Capital District Transportation Committee (CDTC)/ Capital District Regional Planning Commission (CDRPC) Technical Assistance Program

TECHNICAL MEMORANDUM

Village of Castleton-on-Hudson

Development Growth Trends Analysis: Transportation

March 2022

Background

The Village of Castleton-on-Hudson is collecting information to prepare for an update of their Comprehensive Plan (2005). The purpose of this Technical Assistance effort is to compile and analyze transportation-related data since 1998 along key corridors in the Village of Castleton-on-Hudson, to inform the Village's Comprehensive Plan update process.

Daily Traffic Volume Trends

Traffic volume data was collected from the New York State Department of Transportation (NYSDOT) Highway Data Services Bureau. Daily traffic volumes are expressed using the Average Annual Daily Traffic (AADT). AADT is the total volume of vehicle traffic on a roadway for a year, divided by 365 days. There are various methods for collecting data to estimate AADT, including automated and actuated counters, cameras, or using an observer to record traffic.

Daily traffic volume data was collected for four (4) roadway segments identified by Village of Castleton-on-Hudson representatives and is displayed in Table 1 below. For each segment, AADT was collected for all available years since 1998. A compound annual growth rate was calculated for each segment[i]. Segments with growth rates less than zero (negative growth) are shaded in pink, while segments with growth rates greater than zero (positive growth) are shaded in green. A detailed analysis of daily traffic volume trends for each segment can be found on pages T-1 to T-4, attached to this Tech Memo.

Table 1: Daily Traffic Volume Trends[ii]

Page Ref.	Roadway	Segment		Years	Annual Growth Rate
		From	To		
T-1	**NY 9J/Main St**	CR 6/Seaman Ave	CR 58/Hays Rd	1999-2019	-1.0%
T-2	**NY 9J/Main St**	NY 150/Scott Ave	CR 6/Seaman Ave	1998-2019	-1.1%

Table 1: Daily Traffic Volume Trends[ii]					
Page Ref.	**Roadway**	**Segment**		**Years**	**Annual Growth Rate**
		From	**To**		
T-3	**NY 9J/Main St**	CR 2/Schodack Landing Rd	NY 150/Scott Ave	2000-2019	-1.1%
T-4	**NY 150/Scott Ave**	NY 9J/Main St	CR 6/Seaman Ave	1999-2019	-0.6%

There were two (2) other locations with only one traffic count available, therefore, no trends could be analyzed, at:

- Green Ave (NY 9J/Main St to NY 150/Scott Ave)
  - AADT: 972 (2001)
- Scott Ave (Railroad to NY 9J/Main St)
  - AADT: 400 (2002)

Daily Traffic Volume Trends: Observations

From Table 1, the following observations about daily traffic volume trends can be made:

- The AADT data suggests, since 1998, there has been no growth in traffic volumes, and most cases negative growth, for the roadway segments included in this analysis
- All four (4) of the roadway segments included in this analysis experienced negative growth
- The slow/no growth of traffic volumes for the roadway segments included in this analysis is consistent with the observed slow growth of Vehicle Miles Traveled (VMT) in the CDTC region since 1998

Peak Hour Traffic Volume Trends

Similarly, as described above, peak hour traffic volume data was collected from the NYSDOT Highway Data Services Bureau. Peak hour traffic represents the one hour of the day where the traffic volume on the roadway segment is highest. For this analysis, the highest hour of traffic was analyzed regardless of the time of day, also known as a high-hour analysis. In many cases, the peak hour occurs sometime during the evening hours, from approximately 4:00-6:00 PM.

Available peak hour traffic volume data was collected for the same four (4) roadway segments identified by Village of Castleton-on-Hudson representatives above for the daily traffic volume analysis and is displayed in Table 2 below. For each segment, peak hour traffic volume data was collected for all available years since 1998. A compound annual growth rate was calculated for each segment[iii]. Segments with growth rates less than zero (negative growth) are shaded in pink, while segments with growth rates greater than zero (positive growth) are shaded in green. A detailed analysis of peak hour traffic volume trends for each segment can be found on pages T-1 to T-4, attached to this Tech Memo.

Table 2: Peak Hour Traffic Volume Trends[ii]					
Page Ref.	**Roadway**	**Segment**		**Years**	**Annual Growth Rate**
		From	**To**		
T-1	**NY 9J/Main St**	CR 6/Seaman Ave	CR 58/Hays Rd	1999-2016	-0.6%
T-2	**NY 9J/Main St**	NY 150/Scott Ave	CR 6/Seaman Ave	1998-2016	-0.6%
T-3	**NY 9J/Main St**	CR 2/Schodack Landing Rd	NY 150/Scott Ave	2000-2016	-0.9%
T-4	**NY 150/Scott Ave**	NY 9J/Main St	CR 6/Seaman Ave	2001-2017	1.1%

Peak Hour Traffic Volume Trends: Observations

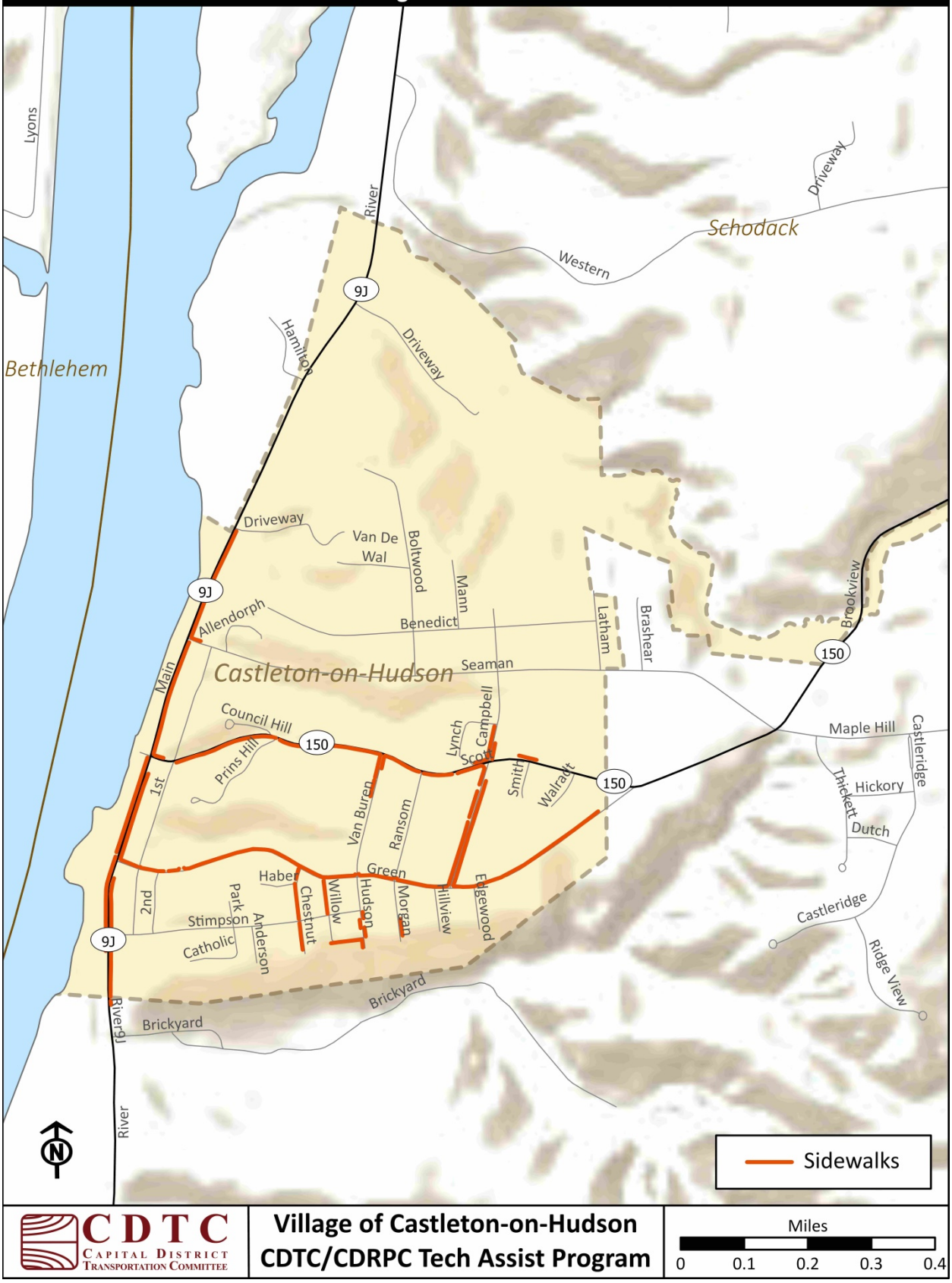
From Table 2, the following observations about peak hour traffic volume trends can be made:

- The peak hour traffic volume data suggests, since 1998, there has been little/no growth in traffic volumes, and some cases negative growth, for the roadway segments included in this analysis
- The peak hour traffic volume data suggests, since 1998, the fastest-growing roadway segment included in this analysis is NY 150, between NY 9J/Main St and CR 6/Seaman Ave, at 1.1%/year
- Three (3) of the roadway segments included in this analysis experienced negative growth, while one (1) of the roadway segments included in this analysis experienced positive growth
- The slow/no growth of peak hour traffic volumes for the roadway segments included in this analysis is consistent with observed slow growth of Vehicle Miles Traveled (VMT) in the CDTC region since 2000

Pedestrian and Bicycle Facilities

Existing sidewalks in the Village are shown in orange on Figure 1, below. There are no regional trails currently in the Village; however, there may be other local trails, not shown on the map. Likewise, no trail counts are available in the Village. There are currently no on-street bicycle facilities in the Village.

Figure 1: Sidewalks



Crash Data

Data for crashes within the Village of Castleton-on-Hudson was extracted from the New York State ALIS (Accident Location Information System) LESQR (Location Editing, Simple Query, and Reporting)/QRA (Query, Report, and Analysis) database containing data from the NYS DMV and DOT for a ten (10)-year time period from November 1, 2011, through October 31, 2021.[iv]

A total of 138 crashes occurred within the Village during the ten (10)-year period. A summary of crash types can be found in Table 3. 84 (61%) of the crashes involved collisions between two (2) or more motor vehicles. 20 (14%) of the crashes involved a collision with a deer, while another 12 (9%) involved a collision with an animal. There were no crashes involving pedestrians or bicyclists.

Table 3: Summary of Crash Type (All Crashes)

Crash Type	Number	Percent
Collision with Motor Vehicle	84	61%
Collision with Deer	20	14%
Collision with Animal	12	9%
Collision with Light Support/Utility Pole	7	5%
Collision with Earth/Rock Cut/Ditch	4	3%
Collision With Guide Rail	3	2%
Collision With Building/Wall	2	1%
Collision With Culvert/Headwall	2	1%
Other	4	3%
Total	**138**	**100%**

Further analysis, including factors such as lighting conditions, weather, collision type, and severity led to the following highlights:

- The majority (59%) of crashes occurred in daylight. There were 25 (18%) crashes on dark, unlit roadways, and a combined 8 (6%) crashes occurred during dawn or dusk.
- The majority (60%) of crashes occurred in clear weather. There were 14 (10%) crashes in the rain and snow.
- The most common crash types are animal collisions (32/23%), rear-end (20/14%), fixed-object (20/14%), and overtaking (19/14%).
- Most of the crashes were classified as Property Damage Only (120/87%). There were no Fatalities or Serious Injury crashes during the ten (10) year period. Eighteen (18) of the crashes were classified as Other Injury.

A summary of the crash data set can be found on Table 4.

Table 4: Summary of Village of Castleton-on-Hudson Crash Data (2011-2021)

Time of Day

	Num.	Percent
0600-1000	31	22%
1000-1600	41	30%
1600-1900	26	19%
1900-2400	26	19%
2400-0600	14	10%
Total	138	100%

Weather

	Num.	Percent
Clear	83	60%
Cloudy	38	28%
Rain/Snow	14	10%
Sleet/Hall/Freezing Rain	3	2%
Total	138	100%

Light Condition

	Num.	Percent
Daylight	81	59%
Dawn	4	3%
Dusk	4	3%
Dark Lighted	24	17%
Dark Unlighted	25	18%
Total	138	100%

Time of Year

	Num.	Percent
Winter (Dec-Feb)	61	44%
Spring (Mar-May)	29	21%
Summer (Jun-Aug)	39	28%
Fall (Sep-Nov)	9	7%
Total	138	100%

Crash Type

	Num.	Percent
Overtaking	19	14%
Rear End	20	14%
Right Angle	18	13%
Left Turn	1	1%
Sideswipe	6	4%
Fixed Object	20	14%
Animal	32	23%
Right Turn	1	1%
Other	21	15%
Total	138	100%

Roadway Characteristics

	Num.	Percent
Straight & Level	100	72%
Straight & Grade	17	12%
Straight & Hillcrest	1	1%
Curve & Level	14	10%
Curve & Grade	6	4%
Total	138	100%

Crash Severity

	Num.	Percent
Fatal	0	0%
Serious Injury	0	0%
Other Injury	18	13%
Property Damage Only	120	87%
Total	138	100%

Roadway Surface Condition

	Num.	Percent
Dry	106	77%
Wet	16	12%
Snow/Ice	15	11
Slush	1	1
Total	138	100%

Crash Locations

The locations of all crashes reported during the ten (10)-year period are displayed on Figure 2, including "hot spots". The Kernel Density function, as part of ESRI's ArcGIS Pro's Spatial Analyst package, was used to identify locations in/near the Village with the highest number of crashes.[v] It should be noted that "hot spots" in this case are comparing all locations in/near Castleton-on-Hudson with each other,

and do not necessarily represent a higher than normal crash rate, or locations with a higher than normal number of crashes. In many cases, the high crash locations are located along the highest traffic volume roadways, as could be expected. "Hot spots" can be observed in the Village at:

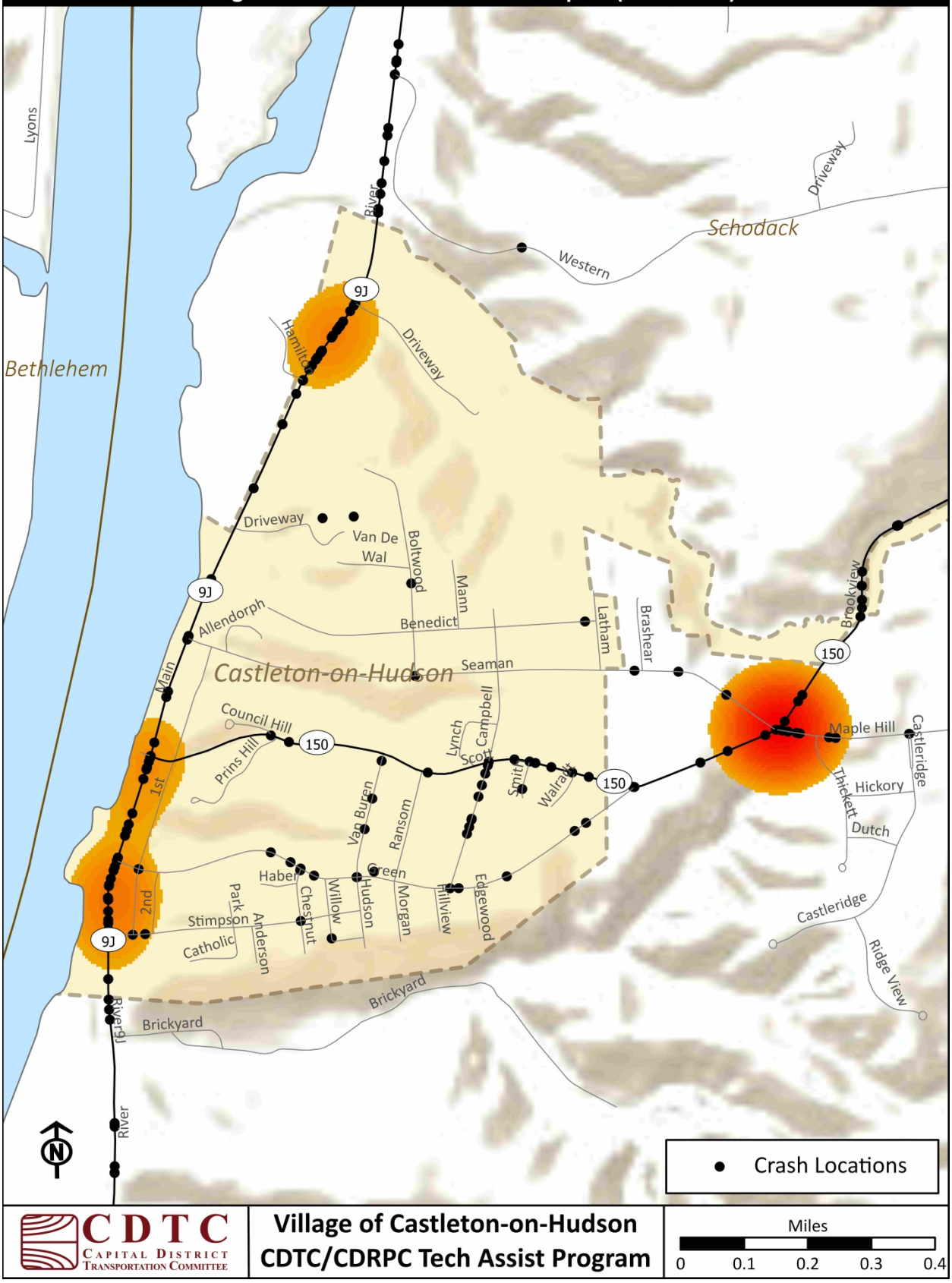
- NY 9J/Main St between Stimpson Ave and Green Ave
- NY 9J/Main St and NY 150/Scott Ave
- NY 9J between Hamilton Way and Castleton Energy Center driveway

Another "hot spot" is noted just outside the Village, at NY 15/Scott Ave, Seaman Ave, CR 6/Maple Hill Rd, and Brookview Ave, in the Town of Schodack.

Notes

The data included in this analysis were collected before the onset of the COVID-19 pandemic. Traffic volumes collected by NYSDOT in 2020 and 2021 were excluded from this analysis but will be provided to the Village where available. This analysis does not include the traffic volume impacts and potential traffic pattern shifts that could have possibly occurred during and/or after the COVID-19 pandemic. CDTC is currently assessing traffic volume and pattern shifts from the COVID-19 pandemic, however, the analysis was not available at the time of this publication.

Figure 2: Crash Locations and Hot Spots (2011-2021)



[i] Compound Annual Growth Rate = (Last AADT Value/First AADT Value) ^ (1/Number of Years) – 1

[ii] Data Source: NYSDOT Highway Data Services Bureau AADTs accessed via https://www.dot.ny.gov/divisions/engineering/technical-services/highway-data-services on 1/12/2022

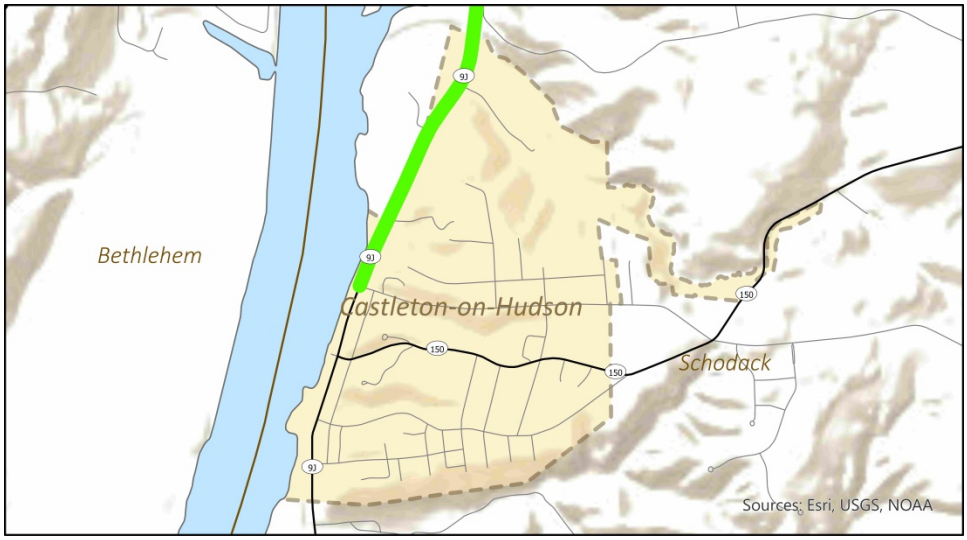
[iii] Compound Annual Growth Rate = (Last Peak Hour Value/First Peak Hour Value) ^ (1/Number of Years) – 1

[iv] Crash data was extracted from the ALIS LESQR/QRA database on January 19, 2022

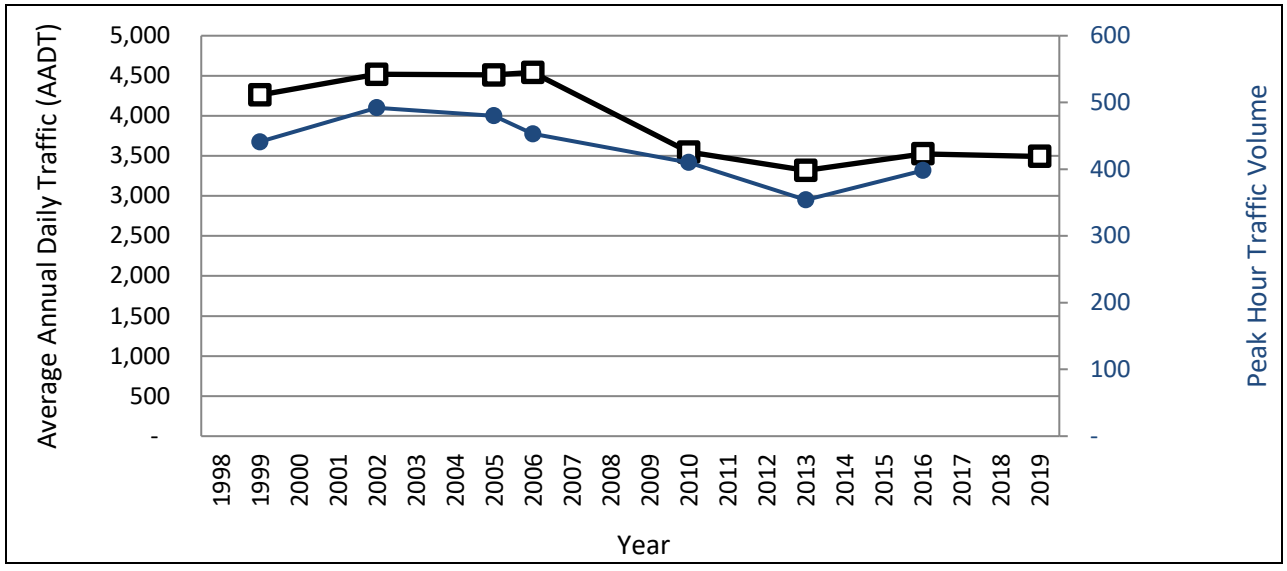
[v] Kernel Density calculates the density of point features around each output raster cell. Conceptually, a smoothly curved surface is fitted over each point. The surface value is highest at the location of the point and diminishes with increasing distance from the point, reaching zero at specified distance from the point. The density at each output raster cell is calculated by adding the values of all the kernel surfaces where they overlay the raster cell center. The kernel function is based on the quartic kernel function described in *Density Estimation for Statistics and Analysis*, B.W. Silverman, 1986, p. 76, equation 4.5. (Source: *How Kernel Density Works*, ArcGIS Pro 2.8, accessed via https://pro.arcgis.com/en/pro-app/2.8/tool-reference/spatial-analyst/how-kernel-density-works.htm)

Traffic Volume Trends Summary

Roadway:	Limits:	NYSDOT Station ID:
NY 9J	CR 6/Seaman Ave to CR 58/Hays Rd	140015



Traffic Counts: 1998-2019[1]								
Year	1999	2002	2005	2006	2010	2013	2016	2019*
AADT[2]	4,260	4,519	4,511	4,542	3,547	3,318	3,526	3,493
Peak Hour	441	492	480	453	410	354	398	n/a



AADT Compound Annual Growth Rate (1999-2019): **-1.0%**

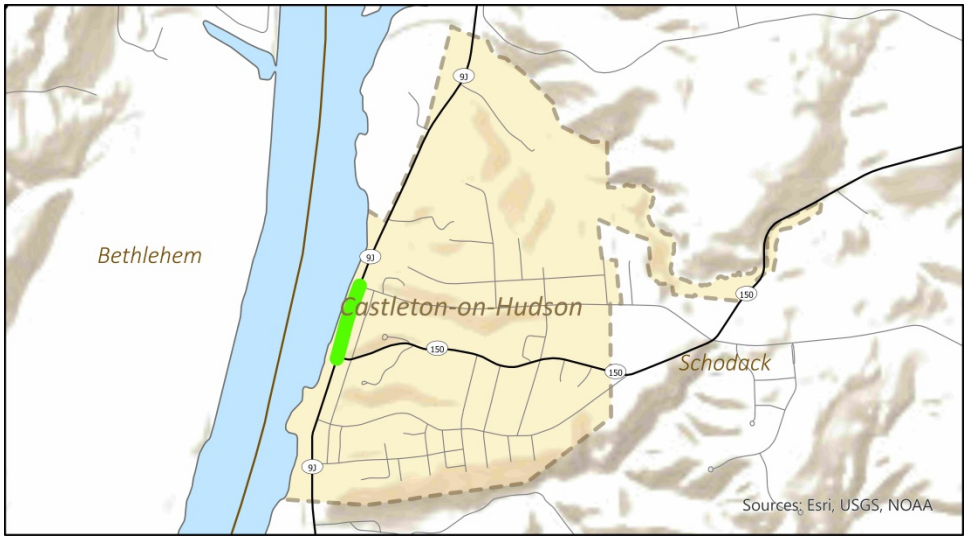
Peak Hour Compound Annual Growth Rate (1999-2016): **-0.6%**

[1] Data Source: NYSDOT Highway Data Services Bureau AADTs accessed via https://www.dot.ny.gov/divisions/engineering/technical-services/highway-data-services on 1/10/2022; *2019 counts are estimates provided by NYSDOT

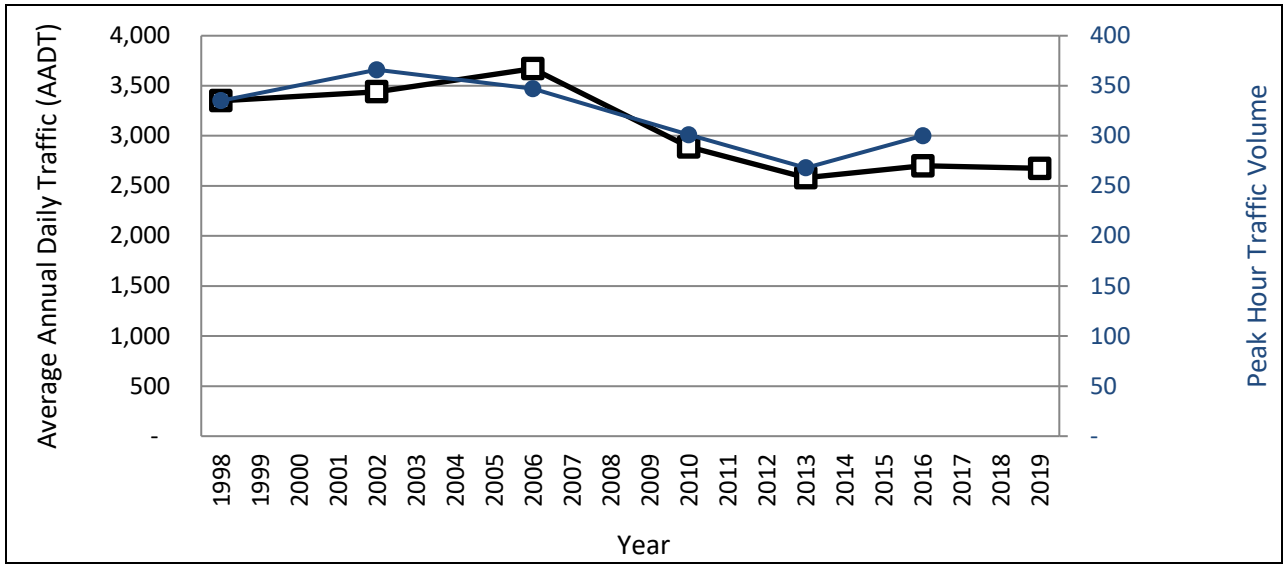
[2] AADT = Average Annual Daily Traffic

Traffic Volume Trends Summary

Roadway:	Limits:	NYSDOT Station ID:
NY 9J	NY 150/Scott Ave to CR 6/Seaman Ave	140065



Traffic Counts: 1998-2019[1]							
Year	1998	2002	2006	2010	2013	2016	2019*
AADT[2]	3,350	3,440	3,671	2,889	2,582	2,700	2,675
Peak Hour	335	366	347	301	268	300	n/a



AADT Compound Annual Growth Rate (1998-2019): **-1.1%**

Peak Hour Compound Annual Growth Rate (1998-2016): **-0.6%**

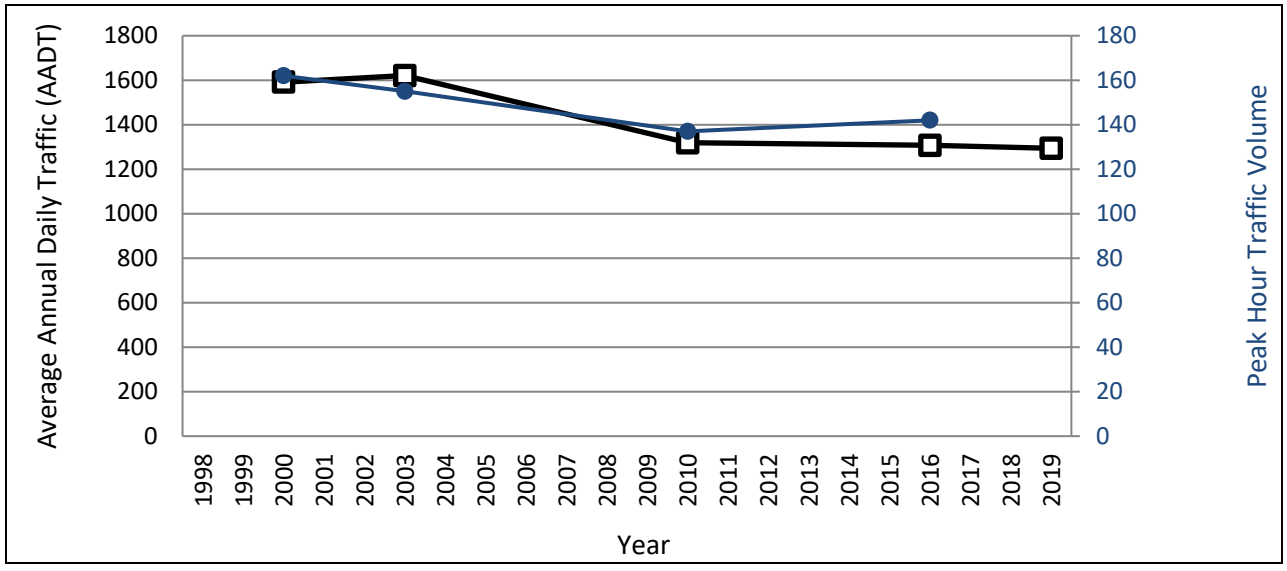
[1] Data Source: NYSDOT Highway Data Services Bureau AADTs accessed via https://www.dot.ny.gov/divisions/engineering/technical-services/highway-data-services on 1/10/2022; *2019 counts are estimates provided by NYSDOT

[2] AADT = Average Annual Daily Traffic

Traffic Volume Trends Summary

Roadway:	Limits:	NYSDOT Station ID:
NY 9J	CR 2/Schodack Landing Rd to NY 150/Scott Ave	140018

Traffic Counts: 1998-2019[1]					
Year	2000	2003	2010	2016	2019*
AADT[2]	1,591	1,621	1,319	1,307	1,294
Peak Hour	162	155	137	142	n/a



AADT Compound Annual Growth Rate (2000-2019): **-1.1%**

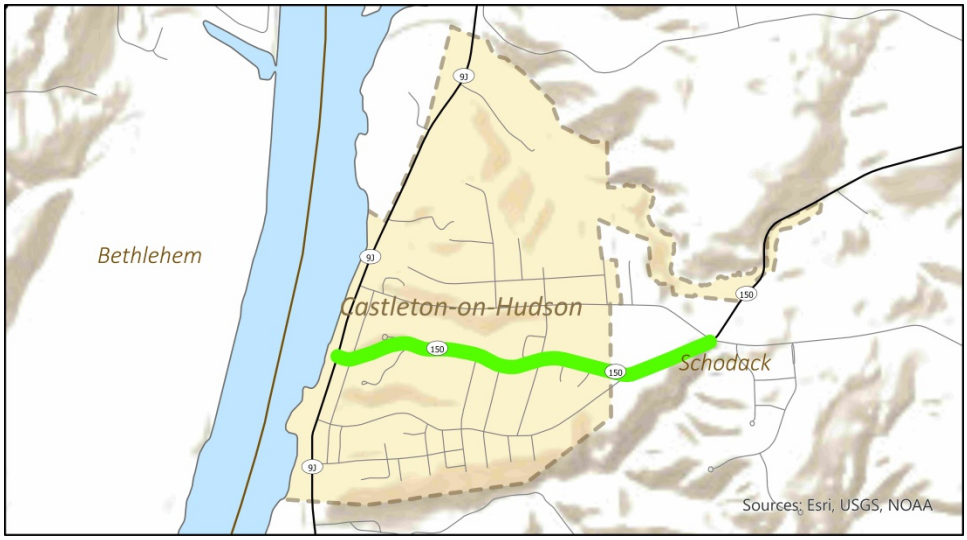
Peak Hour Compound Annual Growth Rate (2000-2016): **-0.9%**

[1] Data Source: NYSDOT Highway Data Services Bureau AADTs accessed via https://www.dot.ny.gov/divisions/engineering/technical-services/highway-data-services on 1/10/2022; *2019 counts are estimates provided by NYSDOT

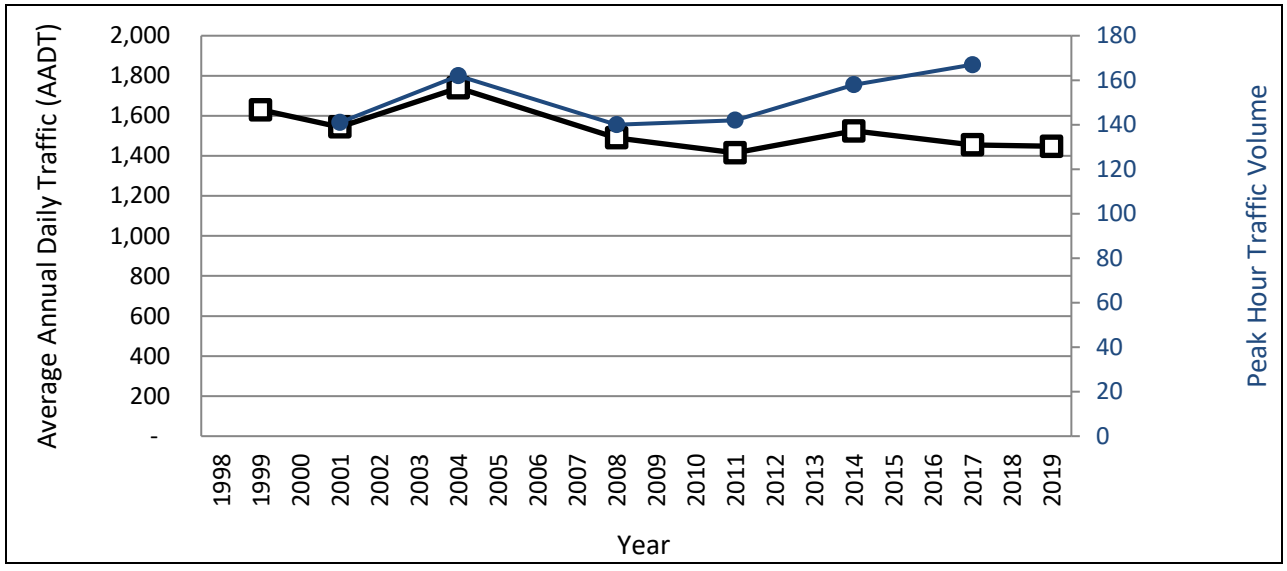
[2] AADT = Average Annual Daily Traffic

Traffic Volume Trends Summary

Roadway:	Limits:	NYSDOT Station ID:
NY 150/Scott Ave	NY 9J to CR 6/Seaman Ave	140512



Traffic Counts: 1998-2019[1]								
Year	1999	2001	2004	2008	2011	2014	2017	2019*
AADT[2]	1,630	1,544	1,739	1,490	1,415	1,524	1,455	1,448
Peak Hour	n/a	141	162	140	142	158	167	n/a



AADT Compound Annual Growth Rate (1999-2019): **-0.6%**

Peak Hour Compound Annual Growth Rate (2001-2017): **1.1%**

[1] Data Source: NYSDOT Highway Data Services Bureau AADTs accessed via https://www.dot.ny.gov/divisions/engineering/technical-services/highway-data-services on 1/10/2022; *2019 counts are estimates provided by NYSDOT

[2] AADT = Average Annual Daily Traffic