170 acres of redevelopable land, and is considered among the most desirable locations. This would be considered among the most likely development sites within the SR 13 corridor.

Past Development

Building permit data can provide insights into the level and type of development being pursued in a community. While permits do not necessarily translate into construction, and are not always acquired for renovations to properties, this data can impart a sense whether a market is the focus of interest and potential growth.

Data shared by the Town of Dryden for building permits opened between 2015 and 2019 showed a total of 1,192 permits issued town-wide. Within that timeframe, there were 179 permits issued for new residential and commercial construction (Table 3.8). Of that total, 151 permits were issued for residential units (totaling 219 units). There were 28 permits issued for new commercial construction or commercial additions, totaling 147,984 square feet of new commercial space. It is noted that approximately 96,000 square feet of commercial space permitted during this time period was for commercial storage space, representing 65 percent of total commercial square footage approved or permitted between 2015 and 2019.

TABLE 3.8: BUILDING PERMITS APPROVED, TOWN OF DRYDEN (2015-2019)

Year	Permits	Residential Units	Comm. Square Feet
2015	45	46	21,984
2016	51	48	109,500
2017	25	24	5,000
2018	42	76	10,800
2019	16	25	1,200
Total	**179**	**219**	**148,484**

Source: Town of Dryden, 2019

Note: Table includes permits for new construction of commercial and residential uses only. Residential new construction includes single-family homes, manufactured homes, modular homes, two-family, and multi-family.

Figure 3.16 and Figure 3.17 on the following page shows the geographic location of commercial permits issued between 2015 and 2019 in proximity to the Study Area.

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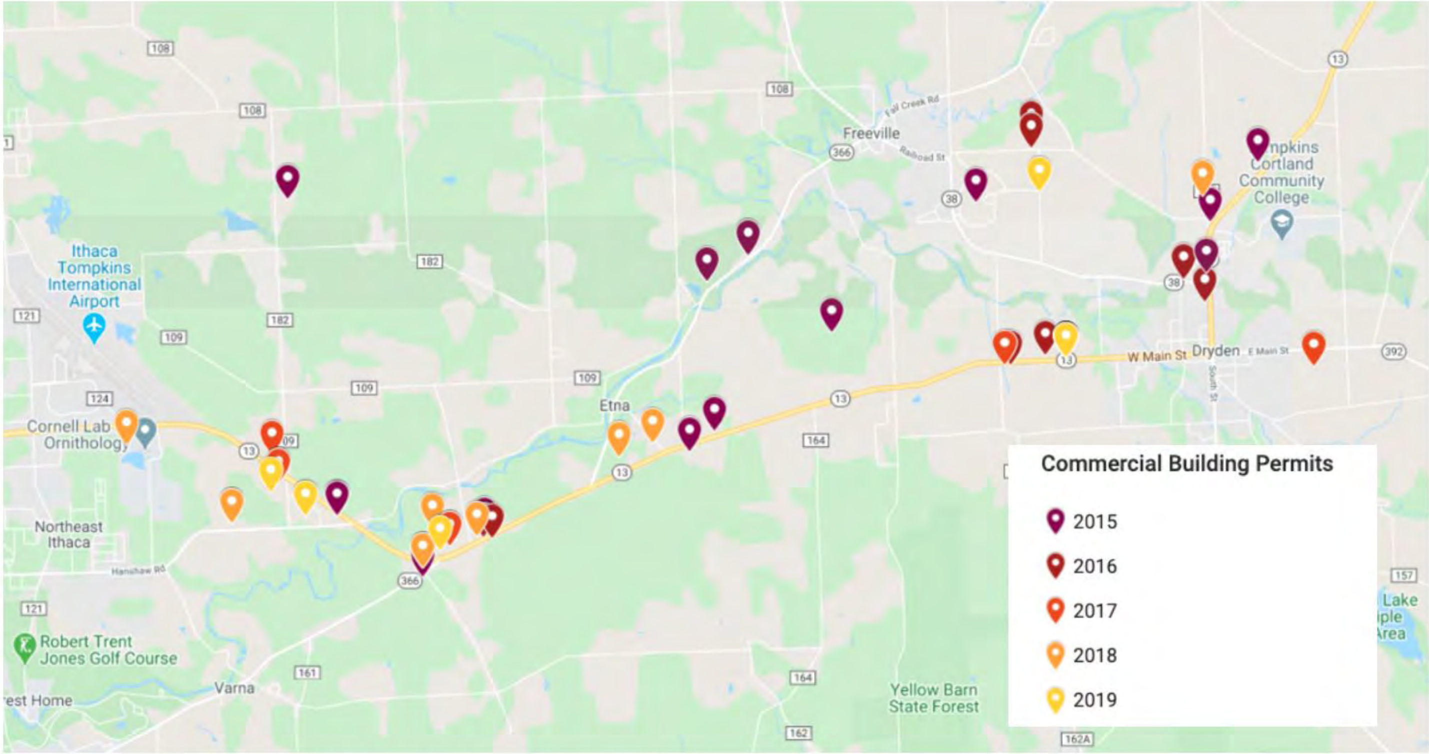
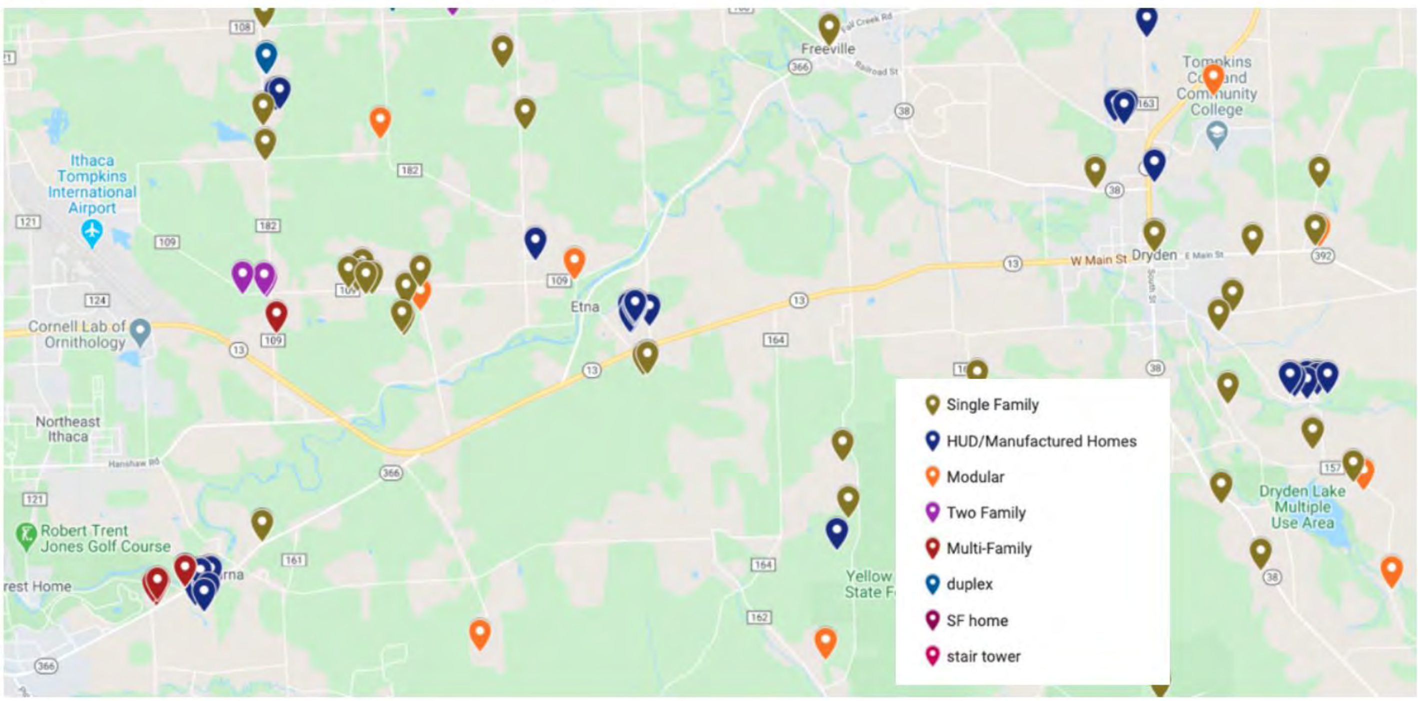
[9] Market Analysis and Feasibility Study for the Airport Business Park, 2016

FIGURE 3.16: COMMERCIAL BUILDING PERMITS, 2015-2019



Source: Town of Dryden, Highland Planning, 2019

FIGURE 3.17: RESIDENTIAL PERMITS BY TYPE, 2015-2019



Source: Town of Dryden, Highland Planning, 2019

POTENTIAL DEVELOPMENT NODES

Cornell Business & Technology Park

The Cornell Business & Technology Park (the Business Park) is a 200-acre site located at the Study Area's western end on the north side of SR 13, adjacent to Ithaca Tompkins International Airport and east of Warren Road. The park is considered to be the region's premier suburban office park. The park currently contains 26 buildings and approximately 700,000 square feet of office and laboratory space. Most of the companies within the park are technology and research based and many are associated with Cornell. The Business Park is studying and pursuing full development of the site. Providing on-site amenities and services for employees of the labs and offices within walking distance is one possibility for building out the Business Park, including the provision of restaurants, shopping, banking and daycare services. Zoning for the Business Park allows low-traffic food and beverage establishments and bank administration by Special Use Permit (SUP).

Airport Business Park/NYSDOT Facility Site.

In 2015, a study was prepared that included relocating the NYSDOT facility currently located on the waterfront in the City of Ithaca to a site on Warren Road north of the Airport. It was envisioned that the NYSDOT facility would act as an anchor for a new business park.

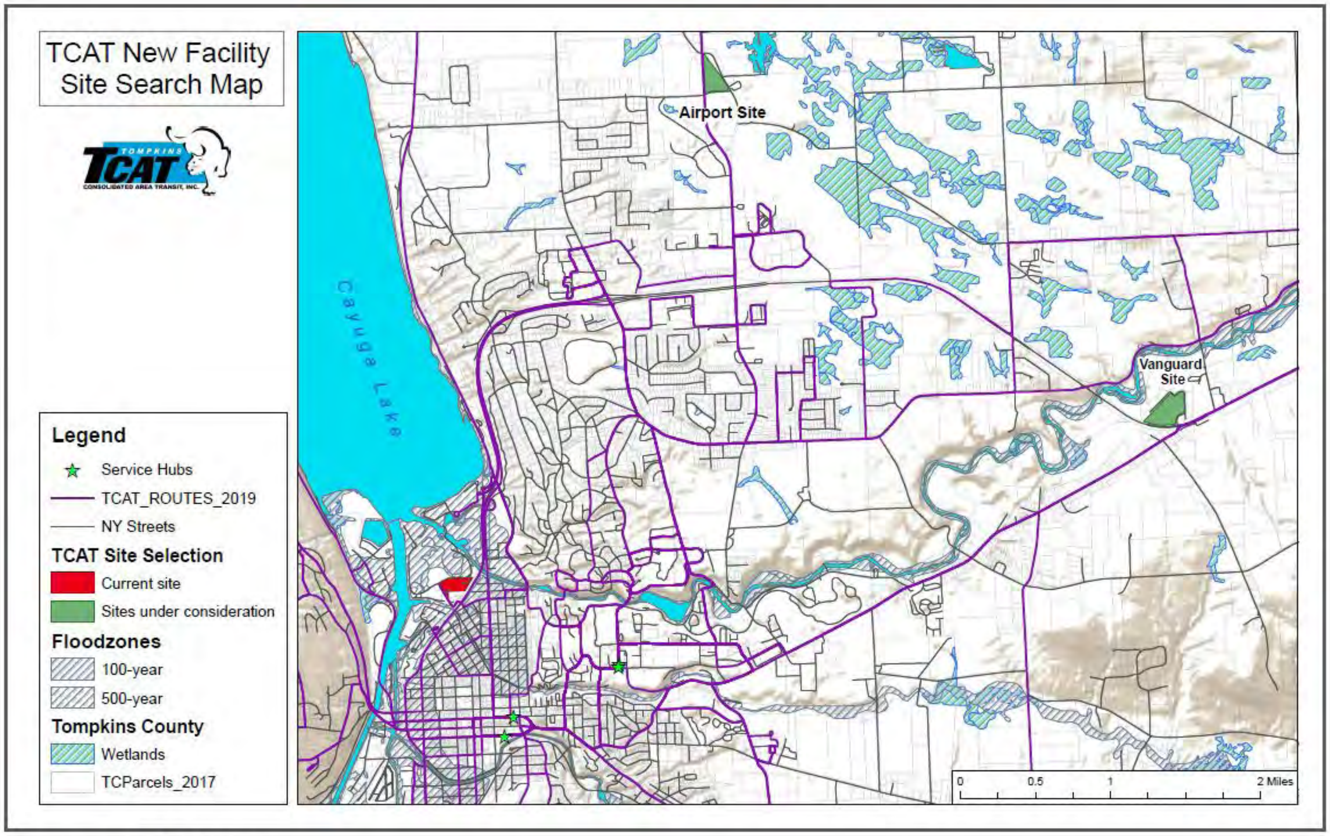
FIGURE 3.18: NYSDOT FACILITY MAP

Source: Feasibility Study for the Ithaca-Tompkins Regional Airport Industrial/Business Park (2016)

TCAT Facility Site

In 2019, TCAT studied relocation of its primary facility from the Waterfront District, which included two potential sites along the SR 13 corridor: a triangular parcel north of the Airport between Warren Road, Cherry Road and Warren Drive, and the former Vanguard site on the north side of SR 13 across from the NYSEG facility.

FIGURE 3.19: TCAT NEW FACILITY SITES MAP



Source: TCAT (2019)

In December 2019, the TCAT Board voted to move forward with the Warren Road location, citing closer proximity to Ithaca, the ability to build on a blank slate and possible funding opportunities related to location at the Airport.

NYSEG Node

The future of the New York State Electric and Gas (NYSEG) building near the overlap of SR 366 and SR 13 includes possible redevelopment the site while maintaining some space for NYSEG uses. Progress in negotiations with a local developer over a 100-acre parcel spanning SR 13 that includes the NYSEG building and agricultural facilities north of the Route has been hampered by the lack of water and sewer on site.

Residential Development

The high cost of housing in Ithaca and the proximity of the Village of Lansing to the employment centers of downtown Ithaca and Cornell University has driven residential development in this area in recent years. Developments include the East Pointe Apartments, Village Solar Apartments, and Ivy Ridge Townhomes. Much of the residential development that has moved forward in recent years is closer to the City of Ithaca, decreasing traffic impacts to the corridor.

"LIKELY-BUILD" SCENARIO

As mentioned previously in this chapter, the future development analysis is intended to provide the County with a realistic sense of the potential for future investment along the corridor within the ten year planning horizon. The build-out analysis performed indicates that there are two major nodes of vacant land that could be developed: the cluster of parcels within the Cornell Business District, and the cluster of parcels just east of the SR 366 / Dryden Road intersection. The market analysis provided context to the results of the build out analysis through consideration of recent development trends, socioeconomic information, and qualitative data received through discussions with local stakeholders. As a result, several parcels identified in the build-out analysis were removed from consideration, and several parcels were added in to the likely-build scenario. The ultimate likely-build development scenario produced consists of two tiers of development potential: those that are considered more likely, or are already in the process of development; and those that are possible, but are less likely to occur within the next ten years.

Once the two tiers of parcels likely to be developed were identified, the estimated square footage of new development was estimated based on parcel size, land use regulations such as maximum lot coverage, and market demand. A potential land use was assigned to each parcel based on its zoning designation and market trends. Table 3.9 below lists the parcels identified in the likely-build scenario, as well as the predicted future use of each parcel and the potential square footage of new investment. Each parcel is numbered; corresponding with the parcels identified in Figure 3.20 on the following page.

TABLE 3.9: LIKELY BUILD DEVELOPMENT SCENARIO PARCELS

#	Tax Parcel ID	Total Parcel Area (Acres)	Estimated Buildout (total floor area)	Projected Use
Most Likely Development to Occur in Next 10 Years				
1	503201-45.1-1-52.31	3	30,000	Research and Development Center
2	503201-45.1-1-55.2	5.6	40,000	Research and Development Center
3	503201-45.1-1-55.2	22	80,000	Industrial Park
4	503201-45.1-1-55.1	8.5	40,000	Industrial Park
5	503289-44.-1-47	13.3	45,700	NYSDOT Facility
6	503289-44.-1-47	3.8	150,000	TCAT Facility
7	502489-33.-1-3.2	900	20 Units	Single-Family Detached Housing
8	502401-8.1-1-6.2	41.7	200,000	Residential Planned Unit Development
Less Likely Development to Occur in Next 10 Years, But Possible				
9	503289-44.-1-47; 503289-44.-1-20.1	52.6	100,000	Office Park
10	502489-52.-1-4.32	23.1	600,000	General Light Industrial
11	502489-52.-1-13	104	100,000	Single Tenant Office Building
			1,700	Fast Casual Restaurant
12	502489-44.-1-9	100.5	300,000	Residential Planned Unit Development
			1,500	Fast Casual Restaurant

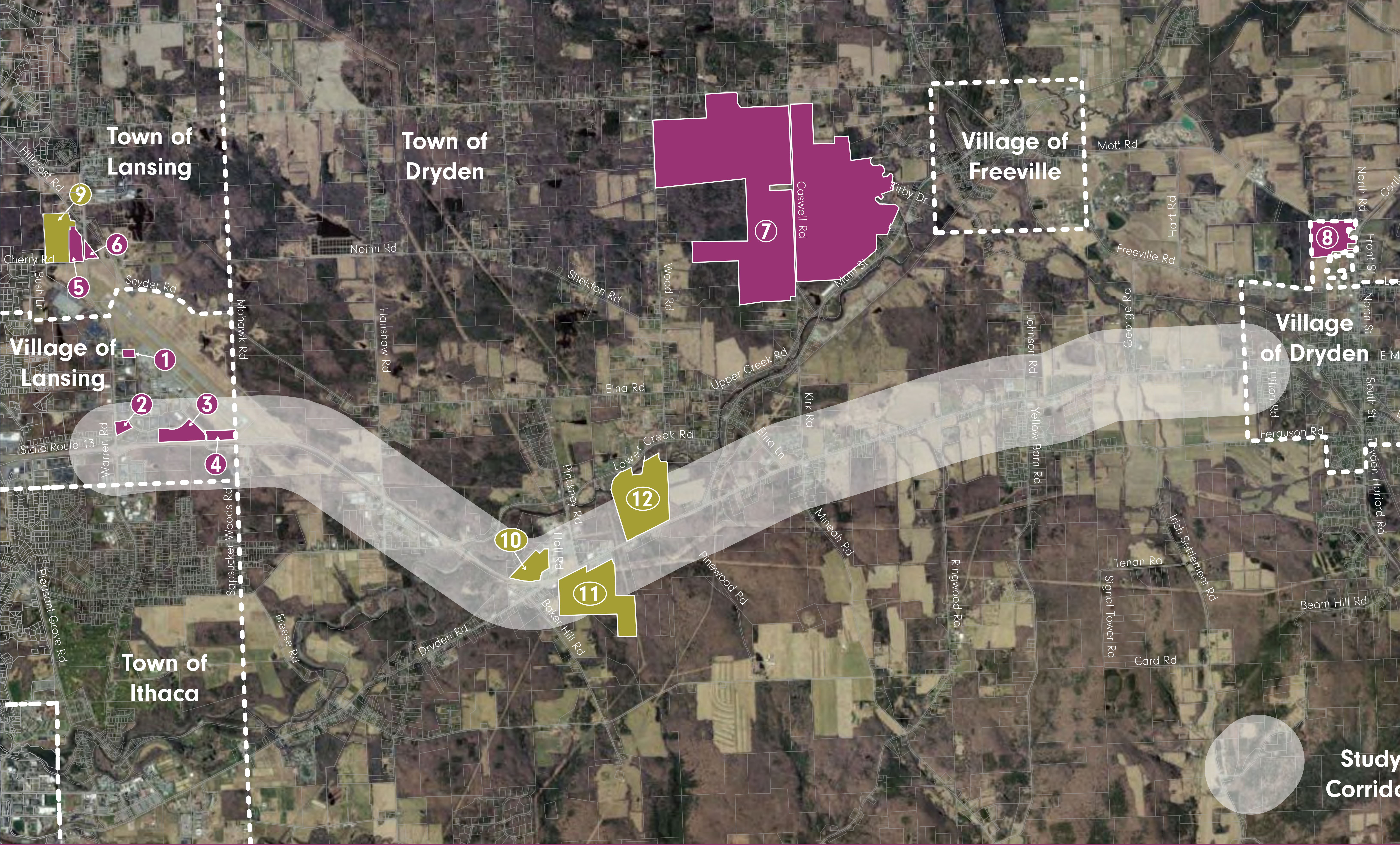


FIGURE 3.20: LIKELY-BUILD DEVELOPMENT SCENARIO PARCELS

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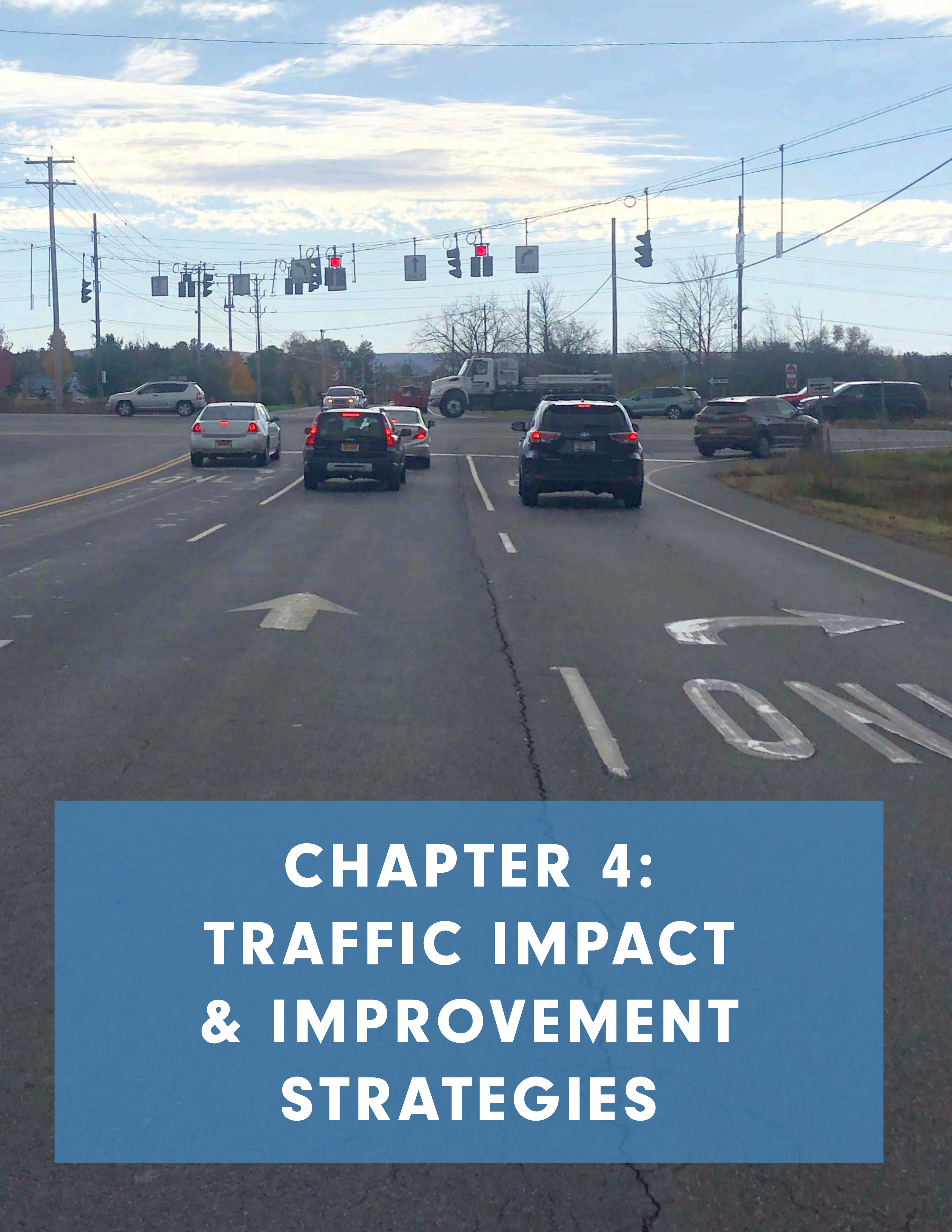


CHAPTER 4: TRAFFIC IMPACT & IMPROVEMENT STRATEGIES

SUMMARY

As with all land use changes, the "likely-build" development scenario presented in Chapter 3 has implications for shifts in traffic patterns. Some of these impacts may detract from the SR 13 Corridor's ability to effectively move vehicles, pedestrians, and bicyclists in a safe and efficient manner. Therefore, the potential traffic impacts of the future development scenarios were considered, and a set of potential improvement strategies were identified that will help mitigate any negative impacts from land development along the Corridor within the next decade. This chapter will outline the methodology used to determine the potential impacts to the corridor, while considering the current deficiencies that exist along the corridor. Following this, a set of recommendations is presented; both for the key intersections identified for this analysis, as well as the corridor as a whole.

METHODOLOGY

FUTURE DEVELOPMENT ANALYSIS

Several sites along the Study Corridor were selected as ten-year "likely-build" future development scenario. As mentioned in the previous chapter, the "likely-build" scenario was developed based on an initial broad-brush build-out analysis, and then further refined based on a market analysis, stakeholder interviews, and a review of existing plans and studies for the corridor. This analysis resulted in a calculation of total potential square footage of new development, which was used to determine potential future traffic issues and opportunities. A more detailed description of this process is presented in Chapter 3, and the parcels selected for analysis are presented in Figure 4.1 below:

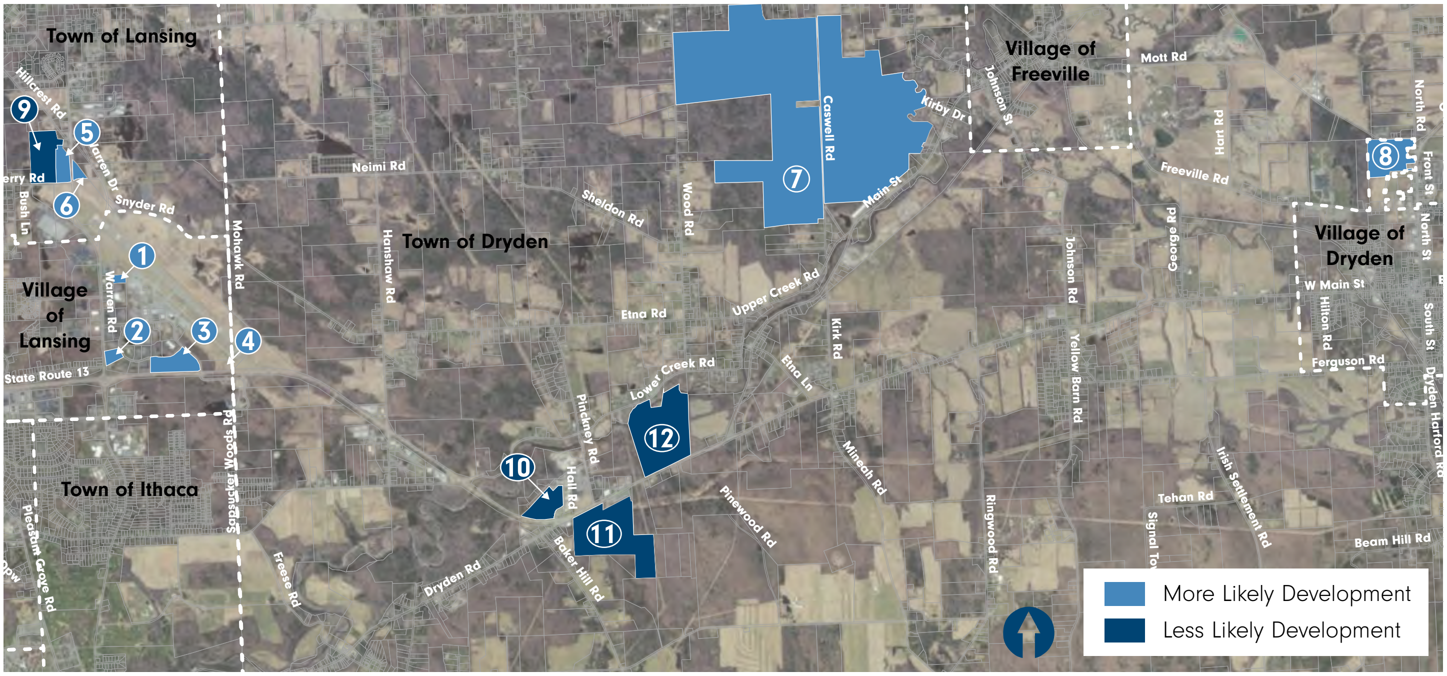


FIGURE 4.1: TEN YEAR "LIKELY-BUILD" DEVELOPMENT SCENARIO PARCELS

Map #	Tax Parcel ID	Total Parcel Area (Acres)	Estimated Buildout (square feet)	Projected Use	ITE Land Use Code	New Trips Generated Daily	Projected Peak Hour Volume (10%)	Network Loading/ Access Location	Potential Impacts
	Most Likely Development to Occur in Next 10 Years								
1	503201-45.1-1-52.31	3	30,000	Research and Development Center	760	200	20	Warren Rd > SR 13	Reduced Level of Service at Warren Rd & SR-13 intersection. Longer traffic queues and increased delay experienced by users.
2	503201-45.1-1-55.2	5.6	40,000	Research and Development Center	760	260	26	Warren Rd/Brown Rd > SR 13	Reduced Level of Service at Warren Rd & SR-13 intersection. Longer traffic queues and increased delay experience by users.
3	503201-45.1-1-55.2	22	80,000	Industrial Park	130	600	60	Brown Rd > SR 13	Increased volume of vehicles turning onto Brown Road from SR 13 has the potential to create more delay for mainline SR 13 users. Substantial queues could occur along Brown Rd while vehicles wait for gaps in traffic on SR 13.
4	503201-45.1-1-55.1	8.5	40,000	Industrial Park	130	450	45	Brown Rd > SR 13	Increased volume of vehicles turning onto Brown Road from SR 13 has the potential to create more delay for mainline SR 13 users. Substantial queues could occur along Brown Rd while vehicles wait for gaps in traffic on SR 13.
5	503289-44.-1-47	13.3	45,700	NYSDOT Facility (30 peak hr trips)	N/A*	120	12	Warren Rd > SR 13	Reduced Level of Service at Warren & SR 13 intersection. Longer traffic queues and increased delay experience by users.
6	503289-44.-1-47	3.8	150,000	TCAT Facility	N/A*	456	45.6	Warren Rd > SR 13	Reduced Level of Service at Warren & SR 13 intersection. Longer traffic queues and increased delay experience by users.
7	502489-33.-1-3.2	900	20 Units	Single-Family Detached Housing	210	65	6.5	Kirk Rd/Wood Rd > SR 13	No impacts anticipated to SR 13.
8	502401-8.1-1-6.2	41.7	200,000	Residential Planned Unit Development 84 duplex Sr housing, 42 condo/apartments, 60 room hotel	254 233 320	15 55 50	12	North St > SR 13	No impacts anticipated to SR 13.
	Less Likely Development to Occur in Next 10 Years, But Possible								
9	503289-44.-1-47; 503289-44.-1-20.1	52.6	100,000	Office Park	750	1050	105	Warren Rd > SR 13	Reduced Level of Service at Warren & SR 13 intersection. Longer traffic queues and increased delay experience by users.
10	502489-52.-1-4.32	23.1	600,000	General Light Industrial	110	4500	450	Hall Rd > SR 13	Significant delays created for both the AM & PM peak period due to large growth in traffic volumes to/from Hall Road.
11	502489-52.-1-13	104	100,000	Single Tenant Office Building	715	1150	115	Existing NYSEG driveways > SR 13	Increased queue lengths into/out of NYSEG property.
			1,700	Fast Casual Restaurant	930	510	51		
12	502489-44.-1-9	100.5	300,000	Residential Planned Unit Development	270	775	77.5	Wood Road > SR13	Significant additional delays created for both the AM & PM peak period along the SR 13 / SR 13 overlap due to growth in traffic volumes.
			1,500	Fast Casual Restaurant	930/ 814	510	51		

*Traffic generation provided by external source.

TABLE 4.1: ANTICIPATED TRAFFIC IMPACTS FROM FUTURE DEVELOPMENT ANALYSIS

TRIP GENERATION & TRIP DISTRIBUTION

Trip generation determines the quantity of traffic expected to travel to/from a proposed development site. The Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, is the industry standard for determining trip generation for proposed land uses. ITE provides trip generation information for different land uses based on studies conducted throughout the U.S. and also supports the use of site specific trip generation data. For this study, anticipated land uses were formulated for each of the development sites which correlated to land uses found in the ITE Trip Generation Manual. This resulted in the daily peak, AM peak period, and PM peak period traffic volumes to be forecasted at specific loading locations along the SR 13 corridor from each development site. In addition, some development sites, such as development site #5 (NYSDOT Facility), supplied known traffic operational data which was also included in this study. This study assumed that all trips generated by the proposed development sites would be new trips, not pass-by trips. Pass-by trips are trips made to the development by traffic already "passing by" the development on an adjacent street. Excluding any pass-by trips results in a "worst case" trip generation scenario. The projected trip generation for each development parcel is presented in Table 4.1 on the previous page.

Trip distribution describes where traffic originates or where traffic is destined. Trips generated by the proposed developments were distributed based on anticipated travel routes of arrivals to and departures from the sites. In general, trips we distributed based on existing traffic trends along the SR 13 corridor. During the AM peak period, trips were primarily distributed as coming from SR 13 to the development site and vice versa during the PM Peak as commuters travel to/from work.

TRAFFIC IMPACTS

As summarized in Chapter 2, turning movement count data was previously collected at multiple strategic locations along the SR 13 corridor. These counts were used to develop traffic simulation models of the existing conditions/corridor to evaluate the operational efficiency of the SR 13 network. Now with the trips generated and distributed for each of the proposed development sites, the simulation models were revisited to assess the impacts of additional users being added to the network during the peak AM/PM peak hours of operation, and identify any failures in LOS compared to the existing traffic levels.

The resulting impacts of each of the proposed developments on the SR 13 corridor are summarized in the Table 4.1 on the previous page. The impacts to SR 13 were evaluated as if all of the proposed developments were fully built out to assess the worst case traffic conditions. It should be noted that these developments will be built out gradually over time, and as such the impacts and required mitigation strategies will need to be re-evaluated and implemented over time as demand on the network grows.

The predominant impact resulting from the additional traffic can be attributed to the fact that there will be substantial additional turning movements off of and onto SR 13. These additional turning movements create longer delays at existing signalized intersections which are already configured with turning lanes to accommodate these movements. But more concerning are the existing intersections which do not have dedicated turn lanes or traffic control (i.e. traffic signals) to facilitate these movements. One example of this is the intersection of SR 13 and Brown Road. At this intersection both SR 13 and Brown Road are two-lane roads (one lane in either direction) and stop control is enforced on Brown Road via stop signs. Should there be a vehicle heading eastbound on SR 13 which wants to turn left onto Brown Road, the driver will need to wait for a gap in westbound traffic. This gap may not occur immediately and with no dedicated turn lane traffic will begin to queue quickly behind the turning vehicle, particularly during the peak hours of operation.

More alarming in this particular circumstance, and as seen at other similar two-lane intersections, is that instead of waiting for the vehicle to turn left onto Brown Road when a gap in westbound traffic occurs, motorists that want to continue driving east along SR 13 will risk going around the left-turning vehicle via the use of the eastbound road shoulder, creating a very dangerous movement for not only the driver but also for any bicyclists or pedestrians using the shoulder in those locations. Similarly, vehicles on Brown Road turning onto SR 13 will also experience additional delays as they wait for the appropriate gaps in traffic to perform a turning movement safely. The potential impacts from the likely build development scenario are summarized in Table 4.1 on page 77.

FUTURE LAND USE & TRANSPORTATION IMPLICATIONS

Land use and transportation networks are inextricably linked, and changes in our land use patterns have significant impacts on how many trips are taken on any given roadway, as well as the quality of traveling along the corridor. It can also be said that transportation planning is a form a land use planning, as you are planning the character and nature of the land which makes up the roadway network. Therefore, both the transportation network and land use patterns must be considered in tandem during any corridor planning process to ensure that future changes to both systems are working harmoniously to work towards the community's vision for the corridor. The general relationship between transportation and land use patterns is depicted in Figure 4.2 below:

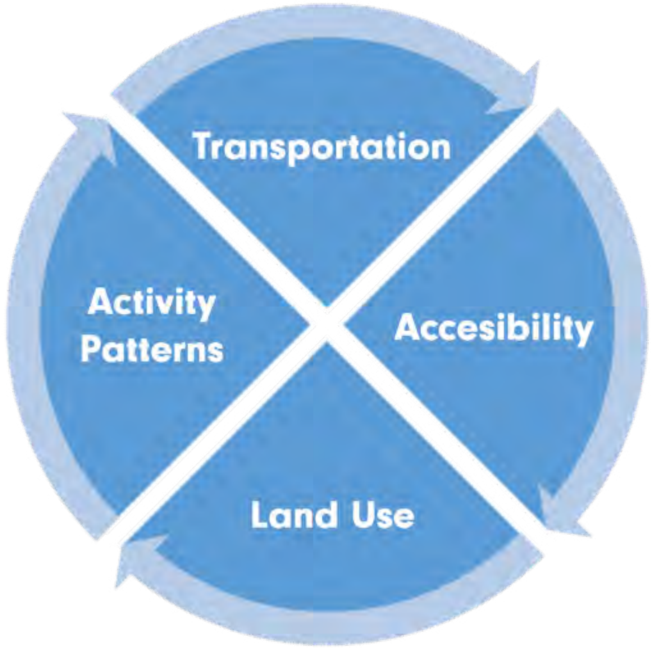


FIGURE 4.2: LAND USE / TRANSPORTATION CYCLE

The recommendations contained within this report taken into consideration the relationship between transportation and land use, and consist both of transportation and land use strategies, including the following:

Intersection Improvements (for each of the six key intersections):

- Recommended Intersection Enhancement Strategies
- Potential Intersection Configuration Strategies
- Multi-modal Intersection Strategies

Corridor Wide Improvements:

- Multi-modal Improvements
- Access Management Strategies
- Zoning Recommendations

CORRIDOR IMPROVEMENT STRATEGY

A thorough analysis has been conducted of the myriad factors that influence the current and future operations of the Study Corridor, including land use regulations, market trends, land use patterns, safety patterns, and intersection performance. This analysis has provided a robust multi-faceted image of how the corridor currently functions, and an idea of how the future will shape the functionality of the corridor. All of the factors described above indicate that there are two distinct character areas within the corridor in terms of existing traffic patterns, as well as potential future development: the western section of the Study Corridor between Warren Road and SR 366 (Main Street), and the eastern section between SR 366 (Main Street) and Spring House Road. The schematic plan in Figure 4.3 on the following page shows the potential improvements recommended for each section of the corridor, and the character of each section is described in further detail below:

WARREN ROAD TO SR 366 (MAIN STREET)

The western portion of the corridor has the most existing development, is most ripe for future development, and has the most significant implications for traffic operations and the quality of traveling along the Study Corridor. Development and activity generated by some of the largest regional traffic generators such as Cornell University has expanded beyond the municipal boundaries of the City of Ithaca and into adjacent communities such as the Village of Lansing and the Town of Dryden. Thus, it is inevitable that this section of the Study Corridor is a more likely location for both development and higher traffic levels. Furthermore, it was incredibly evident that this section of the corridor presents the most challenges to traffic operations based on the hundreds of survey responses collected at the onset of this planning process and at all the public engagement opportunities over the course of this study's development. Therefore, the majority of mitigation strategies are aimed at this section of the corridor, including improvements to six key intersections. The strategies proposed at the six intersection are aimed at mitigating both existing and future operational deficiencies along the Study Corridor for the next ten years.

However, it is possible that the development demands along this corridor, as well development pressures to the west in Ithaca and east in the Cortland area, will have repercussions such that the design and operational improvements recommended in this planning study cannot fully mitigate the traffic impacts of the growth of the region as a whole. In this case, more significant improvement strategies, such as roadway expansion from two to four lanes may be warranted, following additional engineering studies. However, it is important to note that such strategies would require an immense funding commitment, and a lenghty implementation timeframe. The potential pitfalls of such expenditures are described further on page 82.

SR 366 (MAIN STREET) TO SPRING HOUSE ROAD

The eastern portion of the Study Area is much more rural in character, and has fewer traffic generators and less potential for development activity within the next ten years. However, the traffic deficiencies created as a result of the activity centers to the west spill over to this section of the roadway. Additionally, there is a significant amount of commuting activity that occurs along this section of the Corridor, creating higher volumes of traffic than what the adjacent traffic generators would typically produce. Given this, the eastern section of the roadway could also benefit from some improvement strategies, not only to mitigate the issues that currently exist, but to be proactive in regulating a built environment that supports efficient and safe traffic patterns should development occur along this section in the future. It should be noted that, while traffic volumes and safety should continue to be closely monitored for signs of stress, at this time it is not anticipated that future additional lanes on SR 13 would be warranted given existing and projected use. One particular concern in this section is that it would be very challenging to significantly widen the roadway given narrow ROW widths and impacts to adjacent properties.

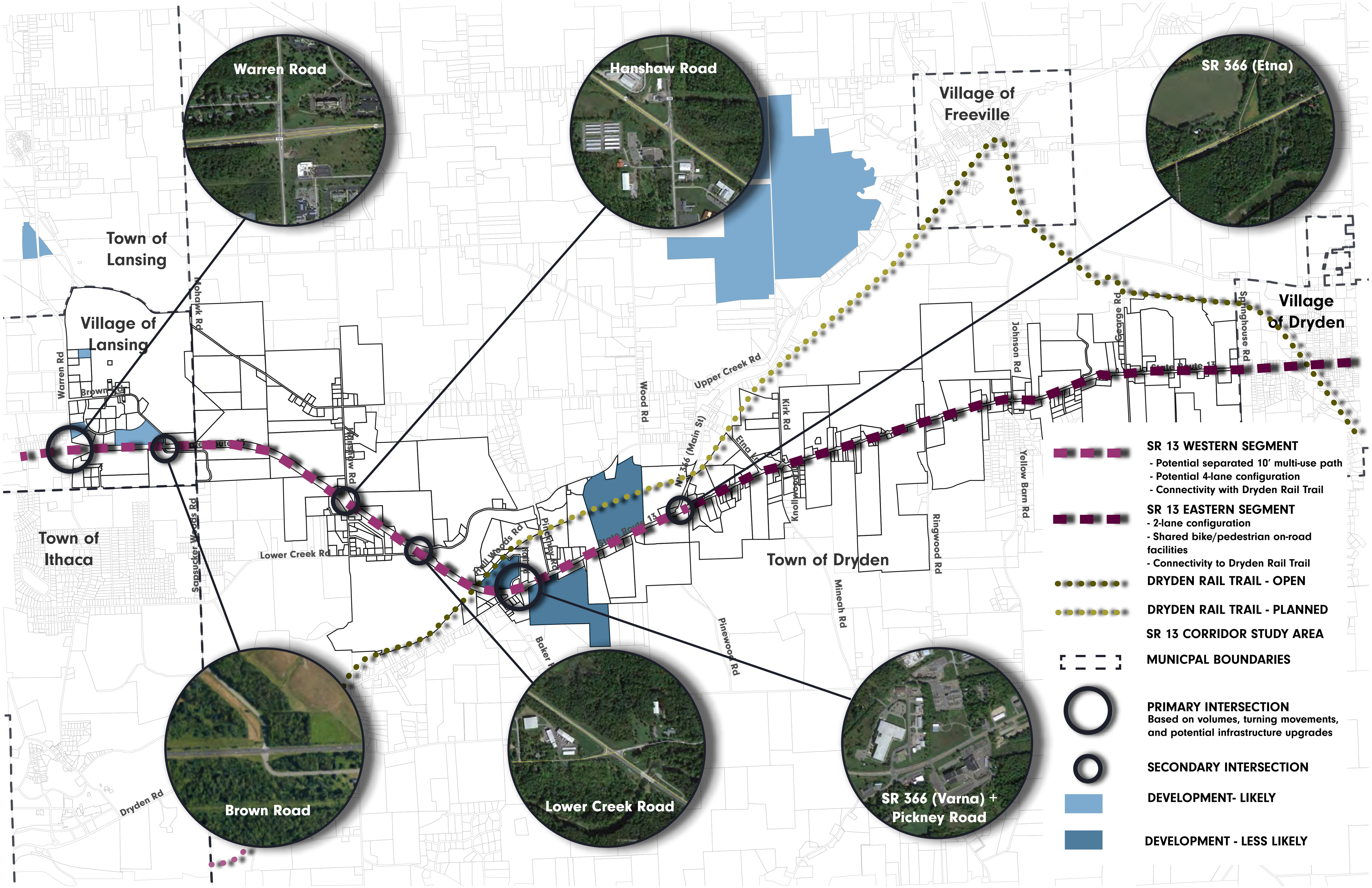
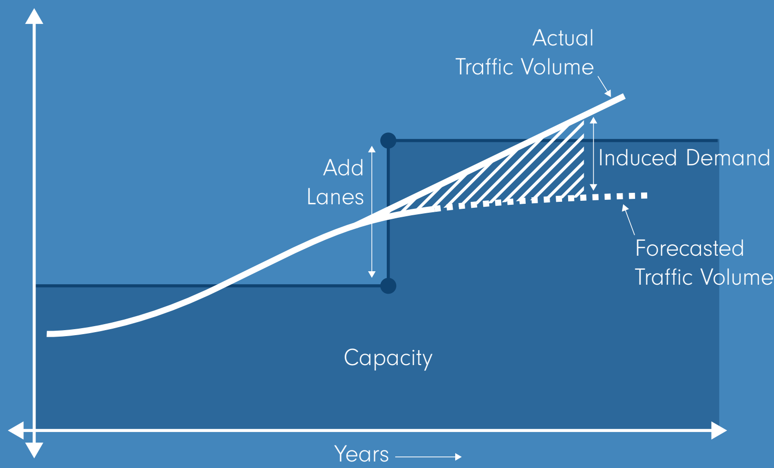


FIGURE 4.3: SCHEMATIC CONCEPT PLAN

CORRIDOR EXPANSION & SR 13

As mentioned previously, due to the analyses performed that suggest that the intersections along the Corridor have more significant deficiencies than the roadway segments, this report emphasizes improvements to the priority intersections as a means to maintain and improve traffic flow and safety. It is also mentioned within this report that after a period of time, if these strategies do not fully mitigate the traffic impacts associated with growth along the Corridor and within the region, that more significant improvement strategies may be considered.



Source: Walkable City Rules, Jeff Speck

Increasing capacity through roadway expansion has been seen as the long-term solution for this problem since the advent of the consumer automobile. However, there is research available that suggests that roadway expansion through the addition of new traffic lanes may not be a silver-bullet solution to reducing congestion along a roadway.[1,2] The concept of "induced demand, or "induced travel" uses the economic principles of supply and demand to explain why adding capacity essentially decreases the "price" of driving" at any given time (i.e. less travel time), and therefore increase the quantity of drivers on the roadway at any given moment.

Put more simply, roadway expansion will initially result in less delay and less conflict among drivers, making the roadway more attractive for drivers who currently avoid the roadway for those reasons. Depending on how many drivers are drawn to begin using the roadway due to these improvements, this may eventually counteract all of the benefits to congestion and safety that the roadway expansion initially provided.

If roadway expansion is to be considered beyond the ten year planning horizon of this study, special attention should be made to the potential overstatement of the benefits of roadway expansion during project development phases and environmental review processes.

The Florida Department of Transportation estimates that it costs over

$2.5 MILLION PER MILE

to widen a rural arterial roadway from two to four lanes.[3]

1. Litman, Todd. (2004). Generated Traffic and Induced Travel: Implications for Transport Planning. Institute of Transportation Engineers Journal. 71. 38-47.
2. Handy, S. (2015). Increasing Highway Capacity Unlikely to Relieve Traffic Congestion. UC Davis: National Center for Sustainable Transportation. Retrieved from https://escholarship.org/uc/item/58x8436d
3. https://www.fdot.gov/programmanagement/estimates/lre/costpermilemodels/cpmsummary.shtm

CRASH REDUCTION FACTORS

This Chapter provides a wide variety of improvement strategies for each of the six key intersections. In order to determine the potential effectiveness of these strategies, a Crash Reduction Factor (CRF) may be used. A Crash Reduction Factor (CRF) is an estimate of the crash reduction that might be expected if a specific countermeasure is implemented. The CRF is reported as a number from 0 to 100 and corresponds to the percentage reduction. CRFs can be a useful way to evaluate and prioritize improvements at intersections and along highway segments.

The Federal Highway Administration (FHWA) Desktop Reference for Crash Reduction Factors (Report No. FHWA-SA-08-011) was used to determine CRFs for the various improvements recommended within the Study Corridor. While the FHWA data is based on before-after safety studies and other engineering analyses, it is important to note that the CRFs are intended to be generic estimates of effectiveness. Actual site-specific results may vary based on traffic volumes, environmental, geometric and other operational conditions. It is also important to note that safety countermeasures are most effective for correctable crashes; the countermeasures may have little to no effect on crashes attributed to causes such as driver distraction and driver error.

Table 4.2 summarizes the CRFs for each safety countermeasure. Unless otherwise noted, the CRF for "all" crash type and severity is reported (for some countermeasures, the FHWA guide does include separate CRFs for various crash types and severity).

TABLE 4.2: CRASH REDUCTION FACTORS (CRF)

Type of Countermeasure	Countermeasure	Crash Type	CRF
Signal Improvements	Install backplates with reflective sheeting	All	15
	Add left turn signal phase	Left Turn	16
	General signal timing improvements	All	8
	Increase yellow change interval	All	15
	Install pedestrian signals	All	20
Intersection / Geometric Improvements	Install traffic signal (convert Stop control to signal)	All	28
	Install left turn lane	All	25
	Install right turn lane	All	25
	Increase length of right turn lane	Fatal/Injury	15
	Install roundabout	All	35
	Install raised median	All	25
	Install pedestrian crosswalk	Pedestrian	25
	Prohibit left turns	All	45
	Install bicycle box at signal	Bicycle	35
Miscellaneous Improvements	Install advance warning signs	All	35
	Install lighting	All	30
	Install animal fencing	Animal	80

RECOMMENDED INTERSECTION IMPROVEMENTS

As mentioned previously in this study, it was determined that given the discrepancies between the crash rates at the intersections along the Study Corridor and average statewide crash rates for similar facilities, the recommendations within this report should prioritize improving the functionality and safety of the identified priority intersections. This section of Chapter 4 will provide three types of improvement strategies for the intersections: Recommended Intersection Enhancement Strategies, Potential Intersection Configuration Strategies, and Recommended Multi-modal Intersection Strategies. A description of each type of strategy as well as some common improvements within that category are described below.

RECOMMENDED INTERSECTION ENHANCEMENT STRATEGIES

These types of strategies are intended to be more immediate improvements that the community can take to enhance safety and improve traffic flow. Generally speaking, these improvements would not require significant further study prior to implementation, and mainly include the installation of additional small-scale infrastructure to improve existing traffic patterns rather than altering them. Common improvement strategies found within this section are as follows:

- **Re-time signal program.** Traffic signals are often not timed to coordinate efficiently with vehicular traffic, which may cause delays and potential crashes. This improvement strategy suggests that an existing traffic signals operations are reviewed further to determine where improvements can be made in the timing of signals to give vehicles more time where current timing is insufficient, or to shorten signal times where appropriate.
- **Implement new vehicle detection system.** A Video Imaging Vehicle Detection System (VIVDS) captures video imagery of vehicles on a roadway, which is then transmitted to a traffic controller or similar device. This type of infrastructure would help to more accurately detect the presence of vehicles, and that data can be used to make improvements to signal timing as well.
- **Implement additional warning signage.** This strategy includes the installation of various MUTCD traffic control signs to improve awareness of changes to the roadway configuration or the presence of other individuals using the roadway.
- **Install intersection lighting.** The installation of new or improved intersection lighting can help improve visibility not only for vehicles, but also for pedestrians and bicyclists as well.
- **Install signal backplates.** Signal backplates are typically black pieces of metal with retroreflective borders that are adhered to the back of a traffic signal to reduce sun glare and improve visibility for motorists during both daytime and nighttime conditions.

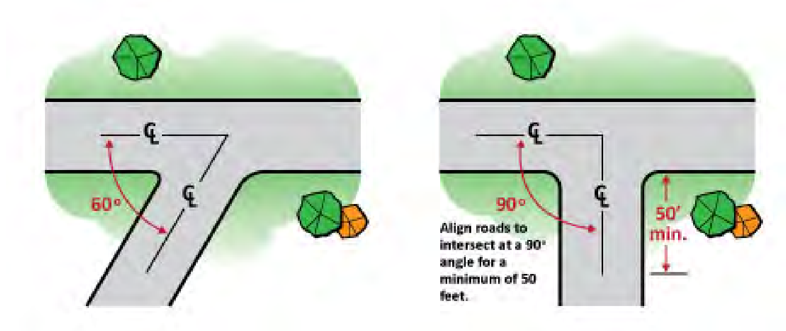
MUTCD Sign W3-4

Signal Backplate (Source: Nevada DOT)

POTENTIAL INTERSECTION CONFIGURATION STRATEGIES

Several of the priority intersections identified either have significant deficiencies, or may have significant deficiencies in the future should the projected development occur along the corridor (as identified in Table 4.1). In these instances, more significant investment in / alterations to the intersection may be warranted than the strategies identified as "enhancement" strategies. The strategies within the Potential Intersection Configuration Strategies Category are presented as potential solutions to the more significant problems identified in the Existing Conditions and Future Development Scenario analyses, such as failing LOS and crash rates significantly higher than statewide averages. These strategies would require significant further study prior to implementation, and the ultimate intersection design would be determined through the NYSDOT project development process.

- **Install turn lanes.** Several additional turn lanes are recommended where there were concentrations of crashes due to conflicting turning movements and where turning movements received failing LOS designations. The addition of turning lanes will improve traffic flow and safety along the corridor, for instance areas where there are vehicles moving along the Study Corridor overtaking (or passing) vehicles waiting to turn left off onto an intersecting roadway.
- **Signalize intersection.** Traffic signals help to assign the right-of-way (ROW) to conflicting traffic movements, and create interruptions in heavy traffic flows along SR 13 during peak hours to allow vehicles approaching the intersection from a secondary road to making turning movements or cross the Corridor safely.
- **Consider installation of roundabout.** Similar to traffic signals, roundabouts are a type of intersection control that assigns ROW to drivers at all four approaches. However, a roundabout allows for the free flow of traffic, using yield signs at each approach and a circular intersection that vehicles circumnavigate in one direction before exiting at their desired location. This strategy may be considered in lieu of a traditional stop-light intersection configuration to mitigate conflicts between traffic movements.
- **Geometrically reconfigure intersection.** When two roadways intersect at an acute angle, this often mean that there are larger required turning areas, reduced visibility, and increased vehicle exposure time within the intersection; ultimately increasing the likelihood for collisions. Therefore, several intersections with acute angle configurations are recommended to be reconstructed with right angle approaches in order to mitigate these safety concerns.



Intersection Angles. (Source: Chester County Planning Commission)

MULTI-MODAL INTERSECTION STRATEGIES

Throughout the technical analysis, as well through analyzing the survey data collected for this study, it was determined that there is not a significant amount of pedestrian and bicyclist activity along the Study Corridor; mainly due to the high speed, rural character of SR 13 in this area. However, opportunities to facilitate non-vehicular traffic have been identified along the Corridor; most significantly through the implementation of a shared use path between Warren Road and SR 366 (described in further detail on page 98). Therefore, the majority of multi-modal intersection strategies are focused on providing facilities for non-motorists to safely cross intersecting roads where the shared use path is proposed. However, it is also important to note that any non-motorist facilities installed should also take into consideration the presence of nearby TCAT facilities, and ensure that the facilities provide safe connections to those bus facilities.

WARREN ROAD @ SR 13:

Issues: Warren Road is one of the most active intersections along the Study Corridor, and exhibits the highest capacity in terms of number of lanes approaching the intersection along SR 13 (left and right turn lanes and two thru-lanes at both approaches). The crash rate for this intersection was the highest within the Study Corridor, and is over five times greater than the Statewide average for similar state facilities. Over half of these crashes were rear end crashes; the majority of which occurred at the westbound approach of SR 13. The LOS for turning movements at this intersection ranges between B and F, and the overall LOS for the intersection at peak hours ranges between C and D (See Chapter 2). Additionally, five of the "likely-build" development parcels identified in the previous chapter would result in additional vehicles accessing SR 13 from Warren Road.

Opportunities: Given the identified operational and safety deficiencies, several improvements to the Warren Road intersection are recommended, which are described below, and some depicted conceptually in Figure 4.4 on the following page. Each of these strategies could serve to improve the functionality and safety of the intersection and are recommended for further evaluation and consideration for implementation by the municipalities and NYSDOT.

Recommended Intersection Enhancements:

- **Re-time signal program.** An analysis of the existing LOS at this intersection suggested that the signals should be re-timed to reduce delays at this intersection, particularly for vehicles turning left from the northbound approach, which currently experience an average delay of almost two minutes during the AM peak period (resulting in a LOS F).
- **Implement new vehicle detection system.** The installation of a video image vehicle detection system (VIVDS) would also reduce delays at this intersection by detecting the presence of vehicles in order to change the signals accordingly.
- **Implement additional warning signage.** SR 13 NB transitions from an access-controlled highway to a principal arterial with at-grade intersections beginning at Warren Road. Additional warning signage, such as the MUTCD sign W3-4 ("Be Prepared to Stop"), would help encourage motorists to reduce their speed upon approaching the intersection. Additionally, additional warning signage to indicate that vehicles must merge to one lane following the Warren Road intersection on SR 13 heading east should be considered.
- **Install intersection lighting.** Currently, no street lights exist at the Warren Road intersection, posing safety concerns for both motorists and pedestrians.

Potential Intersection Configuration Strategies:

- **Install additional turn lanes.** Based on a technical analysis of the potential impacts of the likely-build scenario, and supported by numerous survey respondents, the construction of an additional left turn lane on eastbound SR 13 at this intersection would help reduce queue lengths and delays for vehicles turning onto Warren road from the eastbound approach, which currently has a LOS D in all peak hours. Similarly, an additional left turn lane on the northbound approach to the intersection would help mitigate the low LOS at this approach for vehicles turning left, as mentioned previously. *(Figure 4.4 #1)*
- **Widen Warren Road.** Given the recommended installation of an additional left turn lane on eastbound SR 13, Warren Road north of SR 13 would necessarily need an additional northbound lane to accommodate the vehicles using the new turn lane.

LEGEND

1 Additional Left Turn Lanes
Two additional left turn lanes, one approaching the intersection on SR13 from the west, and another approaching the intersection on Warren Road from the south.

2 Enhanced Crosswalks
Eastern and western leg crosswalks to be 2-stage crossings with refuge island for safety. All crosswalks would provide safe passage for pedestrians and bicyclists and connectivity to potential future shared use path along SR 13. New lighting will also improve visibility for the new crosswalks.

3 Cycle Track
Potential 10' wide two-way cycle track to provide direct connectivity to SR 13 for bicyclists.

4 Shared Use Path
Provide shared use separated 10' path to provide safe connectivity to Dryden Rail Trail and adjacent development.

5 Tree Plantings
Greenspace and street tree integration to provide for visual and vertical separation between eastbound and westbound travel lanes, and to provide safe separation between roadway and potential shared use path along the western segment of the SR 13 corridor.

FIGURE 4.4: ILLUSTRATIVE IMPROVEMENTS @ WARREN ROAD

Recommended Multi-modal Intersection Strategies:

Existing pedestrian call button

- **Implement bi-directional cycle track on the shoulder of Warren Road.** In order to create connectivity between the recommended shared use path along SR 13 (described on page 98) and the activity centers along Warren Road, it is recommended that lane markings indicating the permitted use of the shoulder for bicyclists are installed. *(Figure 4.4 #3)*
- **Install planted medians.** It is recommended to create a planted median where the existing painted median exists at the westbound approach on SR 13, and install street trees in the planted median at the eastbound approach. The planted medians will act as traffic calming elements, causing drivers to slow down when approaching the intersection. Additionally, the median would serve as a refuge for crossing pedestrians. *(Figure 4.4 #5)*
- **Install bicycle and pedestrian facilities.** This intersection would benefit from crosswalks to facilitate pedestrian crosswalks, especially given the existing and projected increased volume of traffic and the particularly long crossing distances. As shown in the photo above, there are existing pedestrian call buttons on the west side of Warren Road, however there is no pedestrian signal to indicate that it is safe for pedestrians to cross. These buttons should be replaced with pedestrian signals to facilitate safer and more comfortable pedestrian movements. Additionally, in order to create connectivity between the recommended shared use path along SR 13 (described on page 98) and the activity centers along Warren Road, it is recommended that lane markings indicating the permitted use of the shoulder for bicyclists are installed. *(Figure 4.4 #2)*

BROWN / SAPSUCKER WOODS ROAD @ SR 13:

Issues: Brown Road and Sapsucker Woods Road provide access to several employment centers, including the Cornell Business Park as well as the Cornell Lab of Ornithology. This results in a large number of vehicles making turning movements at this intersection. Additionally, many survey respondents mentioned that this intersection feels unsafe, particularly during commuting periods.

Opportunities: Several mitigation strategies are proposed to improve the functionality of this intersection, which are described below.

Recommended Intersection Enhancement Strategies:

- **Install intersection lighting.**

Potential Intersection Configuration Strategies:

- **Signalize intersection.**
- **Install center turning lanes on SR 13.**
- **Consider installation of roundabout.** *(Figure 4.5 #1)*

Recommended Multi- Modal Intersection Strategies:

- **Install bicycle warning signage.**
- **Install pedestrian crosswalk.**


Pedestrians crossing SR 13 at Brown & Sapsucker Road

FIGURE 4.5: ILLUSTRATIVE IMPROVEMENTS @ BROWN / SAPSUCKER WOODS ROAD

HANSHAW ROAD @ SR 13:

Issues: The Hanshaw Road intersection has an overall LOS B during the noon and PM peak hours, and an overall LOS C during the AM peak hours. Even though the intersection functions relatively well in terms of delays, the intersection has the second highest crash rate for the intersections along the Study Corridor; over twice the statewide average for similar facilities. Fourteen (21) of the 37 crashes at this intersection were rear end crashes in the through lanes in both directions on SR 13. This was supported by several survey respondents who also indicated that this intersection felt unsafe to navigate, particularly for vehicles turning right onto SR 13 or left onto Hanshaw Road.

Opportunities:

Recommended Intersection Enhancement Strategies:

- **Install signal backplates.**
- **Install intersection lighting.**
- **Consider replacing stop sign with a yield sign for right turn lanes on Hanshaw Road.**
- **Consider re-timing signal program.**

Potential Intersection Configuration Strategies:

- **Geometrically reconfigure intersection to 90° intersection alignment.**

LOWER CREEK ROAD@ SR 13:

Issues: The LOS analysis for this intersection indicates that the intersection functions adequately in terms of average delay. However, Lower Creek Road has the third highest intersection crash rate along the Study Corridor; three times higher than the statewide average for similar facilities. Unlike several of the other intersections with primarily rear end crashes, the majority of crashes at this intersection were due to vehicles entering the intersection from SR 13 and Lower Creek Road at the same time. This location was one of the most frequently mentioned intersections in the survey, and the majority of these responses mentioned that the intersection felt very dangerous; particularly for vehicles turning left onto Lower Creek Road from SR 13.

Opportunities:

Recommended Enhancement Strategies:

- **Install intersection lighting.**

Potential Intersection Configuration Strategies:

- **Signalize intersection.** *(Figure 4.6 #1)*
- **Install dedicated left turn lanes on SR 13.** *(Figure 4.6 #2)*
- **Consider installation of roundabout.**
- **Consider restricting turning movements (e.g. left turns onto Lower Creek Road from SR 13.)**
- **Geometrically reconfigure intersection to 90° intersection alignment.** *(Figure 4.6 #3)*

Recommended Multi-Modal Intersection Strategies:

- **Install pedestrian crosswalk at northbound Lower Creek Road approach.** *(Figure 4.6 #4)*

FIGURE 4.6: ILLUSTRATIVE IMPROVEMENTS @ LOWER CREEK ROAD

SR 366 (DRYDEN ROAD) / PINCKNEY ROAD / NYSEG DRIVEWAY @ SR 13:

Issues: The section of the Study Corridor between the SR 366 intersection towards Varna and Pinckney Road presents some of the biggest challenges on this roadway pertaining to roadway safety and traffic flow. The calculated average crash rate was 1.09 Acc/MEV, two times higher than that of the statewide average, and the third highest crash rate for all intersections analyzed for this study. Half of the crashes were rear end crashes; mainly clustered at the right turn lane on SR 366. Additionally, the roadway was assigned an overall LOS E for the AM peak, and an overall LOS D for the PM peak; indicating significant congestion at this intersection during commuting hours. This is particularly true for vehicles turning left onto SR 366 towards Cornell in the morning, and the opposite turning movement in the PM Peak, which both received a failing LOS. Responses from the public survey further support this analysis; over 100 comments were received regarding this intersection concerning traffic congestion and safety.

Opportunities:

Recommended Enhancement Strategies:

- **Re-time signal program.** Extending the timing for left turns onto SR 366 may help reduce traffic congestion, particularly during the AM peak period.
- **Implement new vehicle detection system.** The installation of a video image vehicle detection system (VIVDS) would also reduce delays at this intersection by detecting the presence of vehicles in order to change the signals accordingly.
- **Install signal backplates.**

Potential Intersection Configuration Strategies:

- **Extend right turn lane from SR 366 onto SR 13 NB.** Long queues frequently occur on SR 366, resulting in congestion at this intersection and vehicles blocking driveways. To mitigate this, extending the dedicated right turn lane towards Baker Hill Road is proposed; separating vehicles turning right from the general traffic lane sooner and thus reducing overall queue lengths.
- **Install additional left turn lane.** Adding a left turn lane at the westbound approach to the intersection would help alleviate congestion by allowing additional vehicles to access SR 366, particularly during the AM peak period when many motorists are commuting to Cornell.
- **Geometrically reconfigure intersection.** Currently, the northbound approach to the SR 366 intersection is configured at an acute angle, which requires larger turning areas, reduces visibility, and increases vehicle exposure time within the intersection; ultimately increasing the likelihood for collisions. Therefore, one alternative to consider is the reconfiguration of the signalized intersection to allow SR 366 to approach SR 13 at a right angle.
- **Consider reconstructing intersection as a roundabout.** The installation of a roundabout should also be considered to help mitigate congestion and allow for traffic to freely flow through the intersection. This alternative would require further engineering studies to determine feasibility regarding necessary ROW acquisition, grading concerns, and additional factors.
- **Re-align Pinckney Road and NYSEG Driveway.** Pinckney Road currently intersects SR 13 approximately 200 feet west of the eastern NYSEG facility driveway, creating two locations for turning movements within very close proximity to each other. In order to reduce conflicts between the two intersections, it is recommended to relocate the NYSEG driveway to align with Pinckney Road and create a four-way stop intersection. Dedicated left turn lanes on SR 13 are also recommended to allow thru-traffic to pass freely when vehicles are making left turns off of SR 13 in both directions. A signal warrant analysis should also be performed to determine whether the intersection should be stop or signal controlled. *(Figure 4.7)*

FIGURE 4.7: ILLUSTRATIVE IMPROVEMENTS @ SR 366 / PINCKNEY ROAD / NYSEG DRIVEWAY

SR 366 (MAIN STREET) @ SR 13:

As mentioned previously, this intersection functions relatively well throughout the day. However, right turns off of SR 366 onto SR 13 received a LOS F for the AM peak. This is due to the large volume of traffic that is headed towards Ithaca and Cornell during the morning commute. Additionally, this intersection has an average crash rate that is almost three times the statewide average for similar facilities. Like most of the intersections, the vast majority of crashes were rear end crashes, concentrated at the southbound approach to SR 13 from SR 366. Therefore, the installation of a traffic signal is recommended for this intersection, as well as several other improvements, which are presented below:

Recommended Intersection Enhancement Strategies:

- **Install intersection lighting.**

Potential Intersection Configuration Strategies:

- **Signalize intersection.**
- **Install a right turn lane on SR 366.** *(Figure 4.8 #1)*
- **Geometrically reconfigure intersection to 90° intersection alignment.** *(Figure 4.8 #2)*

Recommended Multi- Modal Intersection Strategies:

- **Install pedestrian crosswalk** *(Figure 4.8 #3)*

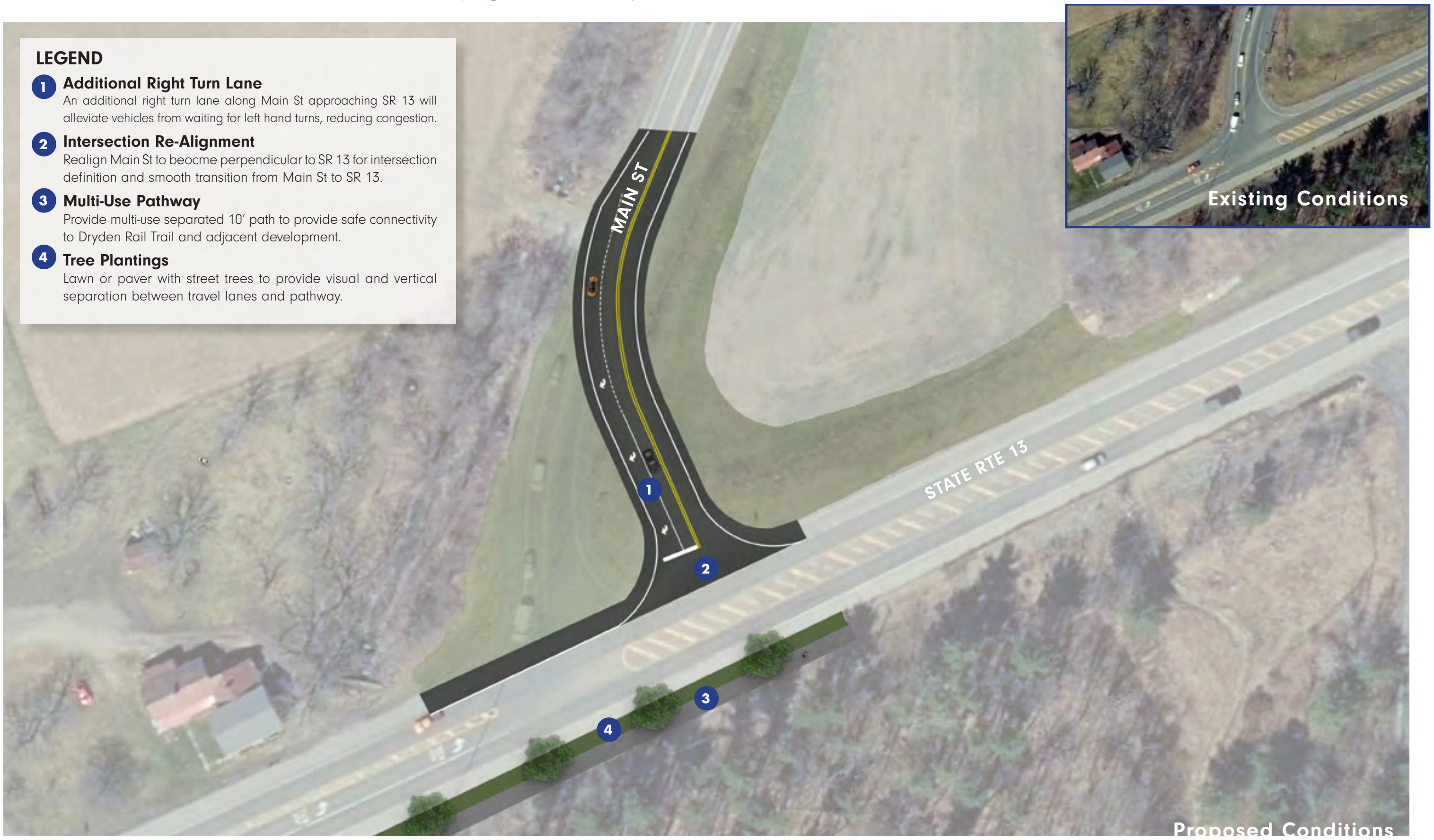


FIGURE 4.8: ILLUSTRATIVE IMPROVEMENTS @ SR 366 (MAIN STREET)

CORRIDOR-WIDE IMPROVEMENTS

MULTI-MODAL IMPROVEMENTS

TRANSIT IMPROVEMENTS

TCAT operates limited service along the Study Corridor. There are no direct stops on State Route 13 between SR 366 (Dryden Road) and Warren Road, and there is flag stop service along SR 13 between the SR 366 (Dryden Road) intersection and the Village of Dryden. There are three bus stop signs within the flag stop corridor, as well as several others adjacent to the roadway on intersecting roads in the section of the corridor where TCAT service does not stop. The three intersections at which TCAT buses stop along the Corridor are State Route 366 (Main Street) towards Freeville, Kirk Road / Mineah Road, and George Road / Irish Settlement Road.

Given that TCAT operates a flag stop service along the Study Corridor, it is to be expected that little transit stop infrastructure is present. However, if ridership grew along the corridor in such a fashion that warranted consideration of switching to a designated stop only service model, the factors described in Table 4.3 should be considered:

Existing Bus Stop Amenities at Kirk Road

TABLE 4.3. FLAG STOP AND DESIGNATED STOP SERVICE CONSIDERATIONS

	Flag Stop Service	Designated Stop Service
Accessibility	In this scenario, a rider is able to access bus service from any point along the corridor, potentially reducing the distance they have to walk to board a bus.	In this instance, TCAT would necessarily install paired bus stops on each side of the corridor approximately every 1/2 mile along the corridor, resulting in riders having to walk up to 1/4 mile to access a bus stop (once on SR 13).
Safety	Riders boarding the bus at arbitrary locations along the Corridor may feel a lack of safety due to their close proximity to high speed traffic and lack of visual cues for motorists of the presence of pedestrians standing along the corridor. However, riders may be required to walk along the corridor where no pedestrian facilities exist, which may deter from a rider's sense of safety.	The installation of designated bus stops with additional amenities (described below) would improve awareness for motorists of the presence of transit riders waiting for service and set waiting areas further off of the corridor, improving the sense of safety for riders. Designated stops will also control where along the corridor pedestrians are crossing the road to access bus service.

Comfort	Flag stop riders must wait along the roadside regardless of weather conditions. If the rider happens to be accessing the bus service from a residence/business directly along SR 13, the rider may have to stand outside to wait for a shorter period of time, however this likely constitutes a small fraction of riders, and given the unpredictability in the timing of the bus arrival, this benefit may be minimal.	Bus stop amenities such as shelters and benches can increase rider comfort by providing refuge from inclement weather and locations to rest. There is research to suggest that riders will walk longer distances to defined bus stops, particularly if capital improvements such as shelters and benches are available.
Speed & Reliability	The number of times a bus stops in a flag-stop system is undetermined, and depending on where the bus stops, it may be difficult for the bus to re-enter traffic; resulting in unpredictability in when the bus is reaching different locations along the corridor.	Providing designated bus stops helps to create a more predictable transit environment by controlling how frequently the bus stops, and providing information at the stop that indicates when a bus can be expected to arrive at that particular location.
Marketing	The lack of transit amenities in a flag stop service can create confusion surrounding where a rider can board a bus, and if there is service available at a given point along the corridor.	The presence of a physical bus stop along a transit corridor can inform new riders where they can access transit, and where the service along the corridor will provide them access to. Physical transit infrastructure can help raise the visibility of the TCAT system throughout the community.
Cost	Flag stop systems do not require any physical infrastructure for bus stops; creating a low cost solution for areas with low ridership.	Given the existing low ridership in comparison to the rest of the TCAT service area, investment in transit amenities along this Corridor may have a relatively low benefit per rider. Additionally, the installation of designated stops would require the inclusion of additional pedestrian facilities.

Pedestrian using SR 13 near the intersection of SR 366.

Given the limitations of this study, neither system is recommended at this time. However, as shown in Table 4.2, there are noted benefits to transitioning to a designated stop system, and TCAT should consider this as development continues to occur along the Corridor and traffic volumes increase. In order to accurately gauge the perception of existing service along the Corridor, a rider survey should be conducted targeting the SR 13 Corridor to determine if the existing flag-stop system is functioning adequately, or if a designated stop service would be preferred. This survey should target both existing and potential riders, and identify key barriers to utilizing transit service along the Corridor.

As mentioned, there are three existing bus stops along the flag-stop corridor to indicate the presence of bus service. Therefore, regardless of the designation of the corridor as a flag stop or designated stop system, the amenities described on the following page should be considered at high-ridership locations along the Study Corridor.

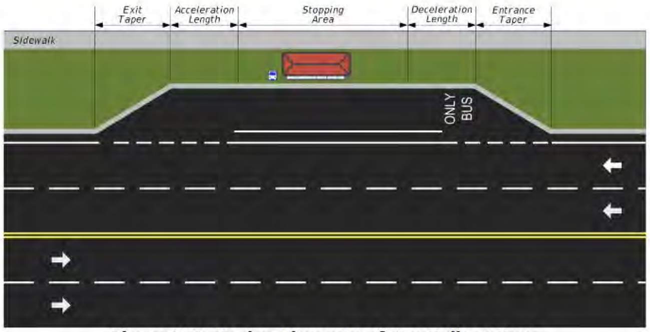


Figure 2-2: Design Elements of Bus Pullout Bays

Source: National Center for Transit Research

Bus Turn-Outs. Based on the existing configurations of the bus stops along the Study Corridor, TCAT buses stop along the shoulder of SR 13 to board and alight passengers. However, given the two lane configuration of the roadway, the buses often block thru-traffic, causing safety concerns for vehicles trying to pass the stopped bus and riders accessing the bus stop and / or crossing the street. Therefore, bus turn-outs, or bus bays, may be considered to remove the conflict between stopped buses and thru-traffic and increase riders' sense of safety by physically distancing them from moving traffic while waiting for the bus. The installation of bus turn-outs would be dictated by frequency of buses stopping at any given stop, and further engineering studies would be required for implementation.

Bus Stop Furniture. As mentioned previously, the presence of certain amenities such as covered bus shelters, benches, or shading can help improve the sense of safety and comfort for riders waiting for TCAT service. Additionally, the provision of bike storage can also promote ridership by allowing riders to access TCAT service without having to bring their bike along with them to their final destination, if that is not desirable. The installation of these amenities should be considered at high ridership locations, and criteria should be developed in terms of roadway characteristics and ridership data to create a uniform methodology for implementing these amenities throughout TCAT's service area.

Bus Lighting. Installing lighting at bus is a relatively low-cost improvement which will improve visibility for both motorists and pedestrians and may significantly enhance rider's comfort and perception of safety while waiting for bus service. Lighting should be at the pedestrian level (no greater than 12' in height), and may utilize solar energy for energy efficiency and reduced maintenance. It is important to note that any pedestrian lighting installed along the Corridor must be durable enough to withstand roadway operations such as snow plowing.

Signage Improvements. If TCAT decides to replace their flag-stop service along the Study Corridor, they may consider the development of larger, more visible signs that clearly indicate which routes are served at each stop & provide additional information for riders. It will be important to carefully consider the placement of the stop at each designated location (near-side, far-side, or midblock) based on visibility and safety concerns.

BICYCLE & PEDESTRIAN ACCOMMODATIONS

Approximately 40 respondents from the public survey administered for this study mentioned the desire for dedicated bicycle lanes along the Corridor. Given the high traffic volumes and vehicle speeds along the Study Corridor, separated bicyclist and pedestrian facilities would help the perception of safety and comfort for active transportation users on SR 13. Additionally, the installation of bicycle and pedestrian facilities would help improve connectivity to points of destination such as the Cornell Business Park, the Cornell School of Ornithology, as well as trail systems such as the Dryden Rail Trail and the Monkey Run Natural Area. Currently, the right-of-way (ROW) width ranges significantly along the corridor (from 60' to 240' wide). However, there are two 12' travel lanes, and 12' shoulders on both sides of the roadway consistently along the Study Corridor, making the majority of the corridor's pavement width 48' wide. The generally wide ROW widths provide ample space on the south side of the Study Corridor, particularly between Warren Road and the SR 366 intersections. East of SR 366, the ROW narrows considerably, and there is less bicycle and pedestrian activity. Therefore, two separate treatments are proposed for the two sections of the corridor east and west of SR 366, which are described on the following page.

Shared Use Path (Warren Road to SR 366 (Dryden Road.)). As mentioned previously, the segment of the corridor between Warren Road and State Route 366 (towards Varna), has a very large ROW; between 170′ and 240′ in width. The south side of the Study Corridor has an average excess ROW width of 100′; providing ample space for a shared use path between these two intersections. The proposed shared use path would be 10′ in width to provide bi-directional travel lanes for both pedestrians and bicyclists, and would be set back from the paved shoulder by at least 10′ to enhance non-motorists comfort and perception of safety. The concept rendering in Figure 4.9 on the following page depicts the potential layout of the shared use trail proposed.

MUTCD Sign W11-15

Bicyclist Signage & Transit Connections (SR 366 (Dryden Road) to Spring House Road. Given the narrower and inconsistent ROW width east of the SR 366 intersection, no formal bicycle or pedestrian accommodations are proposed for this section of the corridor in terms of dedicated travel lanes. However, it is recommended that signage indicating the presence of bicyclists (such as MUTCD sign W11-15 shown at left) should be installed to alert motorists of the potential for bicyclists traveling on the shoulders. Additionally, any transit stop improvements as discussed previously must include the provision of pedestrian crosswalks and other appropriate accommodations so that riders boarding and alighting a bus can safely access the nearby development along the Corridor. The Town of Dryden and Village of Lansing should consider requiring new development to provide access to transit stops where applicable along the corridor, which is discussed in more detail later in this Chapter.

ACCESS MANAGEMENT STRATEGIES

As development continues to occur along the Corridor, the amount of curb-cuts, or breaks in the curb to provide access to adjacent development, will increase. The number of curb cuts that a corridor has can play a significant role in how it functions, as it determines the frequency of vehicles turning off and onto the Corridor to access businesses and residential development. Therefore, it is crucial for any community to proactively consider this, and develop a strategy to reduce the number of access points and appropriately locate those which are created.

Currently, the two character areas of the Study Corridor identified previously in this Chapter have differing accessibility. The first character area between Warren Road and SR 366 (Main Street) already has limited access, with no land uses having direct access to the highway. The exception to this is the SR 366 overlap between the two intersections, where there are numerous curb cuts, which cause significant vehicle conflicts and has been identified as one of the most congested locations along the Corridor, as well as having the highest perception of lack of safety.

The second character area east of SR 366 to the Village of Dryden has no access restrictions. Although this study does not envision significant development occurring along this portion of the Corridor within the next ten years, the issues that the SR 366 overlap have produced can provide an example of what may occur along this segment of the Study Corridor should no access management techniques be implemented. Therefore, this section provides a toolbox of access management strategy that the communities can employ to ensure the continued success of SR 13 as a major travel corridor in the region.

The purpose of developing an access management strategy is to create an approach to development along the Study Corridor that the Town of Dryden and Village of Lansing can implement over time and across municipal boundaries to make the corridor a safer and more efficient transportation facility for all users.

LEGEND

1 Additional Left Turn Lanes
Additional left turn lane approaching the intersection on State Route 13 from the west, and additional turn lane approaching the intersection on Warren Road from the south.

2 Multi-Use Connectivity
Provide bicycle access along the cycle track to the east side of Warren Road, and provide enhanced, multi-use crosswalks approaching each side of the intersection.

3 Shared Use Path
Provide shared use separated 10' path to provide safe connectivity to Dryden Rail Trail and adjacent development.

4 Tree Plantings
Lawn or paver with street trees to provide visual and vertical separation between travel lanes and shared use path, as well as between northbound and southbound travel lanes.

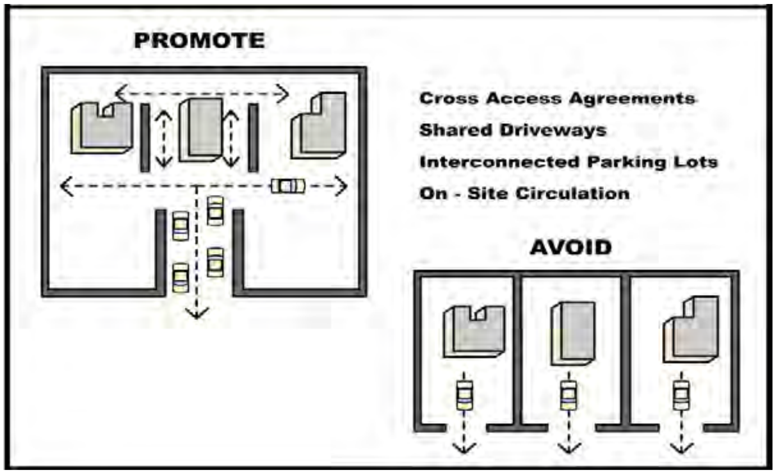
FIGURE 4.9: SHARED USE PATH CONCEPT PLAN

This strategy intends to enhance the character of the roadway while encouraging appropriate development patterns that enhance the quality of life for residents, business owners, and motorists using the roadway for commuting purposes. It accomplishes this through a series of mitigation strategies that directs turning movements in a way that reduces conflict points between motorists as well as pedestrian and bicyclists.

Every driveway and intersection that exists along a roadway creates a set of potential conflict points between roadway users. As development increases along the Study Corridor, both traffic volumes as well as potential conflict points increase. According to the National Highway Institute (NHI), "an effective access management program can reduce crashes as much as 50%, increase roadway capacity by 23 to 45%, and reduce travel time and delay as much as 40 to 60%." In order to be successful, access management policies must be comprehensive and consider "land use management" to include the land that makes up the roadway and driveways, as well as the physical building development adjacent to roadways. Some of the key elements to any good access management strategy include:

- **Lay the foundation for access management in local comprehensive plans.**
- **Encourage internal access to outparcels.**
- **Connect parking lots and consolidate driveways.**
- **Regulate the location, spacing, and design of driveways in local codes.**
- **Locate driveways away from intersections.**
- **Limit the number of driveways per lot.**
- **Coordinate with State and County highway officials.**

Given that a significant amount of commercial development currently exists along the Study Corridor, access management strategies will have to occur as retrofit strategies in the future that eliminate multiple driveways to the same property, combine adjacent driveways into one shared driveway, and relocate driveways to a secondary street rather than SR 13. For currently undeveloped properties, direct access to the Study Corridor should follow the following access management principles:



Source: Wisconsin DOT

SHARED DRIVEWAYS

Access points should be shared between adjacent parcels where possible to reduce conflicting turning movements. This can be implemented for both commercial and residential development, and should be encouraged through local zoning codes.

PLACEMENT & NUMBER OF DRIVEWAYS

The number of access points for any one parcel should be restricted, and access points should be encouraged to be placed off of intersecting roads rather than SR 13 where possible.

PLACEMENT OF DESIGNATED BUS STOPS

As mentioned previously, TCAT may consider creating additional designated bus stops along the Corridor. The location of these bus stops should be within close proximity to development along the Corridor to promote accessibility, but should be considered in the context of where driveways exist, and bus turn-outs should be considered where appropriate.

DRIVEWAY SPACING

As shown in Table 4.4 below, the NYSDOT has Driveway Location Standards (Figure 5A-3 in the NYSDOT Driveway Design Policy document) for any access point to a state highway:

TABLE 4.4: NYSDOT DRIVEWAY SPACING STANDARDS

Location	Minimum Spacing (feet)
From the edge of a property line	15′
Between two residential driveways	30′
Between two commercial driveways	75′
Between one-way commercial driveways separated by a median	30′
From the nearest intersection	Twice the width of the driveway + 15′

However, the report and best practices also suggest that required driveway spacing should be higher; between 300′-700′ apart for roadways with a speed limit of 55 MPH. It is recommended that increased spacing requirements should be implemented in conjunction with driveway sharing to reduce conflict points.

NON TRANSVERSABLE MEDIANS

Where frequent collisions occur due to left hand turns into driveways along the Study Corridor, restricting left turn movements through the installation of a non transversable median should be considered. This will help encourage drivers to make left turns at dedicated locations; and can be used to direct vehicles to the next intersection, where they can perform a U-turn and access the driveway with a right turn movement. Conversely, left turns out of a driveways onto SR 13 can also be restricted, and directed to the nearest intersection where the motorist can make a U-turn to continue along the roadway in the desired direction (depicted at right). Location-specific engineering reviews would be required to be performed to consider traffic volumes, right-of way width, and potential impacts.

Source: FHWA

ALIGNMENT OF ACCESS POINTS

To further reduce conflict points, intersections and driveways should be located across from each other where possible, and aligned at a 90 degree angle to improve visibility for all roadway users. As shown in the photo at left, several of the driveways that currently exist along the corridor are mis-aligned, contributing to uncertainty and congestion at this location along the Study Corridor.

Driveways near the NYSEG property

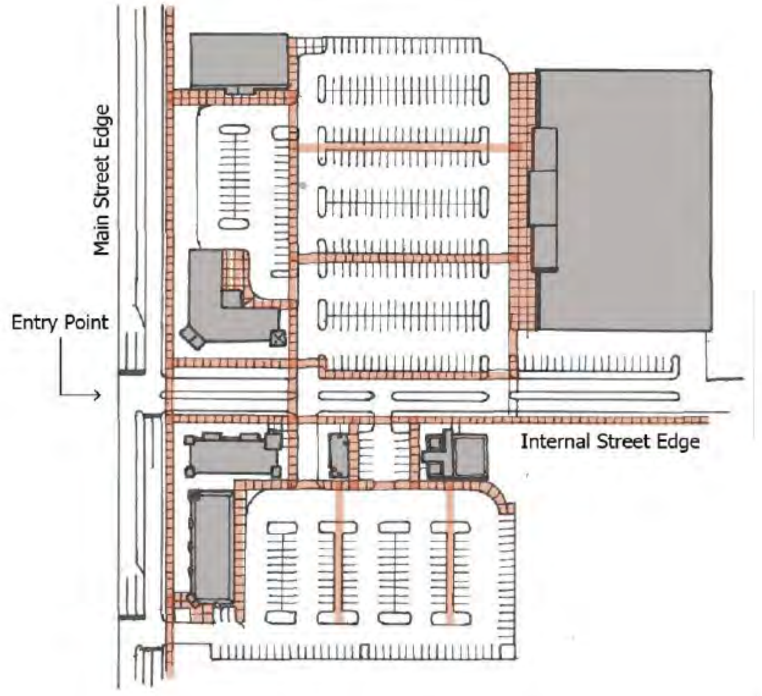
ZONING RECOMMENDATIONS

Add additional access management restrictions in Site Plan Review and Subdivision processes.
Currently, the Town of Dryden's subdivision code encourages the use of shared driveways within its subdivision code, and the Town Planning Board has the authority to require shared parking areas for adjacent lots. The Town may consider also requiring and/or encouraging the use of these strategies within its site plan review process. Additionally, the Town and Village should consider further regulations to encourage strategic access points along the Study Corridor, such as requiring access rights-of-way to be provided to adjacent undeveloped parcels, encouraging driveways to be located along side roads, and adding driveway spacing standards.

Add off-street parking setback requirements to the Town of Dryden's Zoning Code.
As mentioned in the zoning code analysis performed in Chapter 2, the Town of Dryden does not require off-street parking to be setback from the roadway. The addition of such regulations would improve the visual quality of the roadway, and also would facilitate longer throat lengths (i.e. distance between the street and the parking lot served by a driveway) for vehicles entering and exiting off-street parking lots.

Develop a corridor overlay district.
Overlay zones are a zoning strategy that can help address location-specific needs within a community by requiring additional provisions in addition to those within underlying zoning districts. Given the volume of traffic that the Study Corridor experiences daily, as well as the projected future development along the corridor in adjacent locations (such as the Village of Dryden), it is recommended that an overlay district is considered to directly address the impacts of development along the Corridor. The purpose of this overlay district would be to manage access to property along SR 13 in a way that preserves the safety, efficiency, and character of the roadway. It is recommended that a draft overlay district is created as a municipal partnership between the Town of Dryden and the Village of Lansing to promote consistency along the Study Corridor. Initially, it is envisioned that this overlay district would cover all parcels within 500 feet of the entirety of the Corridor, but the boundaries would ultimately be determined by Town Staff. The envisioned provisions within the overlay district would include the access management strategies presented in this Chapter.

Require additional pedestrian / bicyclist accommodations in the Village of Lansing's Zoning Code.
As mentioned in the existing zoning analysis, the Village's code currently lacks specific requirements for bicycle and pedestrian accommodations, in particular within off-street parking areas. The Village should consider implementing additional regulations for such provisions to ensure that non-motorists have comfortable dedicated spaces for ingress and egress when accessing built development from the roadway. Additionally, the Village should consider requiring dedicated pedestrian and/or bicyclist access within off street parking circulation as a part of site plan review. This typically is realized in the form of striping for dedicated bike and walkways, and the provision of bike storage.



Example of pedestrian connections within an off-street parking area highlighted in pink.

COST ESTIMATES

Order of magnitude planning level cost estimates were prepared for each of the primary intersections including bicycle, pedestrian and transit infrastructure improvements along the entirety of the SR 13 Study Area (Village of Lansing to the Village of Dryden). It is important to note that all of the improvement strategies contained within this Chapter were not given detailed cost estimates, rather select improvements for each intersection were chosen in order to provide a sense of the magnitude of costs for each type of improvement. General order-of-magnitude cost estimates (low, medium, high) are given for each improvement strategy in Table 4.13: Implementation Matrix on page 112.

The NYSDOT Preliminary Cost Estimating Tool was used as a starter tool to prepare the cost estimates, in addition to a review of recent bid tabs received for similar linear transportation projects on State and local highways (2017-2020). In additional to all pavement and related construction items, the estimates include the following:

- Mobilization – 4%
- Field Change Payments – Varies
- Contingency – 20%
- Escalation to Mid-point of Construction – 2% (each estimate assumes 5 years of escalation to account for scheduling of further project planning, preliminary and final design, and permitting)
- Preliminary and Final Design – 12%
- Quality Control and Administration – 3%
- Construction Inspection – 7%

Each alternative includes a specific potential design and configuration due to the varying traffic and safety needs as well as the progression of adjacent land use or character area such as suburban, commercial, and rural segments.

TABLE 4.5: PLANNING LEVEL COST SUMMARY OF POTENTIAL PROJECT IMPROVEMENTS

Project Locations	Amount
SR 13 @ Warren Road	$1,860,310
SR 13 @ Brown Road/Sapsucker Road	$1,276,700
SR 13 @ Hanshaw Road	$396,830
SR 13 @ Lower Creek Road	$1,805,170
SR 13 @ SR 366 (Dryden Road) /NYSEG/Pinckney Road Reconstruction	$2,824,470
Sr 13 @ SR 366 (Main Street)	$770,310
Corridor Wide Bicycle/Pedestrian And Transit Improvements	$8,364,470
Total Planning Level Cost Of All Potential Projects	**$17,298,260**

WARREN ROAD @ SR 13

TABLE 4.6: COST ESTIMATES FOR A TRADITIONAL SIGNALIZED INTERSECTION WITH ADDITIONAL LEFT TURN LANES AT WARREN ROAD

Project Costs - Design Bid Build		Amount
Pavement		$650,000
Traffic Signals		$85,000
Earthwork		$45,000
Curb and Pedestrian Ramps		$20,000
Lawn Median and Street Trees		$20,000
Lighting		$85,000
Utilities		$80,000
Drainage		$35,000
Overhead Sign Structures		$10,000
Signing and Pavement Markings		$10,000
Work Zone Traffic Control		$35,000
Survey Operations		$35,000
Field Change		$85,000
Mobilization	4%	$47,800
Subtotal In Base Year Dollars		**$1,242,800**
Contingency/Risk	20%	$248,560
Subtotal In Base Year Dollars		**$1,491,360**
Inflation/Escalation to Midpoint of Construction (2026)	2%	$33,482
Award/Construction Cost in 2026		$1,524,842
Preliminary & Final Design	12%	$182,981
QC and Administration of Final Design and Contract	3%	$45,745
Construction Inspection	7%	$106,739
Total Project Cost		**$1,860,310**

NOTE: Refer to pages 86 and 88 for additional improvements included in cost estimate

BROWN ROAD / SAPSUCKER WOODS ROAD @ SR 13

TABLE 4.7: COST ESTIMATES FOR A ROUNDABOUT DESIGN AT BROWN ROAD / SAPSUCKER WOODS ROAD

Project Costs - Design Bid Build		Amount
Pavement		$550,000
Earthwork		$25,000
Curb and Pedestrian Ramps		$20,000
Lawn Median and Street Trees		$20,000
Lighting		$50,000
Drainage		$20,000
Large Culvert		$25,000
Signing and Pavement Markings		$10,000
Work Zone Traffic Control		$25,000
Survey Operations		$25,000
Field Change		$50,000
Mobilization	4%	$32,800
Subtotal In Base Year Dollars		**$852,800**
Contingency/Risk	20%	$170,560
Subtotal In Base Year Dollars		**$1,023,360**
Inflation/Escalation to Midpoint of Construction (2026)	2%	$22,597
Award/Construction Cost in 2026		**$1,045,957**
Preliminary & Final Design	12%	$125,515
QC and Administration of Final Design and Contract	3%	$31,379
Construction Inspection	7%	$73,217
Total Project Cost		**$1,276,700**

NOTE: Refer to page 88 for additional improvements included in cost estimate

HANSHAW ROAD @ SR 13

TABLE 4.8: COST ESTIMATES FOR A TRADITIONAL SIGNALIZED INTERSECTION WITH LIGHTING, SIGNAGE, RE-TIMING, PEDESTRIAN FACILITIES AT HANSHAW ROAD

Project Costs - Design Bid Build		Amount
Traffic Signals		$50,000
Earthwork		$35,000
Curb and Pedestrian Ramps		$10,000
Street Trees		$20,000
Lighting		$85,000
Overhead Sign Structures		$15,000
Signing and Pavement Markings		$10,000
Work Zone Traffic Control		$10,000
Survey Operations		$10,000
Field Change		$10,000
Mobilization	4%	$10,200
Subtotal In Base Year Dollars		**$265,200**
Contingency/Risk	20%	$53,040
Subtotal In Base Year Dollars		**$318,240**
Inflation/Escalation to Midpoint of Construction (2026)	2%	$7,027
Award/Construction Cost in 2026		**$325,267**
Preliminary & Final Design	12%	$39,032
QC and Administration of Final Design and Contract	3%	$9,758
Construction Inspection	7%	$22,769
Total Project Cost		**$396,830**

NOTE: Refer to page 90 for additional improvements included in cost estimate.

LOWER CREEK ROAD @ SR 13

TABLE 4.9: COST ESTIMATES FOR A RE-BUILT TRADITIONAL INTERSECTION ON A NEW ALIGNMENT AT LOWER CREEK ROAD

Project Costs - Design Bid Build		Amount
Pavement		$480,000
Traffic Signals		$85,000
Earthwork & Demolition		$120,000
Curb and Pedestrian Ramps		$20,000
Lighting		$85,000
Utilities		$45,000
Drainage		$35,000
Large Culvert		$50,000
Overhead Sign Structures		$10,000
Signing and Pavement Markings		$35,000
Landscaping		$25,000
Work Zone Traffic Control		$50,000
Survey Operations		$35,000
Field Change		$85,000
Mobilization	4%	$46,400
Subtotal In Base Year Dollars		**$1,206,400**
Contingency/Risk	20%	$241,280
Subtotal In Base Year Dollars		**$1,447,680**
Inflation/Escalation to Midpoint of Construction (2026)	2%	$31,967
Award/Construction Cost in 2026		**$1,479,647**
Preliminary & Final Design	12%	$177,558
QC and Administration of Final Design and Contract	3%	$44,389
Construction Inspection	7%	$103,575
Total Project Cost		**$1,805,170**

NOTE: Refer to page 90 for additional improvements included in cost estimate.

SR 366 (DRYDEN ROAD) / PINCKNEY ROAD / NYSEG DRIVEWAY @ SR 13

TABLE 4.10: COST ESTIMATES FOR ROUNDABOUT, ADDITIONAL TURN LANES, & REBUILD OF PINCKNEY ROAD INTERSECTION AT SR 366 (DRYDEN ROAD)

Project Costs - Design Bid Build		Amount
Pavement		$650,000
Traffic Signals		$110,000
Earthwork		$120,000
Curb and Pedestrian Ramps		$45,000
Lawn Median and Street Trees		$65,000
Lighting		$175,000
Retaining Walls		$55,000
Utilities		$105,000
Drainage		$100,000
Overhead Sign Structures		$25,000
Signing and Pavement Markings		$35,000
Work Zone Traffic Control		$75,000
Survey Operations		$80,000
Field Change		$175,000
Mobilization	4%	$72,600
Subtotal In Base Year Dollars		**$1,887,600**
Contingency/Risk	20%	$377,520
Subtotal In Base Year Dollars		**$2,265,120**
Inflation/Escalation to Midpoint of Construction (2026)	2%	$50,018
Award/Construction Cost in 2026		**$2,315,138**
Preliminary & Final Design	12%	$277,817
QC and Administration of Final Design and Contract	3%	$69,454
Construction Inspection	7%	$162,060
Total Project Cost		**$2,824,470**

NOTE: Refer to page 92 for additional improvements included in cost estimate.

SR 366 (MAIN STREET) @ SR 13

TABLE 4.11: COST ESTIMATES FOR A TRADITIONAL SIGNALIZED INTERSECTION WITH ADDITIONAL RIGHT TURN LANE ON SR 366 (MAIN STREET)

Project Costs - Design Bid Build		Amount
Pavement		$85,000
Traffic Signals		$25,000
Earthwork		$45,000
Curb and Pedestrian Ramps		$25,000
Lighting		$45,000
Utilities		$85,000
Drainage		$45,000
Overhead Sign Structures		$15,000
Signing and Pavement Markings		$15,000
Work Zone Traffic Control		$35,000
Survey Operations		$25,000
Field Change		$50,000
Mobilization	4%	$19,800
Subtotal In Base Year Dollars		**$514,800**
Contingency/Risk	20%	$102,960
Subtotal In Base Year Dollars		**$617,760**
Inflation/Escalation to Midpoint of Construction (2026)	2%	$13,641
Award/Construction Cost in 2026		**$631,401**
Preliminary & Final Design	12%	$75,768
QC and Administration of Final Design and Contract	3%	$18,942
Construction Inspection	7%	$44,198
Total Project Cost		**$770,310**

NOTE: Refer to page 94 for additional improvements included in cost estimate.

CORRIDOR-WIDE IMPROVEMENTS

TABLE 4.12: COST ESTIMATES FOR POTENTIAL CORRIDOR-WIDE PEDESTRIAN & TRANSIT IMPROVEMENTS

Project Costs - Design Bid Build		Amount
Pavement for Shared Use Path		$3,500,000
Traffic and Pedestrian Detector Poles		$150,000
Earthwork		$350,000
Lawn Median and Street Trees		$85,000
Trail and Shelter Lighting		$185,000
Transit Bus Turnouts		$150,000
Bus Shelters (Assume 4)		$65,000
Utilities		$200,000
Drainage		$35,000
Trail Signing and Pavement Markings		$85,000
Work Zone Traffic Control		$100,000
Survey Operations (Solely for the Multi-Use Trail, Supplemental to Intersection Work)		$225,000
Structures Demolition		$45,000
Field Change		$200,000
Mobilization	4%	$215,000
Subtotal In Base Year Dollars		**$5,590,000**
Contingency/Risk	20%	$1,118,000
Subtotal In Base Year Dollars		**$6,708,000**
Inflation/Escalation to Midpoint of Construction (2026)	2%	$148,123
Award/Construction Cost in 2026		**$6,856,123**
Preliminary & Final Design	12%	$822,735
QC and Administration of Final Design and Contract	3%	$205,684
Construction Inspection	7%	$479,929
Total Project Cost		**$8,364,470**

IMPLEMENTATION MATRIX

When NYSDOT, Tompkins County, the Village of Lansing, the Town of Dryden, or others are considering implementing one of the improvement strategies recommended in this Chapter, there are many factors that must be considered. Table 4.13 summarizes some of the implementation details associated with each proposed strategy, and summarizes cost ranges, potential funding sources, and implementation timeframes.

Specific costs for transportation projects are provided on pages 104-110. The levels for such cost ranges are as follows:

- **Low:** cost is estimated to be below $10,000
- **Medium:** cost is estimated to be between $10,000 and $100,000
- **High:** cost is estimated to be over $100,000

For the purposes of this implementation plan, timeframes are provided for each action or project. Typically, smaller projects that are locally funded are easier to advance, and therefore, usually have shorter timeframes. On the other hand more complicated strategies which may involve state or federal funding applications and agency reviews often take longer to complete. Timeframe ranges for each action or project are defined as follows:

- **Short:** anticipated completion within 1-2 years
- **Moderate:** anticipated completion between 2 and 8 years
- **Long**: anticipated completion greater than 8 years

There are several federal and state funding sources that could be used for implementation of these projects, which have varying eligibility requirements based on the amount of funding requested and the type of project. The funding sources identified for the strategies recommended in this Study are as follows:

- **CHIPS:** Consolidated Local Street and Highway Improvement Program, NYSDOT
- **BUILD:** Better Utilizing Investments to Leverage Development Grants, FHWA
- **FTA:** Various Federal Transit Administration Grants, including Urbanized Area Formula Grants, Capital Investment Grants and Loans, and Formula Program for Other than Urbanized Area, FTA
- **GIGP:** Green Innovation Grant Program, NYSEFC
- **HSIP:** Highway Safety Improvement Program, FHWA
- **NHPP:** National Highway Performance Program, FHWA
- **STBG**: Surface Transportation Block Grant, FHWA
- **TAP:** Transportation Alternatives Program (a set-aside of the STBG program), FHWA

NOTE: Regardless of who the lead agency or project sponsor is implementing any of the strategies summarized in the table below, coordination, review and final approval ultimately must come from the NYSDOT Region 3.

TABLE 4.13: IMPLEMENTATION MATRIX

Type of Strategy	Proposed Actions	Potential Outcome	Cost Estimate	Potential Funding Source	Timeframe
Intersection #1: Warren Road @ SR 13					
Intersection Enhancement Strategies	Re-time signal program	Reduce delays for vehicles making turning movements, particularly for vehicles turning left from the northbound approach	Low	HSIP, NHPP CHIPS	Short
	Implement new vehicle detection system	Reduce delays at intersection	Medium	HSIP, NHPP, CHIPS	Short
	Implement additional warning signage	Reduce vehicle conflicts; particularly on SR 13 NB where the right lane ends following the intersection.	Low	Local Funds	Short
	Install intersection lighting	Improve visibility for motorists and non-motorists	Medium	HSIP, NHPP, CHIPS	Short - Medium
Intersection Configuration Strategies	Install additional turning lanes	Reduce queue lengths and delays for vehicles turning left onto Warren Road from SR 13 NB and vehicles turning left onto SR 13 SB from the southern Warren Road approach.	High	HSIP, NHPP, STBG, CHIPS	Long
	Widen Warren Road north of intersection with additional northbound lane	Accommodate vehicles using new left turning lane on SR 13 NB	High	HSIP, NHPP, STBG, CHIPS	Long
Multi-modal Intersection Strategies	Install bicycle and pedestrian facilities	Improve safety for non-motorists and create connectivity between activity centers north and south of intersection	Low	HSIP, NHPP, TAP, FTA	Short
	Install planted medians	Provide pedestrian refuge mid-crossing, act as traffic calming element, improve visual quality of intersection	Medium-High	HSIP, NHPP, GIGP, TAP, FTA	Medium - Long
	Install bi-directional bike path on shoulder of Warren Road	Create connectivity between proposed corridor shared use path and activity centers along Warren Road	Low	HSIP, NHPP, TAP, FTA	Short-Medium

Type of Strategy	Proposed Actions	Potential Outcome	Cost Estimate	Potential Funding Source	Timeframe
Intersection #2: Brown Road / Sapsucker Woods Road					
Intersection Enhancement Strategies	Install intersection lighting	Improve visibility for motorists and non-motorists	Medium	HSIP, NHPP, CHIPS	Short - Medium
Intersection Configuration Strategies	Signalize intersection	Reduce conflicts between motorists; particularly when vehicles are making turning movements	High	HSIP, NHPP, STBG, CHIPS	Long
	Install center turn lanes on SR 13	Reduce conflicts between vehicles attempting to turn left onto Brown Road or Sapsucker Woods Road from SR 13 and through traffic	Medium	HSIP, NHPP, CHIPS	Medium
	Consider installation of roundabout	Reduce conflicts between motorists	High	HSIP, NHPP, STBG, CHIPS	Long
Multi-modal Intersection Strategies	Install bicycle warning signage	Increase awareness of motorists to the presence of bicyclists crossing SR 13	Low	Local Funds	Short
	Install pedestrian crosswalks	Increase awareness of motorists to the presence of crossing pedestrians and improve safety for non-motorists	Low	Local Funds, TAP	Short
Intersection #3: Hanshaw Road					
Intersection Enhancement Strategies	Install intersection lighting	Improve visibility for motorists and non-motorists	Medium	HSIP, NHPP, CHIPS	Short - Medium
	Install signal backplates	Improve visibility of traffic signal for vehicles during sun-glare events	Low	Local Funds, HSIP, NHPP	Short
	Consider replacing stop sign with yield sign for right turns off of Hanshaw Rd	Improve turning vehicle's ability to merge into SR 13 traffic	Low	Local Funds, HSIP, NHPP	Short
	Re-time signal program	Reduce delays for vehicles making turning movements, particularly for vehicles turning left from the northbound approach	Low	HSIP, NHPP CHIPS	Short
Intersection Configuration Strategies	Geometrically reconfigure intersection to 90° intersection alignment.	Improve visibility for vehicles approaching the intersection, thus improving motorist detection of potential conflicting vehicles, and reduce time required to maneuver through intersection	High	HSIP, NHPP, STBG, CHIPS	Long

Type of Strategy	Proposed Actions	Potential Outcome	Cost Estimate	Potential Funding Source	Timeframe
Intersection #4: Lower Creek Road					
Intersection Enhancement Strategies	Install intersection lighting	Improve visibility for motorists and non-motorists	Medium	HSIP, NHPP, CHIPS	Short - Medium
Intersection Configuration Strategies	Signalize intersection	Reduce conflicts between motorists; particularly when vehicles are making turning movements	High	HSIP, NHPP, STBG, CHIPS	Long
	Install dedicated left turn lanes on SR 13	Reduce conflicts between vehicles attempting to turn left onto Brown Road or Sapsucker Woods Road from SR 13 and through traffic	Medium	HSIP, NHPP, CHIPS	Medium
	Consider restricting turning movements from Lower Creek Road onto SR 13	Reduce conflicts between turning vehicles and through traffic and reduce delays at intersection	Low	N/A	Short
	Consider installation of roundabout	Reduce conflicts between motorists	High	HSIP, NHPP, STBG, CHIPS	Long
	Geometrically reconfigure intersection to 90° intersection alignment	Improve visibility for vehicles approaching the intersection, thus improving motorist detection of potential conflicting vehicles, and reduce time required to maneuver through intersection	High	HSIP, NHPP, STBG, CHIPS	Long
Multi-modal Intersection Strategies	Install pedestrian crosswalks	Increase awareness of motorists to the presence of crossing pedestrians and improve safety for non-motorists	Low	Local Funds, TAP	Short
Intersection #5: SR 366 (Dryden Road) / Pinckney Road / NYSEG Driveway					
Intersection Enhancement Strategies	Re-time signal program	Reduce delays for vehicles making turning movements, particularly for vehicles turning left from the northbound approach	Low	HSIP, NHPP CHIPS	Short
	Implement new vehicle detection system	Reduce delays at intersection	Medium	HSIP, NHPP, CHIPS	Short
	Install signal backplates	Improve visibility of traffic signal for vehicles during sun-glare events	Low	Local Funds, HSIP, NHPP	Short

Type of Strategy	Proposed Actions	Potential Outcome	Cost Estimate	Potential Funding Source	Timeframe
Intersection Configuration Strategies	Extend right turn lane from SR 366 onto SR 13 NB	Reduce delays for vehicles turning right onto SR 13 NB from SR 366 and improve accessibility to adjacent driveways during peak hours	Medium-High	HSIP, NHPP, CHIPS	Medium-Long
	Install additional left turn lane	Reduce delays for vehicles turning onto SR 366 from SR 13 SB, particularly during AM the peak period	High	HSIP, NHPP, CHIPS	Long
	Geometrically reconfigure intersection	Improve visibility for vehicles approaching the intersection, thus improving motorist detection of potential conflicting vehicles, and reduce time required to maneuver through intersection	High	HSIP, NHPP, STBG, CHIPS	Long
	Consider installation of roundabout	Reduce conflicts between motorists	High	HSIP, NHPP, STBG, CHIPS	Long
	Re-align Pinckney Road and NYSEG Driveway	Reduce number of turning movements occurring along SR 13 adjacent to SR 366 intersection, thus reducing potential vehicular conflicts	High	HSIP, NHPP, STBG, CHIPS	Long
Intersection #5: SR 366 (Main Street)					
Intersection Configuration Strategies	Signalize intersection	Reduce conflicts between motorists; particularly when vehicles are making turning movements	High	HSIP, NHPP, STBG, CHIPS	Long
	Install a right turn lane on SR 366	Reduce delays for vehicles turning right onto SR 13 from SR 366	Medium	HSIP, NHPP, CHIPS	Medium-Long
Multi-modal Intersection Strategies	Install pedestrian crosswalks	Increase awareness of motorists to the presence of crossing pedestrians and improve safety for non motorists	Low	Local Funds, TAP	Short
Corridor-Wide Improvements					
Transit Improvements	Install Bus Turn-Outs	Reduce conflicts between buses stopping along SR 13 and through traffic; improve rider safety by setting bus stop farther away from the roadway	High	HSIP, TAP, FTA	Medium

Type of Strategy	Proposed Actions	Potential Outcome	Cost Estimate	Potential Funding Source	Timeframe
Transit Improvements	Implement Bus Lighting	Improve visibility of passengers to bus operators and through traffic	Medium	TAP, FTA	Short - Medium
	Improve Bus Stop Signage	Improve visibility and awareness of existing transit service along SR 13	Low	FTA	Short
Bicycle and Pedestrian Facilities	Install Shared Use Path	Provide dedicated facilities for non-motorists, improving safety; and provide active transportation connections between activity centers along the Corridor and the new Dryden Rail Trail	High	HSIP, NHPP, STBG, CHIPS, BUILD	Long
	Install bicycle warning signage	Increase awareness of motorists to the presence of bicyclists crossing SR 13	Low	Local Funds	Short

CONCLUSION

The State Route 13 Corridor Study includes a myriad of potential project enhancements to ensure the safety and operational viability of the roadway. The study summarizes improvements at specific priority intersections in addition to identifying corridor-wide (8.5 miles from Village of Lansing to Village of Dryden) bicycle, pedestrian and transit infrastructure enhancements that can extend from intersections and other pedestrian generating nodes to regional trail infrastructure such as the Dryden Rail Trail.

Given all of the strategic improvements identified within this document, it is important for local officials, stakeholders and the community at large to understand that the goal of this Study is, again, to raise awareness of functional and safety issues along the SR 13 corridor, highlight potential mitigative solutions to those issues, and gather consensus on potential projects in order for local and State officials and agencies to advocate for their implementation.

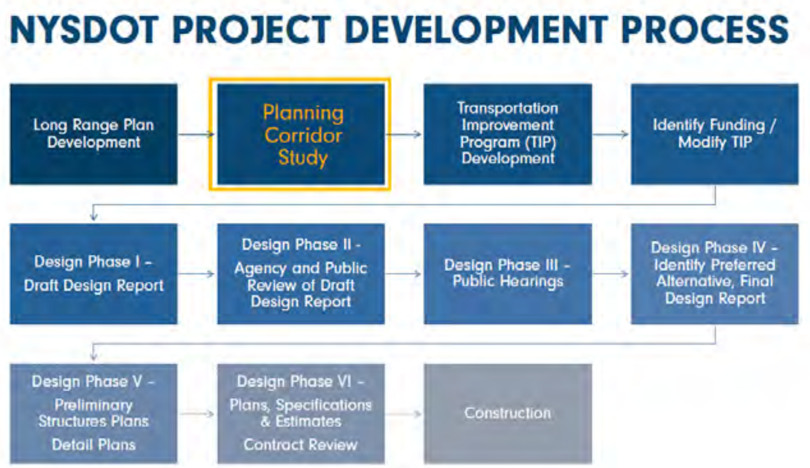


FIGURE 4.10: NYSDOT PROJECT PROCESS

It is important to note that there are no potential projects put forth in this Study that currently have funding in place for their design and construction. This Study is the first step in the planning, design and implementation process, as shown in Figure 4.10. However, it is a very important and critical step to start the discussion and set a direction to eventual implementation and community connectivity and safety along the SR 13 corridor for generations to come.

STATE ROUTE 13 BEYOND 2030

As mentioned throughout the study, the planning horizon for this study is ten years, or between 2020 and 2030. Therefore, the improvement strategies outlined in this study focuses on action items that are implementable within that time frame. However, the nature and functionality of the Study Corridor, like any roadway, will continue to evolve over time as development pressures and market trends shift. Therefore, it will be important for Tompkins County, ITCTC, and NYSDOT to continue to monitor the data presented in this study beyond 2030 to ensure that the recommendations held within this report are still appropriate for the roadway as it functions in the future. These data points include, but are not limited to:

CRASH DATA

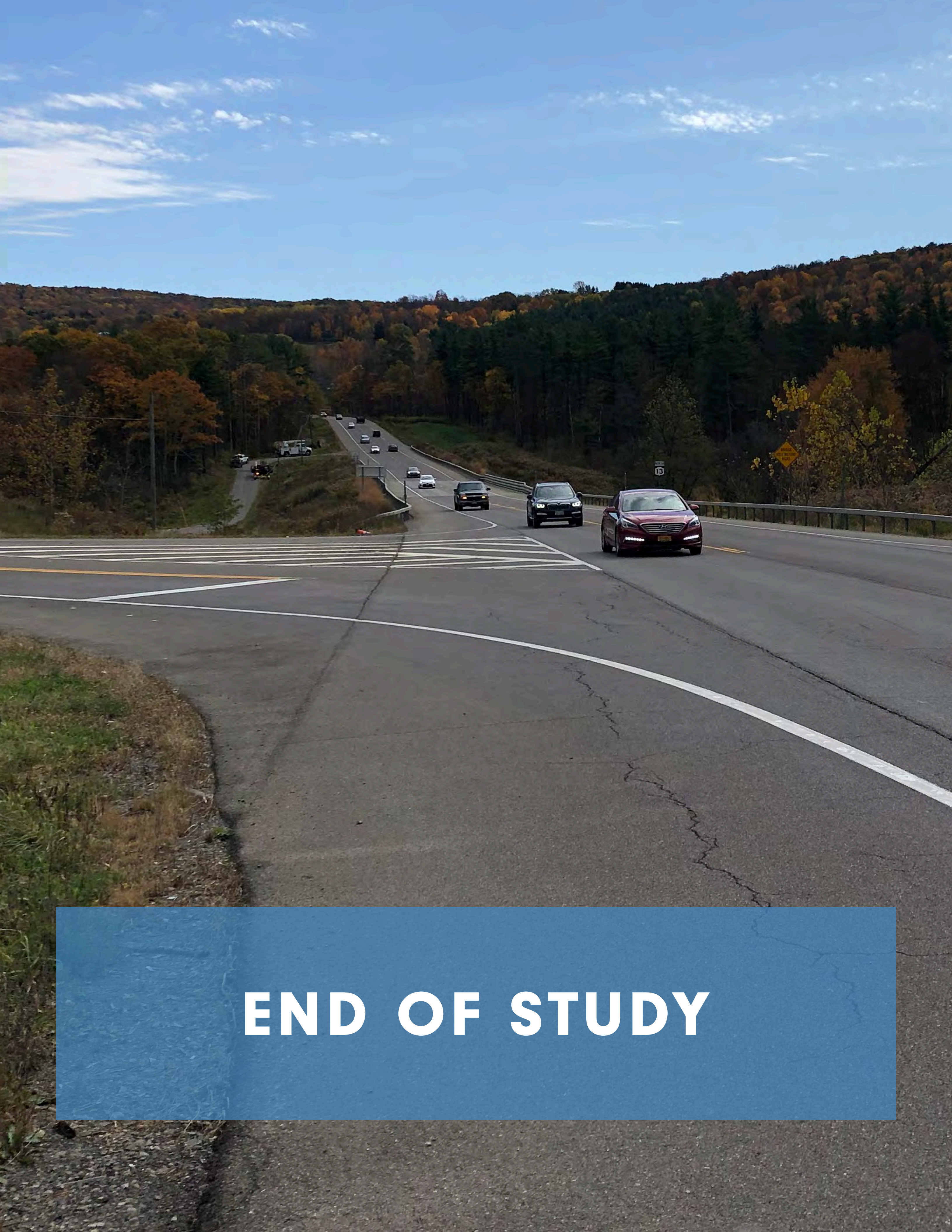
As mentioned in Chapter 2, all of the crash rates calculated at the intersections along the Study Corridor were higher than the statewide average for similar facilities. It will be important to monitor these crash rates moving forward, particularly for intersections where improvements are implemented within the next ten years.

TRAFFIC COUNTS / LOS CALCULATIONS

Several of the intersections analyzed for this report had failing levels of service (LOS F) for particular turning movements at particular approaches. The improvements that seek to mitigate the deficiencies causing prolonged delays should be prioritized, and additional LOS analyses should be performed following implementation to ensure that the improvement strategy was effective. Additionally, traffic volume and speed data should be collected periodically to track corridor-specific growth rates.

DEVELOPMENT TRENDS

This study estimated future development activity based on the availability of vacant land, existing development regulations, and market trends. It will be important to review the anticipated vs. actual development that occurs within the next ten years to determine what extent the resulting traffic impacts were over- or under-estimated. This is particularly important given the onset of the COVID-19 pandemic during this planning process, and the potential resulting effects on development trends in the near future.



END OF STUDY