TOWN OF ULSTER
ROUTE 9W
MOBILITY PLAN

DRAFT FINAL REPORT

December, 2024

Prepared For:

UCTC
ULSTER COUNTY TRANSPORTATION COUNCIL

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CHAPTER 1 – Introduction

The Route 9W Mobility Plan is sponsored by the Town of Ulster and the Ulster County Transportation Council (UCTC) to address peak hour traffic congestion, safety concerns, and multi-modal connectivity, while considering plans for future development and trends that impact travel in the Route 9W corridor between Van Kleeck Lane and Leggs Mills Road.

The Route 9W Corridor in the Town of Ulster serves one of Ulster County's largest commercial retail centers. As such, the corridor generates significant travel demand which must be accommodated by the existing roadway network and transportation infrastructure. Recent studies have indicated that peak hour traffic congestion negatively impacts Town residents and visitors, with long vehicle queues making it difficult to access goods and services, and excessive delay resulting in driver frustration. Likewise, pending redevelopments at the former IBM site and Hudson Valley Mall as well as fluctuations from a changing retail environment have the potential to worsen traffic conditions on Route 9W. Beyond vehicle concerns, the existing infrastructure provides little consideration of multi-modal needs with sidewalks and crosswalks absent at many key locations along the corridor. Recent safety studies have also indicated that areas of the Route 9W corridor experience above average crash rates.

This study will examine the Route 9W corridor in detail in order to identify transportation infrastructure improvements and complete streets features that promote mobility and safety for all roadway users, reduce the negative impacts of traffic congestion, and accommodate future growth in the 9W corridor and surrounding areas in the Town to promote access to jobs and retail. A robust stakeholder and community-driven process will be used throughout the study and during development of recommendations.

Study Purpose

At the outset of the study, the Study Advisory Committee (SAC) discussed and established the following Study Purpose Statement, which establishes the basis for consideration of alternatives, and future expenditures.

Study Purpose:

- The purpose of the study is to address traffic safety and connectivity for all users, and traffic congestion immediate to and surrounding the US Route 9W Corridor in the Town of Ulster, including future travel needs based on major development proposals and trends.

Study Approach

The SAC was established to guide this study, and review and provide feedback on interim and final study products. SAC members include staff from the Town of Ulster, Ulster County Transportation Council (UCTC), New York State Department of Transportation (NYSDOT) Region 8, as well as residents and businesses located along the corridor. A Technical Advisory Committee (TAC) comprised of the Town Supervisor and UCTC Project Manager was also formed to review progress and advance the

study. Specific SAC and TAC committee members are listed in the project's Public Participation Plan included in Appendix A.

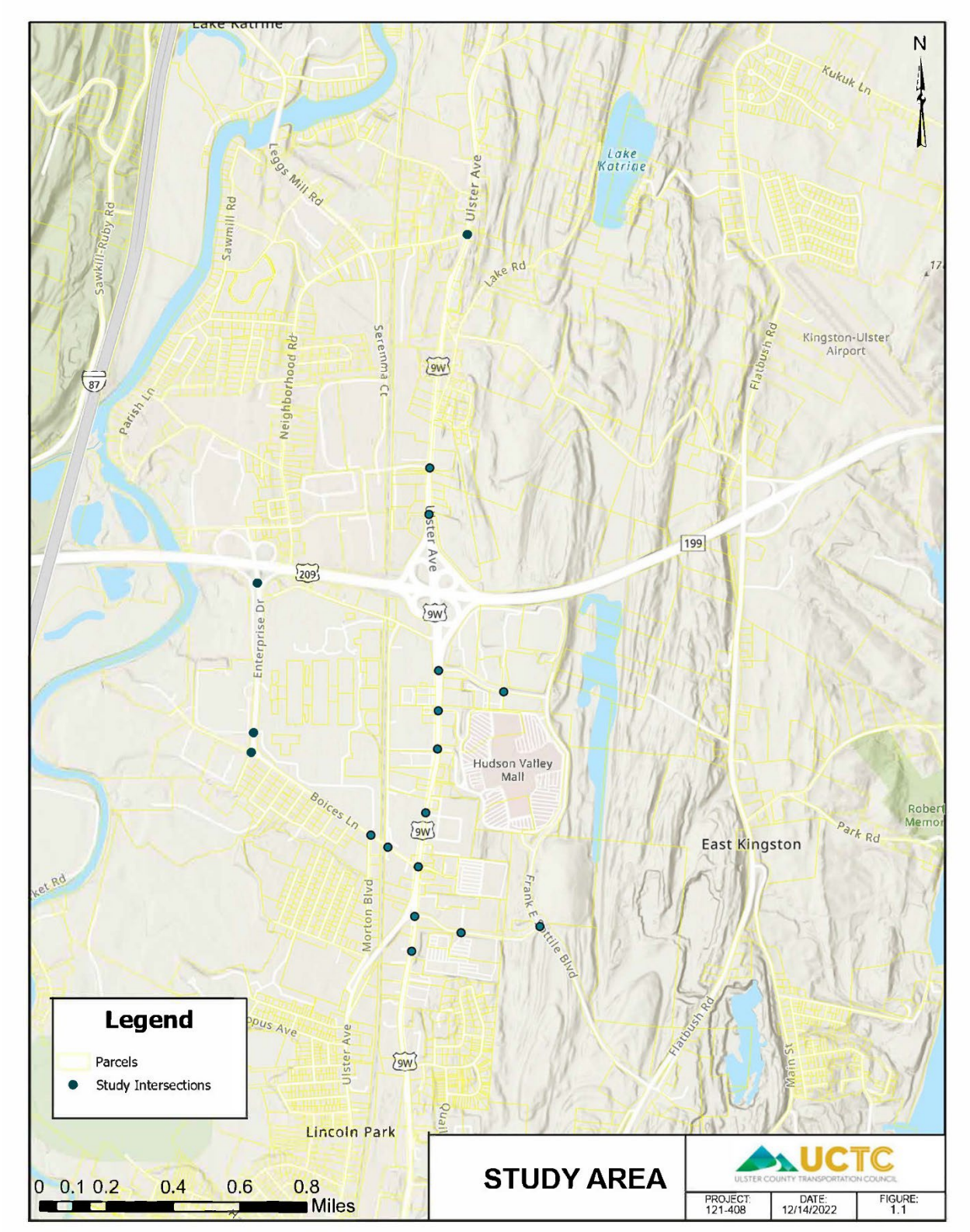
The goal of these committees is to share technical information, provide input on public outreach materials, enable informed decision-making, help shape the draft and final study recommendations, and provide overall guidance on the study as it progresses. The cross-section of agencies and interests on these committees, combined with the open public process, helps to ensure that diverse views are represented and the plan is comprehensive and publicly supported.

Study Area

The study area generally extends along Route 9W from Van Kleeck Lane to Leggs Mills Road and includes the adjacent segments of Boices Lane, Enterprise Drive, Miron Lane, and Frank Sottile Boulevard as depicted in Figure 1.1.

Image 1: Bicyclist on Crosswalk at Route 9W/Boices Lane Intersection

FIGURE 1.1: STUDY AREA



Previous Studies

During the early to mid-2000's, options to extend Frank Sottile Boulevard over NYS Route 199 were studied extensively with the Town of Ulster and the NYSDOT. Due to potential impacts associated with the various concepts including partial interchanges, earthwork, additional bridge structures, wetland impacts, cost-benefit analysis, and funding, the project eventually stalled. Despite the studies being approximately 20 years old, there is now renewed interest around Route 199. While this Frank Sotille Boulevard study was not included in this report, it may be considered in the future.

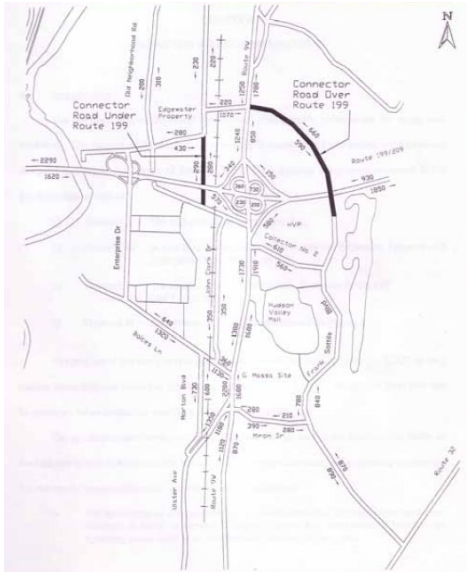


Image 9: Roadway Connections from Town Comprehensive Plan (2007)

In 2007, the Town adopted a new Comprehensive Plan which establishes a vision, strategy, and framework to foster growth while preserving the rural and historic character of the Town. The plan includes several recommendations for the Route 9W corridor including access management improvements, additional roadway connections, and developing a hierarchy of roadway classifications. The plan also identifies the need for safety and streetscape enhancements as well as a sidewalk plan to better accommodate pedestrians.

In 2013, the UCTC in coordination with NYSDOT conducted a detailed study of traffic operations at the Boices Lane railroad crossing to address operational issues. The study recommended short-term traffic signal upgrades with pre-emption tied to the CSX rail crossing, and longer term widening of Boices Lane with pedestrian upgrades and to accommodate the redevelopment of Tech City. Building on the recommendations of the 2007 Comprehensive Plan, the Town adopted the Route 9W Corridor Enhancement plan in 2014 to act as a policy guide for future upgrades to the Route 9W corridor. The Route 9W Corridor Enhancement Plan emphasizes the need for a uniformity of design throughout the corridor in order to improve the pedestrian experience and wayfinding for all users. The plan proposed specific streetscape and lighting enhancements in the corridor as well as new sidewalks on Route 9W and Frank Sottile Boulevard.

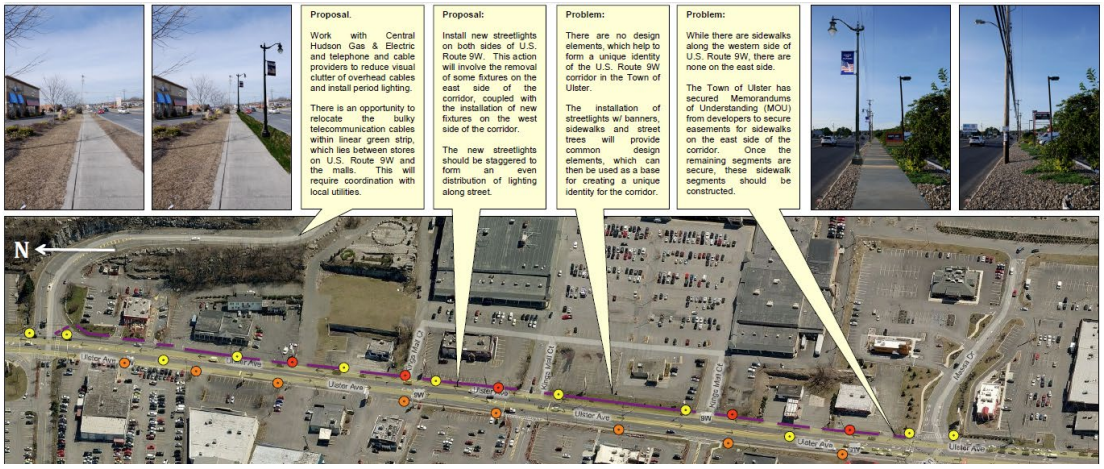


Image 3: Proposed Sidewalk Improvements from Route 9W Corridor Enhancement Plan (2014)

The Ulster County Planning Board published the Community Design Manual in 2017 in order to guide community development and design. The manual illustrates design principles and the potential impacts that policy can have on the built environment, by identifying land use typologies, key details about how each typology functions, and valuable tools for how to achieve desired design outcomes. Application of the design manual to the Route 9W corridor indicates that access management, streetscape improvements, and future redevelopment could all be beneficial to the Route 9W corridor.

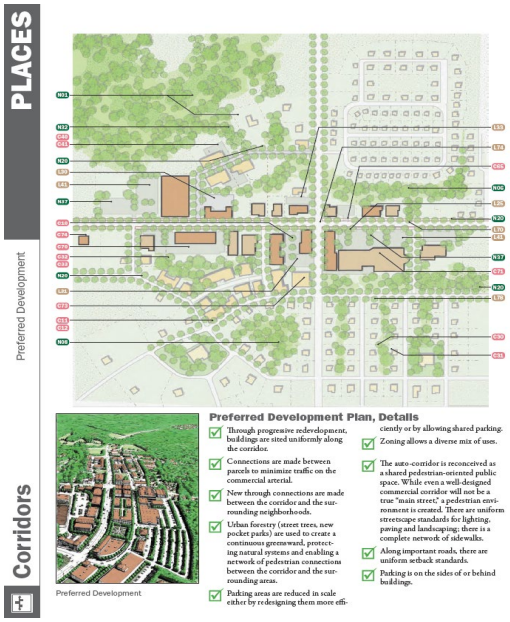


Image 4: Corridor Typology from Community Design Manual (2017)

In 2020, the Mid-Hudson Valley Transportation Management Area (TMA) conducted a macro-level screening to measure overall traffic congestion levels and identify the most congested areas in the Ulster, Dutchess, and Orange County region as part of the Congestion Management Process (CMP). The analysis identified several measures of congestion including peak period congestion, total delay and travel time reliability. The results of the analysis found that the Route 9W corridor near the Route 199 interchange is within the top ten locations for total delay based on the total excessive delay per mile criteria. The analysis notes that this is typical of higher volume roadways and major interchanges where high volume roadways intersect. As a result of the analysis, the Route 9W corridor was identified for further study to identify potential causes of excessive delay.

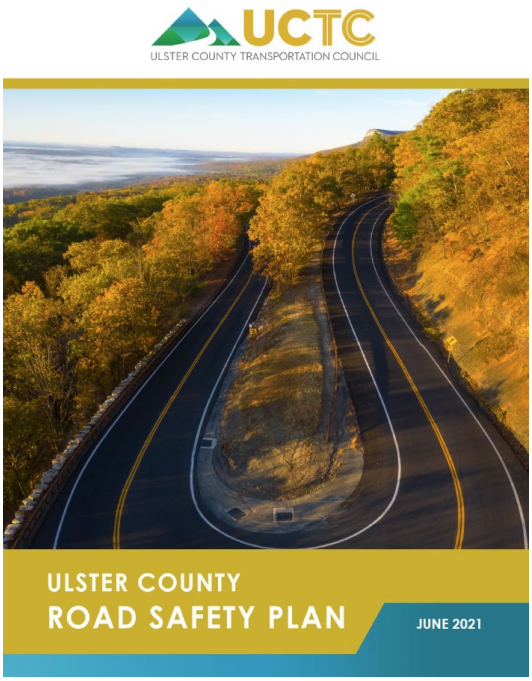


Image 5: Cover of Ulster County Road Safety Plan (2017)

In addition to traffic congestion, the Route 9W corridor was identified in the Ulster County Road Safety Plan (2021) as a priority segment for safety improvements. The 2021 study used data and stakeholder input to identify, analyze, and prioritize roadway safety improvements. As a result of the analysis, the Ulster Avenue/Frank Sottile Boulevard intersection was identified on the list of top 50 priority intersections. In addition to this intersection, a 2023 update to the Road Safety Plan identified segments of Route 9W, Frank Sottile Boulevard, and Morton Blvd as priority locations for safety improvements.

CHAPTER 2 – Existing Conditions

Study Area Zoning and Land Use

The purpose of zoning is to positively shape the community by regulating building size (height and width), lot coverage (placement of buildings), density, and land use by type.

Figure 2.1 shows that zoning in the study area is primarily commercial with office/manufacturing zones setback from the corridor to the east and west and residential zones located to the north and south. Specifically, the zoning code identifies three types of commercial zones (local, highway, and regional), with the local zone generally being the most restrictive and the regional zone the most permissive of the three commercial categories. Of these zones, the 9W corridor is primarily composed of Regional Commercial between Ulster Avenue and Grant Avenue.

Image 6: Retail land uses in Route 9W Corridor

Land uses in the study area are primarily residential and commercial. Figure 2.2 shows that commercial uses are primarily concentrated along Route 9W and include a mix of retail establishments, gas stations, and fast food restaurants.

FIGURE 2.1: EXISTING ZONING

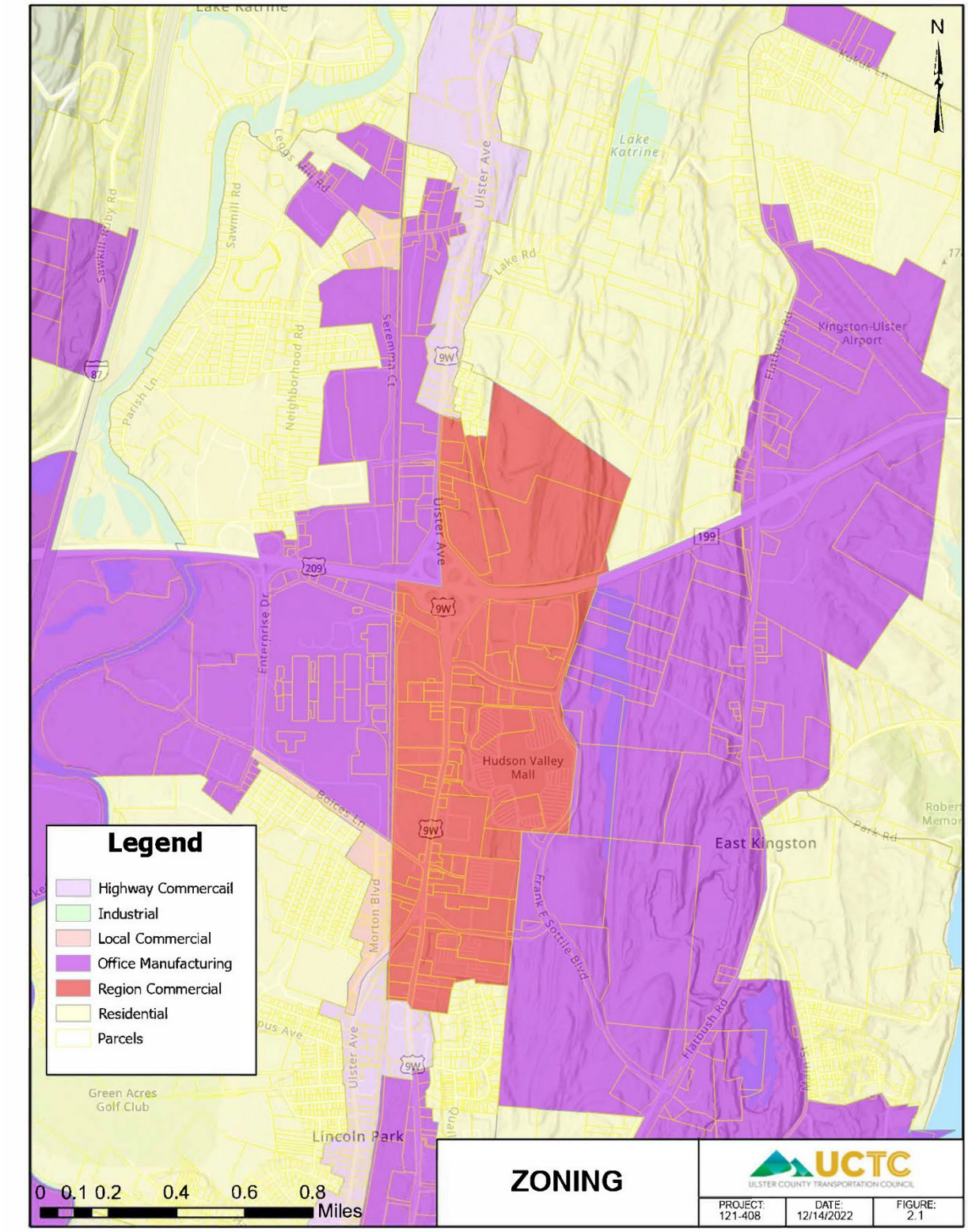
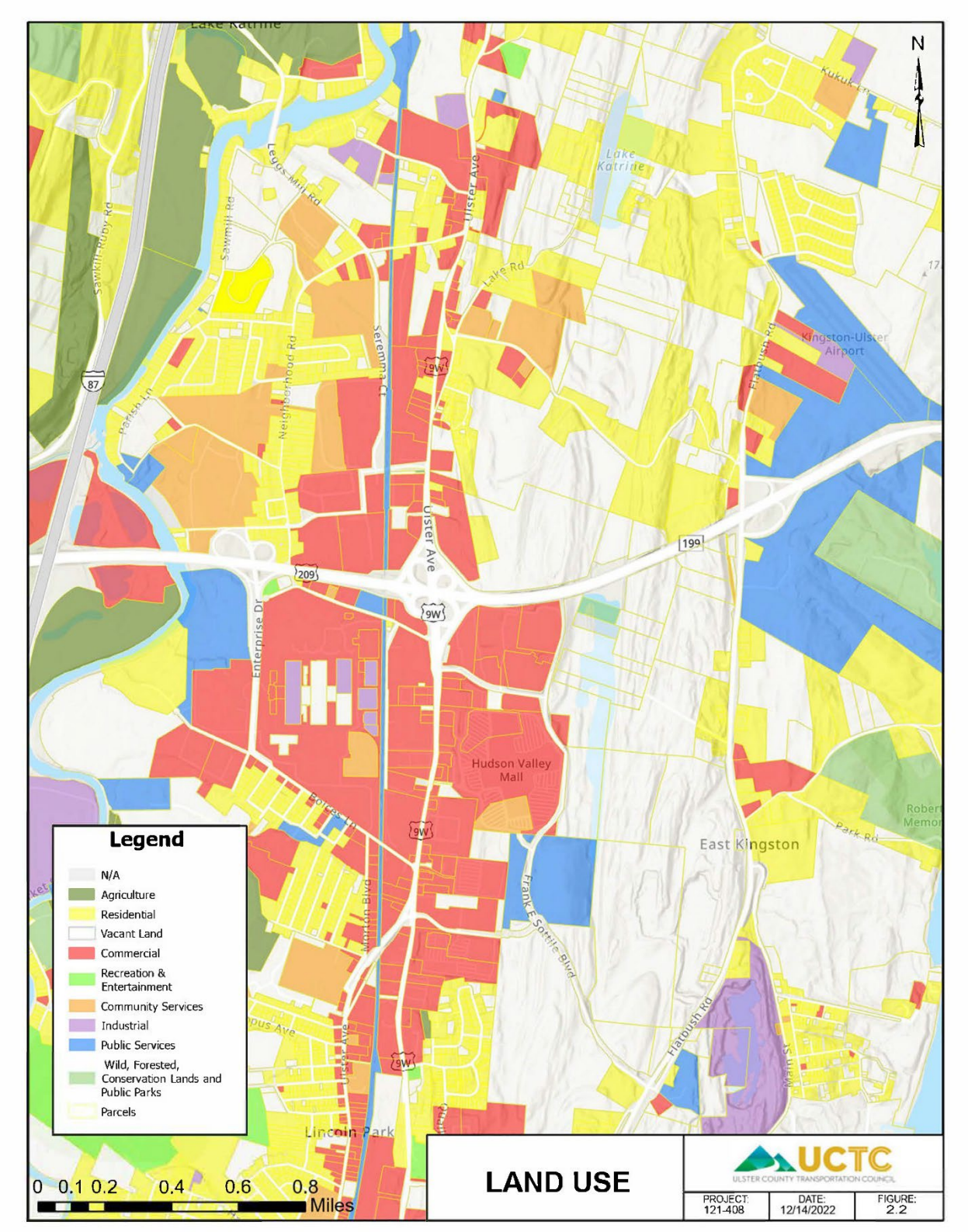


FIGURE 2.2: EXISTING LAND USE



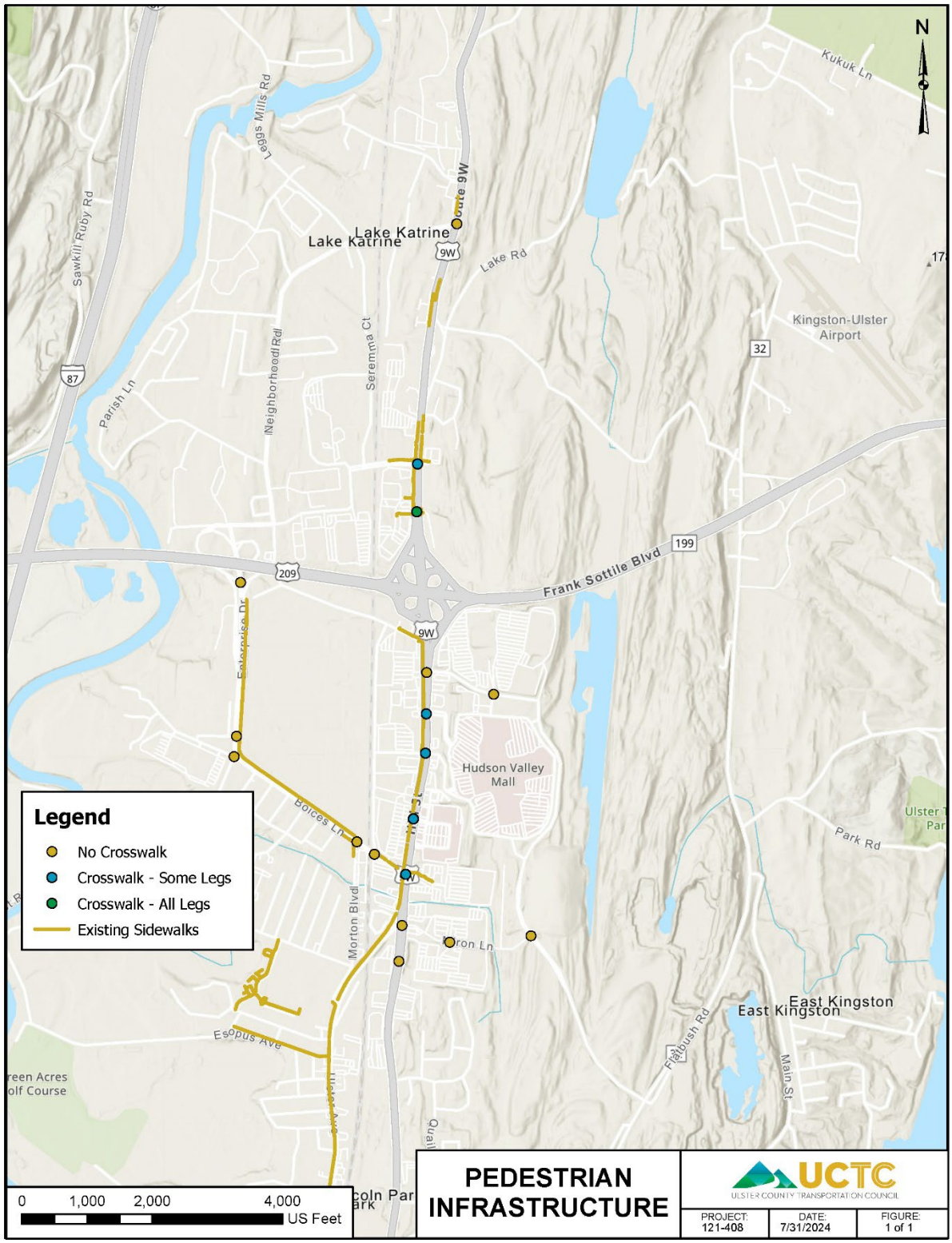
TRANSPORTATION INFRASTRUCTURE

The Route 9W corridor provides north-south travel through the Town of Ulster from the southern Town Border with the City of Kingston to the northern Town border with the Town of Saugerties. South of Ulster Avenue, US Route 9W is a two-lane roadway with approximate 12-foot wide travel lanes and 8-foot wide shoulders. Between Ulster Avenue and Grant Avenue, Route 9W is a four to five lane thoroughfare spanning 55 to 60 feet-wide with two lanes in each direction and auxiliary turn lanes, before transitioning back to a two-lane roadway north of Grant Avenue, which generally aligns with the functional classification. Specifically, Route 9W is generally classified as a minor arterial within the Town of Ulster with the exception of the segment from Ulster Avenue to Route 209/Route 199 which is classified as a principal arterial (other). The posted speed limit is 35 mph between Ulster Avenue and Grant Avenue and 45 mph on the segments to the north and south. Data published by NYSDOT indicates that the pavement on Route 9W in the study area is in poor condition (Rated 5) indicating frequent distress.

Beyond the Route 9W corridor, other major roads in the study area include Boices Lane, Enterprise Drive, and Frank Sottile Boulevard. Boices Lane and Enterprise Drive provide an alternate connection between Route 9W and Route 199/Route 209 and are both classified as minor arterials with a posted speed limit of 40 mph. Boices Lane generally provides two westbound lanes and a single eastbound lane, while Enterprise Drive provides two lanes in each direction. To the east of Route 9W, Frank Sottile Boulevard is classified as a major collector with a posted speed limit of 30 mph. The east-west segment of Frank Sottile Boulevard between the Hudson Valley Mall and Wal-Mart plaza provides two lanes in each direction, while the north-south segment provides a single lane in each direction.

Figure 2.3 shows the pedestrian infrastructure including an inventory of sidewalks and intersection pedestrian accommodations at all signalized intersections along Route 9W within the study area. In addition to sidewalks, the pedestrian inventory included crosswalk type, pedestrian signals, push button type, and overall condition at each intersection. In general, sidewalks are provided on the west side of Route 9W between Ulster Avenue and Old Neighborhood Road, and from Ulster Commons to Carle Terrace. An approximate 800 foot-long segment of sidewalk also exists on the east side of Route 9W between Carle Terrace and Grant Avenue. There are no sidewalks on Route 9W within the study area south of Ulster Avenue. Relative to intersection accommodations, the inventory shows that overall pedestrian crossing accommodations at the existing traffic signals are inconsistent, with crosswalks and pedestrian signals absent at several locations within the corridor.

FIGURE 2.3: PEDESTRIAN INFRASTRUCTURE



Automobile Traffic Characteristics (Speeds, Volumes, and Operations)

Available traffic volume data from the NYSDOT Traffic Data Viewer was reviewed and mapped for the study area as shown on Figure 2.4 and is summarized in Table 2.1.

Table 2.1: Study Area Traffic Volumes

Road	Year	AADT	DDHV
Frank Sottile Boulevard	2018	5,150	220
Enterprise Drive	2017	11,000	490
Boices Lane	2019	12,150	490

AADT = Average Annual Daily Traffic; (vpd = vehicles per day)
DDHV = Directional Design Hour Volume; (vph - vehicles per hour)

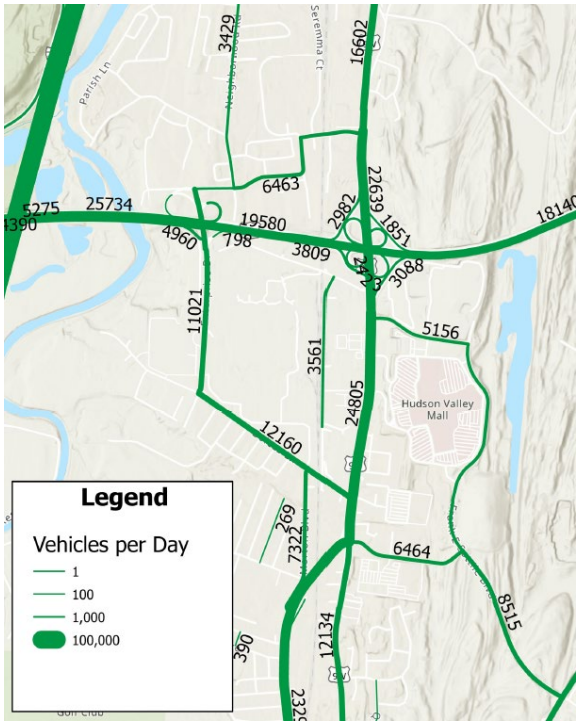


Figure 2.4: Study Area Traffic Volumes

An automatic traffic recorder was installed in November 2022 on Route 9W approximately 1,300-feet north of Boices Lane to document traffic characteristics including daily traffic volumes, peak travel times, and travel speed information. Due to potential changes in travel patterns resulting from the Covid-19 Pandemic, this data was compared to pre-pandemic 2019 conditions and is summarized in Table 2.2.

Table 2.2: Route 9W Traffic Volume and Speed Summary

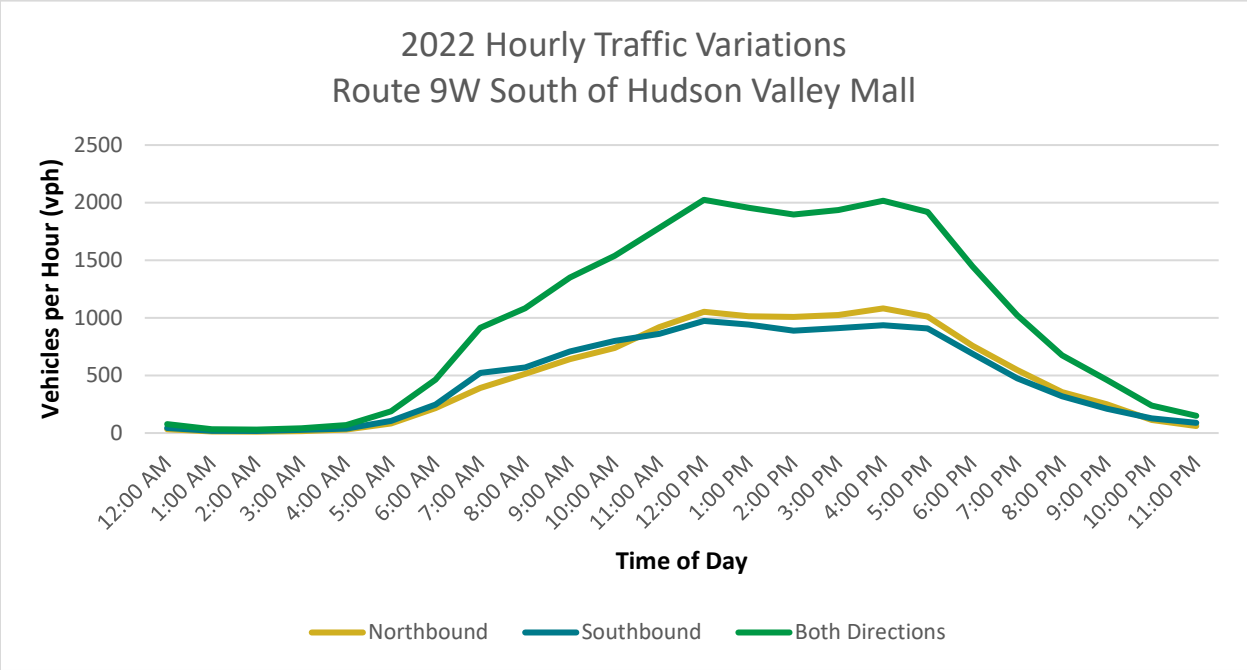
	Route 9W 1,300-Feet North of Boices Lane	
	2019	2022
Volume		
ADT (vpd)	27,100	26,800
DHV	2,150	2,000
DDHV	1,150	1,100
Speed (mph)		
Average Northbound	30	28
Southbound	30	29
85th Percentile Northbound	36	35
Southbound	36	36
Heavy Vehicle Classification		
Northbound	2.6%	4.6%
Southbound	2.7%	4.5%

ADT = Average Daily Traffic; (vpd = vehicles per day)
DHV = Design Hour Volume; (vph – vehicles per hour)
DDHV = Directional Design Hour Volume; (vph - vehicles per hour)

The table shows that the 2022 daily traffic volumes on Route 9W are generally within one-percent of pre-pandemic conditions with peak hour volumes generally within five-percent. A comparison of 2019 and 2022 speeds indicate that average and 85th percentile[1] speeds have remained generally unchanged. In terms of vehicle classification, the data indicates an increase in the proportion of heavy vehicles using the corridor, which could be attributed to increases in online shopping and deliveries.

Figure 2.5 shows the directional traffic volumes for a typical weekday and shows that traffic volumes generally increase throughout the morning and then remain steady through the evening peak hour before decreasing overnight which is typical of commercial corridors.

FIGURE 2.5: HOURLY TRAFFIC VARIATIONS

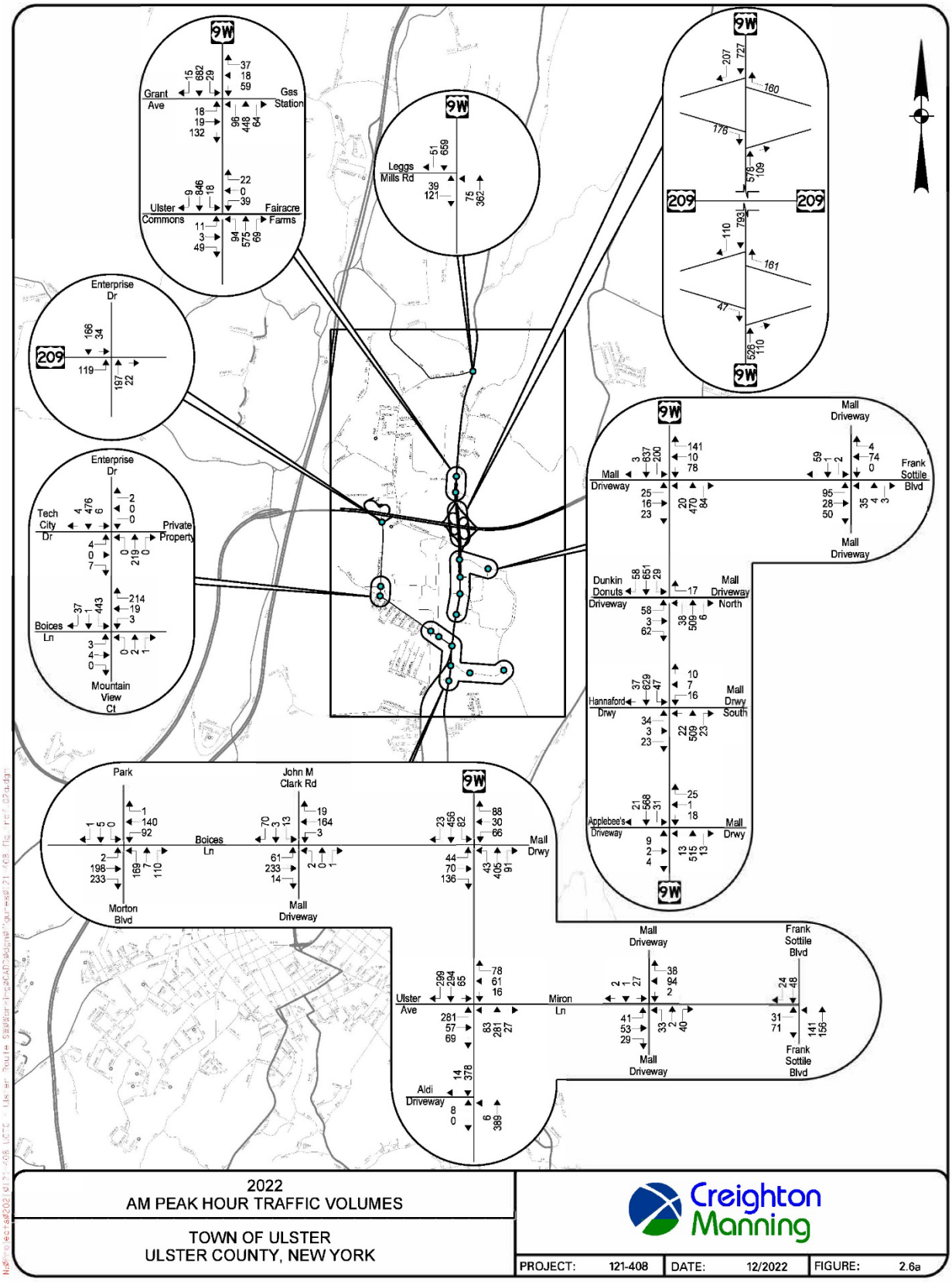


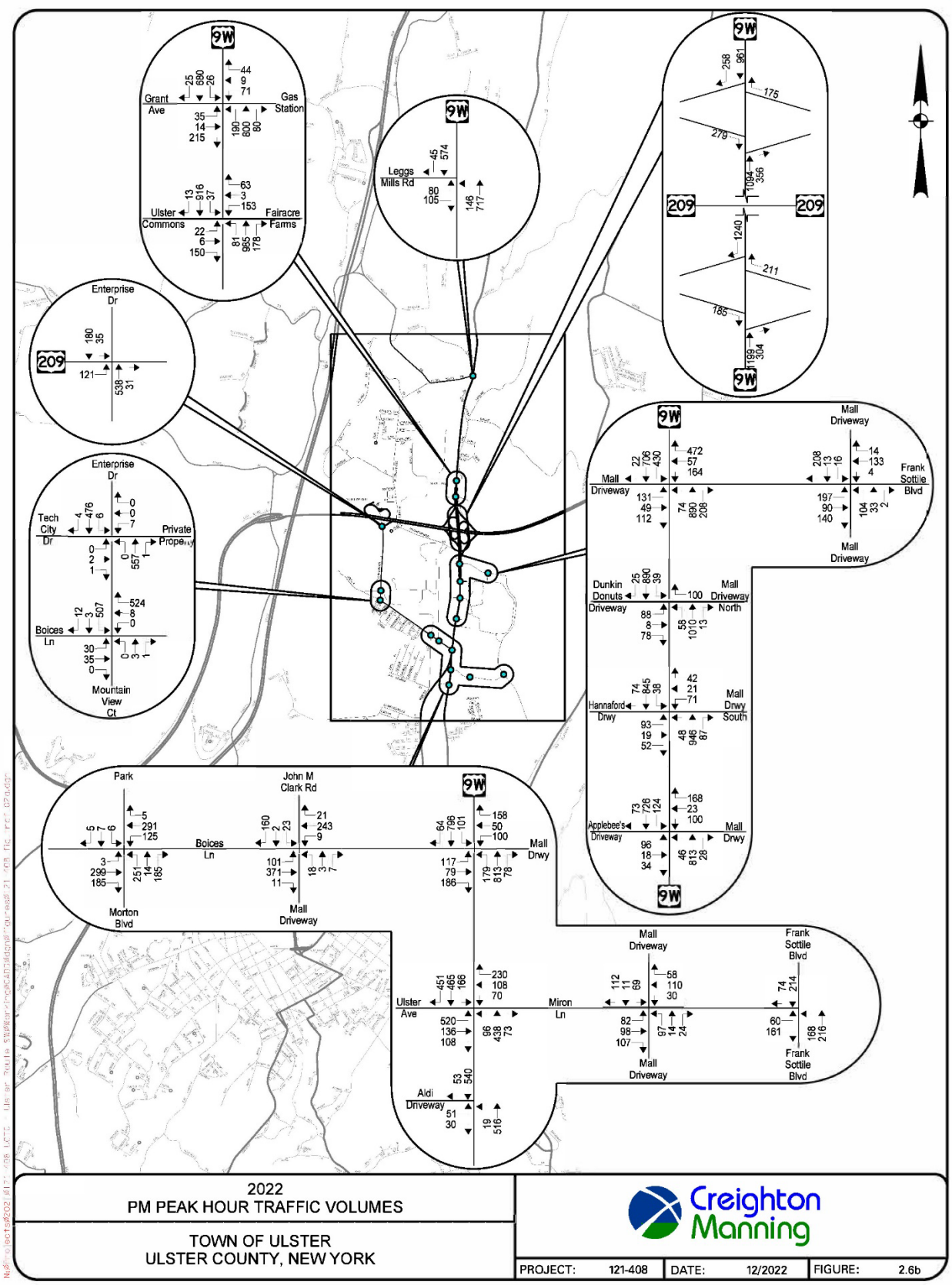
Intersection turning movement counts and pedestrian counts were also conducted during the morning (AM) and evening (PM) peak periods to facilitate the development of a traffic simulation model, and are shown on Figure 2.6.

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Evaluations of the signalized intersections were made using Synchro software which automates the procedures in the Highway Capacity Manual published by the Transportation Research Board (TRB). Levels of service range from A to F, with LOS A conditions considered excellent (less than 10 seconds of delay) while LOS F represents conditions with very long delays (greater than 80 seconds at signalized intersections). Table 2.3 summarizes the existing LOS results in the study corridor.

[1] The 85th percentile speed is the speed at or below which 85 percent of motorists travel.

FIGURE 2.6: 2022 EXISTING TRAFFIC VOLUMES





2022
PM PEAK HOUR TRAFFIC VOLUMES

TOWN OF ULSTER
ULSTER COUNTY, NEW YORK

Creighton Manning

PROJECT:	121-408	DATE:	12/2022	FIGURE:	2.6b

TABLE 2.3: 2022 OVERALL INTERSECTION LEVEL OF SERVICE

Study Intersection		2022 Existing	
		AM Peak	PM Peak
1	Route 9W at Leggs Mills Rd (U-94)	B (15.2)	B (12.6)
2	Route 9W at Grant Ave (U-86)	B (10.7)	B (11.9)
3	Ulster Ave at Ulster Commons / Fairacre Farms (U124PS)	A (5.1)	B (11.0)
4	Ulster Ave at Frank Sottile Blvd / Burlington/Staples (U-49)	**B (17.8)**	**C (30.7)**
5	Ulster Ave at HV Mall north driveway / CVS/Dunkin Donuts (U-79PS)	**A (8.7)**	**B (11.6)**
6	Ulster Ave at HV Mall south driveway / Hannaford (U-78PS)	**B (14.4)**	**B (15.4)**
7	Ulster Ave at Applebee's/Bed Bath & Beyond/Marshalls (U-51PS)	**A (3.5)**	**B (13.5)**
8	Ulster Ave at Boices Lane / Home Depot (U-61)	**A (7.3)**	B (14.9)
9	Ulster Ave at Miron Lane / Rt 9W south leg (U-17)	**D (35.2)**	**D (44.0)**
10	Ulster Ave at Family Dollar / Aldi (U-114PS)	A (5.2)	A (8.0)
11	Miron Ln / Home Depot Dwy	B (10.8)	B (12.7)
12	Frank Sottile Blvd / Miron Ln	A (6.9)	A (7.9)
13	Frank Sottile Blvd / Plaza Dwy	B (18.7)	C (24.3)
14	Boices Ln / John M Clark Rd	C (15.2)	D (25.1)
15	Boices Ln / Park Dwy / Morton Blvd	B (10.3)	B (12.9)
16	Enterprise Dr / Mountain View Ct / Boices Ln	B (14.7)	C (16.0)
17	Enterprise Dr / Tech City	C (23.1)	C (24.3)
18	Enterprise Drive at Rt 209 EB on/off ramps (U-91)	A (7.4)	A (5.9)
19	Ulster Ave/Rt 209 EB off ramp	A (1.2)	D (27.7)

X (Y.Y) = Level of Service (Average delay in seconds per vehicle)
BOLD = LOS E or F for at least one movement

The results of the level of service analysis show that the majority of intersections in the study area currently operate at overall LOS C or better during the morning and evening peak hours. The exception is the Route 9W/Ulster Avenue/Miron Lane intersection which currently operates at LOS D during the AM and PM peak hours. Although overall level of service does not indicate excessive delay in the corridor, some movements such as side-street approaches or left turns from Route 9W experience longer delays and experience LOS D/E during the peak hours. Likewise, closely spaced intersections may experience queueing impacts that are not evident from the level of service calculation. These queuing impacts are evident in the travel time analysis as summarized below.

Based on the above analyses, overall corridor travel times were calculated for the approximate 2-mile length of the corridor. Figure 2.7 summarizes the travel times by direction and shows that it generally takes six to seven minutes to travel through the corridor with slightly longer travel times in the southbound direction. Travel times were obtained from the existing conditions Synchro traffic models which were calibrated based on existing travel times from Google maps. For a detailed summary of peak traffic volumes, see Appendix D.

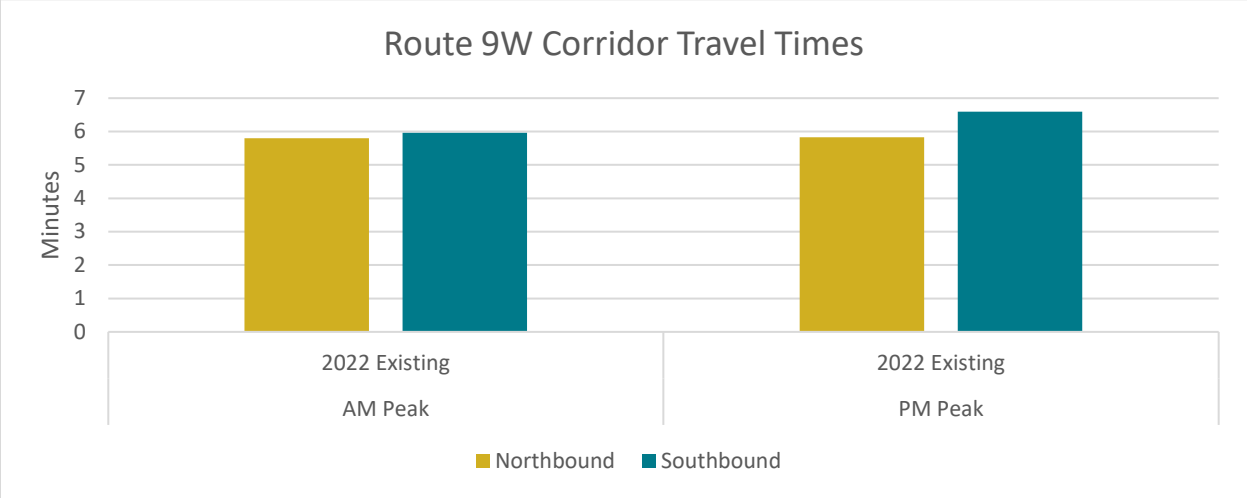


FIGURE 2.7: 2022 CORRIDOR TRAVEL TIMES

Beyond the above travel time and level of service assessments, the MHVTMA Congestion Management Process identified US9W Northbound just south of the NY 199 interchange as an area with a high level of Total Excessive Delay (TED) per mile. As defined in the dataset, excessive delay is the extra amount of time spent in congested conditions defined by speed thresholds that are lower than a normal delay threshold. For the purposes of this rule, the speed threshold is 20 miles per hour or 60 percent of the posted speed limit, whichever is greater. Peak Hour Excessive Delay is then calculated per mile of total segment length. Figures 2.8 and 2.9 show that the Route 9W corridor between Boices Lane and NY 199 generally exhibits slow travel speeds and a high level of hours of delay.

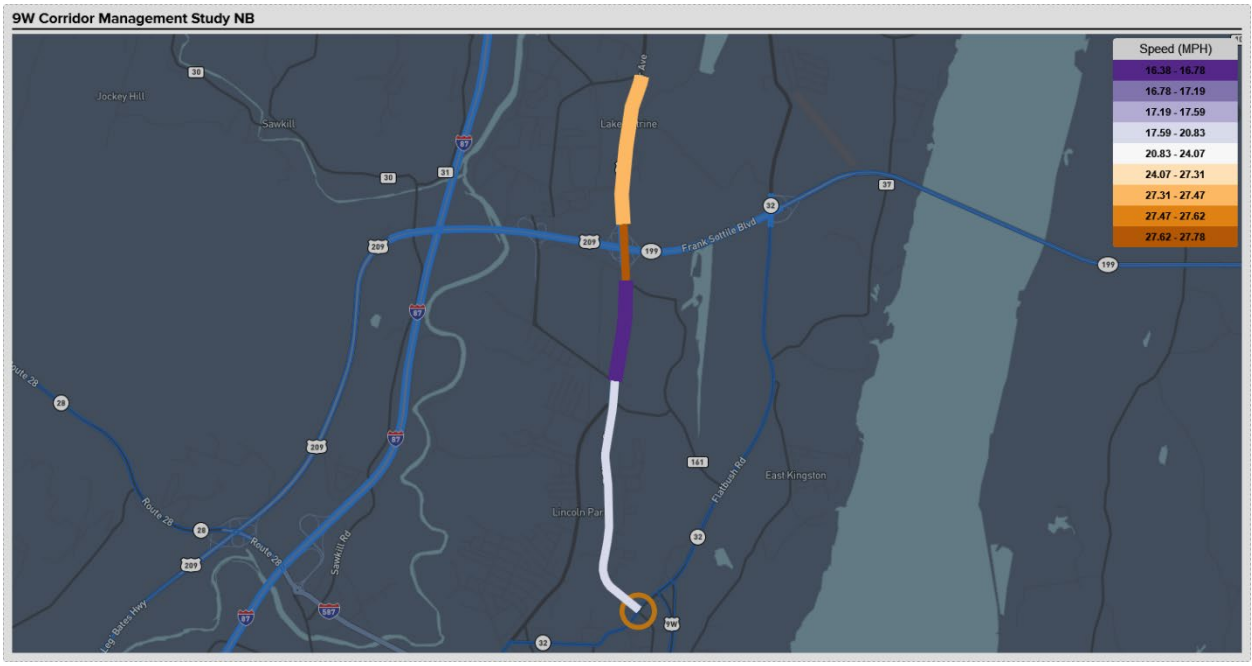


FIGURE 2.8: ROUTE 9W TRAVEL SPEEDS FROM NPMRDS

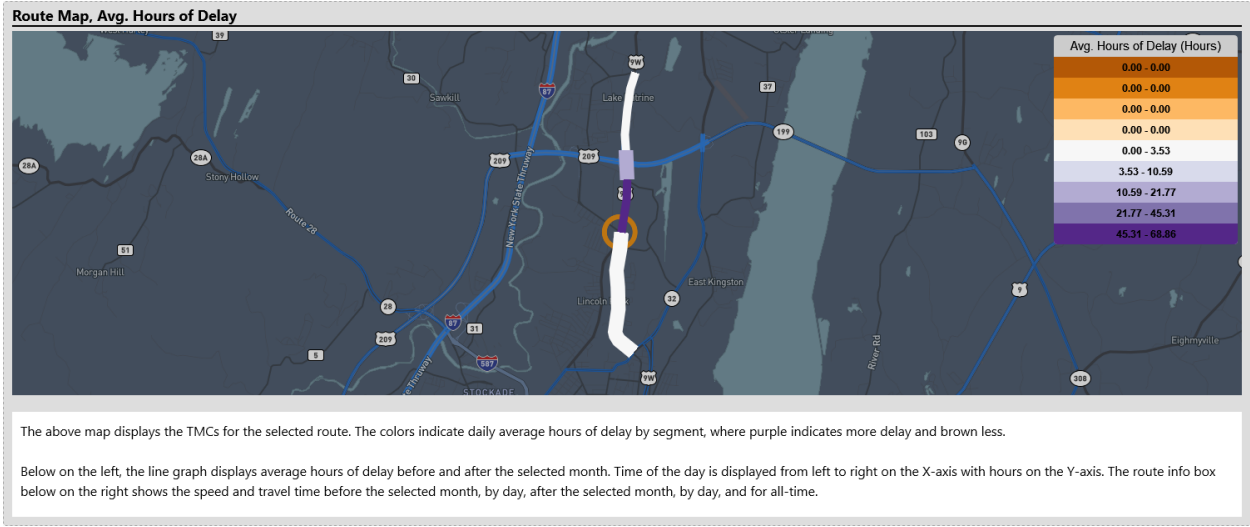


FIGURE 2.9: ROUTE 9W HOURS OF DELAY

While the NPMRDS data shows that the Route 9W corridor operates poorly compared to other roadways in the region, it is important to note that Route 9W in the study area is a commercial corridor with a high density of traffic signals. The TED/Mile measure is heavily influenced by high traffic volumes and signal density, resulting in the high score and may not be indicative of a pervasive congestion issue. The segment did not rise to the same level of congestion in the MHVTMA analysis using other indices.

PEDESTRIAN AND BICYCLE TRAFFIC CHARACTERISTICS

Pedestrian counts were conducted during the vehicle intersection turning movement counts to provide an estimate of overall pedestrian activity in the corridor. Table 2.4 summarizes pedestrian activity in the corridor.

The table shows that pedestrian activity in the study area is generally low with fewer than 10 pedestrian crossings per hour at any given location and no pedestrian activity at eight of the intersections examined. Pedestrian activity is generally the highest on Boices Lane near 9W and 9W between Boices Lane and the south Hudson Valley Mall entrance drive. Relative to bicycle activity, no bicycles were observed during the peak hour traffic counts.

Image 7: Bicyclist traveling on Route 9W

TABLE 2.4: PEDESTRIAN ACTIVITY SUMMARY

Intersection	AM Peak	PM Peak	Total
9W/Leggs Mills Road	1	0	1
9W/Grant Avenue	0	0	0
9W/Fairacre Farms	0	0	0
9W/Frank Sottile Boulevard	2	2	4
9W/Hudson Valley Mall North	0	1	1
9W/Hudson Valley Mall South	1	3	4
9W/Kings Mall	0	5	5
9W/Boices Lane	3	6	9
9W/Ulster Avenue/Miron Lane	2	1	3
9W/Aldi Driveway	1	1	2
Boices Lane/John Clark Road	1	4	5
Boices Lane/Morton Boulevard	3	4	7
Boices Lane/Enterprise Drive	0	0	0
Enterprise Drive/Tech City Drive	0	0	0
Enterprise Drive/US 209 EB Ramp	0	0	0
Miron Lane/Kohl's Driveway	0	0	0
Miron Lane/Frank Sottile Boulevard	0	0	0
Frank Sottile Boulevard/Wal-Mart Driveway	0	2	2
Total	**14**	**29**	**43**

Although bicycle and pedestrian activity is generally low, it is important that the roadway infrastructure accommodate these users when they need or choose to travel through the Route 9W corridor. During a field visit, a bicyclist was observed traveling southbound on Route 9W near Leggs Mills road, and again approximately 10 minutes later near the Ulster Avenue intersection, indicating that there is demand for multi-modal travel in the corridor. Additionally, development of the iPark 87 site is expected to increase bicycle and pedestrian demand, as new residents will likely choose to replace short vehicle trips by walking or biking to retail destinations in the Route 9W corridor. This anticipated demand further underscores the need for bicycle and pedestrian infrastructure in the corridor.

SAFETY ASSESSMENT

Two separate crash assessments were completed for this study – Originally, an area-wide crash analysis was completed based on the most recent five years of available data June 1, 2017 to May 31, 2022, for the study area roadway segments. The second assessment involved a closer review of Route 9W crashes and crash rates as provided by the NYSDOT.

The source data for the original assessment was a spreadsheet summarizing crash data from the NYSDOT Crash Location & Engineering Analysis & Reporting (CLEAR) System. A review was performed on the crash data to understand crash concentrations, severity and type. Table 2.5 summarizes the crashes in the corridor by severity.

TABLE 2.5: SUMMARY OF CRASH SEVERITY

Crash Severity	Number of Crashes	Percent of Total
Property Damage Only	986	75.0%
Possible Injury	242	18.5%
Injury	34	2.5%
Serious Injury	47	3.5%
Fatal	4	0.5%
Total	1,313	100%

The table shows that three quarters of all area-wide crashes that occurred in the study area during the five year period resulted in property damage only while the remaining 25 percent resulted in injuries, and unfortunately several deaths. Based on the CLEAR system, crashes are coded based on the extent of injuries in order to better differentiate between minor injuries and serious injuries. The data indicated that 47 serious injuries occurred within the study area with a predominate cluster on the segment of Route 9W between Ulster Avenue and Boices Lane as shown in Figure 2.10.

In addition to crash severity, the data was reviewed to identify patterns by crash type as summarized in Table 2.6.

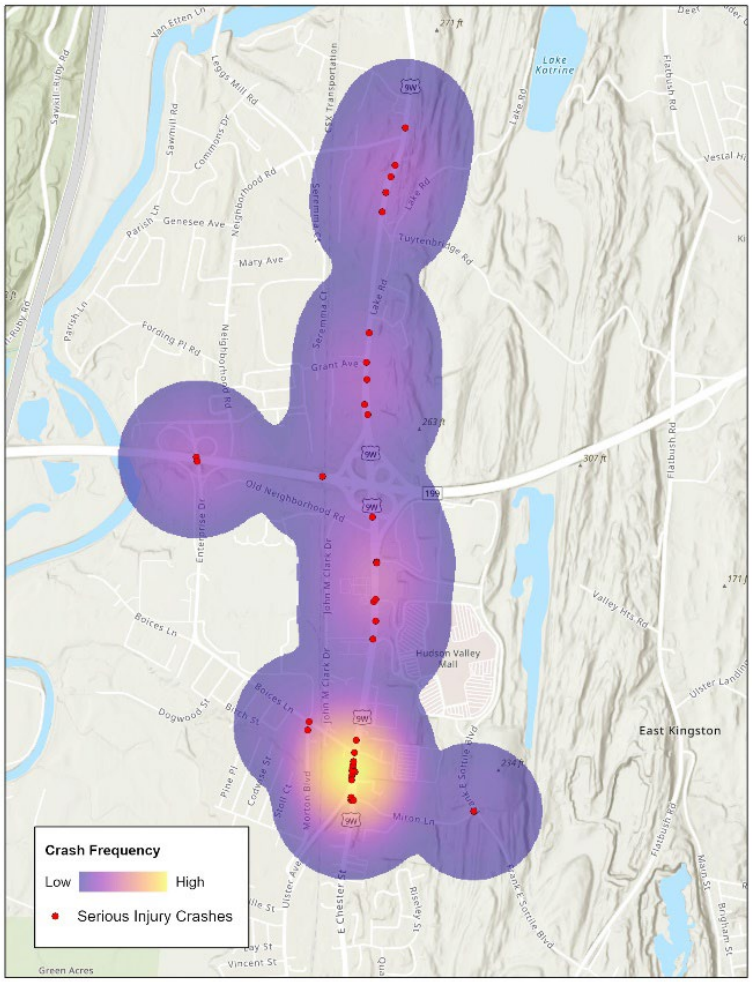


FIGURE 2.10: SERIOUS INJURY CRASH HEAT MAP

TABLE 2.6: SUMMARY OF CRASH TYPES

Crash Severity	Number of Crashes	Percent of Total
Motor Vehicle	1,230	93.5%
Fixed Object	49	3.75%
Animal	23	1.75%
Bicycle	6	0.5%
Pedestrian	5	0.5%
Total	1,313	100%

The data shows that motor vehicle collisions account for the large majority of crashes, followed by collisions with fixed objects. There were six bicycle and five pedestrian crashes, accounting for approximately 0.5 percent each. Figure 2.11 shows the distribution of bicycle and pedestrian crashes in the study area and shows clusters near Boices Lane, the North Hudson Valley Mall entrance, and Leggs Mills Road. Contributing factors for bicycle and pedestrian crashes primarily included driver inattention, failure to yield right of way, and improper passing or lane usage.

While the above tables and maps illustrate the overall study area crash characteristics, a second assessment involved a closer review of Route 9W and Boices Lane as provided by the NYSDOT and is summarized in Table 2.7 and discussed on the following page. A detailed crash summary table can be found in Appendix E.

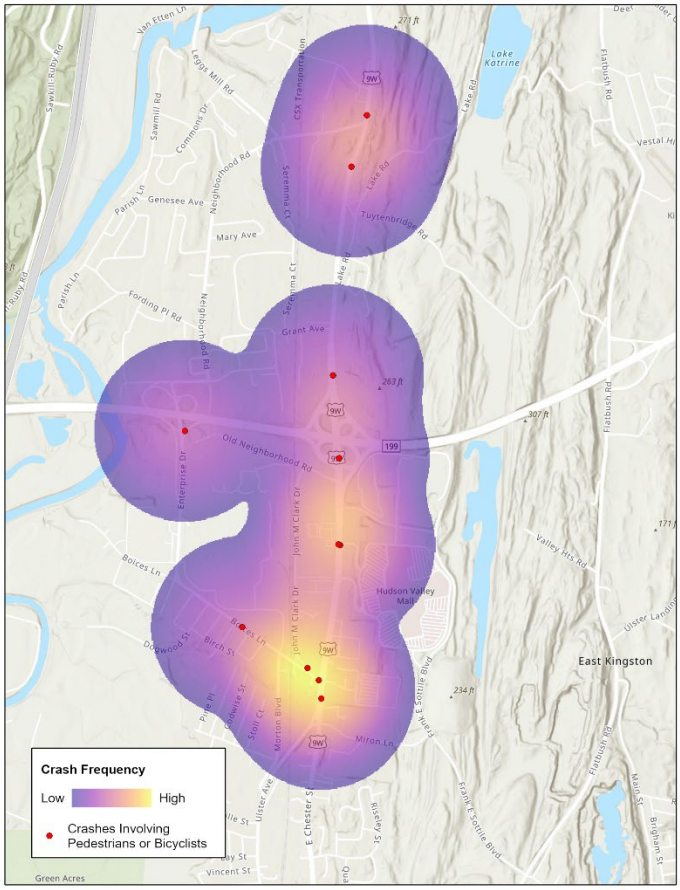


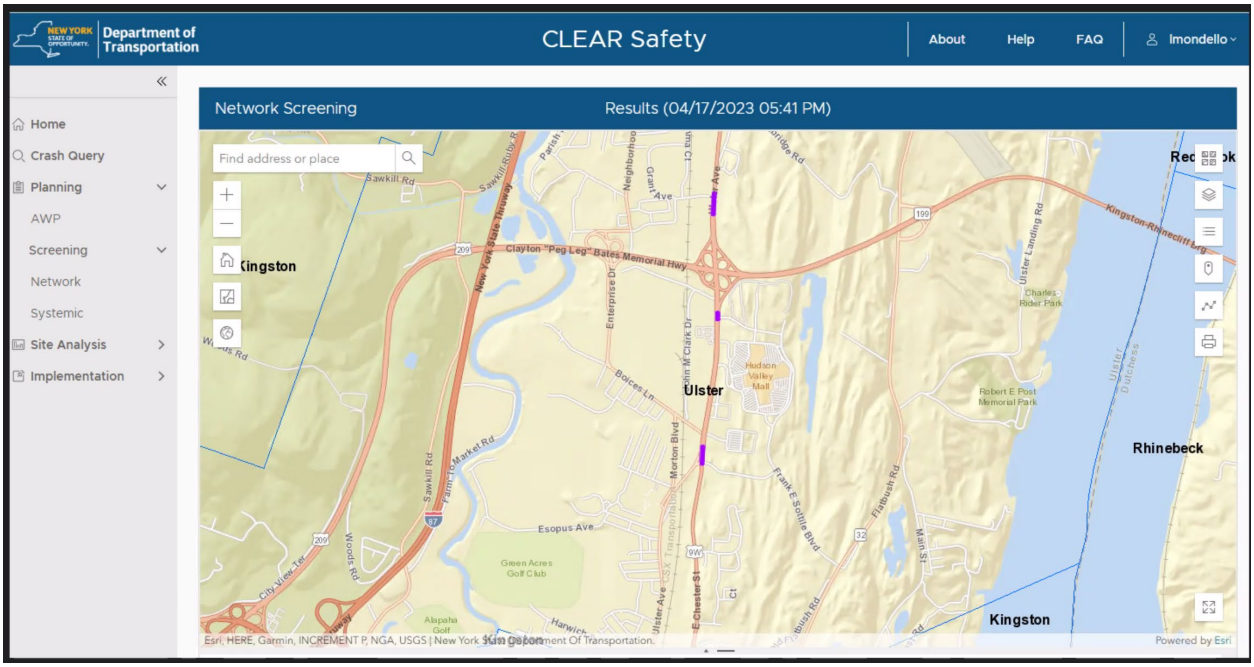
FIGURE 2.11: BICYCLE AND PEDESTRIAN CRASH HEAT MAP

TABLE 2.7: SUMMARY OF CRASH RATES

Crash Location	# of Crashes	Crash Rate	
		Calculated	NYSDOT Average
Intersection Crashes Only (Accidents/Million Entering Vehicles)			
9W/Frank Sottile Boulevard	87	1.59	0.56
9W/Boices Lane	70	1.04	0.56
9W/Ulster Avenue/Miron Lane	47	0.62	0.56
Boices Lane/Morton Boulevard	34	0.91	0.56
Roadway Segment – Including Intersections (Accidents/Million Vehicle Miles)*			
Van Kleeck Lane to Route 199/Route 209	258	6.05	4.27
Route 199/Route 209 to Leggs Mills Road	265	5.67	4.27
Full Segment	523	5.86	4.27

*Note the segment crash rate includes intersection crashes and was compared to the NYS mainline and juncture accidents average crash rates.

This supplemental crash analysis shows that two intersections on Route 9W, and the Boices Lane/Morton Boulevard intersection experienced crash rates that are more than 1.5 times the statewide average for similar facilities. It is noted the overall segment crash rate for the entire Route 9W corridor is more than the NYSDOT average, but less than 1.5 times the average rate for similar segments. The NYSDOT assessment also produced the following map that shows three general areas of concern - in front of Car Wash, Frank Sottile/ramps from Route 209, and north of the interchange.



The crash dataset provided by the NYSDOT CLEAR system identified four fatal crashes in the study area. Two crashes occurred on US-9W/Ulster Ave, while two occurred on nearby roads. The case

number, year, location, apparent contributing factor, and potential mitigation of each fatal crash are as follows:

- Case # 37703957 (2019) along US-9W
    - Details: Collision with pedestrian
    - Potential mitigation: pedestrian infrastructure improvements and street lighting
- Case # 38236971 (2019) along US-9W
    - Details: Failure to yield right of way; driver inattention; head on collision
    - Potential mitigation: unknown
- Case # 38183628 at US-209 on-ramp
    - Details: Collision with pedestrian
    - Potential mitigation: unknown
- Case # 39045215 at John M Clark Rd
    - Details: Unsafe speed; collision with tree
    - Potential mitigation: unknown

Travel Patterns

An origin-destination (O-D) assessment was performed to identify existing travel patterns and inform the development and analysis of future alternatives. Data was queried from Replica, a web-based data platform that uses a regional travel activity model to simulate movements of residents, visitors, and commercial vehicles over the course of a typical weekday. The model uses numerous data sources including location based data, spend data, and demographic data to provide detailed trip tables. The O-D data was developed into an overall matrix with origin zones (from) on the vertical axis and the destinations (to) on the horizontal axis, which was used to identify the relative amount of local traffic compared to trips passing through the corridor.

Table 2.8: Overall Origin-Destination Matrix (Daily Trips)

Origins	Destinations							Total
	Route 9W South	Ulster Avenue	Route 209 West	Route 9W North	Route 199 East	Frank Sottile Boulevard	Internal	
Route 9W South	-	190	260	1170	210	30	5900	7760
Ulster Avenue	325	-	240	1000	1370	100	7165	10200
Route 209 West	425	315	-	1100	6310	50	13200	21400
Route 9W North	1260	1100	1270	-	555	40	4235	8460
Route 199 East	200	1000	6150	560	-	45	6645	14600
Frank Sottile Boulevard	20	70	0	20	20	-	1120	1250
Internal	6240	7205	13480	4460	6835	325	28290	66835
Total	8470	9880	21400	8310	15300	590	66555	130505

The percentage of through traffic on Route 9W can be calculated by comparing the total number of trips originating north and south of the corridor to the number of trips passing through external points on Route 9W to the north and south, Ulster Avenue, Frank Sottile Boulevard, and using the US 209/NY 199 interchange. Per the above matrix, this equates to approximately half of all trips to and from the north and 25 percent of all trips to and from the south.

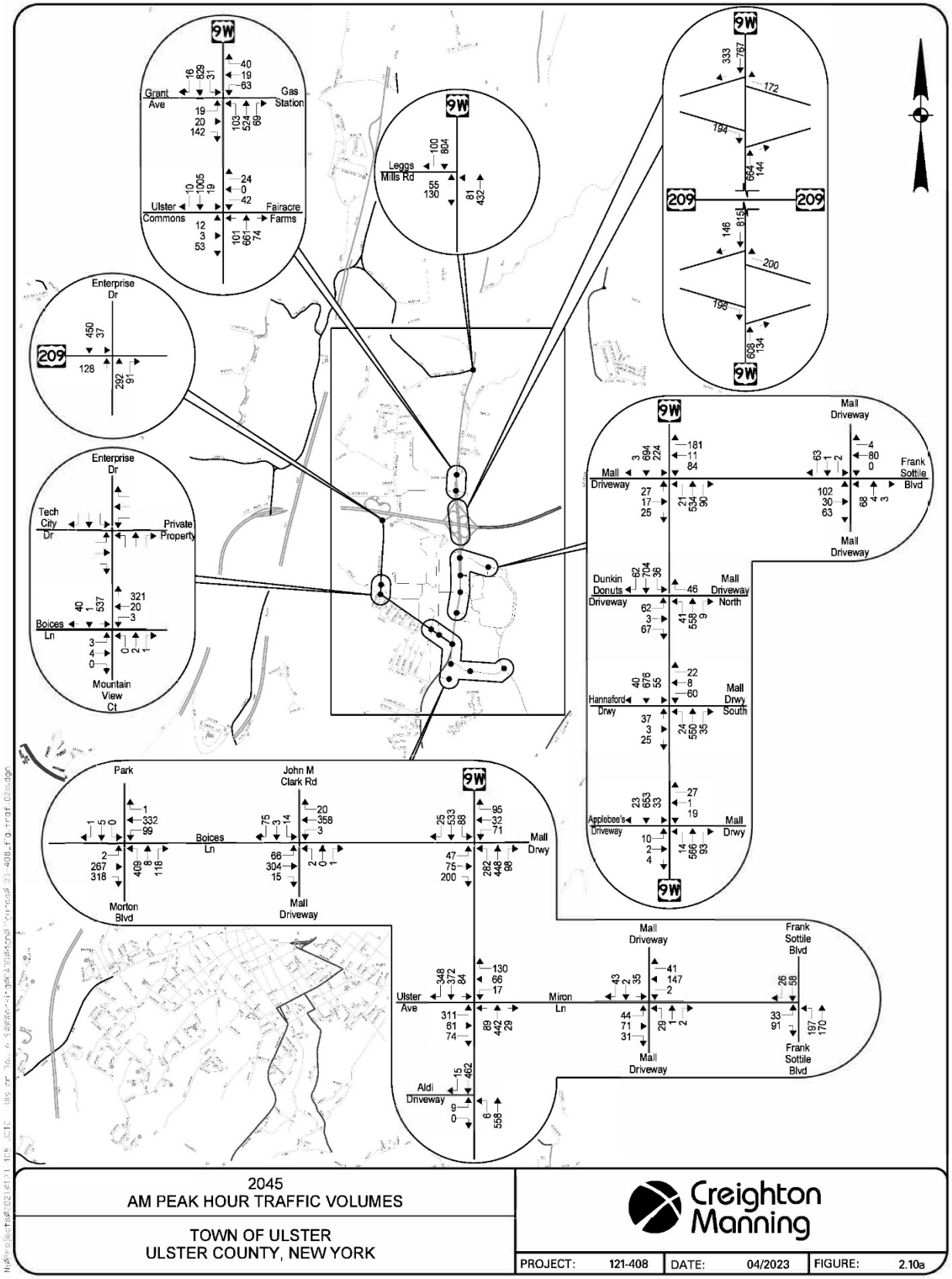
Traffic Volume Forecasts

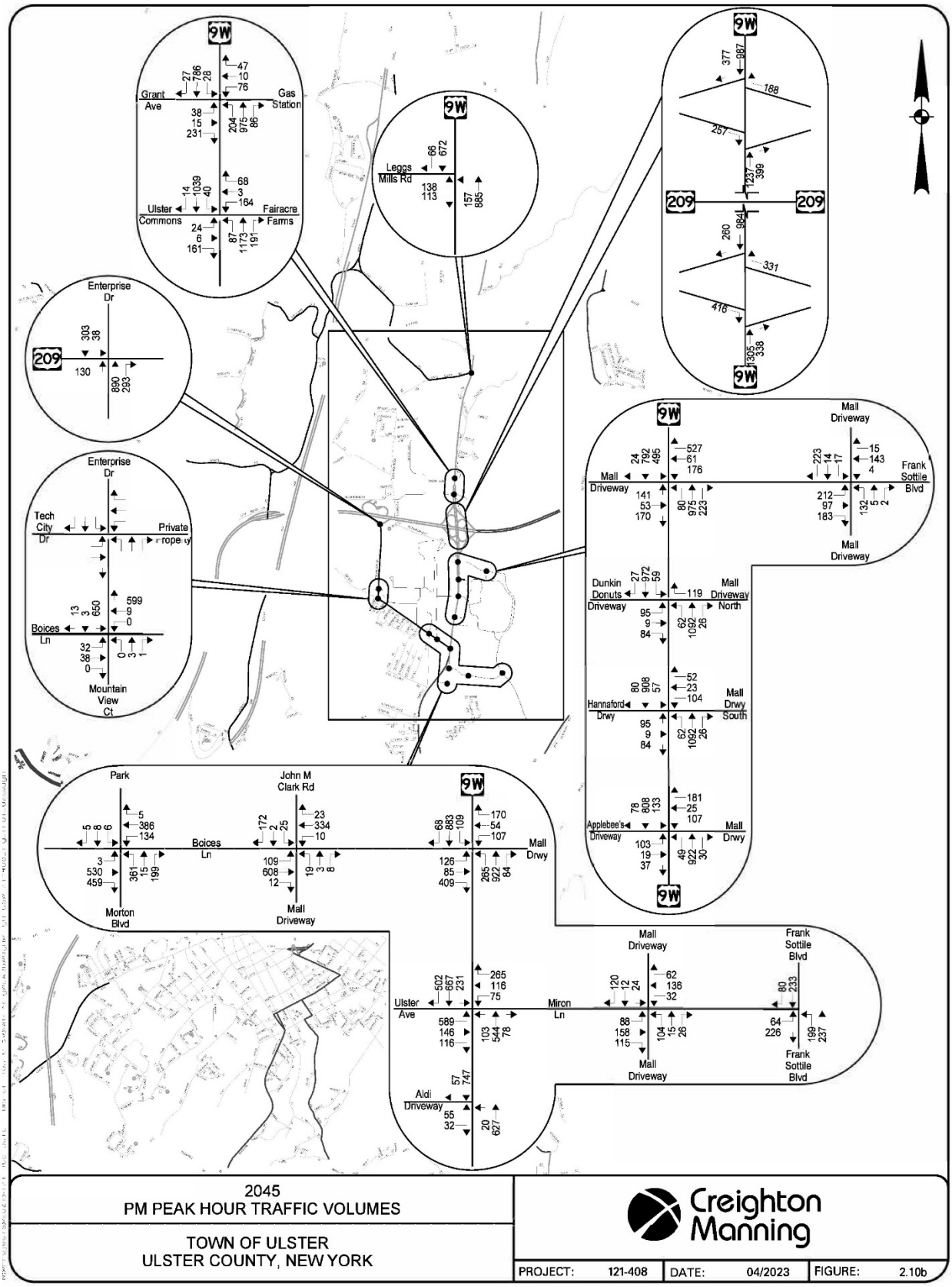
Traffic forecasts were prepared for a 20-year planning horizon (2045) and are necessary to ensure that concepts being considered can reasonably accommodate existing and future traffic. Several factors were considered during the development of the traffic forecasts including historic traffic growth and specific nearby development projects, as well as discussions with the Study Advisory Committee. The team found the following:

- Regression analysis of 5 Automatic Traffic Recorder (ATR) sites in the area over the last 15 years showed traffic growth rates have generally been declining.
- Discussions with the Technical Advisory Committee consisting of representatives from UCTC and The Town of Ulster determined that a one-tenth percent per year background growth rate would be reasonable for this study.
- Known redevelopment projects at the former IBM site and Hudson Valley Mall are anticipated to result in additional traffic throughout the study area. Trip generation was estimated for these projects and the resulting traffic was distributed through the study area based on the results of the origin-destination study, resulting in approximately 1,600 and 2,000 additional trips during the morning and evening peak hours respectively.
- Consideration of the background growth rate and specific development projects results in an approximate 10 to 20 percent total growth over the 20-year period depending on location in the corridor. This equates to an approximate ½ to 1 percent per year growth rate.

The Future No-Build Volumes are shown on Figure 2.12.

FIGURE 2.12: 2045 NO-BUILD TRAFFIC VOLUMES





2045
PM PEAK HOUR TRAFFIC VOLUMES

TOWN OF ULSTER
ULSTER COUNTY, NEW YORK

Creighton Manning

PROJECT:	121-408	DATE:	04/2023	FIGURE:	2.10b

2045 Traffic Operations

The detailed traffic simulation models developed for the existing conditions assessment were updated based on the above traffic forecasts for the AM and PM peak hours. Likewise, the overall level of service and travel time results of the analysis were updated and are summarized in Table 2.10 and Figure 2.13.

Table 2.9: Overall Intersection Level of Service Comparison

Study Intersection		AM Peak Hour		PM Peak Hour	
		2022 Existing	2045 Forecast	2022 Existing	2045 Forecast
1	Route 9W at Leggs Mills Rd	B (15.2)	C (28.9)	B (12.6)	B (19.3)
2	Route 9W at Grant Ave (U-86)	B (10.7)	B (10.6)*	B (11.9)	B (15.4)
3	Ulster Ave at Ulster Commons / Fairacre Farms	A (5.1)	A (5.1)*	B (11.0)	B (11.6)
4	Ulster Ave at Frank Sottile Blvd / Burlington/Staples	**B (17.8)**	**B (18.2)**	**C (30.7)**	**D (35.0)**
5	Ulster Ave at HV Mall north driveway / CVS/Dunkin Donuts	**A (8.7)**	**A (9.3)**	**B (11.6)**	**B (12.3)**
6	Ulster Ave at HV Mall south driveway / Hannaford	**B (14.4)**	**B (17.2)**	**B (15.4)**	**B (16.8)**
7	Ulster Ave at Applebees/Bed Bath & Beyond/Marshalls	**A (3.5)**	**A (3.4)***	**B (13.5)**	**B (13.5)***
8	Ulster Ave at Boices Lane / Home Depot	**A (7.3)**	B (18.5)	B (14.9)	**D (35.3)**
9	Ulster Ave at Miron Lane / Rt 9W south leg	**D (35.2)**	**D (36.4)**	**D (44.0)**	***D (49.7)***
10	Ulster Ave at Family Dollar / Aldi	A (5.2)	A (5.6)	A (8.0)	A (9.5)
11	Miron Ln / Home Depot Dwy	B (10.8)	B (11.2)	B (12.7)	B (13.2)
12	Frank Sottile Blvd / Miron Ln	A (6.9)	A (7.3)	A (7.9)	A (9.0)
13	Frank Sottile Blvd / Plaza Dwy	B (18.7)	C (20.9)	C (24.3)	C (28.4)
14	Boices Ln / John M Clark Rd	C (15.2)	C (21.1)	D (25.1)	**E (47.9)**
15	Boices Ln / Park Dwy / Morton Blvd	B (10.3)	B (15.1)	B (12.9)	C (20.3)
16	Enterprise Dr / Mountain View Ct / Boices Ln	B (14.7)	C (19.1)	C (16.0)	C (24.7)
17	Enterprise Dr / Tech City	C (23.1)	-	C (24.3)	-
18	Enterprise Drive at Rt 209 EB on/off ramps	A (7.4)	A (6.1)*	A (5.9)	A (6.3)
19	Ulster Ave/Rt 209 EB off ramp	A (1.2)	A (1.8)	D (27.7)	***F (74.5)***

X (Y.Y) = Level of Service (Average delay in seconds per vehicle)

BOLD = LOS E or F for at least one movement

*Decrease in delay between Existing (2022) and Future (2045) due to

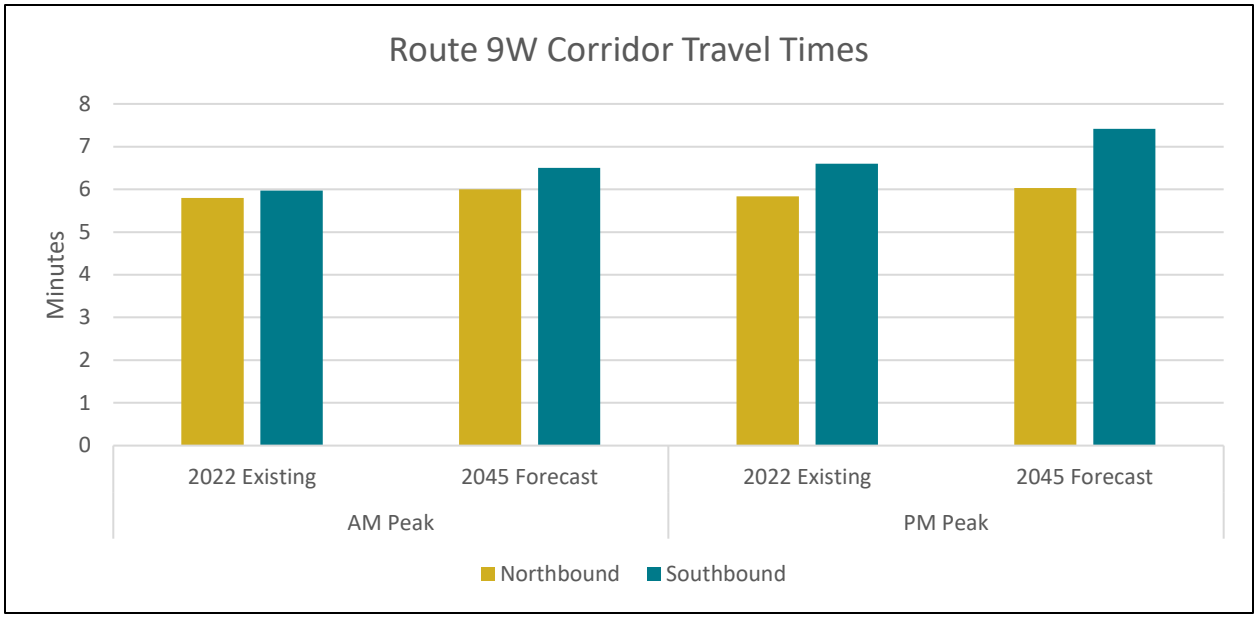


FIGURE 2.13: CORRIDOR TRAVEL TIME COMPARISON

The future traffic analysis indicates that after accounting for growth, traffic delays will generally increase, with intersections currently operating poorly continuing to experience long delays. This is particularly the case on the movements to and from side streets and driveways. Relative to corridor travel times, overall end to end travel time is expected to increase by approximately five percent, resulting in one minute of additional travel.

PUBLIC INPUT ON EXISTING AND FUTURE CONDITIONS

The first public workshop for the Ulster Route 9W Mobility Plan was held online as a "Join at Your Own Pace" presentation. The online presentation was available for review and public comment on the study website https://ulster-route9w-uctc-ulstercounty.hub.arcgis.com/ from Monday June 26, 2023 through Monday July 31, 2023. The meeting was well advertised by a press-release carried by Hudson Valley One for two weekly cycles, a direct mailing to over 130 businesses in the town, social media and web posts by the Ulster County Government and Town of Ulster, and flyers posted at businesses throughout the study area. The meeting was attended with over 65 unique views of the recorded presentation. The online presentation began with an introduction by Brian Slack, Principal Transportation Planner for the Ulster County Transportation Council (UCTC) and Ulster Town Supervisor James Quigley. An overview of the study goals, analysis, and general needs was presented by Jesse Vogl (Creighton Manning).The purpose of the public workshop was to inform the public about this transportation planning study, let them know the different methods by which they can provide comments, provide the public with an initial understanding of the existing conditions and needs, and obtain input from the public on transportation issues and ideas that should be considered as the study progresses.

Meeting attendees had several opportunities to provide input and offer comments including a survey with multiple choice and open ended response questions, an online mapping exercise with the ability to place geo-located comments, and via email to the project team. The project website address was shared and participants were encouraged to provide additional comments. The online presentation directed the public to complete an online survey to provide input on the existing corridor operations and issues. As of the close of the comment period (July 31, 2023), 74 surveys were completed. The survey prompted respondents to provide input on the project goals, how they currently use the corridor, and identify issues/concerns with corridor operations and safety.

In general, the public agreed with the stated study objectives of reducing traffic congestion and improving safety, multi-modal mobility, and corridor aesthetics. When asked to prioritize these objectives, safety and multi-modal access ranked highest. Figure 2.14 summarizes the public priorities.

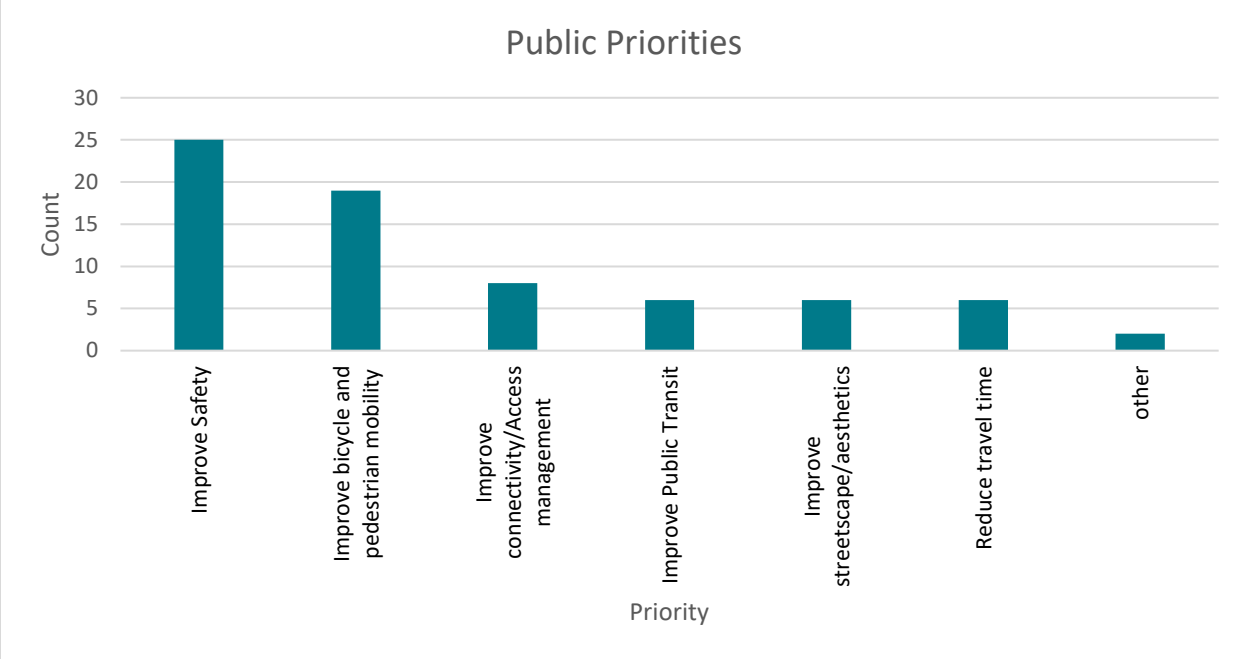


FIGURE 2.14: PUBLIC PRIORITIES

In addition to the study objectives, respondents were asked to provide input on traffic congestion. The survey responses indicate that congestion occurs most frequently on weekends and weekday afternoons, although approximately one third of respondents also noted that congestion is a concern during the morning and afternoon periods as well. Approximately half of the survey respondents indicated a preference to reduce congestion while traveling straight along Route 9W, while the other half prioritized reducing congestion while turning to and from homes, businesses, and side streets.

The final set of multiple choice questions asked respondents to provide input on how they currently use the corridor. Relative to trip purpose, shopping and errands was cited as the most frequent reason for travelling on the Route 9W corridor, followed by medical appointments, which generally aligns with the land uses within the corridor. The majority of respondents (90%) stated the use of automobiles as their primary mode of travel. Figure 2.15 shows how frequently respondents use each mode in the Route 9W corridor, and reinforces that automobile travel is the most frequent, although many respondents indicated that they do walk or bike in the corridor occasionally.

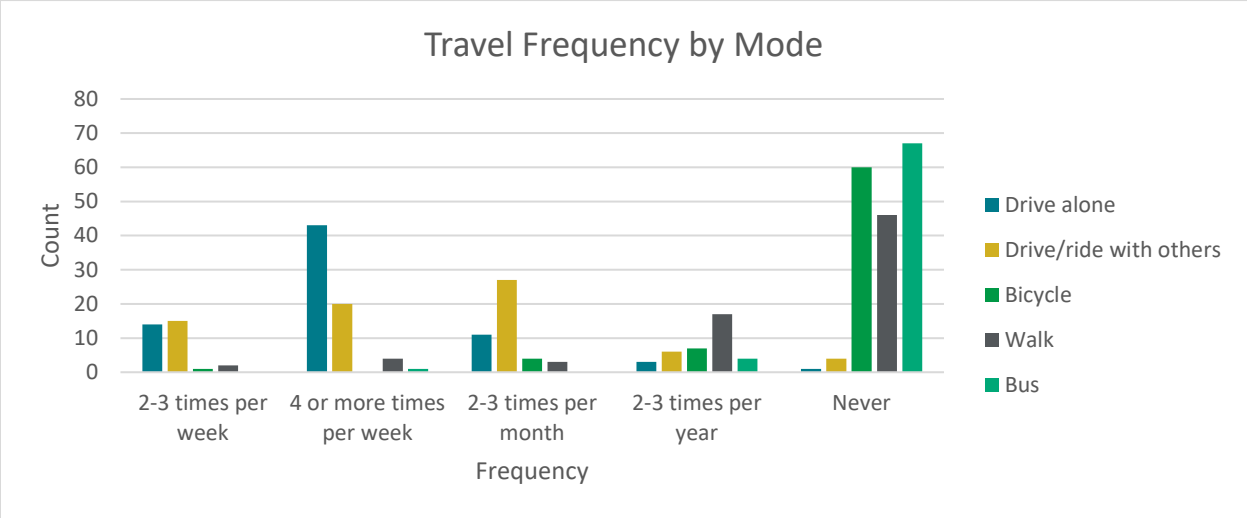


FIGURE 2.15: TRAVEL FREQUENCY BY MODE

Additionally, although the majority of respondents don't currently walk in the Route 9W corridor, approximately 55% indicated that they would be willing to walk if the corridor were improved, and additional 15% stating that they would possibly consider walking in the future, indicating the need for multi-modal accommodations.

Beyond the multiple choice questions, respondents had the opportunity to provide open ended comments on concerns and improvements for the corridor. The most common concerns in the corridor were pedestrian and bicycle connectivity and safety, observations of aggressive or unsafe driving, traffic congestion, and aesthetics. Ideas for corridor improvements include bicycle lanes, sidewalks, intersection and streetscape improvements to improve pedestrian comfort and safety, and changes to traffic operations including signal operation and turn restrictions. Figure 2.16 summarizes the identified concerns while Figure 2.17 summarizes the input on improvements.

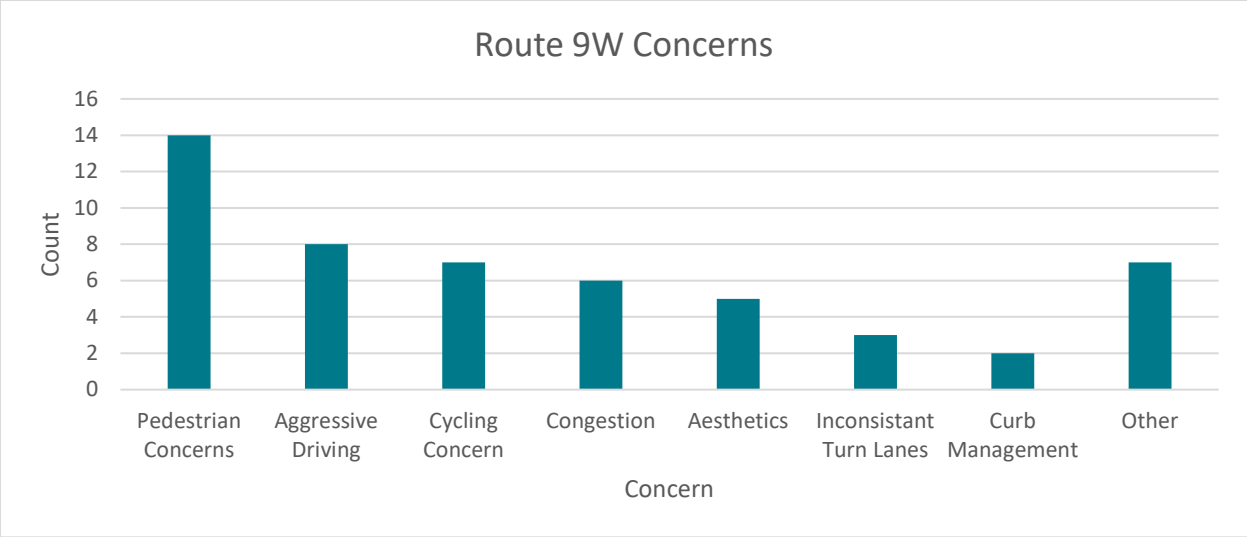


FIGURE 2.16: ROUTE 9W CONCERNS

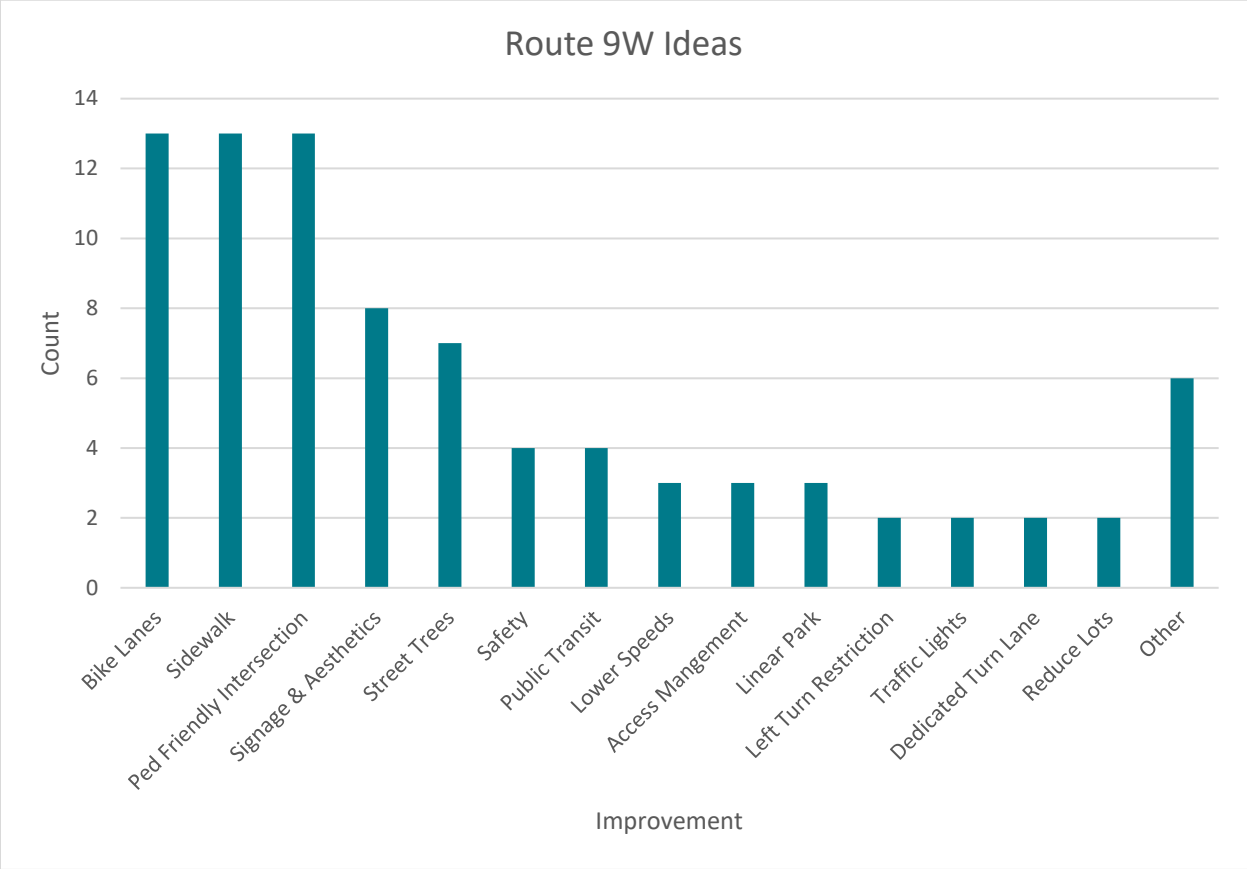


FIGURE 2.17: ROUTE 9W IDEAS

The online "Join at Your Own Pace" workshop also directed the public to provide geo-located comments using a mapping survey. This survey allowed respondents to place a pin on a map and type an open ended response indicating possible concerns or ideas associated with the designated location. A review of the responses indicates that the majority of locations identified lack of pedestrian infrastructure and areas of pedestrian discomfort. Several other locations were identified for concerns related to illegal left turns or traffic delays. Figure 2.18 shows the geo-located comments by type.

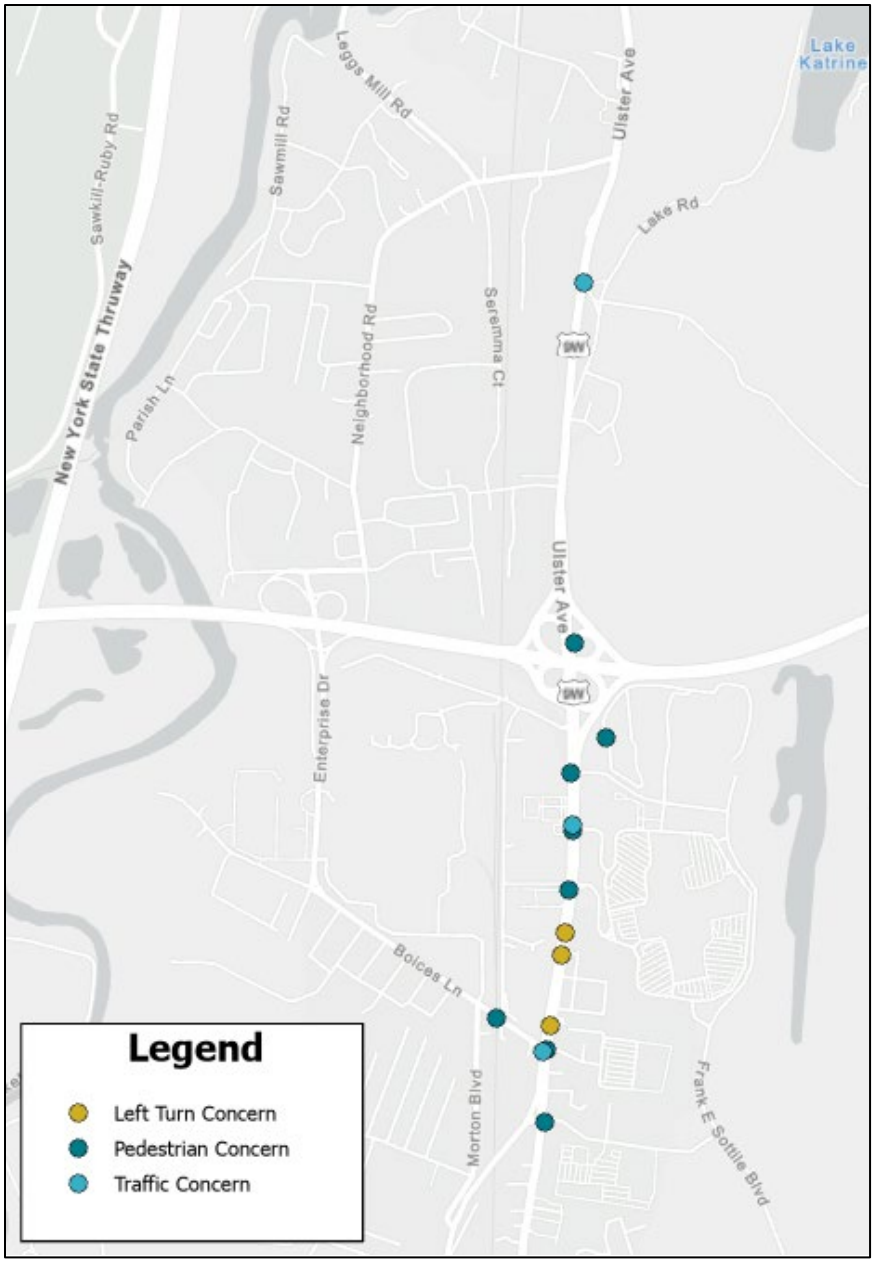


FIGURE 2.18: GEO-LOCATED COMMENTS

NEEDS SUMMARY

Based on the above assessment of traffic volumes and operations, multi-modal infrastructure, and crash history, it is apparent that the Route 9W operates poorly for most users. Traffic operations issues result in driver frustration while lack of sidewalks, crosswalks, and bicycle infrastructure make walking and bicycling in the corridor unappealing. These factors as well as the frequency and severity of crashes in the corridor indicate that there is a need to improve traffic operations and safety, and provide additional multi-modal accommodations to promote access for all users.

CHAPTER 3 – Improvement Concepts

Based on stakeholder feedback, input from the advisory committee, and online public input, a series of transportation improvements were developed to address concerns identified along the Route 9W corridor and adjacent roadways. In many instances, the concerns were related to multi-modal mobility and safety, traffic congestion, and corridor aesthetics; and therefore, the proposed improvements focused on mitigation measures that address these issues.

Pedestrian Infrastructure Improvements

Sidewalks and Crosswalks

Lack of sidewalks on the east side of Route 9W limits pedestrian access to destinations in the corridor and detracts from the overall mobility in the area. Although there are numerous pedestrian trip generators on the east side of Route 9W, missing infrastructure fails to provide pedestrians a dedicated network and comfortable means to access these businesses. Public comments indicated that when possible, customers and employees avoid walking the Route 9W corridor. This absence of sidewalks and pedestrian activity reinforces the current auto-centric character of the corridor and further detracts from the overall sense of place.

Similarly, pedestrian access is hindered by lack of crosswalks on one or more legs at nearly all of the signalized intersections on Route 9W between Leggs Mills Road and Van Kleek Lane. In fact, of the 10 signals in the corridor, marked crosswalks across Route 9W are present at Boices Lane, Hudson Valley Mall South Driveway/Kings Mall Court, and Adams Fairacre Farms, resulting in long stretches without a marked pedestrian crossing and creating a barrier for individuals looking to traverse the corridor. This lack of connectivity puts an undue burden on pedestrians who must travel out of their way to find a safe crossing opportunity, or alternatively risk crossing at a signal or mid-block location without a marked crosswalk.

Pedestrian access to schools and other facilities is also somewhat limited throughout the corridor. Enterprise Drive presents an example of an opportunity to expand upon existing infrastructure to complete an important pedestrian connection, particularly in the context of a pending 880-unit residential development at the nearby iPark 87 site. A multi-use path already exists along the east side of Enterprise Drive but stops near the eastbound US-209 on-ramp. This existing MUP could be extended northward over US-209 to provide connections to M. Clifford Miller Middle School and ER Crosby Elementary School, along with other residential communities to the north. The reconfiguration of the US-209 slip lane into a controlled right-turn lane would encourage traffic calming along Enterprise Drive and permit safer pedestrian crossings across the existing overpass. An accompanying MUP on the west side of the roadway would further increase accessibility. Relatedly, adding crosswalks at the all-way stop intersection of Town Hall Road and Enterprise Drive could help reduce pedestrian-vehicle interactions closer to the middle school. Overall, the area around Enterprise Drive is an example of a location that would benefit from even minor pedestrian connection and crossing improvements.

Furthermore, sidewalks and crosswalks are proposed as shown in Figure 3.1 to address the above deficiencies and improve multi-modal connectivity throughout the Route 9W corridor. The addition of sidewalks to the east side of Route 9W as well as through the Route 9W/US Route 209 interchange and northern segments of Route 9W will provide a designated and safe space for pedestrians to walk, separate from vehicle traffic, reducing the risk of pedestrian involved crashes and enhancing overall

pedestrian comfort. Likewise, adding marked crosswalks across all legs of the existing signals in the corridor will provide additional safe pedestrian crossing opportunities, providing pedestrians a more direct path between origins and destinations, thus minimizing diversions and resulting in increased pedestrian comfort. Cumulatively, these sidewalk and cross walk additions will better serve pedestrians by filling gaps in the existing transportation network.

Yet the benefits of additional sidewalks and crosswalks extend beyond pedestrians. Encouraging additional sidewalks on the Route 9W corridor can reduce the number of short trips currently made by car by encouraging walking, thus contributing to a reduction in air pollution and traffic congestion. Likewise, well-designed sidewalk zones can contribute to economic development by accommodating streetscape improvements that make the corridor more attractive to businesses and residents. Although necessary in their own right, these infrastructure upgrades become even more important due to the pending development of the iPark 87 site. Specifically, the addition of 880 residential units will result in additional pedestrian trips to and from retail opportunities in the Route 9W corridor. As with any infrastructure project, final design must consider drainage, stormwater, and utilities, and right-of-way among other factors.

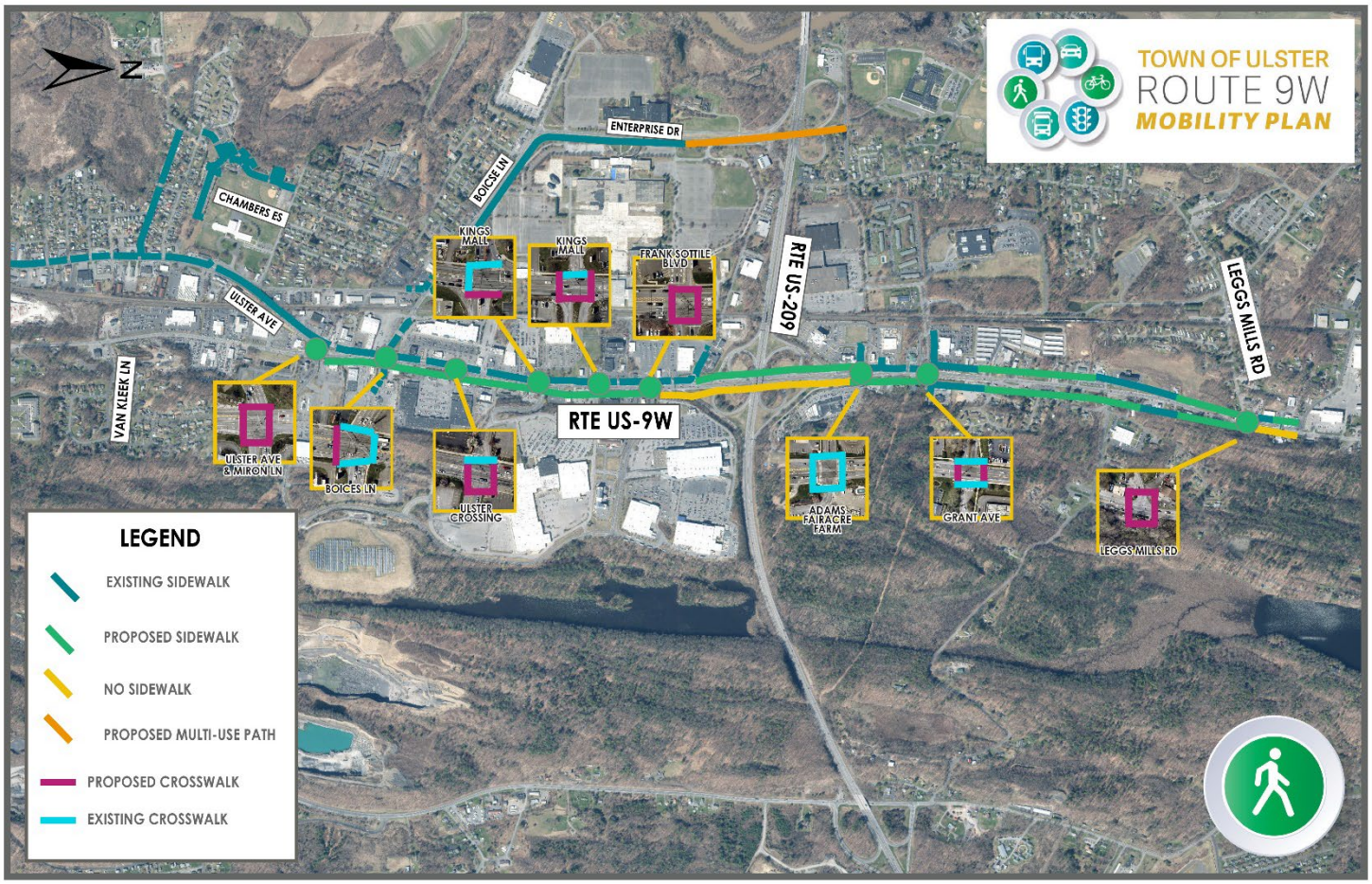


FIGURE 3.1: PROPOSED PEDESTRIAN INFRASTRUCTURE

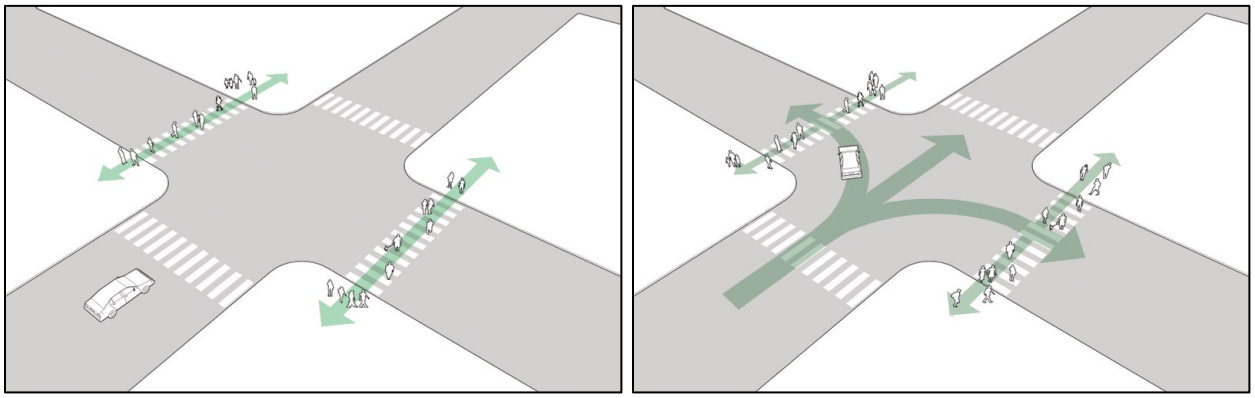
Pedestrian Signals

In addition to provision of sidewalks and crosswalks, signalization plays a pivotal role in balancing vehicle flow with pedestrian safety. Three primary options emerge: no pedestrian signal, pedestrian actuation, and the incorporation of Leading Pedestrian Intervals (LPI).

The absence of dedicated pedestrian signals is often seen in intersections operating at vehicle minimums. This is the existing infrastructure at most intersections in the 9W corridor. This configuration prioritizes motorists, allowing traffic signals to function efficiently based on vehicle demand. However, the lack of pedestrian signals creates conflicts for pedestrians attempting to cross busy intersections.

Pedestrian signals with actuation provide a means of balancing demand between vehicle traffic and pedestrian mobility. This type of actuation introduces control for pedestrians by allowing them to push a button to activate the pedestrian signal. When pushed, these buttons require signals to run for the pedestrian minimum while giving information about when to “Walk” or “Don’t Walk”. This provides pedestrians the information and crossing time necessary to complete a safer crossing.

A method with even more protection for pedestrians is the Leading Pedestrian Interval (LPI) which provides pedestrians a “head start” when crossing an intersection. When using an LPI, pedestrians are given a walk signal 3-7 seconds before vehicles are given a green indication, allowing pedestrians to better establish their position in the crosswalk, as shown in Figure 3.2. This early start reduces the risk of conflicts between turning vehicles and pedestrians. Additionally, when paired with blank out "no turn on red" signs, LPIs offer an added layer of protection. LPIs enhance the visibility of crossing pedestrians which contributes to the reduction of conflicts between pedestrians and vehicles, creating a safer crossing environment. LPIs also heighten the likelihood of motorists yielding to pedestrians. This is especially important for pedestrians who may be slower to start into the intersection.



Phase 1: Pedestrians Only

Phase 2: Pedestrians and Cars

Phase 1: Pedestrians Only

FIGURE 3.2: LEADING PEDESTRIAN INTERVAL SIGNAL PHASING

Boices Lane Railroad Crossing

It should be noted that a Locally Administered Federal Aid Project is currently progressing in the study area. The project is entitled Upgrade and Coordination of Highway Signals at the Boices Lane CSX Railroad Crossing (PIN: 8933.07), and is currently in the preliminary design phase. The project will upgrade and coordinate the highway traffic signals at the Boices Lane intersections with Morton Blvd and John M. Clark Dr, and coordinate the upgraded traffic signals with new railroad warning detection to prevent vehicles from queuing on the CSX railroad tracks between the two intersections. The project is planned to be implemented in phases to align with available funding. Phase one is planned to include the new traffic signal at the Boices Lane / Morton Boulevard intersection, tying into the RR pre-emption, and converting the iPark 87 driveway opposite Morton Boulevard to one-way entering. Right of way acquisition for the improvements is also included. The project will not install crosswalks across Boices Lane at the Morton Blvd or John Clark Drive intersection due to pre-emption conflicts with the RR operation. As such, it was identified that the Town should pursue sidewalk extensions and future crosswalks away from these two signals – across Boices lane to the west, and across Morton Boulevard to the south.

PIN 8933.07 is focused on traffic signal upgrades, and although other desired improvements have been identified in the area, they are not currently funded. In addition to the sidewalk extensions and crosswalks discussed above, these unfunded improvements include – 1) the completion of the sidewalk connection on the north side of Boices Lane across the railroad tracks between Morton Boulevard and John Clark Drive, and 2) extending the eastbound right turn lane on Boices Lane approaching Morton Boulevard to allow this traffic (and the Morton Blvd northbound left) to flow during railroad pre-emption.

It appears that the sidewalk extension over the RR tracks can be a stand-alone project once the funding is secured. The signals are currently being designed to include the pedestrian crossing upgrades across John Clark Drive and the iPark 87 driveway. Right-of-way is also being acquired. Recognizing the additional pedestrian demand generated by the iPark 87 project, discussions are being held with the developer of iPark 87 regarding mitigation and the potential to construct the sidewalk across the railroad tracks, and including a possible crosswalk across Boices Lane west of Morton Boulevard.

Extension of the eastbound right turn lane is complicated by limited right-of-way and utility impacts which would drive up the costs. The existing high-voltage utilities on the north side of Boices Lane are located close to the road and would require relocation, at a cost of more than one million dollars for the utility relocation alone. Although the turn lane extension is desired by the Town to improve operations during RR pre-emption, funding for an operational improvement like this is a challenge when competing for limited funding and other regional transportation maintenance and safety priorities. While a prior study (Boices Lane Railroad Crossing Study, October 2023) identified the long term need for two eastbound through lanes across the railroad, plus a westbound right turn lane entering iPark87, that additional geometry is not needed and has been superseded by PIN 8933.07, which will provide LOS D or better with the build-out of iPark87, by making the iPark87 driveway one-way entering.

Related issues in the area include several older traffic signals along Enterprise Drive, which are outdated and in poor condition and should be reconstructed to current standards. This should include providing pedestrian crosswalks, ramps, and signal heads. Discussions are being held between the Town, the County, and the iPark87 applicant regarding mitigation and the potential to construct these improvements.

Interchange Concepts

Building upon the above pedestrian improvements to the Route 9W corridor, there is an opportunity to improve the Route 9W/Route 209 interchange to better accommodate pedestrians and improve safety while improving vehicle operations and better integrating the character of the interchange with the rest of the Route 9W corridor. In its current cloverleaf configuration, the Route 9W/Route 209 interchange consists of a series of free flow ramps with acceleration lanes merging and diverging from Route 9W, acting as a barrier to pedestrians and contributing to safety concerns. The current layout generally provides a higher capacity and higher speed operation between Route 209 and Route 9W, which is in conflict with the nearby developed corridor, with its commercial driveways and traffic signals.

Likewise, the technical analyses and public input identified operational issues at the eastbound Route 209 to southbound Route 9W ramp which differs from the other ramps in its configuration, providing a short eastbound approach operating under yield control. Notably, the ramp currently operates poorly (LOS D), with additional delay expected as traffic volumes increase with corridor development. A traffic signal warrant evaluation was conducted at the Route 209 eastbound to Route 9W southbound ramp intersection and indicates that the existing traffic volumes warrant the installation of a traffic signal.

As such, the following three alternatives were assessed for their potential to improve multi-modal operations and safety.

No-Build

The "no build" option refers to the scenario in which no changes are made to the existing infrastructure. The interchange would remain in its current state without implementing any modifications, expansions, or renovations. The no-build option is included for comparison; however, it is understood that this option does not provide opportunities to enhance safety, efficiency, and functionality.

Signalized Eastbound Ramp

This option includes a new traffic signal at the eastbound US 209/NY 199 ramp and southbound Route 9W intersection to control the eastbound and southbound approaches. The proposed concept could include a signal only, or it could also realign the eastbound ramp slightly to the north so that it intersects Route 9W at an approximate right-angle, shortening the pedestrian crossing distance and improving intersection sight distance. The proposed ramp concept with realignment is shown on Figure 3.3.

FIGURE 3.3: SIGNALIZED EASTBOUND RAMP CONCEPT

Reduced Footprint (Single Point Urban Interchange (SPUI))

This option would reconfigure the existing interchange as a Single Point Urban Interchange (SPUI) or other reduced footprint concept. As shown in Figure 3.4, a SPUI reduces the overall footprint of the interchange by consolidating the turning movements of the Route 209 ramps and all the movements of Route 9W in one large, signalized intersection that would be located on an underpass. This modification could address speed differential concerns and bicycle and pedestrian needs while providing adequate capacity for motorists. An example of this type of interchange in a suburban area is Route 840 over Route 5A in New Hartford, NY.

According to FHWA website, https://www.fhwa.dot.gov/publications/research/safety/09060/009.cfm "Existing literature points out that SPUIs increase capacity and therefore accommodate more vehicles compared to conventional diamond interchanges. Since a SPUI has one signalized intersection, it allows for a simpler phasing sequence for signal control. This also makes it easy for a SPUI to be coordinated with upstream and downstream signals."

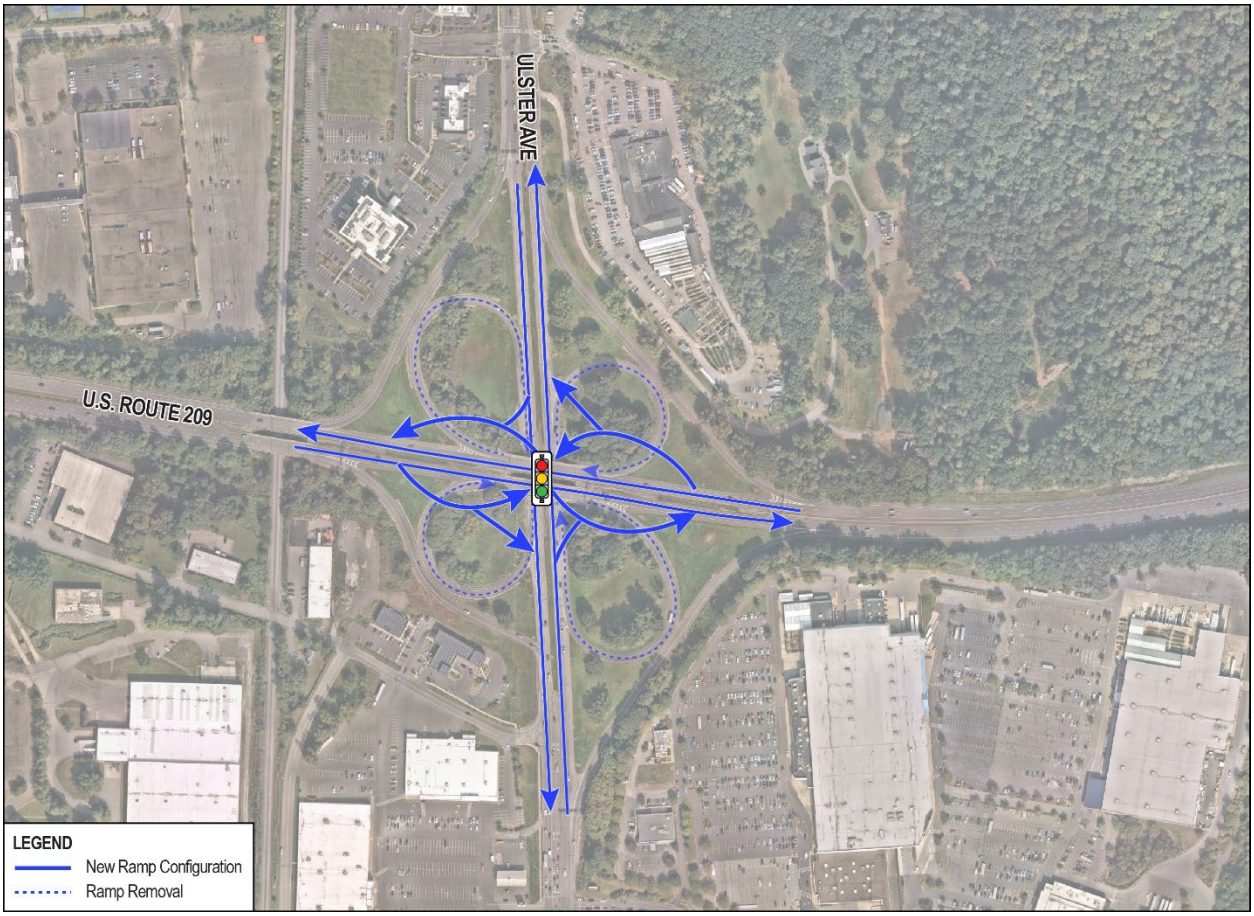


FIGURE 3.4: SINGLE POINT URBAN INTERCHANGE CONCEPT

Both interchange concepts will improve traffic operations, although the benefits will vary. Signalizing the eastbound to southbound off-ramp will reduce queuing on the ramp, and also reduce downstream weaving conflicts between the ramp and the Frank Sottile Boulevard intersection. Under the SPUI concept, additional benefits include improved pedestrian connectivity and controlling traffic movements at intersections, which will further moderate speeds and weaving concerns, and make the interchange more consistent with its environment. It is recognized that interchange reconfiguration represents a substantial capital project and is recommended for consideration when the existing bridge infrastructure reaches its useful life. An alternate configuration may also accomplish the same objectives as a SPUI, which could be confirmed during design.

The analysis shows that both the signalized eastbound ramp and SPUI options are feasible from a traffic operations standpoint, with overall intersection operations at level of service C or better during the peak hours. During the PM peak hour when congestion is greatest, signalization of the eastbound ramp will improve delay with minimal impact to other travel movements. Similarly, the SPUI concept will also improve delay on the eastbound ramp, although overall intersection delay will likely be greater due to new left turn movements which are expected to operate at LOS D or E, similar to other intersections in the Route 9W corridor.

In addition to the above traffic analysis, both concepts also provide the added potential to reduce weaving concerns on the segment of Route 9W southbound between the eastbound ramp and Frank Sottile Boulevard. Specifically, motorists traveling eastbound on US Route 209 destined for Wal-Mart, Lowes, Sam's Club, Target, or other destinations on Frank Sottile Boulevard currently must cross two lanes of traffic in less than 300 feet, resulting in a challenging weaving maneuver. A signalized ramp would manage conflicts between ramp traffic and mainline traffic, reducing the risk of weaving collisions.

The signalized eastbound ramp and SPUI concepts could provide additional multi-modal benefits. Both concepts benefit pedestrians by providing the opportunity for a signalized north/south pedestrian crossing across the eastbound ramp. However, the SPUI could provide additional pedestrian benefits, if all ramps were signalized. Likewise, the SPUI provides reduced land requirements compared to the existing cloverleaf design which would remain largely unchanged under the signalized ramp option. This smaller footprint afforded by the SPUI is more suitable for urban areas with limited space and allows for future development, promoting economic development and a more walkable environment. The reduced infrastructure also allows aesthetic features including landscaping or green space.

Traffic Signal Optimization

Implementation of the above pedestrian improvements within the Route 9W corridor will result in a tradeoff of additional vehicle travel time. Specifically, changes to signal operations to accommodate pedestrians and construction of a new signal at the Route 9W/Route 209 interchange innately requires that vehicles traveling through the corridor to stop at given points to allow pedestrians and conflicting traffic to traverse the corridor.

In order to minimize the travel time tradeoffs for pedestrian improvements and reduce congestion on Route 9W, corridor-wide changes to traffic signal operations were examined. Specifically, the existing traffic signal coordination parameters were evaluated for their potential to improve travel times through the Route 9W corridor and accommodate future increases in traffic volumes and pedestrian accommodations as outlined above. Conventional signal coordination involves pre-programming optimum timing parameters for different times of the day/week, based on historical data and past performance.

Figure 3.5 summarizes the average end to end corridor travel times for the 2045 No-Build scenario, in which no improvements are constructed, the added pedestrian treatment scenario which includes LPI signal phasing and signalization at the Route 9W/Route 209 interchange, and an improved signal coordination scenario.

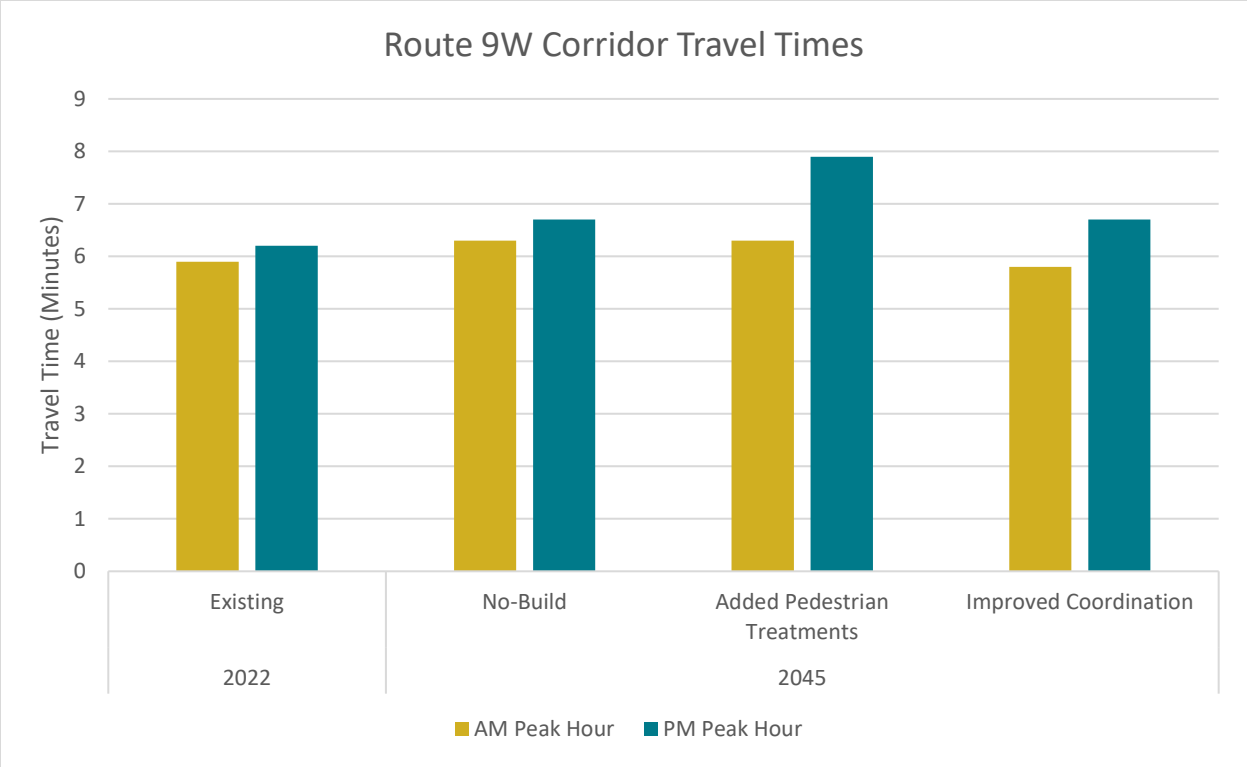


FIGURE 3.5: CORRIDOR TRAVEL TIME TRADEOFFS

The figure shows that currently, motorists can travel through the corridor in approximately six minutes, which is projected to increase in the future as the corridor develops and traffic volumes continue to grow. Likewise, the addition of LPI signal phasing and an additional signal at the Route 9W/Route 209 interchange is expected to result in an approximate 90 seconds of additional travel time through the corridor. However, signal timing and coordination adjustments can mitigate this increase, resulting in the ability to provide enhanced pedestrian accommodations without negatively impacting future travel times for motor vehicles. It should be noted that the travel time estimates above do not include a new signal at the eastbound off ramp, nor a new interchange. The intent of the chart is to show that signal optimization can off-set additional travel time increases associated with new pedestrian crossings.

At a minimum, the signals will require modems for communication between the signals and to reset clocks every hour to improve the coordination in the corridor. It is noted that NYSDOT may explore adaptive traffic signal control and Advanced Traffic Management Systems (ATMS) to further increase capacity through the corridor, which involves the use of additional intersection sensors, cameras, GPS devices, Intelligent Transportation Systems (ITS), new signal controller technology and remote management. An ATMS can also automatically detect and prioritize emergency vehicles at corridor intersections which can assist first responders and decrease response times. The NYSDOT has already programmed PIN 8816.25 to address technical needs at the traffic signals to improve operations. Incorporating emergency pre-emption as part of PIN 8816.25 should be explored as well.

Spot Capacity Improvements

Roundabouts offer benefits that contribute to the overall efficiency and safety of intersections, and the Federal Highway Administration considers roundabouts a Proven Safety Countermeasure with a 78% reduction in fatal and injury crashes. Operating under yield control, roundabouts increase intersection capacity, leading to improved operational performance compared to traditional signalized intersections. Likewise, roundabouts improve safety by lowering the risk of high-speed and/or injurious collisions and reducing the number of intersection conflict points. Traffic safety research supports the conversion of signalized intersections to roundabouts as a means of reducing crash rates and improving overall traffic safety. For example, the FHWA *Desktop Reference for Crash Reduction Factors* acknowledges a crash reduction factor between 40 and 48% for all crash types when converting a signalized intersection to a roundabout. As such, several roundabouts were assessed as shown in Figure 3.6.

Figure 3.6: Potential Roundabout Locations

The Route 9W/Miron Lane location was chosen due to the existing operational and crash experience in the area The Town Road locations were chosen to understand if signal maintenance costs can be avoided in if roundabout would be a better form of traffic control long term.

The roundabout analysis indicates that single-lane roundabouts situated off the corridor are anticipated to operate at level of service A on all intersection approaches, indicating an improvement over existing traffic signals. However, potential constructability challenges exist at the intersection of Frank Sottile Boulevard, Walmart, and Hudson Valley Mall due to grade-related issues.

Beyond the single lane roundabouts, a multi-lane roundabout at the Route 9W, Ulster Avenue, and Miron Lane intersection was identified as a possible solution to increase vehicle capacity while mitigating existing crash issues. Specifically, the existing conditions and needs assessment indicated that this intersection currently operates poorly with long vehicle delays which are expected to increase in the future. Likewise, the intersection as well as segment of Route 9W between Ulster Avenue and Boices Lane experience a number of crashes in part caused by poor access to the businesses on the west side of the road. As such, the roundabout concept shown in Figure 3.7 was developed to provide increase intersection capacity, provide an alternative circulation pattern on the existing southbound Route 9W to Southbound Ulster Avenue slip ramp to improve access to the existing businesses, and incorporate a raised median on Route 9W between Ulster Avenue and Boices Lane to promote positive access management.

Having a roundabout in close proximity to existing traffic signals can be a concern when there is a potential for queues to extend back from the signals through the roundabout. Specifically, it is the

proximity of the Boices Lane signal to the north, and the Aldi's signal to the south that require further study. Initial investigations as part of this planning study suggest that 95th percentile queues southbound approaching Aldi's could extend back to the proposed roundabout. Carrying the two southbound through lanes south of the roundabout through the Aldi's intersection could be explored to mitigate this queuing concern.

FIGURE 3.7: ROUTE 9W/ULSTER AVENUE/MIRON LANE ROUNDABOUT CONCEPT

Figure 3.8 summarizes the level of service analysis and shows that the roundabout concept will reduce delays by approximately 70 to 75% as compared to the 2045 no-build option with the existing traffic signal, at the Route 9W/Ulster Avenue/Miron Lane intersection (Appendix C)

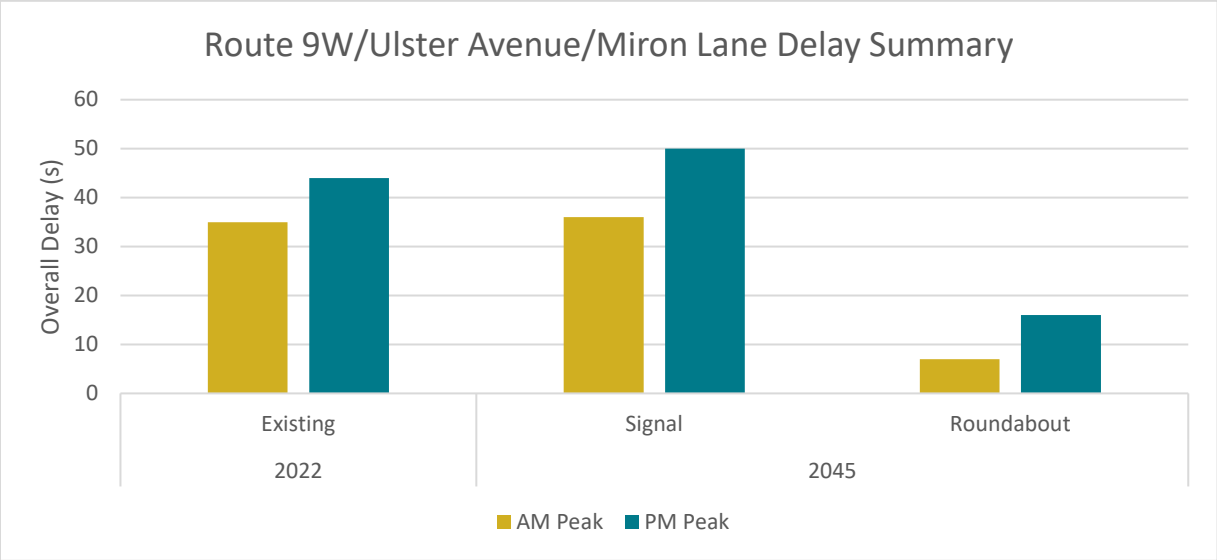


FIGURE 3.8: ROUTE 9W/ULSTER AVENUE/MIRON LANE DELAY SUMMARY

The decision to construct a roundabout at this location will require further engineering study and preliminary design to quantify right-of-way impacts, utility impacts and costs and ultimate determine if a roundabout emerges as the preferred alternative after all necessary studies are completed. At this planning stage, there are apparent safety and operational benefits that are worth exploring further. This could happen through further coordination of the Town, DCTC and the NYSDOT to confirm funding, and programming the preliminary design phase of a Route 9W project.

BICYCLE ACCOMMODATION

In its current form, Route 9W does not adequately accommodate bicycle travel. The large volume of high speed traffic results in a high stress environment for cyclists which only the strongest, most confident riders would attempt to navigate. As such, few cyclists are observed in the corridor, and those that are often utilize the existing sidewalks. While New York State law does not prohibit cycling on sidewalks, and the Town of Ulster has not adopted any such restrictions, better accommodations are necessary to prioritize cycling in the corridor. A review of guidance provided by the Federal Highway Administration (FHWA) (Bikeway Selection Guide, dated February 2019) indicates that based on the traffic volumes and speeds in the Route 9W corridor and adjacent roadways, a separated bike lane or shared use path would be the most appropriate treatment to accommodate bicyclists along Route 9W (Appendix G)Final design would consider all constructability issues including drainage, utilities, and stormwater among others. Beyond the Route 9W corridor, these types of treatments would also be beneficial on Boices Lane to develop a bicycle network that would encourage short trips between the Route 9W corridor and iPark 87 site to be made by bicycle. Furthermore, there may be opportunities to explore bike share opportunities at key locations throughout the corridor, such as near bus stops or at major shopping destinations. The FHWA notes that bike share stations and bike racks are eligible amenities as part of its Active Transportation Infrastructure Investment Program (ATIIP). As such, bicycle accommodations are included in the long term corridor vision.

Long Term Corridor Vision

While the above improvements will result in improved multi-modal mobility and safety, input from the public and study advisory committee indicates a desire for a comprehensive corridor vision with the potential to transform Route 9W from an auto-centric corridor to a vibrant commercial destination. As such, the following long term vision was developed to encompass a series of enhancements that prioritize multi-modal mobility including bicycle, pedestrian, and transit improvements, access management, streetscape enhancements, and land use considerations. The vision includes improved signage and wayfinding, street furniture (benches, trash bins), electric vehicle (EV) infrastructure; improved, uniform traffic signals for improved visibility and aesthetics.

Roadway Widening

In order to achieve the vision of a truly multi-modal corridor that can accommodate existing traffic, pedestrians, bicycles, and public transit, it is necessary to widen the Route 9W corridor. Figure 3.9 shows the proposed cross-section that includes an approximate 20-foot widening to accommodate expanded sidewalks on both sides of Route 9W as well as separated bike lanes that are raised to be at grade with the adjacent sidewalks. The cross-section also includes a raised center median that can accommodate tree plantings and streetscaping elements, as shown in plan view in Figure 3.10. It is noted that several locations along the Route 9W corridor have the potential to be impacted by the widening, involving considerations for property and parking adjustments. Preliminary estimates show that 162 parking spaces could be lost between the interchange and Ulster Avenue. There will also be substantial utility relocation implications.

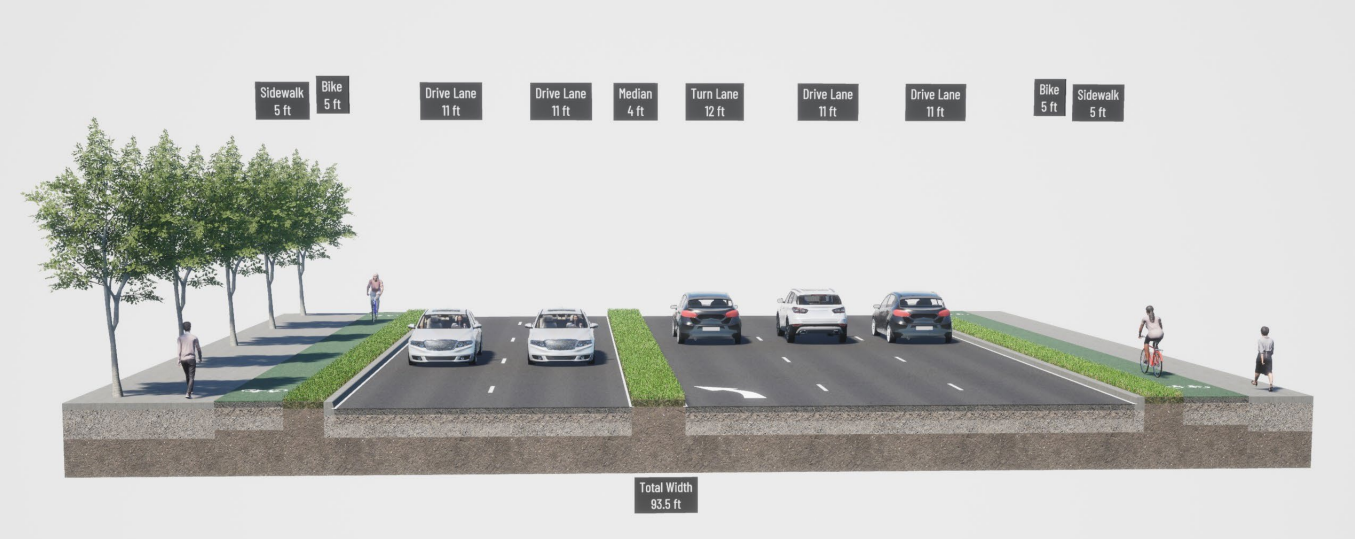


Figure 3.9: Route 9W Long Term Vision Cross-Section

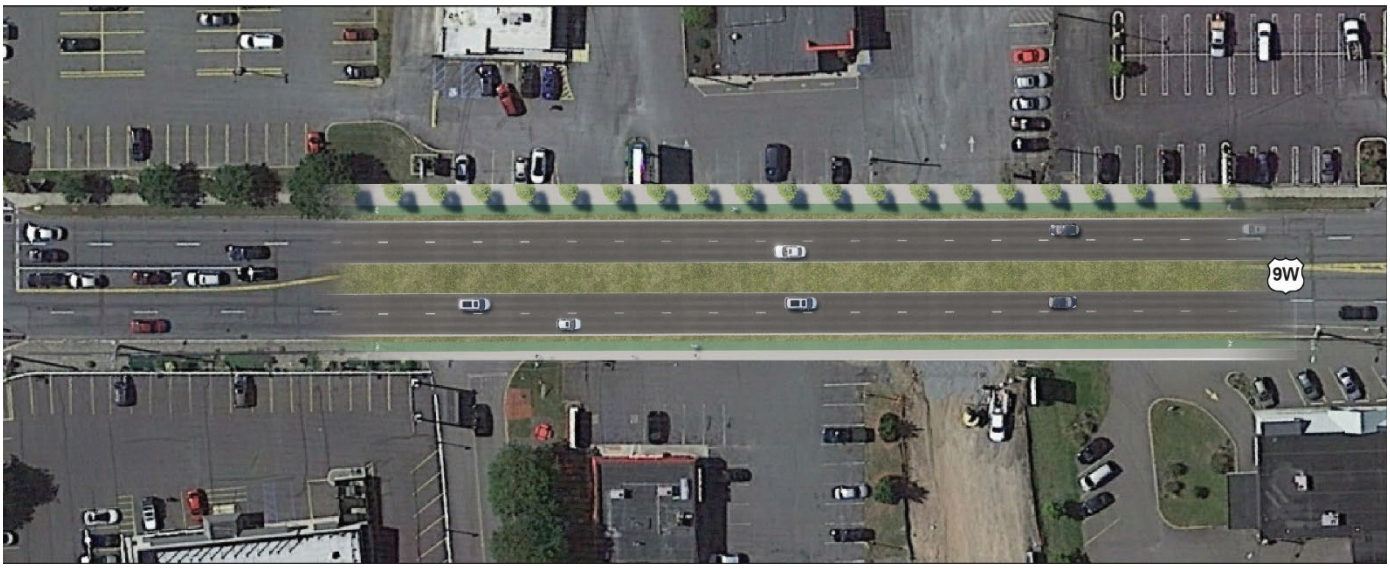


FIGURE 3.10: ROUT 9W LONG TERM VISION PLAN VIEW

Public Transit

While the above figures show the bicycle and pedestrian benefits of widening the Route 9W corridor, the vision also accounts for future transit operations. Specifically, while current transit operations route buses off of the Route 9W corridor to serve destinations via John M. Clark Drive and Frank Sottile Boulevard, this routing plan is inefficient and would benefit from the provision of transit infrastructure on Route 9W. Specifically, additional time spent on vehicles circulating through parking lots and side streets results in lower frequency service and longer overall travel times. As such, the vision includes provisions for signalized bus turnouts that consist of a short bay constructed at a bus stop that allows the bus to exit the travel lane before loading or unloading passengers as shown in Figure 3.11. This infrastructure improvement will enable more direct bus routing resulting in potential increases to frequency and a reduction in passenger travel time between the Route 9W corridor and City of Kingston.

It is noted that while bus turnouts provide the benefit of improving traffic flow, research indicates that when traffic volumes exceed 1,000 vehicles per hour, turnouts result in excessive delay for buses trying to re-enter traffic, and are therefore not recommended without additional design considerations.[2] However, given the nature of the Route 9W corridor, bus turnouts could be an effective measure if implemented at a nearside bus stop (i.e. before the bus crosses through the intersection) in conjunction with a queue jump phase at a signalized intersection which would allow the bus to re-enter traffic. Data from the transportation research board indicates that construction of queue jumps can result in a reduction in transit delays ranging from three to 17 percent. Likewise, bus turnouts can reduce average vehicle delay by up to 50 seconds[3]. This type of improvement could be implemented in the future should UCAT decide to operate along Route 9W to serve businesses in the corridor.

[2] TCRP Report 19: Guidelines for the Location and Design of Bus Stops, Transportation Research Board (1996).
[3] TCRP Report 19: Guidelines for the Location and Design of Bus Stops, Transportation Research Board (1996).

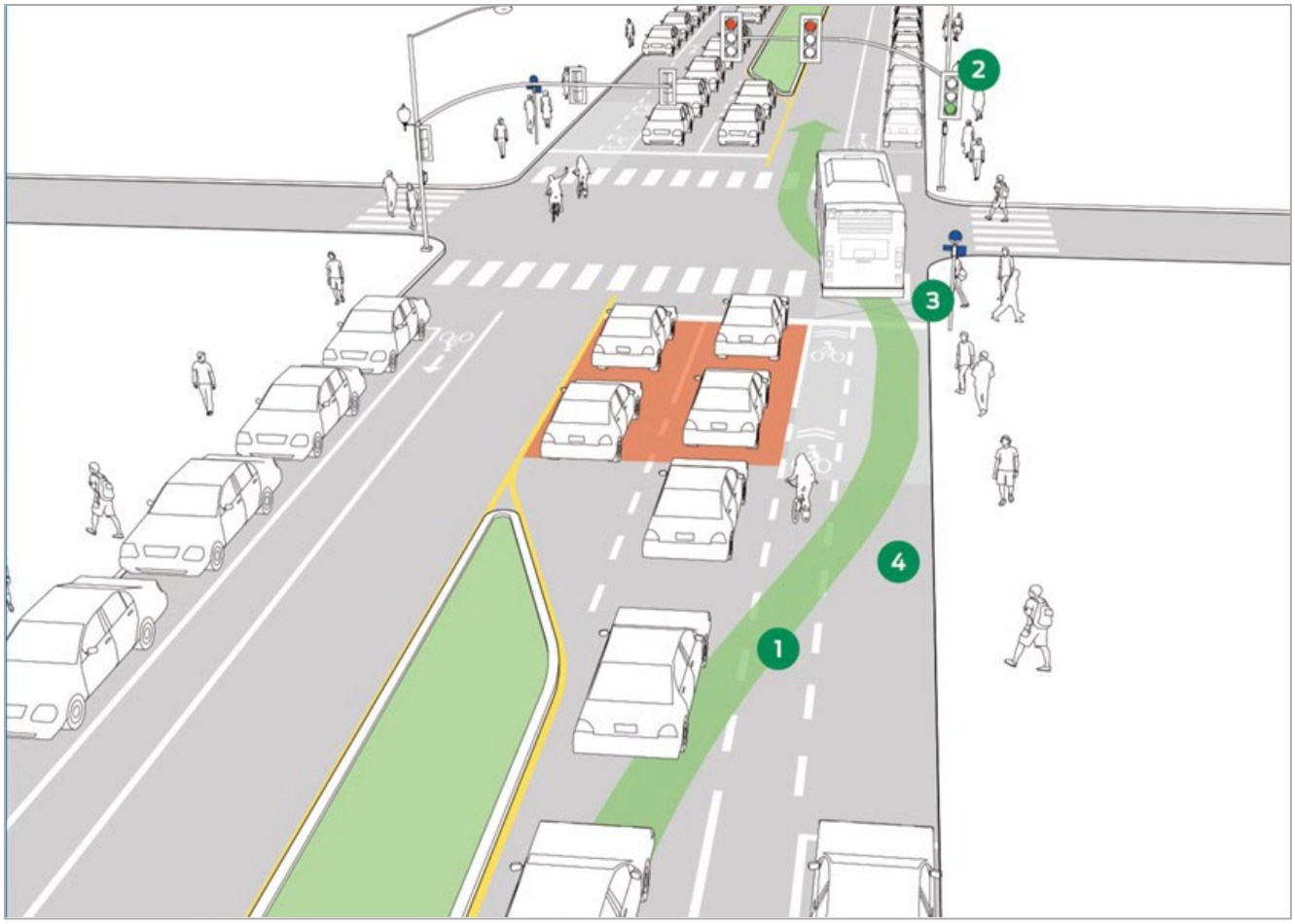


FIGURE 3.11: EXAMPLE NEARSIDE BUS PULL OUT WITH QUEUE JUMP

Pedestrian Bridge

Situated on a hill, the Hudson Valley Mall presents an opportunity for future redevelopment on the east side of Route 9W, while iPark 87 is developing on the west side of the CSX rail line. Connecting these major generators and the Route 9W corridor in the middle with a skyway would dramatically improve east-west multi-modal connectivity in the study area and overcome the challenges of accessing the corridor to/from these nodes. Specifically, incorporating a pedestrian bridge provides a grade separated crossing across the railroad and busiest section of the Route 9W corridor in order to connect two future nodes of mixed-use development. In addition to the safety benefits of the grade separated crossing, the pedestrian bridge would provide a more direct route for bicycles and pedestrians to access businesses on Route 9W, which would incentivize shorter trips to be made using non-motorized modes, thus reducing potential traffic congestion and pollution. While the specific location of the pedestrian bridge would be determined as sites on the west side of the railroad tracks are developed, the design should consider providing street-level access to Route 9W in addition to a direct connection to the Hudson Valley Mall.

FIGURE 3.12: EXAMPLE PEDESTRIAN BRIDGE

Streetscape and Green Infrastructure

In addition to providing improved bicycle, pedestrian, and transit accommodations, the corridor vision includes streetscape and green infrastructure treatments that soften the corridor's appearance. The vision plan calls for the removal or relocation of overhead utilities to minimize conflicts within the ROW to accommodate the potential for future roadway reconstruction activities and beautify the corridor through the planting of street trees. This will not only frame and distinguish street edges from sidewalks but also reduce the need for extensive drainage infrastructure. The increased tree canopy provides protection from rain, sun, and heat while also contributing to lowering urban air temperatures and mitigating the urban heat island effect. Beyond its environmental benefits, the addition of greenery creates a heightened sense of pedestrian security. Green streetscape improvements can also serve as interventions to manage stormwater. Rain gardens, bioswales, and permeable pavement treatments can enhance aesthetics while mitigating stormwater runoff and roadway flooding.

Speed Management

Input from the study advisory committee and public indicated concerns with vehicle speeds entering the Route 9W corridor from the north. Specifically, north of Bread Alone, Route 9W has a posted speed of 55 mph which transitions to 45 mph in the vicinity of the Central Hudson Facility. As the character of the Route 9W corridor continues to change with additional development to the north, posted speed limits should be evaluated to determine if the speed change zone should be relocated further north, and or combined with gateway features to message the change in character and need for lower speeds. Figure 3.13 illustrates a typical median treatment that can be utilized in transition zones to calm traffic and inform drivers in character from rural to urban environments. In addition to traffic calming treatments, roadway congestion is also affected by speed limit changes. Slower vehicle speeds along a corridor decreases space between vehicles, thus increasing the overall capacity of a roadway. While this may appear to increase congestion, it actually permits more vehicles to travel along a roadway due to a higher density of vehicles.[4]

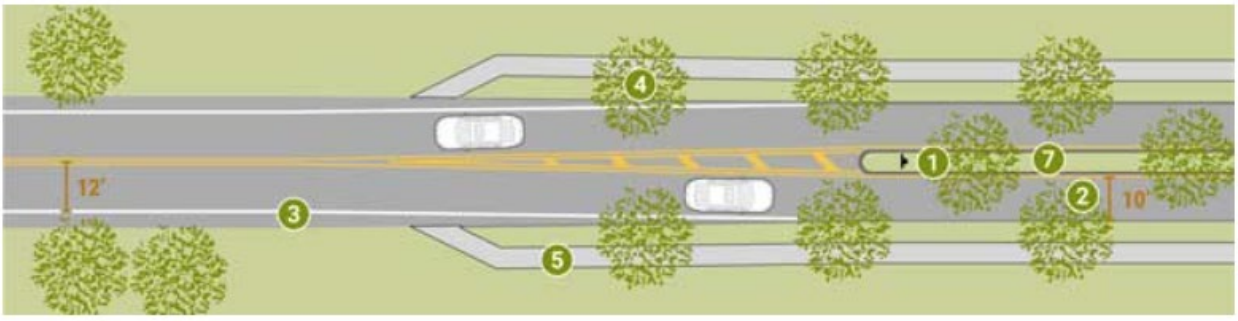


FIGURE 3.13: EXAMPLE TRANSITION ZONE GATEWAY TREATMENT

Access Management

Beyond the above concepts to improve the Route 9W corridor for all users, additional access management techniques and policies could benefit the future of the corridor by promoting an environment that manages vehicle movements to limit future congestion and reduce reliance on vehicle travel. Although there is limited developable land, properties along the corridor may eventually be redeveloped, providing an opportunity to implement new access management and land

[4] FHWA Active Traffic Management: The Next Step in Congestion Management (2007).

use policies that will shape the future corridor in a manner that limits congestion and promotes multi-modal access.

Access management can improve traffic flow and reduce crash risk on roadways like the Route 9W corridor by planning and designing for the orderly control of where vehicles enter of leave the roadway. Access management measures such as limiting new driveways, considering restrictions to certain vehicle movements (such as limiting to right-in/right-out), reducing the existing driveway density, and promoting parcel interconnections to create shared access driveways could be implemented during site plan review as properties along the corridor are developed/redeveloped. Likewise, future developments should consider driveway placement away from existing intersections so as to limit queuing impacts, and attempt to develop cross connections to gain access at existing traffic signals.

FIGURE 3.14: ADAMS FAIRACRE FARMS/ GRANT AVENUE CONNECTOR CONCEPT

An example of this type of access management would be to connect the Grant Avenue and Adams Fairacre Farms signals via a connector road that runs behind the Aqua Jet Pools and Jolly Cow properties as shown in Figure 3.14. This proposed connector road would allow customers to utilize the existing signals, eliminating the need for left turns at mid-block locations. Likewise, the new connector road could serve as the primary access for these businesses, enabling driveways along Route 9W to be removed or restricted to right-in/right-out without limiting access. This would provide a benefit to pedestrians in the corridor and also allow for streetscape improvements. Further, the new connector road would help shape future development patterns and limit traffic impacts by allowing for a denser road network.

There is also potential for improved access management on Route 9W at the intersection with Lake Road and Carle Terrace. In its current configuration, Lake road intersects Route 9W at an acute angle with a wide curb cut that is shared with the parking lot of the Difference Hair Salon and Carle Terrace (south). The existing design fails to clearly define the space, leading to confusion and conflicts

between vehicles and pedestrians. As such, access could potentially be consolidated by extending Carle Terrace (north) to intersection Route 9W and restricting access to Route 9W from Lake Road and Carle Terrace (south) as shown in Figure 3.15. This type of improvement could also be applied at Tuyten Bridge Road to create a more grid-like street network.

Another opportunity to create cross-connections and develop a denser street grid is to extend Anaconda Drive west of the CSX rail line to connect Katrine Lane to Leggs Mills Road. This connection was previously proposed by Central Hudson and would improve access to and from the facility via the existing Leggs Mills Road signal.

FIGURE 3.15: LAKE ROAD ACCESS MANAGEMENT CONCEPT

FIGURE 3.16: PREFERRED PLANNING FOR CORRIDORS, ULSTER COUNTY DESIGN GUIDE

Land Use Considerations

In addition to the above access management strategies, additional land use controls could also be implemented to ensure that changes to the built environment align with the corridor goals. For instance, while Route 9W is the Town's primary commercial center, allowing mixed-use development that includes moderate density housing could minimize future congestion in the corridor by allowing retail trips to be made by walking and providing opportunities for retail workers to live closer to jobs. Likewise, during the site plan review process, measures can be taken to promote walkability such as locating parking behind buildings rather than along property frontages, thus eliminating the need for pedestrians to cross parking lots in order to access their destination.

The Ulster County Design Guide categorizes land use types and gives recommendations to integrate growth with best-practice design details. Several of these types are useful references for the Route 9W study area. When developing a commercial corridor, for instance, standard practice leaves the corridor with poor connections to nearby residential areas. Commercial access is mainly by car, with

large parking lots and insufficient sidewalks or crossings for pedestrian activity. Instead, considerations should be taken during development to provide connections that minimize traffic, differentiate parking lots, and prioritize pedestrian access. Zoning regulations should also be carefully reviewed to ensure provision for a mix of uses. With intention, commercial corridors can be developed in ways that provide connectivity and encourage diverse uses and transportation modes.
Located at the far edge of the City of Kingston, the Route 9W study area could also benefit from strategies that work to draw out higher density development from a nearby downtown. Standard development practice in downtown edges treats these areas as separate and unconnected, prioritizing car-based use and building out residential areas in isolation rather than considering complete neighborhoods. By facilitating mixed-use development, accounting for pedestrian safety by providing continuous sidewalks, and using landscaping to integrate new parks or off-street multi-use paths, formerly unintegrated city edges can become a functioning extension of their neighbors. Figure 3.17 shows this continuation.

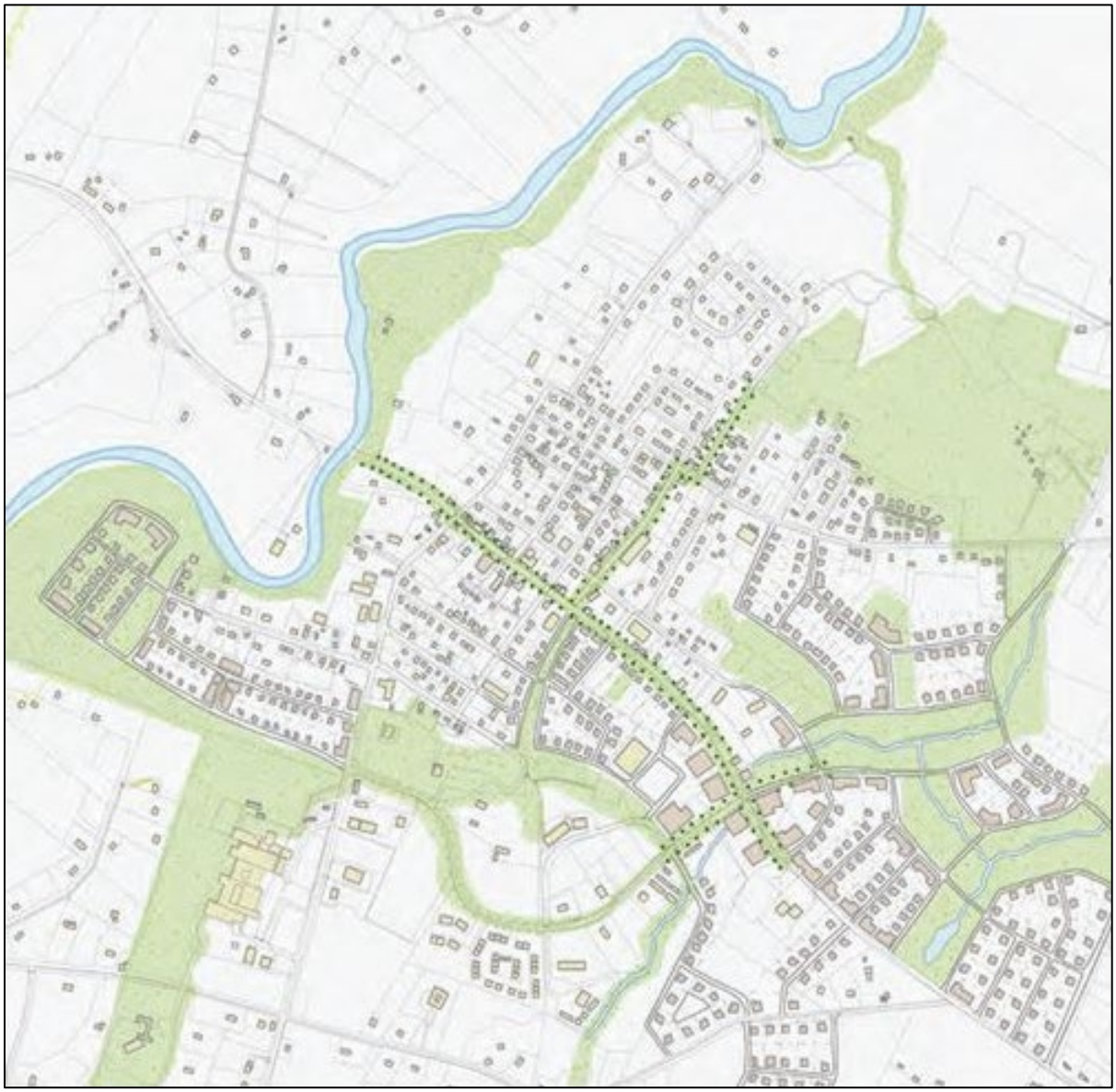


FIGURE 3.17: PREFERRED PLANNING FOR EDGES, ULSTER COUNTY DESIGN GUIDE

These strategies should be used as references both when considering future development and reimagining commercial development. While it may not be possible to retrofit existing areas all at once, the Design Guide shows actions that can add up to a more accessible, uniform urban transportation environment.

Public Input on Improvement Concepts

The second outreach campaign occurred during the fall of 2024. The purpose of this campaign was to specifically solicit feedback from the public regarding proposed interventions along the corridor that resulted from the previous year of work and concept development. At this point, the draft report was complete and summarized on the project website for public comment. Like the first campaign, the second outreach consisted of a pre-recorded JAYOP meeting that was paired with an online survey. Flyers were distributed and the public comment period was publicized by UCTC and the Town (Figure 7). The JAYOP video and survey were both linked on the project site.

The second survey was somewhat different from the first because it asked about specific improvements proposed for the corridor. The survey format consisted of a description of the proposed improvement, a graphic/visualization of the proposed improvement, and a single multiple-choice question asking how the participant felt about the concept. Overall, the survey was successful and garnered 76 responses, three more than the previous survey. Additionally, public sentiment regarding the concepts was quite positive (Figure 3.18; Table 3.1). Every concept received a positive score greater than 50%, with an average positive rating of 69% (Figure 3.18; Table 3.1). The concepts with the highest positive rating were in regards to corridor-wide traffic signal operations (81% positive; Q3) and the creation of a single shared access point between Burger King and Key Bank along the west side of Route 9W (80% positive; Q13). All public comments were considered and shaped the recommendations in the final report. For example, a preliminary concept included a pedestrian connection between Riesley Street and Dena Marie Street, which received negative feedback, and was therefore removed from the final recommendations in Chapter 4. For a more detailed summary of public engagement efforts, please see Appendix H.

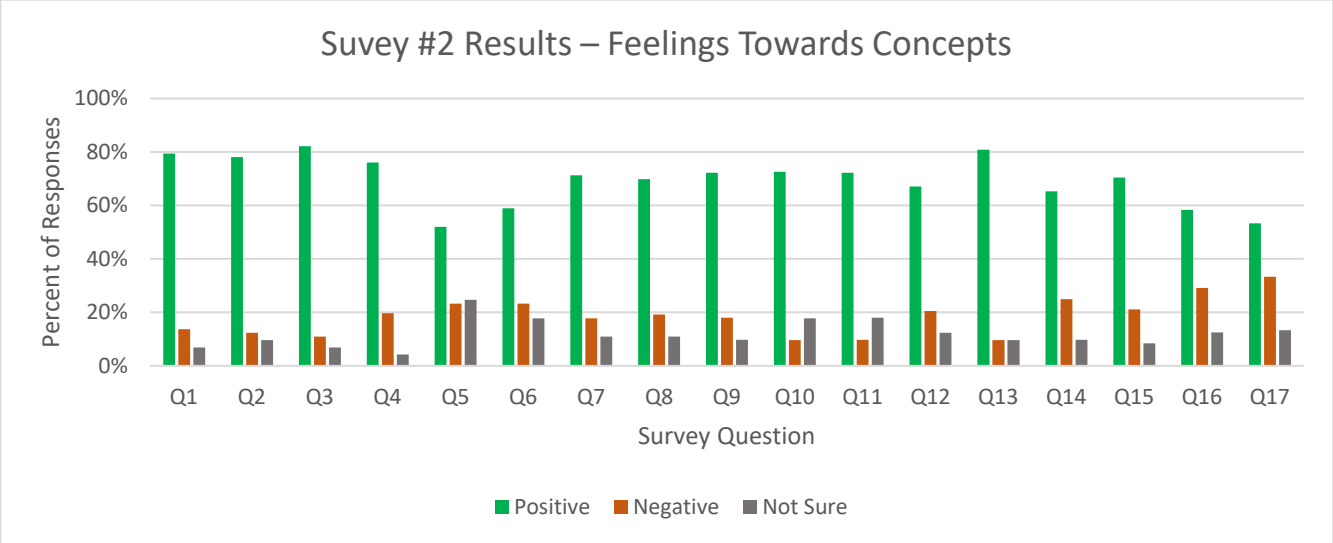


Figure 3.18. Responses from the second survey indicating general support for each presented concept.

Question Number	Improvement Number	Improvement Name	Improvement Type
Q1	N/A	Pedestrian-Friendly Intersections	Corridor-Wide
Q2	N/A	Pedestrian Connection	Corridor-Wide
Q3	N/A	Traffic Signal Operations	Corridor-Wide
Q4	1	Corridor Vision	Long-Term
Q5	2a	Study Alternate Interchange Concept	Long-Term
Q6	2b	Signalize the eastbound Route 209 to southbound Route 9W ramp intersection. Construct sidewalk on west side of Route 9W to connect areas north and south of the interchange	Short-Term
Q7	3	Promote public transit	Long-Term
Q8	4	Consider future land uses	Long-Term
Q9	5a	Access management	Short- and Long-Term
Q10	5b	Extend Anaconda Drive to connect Katrine Lane and Leggs Mills Road	Location-Specific
Q11	5c	Construct access management improvements in the vicinity of Lake Road to channelize traffic, reduce pedestrian crossing distances, and minimize conflict points	Location-Specific
Q12	5d	Construct connector road from Adams Fairacre Farm to Grant Avenue behind Aqua Jet Pools and The Jolly Cow to improve access management	Location-Specific
Q13	5e	Coordinate with property owners to establish a single point of shared access between Burger King and Key Bank	Location-Specific
Q14	5f	Provide a path connection between Riesley Street and Dena Marie Street to promote access between neighborhood and retail communities	Location-Specific
Q15	6	Explore options to manage speeds entering corridor from the north	Long-Term
Q16	7	As iPark 87 and the Hudson Valley Mall redevelop, consider a skyway connection to improve pedestrian access between existing retail and future residential development	Corridor Vision
Q17	8	Construct a roundabout at Route 9W/Ulster Avenue/Miron Lane and modify circulation to improve access to businesses on the west side of 9W	Long-Term

TABLE 3.1. SURVEY CONCEPT REFERENCE TABLE (SEE FIGURE 1.8)

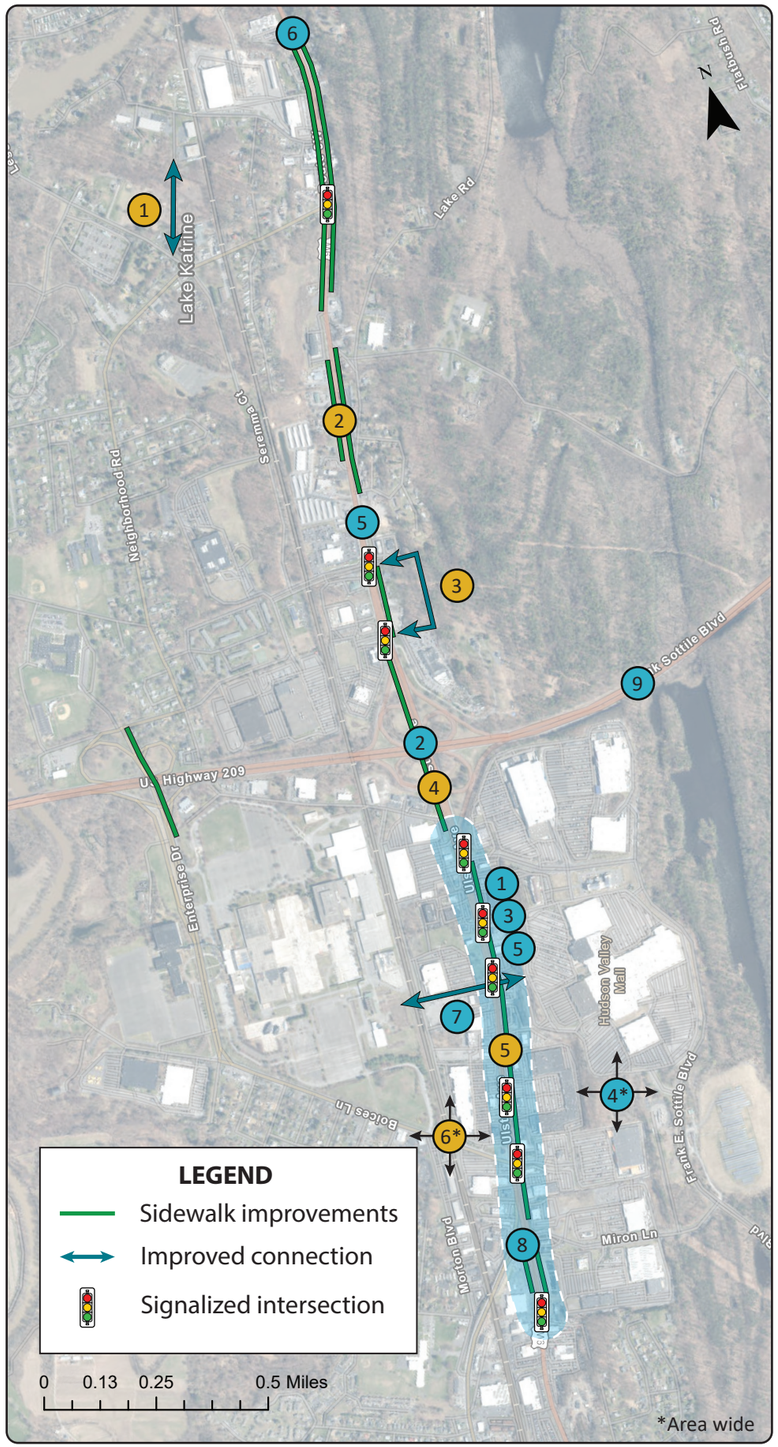
CHAPTER 4 – Conclusions and Recommendations

The Route 9W corridor is one of the region's largest commercial retail destinations carrying the commensurate traffic demand, while undergoing a transformation with anticipated mixed-use development. As such, the transportation network must serve a variety of users and transportation modes including vehicles, pedestrians, bicycles, and public transit. A fundamental objective of this study was to develop recommendations that address peak hour traffic congestion, safety concerns, and multi-modal connectivity, while considering plans for future development. The technical studies show that incorporating the proposed recommendations will support efforts by UCTC, the Town, and NYSDOT to improve traffic safety and operations for all users.

The Plan

The plan identifies a series of transportation improvements to transform the corridor into a vibrant and functional destination that can accommodate all users. The addition of pedestrian facilities including sidewalks along Route 9W, marked crosswalks and enhanced pedestrian signal phasing, will make the corridor more attractive and welcoming to non-motorized users. Likewise, the plan identifies several improvements to address traffic congestion and safety including signal optimization, construction of a roundabout, raised medians, a new connector road/parcel connections and other access management techniques, and changes to the Route 9W/Route 209 interchange. The overall study recommendations, are shown on Figure 4.1 and are described in further detail below. In addition to corridor-wide improvements, the plan recommends location specific enhancements beginning at the north end of the study area and continuing south. The numbering corresponds to the north to south convention on Figure 4.1 and does not represent priority order.

1 As development to the north continues, the area will benefit from a denser roadway network which provides alternative access to Route 9W. Specifically, the Town should act on the previously proposed Anaconda Drive extension to connect Katrine Lane and Leggs Mills Road. This roadway connection will improve access management by allowing businesses to the north, including Central Hudson, to utilize the existing Leggs Mills Road traffic signal, reducing the need for left turn movements to and from the driveways located on Route 9W, resulting in safety and operational benefit to motorists and pedestrians alike.



Corridor Wide Improvements

Pedestrian Friendly Intersections: Add marked crosswalks, curb ramps, and pedestrian push buttons and signal heads at existing signalized intersections.

Pedestrian Connections: Construct sidewalks to fill gaps in the existing network.

Traffic Signal Operations: Optimize signal coordination to reduce vehicle delay and travel times. Consider adaptive traffic signal control. Upgrade signal phasing to provide LPIs systemwide.

Short Term Improvements

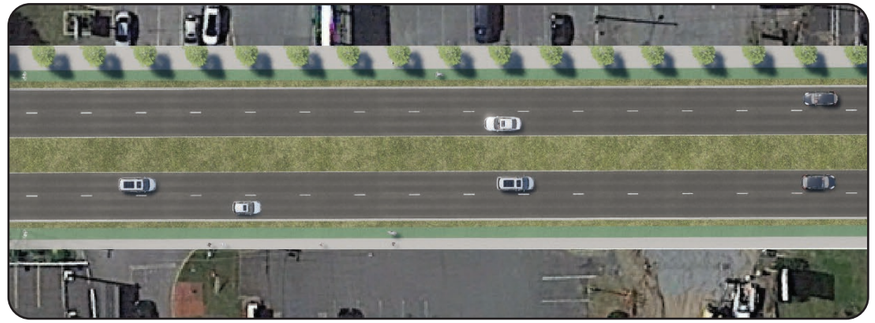
1. Extend Anaconda Drive to connect Katrine Lane and Leggs Mills Road.
2. Construct access management improvements in the vicinity of Lake Road to channelize traffic, reduce pedestrian crossing distances, and minimize conflict points.
3. Construct connector road from Adams Fairacre Farm to Grant Avenue behind Aqua Jet Pools and The Jolly Cow to improve access management.
4. Signalize the eastbound Route 209 to southbound Route 9W ramp intersection. Construct sidewalk on west side of Route 9W to connect areas north and south of the interchange.
5. Coordinate with property owners to establish a single point of shared access between Burger King and Key Bank.
6. Explore opportunities to establish pedestrian access between neighborhoods and retail corridor.

Long Term Improvements

1. Reconstruct Route 9W to accommodate corridor vision of raised separated bike lanes on both sides of Route 9W, wide sidewalks, raised median, and streetscape elements.
2. Study the potential for a Single Point Urban Interchange or other layout with reduced footprint.
3. Incorporate feasbile roadway improvements to facilitiate transit (bus pull outs, queue jumpers, bus stops and shelters).
4. Incorporate best practices as outlined in the Ulster County Community Design Manual during site plan review to transform the corridor.
5. Pursue access management improvements such as limiting curb cuts and promoting shared access.
6. Explore options to manage speeds entering corridor from the north.
7. As iPark 87 and the Hudson Valley Mall redevelop, consider a skyway connection to improve pedestrian access between existing retail and future residential development.
8. Construct a roundabout at Route 9W/Ulster Avenue/Miron Lane and modify circulation to improve access to businesses on the west side of 9W.
9. Consider extending Frank Sottile Boulevard over Route 199 consistent with the 2006 Final Environmental Impact Statement (FEIS) to improve traffic flow in and around the Town's primary retail center on Route 9W.

Suggested Improvements

(Not in Priority Order)



2 Continuing south, the Plan recommends access management improvements to Tuyten Bridge Road, Lake Road, and Carle Terrace. These improvements include a minor roadway realignment at the Tuyten Bridge Road/Route 9W intersection, modifications to the Lake Road/Tuyten Bridge Road intersection, and reconfiguration of the Route 9W/Lake Road/Carle Terrace intersection, all of which will result in a unified streetscape that clearly defines pedestrian and vehicle space. Realignment of the Route 9W/Tuyten Bridge Road will shorten the crossing distance for pedestrians traveling along Route 9W and improve sight lines for motorists approaching Route 9W on Tuyten Bridge Road. Likewise, modification to the Tuytenbridge Road/Lake Road intersection to remove the eastbound right turn slip lane will create a traditional four-leg intersection potentially operating under all-way stop sign control that matches driver expectations and improves pedestrian comfort by reducing the overall pavement width and number of conflict points. Similarly, reconfiguring the Route 9W/Lake Road/Carle Terrace intersection to provide a single point of access to Route 9W at Carle Terrace and channelize access to the adjacent businesses will greatly reduce the number of conflict points and provide for a more pedestrian friendly environment without limiting access to the existing businesses and neighborhood.

FIGURE 4.2: TUYTEN BRIDGE ROAD/LAKE ROAD/CARLE TERRACE ACCESS MANAGEMENT IMPROVEMENTS

3 The Plan also recommends construction of a connector road between Adams Fairacre Farms and Grant Avenue to improve access to the businesses on the east side of Route 9W. This improvement would connect the two existing signals on Route 9W, allowing businesses to provide access via the connector road and eliminate the need for uncontrolled left turns to and from Route 9W. In addition to limiting the number of curb cuts on Route 9W and enabling short term streetscape and sidewalk enhancements, construction of the connector road would provide long term benefits by shaping future development in a sustainable manner that aligns with the Ulster County Community Design Manual.

4 The analysis and public input indicate that the Route 9W/Route 209 interchange experiences peak hour traffic congestion and is a barrier for pedestrian access between the northern and southern portions of the Route 9W corridor. As such, the Plan recommends signalizing (three-color signal) the Route 209 eastbound to Route 9W southbound off-ramp and constructing a sidewalk on the west side of Route 9W. In addition to improving vehicle operations on the

ramp as well as downstream segment of Route 9W between the ramp and Frank Sottile Boulevard, ramp signalization will provide a controlled pedestrian crossing, which combined with additional sidewalks and marked crosswalks on the remaining three ramps will fill the gap in the existing pedestrian network and facilitate north/south pedestrian access. Figure 4.3 shows the proposed sidewalk and pedestrian crossings in plain view.

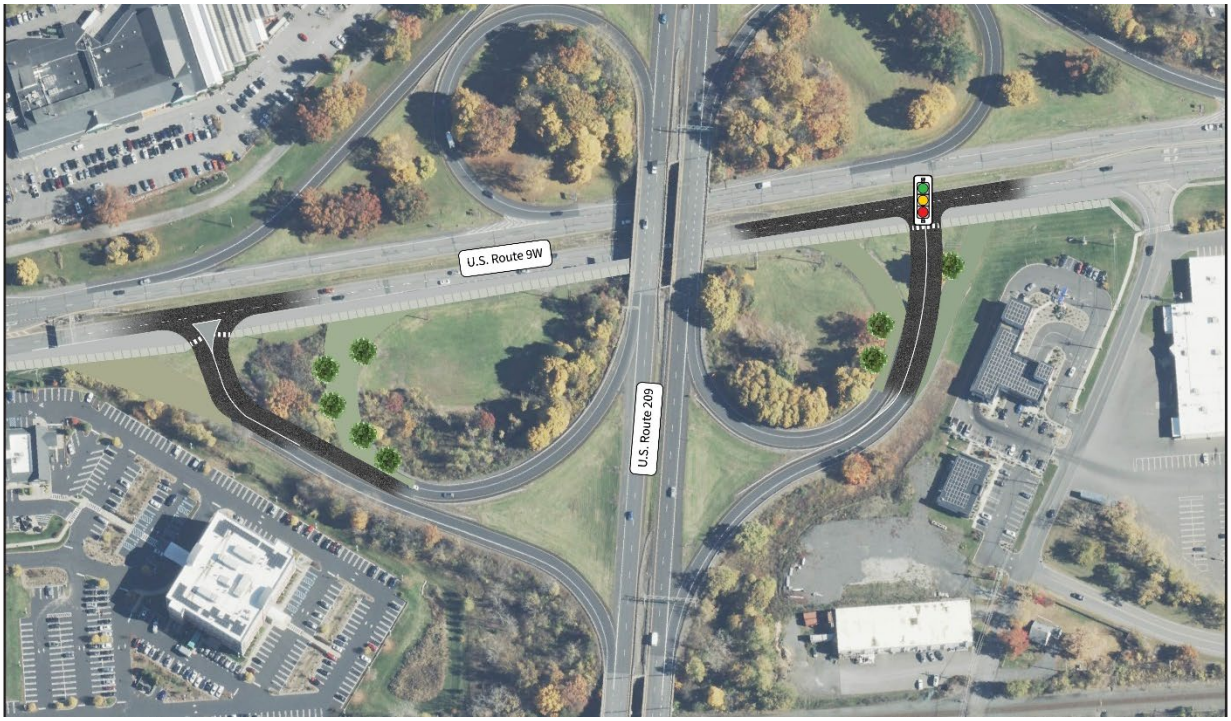


FIGURE 4.3: EASTBOUND RAMP SIGNALIZATION

5

Similarly, the plan recommends coordinating with property owners to establish a single point of shared access between Burger King and Key Bank. In its current form, two full access driveways are located on either side of the business signs which are located on a short 25 foot-long, 10 foot-wide island. As such, the current design fails to delineate pedestrian and vehicle space, resulting in motorist confusion around the island and a longer than necessary pedestrian crossing. Therefore, consolidating to a single point of access could reduce the overall pavement width, improve pedestrian comfort, reduce conflicts and channelize traffic.

FIGURE 4.4: CHANNELIZED DRIVEWAY

6 Identify potential connections between neighborhoods and commercial areas of the corridor. Neighborhood interconnectivity is a fundamental goal of pedestrian-focused transportation planning. Well connected neighborhoods promote walking and result in fewer vehicle trips. While this is also a goal of the corridor-wide improvements, there are likely several key areas that could benefit from pedestrian connections in the short term. The Town should consider identifying these locations and working with the local community to establish pedestrian connections where supported.

FIGURE 4.5: EXAMPLE OF PEDESTRIAN CONNECTION BETWEEN APARTMENT COMPLEX AND COMMERCIAL AREA. EVEN SIMPLE CONNECTIONS LIKE THIS CAN REDUCE RELIANCE ON CARS AND ENCOURAGE PEDESTRIAN ACTIVITY.

FIGURE 4.6: EXAMPLE OF PEDESTRIAN CONNECTION BETWEEN NEIGHBORHOOD AND COMMERCIAL AREA

Corridor-wide Improvements

Beyond these location specific recommendations, the plan identifies several corridor-wide improvements that could be implemented in the short term as outlined below:

Pedestrian Friendly Intersections: Marked crosswalks, curb ramps, and pedestrian push buttons and signals should be present at all existing signalized intersections in the Route 9W corridor to ensure pedestrian connectivity. Furthermore, splitter islands to channelize right turns, such as those at the Hudson Valley Mall entrances should be removed because they impede pedestrian crossings, yet provide little additional benefit to vehicles without the addition of a right turn lane. In addition to improving pedestrian safety, these treatments will make the corridor more accessible, promote walking, and provide a critical improvement for individuals without access to a vehicle.

Pedestrian Connections: The existing sidewalk network has numerous gaps that limit pedestrian access. The plan recommends constructing sidewalks to fill these gaps and improve pedestrian connectivity, allowing all users regardless of travel mode access to economic opportunities in the corridor.

Traffic Signal Operations: The analysis indicates an opportunity to optimize traffic signal coordination in the corridor to reduce vehicle delay and travel times. While the existing infrastructure is capable of providing traditional signal coordination which would solely require an update to the timing parameters, NYSDOT may wish to further explore opportunities to transition to adaptive traffic signal control. An ATMS can also automatically detect and prioritize emergency vehicles at corridor intersections which can assist first responders and decrease response times. The NYSDOT has already programmed PIN 8816.25 to address technical needs at the traffic signals to improve operations. Incorporating emergency pre-emption as part of PIN 8816.25 should be explored as well. In addition to changes to the signal coordination to reduce vehicle delay, the plan also recommends upgrades to the signal phasing to provide LPIs system-wide that provide pedestrians added safety benefits.

Long Term Improvements

In addition to the short term location specific and corridor-wide improvements, the plan includes several long term recommendations.

1. Roadway Reconstruction: The long term vision for the corridor requires reconstruction of Route 9W to accommodate raised separated bike lanes, wide sidewalks, a raised center median, and streetscape enhancements that beautify the corridor, including relocation of overhead utilities to the rear of lots to allow more space for pedestrian facilities and amenities. Cumulatively these improvements can transform Route 9W into a complete street that improves safety, accommodates all modes of transportation, and supports economic development as illustrated in Figure 4.6.

FIGURE 4.7: RENDERING OF ROUTE 9W VISION PLAN

2 Study Interchange Reconfiguration: The existing clover leaf interchange in its current form with higher speed free flow ramps is out of character with lower speed nearby signalized intersections and the remainder of the Route 9W corridor, and also poses a challenge for multi-modal connectivity. The plan recommends further study of interchange options when the existing structures that carry Route 209 over Route 9W reach the end of their useful life. At that time reconfiguring the interchange as a single point urban interchange (SPUI) or other layout with reduced footprint and lower speeds. could be explored to determine if the benefits of an alternative interchange configuration outweigh the costs.

3 Promote Public Transit: Current transit operations are inefficient due in part to lack of infrastructure on Route 9W. The plan recommends incorporating feasible roadway improvements that can support transit such as bus pull out lanes, queue jumpers, bus stops and shelters. These improvements could also serve to facilitate more frequent, faster transit service between Kingston and the Route 9W commercial area.

4 Consider Future Land Uses: Many of the challenges that the Route 9W corridor currently faces are the result of a mismatch between the existing transportation network, land uses, and site

design. Much of the corridor consists of retail buildings with large setbacks and vast parking lots adjacent to the Route 9W, which detracts from the overall pedestrian friendliness and attractiveness of the corridor. The plan recommends incorporating best practices as outlined in the Ulster County Community Design Manual during the site plan review process to transform the corridor over time into a vibrant retail destination.

5 Access Management: Numerous curb cuts add unnecessary conflict and detract from the overall function and attractiveness of the corridor, decrease pedestrian comfort, and contribute to traffic congestion by increasing friction through the corridor. As such, the plan recommends pursuing access management improvements as properties in the corridor redevelop. This overarching recommendation is in addition to the specific access management concepts that were discussed above, when future land use changes may present opportunities to implement best practices related to access management. Typical access management measures include limiting curb cuts, restricting driveway access where possible, and promoting shared access.

6 Speed Management: Beginning at the north end of the Route 9W corridor, the plan recommends exploring options to manage speeds for traffic entering the corridor from the north. As development in the vicinity of Leggs Mills Road and northward continues, a speed limit reduction, coupled with gateway features should be considered to better align the transportation network and motorist behavior with the character of the corridor. These treatments could include a center median, lane and shoulder narrowing, and addition of speed feedback signs to inform drivers of their speed relative to the posted speed limit.

7 Skyway: Another pedestrian improvement the plan recommends is to work with developers to consider a skyway connection as the iPark 87 and Hudson Valley Mall sites redevelop. The example shown in Figure 4.7 is illustrative of how a new building constructed on the iPark 87 campus could incorporate a skyway that takes advantage of the existing topography to provide a grade separated pedestrian connection to the Route 9W corridor and Hudson Valley Mall. . This type of connection would provide a convenient method of direct access to job and retail opportunities that could encourage walking as a replacement for short vehicle trips. This skyway connection would provide a vastly improved pedestrian connection between iPark 87 and the Route 9W corridor, as compared to the use of Boices Lane and the need to cross the CSX railroad at-grade.

FIGURE 4.8: EXAMPLE SKYWAY CONNECTION

Roundabout: The safety assessment and public comments indicate that the segment of Route 9W between Boices Lane and Ulster Avenue/Miron Lane, including the two intersections, experience greater than average crash rates, and thus are a focus area for improvement. The plan recommends construction of a roundabout at the Route 9W/Ulster Avenue/Miron Lane intersection coupled with a raised median on Route 9W that extends between Ulster Avenue/Miron Lane and Boices Lane. The overall concept is shown on Figure 4.8 and includes modification to circulation to improve access to businesses on the west side of Route 9W as well as new sidewalk connections and crosswalks at the Route 9W/Ulster Avenue/Miron Lane intersection to improve pedestrian connectivity. The proposed concept will result in an overall reduction in vehicle delay and provide safety benefits for all users.

FIGURE 4.9: ROUTE 9W/ULSTER AVENUE/MIRON LANE ROUNDABOUT CONCEPT

IMPLEMENTATION

The study recommendations range from relatively low-cost short and mid-term improvements, as well as larger long-term considerations. Specifically, short and mid-term improvements that could be implemented within several years include signalization of the Route 209 eastbound to Route 9W southbound ramp, as well as corridor-wide traffic signal upgrades to improve coordination and provide pedestrian signals with LPI phasing, and intersection modifications to remove splitter islands and stripe crosswalks. In contrast, longer term projects such as reconstructing the Route 9W corridor to accommodate bicycle infrastructure and streetscape improvements, roadway realignments and extensions in the northern part of the corridor, and reconfiguration of the interchange would require additional coordination. It is recommended that for these projects, the Town work with the UCTC and NYSDOT to get these projects on the local and Statewide Transportation Improvement Program (TIP).

The following table (4.1) summarizes the implementation plan for short and medium term projects including opinions of probable cost. These planning level costs are preliminary order-of-magnitude opinions and should be reviewed and updated based on current year dollars at the time of any grant application, and should include major work items, contingencies, and design and construction inspection costs.

TABLE 4.1. IMPLEMENTATION PLAN AND COSTS

ID	Description	Partners	Cost (Thousands)	Implementation Timeframe
Location Specific Short/Medium Term Improvements				
1	Anaconda Drive Extension	Town	$1,500	Medium
2	Lake Road/Tuytenbridge Road Access Management	NYSDOT/Town/UCTC	$1,500	Medium
3	Fairacre Farms/Grant Ave Connector	Town/UCTC	$1,500	Medium
4	Eastbound Ramp Signal	NYSDOT	$1,000	Short
5	Burger King/Key Bank Access Management	NYSDOT / Private	$250,000	Medium
6	Riseley Street Connection	Town	$150	Short
Corridor Wide Improvements				
1	Pedestrian Friendly Intersections	NYSDOT	9 x $100K ea = $900	Short
2	Pedestrian Connections	NYSDOT	~ 4,000 LF w hardscape maintenance + ~ 9800 LF w grass maintenance = $2,000	Medium
3	Traffic Signal Operations	NYSDOT	PIN 8816.25 $1,000	Short

These elements could be incorporated with a number of long term elements as part of a larger funding application. Table 4.2 establishes four groupings of projects which may be considered for competitive grant applications.

TABLE 4.2 PROJECT GROUPING FOR FUNDING APPLICATIONS

Project	Elements	Opinion of Probable Cost (Millions)
Aldis to Boices	• Route 9W/Ulster Avenue/Miron Lane/ Roundabout	$10M
Boices to Frank Sottile Boulevard	• Route 9W Reconstruction • Raised Bicycle Lanes • Sidewalk and Streetscape Enhancements • Signal and Crosswalk Enhancements	$15M
Frank Sottile Boulevard to Adams Fair Acre Farms	• Interchange Reconfiguration • Pedestrian and Streetscape Enhancements	$40M
Adams Fair Acre Farms through Leggs Mills Road	• Sidewalk and Streetscape Enhancements • Access Management • Signal and Crosswalk Enhancements • Gateway	$3.5M
Ped Bridge	• ~ 1400 LF bridge	$10M

FUNDING

Below is a description of the available Federal, State and Local funding sources.

Federal

Discretionary Grants – The Bipartisan Infrastructure Law (BIL) contains a number of discretionary grant opportunities for which project sponsors can apply. These grants are awarded on a competitive basis based on project merit criteria outlined in the notice of funding opportunity (NOFO). One attractive grant option to fund improvements in the Route 9W corridor is the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant program, which provides funds ranging from $5 million to $25 million for innovative and collaborative projects that demonstrate significant local or regional safety, mobility and connectivity, environmental, economic, and quality of life benefits.

TIP – The Transportation Improvement Program (TIP) is a five-year capital improvement program that allocates federal highway funds to surface transportation projects that have been selected through the Transportation Council's planning process. The Ulster County Transportation Council updates the TIP every two to three years to maintain a current list of projects. Below are several federal funding sources typically found on the TIP:

- HSIP – Highway Safety Improvement Program funding is for projects designed to achieve significant reductions in traffic fatalities and serious injuries on all public roads.
- NHPP – National Highway Performance Program funding for projects that support progress toward achievement of national performance goals for improving infrastructure condition, safety, mobility on National Highway System (NHS) roadways. Route 9W is an NHS roadway (south of Route 209), and is therefore eligible for NHPP funding. NHPP eligible activities include roadway reconstruction, resurfacing, operational improvements (including traffic signal upgrades and computerized traffic signal control), safety improvements, and bicycle and pedestrian facilities.
- TA – Transportation Alternatives funding is a set-aside of funds under the Surface Transportation Block Grant (STGB) Program for on and off-road pedestrian and bicycle facilities, non-driver access to public transportation, and safe routes to schools. States have flexibility in how the TA program is administered and the New York State program is run through the state level TAP office.
- STBGP – Surface Transportation Block Grant Program funding provides flexible funding that may be used by states and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway or bridge on any public road, pedestrian and bicycle infrastructure, operational improvements, and transit capital projects.

State

- State Dedicated Funds – Programmed at the discretion of the NYSDOT.
- CFA/REDC – The Consolidated Funding Application is an efficient, streamlined tool to apply for State economic development funds. The application examines funding for transportation infrastructure from multiple State sources including NYSDOT.
- CHIPS – The Consolidated Local Street and Highway Improvement Program provides State funds to municipalities to support the construction and repair of highways on the State highway system. To be eligible for CHIPS funding, the project must be undertaken by a municipality (i.e. Town of Ulster), be for a highway-related purpose, and have a service life of 10 years or more.

Local

- Federal transportation programs typically require a 20% local match. The Town should plan to cover a portion of the project's cost through their general fund or bonding.

The Town of Ulster may adopt or formally acknowledge the findings of this Planning Study as a first step to pursue funding and ultimately to implement the recommendations of this study.