2026

Route 9 and 9D Planning Studies

Summary

DUTCHESS COUNTY
TRANSPORTATION COUNCIL
Better ways from here to there

DISCLAIMER

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Route 9 & 9D Planning Studies: Summary

Background

In 2023, the Dutchess County Transportation Council (DCTC) received requests from the Towns of Wappinger, Fishkill, and Poughkeepsie and the Village of Wappingers Falls to study the Route 9D corridor between Route 9 and I-84. The requests mentioned two primary issues: 1) heavy truck traffic and its impact on infrastructure, safety, and livability, and 2) an increase in overall traffic.

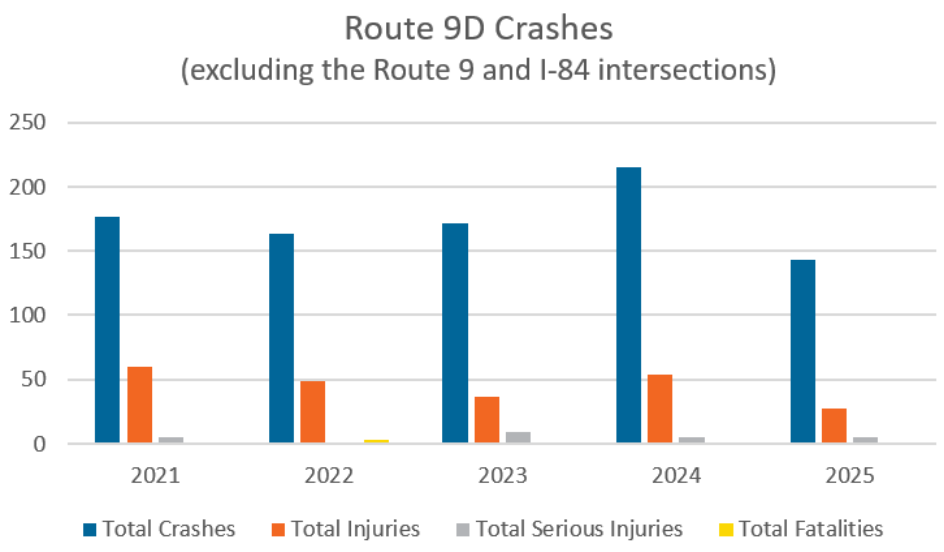
Overview

To address concerns raised by the municipalities, we led a multi-tiered assessment of the Route 9 and 9D corridors, focusing on truck traffic patterns, roadway infrastructure, safety, and traffic signal timing. While the municipalities' focus was Route 9D, operations on Route 9 affect traffic on Route 9D, and vice versa, which led us to look at both corridors. Our assessment included four components:

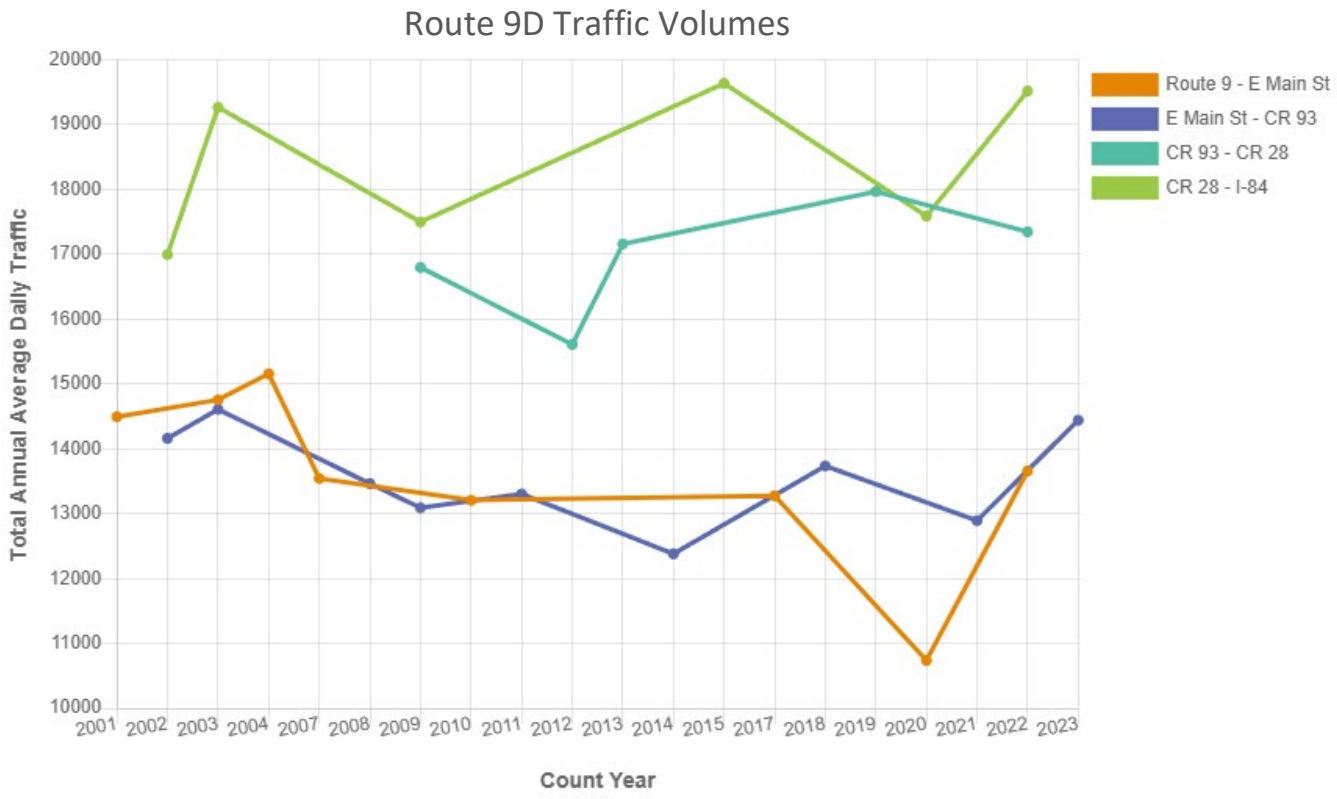
- Analysis of existing traffic levels and crash data to identify trends and safety hot spots (2023).
- Evaluation of truck origin-destination patterns to understand local and regional freight movement (2024).
- A detailed truck turning movement study to assess intersection constraints and potential improvements (2024).
- A traffic signal optimization study to identify opportunities to improve traffic flow and reduce congestion along critical segments of Route 9 and Route 9D (2025-26).

Existing Traffic & Crash Data (9D Corridor)

The 9D corridor is over seven miles long, under NYSDOT jurisdiction, and classified as an Urban Principal Arterial-Other, making it federal-aid eligible. Based on our most recent count data, traffic volumes range from about 14,000 vehicles a day in Wappingers Falls to 19,500 in Wappinger and Fishkill, with 3-4% being heavy vehicles. Overall, traffic volumes have stayed relatively flat over the past 20 years, though they declined during the pandemic and have since mostly returned to pre-pandemic levels (see chart below).



From 2021-2025, the 9D corridor between Route 9 and I-84 (excluding the I-84 and Route 9 intersections) experienced 870 crashes, with between 140 and 215 crashes per year (see chart above). There were a total of 25 serious injuries and six fatalities over the five years, though three of the fatalities occurred during the summer of 2022.



Heavy Truck Origin-Destination (O-D) Study

Working with the American Transportation Research Institute (ATRI), we conducted an Origin-Destination study of the Route 9 and 9D corridors from Poughkeepsie south to I-84 to determine where heavy trucks are traveling to/from and their relative volumes. The ATRI analysis used truck GPS data to study origin and destination patterns. Key findings include:

- Origin/Destination Trends: Most of the trips on Route 9 and 9D are local to southwest Dutchess.
- Truck Flows: Some trucks using Route 9 and 9D travel as far as California and Texas.
- Relative Volumes: Higher truck volumes occur during midday, peaking between 10 am and noon.
- Parking Patterns: Most trucks park at businesses along Route 9 and 9D, or on rest stops on I-84.

Heavy Truck Turning Study

We worked with our on-call consultant to evaluate four intersections in Wappingers Falls and Wappinger, focusing on ways to prevent heavy trucks crossing the centerline or encroaching into oncoming lanes during turns. The study assessed each intersection's ability to accommodate heavy truck movements and considered potential re-routing options. Key findings include:

- We identified significant safety concerns at the Route 9D (East Main St)/Givans Ave intersection, including limited sight distances, high travel speeds, and southbound trucks encroaching onto on-street parking to negotiate the curve. However, solving these issues would require reducing on-street parking and walkability, which run counter to the Villages vision for corridor.
- We assessed alternative routes for trucks via Route 9, using Middlebush Rd (CR 93) or Old Hopewell Rd (CR 28) to connect back to Route 9D. This would require adjustments to stop bar locations to accommodate turns at the intersections with Route 9D, requiring support from NYSDOT, County Public Works, and Town/Village. Ultimately, we identified Route 9 to I-84 as the best route for trucks, which led us to the Traffic Signal Optimization Study below.

Route 9/9D Traffic Signal Optimization Study

Working with our on-call consultant, we studied potential signal timing and other improvements at a series of intersections along the Route 9 and 9D corridors. We sought to determine if these improvements could reduce delays on Route 9 and shift some traffic (including truck traffic) from 9D onto Route 9. As noted in the report, Route 9 is a higher capacity roadway than 9D and was built to accommodate heavy traffic and truck traffic more efficiently, while 9D travels through a village center and residential areas and has some significant curves. Key findings include:

- Travel time: During the peak evening period, traveling between the Route 9/9D intersection and the Route 9D/I-84 interchange takes approximately 19 minutes on Route 9D, vs 20-22 minutes on Route 9.
- Route 9: We found that updated signal timings and other improvements would nominally decrease delay on Route 9. However, more significant improvements on Route 9 would be difficult due to limited right-of-way and the number of commercial driveways on the road.
- Route 9D: For 9D, updated signal timings and other improvements would improve intersection operations but wouldn't shift traffic to Route 9.

Based on this study, we recommend installing video detection for all intersection movements that do not currently have video detection would benefit operations on both corridors. Additionally, the Town of Wappinger, in coordination with NYSDOT, should consider access management changes/modifications such as reducing the number of curb cuts, consolidating driveways, implementing turn restrictions, creating cross connections between parcels, and requiring shared access points to minimize conflict points and improve corridor operations.

Other Recent DCTC Studies

DCTC's Safety Action Plan includes several State-priority safety improvement locations on Route 9D in the study area:

- Route 9D between E Main St and Carmine Dr
- Route 9D/E Academy St intersection
- Route 9D/Franklindale Ave intersection
- Route 9D/Middlebush Rd (CR 93) intersection

In addition, several intersections on Routes 9 and 9D are identified as higher-risk for intersection-related crashes. These are all mapped on our Moving Dutchess Forward Barriers to Safe Access map.

Our Congestion Management Process identified segments of Route 9 and 9D as experiencing daily and/or peak hour congestion. These are mapped on our Moving Dutchess Forward Barriers to Reliable Access map.

Summary and Next Steps:

Based on our assessment of the corridors, we identified several potential next steps for our municipal partners, in coordination with NYSDOT:

- Work with NYSDOT to determine if any truck restrictions on Route 9D are possible, especially given the safety issues documented in the Village of Wappingers Falls.
- Work with NYSDOT and the Village to improve pedestrian safety at key intersections on Route 9D.
- Work with truck-related companies to determine if they can route drivers via Route 9 instead of Route 9D, at least for some trips.
- Coordinate overweight vehicle enforcement on Route 9D.
- Encourage NYSDOT to pursue video-based signal detection and other signal improvements, particularly on Route 9.
- Pursue access management modifications (reducing the number of curb cuts, consolidating driveways, implementing turn restrictions, creating cross connections between parcels, and requiring shared access points) as part of site plan reviews for properties on Route 9.

Appendix A: Heavy Truck Origin-Destination (O-D) Study Memo

Dutchess County Transportation Council (DCTC) Trucking Operations Tech Memo – November 2024

Prepared by the

American Transportation Research Institute
Washington, DC

INTRODUCTION

To better understand truck activity in and around southern Dutchess County, the American Transportation Research Institute (ATRI) was tasked by the Dutchess County Transportation Council (DCTC) to perform a series of trucking operations analyses. Using ATRI's extensive truck GPS database, ATRI was able to perform a series of analyses that isolated truck traffic with a nexus to US Route 9 and NYS Route 9D.

ATRI TRUCK GPS DATA

ATRI maintains one of the largest and most comprehensive databases of vehicle probe data, exclusively comprised of freight truck data. ATRI captures and processes billions of unique probe points annually from several hundred thousand large freight trucks. The devices that produce these data are truck-embedded to ensure that travel points represent truck flows, rather than mobile hand-held devices.

The truck population in ATRI's database skews towards tractor-trailer combination trucks, medium- to large fleet trucks, and dry van, tank, refrigerated, and flatbed trailers. These truck sectors and configurations represent more than 85 percent of all domestic tonnage moved by the trucking industry.

METHODOLOGY

The research team used its database of truck GPS pings and a suite of GIS applications to complete each task. Each truck GPS record consists of a date and time stamp, latitude/longitude, and a unique truck identification number. Using each of these characteristics, the team was able to create a series of analyses relating to truck volumes, origin/destinations and general truck flows with a nexus to US Route 9 and NYS Route 9D. The following tasks were accomplished as part of the scope of work:

- Task 1: Relative volumes by hour of day along US Route 9, NYS Route 9D and I-84 (east and west) reported as an index.
- Task 2: Truck flow maps showing truck movements in the immediate area and throughout the United States.
- Task 3: Location of trucks parked for 10 – 24 hours in the immediate region surrounding US Route 9, NYS Route 9D and I-84.
- Task 4: Origin and destination analysis of trucks within a 200-mile radius with a nexus to US Route 9 and NYS Route 9D.

Four two-week time periods in 2023 were selected for the analyses:

- February 4 – 19
- May 6 – 21
- August 12 – 27
- October 14 – 29

These dates were selected to provide seasonality throughout a typical year of truck operations. For example, the trucking industry often experiences an increase in trucking activity in October due to preparation for holiday inventories. The ability to capture these changes in trucking

activity through a given year is important to understanding how truck activity impacts a region.

For the first task, ATRI provided the DCTC with eight GIS shapefiles showing the relative volumes per hour of the day on US Route 9, NYS Route 9D, and I-84 (east and west) during each of the four time periods. The research team split each roadway into quarter mile segments and snapped truck GPS data to each segment to review the relative volume per hour of day. The volume index was created by using the highest per hour volume segment during February 2023 as the baseline. This baseline index was then used for each subsequent time-period. Due to the significant difference in volumes between US Route 9/NYS Route 9D and I-84, the index was developed separately for each roadway.

Figures 1 and 2 show relative volumes during an average 24-hour period on a representative segment of I-84 and US Route 9, respectively. As expected, the relative volumes demonstrate normal daily operations of trucks with higher relative volumes during the day and lower truck activity at nighttime. For Figure 2, along US Route 9, which services many commercial businesses, the relative volume curve coincides with typical business hours. The relative peak period of truck activity in the area occurred between 10 am to noon.

Figure 1: I-84 Segment Relative Volume by Hour of Day

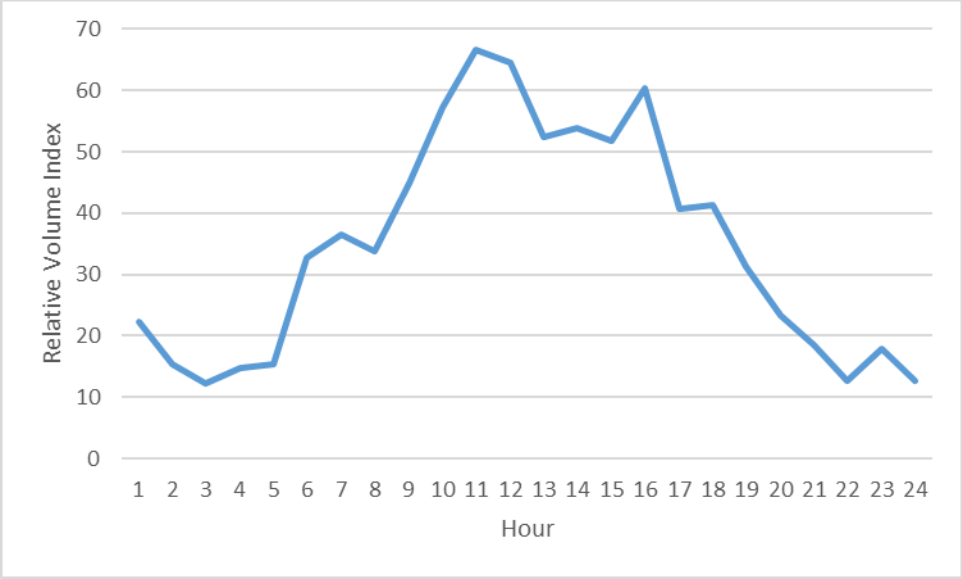
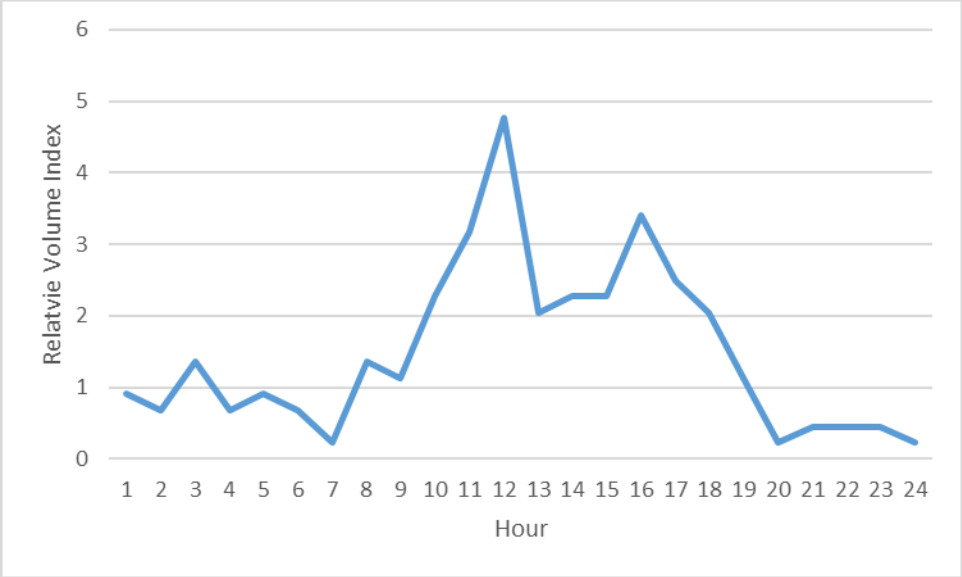
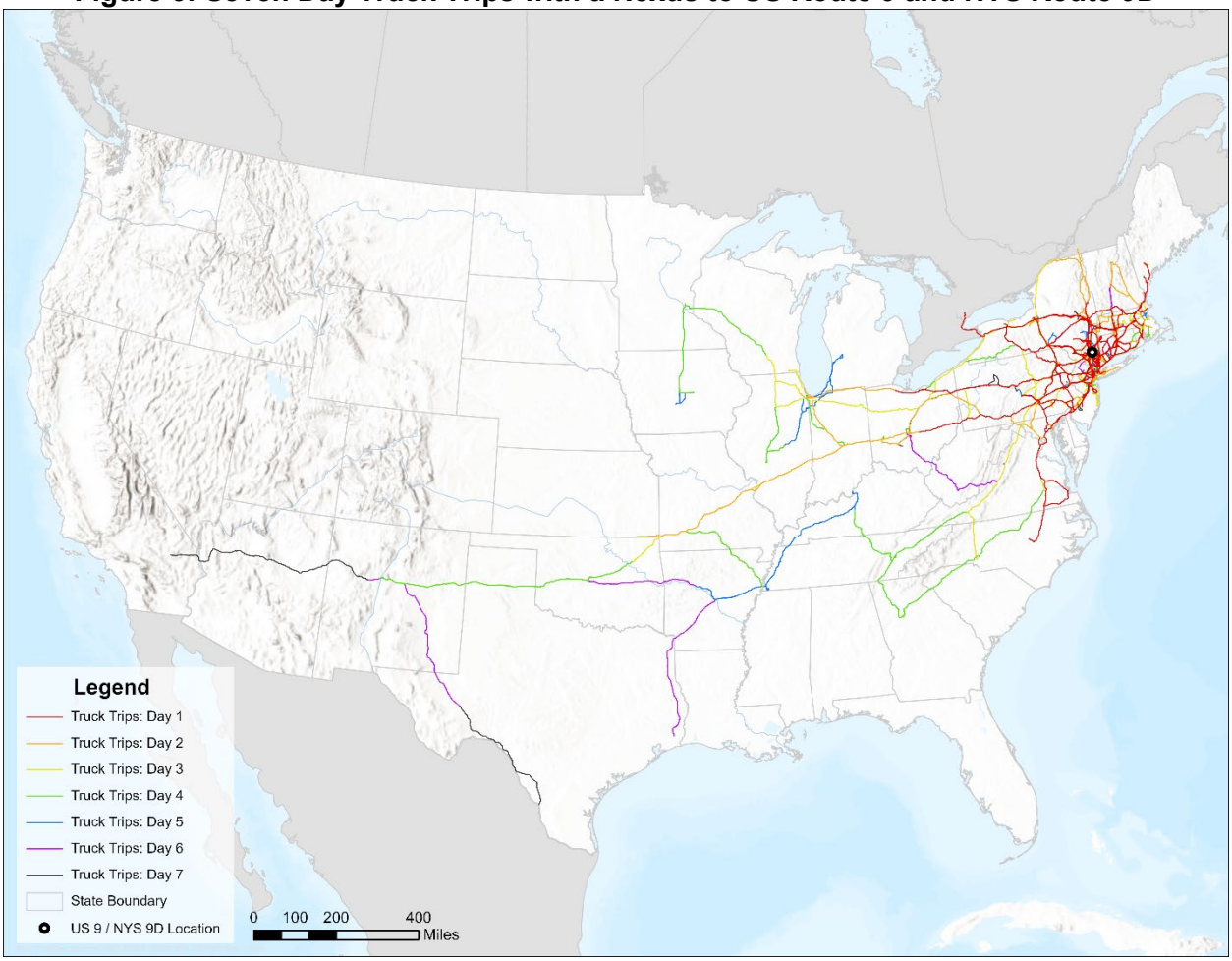


Figure 2: US Route 9 Segment Relative Volume by Hour of Day



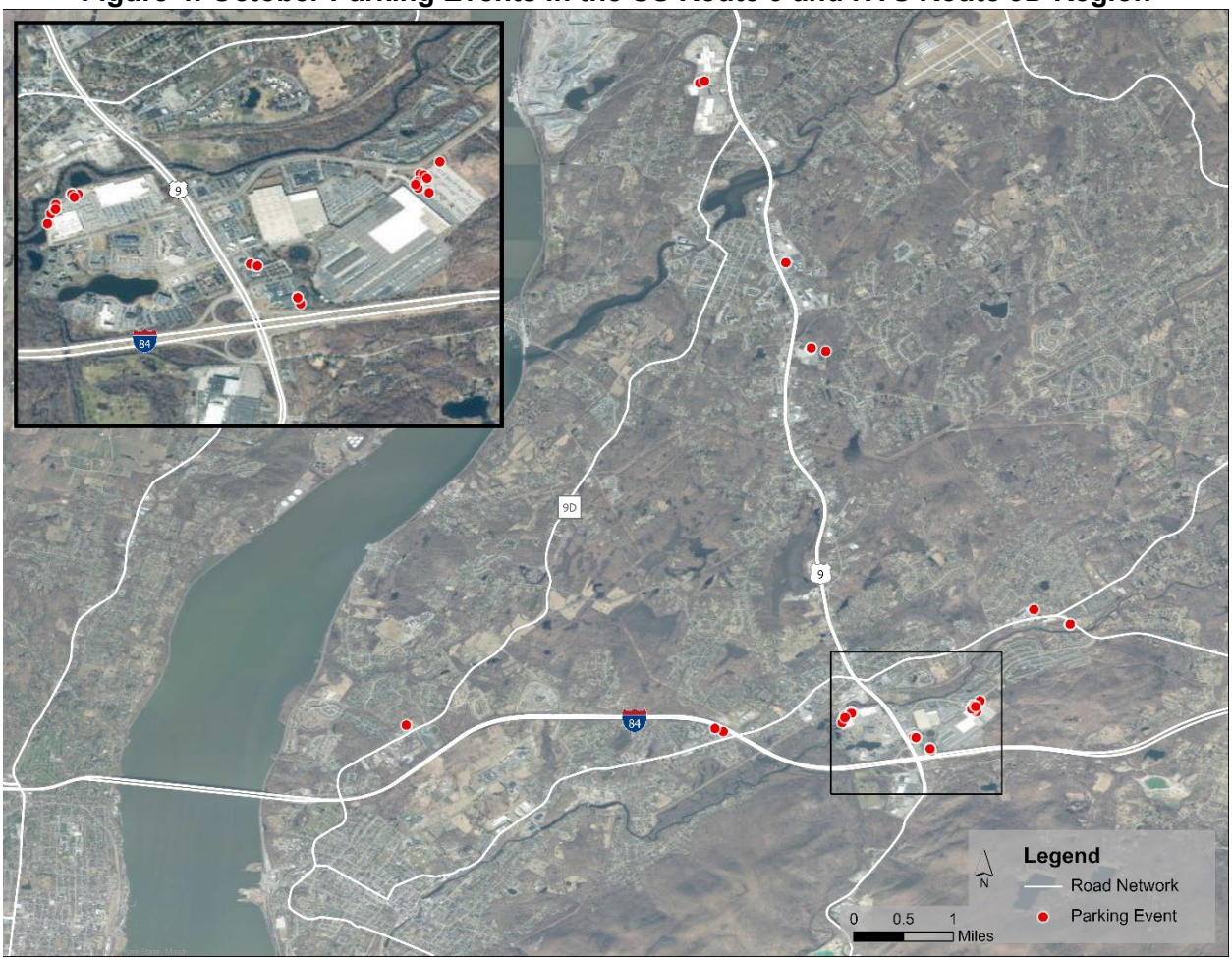
For the second task, seven-day truck flows were created with trucks that had a nexus to US Route 9 and NYS Route 9D. These types of “heartbeat” maps often show the impact a roadway can have on a regional or national economy. Using ATRI’s truck GPS dataset, a time-period was chosen in October 2023 to pull trucks traveling during a 24-hour period on US Route 9 and NYS Route 9D, and then “follow” those same trucks throughout the United States for the following six days. As mentioned previously, October is a critical time-period for the trucking industry, as it is usually associated with increased truck movements for holiday inventory preparations. Figure 3 shows truck trips color coded by day of travel. Trucks with a nexus to US Route 9 and NYS Route 9D can be seen to have traveled to southeastern California and Laredo, Texas by the seventh day.

Figure 3: Seven Day Truck Trips with a Nexus to US Route 9 and NYS Route 9D



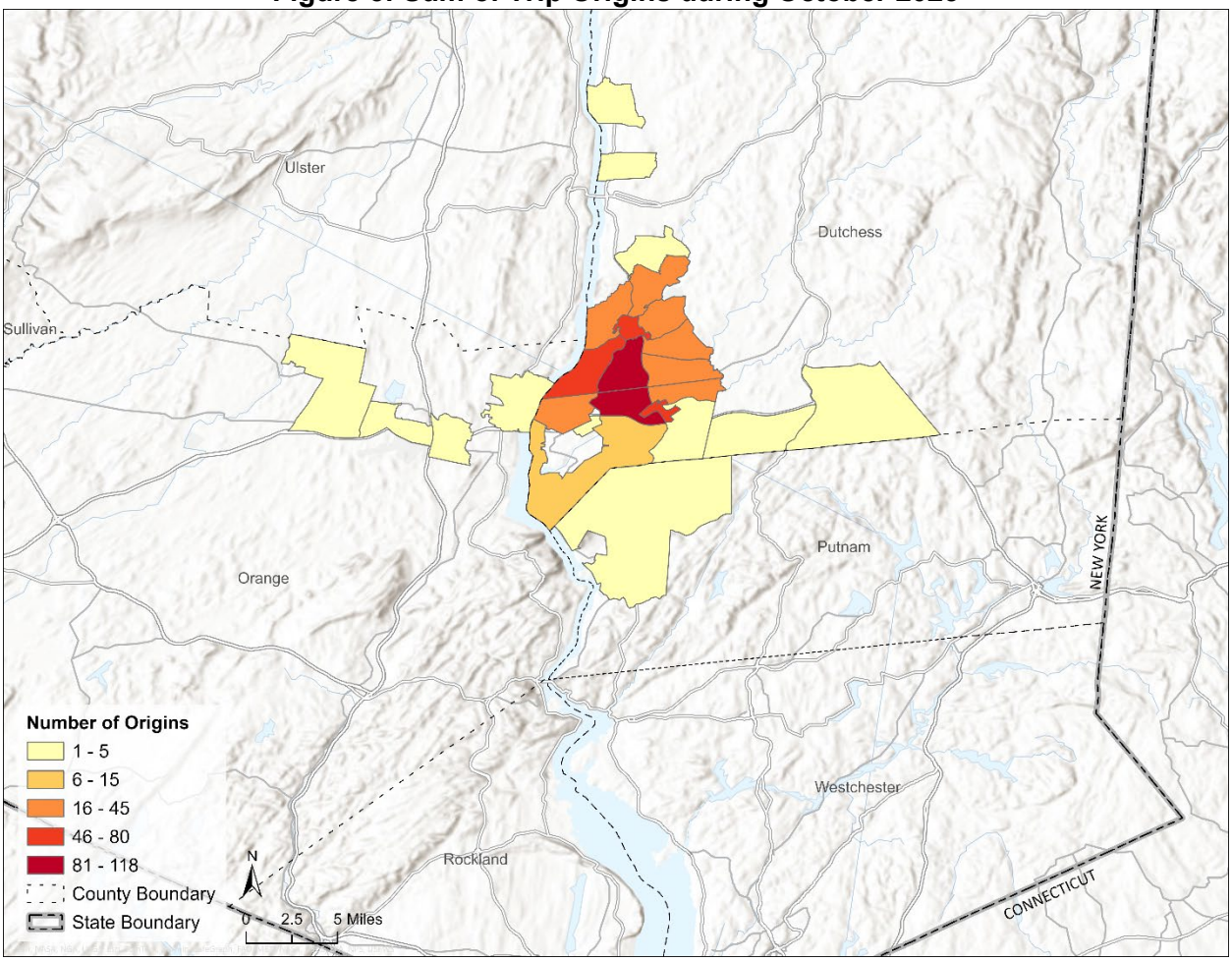
The research team did an analysis of parking in the immediate area of US Route 9 and NYS Route 9D for the third task. Trucks that parked for a minimum of 10 hours and a maximum of 24 hours were reviewed during each of the four time periods. Many of the regularly used locations for truck parking were at the Walmart and Sam's Club in Fishkill, the Gap Distribution warehouse in Fishkill, and the Galleria Mall in Poughkeepsie. Figure 4 shows parking instances during October 2023.

Figure 4: October Parking Events in the US Route 9 and NYS Route 9D Region



Lastly, the research team developed origin/destination (OD) tables during each time-period. In order for trucks to be included in the OD table, the truck had to have been on US Route 9 or NYS Route 9D. Additionally, a trip was considered terminated if a truck had stopped for any length of time between 30 minutes and 4 hours. Census tracts were used within a 200-mile radius of US Route 9 and NYS Route 9D. For anything outside the 200-mile radius, a state or Canadian province administrative boundary was used. Despite the broad geographic bounds, the team found that many of the trips with a nexus to US Route 9 or NYS Route 9D stayed within the immediate region. Figure 5 shows the total number of trips originating in each census tract with a nexus to US Route 9 or NYS Route 9D during October 2023.

Figure 5: Sum of Trip Origins during October 2023



CONCLUSIONS

The research team was able to complete multiple analyses that isolated truck trips with a nexus to US Route 9 or NYS Route 9D. While the trucking population in ATRI's database that utilize either US Route 9 or NYS Route 9D generally have origins and destinations that remain in the Dutchess County region, there are also pass-through trucks that traverse the length of the country over a one-week timeframe. Additionally, the team found that businesses adjacent to US Route 9 or NYS Route 9D play an important role in helping drivers find places to park for either a rest break or to remain in compliance with hours-of-services rules.

Appendix B: Heavy Truck Turning Study Memo

October 11, 2024

Mr. Mark Debald – Transportation Program Administrator
Dutchess County Transportation Council
85 Civic Center Plaza, Suite 107
Poughkeepsie, NY, 12601

RE: Technical Memorandum, NY Route 9D Heavy Truck Turning Study:
Town of Wappinger and Village of Wappingers Falls, Dutchess County, NY
CM Project No. 122-173, Contract No. 22-0489-9124-PL, CA 17561

Dear Mr. Debald:

Creighton Manning Engineering, LLP (CM) has completed this technical memorandum to summarize the findings of the NY Route 9D Heavy Truck Turning Study. This study evaluated select intersections along NY Route 9D in the Town of Wappinger and Village of Wappingers Falls to assess their ability to accommodate heavy truck turning movements in a safe manner. The study intersections are shown in **Figure 1** and listed below:

1. NY Route 9D (East Main Street)/Givans Avenue
2. NY Route 9D (East Main Street)/South Avenue
3. NY Route 9D/Middlebush Road (CR 93)
4. NY Route 9D/Old Hopewell Road (CR 28)

Figure 1 – Study Intersections

Existing Conditions

NY Route 9D is a principal arterial that branches off from US Route 9 and provides a shorter path to I-84 south of the study area; as such, truck traffic will divert to NY Route 9D to avoid congestion on US Route 9, which increases truck conflicts through the study intersections and especially in the Village of Wappingers Falls.

To determine the existing constraints and prevailing traffic conditions at the study intersections, a field visit was conducted on Tuesday, April 23, 2024, during the morning peak period (8:00-9:30 a.m.). Observations were made at the study intersections and surrounding area, with a particular focus on heavy truck traffic.

Based on the field observations and discussions with the DCTC, several safety concerns were identified at the NY Route 9D (East Main Street)/Givans Avenue intersection:

1. Limited sight distance due to physical obstructions.
2. The travel speed approaching the intersection appears to exceed the posted speed limit in both directions, likely due to the downhill approaches.
3. Southbound truck traffic encroaches onto on-street parking spaces to negotiate the curve (See Photo #1).
4. Opposing trucks cannot navigate the curve at the same time, which causes vehicle conflicts and creates travel delays.

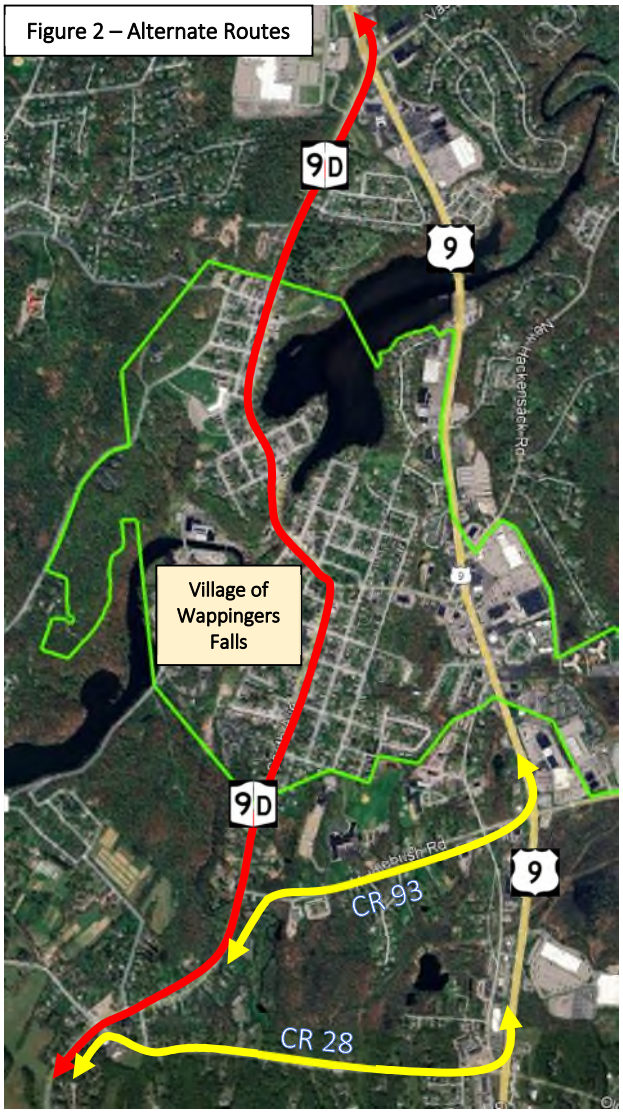
Photo #1 – NY Route 9D (East Main Street)/Givans Avenue SB Truck Encroachment on Parking

No safety concerns were observed at the other study intersections.

Alternate Routes

Alternate routes are available between US Route 9 and NY Route 9D that avoid the East Main Street/Givans Avenue intersection and the Village of Wappingers Falls. Two potential routes include Middlebush Road (CR 93) and Old Hopewell Road (CR 28) as shown in **Figure 2**.

Figure 2 – Alternate Routes



Truck turning templates were performed at each study intersection on the NY Route 9D corridor to evaluate the feasibility of trucks traveling through the intersections within the Village of Wappingers Falls and the two alternate routes in the Town of Wappinger. The templates were plotted on base aerial mapping and parcel mapping obtained from the DCTC and included a typical tractor trailer (WB-50) as shown in Attachment A. Single unit trucks (SU-30) were also analyzed; however, no issues were identified for these types of heavy vehicles, so only the WB-50 results are discussed in Attachment A. The typical dimensions of a tractor trailer (WB-50) and a single unit truck (SU-30) are shown below.

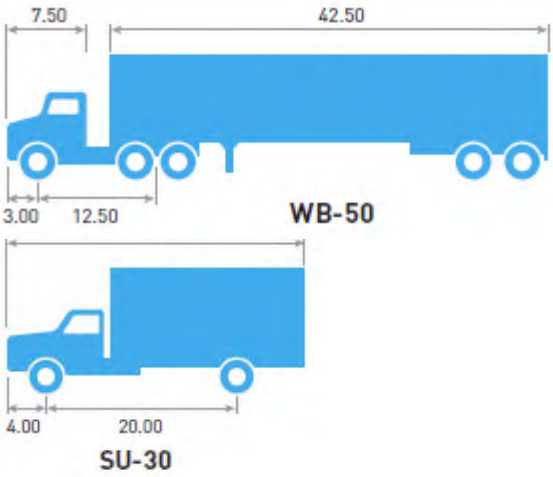


Table 1 summarizes existing traffic on NY Route 9D and shows that single unit trucks account for approximately 2.5% of total traffic (350-500 vehicles/day), while WB-50 trucks account for approximately 0.3% of total traffic (50-90 vehicles/day). Very few trucks larger than a WB-50 travel though the area, particularly north of Middlebush Road (CR 93).

Table 1 – Existing Traffic Volumes & Truck Percentages on Route 9D

Location on NY Route 9D	Date	Average Daily Traffic	Trucks		
			SU-30 (FHWA Class 5-6)	WB-50 (FHWA Class 7-9)	WB-67 (FHWA Class 10-13)
Station 820636 – North of Givans Avenue	4/2022	14,361	343 (2.4%)	57 (0.4%)	9 (0.06%)
Station 820044 – South of East Main Street	7/2023	14,585	398 (2.7%)	61 (0.4%)	9 (0.06%)
Station 820042 – South of Middlebush Road	12/2022	18,215	500 (2.7%)	88 (0.5%)	33 (0.2%)

Source: NYSDOT Traffic Data Viewer

Results

This section summarizes the results of the truck turning movement analysis at the study intersections, as well as what changes to each intersection would be needed to accommodate truck turns, based on a review of the turning templates for a WB-50 truck. Two truck turning alternatives were evaluated at each intersection: a "**No Lane Encroachment**" option that does not permit a truck to use the opposing lane (i.e., "off-track") to make the turn, forcing them instead to turn onto the shoulder or the right-of-way, and a "**Lane Encroachment**" option that allows a truck to use the opposing lane to make the turn. For each option, an assessment was made as to the feasibility of making improvements at the study intersection.

<u>NY Route 9D (East Main Street)/Givans Avenue</u> – Figure 3

- Southbound Left-Turn (from West Main Street):
  - *NO Lane Encroachment Option* (Figure A-1) – To make this turn, trucks will off track into the on-street parking spaces.
    - Accommodating this movement would require eliminating approximately 12 on-street parking spaces on the west side of NY Route 9D and restriping the southbound lane immediately adjacent to the curb. **Assessment: Feasible**
  - *Lane Encroachment Option* (Figure A-2) – To make this turn, trucks will off track into the oncoming lane.
    - No improvements can mitigate this condition. **Assessment: Not Feasible**

Figure 3 – NY Route 9D (East Main Street)/Givans Avenue

- Westbound Right-Turn (from East Main Street):
  - *NO Lane Encroachment Option* (Figure A-3) – Trucks will off-track onto the sidewalk and the right of way in the northeast quadrant of the curve.
    - No improvements can mitigate this condition. **Assessment: Not Feasible**
  - *Lane Encroachment Option* (Figure A-4) – Trucks will off-track into the opposing through lane.
    - Accommodating this movement would require eliminating approximately 12 on-street parking spaces on the west side of NY Route 9D and restriping the southbound lane immediately

adjacent to the curb (as noted above). This would allow the northbound lane to be restriped, which could include the provision of approximately five on-street parking spaces on the east side of NY Route 9D. **Assessment: Feasible**

- The lane striping and parking modifications required to accommodate trucks in both directions at the East Main Street/Givans Avenue intersection are included in Figure A-5. These changes would make it easier for trucks to travel through the village, but this may not be desirable since encouraging more heavy vehicle traffic through the area would impact the quality of life of residents.

Figure 4 – NY Route 9D (East Main Street)/South Avenue

<u>NY Route 9D (East Main Street)/South Avenue</u> – Figure 4

- Eastbound Right-Turn:
  - This turn can be made without any lane encroachment or improvements (Figure A-6). **Assessment: Feasible**
- Northbound Left-Turn:
  - This turn can be made without any lane encroachment or improvements (Figure A-7). **Assessment: Feasible**

Figure 5 – NY Route 9D/Middlebush Road (CR 93)

<u>NY Route 9D/Middlebush Road (CR 93)</u> – Figure 5

- Westbound Left-Turn (from Middlebush Road):
  - *NO Lane Encroachment Option* (Figure A-8) – Trucks will off-track onto the shoulder. While the use of the shoulder is considered acceptable, the lane encroachment option would be preferred to minimize maintenance impacts to the shoulder. **Assessment: Feasible**
  - *Lane Encroachment Option* (Figure A-9) – Truck will off-track into the northbound through/right-turn lane.
    - The stop bar for the northbound through/right-turn lane could be relocated to accommodate this turn. **Assessment: Feasible**
- Northbound Right-Turn (from NY Route 9D):
  - *NO Lane Encroachment Option* (Figure A-10) – Trucks will off-track into the ROW in the southeast quadrant of the intersection.
    - Accommodating this turn would require widening the shoulder, which would impact the existing property on the southeast quadrant of the intersection. **Assessment: Not Feasible**
  - *Lane Encroachment Option* (Figure A-11) – Trucks will off-track into the eastbound left/right turn lane
    - The stop bar for the westbound lane could be relocated to accommodate this turn. **Assessment: Feasible**

<u>NY Route 9D/Old Hopewell Road (CR 28)</u> – Figure 6

- Westbound Left-Turn (from Old Hopewell Road):
  - *NO Lane Encroachment Option* (Figure A-12) – Trucks will off-track into the right of way and building on the southwest quadrant of the intersection. **Assessment: Not Feasible**
  - *Lane Encroachment* Option (Figure A-13) – Trucks will off-track into the northbound left-turn lane.
    - To accommodate this turn, the stop bar for the northbound left-turn lane could be relocated. **Assessment: Feasible**
- Northbound Right-Turn (from NY Route 9D):
  - *NO Lane Encroachment Option* (Figure A-14) – Trucks will off-track into the right of way on the southeast quadrant of the intersection.
    - Accommodating this turn would require widening the shoulder, which would impact the property on the southeast quadrant of the intersection. **Assessment: Not Feasible**
  - *Lane Encroachment Option* (Figure A-15) – Trucks will off-track into the eastbound left-turn lane.
    - To accommodate this turn, the stop bar for the eastbound left-turn lane could be relocated. **Assessment: Feasible**

Figure 6 – NY Route 9D/old Hopewell Road (CR 28)

Summary

This Heavy Truck Turning Study indicates that there are feasible improvements (e.g., stop bar relocations) at the NY Route 9D/Middlebush Road (CR 93) and NY Route 9D/Old Hopewell Road (CR 28) intersections. These improvements would make it easier for WB-50 trucks to use Middlebush Road (CR 93) and Old Hopewell Road (CR 28) as alternate routes to access NY Route 9D, and in turn, avoid safety and quality of life concerns in the Village of Wappingers Falls. More challenging, the modifications necessary at the NY Route 9D (East Main Street)/Givans Avenue intersection to safely accommodate heavy trucks would impact on-street parking in the center of the village. It is recommended that the DCTC work with the Village of Wappingers Falls, Town of Wappinger, Dutchess County Public Works, and NYSDOT to review and progress those changes that best meet the area's priorities.

Please feel free to contact our office if you have any questions or comments regarding the above assessment.

Respectfully submitted,
Creighton Manning Engineering, LLP

Mark Nadolny
Associate

Mark A. Sargent, P.E.
Partner/Senior Traffic Manager

Attachments

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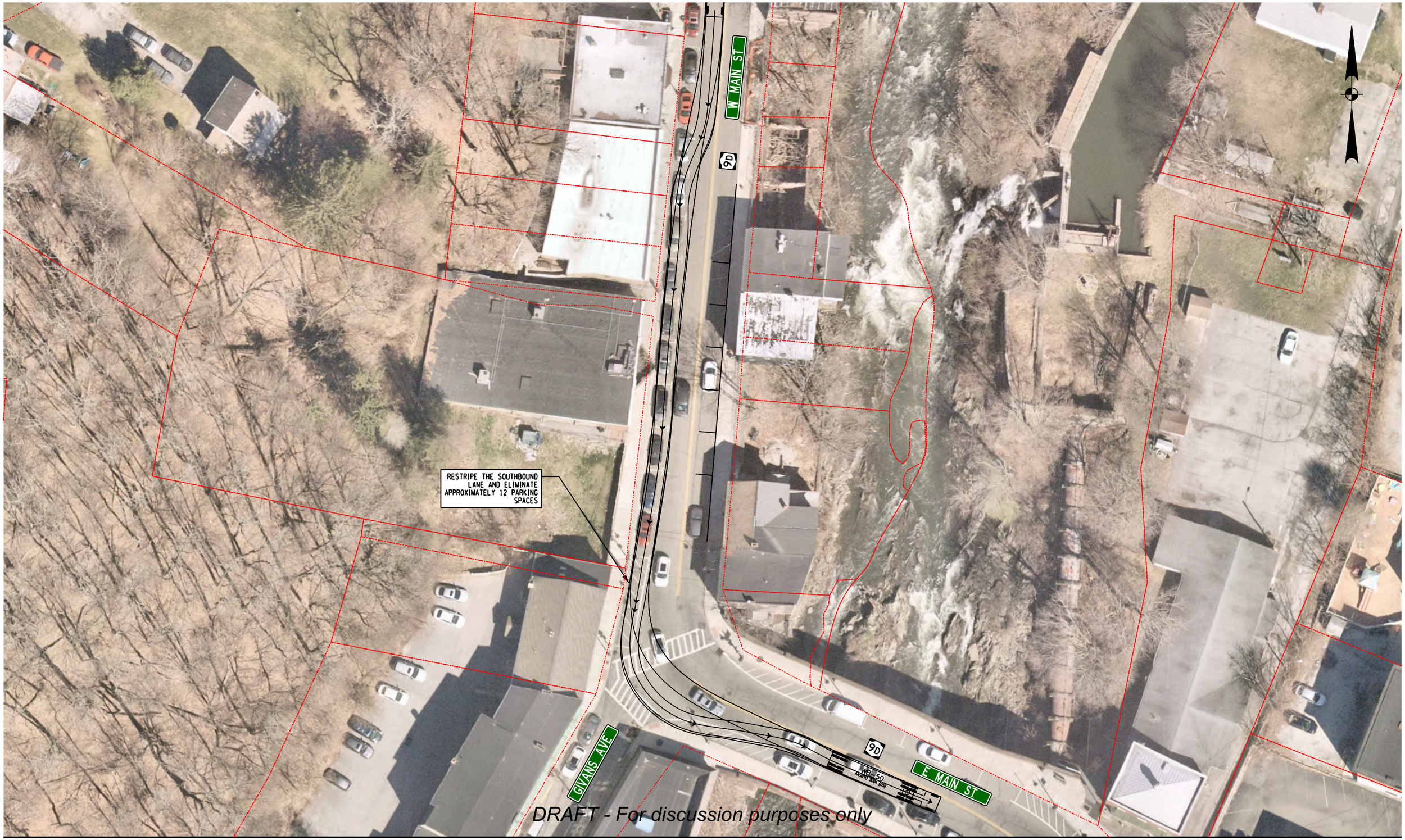

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

20 0 20 40 60 80'
1" = 40'

NY ROUTE 9D (EAST MAIN STREET)/GIVANS AVENUE

SB LEFT-TURN (WB-50), NO LANE ENCROACHMENT OPTION

FIGURE A-1

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W MAIN ST

9D

WB-50
(50' WHEELBASE)

TRUCK OFF-TRACKS INTO OPPOSING LANE

GIVANS AVE

9D

E MAIN ST

WB-50
(50' WHEELBASE)

DRAFT - For discussion purposes only

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

20 0 20 40 60 80'
1" = 40'

NY ROUTE 9D (EAST MAIN STREET)/GIVANS AVENUE

SB LEFT-TURN (WB-50), LANE ENCROACHMENT OPTION

FIGURE A-2

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\Figures\122-173_cnpt_grp_02_WB50LT.dgn

W MAIN ST

9D

WB-50
AASHTO 2004 (US)

TRUCK OFF-TRACKS ONTO SIDEWALK

GIVANS AVE

9D

E MAIN ST

DRAFT - For discussion purposes only

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

20 0 20 40 60 80'
1" = 40'

NY ROUTE 9D (EAST MAIN STREET)/GIVANS AVENUE

WB RIGHT-TURN (WB-50), NO LANE ENCROACHMENT OPTION

FIGURE A-3

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\Figures\122-173_cnpt_grp_03_WB50RT.dgn

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

20 0 20 40 60 80'
1" = 40'

NY ROUTE 9D (EAST MAIN STREET)/GIVANS AVENUE

WB RIGHT-TURN (WB-50), LANE ENCROACHMENT OPTION

FIGURE A-4

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\figures\122-173_cnpt_grp_04_WB50RT.dgn

RESTRIPE THE SOUTHBOUND LANE AND ELIMINATE APPROXIMATELY 12 PARKING SPACES

RESTRIPE THE NORTHBOUND LANE AND ADD APPROXIMATELY 5 PARKING SPACES

W MAIN ST

9D

GIVANS AVE

E MAIN ST

WB-50

DRAFT - For discussion purposes only

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

20 0 20 40 60 80'
1" = 40'

NY ROUTE 9D (EAST MAIN STREET)/GIVANS AVENUE

OPPOSING TRUCK MOVEMENT ALTERNATIVE (WB-50)

FIGURE A-5

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\Figures\122-173_cnpt_grp_05_WB50RT.dgn

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

20 0 20 40 60 80'
1" = 40'

NY ROUTE 9D (EAST MAIN STREET)/SOUTH AVENUE

EB RIGHT-TURN (WB-50)

FIGURE A-6

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\Figures\122-173_cnpt_grp_06_WB50RT.dgn

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

20 0 20 40 60 80'
1" = 40'

NY ROUTE 9D (EAST MAIN STREET)/SOUTH AVENUE

NB LEFT-TURN (WB-50)

FIGURE A-7

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\Figures\122-173_cnpt_grp_07_WB50LT.dgn

DRAFT - For discussion purposes only

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

20 0 20 40 60 80'
1" = 40'

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\Figures\122-173_cnpt_grp_08_WB50LT.dgn

NY ROUTE 9D/MIDDLEBUSH ROAD (CR93)

WB LEFT-TURN (WB-50), NO LINE ENCROACHMENT OPTION

FIGURE A-8

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

20 0 20 40 60 80'
1" = 40'

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\Figures\122-173_cnpt_grp_09_WB50LT.dgn

NY ROUTE 9D/MIDDLEBUSH ROAD (CR93)

WB LEFT-TURN (WB-50), LANE ENCROACHMENT OPTION

FIGURE A-9

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

20 0 20 40 60 80'
1" = 40'

NY ROUTE 9D/MIDDLEBUSH ROAD (CR93)

NB RIGHT-TURN (WB-50), NO LANE ENCROACHMENT OPTION

FIGURE A-10

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\Figures\122-173_cnpt_grp.10.W050RT.dgn

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

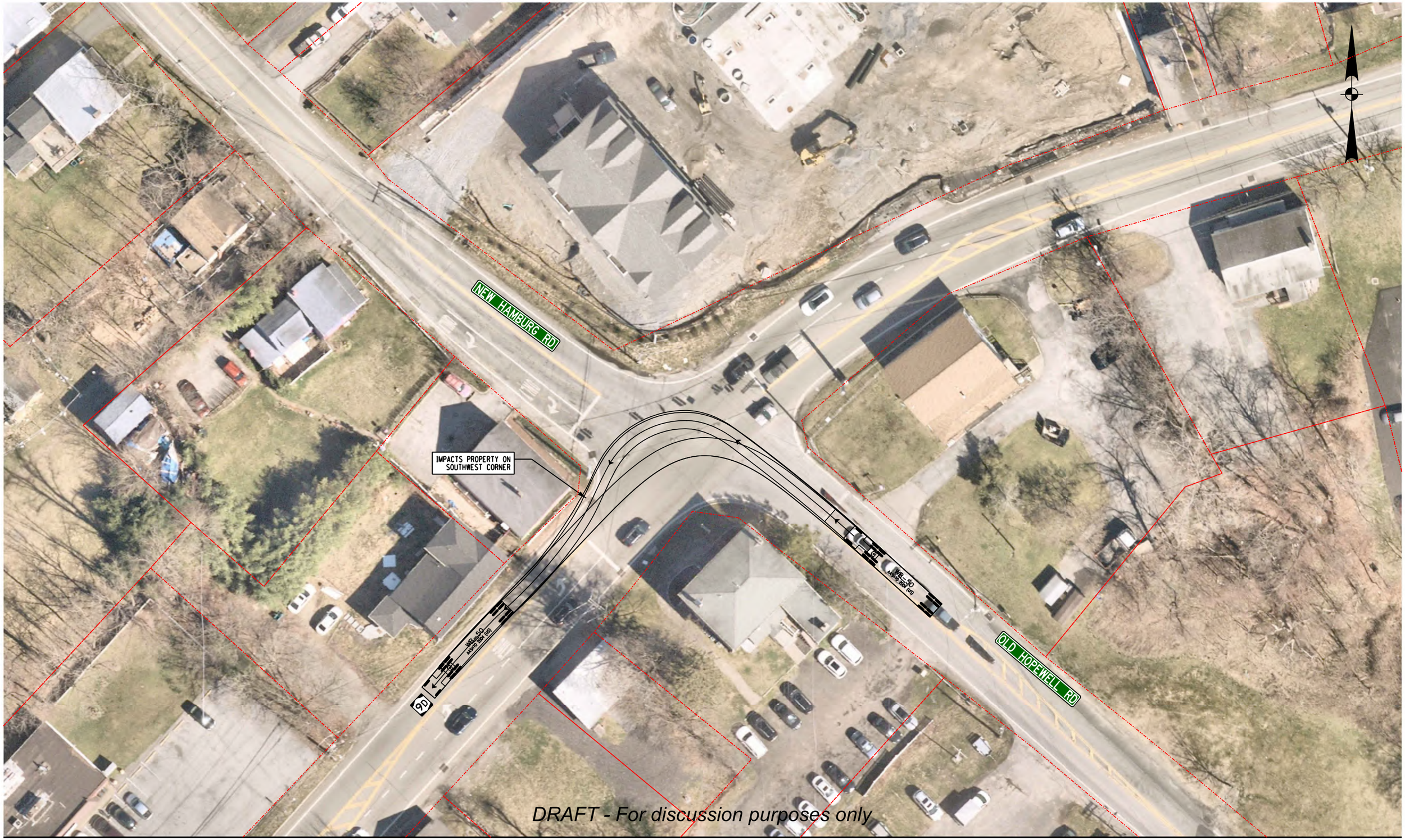
20 0 20 40 60 80'
1" = 40'

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\Figures\122-173_cnpt_grp_11_WB50RT.dgn

NY ROUTE 9D/MIDDLEBUSH ROAD (CR93)

NB RIGHT-TURN (WB-50), LANE ENCROACHMENT OPTION

FIGURE A-11



DRAFT - For discussion purposes only

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

20 0 20 40 60 80'
1" = 40'

NY ROUTE 9D/OLD HOPEWELL ROAD (CR 28)

WB LEFT-TURN (WB-50), NO LANE ENCROACHMENT OPTION

FIGURE A-12

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\Figures\122-173_cnpt_grp_12_WB50LT.dgn

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

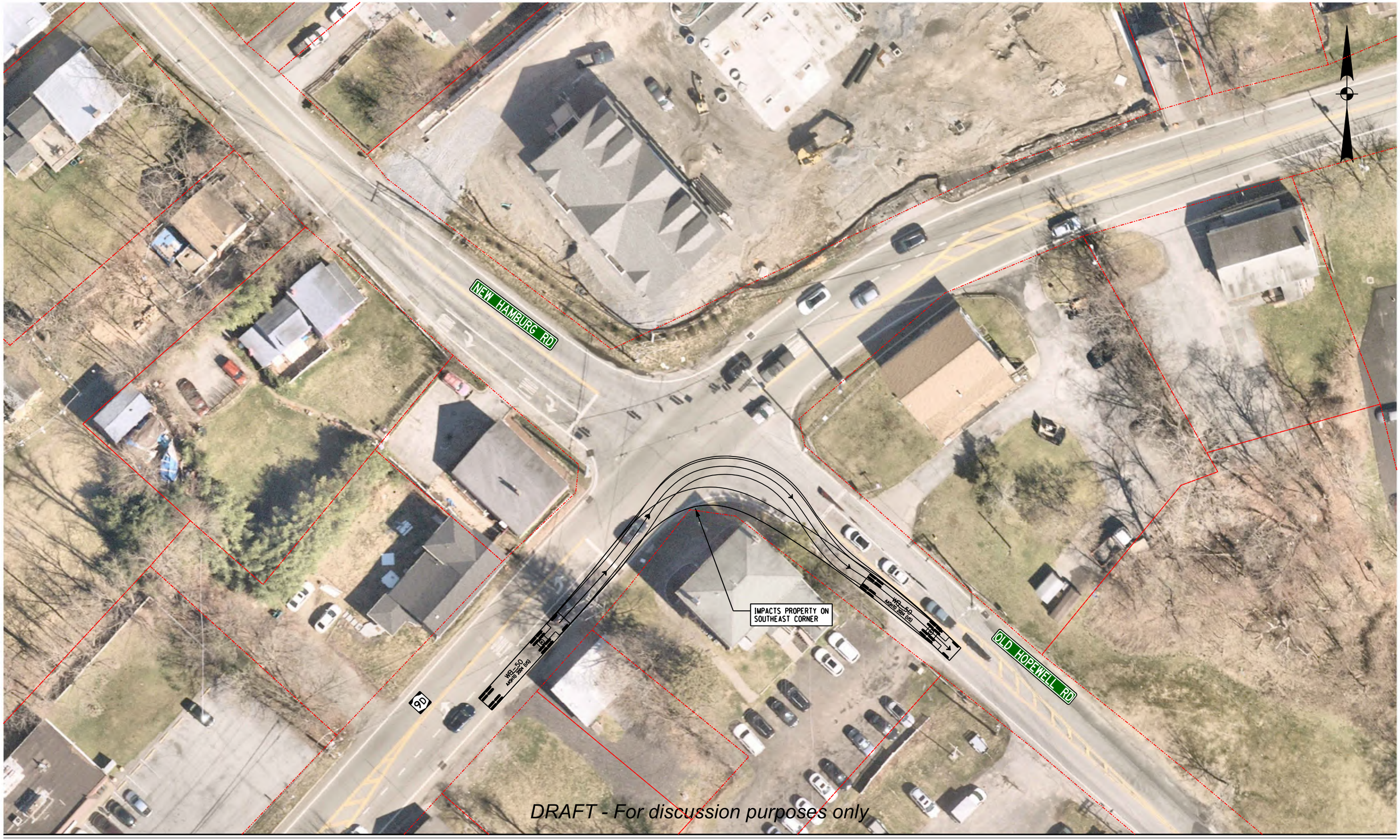
20 0 20 40 60 80'
1" = 40'

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\Figures\122-173_cnpt_grp_13_WB50LT.dgn

NY ROUTE 9D/OLD HOPEWELL ROAD (CR 28)

WB LEFT-TURN (WB-50), LANE ENCROACHMENT OPTION

FIGURE A-13



DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

20 0 20 40 60 80'
1" = 40'

NY ROUTE 9D/OLD HOPEWELL ROAD (CR 28)

NB RIGHT-TURN (WB-50), NO LANE ENCROACHMENT OPTION

FIGURE A-14

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\figures\122-173_cnpt_grp_14_WB50RT.dgn

DCTC
Route 9D Heavy Truck Turning Movements
PROJECT: 122-173 DATE: 09/2024

Creighton Manning

20 0 20 40 60 80'
1" = 40'

FILE = N:\Projects\2022\122-173 DCTC - On-call\Working\CADD\dgn\Figures\122-173_cnpt_grp.15.W85RT.dgn

NY ROUTE 9D/OLD HOPEWELL ROAD (CR 28)

NB RIGHT-TURN (WB-50), LANE ENCROACHMENT OPTION

FIGURE A-15

Appendix C: Route 9/9D Traffic Signal Optimization Study Memo

MEMORANDUM

Date: November 20, 2025 (**Revised June 30, 2026**)

To: Mark Debald
From: Mark Nadolny, Matt Flaherty, P.E.
CC: Emily Dozier, Nina Leonard

Study: DCTC On-Call Transportation Planning Support
Re: US Route 9/NY Route 9D Traffic Signal Optimization Study Memo

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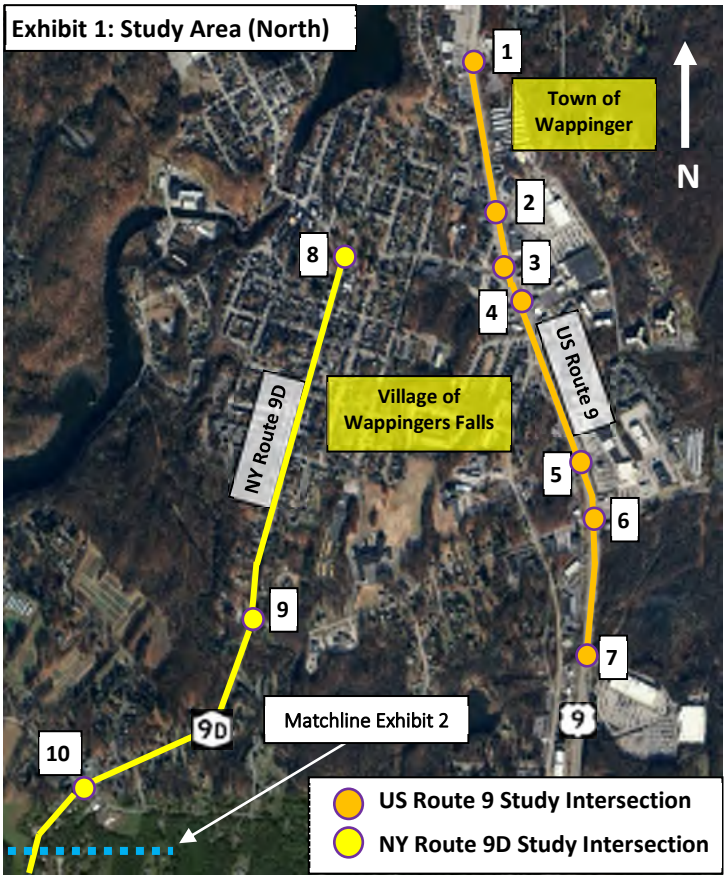
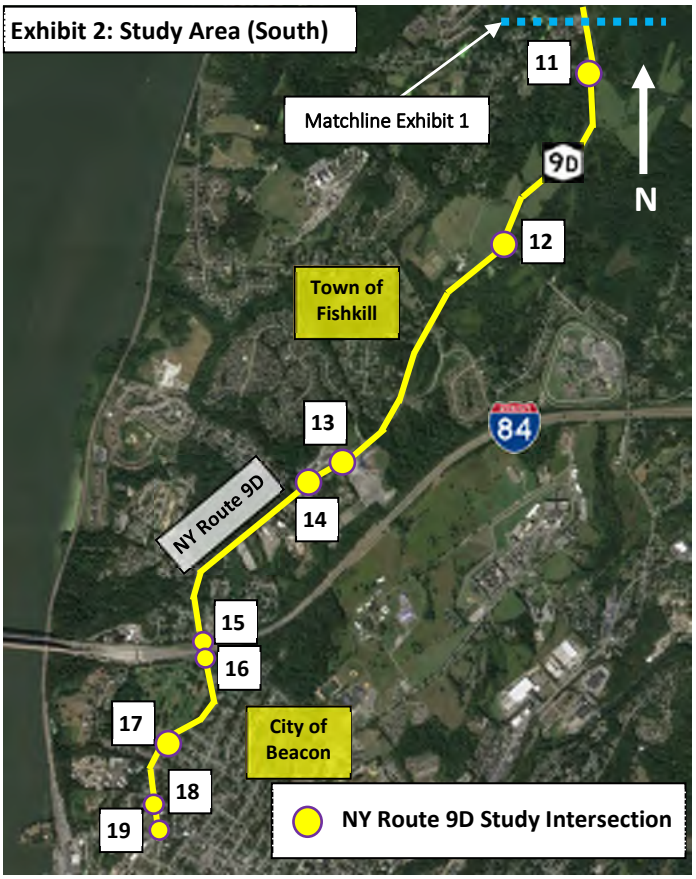
For many years, residents and elected officials in southwestern Dutchess County have expressed frustration with congestion on portions of US Route 9 and NY Route 9D, and residents and leaders in the Village of Wappingers Falls have struggled with heavy truck traffic through the village center. This study aims to identify traffic signal improvements that could reduce vehicle delays and congestion experienced by drivers on a segment of US Route 9 through the Town of Wappinger and Village of Wappingers Falls, and on a segment of NY Route 9D through the Village of Wappingers Falls, Town of Wappinger, Town of Fishkill, and City of Beacon.

The potential improvements could also increase pedestrian safety and access, and shift some traffic, particularly truck traffic, from NY Route 9D to US Route 9, which was specifically built to accommodate heavy traffic and truck traffic more efficiently. US Route 9 in this area is a higher capacity roadway than NY Route 9D. NY Route 9D traverses a walkable village center and residential areas in the Village of Wappingers Falls where heavy truck traffic and noise pollution are not desirable. In addition, NY Route 9D has less roadway capacity and some significant curves.

The analysis covers seven study intersections along US Route 9 and 12 intersections along NY Route 9D. The 19 total study area intersections are shown in Exhibits 1 and 2 below and listed in the Study Intersections section below. A full-scale map showing all intersections is also shown in Figure 1.





1.0 Study Area

Study Corridors

US Route 9 runs north-south through the Town of Wappinger and Village of Wappingers Falls and is classified as an Urban Principal Arterial-Other. The study segment of US Route 9 is approximately 1.3 miles and includes seven study intersections. Within this area, it generally provides three northbound lanes and two southbound lanes, with a raised center median of varying width. Lane widths are generally 11 to 12 feet with paved shoulders of varying width. The speed limit at the northernmost section of US Route 9 in the study area is 45 mph. The speed limit transitions to 40 mph between the Colonial Drive and Myers Corners Road/Middlebush Road intersections. South of Myers Corners Road/ Middlebush Road, the speed limit increases to 55 mph. Land use along the roadway mostly consists of commercial uses, notably the *Alpine Commons Shopping Center*, *Wappinger Plaza*, and *Imperial Shopping Center Plaza*. Sidewalks are generally not present except at the locations listed below (see Figure 2 for a map of sidewalk locations):

- A 145-foot sidewalk is provided on the east side of US Route 9 north of the Hannaford Shopping Center driveway.
- A sidewalk is provided on the west side of US Route 9 from Sergeant Palmateer Way to N. Mesier Avenue.
- A sidewalk is provided on the east side of US Route 9 between New Hackensack Road and the driveway for the property located at 1622 US Route 9, approximately 415-feet to the north .

NY Route 9D also travels north-south and is classified as an Urban Principal Arterial-Other through most of the study area, apart from the portion in the City of Beacon south of I-84, where it is classified as an Urban Minor Arterial. The study segment of NY Route 9D is approximately 7.5 miles long and includes 12 study intersections. In general, it provides one lane in each direction with no median; however, two southbound lanes and one northbound lane with auxiliary turn lanes and a striped median of varying width are provided for about a quarter mile, as it travels past the *Heritage Financial Park Stadium* in Fishkill. In the southernmost section, a 12-foot wide two-way left-turn lane (TWLTL) is provided south of Verplank Avenue in Beacon and transitions to a dedicated turn lane at key intersections between Tompkins Avenue and Main Street. The speed limit is 35 mph in the northernmost section, transitions to 45 mph near Baxtertown Road/Chelsea Road, and decreases to 30 mph near the I-84 interchange to the south.

Land uses along the roadway vary. There is generally a mix of residential and commercial uses in the northern (Village of Wappingers Falls) and southern (City of Beacon) sections. The middle section contains stretches of vacant land with some commercial and residential areas, as well as the Heritage Financial Park stadium. Sidewalks are provided in the following areas from north to south (see Figure 2 for a map of sidewalk locations):

- A sidewalk is provided on both sides of NY Route 9D within the Village of Wappingers Falls.
- A sidewalk is provided on the west side of NY Route 9D from the Firethorn Drive intersection to the Brockway Road/Papas Lane intersection, which provides access to the businesses within the *Stadium Plaza*.
- A sidewalk is provided on the east side of NY Route 9D at the I-84 westbound Exit 41 intersection. South of the interchange, sidewalks are provided on both sides of NY Route 9D into the City of Beacon.

Study Intersections

Listed below are the seven study intersections on US Route 9 in the Town of Wappinger and Village of Wappingers Falls and the 12 study intersections on NY Route 9D in the Village of Wappingers Falls, Town of Wappinger, Town of Fishkill, and City of Beacon:

US Route 9 Intersections
1) N Mesier Avenue/Scenic Drive
2) New Hackensack Road (CR 104)
3) E Main Street
4) Home Depot Shopping Center
5) Hannaford Shopping Center
6) Myers Corners Road (CR 93)
7) Alpine Commons Driveway/BJs Driveway

NY Route 9D Intersections
8) East Main Street/South Avenue
9) Middlebush Road (CR 93)
10) Old Hopewell Road (CR 28)
11) Chelsea Road (CR 34)
12) Red Schoolhouse Road
13) Stadium Plaza Driveway/Heritage Financial Park
14) Brockway Road/Pappas Lane
15) I-84 Interchange WB Ramps
16) I-84 Interchange EB Ramps
17) Verplanck Avenue
18) Beekman Street
19) Main Street

Turning movement counts were conducted at the study intersections in 2024 during the morning peak period (7:00 to 9:00 a.m.), evening peak period (4:00 to 6:00 p.m.), and Saturday midday peak period (noon to 2:00 p.m.). The observed peak hours varied on different sections of each corridor; therefore, peak hour traffic volumes were balanced between closely spaced intersections for subsequent traffic modeling. Turning movement count dates and peak hours are shown in Attachment A. The balanced peak hour traffic volumes are shown in Figure 3, while the raw turning movement count data is included in Attachment B.

2.0 Existing Signal Conditions

Signal Equipment Assessment

existing traffic signal equipment and pedestrian signal accommodations were assessed to determine if operations could be improved along the two study corridors. The assessment included an inventory of existing detection, coordination plans, and adaptive signal controls for the existing traffic signals. A table showing the full signal inventory details is included in Attachment C while the pedestrian accommodations are shown in Figure 4. A summary of the findings is provided below:

US Route 9 Signals:

- **Detection Type:**
  - Two signals are fully actuated; four have side street/mainline turn lane detection only.
  - N Mesier Avenue has full detection except for the southbound right-turn lane.
- **Modem**:
  - Six of seven intersections have server modems (Alpine Shopping Center intersection does not).
- **Coordination:**
  - All signals are traditionally coordinated.
- **Controller Model:**
  - NYSDOT indicated that all traffic signals use Model 2070.
- **Signal Age/Condition:**
  - All signals are in good condition.
- **Pedestrian Accommodations:**
  - Five of seven intersections have pedestrian signals, pushbuttons, and a crosswalk across at least one leg of US Route 9.
  - Three of these also include an unsignalized side street crosswalk.
  - Some pushbuttons do not appear to be fully accessible.
  - Intersections at Myers Corners Road/Middlebush Road and Alpine Shopping Center have no pedestrian accommodations.

Traffic Signal Definitions:

- **Fully Actuated** – Traffic signals that have detection on all approaches to monitor traffic and adjust signal timings to accommodate traffic demand in real time.
- **Coordinated (traditional)** – Traffic signals that have synchronized signal timings to allow for vehicles to progress through the corridor with minimal stops at red lights.
- **Adaptive Coordination** – Traffic signal technology that uses real-time traffic data to dynamically adjust signal timings through a corridor to accommodate changes in traffic demand and optimize traffic flow.
- **Signal Modem** – Device that connects data from the traffic signal controller to NYSDOT's ATMS system. This connection allows NYSDOT to print and analyze real-time and historic counts of vehicle and pedestrian traffic volumes.

NY Route 9D Signals:

- **Detection Type:**
  - Most signals are fully actuated. Heritage Financial Park and Brockway Road/Pappas Lane only include detection on side streets and mainline turning lanes.
  - Main Street signal detection is broken and needs replacement.
- **Modem:**
  - Four of 12 intersections have server modems.
- **Coordination:**
  - Traditional coordination at Heritage Financial Park and Brockway Road/Pappas Lane.
  - Adaptive traffic signal coordination at I-84 Interchange intersections, Verplank Avenue, and Beekman Street.
  - I-84 Exit 41 Interchange signals operate under one controller
- **Controller Model:**
  - NYSDOT indicated that all traffic signals use Model 2070.
- **Signal Age/Condition:**
  - Most signals are in good/fair condition. Main Street has outdated 8-inch signal heads.
- **Pedestrian Accommodations:**
  - Seven of 12 intersections have pedestrian signals, pushbuttons, and crosswalks on at least one approach.
  - Heritage Financial Park and I-84 Interchange intersections have outdated pushbuttons and signs.
  - Middlebush Road, Old Hopewell Road, Baxtertown Road, Red Schoolhouse Road, and Brockway Road have no pedestrian accommodations.

Traffic Operations

An intersection Level of Service (LOS) and capacity analysis relates traffic volumes to the physical characteristics of an intersection. Intersection evaluations were made using Synchro 12, which automates the procedures in the *Highway Capacity Manual.* A LOS summary table and detailed LOS analyses can be found in Attachment D while a summary of overall operations is shown on Figure 5.

Overall intersection LOS on US Route 9 ranges from LOS A to LOS D during the AM, PM, and Saturday peak hours. The mainline through movements generally have adequate traffic operations (LOS D or better, most being LOS A/B). However, mainline left-turn movements operate at LOS E/F at all intersections except for the Alpine Commons Driveway. All intersections also have side street movements with LOS E/F for all peak hours.

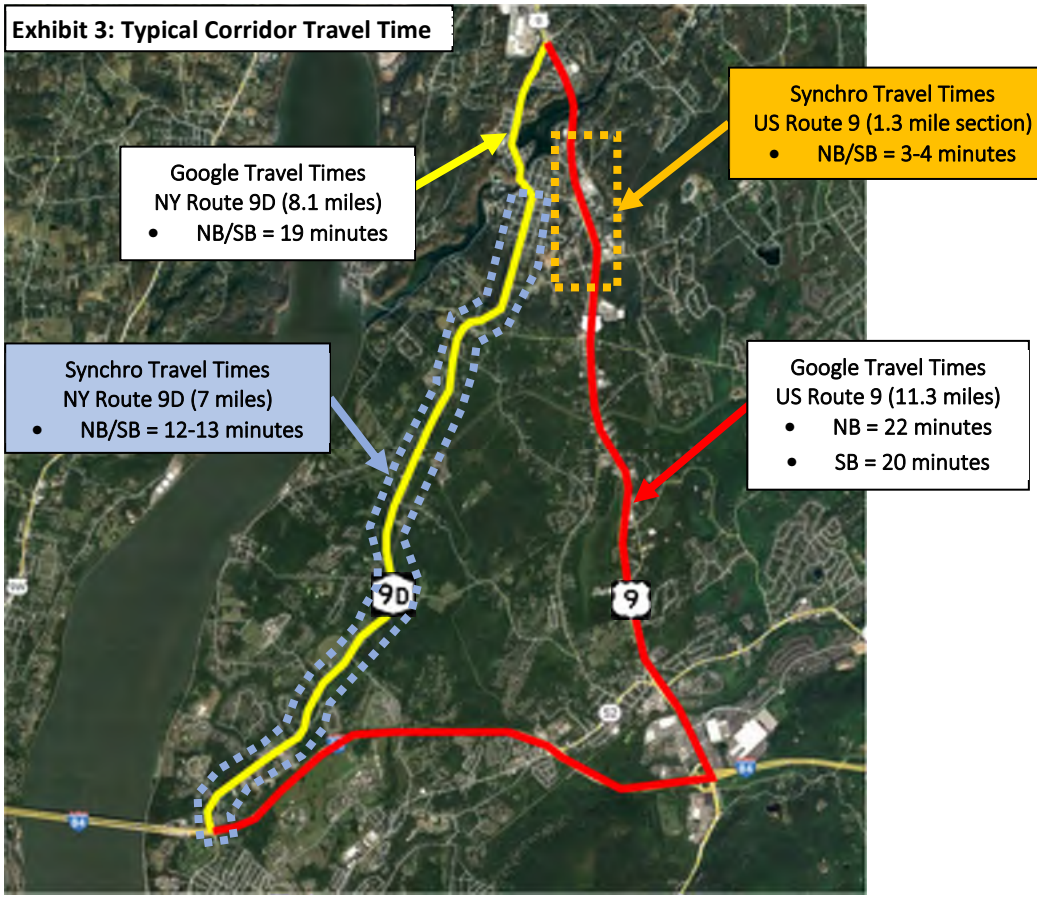
Traffic operations for the study intersections on NY Route 9D are generally adequate, with all intersections operating at an overall LOS C or better. All intersection movements on mainline and side streets operate at LOS D or better.

3.0 Existing Travel Time Assessment

Overall Travel Times

An evaluation was conducted to determine baseline travel times for vehicles traveling northbound and southbound along the study corridors. Based on anecdotal evidence, it appears that some drivers use NY Route 9D to bypass congestion and unreliable travel times on US Route 9. Exhibit 3 illustrates two possible routes that drivers use to access the Newburgh-Beacon Bridge from the intersection of US Route 9 and NY Route 9D (at Vassar Road) to the NY Route 9D/I-84 interchange. A review of Google Maps for the peak evening period indicates that the 8.1-mile trip on NY Route 9D takes drivers approximately 19 minutes in the northbound and southbound direction. The 11.3-mile trip using US Route 9 takes approximately one to three-minutes longer in each direction compared to NY Route 9D. Reducing vehicle congestion and improving travel times on US Route 9 could make that option more attractive and potentially reduce truck traffic through the Village of Wappingers Falls.

Exhibit 3: Typical Corridor Travel Time



The typical PM peak hour travel times provided by Google Maps in the northbound and southbound directions were checked against the Synchro 12 analysis and found to be consistent for the corridors evaluated as shown in Exhibit 3.

4.0 Improvement Assessment Summary

As noted, the study explores improvements that would improve conditions for through traffic on US Route 9, encourage heavy vehicles to shift from NY Route 9D to US Route 9, and decrease vehicle delay on the minor street approaches to NY Route 9D.

Potential improvements to the US Route 9 and NY Route 9D corridors were assessed and categorized by timeframe ("Short-Term" and "Long-Term" improvements). "Short-Term" improvements are generally minor improvements that can be implemented by adjusting the traffic signal controllers for the intersections and do not require roadway construction; and "Long-Term" improvements may require construction work.

Table 1 – Types of Short-Term and Long-Term Improvements

General Short-Term Improvements	General Long-Term Improvements
Signal timing and phasing modification	Roadway geometry changes
Signal cycle length adjustment	Additional traffic signal/pedestrian signal equipment
Re-calculation of yellow and all-red times	Installation of video detection cameras
Updating pedestrian clearance times and walk times	
Optimizing signal offsets	

When modeling the short-term and long-term improvement scenarios, a signal timing optimization function, in combination with manual adjustments based on engineering judgement, was used to minimize long delays and distribute delays according to the goals of this study. It should be noted that since these optimizations were done at each intersection individually under the three peak periods in both improvement scenarios, signal timing plans in the short-term and long-term scenarios are not necessarily identical for each intersection. Synchro's signal timing outputs for each intersection under all scenarios and peak hours are provided under Attachment F, grouped by intersection.

The existing clearance times at all study intersections were updated to be compliant with MUTCD and NCHRP 731 guidelines, including yellow, all-red, and pedestrian clearances. Calculations for these clearance times were conducted for each intersection based on approach widths, turning widths, existing grade, speeds, and crosswalk widths. The calculated clearance times were implemented into all "Improvement" models. A comparison of existing and proposed clearance times is included under Attachment E.

It is noted that a minimum yellow clearance interval of four (4) seconds was maintained for all intersections based on NYSDOT guidance. The implementation of increased yellow, all-red, and pedestrian clearance intervals could cause an increase in overall or individual movement vehicle delay under the improvement scenarios. However, a review of the *Post Implementation Evaluation System* (PIES) report published by NYSDOT indicates that clearance signal timing improvements can reduce overall crashes by approximately 15%, so these adjustments would be a safety improvement.

During consideration of "Short-Term" and "Long-Term" improvements, PDCTC's (now DCTC) *CR 93 Corridor Management Plan* from June 2011 (CR 93 Plan) was reviewed to confirm if previously recommended improvements along the CR 93 corridor were relevant to this project. The *CR 93 Plan* includes recommendations at the US Route 9/Myers Corners Road (CR 93)/Middlebush Road (CR 93) intersection and at the NY Route 9D/Middlebush Road (CR 93) intersection. It is noted that the *CR 93 Plan* also uses "Short-Term" and "Long-Term" to describe improvements; however, the "Short-Term" includes road geometry/traffic signal equipment changes which will not be considered in the "Short-Term" for this study. The improvements outlined in the *CR 93 Plan* at the US Route 9/Myers Corners Road/Middlebush Road intersection were considered as "Long-Term" improvements for this study; however, the improvements identified at the NY Route 9D/Middlebush Road(CR 93) intersection were not included for this assessment since adequate operations are currently experienced at this location and the purpose of this study is to shift traffic to US Route 9.

5.0 Future Travel Time Assessment

We conducted a travel time evaluation to determine the impacts associated with the implementation of improvements and provide a macro level assessment of the study corridor. Table 2 summarizes the total northbound and southbound vehicle travel time along the US Route 9 and NY Route 9D corridors based on travel time data calculated from the Synchro software. As noted in Section 3.0, the travel times for the 1.3-mile long segment of US Route 9 corridor only include the intersections analyzed for this study. In addition, the travel times for the 7-mile long segment of NY Route 9D only include the intersections analyzed in this study that generally provide access to the *Newburgh-Beacon Bridge* via the I-84 interchange. The specific improvements associated with the "Short-Term" and "Long-Term" improvement scenarios are provided in detail in the following sections.

Table 2 – Travel Time with Improvements (in seconds)

Peak Hour	Direction	US Route 9					NY Route 9D				
		Existing	Improvements				Existing	Improvements			
			Short-Term		Long-Term			Short-Term		Long-Term	
			Time	Delta	Time	Delta		Time	Delta	Time	Delta
AM Peak Hour	Northbound	199	198	-1	190	-9	719	722	+3	719	0
	Southbound	197	184	-13	180	-17	758	767	+9	777	+19
	Total	**396**	**382**	**-14**	**370**	**-26**	**1,477**	**1,489**	**+12**	**1,496**	**+19**
PM Peak Hour	Northbound	204	205	+1	206	+2	743	738	-5	739	-4
	Southbound	203	188	-15	184	-19	741	755	+14	767	+26
	Total	**407**	**393**	**-14**	**390**	**-17**	**1,484**	**1,493**	**+9**	**1,506**	**+22**
Saturday Peak Hour	Northbound	198	199	+1	204	+6	712	729	+17	725	+13
	Southbound	199	185	-14	186	-13	689	685	-4	691	+2
	Total	**397**	**388**	**-13**	**390**	**-7**	**1,401**	**1,414**	**+13**	**1,416**	**+15**

US Route 9

Travel time during the peak hours on the 1.3-mile segment of US Route 9 is approximately 200 seconds (3.3 minutes) in the northbound and southbound directions at present. The northbound

direction remains fairly consistent during both improvement scenarios (+/- 9 seconds); however, the "Short-Term" and "Long-Term" improvement scenarios will decrease travel times in the southbound direction by approximately 13 to 19 seconds during the AM and PM peak hours and by approximately 13 to 14 seconds during the Saturday peak hour. In general, the "Short-Term" and "Long-Term" improvements will nominally decrease delay on the US Route 9 corridor for mainline vehicles.

NY Route 9D

The assessment indicates that travel times during the peak hours on the 7-mile segment of NY Route 9D is, on average, approximately 740 seconds (12.5 minutes) in both directions during the AM and PM peak hours and 700 seconds (11.5 minutes) in both directions during the PM and Saturday peak hours.

In the "Short-Term" improvement scenario, overall delay would generally increase approximately 9 to 13 seconds during all peak hours, as a result of improvements focused on side-street operations. The "Long-Term" improvements are generally similar with an increase of 15 to 22 seconds, due to the lack of major geometric changes proposed on the stretch of NY Route 9D studied under this Travel Time assessment. While the improvements will improve intersection operations, they are unlikely to shift traffic to the US Route 9 corridor. NYSDOT, DCTC, and the local municipalities should consider the overall impacts associated with the improvements recommended in the *CR 93 Plan* on NY Route 9D.

The intersection evaluations of the "Short-Term" and "Long-Term" improvement scenarios were made using the Synchro software, which automates the procedures in the *Highway Capacity Manual.* A LOS summary table and detailed LOS analyses can be found in Attachment D while a summary of overall operations is shown in Figure 6. The following sections summarize the intersection improvement scenarios on US Route 9 and NY Route 9D.

6.0 US Route 9 Intersection Improvement Assessment

The "Short-Term" and "Long-Term" improvements evaluated and recommended for the intersections on US Route 9 are summarized in Table 3. Signal timing optimization related to offsets or splits resulted in minor vehicle delay increases on some of the minor street approaches, since mainline operations on US Route 9 were generally favored. In addition, the existing signal cycle lengths (120 to 150 seconds) were maintained to be consistent with the existing coordination plan for the entire corridor. It is noted that the green times provided for the minor approaches are generally long enough to accommodate the relatively low existing traffic volumes on the side streets, and the LOS E/F's experienced on these approaches are generally associated with the longer signal cycle lengths. The improvements at the US Route 9 intersections are also summarized in Figure 7.

Table 3 – US Route 9 Improvement Summary

US Route 9 Intersections	Short-Term Improvement Model[1]	Long-Term Improvement Model[2]
1) N Mesier Avenue/ Scenic Drive	• Optimize signal offset	• Add video detection to improve signal actuation, including for the SB right-turn lane
2) New Hackensack Road (CR 104)	• Optimize signal offset • Change SB left from lead to lag	• Realign east leg to include a left-turn storage lane with permitted/protected phasing and a through/right-turn lane • Add video detection to improve signal actuation, including for the NB and SB movements
3) E Main Street	• Optimize signal offset	• Add video detection to improve signal actuation, including for the NB and SB movements • Increase storage length of NB left-turn lane by 30-feet
4) Home Depot Shopping Center	• Optimize signal offset	• Add video detection to improve signal actuation, including for the NB and SB movements and WB right-turn movement • Decrease storage length of SB left-turn lane by 30-feet
5) Hannaford Shopping Center	• Optimize signal offset • Change NB left from lead to lag	• Add video detection to improve signal actuation, including for the NB and SB movements
6) Myers Corners Road (CR 93)	• Optimize signal offset	• Eliminate split phasing for EB and WB phases[3]
7) Alpine Commons Driveway/BJs Driveway	• Optimize signal offset	

[1]All improvements (short-term and long-term) include general optimization of signal timing splits. Cycle Lengths on US Route 9 were not changed in order to maintain coordination.
[2]Long-Term improvements include all short-term improvements
[3]Improvement included as outlined in *CR 93 Corridor Management Plan* (June 2011)

Intersection LOS Improvements

A review of the Level of Service Summary Table included under Attachment D indicates that the "Short-Term" improvement scenario on US Route 9 generally improves overall vehicle delay when compared to existing conditions; however, the "Short-Term" solutions proposed as part of this study did not eliminate many of the LOS E/F's currently experienced on the minor street approaches and some of the US Route 9 turning movements. However, many of these movements serve minor traffic volumes when compared to the US Route 9 mainline and are therefore not indicative of the delay experienced by the majority of vehicles. It is noted that some individual intersections may have minor LOS increases between existing and short/long term conditions since offset optimizations were applied to improve overall network operations and decrease US Route 9 travel time.

In addition, a review of the US Route 9 corridor indicates that it is difficult to implement major intersection improvements due to the available right-of-way and commercial density along the roadway; therefore, the intersection operations and vehicle delay associated with the "Long-Term" improvement scenario is fairly similar to the "Short-Term" improvement scenario with slightly better overall LOS conditions. Although it is not explicitly shown in the results of the LOS analysis, it is expected that the installation of video detection for all intersection movements (that are not currently under video detection) would benefit overall corridor operations. The following summarizes the instances where overall LOS changed by a letter grade between existing and "Short-Term/Long-Term" improvement conditions:

- US Route 9/N. Mesier Avenue/Scenic Drive:
  - Short-Term = **Improves** from LOS C to LOS B (all peak hours)
  - Long-Term = **Improves** from LOS C to LOS B (all peak hours)
- US Route 9/New Hackensack Road:
  - Short-Term = **Improves** from LOS E to D (AM)
  - Long-Term = **Improves** from LOS E to C (AM) and LOS D to C (PM)
- US Route 9/E. Main St/Dutchess Co. Shopping Plaza:
  - Short-Term = **Improves** from LOS C to LOS B (Saturday)
- US Route 9/Hannaford Shopping Center Driveway:
  - Short-Term = **Improves** from LOS B to LOS A (Saturday)
  - Long-Term = **Improves** from LOS B to LOS A (Saturday)
- US Route 9/Middlebush Road/Myers Corners Road:
  - Long-Term = **Improves** from LOS D to LOS C (Saturday)

The overall LOS letter grade remained the same between the existing and "Short-Term/Long-Term" improvement conditions for the remaining intersections during the three peak hours with minor changes in vehicle delay.

The following summarizes the two potential geometric improvement options associated with the "Long-Term" scenario:

- **US Route 9/New Hackensack Road intersection** – The proposed improvement includes the installation of video detection enabling full actuation. In addition, it is recommended that the lanes on the east leg be reconfigured to provide an exclusive left-turn lane (with the addition of a protected left-turn phase) and a shared through/right-turn lane. Overall vehicle delay would decrease by approximately 10 to 40 seconds during peak hours after implementation of these changes with delay to the left-turn movement on the westbound approach decreasing by approximately 80 to 290 seconds. Signal pole footing moment calculations will be needed to determine if the existing span wire poles can accommodate the overhead signal modifications.
- **US Route 9/E Main Street and US Route 9/Home Depot Shopping Center** – The existing and "Short-Term" improvement simulation models indicate that long vehicle queues on US Route 9

from the northbound left-turn lane at the E. Main Street intersection extend through the Home Depot Shopping Center intersection up to Sergeant Palmateer Way during the PM and Saturday peak hours. This suggests that the existing left-turn storage bay cannot accommodate the northbound left-turn volume which spills back and affects through traffic on US Route 9. It is recommended that the northbound left-turn storage bay at the E. Main Street intersection be increased and the southbound left-turn storage bay at the Home Depot Shopping Center intersection be reduced to minimize vehicle back-ups into the northbound through lanes on US Route 9.

- **US Route 9/Middlebush Road/Myers Corners Road intersection** – Eliminating the existing split phase associated with the eastbound and westbound approaches (recommended in the *CR 93 Plan)* would decrease overall vehicle delay by approximately 4 to 8 seconds during the PM and Saturday peak hours with delay on the westbound right-turn movement decreasing by approximately 48 to 75 seconds.

The following additional geometric modifications were considered but not recommended for the ”Long-Term” improvement scenario since they did not provide a significant operational benefit:

- The provision of a second southbound left-turn lane at the US Route 9/Hannaford Shopping Center intersection was considered due to the available wide median and two receiving lanes on the east leg of the intersection. While the analysis indicates that this would slightly reduce delay for the southbound left-turn movement and increase available storage, this improvement was not considered feasible due to constructability concerns associated with drainage.
- To increase capacity on the westbound New Hackensack Road approach, an alternative that includes a double left-turn movement from the westbound approach was considered. The level of service analysis indicates that overall vehicle delay would increase and mainline operations would degrade since this lane assignment modification would require split phasing for the eastbound and westbound approaches; therefore, this concept was not considered effective.

7.0 NY Route 9D Intersection Improvement Assessment

The “Short-Term” and “Long-Term” improvements evaluated and recommended for the intersections on NY Route 9D are summarized in Table 4. As noted above, an increase in overall or individual movement vehicle delay from the existing to the improvement scenarios could be caused by the increased yellow, all-red, and pedestrian clearance intervals. Improvements to side street operations were considered in order to minimize local delay without significantly impacting levels of service. For example, side street delay decreased by approximately 5 to 7 seconds during the peak hours at the NY Route 9D/Old Hopewell Road/New Hamburg Road intersection while mainline delay increased by approximately 15 to 20 seconds during the peak hours. It is noted that no “Short-Term” improvements have been considered at the intersections along NY Route 9D that currently have

adaptive coordination capabilities (interchange signals at the I-84 ramps, Verplank Avenue, and Beekman Street). Given the nature of adaptive coordination, which allows for dynamic changes to traffic signal timings in response to real-time traffic conditions, the "Short-Term" solutions outlined in this study are not applicable to these intersections, which adjust and optimize signal operations automatically. The improvements at the NY Route 9D intersections are also summarized on Figure 8.

Table 4 – NY Route 9D Improvement Summary

NY Route 9D Intersections	Improvement Model (Short-Term)[1]	Improvement Model (Long-Term)[2]
8) East Main Street/ South Avenue	• Shorten cycle length from 141 seconds to 90-100 seconds • Decrease walk time from 8 to 7 seconds	• Add video detection to all movements to improve signal actuation (existing detection broken)
9) Middlebush Road (CR 93)	• Shorten cycle length from 83 seconds to 60-80 seconds	
10) Old Hopewell Road (CR 28)	• Shorten cycle length from 184 seconds to 90 seconds • Decrease walk time from 8 to 7 seconds	
11) Chelsea Road (CR 34)	• Shorten cycle length from 145 seconds to 60-75 seconds	
12) Red Schoolhouse Road	• Shorten cycle length from 128 seconds to 60-70 seconds	
13) Stadium Plaza Driveway/ Heritage Financial Park	• Optimize signal offset • Change NB and SB lefts from lead to lag • Decrease split times for low-volume side streets to improve coordination between signals	• Add video detection to all NY Route 9D movements to improve signal actuation
14) Brockway Road/ Pappas Lane	• Optimize signal offset • Change SB left from lead to lag	• Add video detection to all NY Route 9D movements to improve signal actuation
15) I-84 Interchange WB Ramps	NA – adaptive coordination	
16) I-84 Interchange EB Ramps	NA – adaptive coordination	
17) Verplanck Avenue	NA – adaptive coordination	
18) Beekman Street	NA – adaptive coordination	• Add pedestrian signal to east and west legs (existing unsignalized crosswalks)
19) Main Street	• Shorten cycle length from 105 to 75 seconds • Decrease walk time from 8 to 7 seconds	• Add pedestrian signal to west leg • Add video detection to improve signal actuation (including for the NB and SB through movements)

[1]All improvements (short-term and long-term) include optimization of signal timing splits

[2]Long-Term improvements include all short-term improvements

[3]Improvement included as outlined in *CR 93 Corridor Management Plan* (June 2011)

Intersection LOS Improvements

A review of the Level of Service Summary Table included under Attachment D indicates that the "Short-Term" improvement scenario on NY Route 9D is similar to existing conditions with some intersections experiencing slightly higher overall delay (<12 seconds) and that major geometric improvements are generally not necessary to improve overall intersection operations. As noted above for the US Route 9 intersections, it is expected that the installation of video detection for the intersection movements noted in the table would benefit overall corridor operations. In addition, the installation of pedestrian signals at two intersections is a safety benefit, and does not significantly increase vehicle delay. It is also noted that LOS was not reported for the intersections with adaptive control (the I-84 interchange signals and the intersections at Verplank Avenue and Beekman Street/W. Church Street) because no improvements are recommended at these locations, except for adding pedestrian signals to the east and west legs of Beekman Street/W. Church Street. These additional pedestrian signals on the side streets are not expected to have a significant effect on LOS. The following summarizes the instances where overall LOS changed by a letter grade between existing and "Short-Term/Long-Term" improvement conditions:

- NY Route 9D/E. Main Street/South Avenue:
  - Short-Term = **Improves** from LOS C to LOS B (PM/Saturday)
  - Long-Term = **Improves** from LOS C to LOS B (PM/Saturday)
- NY Route 9D/Old Hopewell Road/New Hamburg Road:
  - Short-Term = **Degrades** from LOS C to LOS D (PM/Saturday)
  - Long-Term = **Degrades** from LOS C to LOS D (PM) and changes back to LOS C (Saturday)
- NY Route 9D/Red Schoolhouse Road:
  - Short-Term = **Degrades** from LOS B to LOS C (PM/Saturday)
  - Long-Term = **Degrades** from LOS B to LOS C (PM/Saturday)
- NY Route 9D/Stadium Plaza Driveway/Heritage Financial Park Driveway:
  - Short -Term = **Improves** from LOS B to LOS A (PM)
  - Long -Term = **Improves** from LOS B to LOS A (PM)
- NY Route 9D/Main Street:
  - Short-Term = **Degrades** from LOS A to LOS B (AM)
  - Long-Term = **Degrades** from LOS A to LOS B (AM)

The overall LOS letter grade remained the same between existing and "Short-Term/Long-Term" improvement conditions for the remaining intersections during the three peak hours, with minor changes in vehicle delay. All movements in improvement scenarios operate at LOS D or better except for the eastbound left-turn/through lane on the Stadium Plaza Driveway, which operates at LOS E during the PM peak hour; however, it is noted that this lane serves a maximum of 45 vehicles during the peak hours.

8.0 Conclusion

The analysis of the study area intersections on the US Route 9 corridor indicates that overall improvement to mainline operations is difficult due to the available right-of-way and commercial driveways along the roadway. The recommended signal timing changes will have a nominal impact on mainline progression. It is recommended that the Town of Wappinger consider access management principles when reviewing future site plan reviews. Access changes/modifications such as reducing the number of curb cuts, consolidating driveways, implementing turn restrictions, creating cross connections between parcels, and requiring shared access points can minimize conflict points and improve corridor progression on US Route 9.

The assessment of signalized intersections along the NY Route 9D corridor indicates that improved operations can be provided on the side street approaches, but these are unlikely to shift traffic over to the US Route 9 corridor.

It is noted that, aligning with NYSDOT's best practices, minor signal timing shifts of less than five seconds and any signal timing improvement that results in a reduction of travel time of less than 10% are not warranted for deployment on their own. The minor updates to signal timings are only recommended if combined with other, more substantial changes.

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LOCATION NUMBER	LOCATION	MUNICIPALITY
	US ROUTE 9 SIGNALS	
1	N Mesler Avenue/Scenic Drive	T/o Wappinger
2	New Hackensack Road (CR 104)	V/o Wappingers Falls
3	E Main Street	V/o Wappingers Falls
4	Home Depot Shopping Center	V/o Wappingers Falls
5	Hannaford Shopping Center	T/o Wappinger
6	Myers Corners Road (CR 93)	T/o Wappinger
7	Alpine Commons Driveway/BJs Driveway	T/o Wappinger
	NY ROUTE 9D	
8	East Main Street/South Avenue	V/o Wappingers Falls
9	Middlebush Road (CR 93)	T/o Wappinger
10	Old Hopewell Road (CR 28)	T/o Wappinger
11	Chelsea Road (CR 34)	T/o Wappinger
12	Red Schoolhouse Road	T/o Beacon
13	Stadium Plaza Driveway/Heritage Financial Park	T/o Beacon
14	Brockway Road/Pappas Lane	T/o Fishkill
15	I-84 Interchange WB Ramps	T/o Fishkill
16	I-84 Interchange EB Ramps	T/o Fishkill
17	Verplanck Avenue	C/o Beacon
18	Beekman Street	C/o Beacon
19	Main Street	C/o Beacon

INSET

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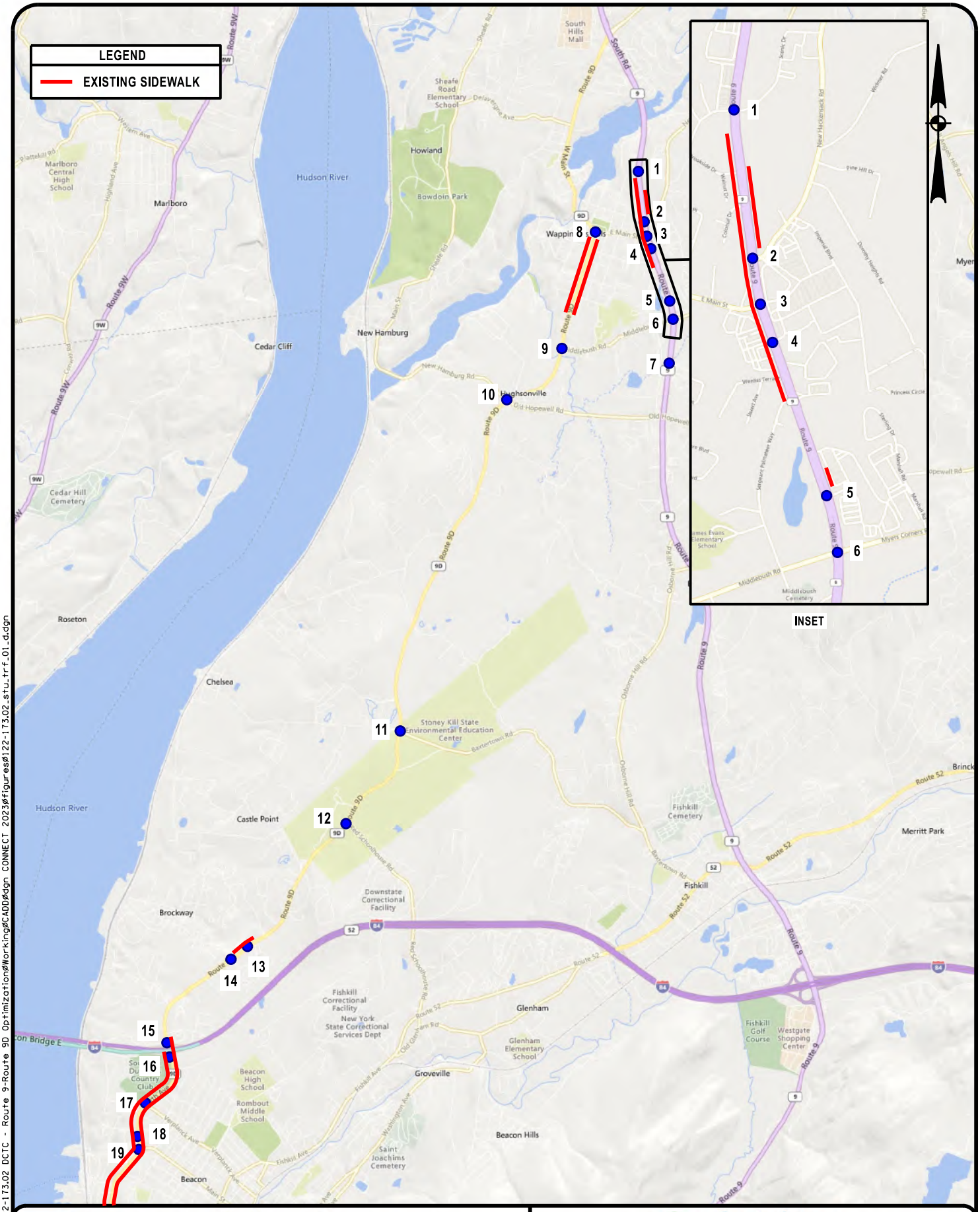
STUDY AREA MAP

ROUTE 9 / 9D TRAFFIC SIGNAL OPTIMIZATION
DUTCHESS COUNTY, NEW YORK

Creighton Manning
a GAI Company

PROJECT:	122-173.02	DATE:	07/2026	FIGURE:	1



SIDEWALK LOCATION MAP

ROUTE 9 / 9D TRAFFIC SIGNAL OPTIMIZATION
DUTCHESS COUNTY, NEW YORK

Creighton Manning
a GAI Company

PROJECT:	122-173.02	DATE:	07/2026	FIGURE:	2

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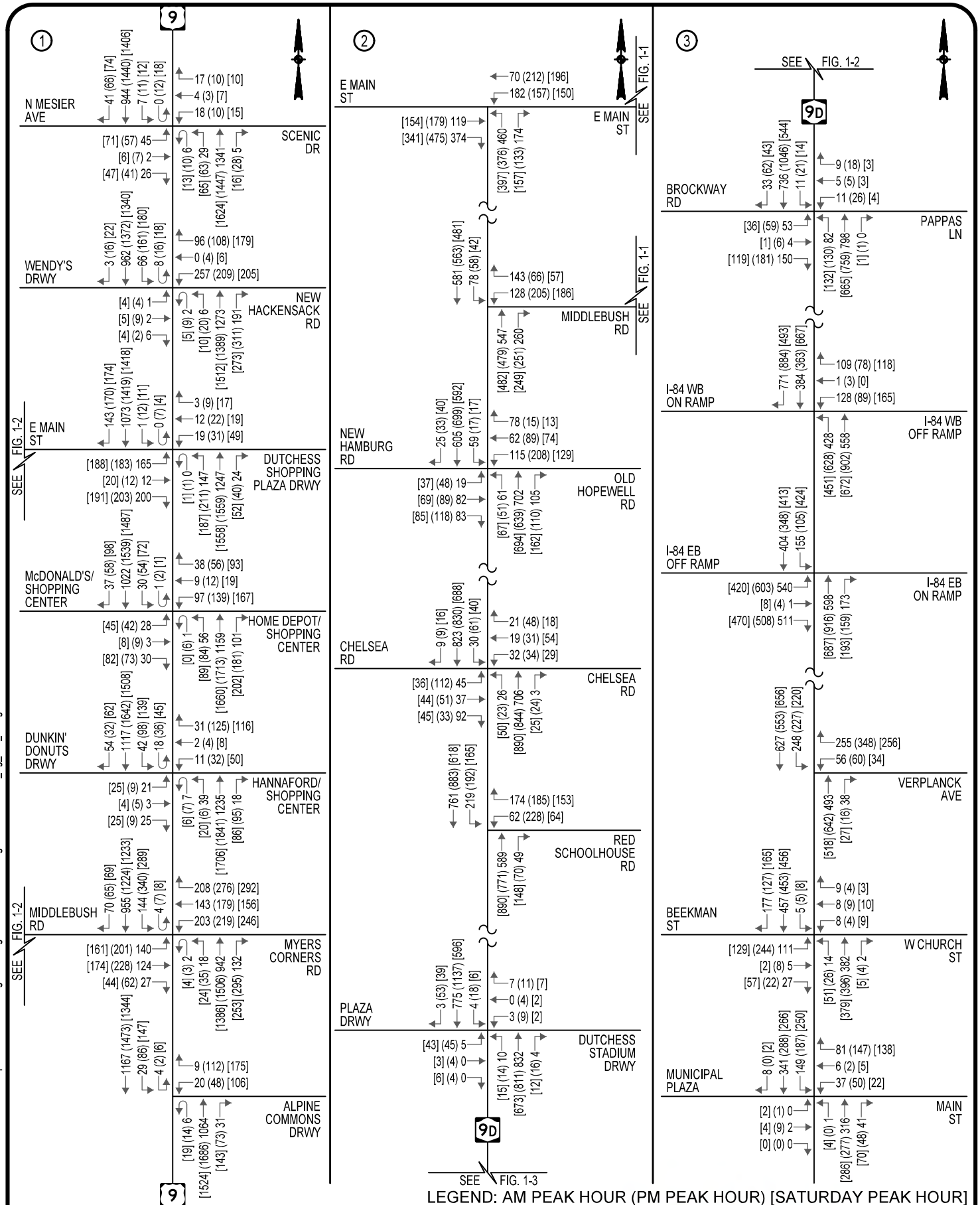

LEGEND: AM PEAK HOUR (PM PEAK HOUR) [SATURDAY PEAK HOUR]

EXISTING 2024 TRAFFIC VOLUMES

ROUTE 9 / 9D TRAFFIC SIGNAL OPTIMIZATION DUTCHESS COUNTY, NEW YORK

Creighton Manning
a GAI Company

PROJECT:	122-173.02	DATE:	07/2026	FIGURE:	3

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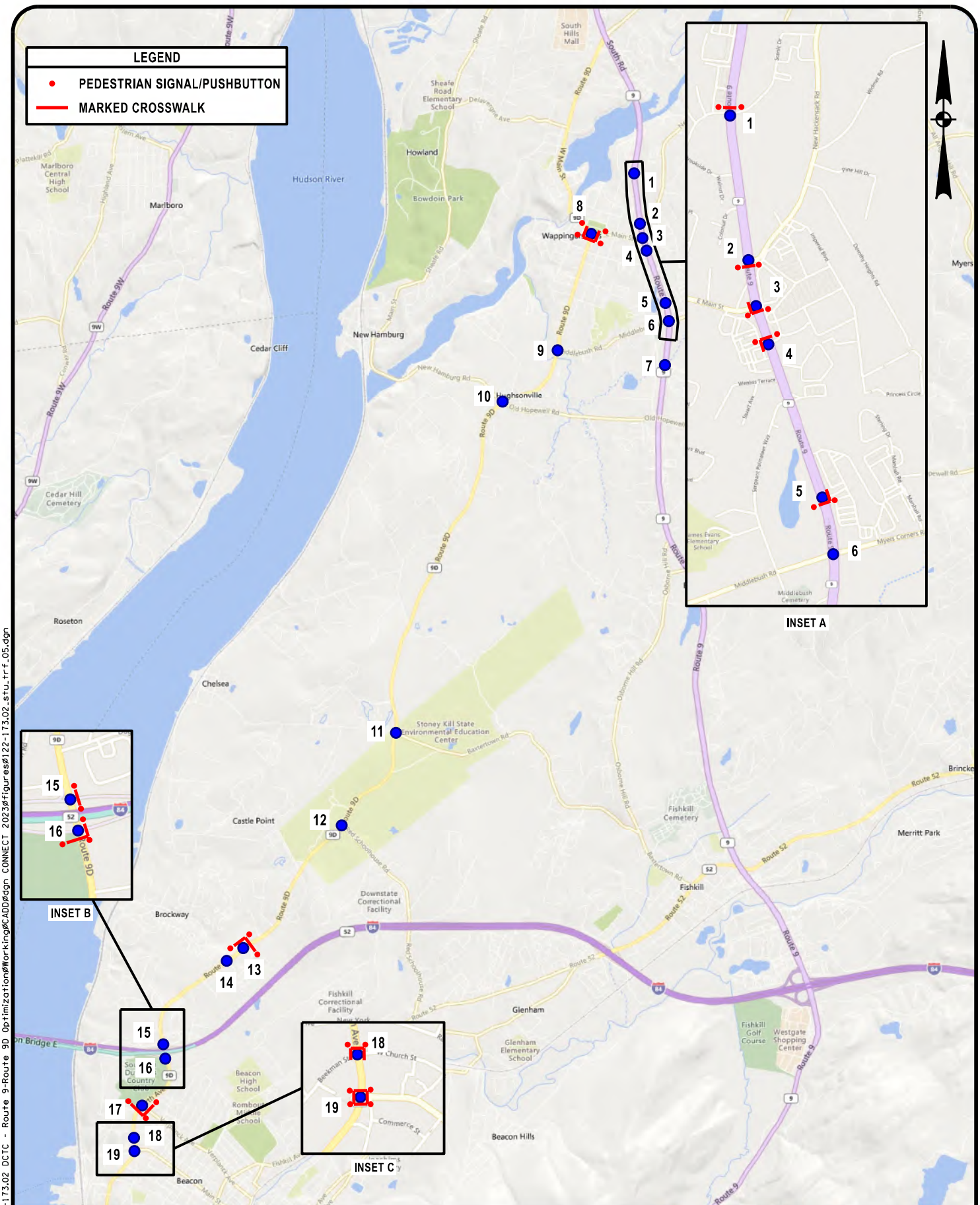

PEDESTRIAN ACCOMMODATION MAP

ROUTE 9 / 9D TRAFFIC SIGNAL OPTIMIZATION
DUTCHESS COUNTY, NEW YORK

Creighton Manning
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PROJECT:	122-173.02	DATE:	07/2026	FIGURE:	4

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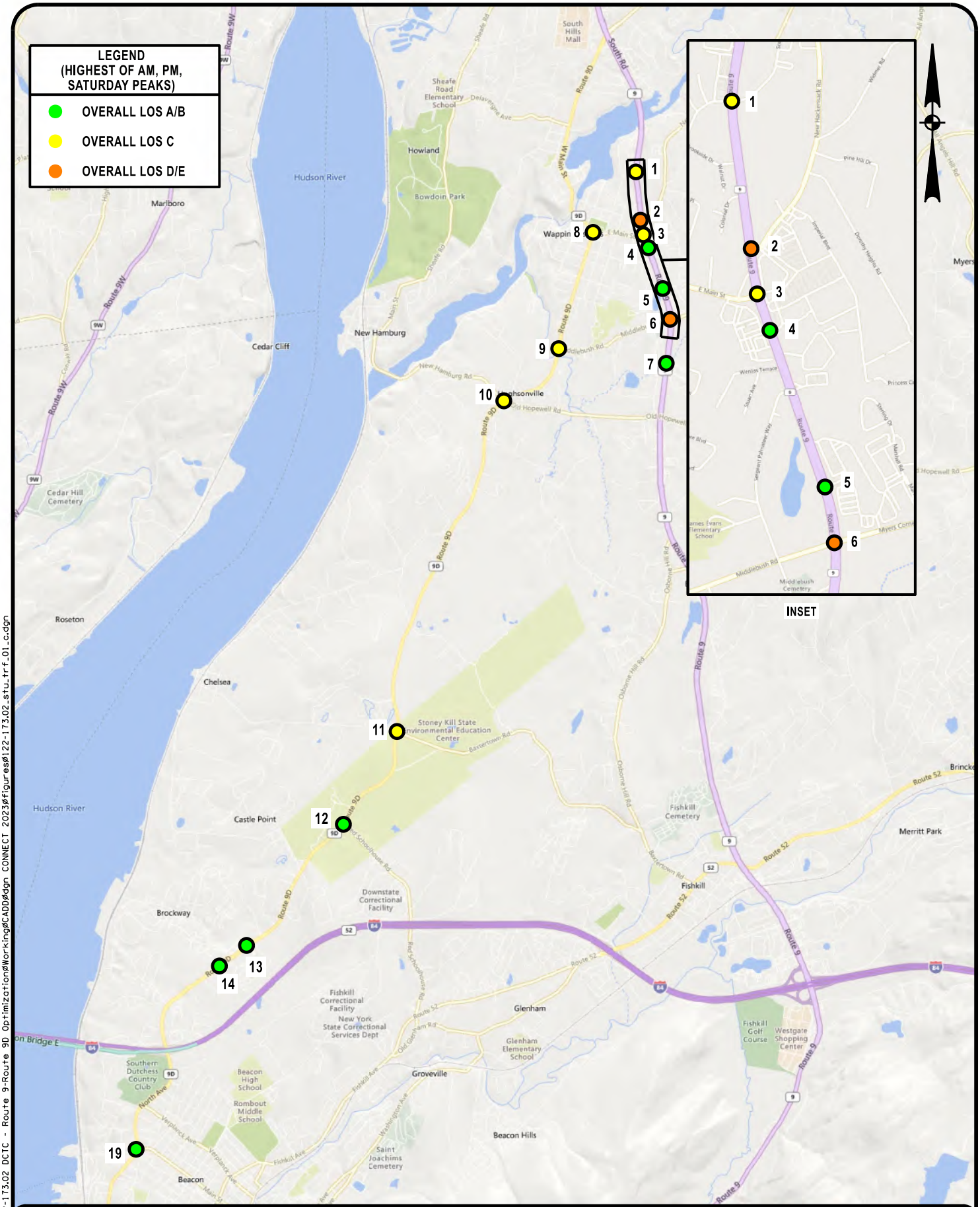

EXISTING OVERALL LEVEL OF SERVICE

ROUTE 9 / 9D TRAFFIC SIGNAL OPTIMIZATION
DUTCHESS COUNTY, NEW YORK

Creighton Manning
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PROJECT:	122-173.02	DATE:	07/2026	FIGURE:	5

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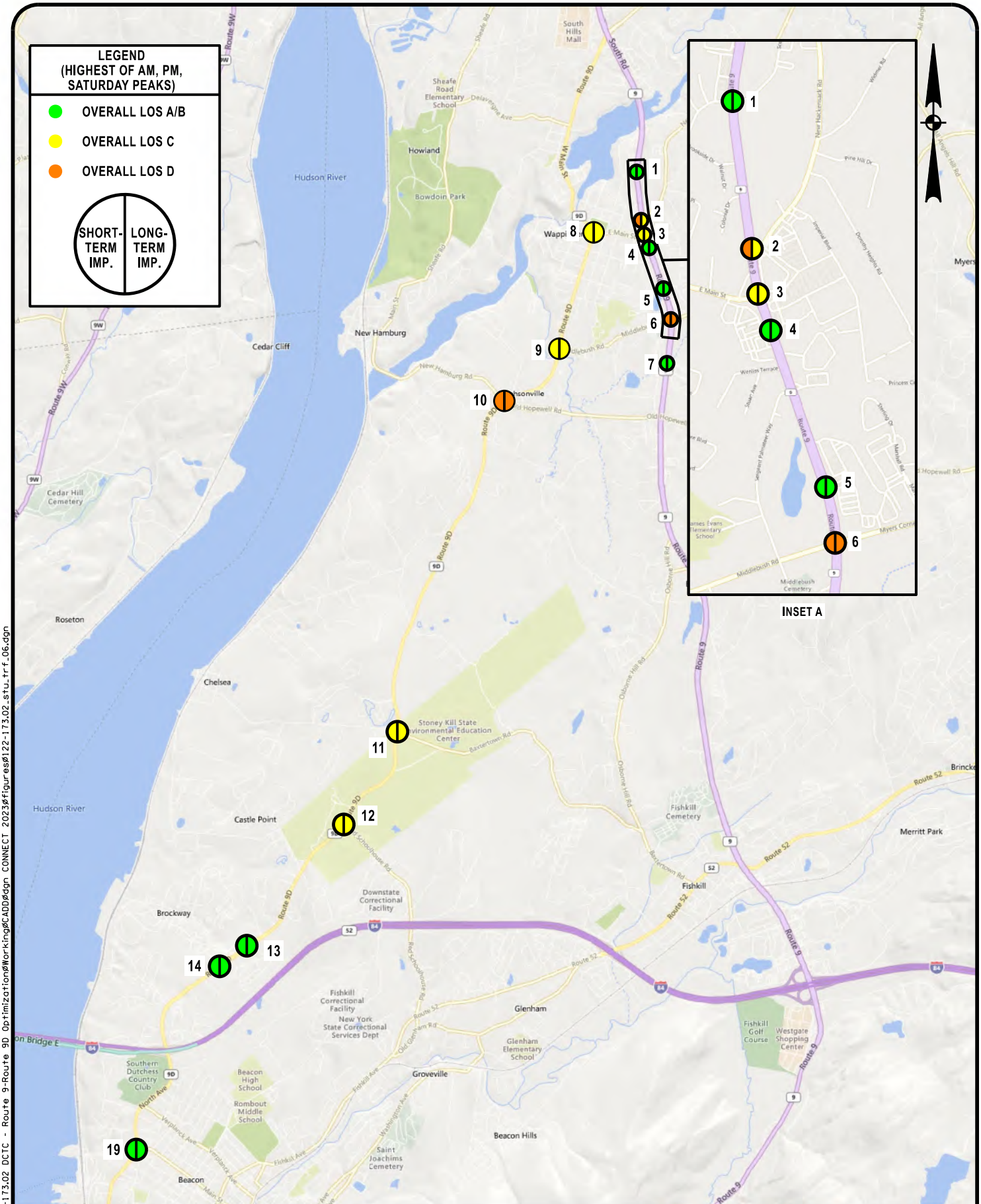

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SHORT-TERM / LONG-TERM IMPROVEMENTS LEVEL OF SERVICE

ROUTE 9 / 9D TRAFFIC SIGNAL OPTIMIZATION DUTCHESS COUNTY, NEW YORK

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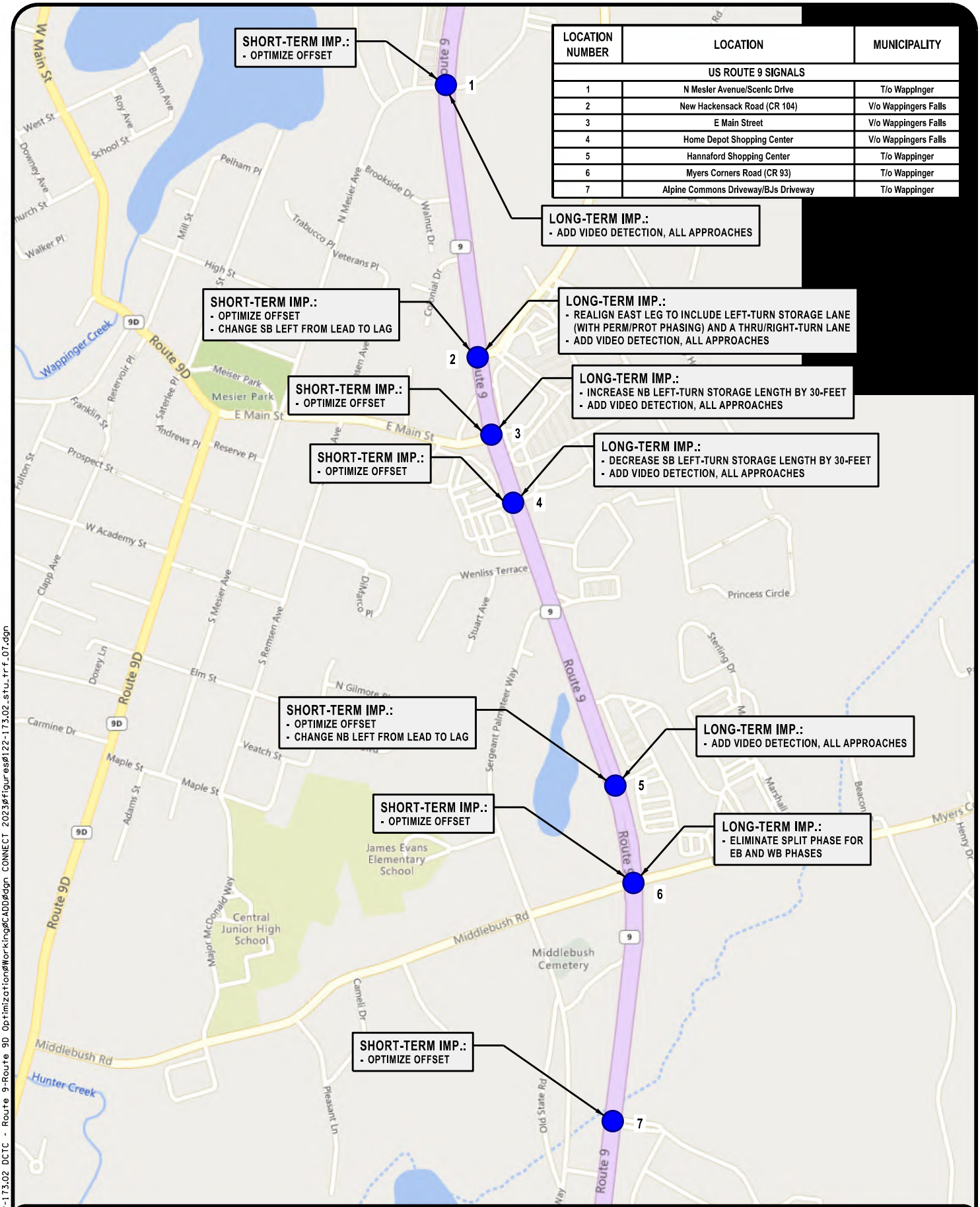
PROJECT:	122-173.02	DATE:	07/2026	FIGURE:	6



LOCATION NUMBER	LOCATION	MUNICIPALITY
US ROUTE 9 SIGNALS		
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5	Hannaford Shopping Center	T/o Wappinger
6	Myers Corners Road (CR 93)	T/o Wappinger
7	Alpine Commons Driveway/BJs Driveway	T/o Wappinger

US ROUTE 9 IMPROVEMENTS

ROUTE 9 / 9D TRAFFIC SIGNAL OPTIMIZATION
DUTCHESS COUNTY, NEW YORK

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PROJECT:	122-173.02	DATE:	07/2026	FIGURE:	7

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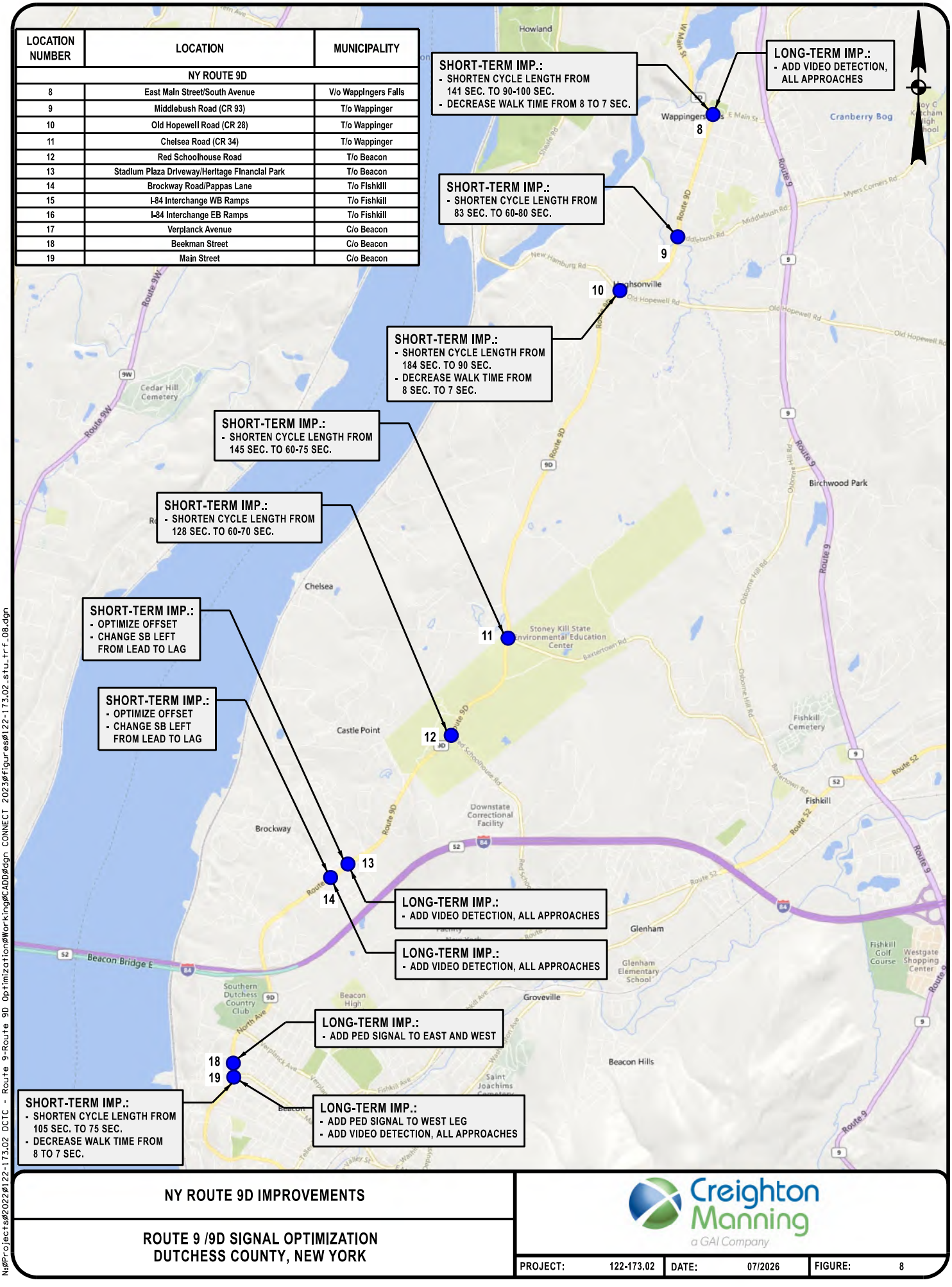

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NY ROUTE 9D IMPROVEMENTS

ROUTE 9 /9D SIGNAL OPTIMIZATION
DUTCHESS COUNTY, NEW YORK

Creighton Manning
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PROJECT:	122-173.02	DATE:	07/2026	FIGURE:	8