Technical Memorandum

To: **John Tully, Deputy Commissioner, Putnam County Highways & Facilities**

From: **Michael Wieszchowski, PE, PTOE, Greenman-Pedersen, Inc.**

Subject: **Roundabout Supplemental Analysis Summary**

Date: **October 3, 2019**

To supplement the Traffic Analysis and Roundabout Feasibility Report prepared in June 2019, additional analysis was performed at the following 3 intersections.

9. Fairfield Dr & Haviland Dr
10. Fairfield Dr & Haviland Dr
11. Secor Rd & Wood St

A summary of each evaluation is as follows:

Fairfield Dr & Haviland Dr

- Level of Service and Capacity appear adequate for the traffic volumes present in the peak hours.
- Neither traffic volumes nor accidents are sufficient enough to warrant a traffic signal.
- Vehicles backing from roadside parking stalls into the travelway appear to be a significant contributor to the high accident rate at this location.
- Sight distance is less than desirable, but not critically limited.
- A Roundabout would require significant property acquisition and even then slopes would make installation difficult. A roundabout is not recommended for this location.
- Two concepts are presented in the Report that could improve safety at this location, both require significant coordination and “Buy-in” of property owners to reconfigure parking.

Fairfield Dr & Haviland Dr

- Level of Service and Capacity appear adequate for the traffic volumes present in the peak hours. Although there is a potential queuing issue eastbound which could impact safety.
- Neither traffic volumes nor accidents are sufficient enough to warrant a traffic signal.
- Accident rate is high, but no pattern of concern was noted. Contributing factors could potentially be adjacent roadside parking backing out into the travelway or sight distance limitation along Haviland Dr looking left past the war memorial, but neither of these factors were listed as a factor in any of the accidents reported.
- A Roundabout would require significant property acquisition and even then the approaching slope on Haviland Dr may make installation difficult. A roundabout is not recommended for this location.

- Two concepts are presented in the Report that could improve safety and reduce queues at this location, both require significant coordination and "Buy-in" of property owners to eliminate roadside parking spaces in order to construct an eastbound left turn lane.

Secor Rd & Wood St

- Level of Service and Capacity appear adequate for the traffic volumes present in the peak hours.
- Neither traffic volumes nor accidents are sufficient enough to warrant a traffic signal.
- Accident rate is high, and although there is no definitive correctable pattern of accidents, there is a higher than normal percentage of right angle crashes. Given the all-way stop condition, this should not occur unless drivers are not seeing or ignoring the stop signs.
- A Roundabout could be constructed within the existing right-of-way at this location. Although not warranted by traffic volume at this time, the installation of a roundabout would eliminate the possibility of right angle accidents which should improve safety.

The evaluation sheets, data sheets, conceptual cost estimate and concept sketches for each intersection follows:

SUMMARY OF INTERSECTION EVALUATION
TOWNERS RD AND HILL AND DALE RD/LAKESHORE DR

Existing Conditions:

The existing intersection has four approaches with Towner Rd approaching from the northwest and northeast, curving significantly within the intersection and being uncontrolled. Hill and Dale Road approaches from the south and Lakeshore Driver approaches from the north and both are stop sign controlled. On the south side of the intersection there is a deli and an auto repair shop that have wide curb cuts that run the length of their frontage and cars are allowed to park in front of the businesses. This is problematic as car's pulling out of these parking spaces have to back into the roadway in order to get out of the properties. This situation also occurs on the north side for a newly renovated hair salon and gift shop building. There are no pedestrian crossing accommodations at the intersection and there are no sidewalks approaching the intersection. It should also be noted that there is a significant downgrade on the north side of the intersection, with slopes of 10% or more leading away from the intersection.

Sight distance is limited by both horizontal and vertical curvature, as well as parked vehicles at the deli for both side streets. It appears that there is sufficient stopping sight distance for the 30 mph speed limit (200 foot minimum), but in some area's the 335 feet needed for desirable intersection sight distance is not available.

A traffic analysis was conducted and capacity is adequate at this intersection. Intersection Level of service is LOS A in both peak hours and no approach operates worse than LOS B. An Intersection Evaluation worksheet, showing geometric details, the existing traffic volumes, and a summary of the capacity analyses is attached.

Signal Warrant Analysis:

A review of the hourly traffic volumes between 7:00 AM and 8:00 PM show that none of the warrants reviewed; Warrant 1 (8-hour warrant), Warrant 2 (4-hour warrant) or Warrant 3 (peak hour warrant) are satisfied for the existing traffic volumes. In fact, there is not a single hour that satisfies the minimum requirements for the least restrictive 8-hour warrant. Additionally, fewer than 5 accidents per year occur at this location, so Warrant 7 (Crash Experience) is not satisfied either. With no warrants being satisfied, a traffic signal, or similar treatment such as a roundabout, is not justified. See attached signal warrant analysis worksheets for more details.

Accident Analysis:

Accident data shows 10 accidents at this location in the 3-year period (2016-2018) reviewed. This results in an accident rate of 1.82 accidents/MEV, which is 5 times the statewide average for similar intersections. However, the majority of the accidents (60%) had nothing to do with the intersection and were related to the parking situation adjacent to the intersection and vehicles backing out into the roadway. Outside of that, there is no accident pattern that would be of concern. The accidents types and severity are summarized in the table below, and accident records are attached.

ACCIDENT SUMMARY

Accident Type	Number of Occurrences	Accident Severity	Number of Occurrences
Right Angle	3 (all 3 involving backing)	Fatality	0
Sideswipe	3 (1 involving backing)	Personal Injury	2
Rear End	2 (1 involving backing)	Property Damage Only	3
Pedestrian	1	Non-Reportable	5
Other	1 (Involved backing)		
	10		10

Field Condition and Right of Way Review:

This location is not conducive to the installation of a roundabout. The significant slopes to the north of the intersection would require the roundabout to be constructed more to the south, so any roundabout solution would require acquisition and demolition of both the Deli and the Auto Repair shop to the south of the intersection, and even then, the slopes to the north would be difficult to address leading into a roundabout.

Design Alternative Consideration:

As there is no existing capacity issue with the current geometry, alternatives that included the installation of a traffic signal and a roundabout were analyzed for informational purposes but were not considered as reasonable alternatives. With both a traffic signal and roundabout, the intersection would operate at LOS A, same as the existing condition, so neither provides a significant level of service benefit either. Figure 9 does depict the roundabout option in order to show the construction footprint and right-of-way impacts, but as mentioned, it isn't warranted and would require the demolition of two key area businesses. As such, two other improvement options were considered. Both keeping the existing traffic control, but better addressing the safety issues identified at this location.

Concept A keeps the roadway as it is and only reconfigures parking to removes vehicles backing into the mainline traffic. It does this by moving the deli parking to the side road and constructing a retaining wall deeper into the northern property to allow enough room for vehicle turnouts without hitting the road. See Figure 9A for a concept sketch of this alternative. With this option, there will still be vehicles backing into a roadway at the deli, but they will be backing into a very lightly traveled local road, which poses far less of a safety concern than backing out onto Towners Road. This option would require significant cooperation and coordination with the business owners, but would provide a much safer condition than the existing geometry.

Concept B takes a similar approach, but also realigns Towners Rd to provide less curvature and better sight distance. Treatment on the north side would be similar to Concept A, but with the roadway shifting to the north, it allows parking to remain in front of the deli by providing more maneuvering space (see Figure 9B). This option still requires "buy-in" from the business owners, as improvements are being made on private property, and it has significant grade issues to overcome, but is the option that best addresses both sight distance and parking to improve safety.

Conceptual Cost Estimate:

Based on our past experience with similar projects, knowledge of construction pricing in this region of New York State and our understanding of the issues, it is estimated that Concept A would cost approximately $800,000, and concept B, with the road realignment, would cost approximately $1,580,000. These costs include construction of all improvements, right-of-way, wetland mitigation, and costs for design and inspection. If a roundabout was progressed, it would likely cost close to $3M because of the extensive property acquisitions and slope mitigation. Cost estimates with a breakdown of the big picture cost items is attached.

Summary & Conclusion:

The analysis shows that there is no capacity or level of service issues at the existing intersection and that the need for more extensive traffic control, such as a signal or roundabout, is not warranted. However, the accident analysis did identify a safety issue with vehicles backing out of adjacent businesses onto the roadway, and sight distance is somewhat limited for the side street traffic. It is recommended that parking adjacent to the intersection be reconfigured in some way to reduce the likelihood vehicles backing into the travelway, similar to that shown in either Concept Sketch A or Concept Sketch B. If this parking reconfiguration could be incorporated with a realignment of Towners Rd, improved sight distance could be achieved, and safety maximized.

INTERSECTION EVALUATION WORKSHEET

Project: Putnam County Roundabout Evaluation

Location: Putnam County (Various Locations)

Intersection: Towners Rd & Hill and Dale Rd

GPS Coord.: 41°26'50.02"N, 73°39'51.47"W

Traffic Control: Stop Sign (NB & SB)

Traffic Control Notes (if applicable):

Two-Way Stop Control

Other Intersection Notes (if applicable):

Steep grade on westbound and southbound approaches. Frequent exits from adjacent commercial properties into intersection.

APPROACH DATA

	Hill and Dale Rd			Lakeshore Dr			Towners Rd			Towners Rd		
	Northbound			**Southbound**			**Eastbound**			**Westbound**		
	Left	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**
Lane Assignments:		<-1->			<-1->			<-1->			<-1->	
Lane Widths:		11'			10'			11'			11'	
Turn Bay Lengths:		-			-			-			-	
Speed Limits:	30 mph			30 mph			30 mph			30 mph		

TRAFFIC COUNT DATA

(traffic volumes below represent counted traffic adjusted by 1.05 to account for seasonal variation and annual growth)

AM Peak Hour	Time Period:	7:45	to	8:45					Date Counted:	9/11/2019		
Volume:	50	11	24	0	26	29	12	27	64	48	55	0
Truck %:	6%	20%	9%	0%	1%	1%	9%	15%	2%	6%	1%	0%
Peds (Bikes):	0 (0)			0 (0)			3 (0)			0 (0)		
PHF = 0.83												
PM Peak Hour	Time Period:	4:45	to	5:45					Date Counted:	9/11/2019		
Volume:	127	38	58	0	21	30	29	80	78	29	43	4
Truck %:	1%	1%	1%	0%	1%	1%	1%	1%	1%	1%	1%	1%
Peds (Bikes):	0 (0)			0 (0)			3 (0)			0 (0)		
PHF = 0.93												

EXISTING CONDITION LEVEL OF SERVICE

AM Peak Delay (s):	11.7			11.1			7.4			7.6		
LOS:	B			B			A			A		
v/c:	0.16			0.10			0.01			0.04		
95% Queue:	<25'			<25'			<25'			<25'		
A (6.0) Overall	**B (11.7)**			**B (11.1)**			**A (0.9)**			**A (3.6)**		
PM Peak Delay (s):	14.2			10.8			7.3			7.6		
LOS:	B			B			A			A		
v/c:	0.38			0.08			0.02			0.02		
95% Queue:	45'			<25'			<25'			<25'		
A (7.7) Overall	**B (11.7)**			**B (11.1)**			**A (1.1)**			**A (2.9)**		

Note: LOS calculated using HCM 6 methodologies. For unsignalized intersections, only side street approach delay and mainline left turn delay is shown. The HCM 6 methodology assumes zero delay for all other movements.

INTERSECTION EVALUATION WORKSHEET

	Hill and Dale Rd			Lakeshore Dr			Towners Rd			Towners Rd		
	Northbound			**Southbound**			**Eastbound**			**Westbound**		
	Left	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**
ANALYSIS SCENARIO #1 - LEVEL OF SERVICE												
Description of Improvements:	Actuated Traffic Signal with No Geometric Improvements											
AM Peak Delay (s):	10.6			10.2			5.5			5.3		
LOS:	B			B			A			A		
v/c:	0.23			0.18			0.19			0.14		
95% Queue:	30'			20'			20'			30'		
A (7.5) Overall	**B (10.6)**			**B (10.2)**			**A (5.5)**			**A (5.3)**		
PM Peak Delay (s):	11.4			9.6			6.6			5.8		
LOS:	B			A			A			A		
v/c:	0.44			0.13			0.28			0.10		
95% Queue:	80'			<25'			60'			35'		
A (8.8) Overall	**A (4.4)**			**A (5.0)**			**A (4.0)**			**A (5.9)**		
ANALYSIS SCENARIO #2 - LEVEL OF SERVICE												
Description of Improvements:	Single Lane Roundabout - 3 Leg (120' Radius) + Lakeshore Dr Stop Controlled											
Note: delay reported is the weighted average delay of the two intersections combined for each direction of travel.												
AM Peak Delay (s):	3.7			9.1			3.7			4.1		
LOS:	A			A			A			A		
v/c:	0.08			0.07			0.11			0.2		
95% Queue:	<25'			<25'			<25'			25'		
A (4.4) Overall	**A (3.7)**			**A (9.1)**			**A (3.7)**			**A (4.1)**		
PM Peak Delay (s):	4.7			8.9			3.7			4.0		
LOS:	A			A			A			A		
v/c:	0.20			0.06			0.16			0.11		
95% Queue:	25'			< 25'			25'			25'		
A (5.0) Overall	**A (4.7)**			**A (8.9)**			**A (3.7)**			**A (4.0)**		
ANALYSIS SCENARIO #3 - LEVEL OF SERVICE												
Description of Improvements:												
AM Peak Delay (s):												
LOS:												
v/c:												
95% Queue:												
Overall												
PM Peak Delay (s):												
LOS:												
v/c:												
95% Queue:												
Overall												

Towners Rd & Hill and Dale Rd
Carmel Hamlet NY
Wednesday, September 11, 2019

Time	Southbound Lakeshore Dr					Westbound Towners Rd					Northbound Hill and Dale Rd					Eastbound Towners Rd					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:00 AM	0	0	9	3	0	0	7	7	0	0	0	6	1	4	0	0	5	7	10	0	**59**
7:15 AM	0	0	5	5	0	0	8	12	0	0	0	10	2	3	0	0	1	5	17	2	**68**
7:30 AM	0	2	5	10	0	0	13	9	0	0	0	16	2	0	0	0	4	11	20	0	**92**
7:45 AM	0	0	7	9	0	0	20	16	0	0	0	10	2	4	0	0	3	9	20	0	**100**
Hourly Total	0	2	26	27	0	0	48	44	0	0	0	42	7	11	0	0	13	32	67	2	**319**

Towners Rd & Hill and Dale Rd
Carmel Hamlet NY
Wednesday, September 11, 2019

Time	Southbound Lakeshore Dr					Westbound Towners Rd					Northbound Hill and Dale Rd					Eastbound Towners Rd					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
8:00 AM	0	0	6	8	0	0	9	12	0	0	0	12	2	5	0	0	2	4	9	2	**69**
8:15 AM	0	0	2	3	0	0	6	13	0	0	0	13	1	5	0	0	3	3	15	1	**64**
8:30 AM	0	0	10	8	0	0	11	11	0	0	0	13	5	9	0	0	3	10	17	0	**97**
8:45 AM	0	1	10	6	0	0	6	19	0	0	0	15	2	4	2	0	5	6	19	0	**93**
Hourly Total	0	1	28	25	0	0	32	55	0	0	0	53	10	23	2	0	13	23	60	3	**323**
9:00 AM	0	0	5	6	1	0	6	8	1	0	0	9	2	1	0	1	1	6	19	1	**65**
9:15 AM	0	0	3	3	0	0	11	10	0	0	0	10	0	1	0	0	3	10	14	1	**65**
9:30 AM	0	0	5	3	0	0	6	9	0	0	0	16	2	5	0	0	3	7	12	0	**68**
9:45 AM	0	0	2	5	0	0	4	10	0	0	0	14	3	3	0	0	1	11	15	0	**68**
Hourly Total	0	0	15	17	1	0	27	37	1	0	0	49	7	10	0	1	8	34	60	2	**266**
10:00 AM	0	0	4	6	0	0	4	3	0	0	0	12	3	4	0	0	0	14	9	0	**59**
10:15 AM	0	0	5	7	0	0	5	8	0	0	1	13	1	8	2	0	6	8	13	5	**75**
10:30 AM	0	0	8	1	0	0	8	15	0	0	0	12	1	4	0	1	2	15	16	1	**83**
10:45 AM	0	0	5	4	0	0	4	12	1	0	1	15	2	7	0	0	3	10	9	1	**73**
Hourly Total	0	0	22	18	0	0	21	38	1	0	2	52	7	23	2	1	11	47	47	7	**290**
11:00 AM	0	0	2	1	0	0	2	7	0	0	1	17	1	4	0	0	8	8	16	3	**67**
11:15 AM	0	0	2	7	0	0	5	7	0	0	0	20	4	3	0	0	2	10	7	3	**67**
11:30 AM	0	0	5	6	0	0	7	13	0	0	0	12	3	4	0	0	1	12	14	2	**77**
11:45 AM	0	1	5	5	1	0	9	10	0	0	0	18	2	3	0	0	3	14	17	1	**87**
Hourly Total	0	1	14	19	1	0	23	37	0	0	1	67	10	14	0	0	14	44	54	9	**298**
12:00 PM	0	0	2	4	0	0	11	11	0	0	0	16	2	5	0	0	5	13	17	1	**86**
12:15 PM	0	0	3	3	0	0	4	7	0	0	0	8	2	7	2	0	4	6	12	0	**56**
12:30 PM	0	1	5	5	0	0	0	17	1	0	0	17	3	10	0	0	5	14	16	2	**94**
12:45 PM	0	0	2	5	0	0	2	15	0	0	0	13	2	2	0	0	8	9	12	2	**70**
Hourly Total	0	1	12	17	0	0	17	50	1	0	0	54	9	24	2	0	22	42	57	5	**306**
1:00 PM	0	0	3	4	0	0	3	8	0	0	0	15	3	4	0	0	5	7	14	0	**66**
1:15 PM	0	0	5	4	0	0	6	9	0	0	0	16	3	3	0	1	1	9	14	1	**71**
1:30 PM	0	1	2	1	0	0	4	6	0	0	0	24	2	0	0	0	3	17	25	2	**85**
1:45 PM	0	0	1	2	0	0	4	12	0	0	0	8	2	10	0	0	2	16	16	0	**73**
Hourly Total	0	1	11	11	0	0	17	35	0	0	0	63	10	17	0	1	11	49	69	3	**295**
2:00 PM	0	0	5	1	0	0	5	6	0	0	0	28	7	8	0	0	7	18	17	0	**102**
2:15 PM	0	0	0	7	0	0	13	10	0	0	0	26	5	8	0	0	4	18	19	2	**110**
2:30 PM	0	0	7	5	0	0	12	8	0	0	0	22	4	10	0	0	1	13	11	0	**93**
2:45 PM	0	0	4	6	0	0	4	18	0	0	0	19	12	7	0	0	5	11	20	0	**106**
Hourly Total	0	0	16	19	0	0	34	42	0	0	0	95	28	33	0	0	17	60	67	2	**411**
3:00 PM	0	0	4	7	0	0	5	10	0	0	0	19	4	5	2	0	2	10	12	4	**78**
3:15 PM	0	0	4	5	0	0	6	9	0	0	0	21	6	7	0	0	7	10	15	0	**90**
3:30 PM	0	0	2	3	0	0	8	13	0	0	0	24	2	10	0	0	5	13	22	1	**102**
3:45 PM	0	0	4	7	0	0	8	12	0	0	0	14	9	11	0	0	5	13	10	0	**93**
Hourly Total	0	0	14	22	0	0	27	44	0	0	0	78	21	33	2	0	19	46	59	5	**363**

Towners Rd & Hill and Dale Rd
Carmel Hamlet NY
Wednesday, September 11, 2019

Time	Southbound Lakeshore Dr					Westbound Towners Rd					Northbound Hill and Dale Rd					Eastbound Towners Rd					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:00 PM	0	0	6	10	0	0	4	9	0	1	0	30	10	5	0	0	8	13	15	1	**110**
4:15 PM	0	0	5	7	0	0	5	7	0	0	1	38	9	9	0	2	9	14	9	2	**115**
4:30 PM	0	0	5	6	0	0	5	11	0	0	0	21	12	10	1	0	9	17	14	0	**110**
4:45 PM	0	0	5	4	0	0	4	8	0	0	0	24	10	10	0	0	10	23	21	2	**119**
Hourly Total	0	0	21	27	0	0	18	35	0	1	1	113	41	34	1	2	36	67	59	5	**454**
5:00 PM	0	0	4	8	0	0	5	13	3	0	0	30	9	7	0	0	7	19	15	0	**120**
5:15 PM	0	0	2	6	0	0	12	8	1	0	0	39	11	13	0	0	7	19	18	0	**136**
5:30 PM	0	0	9	11	0	0	7	12	0	0	0	28	6	25	0	0	4	15	20	1	**137**
5:45 PM	0	0	6	5	0	0	4	13	1	0	0	25	3	11	2	0	10	13	15	1	**106**
Hourly Total	0	0	21	30	0	0	28	46	5	0	0	122	29	56	2	0	28	66	68	2	**499**
6:00 PM	0	0	5	7	0	0	3	15	0	0	0	20	11	7	0	0	5	27	12	3	**112**
6:15 PM	0	0	3	5	0	0	6	11	2	0	0	26	9	8	3	0	7	14	14	2	**105**
6:30 PM	0	0	2	4	1	0	12	13	0	0	0	23	8	12	0	1	9	13	18	1	**115**
6:45 PM	0	0	3	6	0	0	13	17	0	0	0	32	7	10	0	0	5	8	10	0	**111**
Hourly Total	0	0	13	22	1	0	34	56	2	0	0	101	35	37	3	1	26	62	54	6	**443**
7:00 PM	0	0	2	8	1	0	13	9	0	0	0	17	10	5	2	0	6	22	14	1	**106**
7:15 PM	0	1	4	3	0	0	6	13	0	0	0	13	4	12	2	0	7	12	17	3	**92**
7:30 PM	0	0	3	3	0	0	2	9	1	0	0	18	8	8	1	0	7	13	10	2	**82**
7:45 PM	0	0	1	8	0	0	8	10	0	0	0	18	0	7	0	0	8	12	13	1	**85**
Hourly Total	0	1	10	22	1	0	29	41	1	0	0	66	22	32	5	0	28	59	54	7	**365**
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DAILY TOTAL	**0**	**7**	**223**	**276**	**4**	**0**	**355**	**560**	**11**	**1**	**4**	**955**	**236**	**347**	**19**	**6**	**246**	**631**	**775**	**58**	**4632**
Cars	0	6	218	270	4	0	345	548	11	1	4	929	227	336	19	6	244	607	742	58	**4493**
Heavy Vehicles	0	1	5	6	0	0	10	12	0	0	0	26	9	11	0	0	2	24	33	0	**139**
Heavy Vehicle %	0.00%	14.29%	2.24%	2.17%	0.00%	0.00%	2.82%	2.14%	0.00%	0.00%	0.00%	2.72%	3.81%	3.17%	0.00%	0.00%	0.81%	3.80%	4.26%	0.00%	**3.00%**

Towners Rd & Hill and Dale Rd
Carmel Hamlet NY
Wednesday, September 11, 2019

AM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	VEHICLE TOTAL
7:45 AM	0	0	7	9	0	0	20	16	0	0	0	10	2	4	0	0	3	9	20	0	**100**
8:00 AM	0	0	6	8	0	0	9	12	0	0	0	12	2	5	0	0	2	4	9	2	**69**
8:15 AM	0	0	2	3	0	0	6	13	0	0	0	13	1	5	0	0	3	3	15	1	**64**
8:30 AM	0	0	10	8	0	0	11	11	0	0	0	13	5	9	0	0	3	10	17	0	**97**
Peak Hour Total	0	0	25	28	0	0	46	52	0	0	0	48	10	23	0	0	11	26	61	3	**330**
PHF	0.000	0.000	0.625	0.778	0.000	0.000	0.575	0.813	0.000	0.000	0.000	0.923	0.500	0.639	0.000	0.000	0.917	0.650	0.763	0.375	**0.825**
Heavy Vehicle %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.52%	0.00%	0.00%	0.00%	0.00%	6.25%	20.00%	8.70%	0.00%	0.00%	9.09%	15.38%	1.64%	0.00%	**4.85%**

PM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	VEHICLE TOTAL
4:45 PM	0	0	5	4	0	0	4	8	0	0	0	24	10	10	0	0	10	23	21	2	**119**
5:00 PM	0	0	4	8	0	0	5	13	3	0	0	30	9	7	0	0	7	19	15	0	**120**
5:15 PM	0	0	2	6	0	0	12	8	1	0	0	39	11	13	0	0	7	19	18	0	**136**
5:30 PM	0	0	9	11	0	0	7	12	0	0	0	28	6	25	0	0	4	15	20	1	**137**
Peak Hour Total	0	0	20	29	0	0	28	41	4	0	0	121	36	55	0	0	28	76	74	3	**512**
PHF	0.000	0.000	0.556	0.659	0.000	0.000	0.583	0.788	0.333	0.000	0.000	0.776	0.818	0.550	0.000	0.000	0.700	0.826	0.881	0.375	**0.934**
Heavy Vehicle %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.35%	0.00%	**0.20%**

Southbound					
Total Vehicles On Leg 999					
Vehicles Entering Intersection 506			Vehicles Exiting Intersection 493		
Cars	270	218	6	0	4
Heavy	6	5	1	0	0
Total	**276**	**223**	**7**	**0**	**4**

Eastbound	Cars	Heavy	Total
Vehicles Entering Intersection 1658	58	0	**58**
	6	0	**6**
	244	2	**246**
Vehicles Exiting Intersection 1797	607	24	**631**
	742	33	**775**

Total Vehicles on Leg 3455

Daily Volumes

Westbound	Cars	Heavy	Total
Vehicles Entering Intersection 926	11	0	**11**
	548	12	**560**
Vehicles Exiting Intersection 985	345	10	**355**
	0	0	**0**
	1	0	**1**

Total Vehicles on Leg 1911

Northbound					
Cars	19	4	929	227	336
Heavy	0	0	26	9	11
Total	**19**	**4**	**955**	**236**	**347**
Vehicles Entering Intersection 1542			Vehicles Exiting Intersection 1357		
Total Vehicles On Leg 2899					

TRAFFIC SIGNAL WARRANT SUMMARY

Project: Putnam County Roundabout Evaluation
Condition: 2019 Existing Condition
Location: Towners Rd & Hill and Dale Rd
Date: September 11, 2019

Major Street: Towners Rd
Lanes: 1
Critical Approach Speed: 30 mph
Minor Street: Hill and Dale Rd/Lakeshore Dr
Lanes: 1

Volume Level Criteria

1. Is the critical speed of major street traffic greater than 40 mph? No
2. Is the intersection in a built-up area of an isolated community with population less than 10,000? No

If either Question 1 or Question 2 is answered "Yes", then use the 70% volume level. Criteria used: 100%

WARRANT 1 - EIGHT HOUR VEHICULAR VOLUME **Warrant 1 Satisfied: NO**

Warrant 1 is satisfied if EITHER Condition A OR Condition B is 100% satisfied.
Warrant 1 is also satisfied if BOTH Condition A AND Condition B are satisfied to the 80% volume level.

			Condition 1A - Minimum Vehicular Volume (X indicates that criteria is met for specified condition)				Condition 1B - Interuption of Continuous Traffic (X indicates that criteria is met for specified condition)				Total Satisfied Hours (8 required)		
											0	0	0
Minimum Volume Criteria:			500	150	400	120	750	75	600	60	Condition	Condition	80% for
Start Time	Major St. Volume[1]	Minor St. Volume[2]	Major St. 100%	Minor St. 100%	Major St. 80%	Minor St. 80%	Major St. 100%	Minor St. 100%	Major St. 80%	Minor St. 80%	1A Satisfied	1B Satisfied	Both Satisfied
12:00 AM			-	-	-	-	-	-	-	-	-	-	-
1:00 AM			-	-	-	-	-	-	-	-	-	-	-
2:00 AM			-	-	-	-	-	-	-	-	-	-	-
3:00 AM			-	-	-	-	-	-	-	-	-	-	-
4:00 AM			-	-	-	-	-	-	-	-	-	-	-
5:00 AM			-	-	-	-	-	-	-	-	-	-	-
6:00 AM			-	-	-	-	-	-	-	-	-	-	-
7:00 AM	214	63	-	-	-	-	-	-	-	X	-	-	-
8:00 AM	192	90	-	-	-	-	-	X	-	X	-	-	-
9:00 AM	176	69	-	-	-	-	-	-	-	X	-	-	-
10:00 AM	174	88	-	-	-	-	-	X	-	X	-	-	-
11:00 AM	181	97	-	-	-	-	-	X	-	X	-	-	-
12:00 PM	198	91	-	-	-	-	-	X	-	X	-	-	-
1:00 PM	191	95	-	-	-	-	-	X	-	X	-	-	-
2:00 PM	231	164	-	X	-	X	-	X	-	X	-	-	-
3:00 PM	205	139	-	-	-	X	-	X	-	X	-	-	-
4:00 PM	228	198	-	X	-	X	-	X	-	X	-	-	-
5:00 PM	253	217	-	X	-	X	-	X	-	X	-	-	-
6:00 PM	247	182	-	X	-	X	-	X	-	X	-	-	-
7:00 PM	223	126	-	-	-	X	-	X	-	X	-	-	-
8:00 PM			-	-	-	-	-	-	-	-	-	-	-
9:00 PM			-	-	-	-	-	-	-	-	-	-	-
10:00 PM			-	-	-	-	-	-	-	-	-	-	-
11:00 PM			-	-	-	-	-	-	-	-	-	-	-

[1] Major Street Volume is the total combined volume of both mainline approaches.

[2] Minor Street volumes is the highest single side street approach volume.

WARRANT 2 - FOUR HOUR VEHICULAR VOLUME **Warrant 2 Satisfied: NO**

Warrant is satisfied if four (4) or more hours satisfy the volume requirements depicted on the four hour warranting graph **(see page 2)**. No. of Points Above Criteria Curve: 0

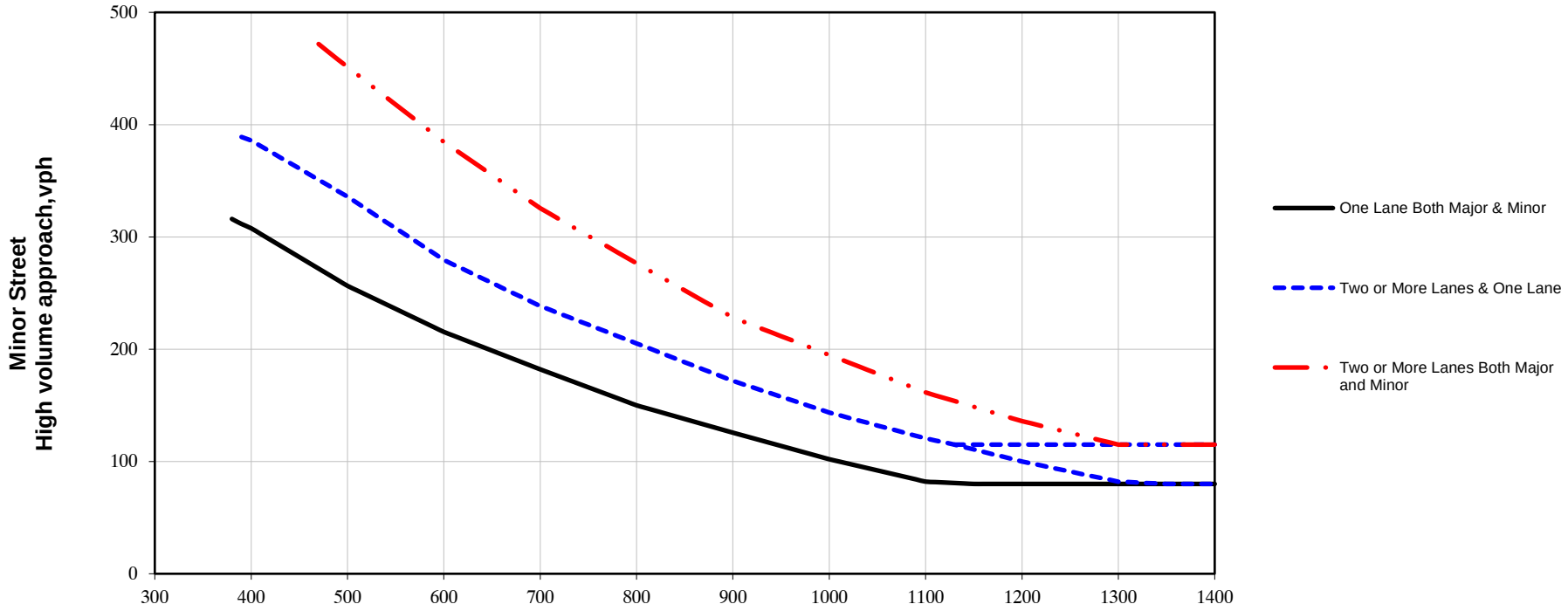
WARRANT 3 - PEAK HOUR VEHICULAR VOLUME **Warrant 3 Satisfied: NO**

Warrant is satisfied if any hour satisfy the volume requirements depicted on the peak hour warranting graph **(see page 3)**, and ALL three of the following requirement are met. No. of Points Above Criteria Curve: 0

1. Total stopped time delay on Minor Street equals or exceeds 4 VHD (single lane) or 5 VHD (two lanes): 0.82 VHD Max. N/A
2. Volume on Minor Street equals or exceeds 100 vehicles (single lane) or 150 vehicles (two lanes): N/A
3. Total intersection volume serviced during the hour equals or exceeds 650 veh. (3-leg) or 800 veh. (4-leg or more): N/A

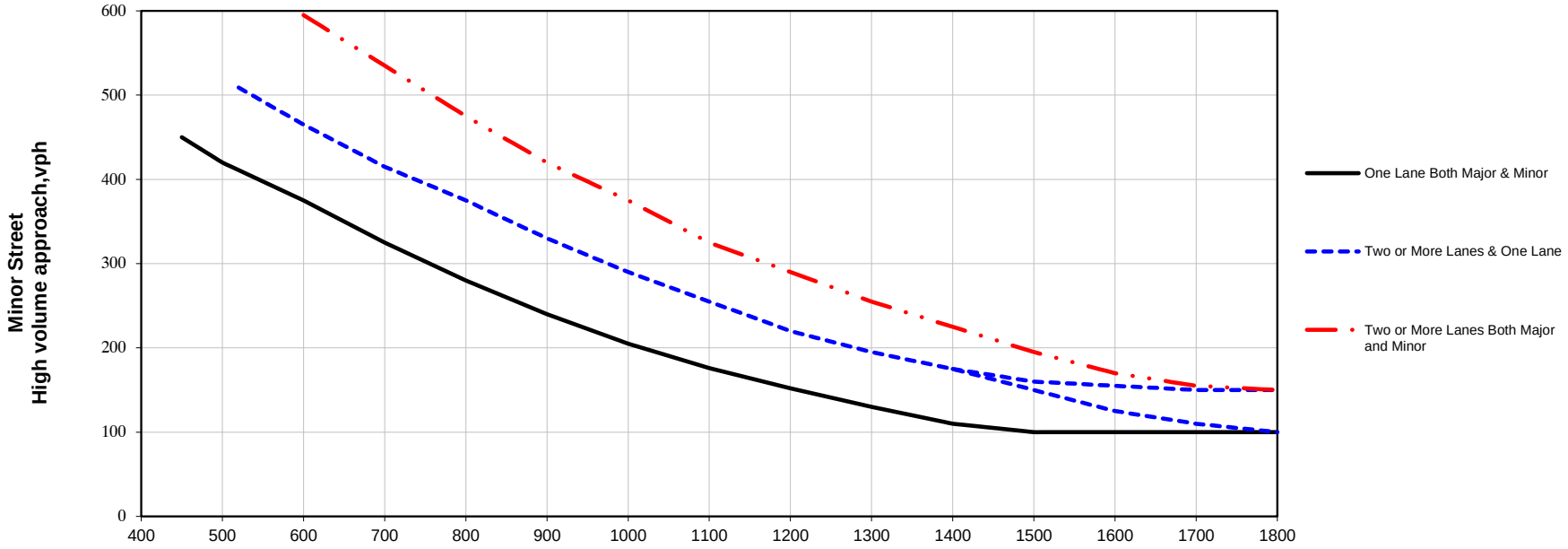
Criteria Source: Manual on Uniform Traffic Control Devices, 2009

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



Note: Points on graph represent hourly volumes. Points above the respective curve satisfy warrant, points below do not satisfy warrant.

Figure 4C-3. Warrant 3, Peak Hour



Note: Points on graph represent hourly volumes. Points above the respective curve satisfy warrant, points below do not satisfy warrant.

Accident Location Information System(ALIS)

Date: 9/5/2019
3:29:12 PM

Accident Verbal Description

16408_VDR

Date in this report covers the period - 2/29/2016-2/28/2019

Complete Accident data from NYSDMV is only available thru 2/28/2019 12:00:00 AM

Street: TOWNERS RD
AT INTERSECTION WITH BRAYTON RD
7/26/2016 Tue 08:35 AM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2016-36314862**
Accident Class: NON-REPORTABLE Police Agency: KENT TOWN PD Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NO PASSING ZONE
Manner of Collision: RIGHT ANGLE Weather: CLEAR
Road Surface Condition: DRY Road Char.: STRAIGHT AND LEVEL Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 2 Driver's Age: Sex: Citation Issued:
Direction of Travel: UNKNOWN Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: PARKED
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 1 Driver's Age: 46 Sex: M Citation Issued: Y
Direction of Travel: WEST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: GOING STRAIGHT AHEAD
Apparent Factors: DRIVER INATTENTION, NOT APPLICABLE

Street: TOWNERS RD
22 Meters West of Lakeshore Dr E
11/10/2016 Thu 14:26 PM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2016-36466546**
Accident Class: NON-REPORTABLE Police Agency: KENT TOWN PD Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NONE
Manner of Collision: OTHER Weather: CLEAR
Road Surface Condition: DRY Road Char.: STRAIGHT AND LEVEL Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 1 Driver's Age: 46 Sex: M Citation Issued: N
Direction of Travel: NORTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: BACKING
Apparent Factors: BACKING UNSAFELY, NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 2 Driver's Age: Sex: Citation Issued:
Direction of Travel: SOUTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: PARKED

Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

County: Putnam Muni: Kent(T) Ref. Marker: Street: TOWNERS RD
AT INTERSECTION WITH HILL AND DALE RD
1/21/2017 Sat 18:12 PM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2017-36587317**
Accident Class: PROPERTY DAMAGE Police Agency: KENT TOWN PD Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NO PASSING ZONE
Manner of Collision: SIDESWIPE Weather: CLEAR
Road Surface Condition: DRY Road Char.: CURVE AND GRADE Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: 3278 State of Registration: NY
Num of Occupants: 2 Driver's Age: 52 Sex: M Citation Issued: N
Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: GOING STRAIGHT AHEAD
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: 8600 State of Registration: NY
Num of Occupants: 2 Driver's Age: 57 Sex: M Citation Issued: N
Direction of Travel: WEST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: MAKING LEFT TURN
Apparent Factors: FAILURE TO YIELD RIGHT OF WAY, NOT APPLICABLE

County: Putnam Muni: Kent(T) Ref. Marker: Street: TOWNERS RD
AT INTERSECTION WITH Hill and Dale Rd
3/3/2018 Sat 09:55 AM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2018-37176297**
Accident Class: NON-REPORTABLE Police Agency: KENT TOWN PD Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NONE
Manner of Collision: SIDESWIPE Weather: CLEAR
Road Surface Condition: WET Road Char.: STRAIGHT/ GRADE Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 TRUCK Registered Weight: State of Registration: NY
Num of Occupants: 2 Driver's Age: 41 Sex: M Citation Issued: N
Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: STARTING FROM PARKING
Apparent Factors: TURNING IMPROPER, NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 3 Driver's Age: Sex: Citation Issued:
Direction of Travel: WEST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: PARKED
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

County: Putnam Muni: Kent(T) Ref. Marker: Street: TOWNERS RD
AT INTERSECTION WITH HILL AND DALE RD
2/28/2018 Wed 17:30 PM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2018-37182119**
Accident Class: PROPERTY DAMAGE Police Agency: KENT TOWN PD Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NO PASSING ZONE
Manner of Collision: RIGHT ANGLE Weather: CLEAR
Road Surface Condition: DRY Road Char.: CURVE AND LEVEL Light Condition: DUSK

Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: 3904 State of Registration: NY
Num of Occupants: 3 Driver's Age: 72 Sex: M Citation Issued: N
Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: GOING STRAIGHT AHEAD
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: 4633 State of Registration: NY
Num of Occupants: 1 Driver's Age: 51 Sex: F Citation Issued: N
Direction of Travel: NORTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: STARTING FROM PARKING
Apparent Factors: VIEW OBSTRUCTED/LIMITED, FAILURE TO YIELD RIGHT OF WAY

County: Putnam Muni: Kent(T) Ref. Marker: Street: HILL AND DALE RD
11 Meters North of Amazon Rd
4/13/2018 Fri 13:35 PM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2018-37237754**
Accident Class: NON-REPORTABLE Police Agency: KENT TOWN PD Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NO PASSING ZONE
Manner of Collision: SIDESWIPE Weather: CLEAR
Road Surface Condition: DRY Road Char.: STRAIGHT AND LEVEL Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 1 Driver's Age: 79 Sex: M Citation Issued: Y
Direction of Travel: SOUTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: GOING STRAIGHT AHEAD
Apparent Factors: ALCOHOL INVOLVEMENT, FAILURE TO KEEP RIGHT

Veh :2 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 1 Driver's Age: 52 Sex: F Citation Issued: N
Direction of Travel: NORTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: GOING STRAIGHT AHEAD
Apparent Factors: NOT APPLICABLE, NOTAPPLICABLE

County: Putnam Muni: Kent(T) Ref. Marker: Street: TOWNERS RD
AT INTERSECTION WITH HILL AND DALE RD
4/22/2018 Sun 10:15 AM Persons Killed: 0 Persons Injured: 1 Extent of Injuries: C **Case: 2018-37257341**
Accident Class: INJURY Police Agency: KENT TOWN PD Num of Veh: 1
Type Of Accident: COLLISION WITH PEDESTRIAN Traffic Control: NO PASSING ZONE
Manner of Collision: OTHER Weather: CLEAR
Road Surface Condition: DRY Road Char.: CURVE AND LEVEL Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: PED/BICYCLIST NOT AT INTERSECTION Action of Ped/Bicycle: CROSSING/ NO SIGNAL OR CROSSWALK

Veh :2 PEDESTRIAN Registered Weight: State of Registration: -3
Num of Occupants: 1 Driver's Age: 40 Sex: M Citation Issued: N
Direction of Travel: NOT APPLICABLE Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: NOT APPLICABLE
Apparent Factors: PEDESTRIAN'S ERROR/CONFUSION, NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 1 Driver's Age: 46 Sex: M Citation Issued: Y
Direction of Travel: SOUTH-EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: MAKING RIGHT TURN
Apparent Factors: NOT APPLICABLE, GLARE

County: Putnam Muni: Kent(T) Ref. Marker: Street: TOWNERS RD
AT INTERSECTION WITH HILL AND DALE RD
5/12/2018 Sat 15:30 PM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2018-37280228**
Accident Class: NON-REPORTABLE Police Agency: KENT TOWN PD Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NO PASSING ZONE
Manner of Collision: REAR END Weather: RAIN
Road Surface Condition: WET Road Char.: STRAIGHT AND LEVEL Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 1 Driver's Age: 43 Sex: M Citation Issued: Y
Direction of Travel: WEST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: BACKING
Apparent Factors: NOT APPLICABLE, BACKING UNSAFELY

Veh :1 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 2 Driver's Age: Sex: Citation Issued:
Direction of Travel: UNKNOWN Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: PARKED
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

County: Putnam Muni: Kent(T) Ref. Marker: Street: HILL AND DALE RD
14 Meters North of Amazon Rd
12/24/2018 Mon 15:58 PM Persons Killed: 0 Persons Injured: 1 Extent of Injuries: C **Case: 2018-37658159**
Accident Class: PROPERTY DAMAGE AND INJURY Police Agency: KENT TOWN PD Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NO PASSING ZONE
Manner of Collision: REAR END Weather: CLEAR
Road Surface Condition: DRY Road Char.: STRAIGHT AND LEVEL Light Condition:
DAYLIGHT Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: 3361 State of Registration: NY
Num of Occupants: 1 Driver's Age: 37 Sex: M Citation Issued: N
Direction of Travel: SOUTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: GOING STRAIGHT AHEAD
Apparent Factors: DRIVER INATTENTION, NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: 2445 State of Registration: NY
Num of Occupants: 3 Driver's Age: 40 Sex: F Citation Issued: N
Direction of Travel: SOUTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: STOPPED IN TRAFFIC
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

County: Putnam Muni: Kent(T) Ref. Marker: Street: TOWNERS RD
13 Meters North of Lakeshore Dr E

2/7/2019 Thu 16:49 PM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2019-37733258**
Accident Class: PROPERTY DAMAGE Police Agency: KENT TOWN PD Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NONE
Manner of Collision: RIGHT ANGLE Weather: RAIN
Road Surface Condition: WET Road Char.: CURVE AND LEVEL Light Condition: DUSK
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: 10000 State of Registration: NY
Num of Occupants: 1 Driver's Age: 29 Sex: M Citation Issued: N
Direction of Travel: SOUTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: BACKING
Apparent Factors: BACKING UNSAFELY, NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: 3027 State of Registration: NY
Num of Occupants: 1 Driver's Age: 59 Sex: F Citation Issued: N
Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: STARTING IN TRAFFIC
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

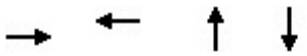
Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	27	64	46	52	0	50	11	24	0	26	29
Future Vol, veh/h	12	27	64	46	52	0	50	11	24	0	26	29
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	10	-	-	0	-	-	10	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	9	15	2	6	1	0	6	20	9	0	1	1
Mvmt Flow	14	33	77	55	63	0	60	13	29	0	31	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	63	0	0	110	0	0	309	273	72	294	311	66
Stage 1	-	-	-	-	-	-	100	100	-	173	173	-
Stage 2	-	-	-	-	-	-	209	173	-	121	138	-
Critical Hdwy	4.19	-	-	4.16	-	-	7.16	6.7	6.29	9.1	8.51	7.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.7	-	8.1	7.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.7	-	8.1	7.51	-
Follow-up Hdwy	2.281	-	-	2.254	-	-	3.554	4.18	3.381	3.5	4.009	3.309
Pot Cap-1 Maneuver	1496	-	-	1456	-	-	636	605	971	562	509	982
Stage 1	-	-	-	-	-	-	896	779	-	757	688	-
Stage 2	-	-	-	-	-	-	784	723	-	830	726	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1496	-	-	1456	-	-	560	575	971	516	484	979
Mov Cap-2 Maneuver	-	-	-	-	-	-	560	575	-	516	484	-
Stage 1	-	-	-	-	-	-	887	771	-	749	661	-
Stage 2	-	-	-	-	-	-	690	695	-	784	719	-

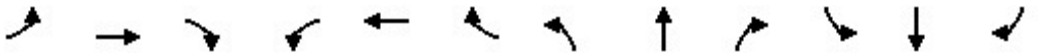
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	3.6	11.7	11.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	638	1496	-	-	1456	-	-	660
HCM Lane V/C Ratio	0.161	0.01	-	-	0.038	-	-	0.1
HCM Control Delay (s)	11.7	7.4	0	-	7.6	0	-	11.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.6	0	-	-	0.1	-	-	0.3



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	124	118	102	66
v/c Ratio	0.15	0.14	0.28	0.15
Control Delay	3.8	6.4	9.8	6.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	3.8	6.4	9.8	6.9
Queue Length 50th (ft)	5	13	10	4
Queue Length 95th (ft)	20	29	30	18
Internal Link Dist (ft)	501	422	652	539
Turn Bay Length (ft)				
Base Capacity (vph)	984	1038	854	1030
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.13	0.11	0.12	0.06

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	12	27	64	46	52	0	50	11	24	0	26	29
Future Volume (veh/h)	12	27	64	46	52	0	50	11	24	0	26	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1510	1510	1510	1697	1697	1697	1443	1443	1443	1697	1697	1697
Adj Flow Rate, veh/h	14	33	77	55	63	0	60	13	29	0	31	35
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	15	15	15	1	1	1	20	20	20	1	1	1
Cap, veh/h	144	180	332	413	407	0	304	69	79	0	173	196
Arrive On Green	0.46	0.46	0.46	0.46	0.46	0.00	0.24	0.24	0.24	0.00	0.24	0.24
Sat Flow, veh/h	49	395	727	553	890	0	543	287	330	0	725	819
Grp Volume(v), veh/h	124	0	0	118	0	0	102	0	0	0	0	66
Grp Sat Flow(s),veh/h/ln	1171	0	0	1444	0	0	1160	0	0	0	0	1544
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	1.1
Cycle Q Clear(g_c), s	2.1	0.0	0.0	1.3	0.0	0.0	2.2	0.0	0.0	0.0	0.0	1.1
Prop In Lane	0.11		0.62	0.47		0.00	0.59		0.28	0.00		0.53
Lane Grp Cap(c), veh/h	657	0	0	820	0	0	451	0	0	0	0	369
V/C Ratio(X)	0.19	0.00	0.00	0.14	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.18
Avail Cap(c_a), veh/h	1005	0	0	1246	0	0	1034	0	0	0	0	1176
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	5.4	0.0	0.0	5.2	0.0	0.0	10.3	0.0	0.0	0.0	0.0	9.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.3	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.5	0.0	0.0	5.3	0.0	0.0	10.6	0.0	0.0	0.0	0.0	10.2
LnGrp LOS	A	A	A	A	A	A	B	A	A	A	A	B
Approach Vol, veh/h		124			118			102			66	
Approach Delay, s/veh		5.5			5.3			10.6			10.2	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		20.0		12.8		20.0		12.8				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		25.0		25.0		25.0		25.0				
Max Q Clear Time (g_c+I1), s		4.1		3.1		3.3		4.2				
Green Ext Time (p_c), s		0.6		0.3		0.6		0.5				

Intersection Summary												
HCM 6th Ctrl Delay			7.5									
HCM 6th LOS			A									

Intersection	
Intersection Delay, s/veh	3.9
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	124	185	102
Demand Flow Rate, veh/h	132	189	110
Vehicles Circulating, veh/h	90	64	53
Vehicles Exiting, veh/h	163	99	169
Ped Vol Crossing Leg, #/h	3	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.9	4.1	3.7
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	132	189	110
Cap Entry Lane, veh/h	1259	1293	1307
Entry HV Adj Factor	0.939	0.979	0.927
Flow Entry, veh/h	124	185	102
Cap Entry, veh/h	1181	1265	1212
V/C Ratio	0.105	0.146	0.084
Control Delay, s/veh	3.9	4.1	3.7
LOS	A	A	A
95th %tile Queue, veh	0	1	0

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	23	51	98	0	0	55
Future Vol, veh/h	23	51	98	0	0	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-10	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	14	12	3	0	1	1
Mvmt Flow	28	61	118	0	0	66

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	118	0	-	0	235	118
Stage 1	-	-	-	-	118	-
Stage 2	-	-	-	-	117	-
Critical Hdwy	4.24	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.326	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1399	-	-	-	755	937
Stage 1	-	-	-	-	910	-
Stage 2	-	-	-	-	911	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1399	-	-	-	739	937
Mov Cap-2 Maneuver	-	-	-	-	739	-
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	911	-

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1399	-	-	-	937
HCM Lane V/C Ratio	0.02	-	-	-	0.071
HCM Control Delay (s)	7.6	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

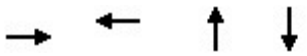
Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	29	80	78	29	43	4	127	38	58	0	21	30
Future Vol, veh/h	29	80	78	29	43	4	127	38	58	0	21	30
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	10	-	-	0	-	-	10	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	0	1	1
Mvmt Flow	31	86	84	31	46	4	137	41	62	0	23	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	50	0	0	170	0	0	331	302	128	352	342	51
Stage 1	-	-	-	-	-	-	190	190	-	110	110	-
Stage 2	-	-	-	-	-	-	141	112	-	242	232	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	9.1	8.51	7.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	8.1	7.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	8.1	7.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.5	4.009	3.309
Pot Cap-1 Maneuver	1563	-	-	1413	-	-	624	612	925	499	481	1006
Stage 1	-	-	-	-	-	-	814	745	-	847	758	-
Stage 2	-	-	-	-	-	-	864	805	-	670	628	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1563	-	-	1413	-	-	560	585	925	426	460	1003
Mov Cap-2 Maneuver	-	-	-	-	-	-	560	585	-	426	460	-
Stage 1	-	-	-	-	-	-	796	729	-	828	741	-
Stage 2	-	-	-	-	-	-	790	786	-	577	614	-

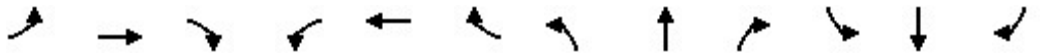
Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	2.9	14.2	10.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	629	1563	-	-	1413	-	-	675
HCM Lane V/C Ratio	0.381	0.02	-	-	0.022	-	-	0.081
HCM Control Delay (s)	14.2	7.3	0	-	7.6	0	-	10.8
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.8	0.1	-	-	0.1	-	-	0.3



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	201	81	240	55
v/c Ratio	0.34	0.14	0.57	0.12
Control Delay	7.8	8.6	14.6	5.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.8	8.6	14.6	5.8
Queue Length 50th (ft)	15	9	32	3
Queue Length 95th (ft)	58	33	77	17
Internal Link Dist (ft)	501	422	652	539
Turn Bay Length (ft)				
Base Capacity (vph)	866	868	828	901
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.23	0.09	0.29	0.06

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	80	78	29	43	4	127	38	58	0	21	30
Future Volume (veh/h)	29	80	78	29	43	4	127	38	58	0	21	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1697	1697	1697	1697	1697	1697	1697	1697	1697	1697	1697	1697
Adj Flow Rate, veh/h	31	86	84	31	46	4	137	41	62	0	23	32
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	163	300	245	329	420	31	342	102	97	0	175	243
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.44	0.27	0.27	0.27	0.00	0.27	0.27
Sat Flow, veh/h	96	688	563	424	963	72	648	372	355	0	640	891
Grp Volume(v), veh/h	201	0	0	81	0	0	240	0	0	0	0	55
Grp Sat Flow(s),veh/h/ln	1347	0	0	1459	0	0	1376	0	0	0	0	1531
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.9
Cycle Q Clear(g_c), s	3.3	0.0	0.0	1.0	0.0	0.0	5.1	0.0	0.0	0.0	0.0	0.9
Prop In Lane	0.15		0.42	0.38		0.05	0.57		0.26	0.00		0.58
Lane Grp Cap(c), veh/h	708	0	0	781	0	0	540	0	0	0	0	418
V/C Ratio(X)	0.28	0.00	0.00	0.10	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.13
Avail Cap(c_a), veh/h	1088	0	0	1187	0	0	1145	0	0	0	0	1112
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	6.4	0.0	0.0	5.7	0.0	0.0	10.9	0.0	0.0	0.0	0.0	9.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.2	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.6	0.0	0.0	5.8	0.0	0.0	11.4	0.0	0.0	0.0	0.0	9.6
LnGrp LOS	A	A	A	A	A	A	B	A	A	A	A	A
Approach Vol, veh/h		201			81			240			55	
Approach Delay, s/veh		6.6			5.8			11.4			9.6	
Approach LOS		A			A			B			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		20.0		14.4		20.0		14.4				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		25.0		25.0		25.0		25.0				
Max Q Clear Time (g_c+I1), s		5.3		2.9		3.0		7.1				
Green Ext Time (p_c), s		1.1		0.2		0.4		1.3				
Intersection Summary												
HCM 6th Ctrl Delay			8.8									
HCM 6th LOS			A									

Intersection	
Intersection Delay, s/veh	4.3
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	201	132	240
Demand Flow Rate, veh/h	203	134	242
Vehicles Circulating, veh/h	55	138	118
Vehicles Exiting, veh/h	217	222	140
Ped Vol Crossing Leg, #/h	3	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.1	4.0	4.7
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	203	134	242
Cap Entry Lane, veh/h	1305	1199	1223
Entry HV Adj Factor	0.989	0.987	0.992
Flow Entry, veh/h	201	132	240
Cap Entry, veh/h	1290	1183	1213
V/C Ratio	0.156	0.112	0.198
Control Delay, s/veh	4.1	4.0	4.7
LOS	A	A	A
95th %tile Queue, veh	1	0	1

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	67	138	72	4	0	51
Future Vol, veh/h	67	138	72	4	0	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-10	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	72	148	77	4	0	55

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	81	0	-	0	371	79
Stage 1	-	-	-	-	79	-
Stage 2	-	-	-	-	292	-
Critical Hdwy	4.11	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.209	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1523	-	-	-	632	984
Stage 1	-	-	-	-	947	-
Stage 2	-	-	-	-	760	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1523	-	-	-	599	984
Mov Cap-2 Maneuver	-	-	-	-	599	-
Stage 1	-	-	-	-	898	-
Stage 2	-	-	-	-	760	-

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1523	-	-	-	984
HCM Lane V/C Ratio	0.047	-	-	-	0.056
HCM Control Delay (s)	7.5	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

Intersection: Towners Rd & Hill and Dale Rd
Client: Putnam County — GPI No. 2019058.00
Calculated By: D. Creen — Date: 9/29/2019
Checked By: M. Wieszchowski — Date: 9/30/2019

ALTERNATE COMMERCIAL PARKING WITH NO GEOMETRIC IMPROVEMENTS

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL COST
PARKING LOTS [1]	8,000	SF	$12	$100,000
ADDITIONAL EARTHWORK (ABOVE AND BEYOND TYPICAL)	5,000	CY	$20	$100,000
RETAINING WALL	950	SF	$100	$95,000
UTILITY RELOCATION [2]	0	EA	$75,000	$0
STORMWATER AND TREATMENT [3]	1	LS	$75,000	$75,000
WORK ZONE TRAFFIC CONTROL	1	LS	$75,000	$75,000
			ESTIMATED CONSTRUCTION COST (CONCEPTUAL)	**$445,000**
PROPERTY OWNER COORDINATION	2	EA	$75,000	$150,000
CONTIGENCY (20%)	1	LS	$89,000	$90,000
DESIGN AND INSPECTION (25%)	1	LS	$111,250	$115,000
			FINAL TOTAL	**$800,000**

[1] INCLUDES TYPICAL COST FOR PAVEMENT, CURB, EARTHWORK, DRAINAGE, LANDSCAPING, ETC., FOR A COMMERICAL PARKING LOT.

[2] ELECTRIC AND GAS RELOCATIONS ARE ASSUMED NO COST FOR MUNICIPAL PROJECTS. WATER AND SEWER RELOCATIONS ARE NOT PRESENT.

[3] IMPACTS OVER 5,000 SF WITHIN DEP WATERSHEDS REQUIRE POST STORMWATER TREATMENT. $75,000 ALLOWANCE FOR EXTRA ROW OR WORK REQUIRED.

INTERSECTION REALIGNMENT

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL COST
FOUR-WAY INTERSECTION [4]	1	EA	$300,000	$300,000
PARKING LOTS [5]	4,000	SF	$12	$50,000
ADDITONAL EARTHWORK (ABOVE AND BEYOND TYPICAL)	10,000	CY	$20	$200,000
RETAINING WALL	950	SF	$100	$95,000
UTILITY RELOCATION [6]	0	EA	$75,000	$0
STORMWATER AND TREATMENT [7]	1	LS	$175,000	$175,000
WORK ZONE TRAFFIC CONTROL	1	LS	$150,000	$150,000
			ESTIMATED CONSTRUCTION COST (CONCEPTUAL)	**$970,000**
RIGHT OF WAY (RESIDENTIAL)	1	LS	$8,000	$8,000
RIGHT OF WAY (COMMERCIAL)	0.020	ACRE	$340,000	$10,000
PROPERTY OWNER COORDINATION	2	EA	$75,000	$150,000
CONTIGENCY (20%)	1	LS	$194,000	$195,000
DESIGN AND INSPECTION (25%)	1	LS	$242,500	$245,000
			FINAL TOTAL	**$1,580,000**

[4] INCLUDES TYPICAL COST FOR PAVEMENT, CURB, EARTHWORK, DRAINAGE, LANDSCAPING, ETC., FOR A FOUR WAY INTERSECTION.

[5] INCLUDES TYPICAL COST FOR PAVEMENT, CURB, EARTHWORK, DRAINAGE, LANDSCAPING, ETC., FOR A COMMERICAL PARKING LOT.

[6] ELECTRIC AND GAS RELOCATIONS ARE ASSUMED NO COST FOR MUNICIPAL PROJECTS. WATER AND SEWER RELOCATIONS ARE NOT PRESENT.

[7] IMPACTS OVER 5,000 SF WITHIN DEP WATERSHEDS REQUIRE POST STORMWATER TREATMENT. $175,000 ALLOWANCE FOR EXTRA ROW OR WORK REQUIRED.

SINGLE LANE ROUNDABOUT (120 FT DIAMETER)

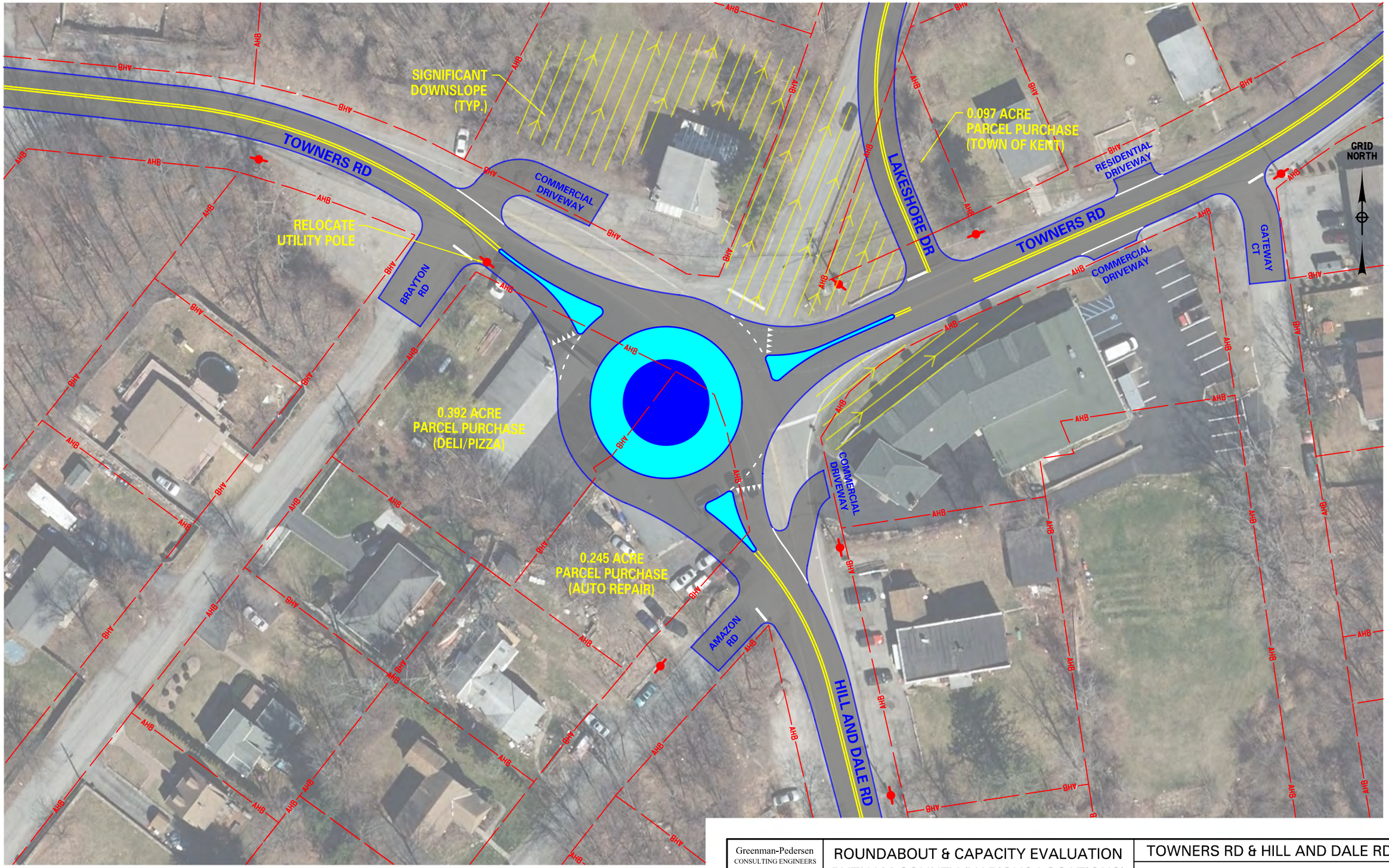
DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL COST
SINGLE LANE ROUNDABOUT [8]	1	EA	$750,000	$750,000
THREE-WAY INTERSECTION [9]	1	EA	$250,000	$250,000
ADDITONAL EARTHWORK (ABOVE AND BEYOND TYPICAL)	10,000	CY	$20	$200,000
UTILITY RELOCATION [10]	0	EA	$75,000	$0
STORMWATER AND TREATMENT [11]	1	LS	$175,000	$175,000
WORK ZONE TRAFFIC CONTROL	1	LS	$200,000	$200,000
			ESTIMATED CONSTRUCTION COST (CONCEPTUAL)	**$1,575,000**
RIGHT OF WAY (RESIDENTIAL)	1	LS	$8,000	$8,000
RIGHT OF WAY (COMMERCIAL)	1	LS	$320,000	$320,000
RIGHT OF WAY (COMMERCIAL)	1	LS	$335,000	$335,000
CONTIGENCY (20%)	1	LS	$315,000	$315,000
DESIGN AND INSPECTION (25%)	1	LS	$393,750	$395,000
			FINAL TOTAL	**$2,950,000**

[8] INCLUDES TYPICAL COST FOR PAVEMENT, CURB, EARTHWORK, DRAINAGE, LANDSCAPING, ETC., FOR A SINGLE LANE ROUNDABOUT.

[9] INCLUDES TYPICAL COST FOR PAVEMENT, CURB, EARTHWORK, DRAINAGE, LANDSCAPING, ETC., FOR A THREE WAY INTERSECTION.

[10] ELECTRIC AND GAS RELOCATIONS ARE ASSUMED NO COST FOR MUNICIPAL PROJECTS. WATER AND SEWER RELOCATIONS ARE NOT PRESENT.

[11] IMPACTS OVER 5,000 SF WITHIN DEP WATERSHEDS REQUIRE POST STORMWATER TREATMENT. $175,000 ALLOWANCE FOR EXTRA ROW OR WORK REQUIRED.



25 0 25 50 75 100′

1" = 50′

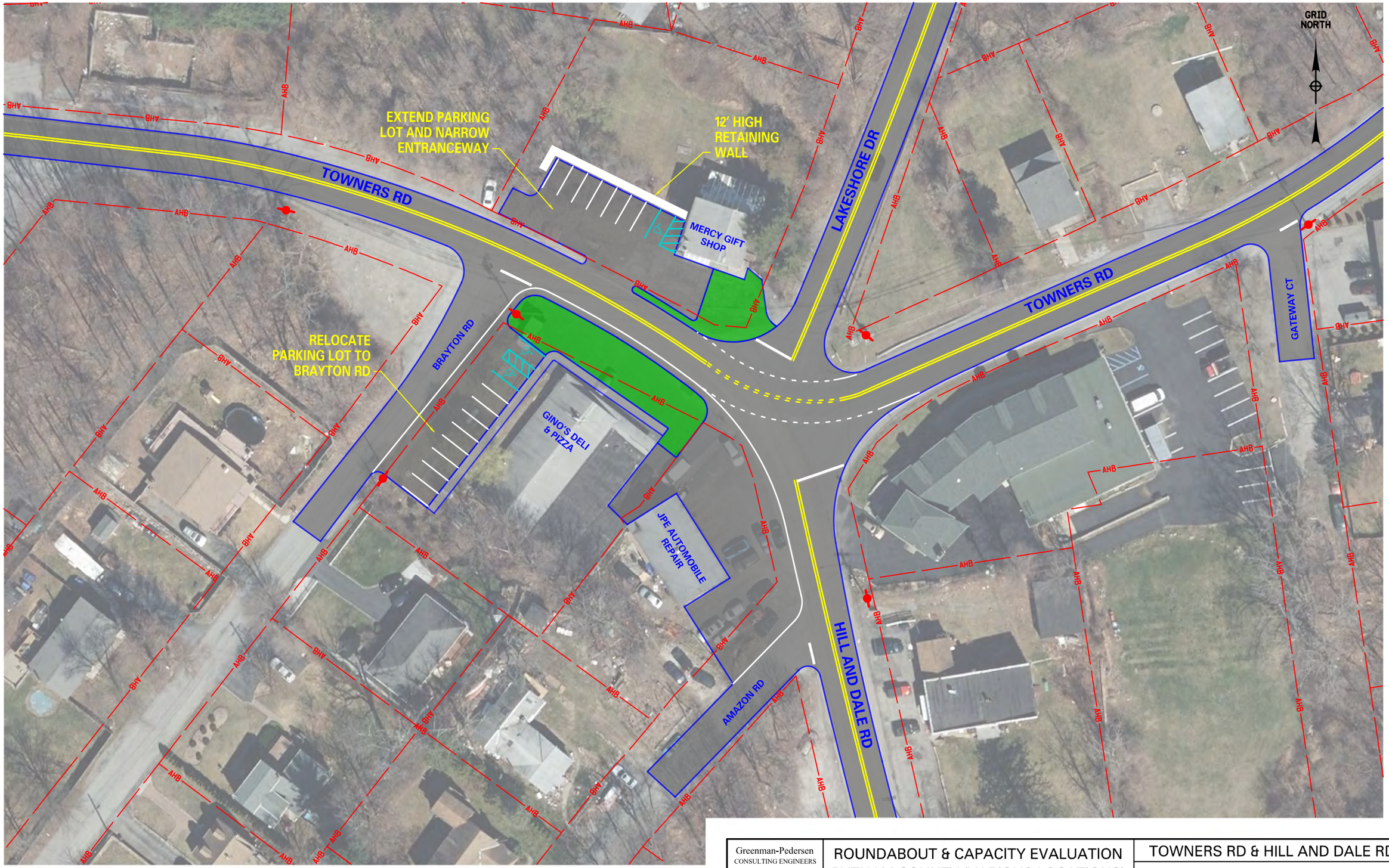
Greenman-Pedersen
CONSULTING ENGINEERS
GPI
80 Wolf Road
Suite 300
Albany, NY 12205

ROUNDABOUT & CAPACITY EVALUATION
PUTNAM COUNTY (VARIOUS LOCATIONS)
COUNTY OFFICES
842 FAIR ST, CARMEL, NY 10512

TOWNERS RD & HILL AND DALE RD

ROUNDABOUT CONCEPT SKETCH
(120 FT DIAMETER)

JOB NO.	SCALE:	DATE:	FIGURE NO.
2019058.00	AS SHOWN	OCT 2019	9



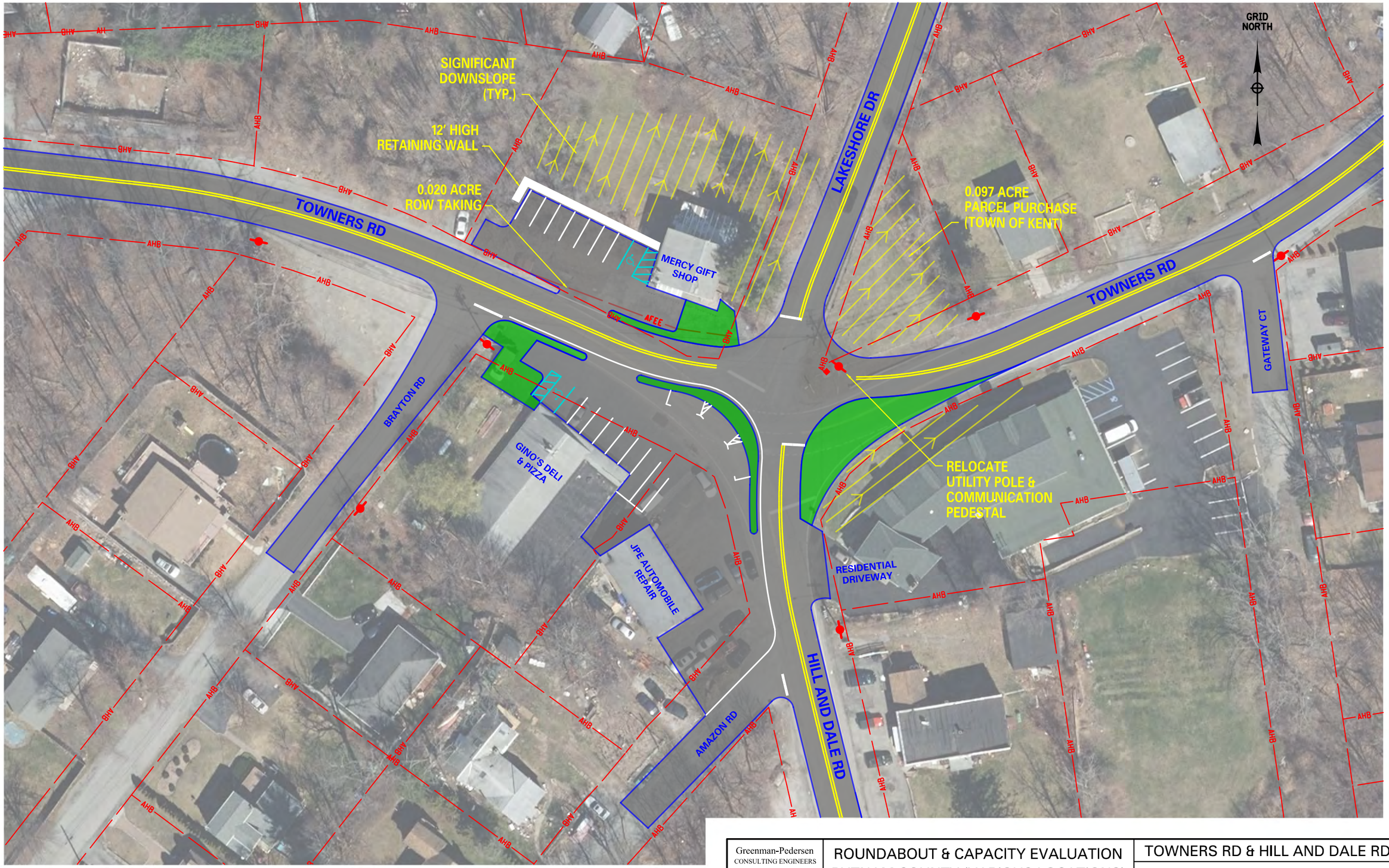
Greenman-Pedersen
CONSULTING ENGINEERS
GPI
80 Wolf Road
Suite 300
Albany, NY 12205

ROUNDABOUT & CAPACITY EVALUATION
PUTNAM COUNTY (VARIOUS LOCATIONS)
COUNTY OFFICES
842 FAIR ST, CARMEL, NY 10512

TOWNERS RD & HILL AND DALE RD

CONCEPT SKETCH A
PARKING RECONFIGURATION

JOB NO.	SCALE:	DATE:	FIGURE NO.
2019058.00	AS SHOWN	OCT 2019	9A



Greenman-Pedersen
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GPI
80 Wolf Road
Suite 300
Albany, NY 12205

ROUNDABOUT & CAPACITY EVALUATION
PUTNAM COUNTY (VARIOUS LOCATIONS)
COUNTY OFFICES
842 FAIR ST, CARMEL, NY 10512

TOWNERS RD & HILL AND DALE RD

CONCEPT SKETCH B
INTERSECTION REALIGNMENT

JOB NO.	SCALE:	DATE:	FIGURE NO.
2019058.00	AS SHOWN	OCT 2019	9B

SUMMARY OF INTERSECTION EVALUATION
FAIRFIELD DR AND HAVILAND DR

Existing Conditions:

Fairfield Drive in the area of this intersection is a curved road approaching from the west and southeast. Haviland Drive approaches from the northeast. Each of these roadways has a 30 mph speed limit. There is a skew to the intersection and a right turn slip ramp heading northwest, which forms a triangular island between Fairfield Dr, Haviland Dr, and the slip ramp. There is a war memorial in this island, which is inaccessible to pedestrians, as there are no sidewalks or pedestrian crossing facilities at this intersection. Traffic is controlled through the use of an all-way stop condition at the intersection. There is a firehouse in the northwest quadrant of the intersection, and parking for the businesses south of the intersection are accessed through a wide curb cut and parking along the building frontages that requires vehicles to back out into traffic to exit.

Existing capacity and level of service are within an acceptable range, with overall level of service being LOS B during the AM peak and LOS C during the PM peak. The eastbound approach operates at LOS D with a volume to capacity ratio of 0.86 in the PM peak, but that is the only approach that approaches capacity. Though no capacity issues exist, the eastbound queue does extent back approximately 250 feet, and may extend past the midblock pedestrian crossing located west of the intersection. Additionally, the eastbound queue does block parked vehicles in front of the south side businesses from existing their parking spaces, which pose a safety concern. An Intersection Evaluation worksheet, showing geometric details, the existing traffic volumes, and a summary of the capacity analyses is attached.

Signal Warrant Analysis:

A review of the hourly traffic volumes between 7:00 AM and 8:00 PM show that none of the warrants reviewed; Warrant 1 (8-hour warrant), Warrant 2 (4-hour warrant) or Warrant 3 (peak hour warrant) are satisfied for the existing traffic volumes. Warrant 1 is satisfied for 4 hours and warrant 2 is satisfied for 3 hours, but neither reach the threshold necessary to justify a traffic signal or roundabout. Additionally, fewer than 5 accidents per year occur at this location, so Warrant 7 (Crash Experience) is not satisfied either. See the signal warrant analysis worksheets attached.

Accident Analysis:

For the 3-year period studied (2016-2018), 7 accidents were reported at this intersection, they range from right angle and left turn to right turn and fixed object, and none resulting in an injury. Overall the accident rate for this location was calculated to be 0.77 accidents/Million Entering Vehicles (MEV), which is 4 times the statewide average for similar intersection on State Roads, but there is no noticeable pattern that reveals a particular concern. However, the existing roadside parking condition that requires vehicles to back out into the travel lane to exit does cause unexpected conflicts that could potential be hazardous and may contribute to the high accident rate at this location. The accidents types and severity are summarized in the table below, and accident records are attached.

ACCIDENT SUMMARY

Accident Type	Number of Occurrences	Accident Severity	Number of Occurrences
Right Angle	1	Fatality	0
Left Turn	2	Personal Injury	0
Rear End	1	Property Damage Only	5
Fixed Object	2	Non-Reportable	2
Right Turn	1		
	7		7

Field Condition and Right of Way Review:

Right of way is tight in the area and if a roundabout were to be constructed it would require full acquisition of two properties, the demolition of two buildings, and removal of some of the southside store frontage parking. It would also require the relocation of the war memorial, possibly to the center of the roundabout. In addition, the roundabout would require some utility relocations and would need to tie into a significant slope along Haviland Dr.

Design Alternative Consideration:

Neither a traffic signal or roundabout is warranted here and though a traffic signal would improve the already acceptable levels of service (from B to A in the AM and C to B in the PM), it could potentially lengthen the already problematic eastbound queue to 400 feet long, which may cause additional blockage time for the adjacent roadside parking and the mid-block crosswalk located approximately 220 feet from the intersection. A roundabout would operate at LOS A in both peaks with much shorter queues, but as mentioned above, would require the acquisition of significant property (see Figure 10 for roundabout footprint and impacts).

To improve operations and safety at the intersection, two main concerns need to be addressed, the excessive eastbound queue resulting from the high number of left turn vehicles on that approach, and the adjacent roadside parking on the south side of the road, which results in traffic backing out into the roadway. Other potential issues, though to a lesser degree, is the entering skew of the southbound, Haviland Dr, approach and the war memorial within the intersection, which does partially block sight distance.

Traffic operations could be improved with the existing intersection geometry by changing traffic control to a stop sign on the side street (Haviland Dr) only. If this were done, level of service would be LOS A for all hours of the day and the longest queue would be approximately 55 feet. However, this would only address the queueing issue, and not the other issues identified.

Two concepts were developed to best address the issues identified. Concept A, which includes an eastbound left turn lane, while maintaining the existing intersection geometry for the other approaches, and Concept B, which adds an eastbound left turn lane, realigns the southbound approach and relocates the war memorial to a location more accessible by pedestrians (see Figures 10A & 10B for concept sketches for each of these alternatives). In both cases, the left turn lanes can be formed within the County right-of-way, but at the cost of the adjacent roadside parking. As

the commercial developments served by that parking also have a parking lot behind the building, this may not be an issue, but this parking loss should be coordinated with the property owners prior to design. The benefit of removing this parking, in addition to being able to add the left turn lane, is improved safety, as parked vehicles will no longer be backing out into the roadway.

Both Concept A and Concept B can be constructed with an all-way stop condition, same as existing, or with just a side street stop sign and uncontrolled Fairfield Dr approaches. The all-way stop condition is more appropriate for Concept A, as the intersection skew and sight distance limitations from the war memorial will still exist under this concept. With an all-way stop, Concept A should see LOS B overall operations for both peak hours and the maximum eastbound queue should not exceed 75 feet. For Concept B, with the skew removed and sight distance improved, it would be reasonable to go to stop sign control on the side street (Haviland Dr) only. If this were done, the level of service would be LOS A overall during both peak hours and the eastbound queues shouldn't exceed one vehicle per lane.

Conceptual Cost Estimate:

As mentioned above, neither a traffic signal nor roundabout would be an appropriate solution for this location. However, if they were to be constructed, it is estimated that they would cost $250,000 and $2.5M respectively.

Of the reasonable options available, the cost of removing the stop signs and stop bars on Fairfield Dr to improve the eastbound queuing condition would be minimal. The cost of concept A, with the left turn lane added, would be approximately $330,000, and the cost of Concept B, with left turn lane and realigned Haviland Dr would be approximately $1,280,000.

These costs are based on our past experience with similar projects, knowledge of construction pricing in this region of New York State and our understanding of the issues. These costs include construction of all improvements, right of way, wetland mitigation, and costs for design and inspection. Cost estimates with a breakdown of the big picture cost items is attached.

Summary & Conclusion:

To address all potential issues at this location, Concept B would be the recommended option. However, Concept A is an acceptable alternative that address most of the issues at a much cheaper cost. In both cases, improved safety and reduced eastbound queuing are achieved by adding an eastbound left turn lane and removing the roadside parking near the intersection. If removal of the parking becomes an issue, traffic operations and queuing can be improved by removing the stop signs on Fairfield Dr, but the removal of the stop conditions could increase speeds through the intersection and with the adjacent parking could pose a safety concern. It is understandable that the businesses would want to maximize parking availability and convenience for their customers, but the presence of that roadside parking does yield a less safe condition.

INTERSECTION EVALUATION WORKSHEET

Project:	Putnam County Roundabout Evaluation
Location:	Putnam County (Various Locations)
Intersection:	Fairfield Dr & Haviland Dr
GPS Coord.:	41°27'37.19"N, 73°32'50.99"W
Traffic Control:	Stop Sign (All Legs)

Traffic Control Notes (if applicable):

All-Way Stop Control. Channelized stop controlled right turn on westbound approach.

Other Intersection Notes (if applicable):

Steep grade on southbound approach.

APPROACH DATA

	n/a			Haviland Dr			Fairfield Dr			Fairfield Dr		
	Northbound (NE)			**Southbound (SW)**			**Eastbound (SE)**			**Westbound (NW)**		
	Left	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**
Lane Assignments:					<-1->			<-1->			<-1	1
Lane Widths:					11'			11'			11'	14'
Turn Bay Lengths:					-			-			-	60'
Speed Limits:					30 mph			30 mph			30 mph	

TRAFFIC COUNT DATA

(traffic volumes below represent counted traffic adjusted by 1.05 to account for seasonal variation and annual growth)

AM Peak Hour	Time Period:		7:15	to	8:15					Date Counted:		9/11/2019
Volume:	-	-	-	36	-	299	75	97	-	-	244	8
Truck %:	-	-	-	3%	-	4%	14%	14%	-	-	2%	13%
Peds (Bikes):		-			0 (0)			0 (0)			1 (0)	
PHF = 0.95												
PM Peak Hour	Time Period:		5:15	to	6:15					Date Counted:		9/11/2019
Volume:	-	-	-	38	-	149	314	286	-	-	123	28
Truck %:	-	-	-	1%	-	3%	1%	1%	-	-	3%	1%
Peds (Bikes):		-			1 (0)			0 (0)			0 (0)	
PHF = 0.95												

EXISTING CONDITION LEVEL OF SERVICE

AM Peak Delay (s):				11.4		10.9	12.2	7.7
LOS:				B		B	B	A
v/c:				0.46		0.28	0.40	0.01
95% Queue:				60'		30'	50'	< 25'
B (11.5) Overall		-		**B (11.4)**		**B (10.9)**	**B (12.1)**	
PM Peak Delay (s):				10.7		29.2	10.0	8.0
LOS:				B		D	A	A
v/c:				0.30		0.86	0.21	0.04
95% Queue:				30'		250'	<25'	< 25'
C (22.4) Overall		-		**B (10.7)**		**D (29.2)**	**A (9.6)**	

Note: LOS calculated using HCM 6 methodologies.

INTERSECTION EVALUATION WORKSHEET

	n/a			Haviland Dr			Fairfield Dr			Fairfield Dr		
	Northbound (NE)			**Southbound (SW)**			**Eastbound (SE)**			**Westbound (NW)**		
	Left	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**
ANALYSIS SCENARIO #1 - LEVEL OF SERVICE												
Description of Improvements:	Existing Geometry with Stop Contol on Haviland Dr Only / Fairfield Dr Uncontolled											
AM Peak Delay (s):				12.8			8.1					
LOS:				B			A					
v/c:				0.44			0.06					
95% Queue:				55'			<25'					
A (6.4) Overall	**-**			**B (12.8)**			**A (3.5)**			**A (0.0)**		
PM Peak Delay (s):				8.6			8.2					
LOS:				A			A					
v/c:				0.17			0.23					
95% Queue:				<25'			< 25'					
A (4.5) Overall	**-**			**A (8.6)**			**A (4.3)**			**A (0.0)**		
Note: LOS calculated using HCM 6 methodologies. For unsignalized intersections, only side street approach delay and mainline left turn delay is shown. The HCM 6 methodology assumes zero delay for all other movements.												
ANALYSIS SCENARIO #2 - LEVEL OF SERVICE												
Description of Improvements:	Added Eastbound Left Turn Lane with All-Way Stop Control											
AM Peak Delay (s):				11.3			10.2	9.9		11.4		
LOS:				B			B	A		B		
v/c:				0.45			0.14	0.17		0.38		
95% Queue:				60'			<25'	<25'		45'		
B (11.0) Overall	**-**			**B (11.3)**			**A (10.0)**			**B (11.4)**		
PM Peak Delay (s):				10.2			14.5	11.9		9.7		
LOS:				B			B	B		A		
v/c:				0.28			0.53	0.44		0.23		
95% Queue:				30'			75'	55'		<25'		
B (12.1) Overall	**-**			**B (10.2)**			**B (13.3)**			**A (9.7)**		
Note: LOS calculated using HCM 6 methodologies.												
ANALYSIS SCENARIO #3 - LEVEL OF SERVICE												
Description of Improvements:	Added Eastbound Left Turn Lane with Stop Control on Haviland Dr Only											
AM Peak Delay (s):				12.8			8.1					
LOS:				B			A					
v/c:				0.43			0.06					
95% Queue:				55'			<25'					
A (6.4) Overall	**-**			**B (12.9)**			**A (3.5)**			**A (0.0)**		
PM Peak Delay (s):				8.6			8.2					
LOS:				A			A					
v/c:				0.17			0.23					
95% Queue:				<25'			< 25'					
A (4.5) Overall	**-**			**B (8.6)**			**A (4.3)**			**A (0.0)**		
Note: LOS calculated using HCM 6 methodologies. For unsignalized intersections, only side street approach delay and mainline left turn delay is shown. The HCM 6 methodology assumes zero delay for all other movements.												

INTERSECTION EVALUATION WORKSHEET

ANALYSIS SCENARIO #4 - LEVEL OF SERVICE

	Driveway			Haviland Dr			Fairfield Dr			Fairfield Dr		
	Northbound (NE)			**Southbound (SW)**			**Eastbound (SE)**			**Westbound (NW)**		
	Left	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**
Description of Improvements:	Actuated Traffic Signal with No Geometric Improvements											
AM Peak Delay (s):				12.3			6.6			6.9		
LOS:				B			A			B		
v/c:				0.65			0.28			0.36		
95% Queue:				50'			65'			80'		
A (9.3) Overall	**-**			**B (12.3)**			**A (6.6)**			**B (6.9)**		
PM Peak Delay (s):				15.3			9.5			4.7		
LOS:				B			A			A		
v/c:				0.47			0.73			0.14		
95% Queue:				60'			>400'			35'		
B (10.0) Overall	**-**			**B (15.3)**			**A (9.5)**			**A (4.7)**		

Note: LOS calculated using HCM 6 methodologies. Unsignalized delay for westbound right turn is excluded from calculations of the approach delay and intersection delay.

ANALYSIS SCENARIO #5 - LEVEL OF SERVICE

Description of Improvements:	Single Lane Roundabout - 4 Leg (120' Radius)			
AM Peak Delay (s):	3.5	7.2	4.5	4.9
LOS:	A	A	A	A
v/c:	0.01	0.35	0.16	0.2
95% Queue:	<25'	50'	25'	25'
A (5.8) Overall	**A (3.5)**	**A (7.2)**	**A (4.5)**	**A (4.9)**
PM Peak Delay (s):	5.5	4.6	7.9	5.4
LOS:	A	A	A	A
v/c:	0.02	0.17	0.49	0.17
95% Queue:	<25'	25'	75'	25'
A (6.8) Overall	**A (5.5)**	**A (4.6)**	**A (7.9)**	**A (5.4)**

Fairfield Dr & Haviland Dr
Patterson NY
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Time	Southbound Haviland Dr					Westbound Fairfield Dr					Northbound n/a					Eastbound Fairfield Dr					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:00 AM	0	5	0	86	0	0	0	43	4	0	0	0	0	0	0	0	11	11	0	0	**160**
7:15 AM	0	5	0	72	0	0	0	56	1	0	0	0	0	0	0	0	20	17	0	0	**171**
7:30 AM	0	9	0	78	0	0	0	60	3	0	0	0	0	0	0	0	17	24	0	0	**191**
7:45 AM	0	9	0	67	0	0	1	68	3	1	0	0	0	0	0	0	12	19	0	0	**179**
Hourly Total	0	28	0	303	0	0	1	227	11	1	0	0	0	0	0	0	60	71	0	0	**701**

Fairfield Dr & Haviland Dr
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Time	Southbound Haviland Dr					Westbound Fairfield Dr					Northbound n/a					Eastbound Fairfield Dr					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
8:00 AM	0	11	0	68	0	0	0	48	1	0	0	0	0	0	0	0	22	32	0	0	**182**
8:15 AM	0	6	0	60	0	0	0	51	4	0	0	0	0	0	0	0	16	25	0	0	**162**
8:30 AM	0	12	1	53	0	0	0	55	2	0	0	0	0	0	0	0	11	27	0	0	**161**
8:45 AM	0	4	0	32	0	0	1	41	4	0	0	0	0	0	0	0	19	18	0	0	**119**
Hourly Total	0	33	1	213	0	0	1	195	11	0	0	0	0	0	0	0	68	102	0	0	**624**
9:00 AM	0	4	0	37	0	0	0	37	4	0	0	0	0	0	0	0	17	22	0	0	**121**
9:15 AM	0	1	0	47	0	0	0	25	9	0	0	0	0	0	0	0	19	27	0	0	**128**
9:30 AM	0	8	0	37	0	0	0	27	6	0	0	0	0	0	0	0	23	18	0	0	**119**
9:45 AM	0	5	1	39	0	0	0	30	5	0	0	0	0	0	0	0	22	29	0	0	**131**
Hourly Total	0	18	1	160	0	0	0	119	24	0	0	0	0	0	0	0	81	96	0	0	**499**
10:00 AM	0	2	0	28	1	0	0	26	4	0	0	0	0	0	0	0	15	23	0	0	**98**
10:15 AM	0	6	0	40	2	0	0	25	5	0	0	0	0	0	0	0	24	21	0	0	**121**
10:30 AM	0	5	0	41	1	0	0	25	5	0	0	0	0	0	0	1	29	19	0	0	**125**
10:45 AM	0	6	0	26	0	0	0	17	4	0	0	0	0	0	0	0	22	26	0	0	**101**
Hourly Total	0	19	0	135	4	0	0	93	18	0	0	0	0	0	0	1	90	89	0	0	**445**
11:00 AM	0	5	0	33	0	0	0	23	8	0	0	0	0	0	0	1	30	14	0	0	**114**
11:15 AM	0	2	0	27	0	0	0	23	1	0	0	0	0	0	0	0	23	24	0	1	**100**
11:30 AM	0	5	0	34	1	0	0	25	12	0	0	0	0	0	0	0	25	24	0	0	**125**
11:45 AM	0	7	0	24	0	0	0	18	6	0	0	0	0	0	0	0	22	20	0	0	**97**
Hourly Total	0	19	0	118	1	0	0	89	27	0	0	0	0	0	0	1	100	82	0	1	**436**
12:00 PM	0	5	0	31	0	0	0	13	9	0	0	0	0	0	3	1	31	24	0	2	**114**
12:15 PM	0	6	0	30	1	0	1	27	3	0	0	0	0	0	0	0	26	20	0	0	**113**
12:30 PM	0	7	1	31	0	0	0	19	5	0	0	0	0	0	0	0	28	21	0	0	**112**
12:45 PM	0	7	0	40	0	0	1	28	7	0	0	0	0	0	0	0	26	25	0	0	**134**
Hourly Total	0	25	1	132	1	0	2	87	24	0	0	0	0	0	3	1	111	90	0	2	**473**
1:00 PM	0	2	1	29	0	0	0	24	4	0	0	0	0	0	0	0	30	29	0	0	**119**
1:15 PM	0	4	0	24	0	0	0	23	4	0	0	0	0	0	0	0	27	26	0	1	**108**
1:30 PM	0	1	0	29	0	0	0	22	8	1	0	0	0	0	0	0	31	28	0	1	**119**
1:45 PM	0	9	0	31	0	0	0	26	8	1	0	0	0	0	0	0	24	20	0	0	**118**
Hourly Total	0	16	1	113	0	0	0	95	24	2	0	0	0	0	0	0	112	103	0	2	**464**
2:00 PM	0	3	0	32	0	0	0	19	3	0	0	0	0	0	0	0	36	31	0	0	**124**
2:15 PM	0	4	0	37	0	0	0	25	7	0	0	0	0	0	0	0	45	37	0	2	**155**
2:30 PM	0	5	0	42	0	0	0	21	3	0	0	0	0	0	0	0	41	21	0	0	**133**
2:45 PM	0	1	0	39	0	0	1	27	12	0	0	0	0	0	0	0	37	50	0	0	**167**
Hourly Total	0	13	0	150	0	0	1	92	25	0	0	0	0	0	0	0	159	139	0	2	**579**
3:00 PM	0	4	0	34	0	0	1	27	4	0	0	0	0	0	0	0	42	38	0	0	**150**
3:15 PM	0	10	0	32	0	0	0	23	7	0	0	0	0	0	0	0	67	42	0	0	**181**
3:30 PM	0	4	0	31	0	0	0	44	8	0	0	0	0	0	0	0	52	46	0	0	**185**
3:45 PM	0	7	0	22	0	0	0	33	14	0	0	0	0	0	0	0	77	68	0	1	**221**
Hourly Total	0	25	0	119	0	0	1	127	33	0	0	0	0	0	0	0	238	194	0	1	**737**

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Time	Southbound Haviland Dr					Westbound Fairfield Dr					Northbound n/a					Eastbound Fairfield Dr					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:00 PM	0	3	0	35	0	0	0	39	3	0	0	0	0	0	0	0	56	60	0	1	**196**
4:15 PM	0	4	0	40	0	0	0	27	13	0	0	0	0	0	0	0	67	68	0	1	**219**
4:30 PM	0	11	0	45	0	0	0	29	8	0	0	0	0	0	0	0	75	64	0	1	**232**
4:45 PM	0	3	0	40	0	0	1	32	6	0	0	0	0	0	0	0	67	68	0	2	**217**
Hourly Total	0	21	0	160	0	0	1	127	30	0	0	0	0	0	0	0	265	260	0	5	**864**
5:00 PM	0	8	0	35	0	0	0	25	11	0	0	0	0	0	0	0	70	65	0	0	**214**
5:15 PM	0	5	0	29	0	0	1	35	9	0	0	0	0	0	0	0	63	66	0	0	**208**
5:30 PM	1	13	0	38	0	0	0	28	6	0	0	0	0	0	0	0	72	77	0	0	**235**
5:45 PM	0	11	0	41	0	0	0	28	4	0	0	0	0	0	0	0	85	57	0	0	**226**
Hourly Total	1	37	0	143	0	0	1	116	30	0	0	0	0	0	0	0	290	265	0	0	**883**
6:00 PM	0	7	0	34	1	0	0	26	8	0	0	0	0	0	0	0	79	72	0	0	**226**
6:15 PM	0	8	0	24	0	0	0	28	7	0	0	0	0	0	0	0	69	67	0	0	**203**
6:30 PM	0	7	0	34	0	0	1	40	12	0	0	0	0	0	0	0	53	45	0	0	**192**
6:45 PM	0	8	0	35	0	0	0	23	7	0	0	0	0	0	0	0	69	53	0	0	**195**
Hourly Total	0	30	0	127	1	0	1	117	34	0	0	0	0	0	0	0	270	237	0	0	**816**
7:00 PM	0	11	0	27	0	1	0	26	11	0	0	0	0	0	0	0	43	50	0	1	**169**
7:15 PM	0	7	0	25	0	0	0	20	13	0	0	0	0	0	0	0	45	44	0	1	**154**
7:30 PM	0	5	0	31	0	0	0	22	11	0	0	0	0	0	0	0	44	37	0	0	**150**
7:45 PM	0	3	0	18	0	0	0	14	10	0	0	0	0	0	0	0	45	34	0	0	**124**
Hourly Total	0	26	0	101	0	1	0	82	45	0	0	0	0	0	0	0	177	165	0	2	**597**
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DAILY TOTAL	**1**	**310**	**4**	**1974**	**7**	**1**	**9**	**1566**	**336**	**3**	**0**	**0**	**0**	**0**	**3**	**3**	**2021**	**1893**	**0**	**15**	**8118**
Cars	1	307	4	1864	4	1	9	1513	320	3	0	0	0	0	0	3	1969	1786	0	11	**7777**
Heavy Vehicles	0	3	0	110	3	0	0	53	16	0	0	0	0	0	3	0	52	107	0	4	**341**
Heavy Vehicle %	0.00%	0.97%	0.00%	5.57%	42.86%	0.00%	0.00%	3.38%	4.76%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	2.57%	5.65%	0.00%	26.67%	**4.20%**

Fairfield Dr & Haviland Dr
Patterson NY
Wednesday, September 11, 2019

AM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	VEHICLE TOTAL
7:15 AM	0	5	0	72	0	0	0	56	1	0	0	0	0	0	0	0	20	17	0	0	**171**
7:30 AM	0	9	0	78	0	0	0	60	3	0	0	0	0	0	0	0	17	24	0	0	**191**
7:45 AM	0	9	0	67	0	0	1	68	3	1	0	0	0	0	0	0	12	19	0	0	**179**
8:00 AM	0	11	0	68	0	0	0	48	1	0	0	0	0	0	0	0	22	32	0	0	**182**
Peak Hour Total	0	34	0	285	0	0	1	232	8	1	0	0	0	0	0	0	71	92	0	0	**723**
PHF	0.000	0.773	0.000	0.913	0.000	0.000	0.250	0.853	0.667	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.807	0.719	0.000	0.000	**0.946**
Heavy Vehicle %	0.00%	2.94%	0.00%	4.21%	0.00%	0.00%	0.00%	2.16%	12.50%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	14.08%	14.13%	0.00%	0.00%	**5.81%**

PM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	VEHICLE TOTAL
5:15 PM	0	5	0	29	0	0	1	35	9	0	0	0	0	0	0	0	63	66	0	0	**208**
5:30 PM	1	13	0	38	0	0	0	28	6	0	0	0	0	0	0	0	72	77	0	0	**235**
5:45 PM	0	11	0	41	0	0	0	28	4	0	0	0	0	0	0	0	85	57	0	0	**226**
6:00 PM	0	7	0	34	1	0	0	26	8	0	0	0	0	0	0	0	79	72	0	0	**226**
Peak Hour Total	1	36	0	142	1	0	1	117	27	0	0	0	0	0	0	0	299	272	0	0	**895**
PHF	0.250	0.692	0.000	0.866	0.250	0.000	0.250	0.836	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.879	0.883	0.000	0.000	**0.952**
Heavy Vehicle %	0.00%	0.00%	0.00%	2.82%	0.00%	0.00%	0.00%	2.56%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.33%	1.47%	0.00%	0.00%	**1.34%**

Total Vehicles On Leg 4647

Vehicles Entering Intersection 2289 | Vehicles Exiting Intersection 2358

Southbound

Cars	1864	4	307	1	4
Heavy	110	0	3	0	3
Total	**1974**	**4**	**310**	**1**	**7**

Total Vehicles on Leg 7460

Vehicles Entering Intersection 3917 | Vehicles Exiting Intersection 3543

Eastbound

Cars	Heavy	Total
11	4	**15**
3	0	**3**
1969	52	**2021**
1786	107	**1893**
0	0	**0**

Daily Volumes

Westbound

Cars	Heavy	Total
320	16	**336**
1513	53	**1566**
9	0	**9**
1	0	**1**
3	0	**3**

Vehicles Entering Intersection 1912 | Vehicles Exiting Intersection 2204

Total Vehicles on Leg 4116

Cars	0	0	0	0	0
Heavy	3	0	0	0	0
Total	**3**	**0**	**0**	**0**	**0**

Northbound

Vehicles Entering Intersection 0 | Vehicles Exiting Intersection 13

Total Vehicles On Leg 13

TRAFFIC SIGNAL WARRANT SUMMARY

Project: Putnam County Roundabout Evaluation
Condition: 2019 Existing Condition
Location: Fairfield Dr & Haviland Dr
Date: September 11, 2019

Major Street: Fairfield Dr
Lanes: 1
Critical Approach Speed: 30 mph
Minor Street: Haviland Dr
Lanes: 1

Volume Level Criteria

1. Is the critical speed of major street traffic greater than 40 mph? No
2. Is the intersection in a built-up area of an isolated community with population less than 10,000? No

If either Question 1 or Question 2 is answered "Yes", then use the 70% volume level. Criteria used: 100%

WARRANT 1 - EIGHT HOUR VEHICULAR VOLUME **Warrant 1 Satisfied: NO**

Warrant 1 is satisfied if EITHER Condition A OR Condition B is 100% satisfied.
Warrant 1 is also satisfied if BOTH Condition A AND Condition B are satisfied to the 80% volume level.

			Condition 1A - Minimum Vehicular Volume (X indicates that criteria is met for specified condition)				Condition 1B - Interuption of Continuous Traffic (X indicates that criteria is met for specified condition)				Total Satisfied Hours (8 required)		
											4	0	4
Minimum Volume Criteria:			500	150	400	120	750	75	600	60	Condition	Condition	80% for
Start Time	Major St. Volume[1]	Minor St. Volume[2]	Major St. 100%	Minor St. 100%	Major St. 80%	Minor St. 80%	Major St. 100%	Minor St. 100%	Major St. 80%	Minor St. 80%	1A Satisfied	1B Satisfied	Both Satisfied
12:00 AM			-	-	-	-	-	-	-	-	-	-	-
1:00 AM			-	-	-	-	-	-	-	-	-	-	-
2:00 AM			-	-	-	-	-	-	-	-	-	-	-
3:00 AM			-	-	-	-	-	-	-	-	-	-	-
4:00 AM			-	-	-	-	-	-	-	-	-	-	-
5:00 AM			-	-	-	-	-	-	-	-	-	-	-
6:00 AM			-	-	-	-	-	-	-	-	-	-	-
7:00 AM	389	348	-	X	-	X	-	X	-	X	-	-	-
8:00 AM	396	259	-	X	-	X	-	X	-	X	-	-	-
9:00 AM	336	188	-	X	-	X	-	X	-	X	-	-	-
10:00 AM	306	162	-	X	-	X	-	X	-	X	-	-	-
11:00 AM	314	144	-	-	-	X	-	X	-	X	-	-	-
12:00 PM	331	166	-	X	-	X	-	X	-	X	-	-	-
1:00 PM	351	137	-	-	-	X	-	X	-	X	-	-	-
2:00 PM	437	171	-	X	X	X	-	X	-	X	-	-	-
3:00 PM	623	151	X	X	X	X	-	X	X	X	**1**	-	**1**
4:00 PM	717	190	X	X	X	X	-	X	X	X	**1**	-	**1**
5:00 PM	737	190	X	X	X	X	-	X	X	X	**1**	-	**1**
6:00 PM	692	165	X	X	X	X	-	X	X	X	**1**	-	**1**
7:00 PM	494	133	-	-	X	X	-	X	-	X	-	-	-
8:00 PM			-	-	-	-	-	-	-	-	-	-	-
9:00 PM			-	-	-	-	-	-	-	-	-	-	-
10:00 PM			-	-	-	-	-	-	-	-	-	-	-
11:00 PM			-	-	-	-	-	-	-	-	-	-	-

[1] Major Street Volume is the total combined volume of both mainline approaches.

[2] Minor Street volumes is the highest single side street approach volume.

Note: Right turn traffic was removed from side street volume and only one of the two available lanes was considered in the Warrant analysis.

WARRANT 2 - FOUR HOUR VEHICULAR VOLUME **Warrant 2 Satisfied: NO**

Warrant is satisfied if four (4) or more hours satisfy the volume requirements depicted on the four hour warranting graph **(see page 2)**. No. of Points Above Criteria Curve: 3

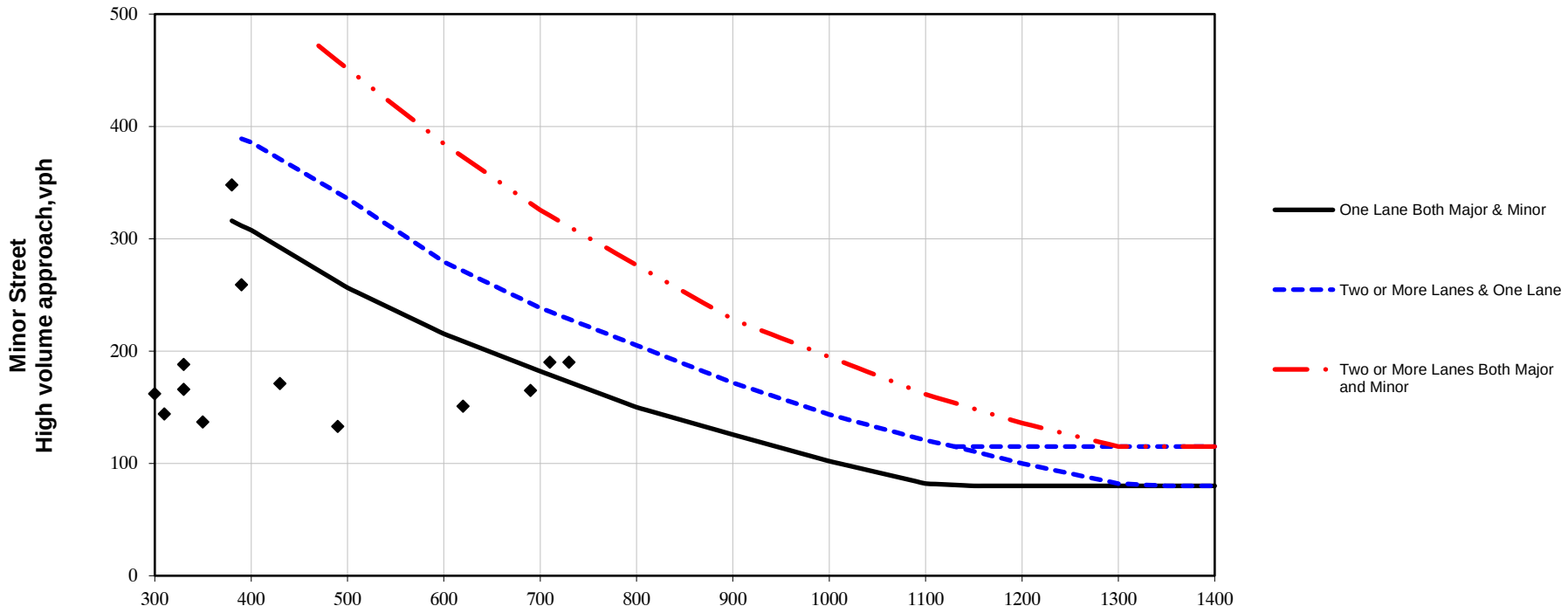
WARRANT 3 - PEAK HOUR VEHICULAR VOLUME **Warrant 3 Satisfied: NO**

Warrant is satisfied if any hour satisfy the volume requirements depicted on the peak hour warranting graph **(see page 3)**, and ALL three of the following requirement are met. No. of Points Above Criteria Curve: 0

1. Total stopped time delay on Minor Street equals or exceeds 4 VHD (single lane) or 5 VHD (two lanes): 1.1 VHD Max. N/A
2. Volume on Minor Street equals or exceeds 100 vehicles (single lane) or 150 vehicles (two lanes): N/A
3. Total intersection volume serviced during the hour equals or exceeds 650 veh. (3-leg) or 800 veh. (4-leg or more): N/A

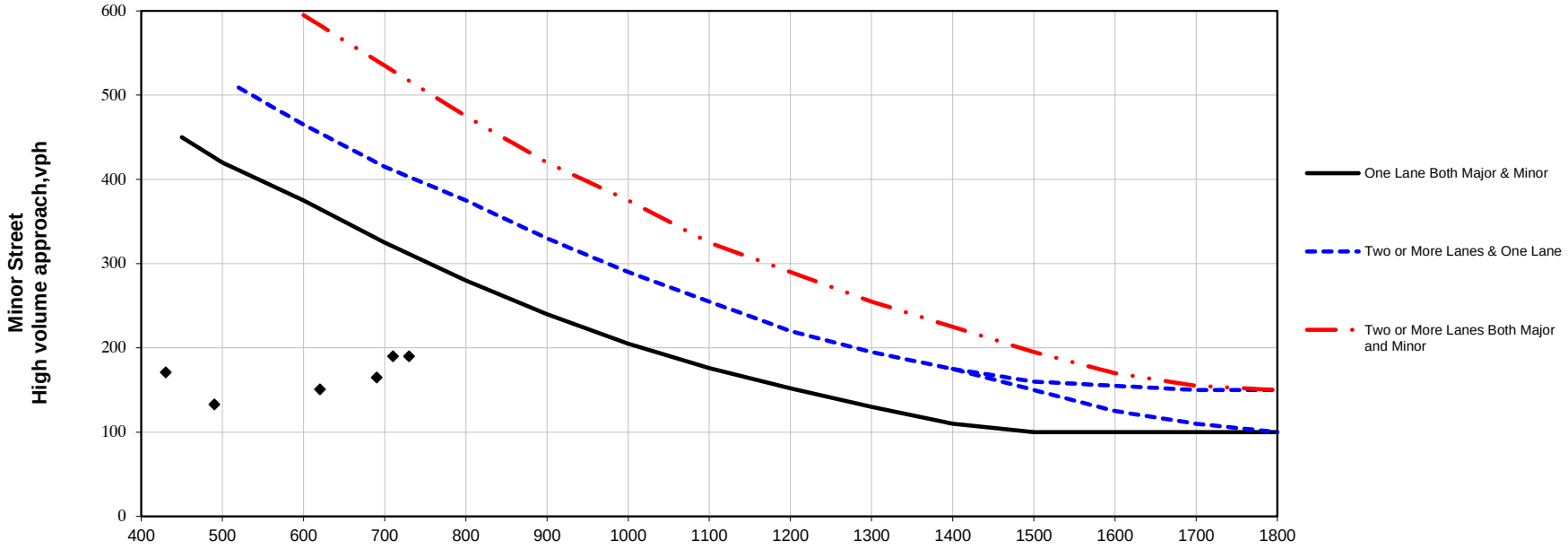
Criteria Source: Manual on Uniform Traffic Control Devices, 2009

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



Note: Points on graph represent hourly volumes. Points above the respective curve satisfy warrant, points below do not satisfy warrant.

Figure 4C-3. Warrant 3, Peak Hour



Note: Points on graph represent hourly volumes. Points above the respective curve satisfy warrant, points below do not satisfy warrant.

Accident Location Information System(ALIS)

Date: 9/5/2019
3:29:12 PM

Accident Verbal Description

16408_VDR

Date in this report covers the period - 2/29/2016-2/28/2019

Complete Accident data from NYSDMV is only available thru 2/28/2019 12:00:00 AM

County: Putnam Muni: Patterson(T) Ref. Marker: Street: FAIRFIELD DR
45 Meters West of Haviland Dr

3/5/2016 Sat 12:38 PM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2016-36128384**
Accident Class: NON-REPORTABLE Police Agency: BREWSTER SP Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NO PASSING ZONE
Manner of Collision: LEFT TURN (AGAINST OTHER CAR) Weather: CLEAR
Road Surface Condition: DRY Road Char.: CURVE AND LEVEL Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 1 Driver's Age: 53 Sex: F Citation Issued: N
Direction of Travel: WEST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: MAKING LEFT TURN
Apparent Factors: FAILURE TO YIELD RIGHT OF WAY, NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 1 Driver's Age: 73 Sex: F Citation Issued: N
Direction of Travel: WEST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: GOING STRAIGHT AHEAD
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

County: Putnam Muni: Patterson(T) Ref. Marker: Street: FAIRFIELD DR
AT INTERSECTION WITH HAVILAND DR

11/5/2016 Sat 11:14 AM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2016-36466680**
Accident Class: PROPERTY DAMAGE Police Agency: PUTNAM CO SHERIFF DEPT Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: STOP SIGN
Manner of Collision: RIGHT TURN (WITH OTHER CAR) Weather: CLEAR
Road Surface Condition: DRY Road Char.: CURVE AND GRADE Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: 3456 State of Registration: NY
Num of Occupants: 1 Driver's Age: 89 Sex: F Citation Issued: Y
Direction of Travel: WEST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: MAKING RIGHT TURN
Apparent Factors: FAILURE TO YIELD RIGHT OF WAY, TRAFFIC CONTROL DEVICES DISREGARDED

Veh :2 CAR/VAN/PICKUP Registered Weight: 4233 State of Registration: NY
Num of Occupants: 2 Driver's Age: 42 Sex: F Citation Issued: N
Direction of Travel: NORTH-WEST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: GOING STRAIGHT AHEAD
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

County: Putnam Muni: Patterson(T) Ref. Marker: Street: HAVILAND DR
AT INTERSECTION WITH FAIRFIELD DR
12/3/2016 Sat 18:40 PM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2016-36504668**
Accident Class: PROPERTY DAMAGE Police Agency: PUTNAM CO SHERIFF DEPT Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NONE
Manner of Collision: UNKNOWN Weather: CLEAR
Road Surface Condition: DRY Road Char.: STRAIGHT/ GRADE Light Condition: DARK-ROAD LIGHTED
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: 3886 State of Registration: NY
Num of Occupants: 1 Driver's Age: 23 Sex: F Citation Issued: N
Direction of Travel: NORTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: STOPPED IN TRAFFIC
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: State of Registration: CT
Num of Occupants: 1 Driver's Age: 24 Sex: F Citation Issued: Y
Direction of Travel: SOUTH-WEST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: MAKING LEFT TURN
Apparent Factors: NOT APPLICABLE, DRIVER INEXPERIENCE

County: Putnam Muni: Patterson(T) Ref. Marker: Street: HAVILAND DR
4/27/2017 Thu 06:30 AM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2017-36711853**
Accident Class: PROPERTY DAMAGE Police Agency: PUTNAM CO SHERIFF DEPT Num of Veh: 1
Type Of Accident: COLL. W/LIGHT SUPPORT/UTILITY POLE Traffic Control: NO PASSING ZONE
Manner of Collision: OTHER Weather: CLOUDY
Road Surface Condition: WET Road Char.: STRAIGHT AND LEVEL Light Condition: DAWN
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: 3173 State of Registration: NY
Num of Occupants: 1 Driver's Age: 25 Sex: F Citation Issued: Y
Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: MAKING RIGHT TURN
Apparent Factors: UNSAFE SPEED, NOT APPLICABLE

County: Putnam Muni: Patterson(T) Ref. Marker: Street: HAVILAND DR
AT INTERSECTION WITH FAIRFIELD DR
10/31/2017 Tue 09:05 AM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2017-36966247**
Accident Class: PROPERTY DAMAGE Police Agency: PUTNAM CO SHERIFF DEPT Num of Veh: 1
Type Of Accident: COLLISION WITH SIGN POST Traffic Control: STOP SIGN
Manner of Collision: OTHER Weather: CLEAR
Road Surface Condition: DRY Road Char.: STRAIGHT/ GRADE Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: 7200 State of Registration: NY
Num of Occupants: 1 Driver's Age: 47 Sex: M Citation Issued: N
Direction of Travel: NORTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: MAKING RIGHT TURN
Apparent Factors: TURNING IMPROPER, NOT APPLICABLE

County: Putnam Muni: Patterson(T) Ref. Marker: Street: FAIRFIELD DR
20 Meters West of Haviland Dr
11/21/2017 Tue 18:00 PM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2017-36998818**
Accident Class: NON-REPORTABLE Police Agency: BREWSTER SP Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: STOP SIGN
Manner of Collision: REAR END Weather: CLEAR
Road Surface Condition: DRY Road Char.: STRAIGHT AND LEVEL Light Condition: DARK-ROAD LIGHTED
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 1 Driver's Age: 18 Sex: M Citation Issued: N
Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: SLOWED OR STOPPING
Apparent Factors: FOLLOWING TOO CLOSELY, NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 1 Driver's Age: 56 Sex: F Citation Issued: N
Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: SLOWED OR STOPPING
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

County: Putnam Muni: Patterson(T) Ref. Marker: Street: FAIRFIELD DR
61 Meters West of HAVILAND DR
1/27/2018 Sat 00:16 AM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2018-37129376**
Accident Class: PROPERTY DAMAGE Police Agency: PUTNAM CO SHERIFF DEPT Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NO PASSING ZONE
Manner of Collision: RIGHT ANGLE Weather: CLEAR
Road Surface Condition: DRY Road Char.: STRAIGHT AND LEVEL Light Condition: DARK-ROAD LIGHTED
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: 3660 State of Registration: NY
Num of Occupants: 2 Driver's Age: Sex: Citation Issued:
Direction of Travel: SOUTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: PARKED
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: State of Registration: -3
Num of Occupants: 0 Driver's Age: Sex: Citation Issued:
Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: GOING STRAIGHT AHEAD
Apparent Factors: UNSAFE LANE CHANGE, NOT APPLICABLE

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	75	97	244	8	36	299
Future Vol, veh/h	75	97	244	8	36	299
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	14	14	3	1	1	3
Mvmt Flow	79	102	257	8	38	315
Number of Lanes	0	1	1	1	1	0

Approach	SE	NW	SW
Opposing Approach	NW	SE	
Opposing Lanes	2	1	0
Conflicting Approach Left	SW		NW
Conflicting Lanes Left	1	0	2
Conflicting Approach Right		SW	SE
Conflicting Lanes Right	0	1	1
HCM Control Delay	10.9	12.1	11.4
HCM LOS	B	B	B

Lane	NWLn1	NWLn2	SELn1	SWLn1
Vol Left, %	0%	0%	44%	11%
Vol Thru, %	100%	0%	56%	0%
Vol Right, %	0%	100%	0%	89%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	244	8	172	335
LT Vol	0	0	75	36
Through Vol	244	0	97	0
RT Vol	0	8	0	299
Lane Flow Rate	257	8	181	353
Geometry Grp	7	7	5	2
Degree of Util (X)	0.405	0.012	0.283	0.449
Departure Headway (Hd)	5.683	4.94	5.635	4.579
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	637	728	641	776
Service Time	3.387	2.644	3.643	2.665
HCM Lane V/C Ratio	0.403	0.011	0.282	0.455
HCM Control Delay	12.2	7.7	10.9	11.4
HCM Lane LOS	B	A	B	B
HCM 95th-tile Q	2	0	1.2	2.3

Intersection	
Int Delay, s/veh	6.4

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	75	97	244	8	36	299
Future Vol, veh/h	75	97	244	8	36	299
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Stop	-	None
Storage Length	-	-	-	65	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	-10	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	14	14	3	1	1	3
Mvmt Flow	79	102	257	8	38	315

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	257	0	-	0	518	257
Stage 1	-	-	-	-	257	-
Stage 2	-	-	-	-	261	-
Critical Hdwy	4.24	-	-	-	4.41	5.23
Critical Hdwy Stg 1	-	-	-	-	3.41	-
Critical Hdwy Stg 2	-	-	-	-	3.41	-
Follow-up Hdwy	2.326	-	-	-	3.509	3.327
Pot Cap-1 Maneuver	1241	-	-	-	693	837
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	907	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1241	-	-	-	647	837
Mov Cap-2 Maneuver	-	-	-	-	647	-
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	907	-

Approach	SE	NW	SW
HCM Control Delay, s	3.5	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1241	-	811
HCM Lane V/C Ratio	-	-	0.064	-	0.435
HCM Control Delay (s)	-	-	8.1	0	12.8
HCM Lane LOS	-	-	A	A	B
HCM 95th %tile Q(veh)	-	-	0.2	-	2.2

Intersection	
Int Delay, s/veh	6.4

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	75	97	244	8	36	299
Future Vol, veh/h	75	97	244	8	36	299
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Stop	-	None
Storage Length	75	-	-	65	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	-10	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	14	14	3	1	1	3
Mvmt Flow	79	102	257	8	38	315

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	257	0	-	0	518	257
Stage 1	-	-	-	-	257	-
Stage 2	-	-	-	-	261	-
Critical Hdwy	4.24	-	-	-	4.41	5.23
Critical Hdwy Stg 1	-	-	-	-	3.41	-
Critical Hdwy Stg 2	-	-	-	-	3.41	-
Follow-up Hdwy	2.326	-	-	-	3.509	3.327
Pot Cap-1 Maneuver	1241	-	-	-	693	837
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	907	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1241	-	-	-	649	837
Mov Cap-2 Maneuver	-	-	-	-	649	-
Stage 1	-	-	-	-	851	-
Stage 2	-	-	-	-	907	-

Approach	SE	NW	SW
HCM Control Delay, s	3.5	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1241	-	812
HCM Lane V/C Ratio	-	-	0.064	-	0.434
HCM Control Delay (s)	-	-	8.1	-	12.8
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0.2	-	2.2

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	75	97	244	8	36	299
Future Vol, veh/h	75	97	244	8	36	299
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	14	14	3	1	1	3
Mvmt Flow	79	102	257	8	38	315
Number of Lanes	1	1	1	0	1	0

Approach	SE	NW	SW
Opposing Approach	NW	SE	
Opposing Lanes	1	2	0
Conflicting Approach Left	SW		NW
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SW	SE
Conflicting Lanes Right	0	1	2
HCM Control Delay	10	11.4	11.3
HCM LOS	A	B	B

Lane	NWLn1	SELn1	SELn2	SWLn1
Vol Left, %	0%	100%	0%	11%
Vol Thru, %	97%	0%	100%	0%
Vol Right, %	3%	0%	0%	89%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	252	75	97	335
LT Vol	0	75	0	36
Through Vol	244	0	97	0
RT Vol	8	0	0	299
Lane Flow Rate	265	79	102	353
Geometry Grp	5	7	7	2
Degree of Util (X)	0.384	0.142	0.169	0.445
Departure Headway (Hd)	5.21	6.454	5.948	4.54
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	695	558	607	783
Service Time	3.21	4.161	3.655	2.623
HCM Lane V/C Ratio	0.381	0.142	0.168	0.451
HCM Control Delay	11.4	10.2	9.9	11.3
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	1.8	0.5	0.6	2.3

Lane Group	SET	NWT	NWR	SWL
Lane Group Flow (vph)	181	257	8	353
v/c Ratio	0.42	0.42	0.01	0.54
Control Delay	11.2	9.9	4.2	6.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.2	9.9	4.2	6.0
Queue Length 50th (ft)	22	30	0	5
Queue Length 95th (ft)	63	78	5	49
Internal Link Dist (ft)	586	723		611
Turn Bay Length (ft)			65	
Base Capacity (vph)	964	1389	1328	799
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.19	0.19	0.01	0.44

Intersection Summary

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	75	97	244	8	36	299
Future Volume (veh/h)	75	97	244	8	36	299
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	0.89	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1523	1523	1670	1765	1710	1710
Adj Flow Rate, veh/h	79	102	257	0	38	315
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	14	14	3	1	0	0
Cap, veh/h	319	331	723		58	484
Arrive On Green	0.43	0.43	0.43	0.00	0.28	0.28
Sat Flow, veh/h	392	765	1670	1331	210	1737
Grp Volume(v), veh/h	181	0	257	0	354	0
Grp Sat Flow(s),veh/h/ln	1157	0	1670	1331	1952	0
Q Serve(g_s), s	0.3	0.0	3.6	0.0	5.5	0.0
Cycle Q Clear(g_c), s	3.9	0.0	3.6	0.0	5.5	0.0
Prop In Lane	0.44			1.00	0.11	0.89
Lane Grp Cap(c), veh/h	650	0	723		544	0
V/C Ratio(X)	0.28	0.00	0.36		0.65	0.00
Avail Cap(c_a), veh/h	1331	0	1686		844	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	6.4	0.0	6.6	0.0	11.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.3	0.0	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.8	0.0	1.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.6	0.0	6.9	0.0	12.3	0.0
LnGrp LOS	A	A	A		B	A
Approach Vol, veh/h		181	257	A	354	
Approach Delay, s/veh		6.6	6.9		12.3	
Approach LOS		A	A		B	

Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	20.0				20.0	14.7
Change Period (Y+Rc), s	5.0				5.0	5.0
Max Green Setting (Gmax), s	35.0				35.0	15.0
Max Q Clear Time (g_c+I1), s	5.6				5.9	7.5
Green Ext Time (p_c), s	1.6				1.2	0.8

Intersection Summary	
HCM 6th Ctrl Delay	9.3
HCM 6th LOS	A

Notes

Unsignalized Delay for [NWR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	5.8
Intersection LOS	A

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	186	270	15	358
Demand Flow Rate, veh/h	211	278	15	367
Vehicles Circulating, veh/h	48	100	244	275
Vehicles Exiting, veh/h	594	159	15	103
Ped Vol Crossing Leg, #/h	0	1	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.5	4.9	3.5	7.2
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	211	278	15	367
Cap Entry Lane, veh/h	1314	1246	1076	1042
Entry HV Adj Factor	0.880	0.972	0.997	0.975
Flow Entry, veh/h	186	270	15	358
Cap Entry, veh/h	1157	1211	1072	1017
V/C Ratio	0.161	0.223	0.014	0.352
Control Delay, s/veh	4.5	4.9	3.5	7.2
LOS	A	A	A	A
95th %tile Queue, veh	1	1	0	2

Intersection	
Intersection Delay, s/veh	22.4
Intersection LOS	C

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	314	286	123	28	38	149
Future Vol, veh/h	314	286	123	28	38	149
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	1	1	3	1	1	3
Mvmt Flow	331	301	129	29	40	157
Number of Lanes	0	1	1	1	1	0

Approach	SE	NW	SW
Opposing Approach	NW	SE	
Opposing Lanes	2	1	0
Conflicting Approach Left	SW		NW
Conflicting Lanes Left	1	0	2
Conflicting Approach Right		SW	SE
Conflicting Lanes Right	0	1	1
HCM Control Delay	29.2	9.6	10.7
HCM LOS	D	A	B

Lane	NWLn1	NWLn2	SELn1	SWLn1
Vol Left, %	0%	0%	52%	20%
Vol Thru, %	100%	0%	48%	0%
Vol Right, %	0%	100%	0%	80%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	123	28	600	187
LT Vol	0	0	314	38
Through Vol	123	0	286	0
RT Vol	0	28	0	149
Lane Flow Rate	129	29	632	197
Geometry Grp	7	7	5	2
Degree of Util (X)	0.207	0.041	0.85	0.298
Departure Headway (Hd)	5.769	5.025	4.847	5.446
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	624	715	739	663
Service Time	3.485	2.74	2.943	3.446
HCM Lane V/C Ratio	0.207	0.041	0.855	0.297
HCM Control Delay	10	8	29.2	10.7
HCM Lane LOS	A	A	D	B
HCM 95th-tile Q	0.8	0.1	9.9	1.2

Intersection	
Int Delay, s/veh	4.5

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	314	286	123	28	38	149
Future Vol, veh/h	314	286	123	28	38	149
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Stop	-	Stop	-	Stop
Storage Length	-	-	-	65	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	-10	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	1	1	3	1	1	3
Mvmt Flow	331	301	129	29	40	157

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	130	0	-	0	1093	130
Stage 1	-	-	-	-	130	-
Stage 2	-	-	-	-	963	-
Critical Hdwy	4.11	-	-	-	4.41	5.23
Critical Hdwy Stg 1	-	-	-	-	3.41	-
Critical Hdwy Stg 2	-	-	-	-	3.41	-
Follow-up Hdwy	2.209	-	-	-	3.509	3.327
Pot Cap-1 Maneuver	1462	-	-	-	437	951
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	635	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1461	-	-	-	318	950
Mov Cap-2 Maneuver	-	-	-	-	318	-
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	634	-

Approach	SE	NW	SW
HCM Control Delay, s	4.3	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1461	-	1192
HCM Lane V/C Ratio	-	-	0.226	-	0.165
HCM Control Delay (s)	-	-	8.2	0	8.6
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.9	-	0.6

Intersection	
Int Delay, s/veh	4.5

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	314	286	123	28	38	149
Future Vol, veh/h	314	286	123	28	38	149
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Stop	-	Stop	-	Stop
Storage Length	75	-	-	65	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	-10	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	1	1	3	1	1	3
Mvmt Flow	331	301	129	29	40	157

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	130	0	-	0	1093	130
Stage 1	-	-	-	-	130	-
Stage 2	-	-	-	-	963	-
Critical Hdwy	4.11	-	-	-	4.41	5.23
Critical Hdwy Stg 1	-	-	-	-	3.41	-
Critical Hdwy Stg 2	-	-	-	-	3.41	-
Follow-up Hdwy	2.209	-	-	-	3.509	3.327
Pot Cap-1 Maneuver	1462	-	-	-	437	951
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	635	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1461	-	-	-	337	950
Mov Cap-2 Maneuver	-	-	-	-	337	-
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	634	-

Approach	SE	NW	SW
HCM Control Delay, s	4.3	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1461	-	1192
HCM Lane V/C Ratio	-	-	0.226	-	0.165
HCM Control Delay (s)	-	-	8.2	-	8.6
HCM Lane LOS	-	-	A	-	A
HCM 95th %tile Q(veh)	-	-	0.9	-	0.6

Intersection	
Intersection Delay, s/veh	12.1
Intersection LOS	B

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	314	286	123	28	38	149
Future Vol, veh/h	314	286	123	28	38	149
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	1	1	3	1	1	3
Mvmt Flow	331	301	129	29	40	157
Number of Lanes	1	1	1	0	1	0

Approach	SE	NW	SW
Opposing Approach	NW	SE	
Opposing Lanes	1	2	0
Conflicting Approach Left	SW		NW
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SW	SE
Conflicting Lanes Right	0	1	2
HCM Control Delay	13.3	9.7	10.2
HCM LOS	B	A	B

Lane	NWLn1	SELn1	SELn2	SWLn1
Vol Left, %	0%	100%	0%	20%
Vol Thru, %	81%	0%	100%	0%
Vol Right, %	19%	0%	0%	80%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	151	314	286	187
LT Vol	0	314	0	38
Through Vol	123	0	286	0
RT Vol	28	0	0	149
Lane Flow Rate	159	331	301	197
Geometry Grp	5	7	7	2
Degree of Util (X)	0.225	0.521	0.432	0.281
Departure Headway (Hd)	5.105	5.675	5.171	5.148
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	696	631	692	695
Service Time	3.186	3.445	2.942	3.208
HCM Lane V/C Ratio	0.228	0.525	0.435	0.283
HCM Control Delay	9.7	14.5	11.9	10.2
HCM Lane LOS	A	B	B	B
HCM 95th-tile Q	0.9	3	2.2	1.2

Lane Group	SET	NWT	NWR	SWL
Lane Group Flow (vph)	632	129	29	197
v/c Ratio	0.89	0.14	0.03	0.49
Control Delay	28.6	4.8	2.0	10.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	28.6	4.8	2.0	10.7
Queue Length 50th (ft)	145	14	0	11
Queue Length 95th (ft)	#396	35	7	57
Internal Link Dist (ft)	962	723		611
Turn Bay Length (ft)			65	
Base Capacity (vph)	709	922	874	502
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.89	0.14	0.03	0.39

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	314	286	123	28	38	149
Future Volume (veh/h)	314	286	123	28	38	149
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	0.89	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1697	1697	1670	1765	1710	1710
Adj Flow Rate, veh/h	331	301	129	0	40	157
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	3	1	0	0
Cap, veh/h	493	374	918		85	335
Arrive On Green	0.55	0.55	0.55	0.00	0.21	0.21
Sat Flow, veh/h	660	680	1670	1331	399	1567
Grp Volume(v), veh/h	632	0	129	0	198	0
Grp Sat Flow(s),veh/h/ln	1340	0	1670	1331	1976	0
Q Serve(g_s), s	15.5	0.0	1.6	0.0	3.7	0.0
Cycle Q Clear(g_c), s	17.1	0.0	1.6	0.0	3.7	0.0
Prop In Lane	0.52			1.00	0.20	0.79
Lane Grp Cap(c), veh/h	867	0	918		422	0
V/C Ratio(X)	0.73	0.00	0.14		0.47	0.00
Avail Cap(c_a), veh/h	1244	0	1383		702	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	8.2	0.0	4.6	0.0	14.5	0.0
Incr Delay (d2), s/veh	1.3	0.0	0.1	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.4	0.0	1.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	9.5	0.0	4.7	0.0	15.3	0.0
LnGrp LOS	A	A	A		B	A
Approach Vol, veh/h		632	129	A	198	
Approach Delay, s/veh		9.5	4.7		15.3	
Approach LOS		A	A		B	

Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	28.2				28.2	14.0
Change Period (Y+Rc), s	5.0				5.0	5.0
Max Green Setting (Gmax), s	35.0				35.0	15.0
Max Q Clear Time (g_c+I1), s	3.6				19.1	5.7
Green Ext Time (p_c), s	0.7				4.1	0.4

Intersection Summary	
HCM 6th Ctrl Delay	10.0
HCM 6th LOS	B

Notes

Unsignalized Delay for [NWR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	6.8
Intersection LOS	A

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	637	163	15	202
Demand Flow Rate, veh/h	643	167	15	207
Vehicles Circulating, veh/h	50	344	678	143
Vehicles Exiting, veh/h	300	349	15	368
Ped Vol Crossing Leg, #/h	0	1	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.9	5.4	5.5	4.6
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	643	167	15	207
Cap Entry Lane, veh/h	1311	972	691	1193
Entry HV Adj Factor	0.991	0.977	0.997	0.976
Flow Entry, veh/h	637	163	15	202
Cap Entry, veh/h	1299	949	689	1163
V/C Ratio	0.490	0.172	0.022	0.174
Control Delay, s/veh	7.9	5.4	5.5	4.6
LOS	A	A	A	A
95th %tile Queue, veh	3	1	0	1

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

Intersection: Fairfield Dr & Haviland Dr
Client: Putnam County — GPI No. 2019058.00
Calculated By: D. Creen — Date: 9/29/2019
Checked By: M. Wieszchowski — Date: 9/30/2019

ACTUATED TRAFFIC SIGNAL WITH NO GEOMETRIC IMPROVEMENTS

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL COST
ACTUATED TRAFFIC SIGNAL [1]	1	EA	$150,000	$150,000
WORK ZONE TRAFFIC CONTROL	1	LS	$20,000	$20,000
			ESTIMATED CONSTRUCTION COST (CONCEPTUAL)	**$170,000**
CONTIGENCY (20%)	1	LS	$34,000	$35,000
DESIGN AND INSPECTION (25%)	1	LS	$42,500	$45,000
			FINAL TOTAL	**$250,000**

[1] INCLUDES TYPICAL COST FOR CONTROLLER, SIGNAL POLES, LOOPS, WIRING, SIGNAL HEADS, ETC., FOR AN ACTUATED TRAFFIC SIGNAL.

EASTBOUND LEFT TURN LANE

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL COST
75' TURN LANE WITH 150' TAPER [2]	1	EA	$100,000	$100,000
UTILITY RELOCATION [3]	0	EA	$75,000	$0
STORMWATER AND TREATMENT [4]	1	LS	$75,000	$75,000
WORK ZONE TRAFFIC CONTROL	1	LS	$50,000	$50,000
			ESTIMATED CONSTRUCTION COST (CONCEPTUAL)	**$225,000**
CONTIGENCY (20%)	1	LS	$45,000	$45,000
DESIGN AND INSPECTION (25%)	1	LS	$56,250	$60,000
			FINAL TOTAL	**$330,000**

[2] INCLUDES TYPICAL COST FOR PAVEMENT, CURB, EARTHWORK, DRAINAGE, LANDSCAPING, ETC., FOR A 75' TURN LANE WITH 150' TAPER.

[3] ELECTRIC AND GAS RELOCATIONS ARE ASSUMED NO COST FOR MUNICIPAL PROJECTS. WATER AND SEWER RELOCATIONS ARE NOT PRESENT.

[4] IMPACTS OVER 5,000 SF WITHIN DEP WATERSHEDS REQUIRE POST STORMWATER TREATMENT. $75,000 ALLOWANCE FOR EXTRA ROW OR WORK REQUIRED.

INTERSECTION REALIGNMENT

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL COST
THREE-WAY INTERSECTION [5]	1	EA	$350,000	$350,000
75' TURN LANE WITH 150' TAPER [6]	1	EA	$100,000	$100,000
ADDITONAL EARTHWORK (ABOVE AND BEYOND TYPICAL)	5,000	CY	$20	$100,000
UTILITY RELOCATION [7]	0	EA	$75,000	$0
WAR MEMORIAL RELOCATION	1	LS	$20,000	$20,000
STORMWATER AND TREATMENT [8]	1	LS	$150,000	$150,000
WORK ZONE TRAFFIC CONTROL	1	LS	$150,000	$150,000
			ESTIMATED CONSTRUCTION COST (CONCEPTUAL)	**$870,000**
RIGHT OF WAY (RESIDENTIAL)	0.087	ACRE	$65,000	$6,000
RIGHT OF WAY (COMMERCIAL)	0.021	ACRE	$340,000	$8,000
CONTIGENCY (20%)	1	LS	$174,000	$175,000
DESIGN AND INSPECTION (25%)	1	LS	$217,500	$220,000
			FINAL TOTAL	**$1,280,000**

[5] INCLUDES TYPICAL COST FOR PAVEMENT, CURB, EARTHWORK, DRAINAGE, LANDSCAPING, ETC., FOR A THREE WAY INTERSECTION.

[6] INCLUDES TYPICAL COST FOR PAVEMENT, CURB, EARTHWORK, DRAINAGE, LANDSCAPING, ETC., FOR A 75' TURN LANE WITH 150' TAPER.

[7] ELECTRIC AND GAS RELOCATIONS ARE ASSUMED NO COST FOR MUNICIPAL PROJECTS. WATER AND SEWER RELOCATIONS ARE NOT PRESENT.

[8] IMPACTS OVER 5,000 SF WITHIN DEP WATERSHEDS REQUIRE POST STORMWATER TREATMENT. $150,000 ALLOWANCE FOR EXTRA ROW OR WORK REQUIRED.

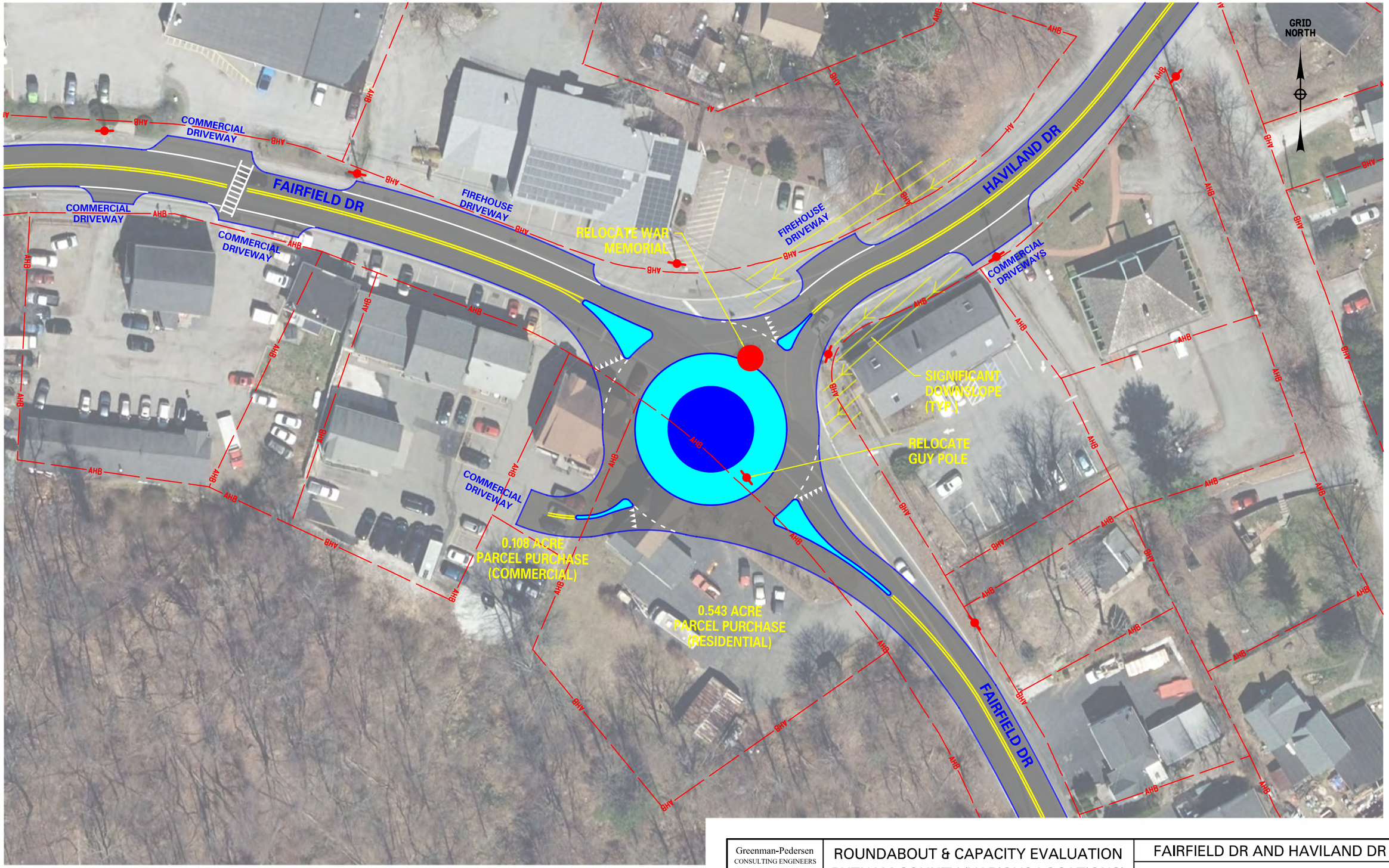
SINGLE LANE ROUNDABOUT (120 FT DIAMETER)

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL COST
SINGLE LANE ROUNDABOUT [9]	1	EA	$750,000	$750,000
ADDITONAL EARTHWORK (ABOVE AND BEYOND TYPICAL)	10,000	CY	$20	$200,000
UTILITY RELOCATION [10]	0	EA	$75,000	$0
WAR MEMORIAL RELOCATION	1	LS	$20,000	$20,000
STORMWATER AND TREATMENT [11]	1	LS	$175,000	$175,000
WORK ZONE TRAFFIC CONTROL	1	LS	$150,000	$150,000
			ESTIMATED CONSTRUCTION COST (CONCEPTUAL)	**$1,295,000**
RIGHT OF WAY (RESIDENTIAL)	1	LS	$285,000	$285,000
RIGHT OF WAY (COMMERCIAL)	1	LS	$380,000	$380,000
CONTIGENCY (20%)	1	LS	$259,000	$260,000
DESIGN AND INSPECTION (25%)	1	LS	$323,750	$325,000
			FINAL TOTAL	**$2,545,000**

[9] INCLUDES TYPICAL COST FOR PAVEMENT, CURB, EARTHWORK, DRAINAGE, LANDSCAPING, ETC., FOR A SINGLE LANE ROUNDABOUT.

[10] ELECTRIC AND GAS RELOCATIONS ARE ASSUMED NO COST FOR MUNICIPAL PROJECTS. WATER AND SEWER RELOCATIONS ARE NOT PRESENT.

[11] IMPACTS OVER 5,000 SF WITHIN DEP WATERSHEDS REQUIRE POST STORMWATER TREATMENT. $175,000 ALLOWANCE FOR EXTRA ROW OR WORK REQUIRED.



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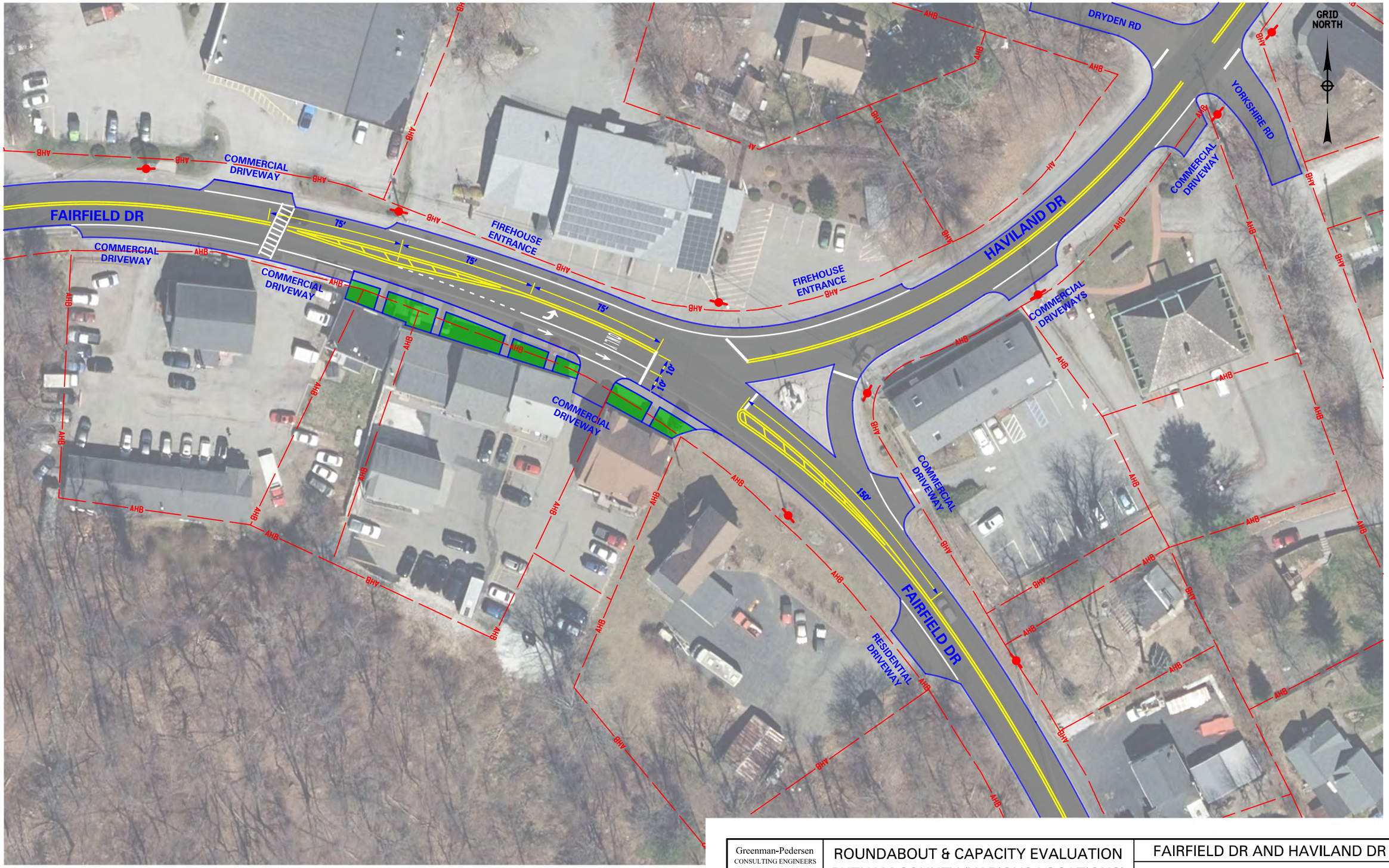
ROUNDABOUT & CAPACITY EVALUATION
PUTNAM COUNTY (VARIOUS LOCATIONS)
COUNTY OFFICES
842 FAIR ST, CARMEL, NY 10512

FAIRFIELD DR AND HAVILAND DR

ROUNDABOUT CONCEPT SKETCH
(120 FT DIAMETER)

JOB NO.	SCALE:	DATE:	FIGURE NO.
2019058.00	AS SHOWN	OCT 2019	10



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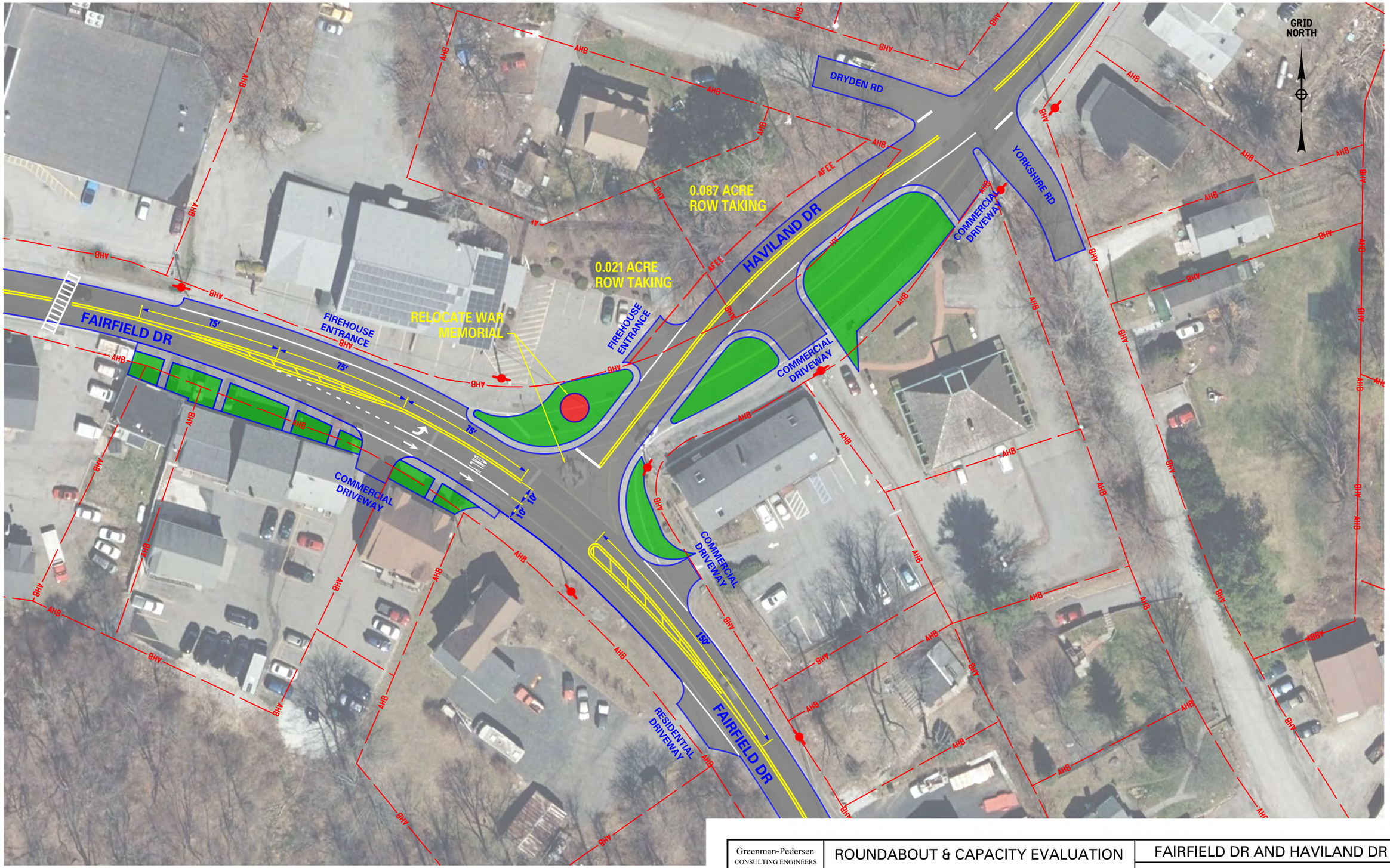
ROUNDABOUT & CAPACITY EVALUATION
PUTNAM COUNTY (VARIOUS LOCATIONS)
COUNTY OFFICES
842 FAIR ST, CARMEL, NY 10512

FAIRFIELD DR AND HAVILAND DR

CONCEPT SKETCH A
EASTBOUND LEFT TURN LANE

JOB NO.	SCALE:	DATE:	FIGURE NO.
2019058.00	AS SHOWN	OCT 2019	10A



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ROUNDABOUT & CAPACITY EVALUATION
PUTNAM COUNTY (VARIOUS LOCATIONS)
COUNTY OFFICES
842 FAIR ST, CARMEL, NY 10512

FAIRFIELD DR AND HAVILAND DR

CONCEPT SKETCH B
INTERSECTION REALIGNMENT

JOB NO.	SCALE:	DATE:	FIGURE NO.
2019058.00	AS SHOWN	OCT 2019	10B

SUMMARY OF INTERSECTION EVALUATION
SECOR RD/BRYANT POND RD AND WOOD ST

Existing Conditions:

This intersection is currently an all-way stop controlled 4-legged intersection, with turn lanes, of approximately 175 feet, on the eastbound, westbound and southbound approaches. Wood Street northbound is posted as 40 mph, but the other 3 approaches; Bryant Pond Rd (eastbound), Secor Rd (westbound) and Wood St (southbound) are all posted as 30 mph.

In reviewing the existing traffic operations, the intersection operated at an overall LOS C with less than 22 seconds per vehicle of delay in both the AM and PM peak hours. No approach operates worse than LOS C in either peak, except for the southbound approach in the PM peak, which operates at LOS D with a 0.83 volume to capacity ratio in the PM peak. Level of services and delays meet acceptable standards. An Intersection Evaluation worksheet, showing geometric details, the existing traffic volumes, and a summary of the capacity analyses is attached.

Signal Warrant Analysis:

The signal warrant analysis revealed that the Warrant 1 (8-hour criteria) was met for 5 hours of the day, the Warrant 2 (4-hour criteria) was met for 1 hour of the day and the Warrant 3 (peak hour criteria) was not met by any hour of the day. Additionally, fewer than 5 accidents per year occur at this location, so Warrant 7 (Crash Experience) is not satisfied either. As a result, a traffic signal, or similar treatment such as a roundabout is not justified at this time. See attached signal warrant analysis worksheets for more details.

Accident Analysis:

For the 3-year period studied (2016-2018), 8 accidents were reported at this intersection, the majority of these accidents were rear end and right angle and one resulted in an injury. The calculated accident rate is 0.63 accidents per Million Entering Vehicles (MEV), which is nearly 4 times the statewide average accident rate for similar intersection on State roads. A review of the accident types didn't reveal any particular deficiencies as a cause for the high rate, but the right-angle accidents are of particular concern, as they should not be occurring at an all-way stop intersection unless drivers are disregarding or not seeing the traffic control signs. The accidents types and severity are summarized in the table below, and accident records are attached.

ACCIDENT SUMMARY

Accident Type	Number of Occurrences	Accident Severity	Number of Occurrences
Right Angle	3	Fatality	0
Rear End	3	Personal Injury	1
Backing	1	Property Damage Only	5
Unknown	1	Non-Reportable	2
	8		8

Field Condition and Right of Way Review:

Sight distances are more than adequate and there are no horizontal or vertical curvature issues near the intersection. There is ample right-of-way to fit a single lane roundabout at this location, though a roundabout would require the relocation of some overhead utilities and poles. It was noticed in the field that a speed limit ends sign for the 40 mph posted speed limit northbound has been placed approximately 300 foot before the intersection, which can confuse drivers; ending the speed limit would indicate to drivers that they could go up to 55 mph, even though all approaches are signed 30 mph at the intersection. Regardless of what improvements are made, that sign should be removed and a 30 mph sign substituted in it's place, or at a bare minimum, remove the sign and replace it with nothing. Either would be better than the sign currently in place.

Design Alternative Consideration:

Capacity is currently not an issue and level of service is well within an acceptable range, yet the presence of several right-angle accidents is a safety concern. Both a traffic signal and roundabout were analyzed for comparative purposes at this location and it was found that the signal would yield an overall LOS B in the morning and LOS A in the evening, while the Roundabout would yield an overall LOS A for all hours of the day. With that said, it should be noted that a traffic signal would increase some of the queue lengths and would not reduce the chance of right-angle accidents. In fact, it could increase the severity of such accidents, as vehicles won't all be required to stop, which would raise vehicle speeds going through the intersection. As such, a traffic signal is not a good option for this location. A roundabout, on the other hand, would reduce the chance of rear end accidents, reducing queues and the amount of time a queue is present, and it would eliminate all right-angle accidents. Given the accident types present at this location, a roundabout should result in a safer condition. See Figure 11 for a roundabout concept sketch for this location.

Conceptual Cost Estimate:

Based on our past experience with similar projects, knowledge of construction pricing in this region of New York State and our understanding of the issues, it is estimated that a traffic signal would cost approximately $250,000 and a roundabout would cost approximately $1,670,000. These costs include construction of all improvements, wetland mitigation, and costs for design and inspection. A breakdown of the big picture cost items is attached.

Summary & Conclusion:

The existing intersection appears to operate acceptably with level of service, delays and capacity all within acceptable levels. Traffic volumes are not overly high and the existing traffic control is appropriate for the volumes present. However, there is some concern that too many right-angle accidents may be occurring at this location. A traffic signal would not correct the right-angle accident issue, but a roundabout would. Since the traffic is not high enough to warrant a traffic signal, or roundabout, and the number of accidents occurring isn't high enough to trigger the satisfaction of the crash history signal warrant, it is recommended that no change in traffic control is made at this time, unless the County wishes to eliminate right angle accidents at this location. If so, a roundabout would be the best improvement to achieve that goal. In any case, the "End 40mph Speed Zone" sign on the northbound approach should be removed or replaced with a 30 mph sign.

INTERSECTION EVALUATION WORKSHEET

Project: Putnam County Roundabout Evaluation

Location: Putnam County (Various Locations)

Intersection: Secor Rd & Wood St

GPS Coord.: 41°22'24.09"N, 73°47'51.39"W

Traffic Control: Stop Sign (All Legs)

Traffic Control Notes (if applicable):

All-Way Stop Control. LT lane on the EB and WB approaches and a RT lane on the SB approach.

Other Intersection Notes (if applicable):

None

APPROACH DATA

	Wood St			Wood St			Bryant Pond Rd			Secor Rd		
	Northbound (NE)			**Southbound (SW)**			**Eastbound (SE)**			**Westbound (NW)**		
	Left	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**
Lane Assignments:		<-1->			<-1	1	1	1->		1	1->	
Lane Widths:		11'			10'	10'	11'	11'		10'	10'	
Turn Bay Lengths:					-	200'	200'	-		200'	-	
Speed Limits:	40 mph			30 mph			30 mph			30 mph		

TRAFFIC COUNT DATA

(traffic volumes below represent counted traffic adjusted by 1.05 to account for seasonal variation and annual growth)

AM Peak Hour	Time Period:	7:00	to	8:00					Date Counted:	9/11/2019		
Volume:	26	2	18	7	7	168	24	280	32	18	438	7
Truck %:	1%	1%	12%	1%	14%	1%	1%	1%	1%	12%	2%	15%
Peds (Bikes):	0 (0)			0 (1)			0 (0)			0 (0)		
PHF = 0.94												
PM Peak Hour	Time Period:	4:45	to	5:45					Date Counted:	9/11/2019		
Volume:	44	18	46	15	7	54	138	415	45	36	320	16
Truck %:	1%	6%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Peds (Bikes):	0 (0)			0 (0)			0 (2)			0 (1)		
PHF = 0.89												

EXISTING CONDITION LEVEL OF SERVICE

AM Peak Delay (s):	11.1	10.2	12.2	9.6	15.6	9.5	25.2
LOS:	B	B	B	A	C	A	D
v/c:	0.10	0.03	0.32	0.05	0.55	0.04	0.76
95% Queue:	<25'	<25'	35'	<25'	85'	<25'	175'
C (18.7) Overall	**B (11.1)**	**B (12.0)**		**C (15.2)**		**C (24.6)**	
PM Peak Delay (s):	12.6	11.2	10.5	11.5	30.4	10.0	19.2
LOS:	B	B	B	B	D	A	C
v/c:	0.24	0.06	0.12	0.28	0.83	0.08	0.64
95% Queue:	<25'	<25'	<25'	30'	220'	<25'	115'
C (21.3) Overall	**B (12.6)**	**B (10.7)**		**D (26.0)**		**C (18.3)**	

Note: LOS calculated using HCM 6 methodologies.

INTERSECTION EVALUATION WORKSHEET

	Wood St			Wood St			Bryant Pond Rd			Secor Rd		
	Northbound (NE)			**Southbound (SW)**			**Eastbound (SE)**			**Westbound (NW)**		
	Left	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**
ANALYSIS SCENARIO #1 - LEVEL OF SERVICE												
Description of Improvements:	Actuated Traffic Signal with No Geometric Improvements											
AM Peak Delay (s):	7.6			7.3		8.5	14.2	9.9		11.6	11.6	
LOS:	A			A		A	B	A		B	B	
v/c:	0.07			0.02		0.30	0.08	0.50		0.05	0.71	
95% Queue:	25'			<25'		35'	<25'	95'		<25'	155'	
B (10.4) Overall	**A (7.6)**			**A (8.4)**			**B (10.2)**			**B (11.6)**		
PM Peak Delay (s):	9.8			9.4		9.7	12.3	9.8		13.0	8.5	
LOS:	A			A		A	B	A		B	A	
v/c:	0.13			0.04		0.12	0.33	0.65		0.11	0.47	
95% Queue:	30'			<25'		<25'	55'	160'		<25'	110'	
A (9.8) Overall	**A (9.8)**			**A (9.6)**			**B (10.4)**			**A (8.9)**		
ANALYSIS SCENARIO #2 - LEVEL OF SERVICE												
Description of Improvements:	Single Lane Roundabout - 4 Leg (120' Radius)											
AM Peak Delay (s):	4.3			7.2			5.1			6.5		
LOS:	A			A			A			A		
v/c:	0.05			0.24			0.27			0.4		
95% Queue:	<25'			25'			25'			50'		
A (6.1) Overall	**A (4.3)**			**A (7.2)**			**A (5.1)**			**A (6.5)**		
PM Peak Delay (s):	7.1			5.2			8.5			7.3		
LOS:	A			A			A			A		
v/c:	0.17			0.10			0.53			0.39		
95% Queue:	25'			< 25'			75'			50'		
A (7.8) Overall	**A (7.1)**			**A (5.2)**			**A (8.5)**			**A (7.3)**		
ANALYSIS SCENARIO #3 - LEVEL OF SERVICE												
Description of Improvements:												
AM Peak Delay (s):												
LOS:												
v/c:												
95% Queue:												
Overall												
PM Peak Delay (s):												
LOS:												
v/c:												
95% Queue:												
Overall												

Secor Rd & Wood St
Mahopac NY
Wednesday, September 11, 2019

Time	Southbound Wood St U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	Westbound Secor Rd U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	Northbound Wood St U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	Eastbound Bryant Pond Rd U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	TOTAL
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:00 AM	0	1	1	46	0	0	2	124	4	0	0	4	1	4	0	0	6	55	2	0	**250**
7:15 AM	0	2	1	46	0	0	5	109	1	0	0	8	0	5	0	0	7	65	11	0	**260**
7:30 AM	0	3	2	32	1	0	6	99	1	0	0	8	0	3	0	0	7	68	7	0	**236**
7:45 AM	0	1	3	36	0	0	4	85	1	0	0	5	1	5	0	0	3	79	10	0	**233**
Hourly Total	0	7	7	160	1	0	17	417	7	0	0	25	2	17	0	0	23	267	30	0	**979**

Secor Rd & Wood St
Mahopac NY
Wednesday, September 11, 2019

Time	Southbound Wood St					Westbound Secor Rd					Northbound Wood St					Eastbound Bryant Pond Rd					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
8:00 AM	0	2	3	32	0	0	5	98	1	0	0	3	1	7	0	0	5	47	7	0	**211**
8:15 AM	0	0	1	30	0	0	9	90	0	0	0	5	1	9	0	0	14	52	7	0	**218**
8:30 AM	0	3	0	22	0	0	4	59	4	0	0	9	0	6	0	0	11	47	4	0	**169**
8:45 AM	0	7	3	28	0	0	4	65	1	0	0	6	1	6	0	0	10	48	6	0	**185**
Hourly Total	0	12	7	112	0	0	22	312	6	0	0	23	3	28	0	0	40	194	24	0	**783**
9:00 AM	0	5	2	29	0	0	4	62	1	0	0	6	4	8	0	0	8	35	1	0	**165**
9:15 AM	0	3	1	21	0	0	6	57	1	0	0	4	1	5	0	0	13	47	5	0	**164**
9:30 AM	0	1	3	13	0	0	9	60	4	0	0	6	0	0	0	0	8	34	5	0	**143**
9:45 AM	0	3	0	11	0	1	9	52	1	0	0	5	0	5	0	0	9	27	3	0	**126**
Hourly Total	0	12	6	74	0	1	28	231	7	0	0	21	5	18	0	0	38	143	14	0	**598**
10:00 AM	0	3	2	11	0	0	5	34	3	0	0	6	0	2	0	0	9	33	6	0	**114**
10:15 AM	0	4	0	10	0	0	3	50	2	0	0	8	0	6	0	0	9	44	5	0	**141**
10:30 AM	0	4	1	7	0	0	5	30	3	0	0	8	1	4	0	0	3	36	1	0	**103**
10:45 AM	0	2	2	8	0	0	6	48	4	0	0	6	2	9	0	0	14	28	3	0	**132**
Hourly Total	0	13	5	36	0	0	19	162	12	0	0	28	3	21	0	0	35	141	15	0	**490**
11:00 AM	0	7	1	11	0	0	9	41	1	0	0	4	2	8	0	0	4	43	1	0	**132**
11:15 AM	0	2	1	18	0	0	4	42	1	0	0	2	3	7	0	0	8	48	9	0	**145**
11:30 AM	0	0	1	8	0	0	1	32	1	0	0	1	3	4	0	0	8	34	8	0	**101**
11:45 AM	0	1	3	12	0	0	5	42	3	0	0	3	2	8	0	0	7	40	6	0	**132**
Hourly Total	0	10	6	49	0	0	19	157	6	0	0	10	10	27	0	0	27	165	24	0	**510**
12:00 PM	0	1	2	16	0	0	2	44	0	0	0	3	2	5	0	0	6	43	1	0	**125**
12:15 PM	0	1	2	12	0	0	3	47	4	0	0	7	0	4	1	1	10	40	2	0	**133**
12:30 PM	0	0	1	9	0	0	9	36	3	0	0	6	4	7	0	0	9	30	1	0	**115**
12:45 PM	0	1	3	6	0	0	11	51	2	0	0	4	0	7	0	0	11	42	3	0	**141**
Hourly Total	0	3	8	43	0	0	25	178	9	0	0	20	6	23	1	1	36	155	7	0	**514**
1:00 PM	0	0	3	10	0	0	5	39	2	1	0	3	2	1	2	2	15	40	6	0	**128**
1:15 PM	0	2	2	6	0	0	6	38	1	0	0	9	1	7	0	0	11	44	10	0	**137**
1:30 PM	0	1	1	13	0	0	4	38	4	0	0	7	2	8	0	0	8	35	3	0	**124**
1:45 PM	0	3	4	9	0	0	4	55	2	0	0	4	3	2	0	0	3	32	3	0	**124**
Hourly Total	0	6	10	38	0	0	19	170	9	1	0	23	8	18	2	2	37	151	22	0	**513**
2:00 PM	0	5	2	10	0	0	3	58	3	0	0	8	0	4	0	0	11	46	7	0	**157**
2:15 PM	0	1	2	8	2	0	8	49	4	0	0	6	3	13	0	0	10	49	4	0	**157**
2:30 PM	0	3	5	14	0	0	2	47	6	0	0	6	5	3	0	0	20	55	7	0	**173**
2:45 PM	0	2	3	6	0	0	5	60	7	0	0	8	3	7	0	0	20	66	5	0	**192**
Hourly Total	0	11	12	38	2	0	18	214	20	0	0	28	11	27	0	0	61	216	23	0	**679**
3:00 PM	0	1	1	11	0	0	9	71	2	0	0	4	5	13	0	0	18	77	6	0	**218**
3:15 PM	0	3	3	22	0	0	3	52	7	0	0	7	2	7	0	0	29	71	6	0	**212**
3:30 PM	0	1	1	13	0	0	4	80	2	0	0	11	4	6	0	0	24	81	10	0	**237**
3:45 PM	0	2	1	19	0	0	9	62	4	0	0	9	6	11	0	0	28	79	8	0	**238**
Hourly Total	0	7	6	65	0	0	25	265	15	0	0	31	17	37	0	0	99	308	30	0	**905**

Secor Rd & Wood St
Mahopac NY
Wednesday, September 11, 2019

Time	Southbound Wood St					Westbound Secor Rd					Northbound Wood St					Eastbound Bryant Pond Rd					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:00 PM	0	1	1	13	0	0	11	55	3	0	0	9	6	9	4	0	37	88	6	0	**239**
4:15 PM	0	3	2	20	0	0	6	81	2	0	0	13	2	8	0	0	34	88	5	0	**264**
4:30 PM	0	2	4	17	0	0	7	59	2	0	0	12	4	4	0	0	31	101	9	0	**252**
4:45 PM	0	0	3	12	0	0	10	67	6	0	0	12	3	10	0	0	31	98	8	1	**260**
Hourly Total	0	6	10	62	0	0	34	262	13	0	0	46	15	31	4	0	133	375	28	1	**1015**
5:00 PM	0	3	3	8	0	0	9	75	3	0	0	4	4	5	0	0	31	95	14	0	**254**
5:15 PM	0	7	1	17	0	0	11	85	3	0	0	14	6	15	0	0	32	106	10	1	**307**
5:30 PM	0	4	0	14	0	0	4	78	3	1	0	12	4	14	0	0	37	96	11	0	**277**
5:45 PM	0	5	2	16	0	0	10	67	2	0	0	11	2	8	0	0	28	75	8	0	**234**
Hourly Total	0	19	6	55	0	0	34	305	11	1	0	41	16	42	0	0	128	372	43	1	**1072**
6:00 PM	0	3	0	15	0	0	8	70	1	0	0	26	4	7	0	0	23	98	15	0	**270**
6:15 PM	0	3	1	16	0	0	6	61	7	0	0	5	3	6	0	0	22	83	8	0	**221**
6:30 PM	0	4	4	10	2	0	8	39	7	0	0	9	6	12	0	0	42	110	9	0	**260**
6:45 PM	0	2	1	13	0	0	11	49	8	0	0	8	2	10	0	0	29	97	13	0	**243**
Hourly Total	0	12	6	54	2	0	33	219	23	0	0	48	15	35	0	0	116	388	45	0	**994**
7:00 PM	0	1	3	9	0	0	13	49	6	0	0	8	4	5	0	0	26	84	9	0	**217**
7:15 PM	0	2	1	4	0	0	9	46	3	0	0	6	1	8	1	0	17	60	4	0	**161**
7:30 PM	0	5	1	6	0	0	6	39	2	0	0	4	1	2	1	0	19	63	6	0	**154**
7:45 PM	0	2	1	6	0	0	6	27	3	0	0	2	3	2	0	0	20	65	6	0	**143**
Hourly Total	0	10	6	25	0	0	34	161	14	0	0	20	9	17	2	0	82	272	25	0	**675**
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
DAILY TOTAL	**0**	**128**	**95**	**811**	**5**	**1**	**327**	**3053**	**152**	**2**	**0**	**364**	**120**	**341**	**9**	**3**	**855**	**3147**	**330**	**2**	**9727**
Cars	0	123	88	803	2	1	310	2981	144	0	0	356	119	322	9	3	846	3066	320	0	**9482**
Heavy Vehicles	0	5	7	8	3	0	17	72	8	2	0	8	1	19	0	0	9	81	10	2	**245**
Heavy Vehicle %	0.00%	3.91%	7.37%	0.99%	60.00%	0.00%	5.20%	2.36%	5.26%	100.00%	0.00%	2.20%	0.83%	5.57%	0.00%	0.00%	1.05%	2.57%	3.03%	100.00%	**2.52%**

Secor Rd & Wood St
Mahopac NY
Wednesday, September 11, 2019

AM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	VEHICLE TOTAL
7:00 AM	0	1	1	46	0	0	2	124	4	0	0	4	1	4	0	0	6	55	2	0	**250**
7:15 AM	0	2	1	46	0	0	5	109	1	0	0	8	0	5	0	0	7	65	11	0	**260**
7:30 AM	0	3	2	32	1	0	6	99	1	0	0	8	0	3	0	0	7	68	7	0	**236**
7:45 AM	0	1	3	36	0	0	4	85	1	0	0	5	1	5	0	0	3	79	10	0	**233**
Peak Hour Total	0	7	7	160	1	0	17	417	7	0	0	25	2	17	0	0	23	267	30	0	**979**
PHF	0.000	0.583	0.583	0.870	0.250	0.000	0.708	0.841	0.438	0.000	0.000	0.781	0.500	0.850	0.000	0.000	0.821	0.845	0.682	0.000	**0.941**
Heavy Vehicle %	0.00%	0.00%	14.29%	0.63%	100.00%	0.00%	11.76%	1.92%	14.29%	0.00%	0.00%	0.00%	0.00%	11.76%	0.00%	0.00%	0.00%	2.25%	10.00%	0.00%	**2.45%**

PM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	VEHICLE TOTAL
4:45 PM	0	0	3	12	0	0	10	67	6	0	0	12	3	10	0	0	31	98	8	1	**260**
5:00 PM	0	3	3	8	0	0	9	75	3	0	0	4	4	5	0	0	31	95	14	0	**254**
5:15 PM	0	7	1	17	0	0	11	85	3	0	0	14	6	15	0	0	32	106	10	1	**307**
5:30 PM	0	4	0	14	0	0	4	78	3	1	0	12	4	14	0	0	37	96	11	0	**277**
Peak Hour Total	0	14	7	51	0	0	34	305	15	1	0	42	17	44	0	0	131	395	43	2	**1098**
PHF	0.000	0.500	0.583	0.750	0.000	0.000	0.773	0.897	0.625	0.250	0.000	0.750	0.708	0.733	0.000	0.000	0.885	0.932	0.768	0.500	**0.894**
Heavy Vehicle %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.98%	0.00%	100.00%	0.00%	0.00%	5.88%	2.27%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	**0.46%**

Total Vehicles On Leg 2161					
Vehicles Entering Intersection 1034			Vehicles Exiting Intersection 1127		
Southbound					
Cars	803	88	123	0	2
Heavy	8	7	5	0	3
Total	**811**	**95**	**128**	**0**	**5**

Total Vehicles on Leg 8566		Eastbound	Cars	Heavy	Total
	Vehicles Entering Intersection 4335		0	2	**2**
			3	0	**3**
	Vehicles Exiting Intersection 4231		846	9	**855**
			3066	81	**3147**
			320	10	**330**

Daily Volumes

Cars	Heavy	Total	Westbound		
144	8	**152**		Vehicles Entering Intersection 3533	Total Vehicles on Leg 7150
2981	72	**3053**			
310	17	**327**		Vehicles Exiting Intersection 3617	
1	0	**1**			
0	2	**2**			

Cars	9	0	356	119	322
Heavy	0	0	8	1	19
Total	**9**	**0**	**364**	**120**	**341**
Northbound					
Vehicles Entering Intersection 825			Vehicles Exiting Intersection 752		
Total Vehicles On Leg 1577					

TRAFFIC SIGNAL WARRANT SUMMARY

Project: Putnam County Roundabout Evaluation | Condition: 2019 Existing Condition

Location: Secor Rd & Wood St | Date: September 11, 2019

Major Street: Secor Rd | Lanes: 1 | Critical Approach Speed: 40 mph

Minor Street: Wood St | Lanes: 1

Volume Level Criteria

1. Is the critical speed of major street traffic greater than 40 mph? No
2. Is the intersection in a built-up area of an isolated community with population less than 10,000? No

If either Question 1 or Question 2 is answered "Yes", then use the 70% volume level. Criteria used: 100%

WARRANT 1 - EIGHT HOUR VEHICULAR VOLUME **Warrant 1 Satisfied: NO**

Warrant 1 is satisfied if EITHER Condition A OR Condition B is 100% satisfied.
Warrant 1 is also satisfied if BOTH Condition A AND Condition B are satisfied to the 80% volume level.

			Condition 1A - Minimum Vehicular Volume (X indicates that criteria is met for specified condition)				Condition 1B - Interuption of Continuous Traffic (X indicates that criteria is met for specified condition)				Total Satisfied Hours (8 required)		
											1	5	2
Minimum Volume Criteria:			500	150	400	120	750	75	600	60	Condition	Condition	80% for
Start Time	Major St. Volume[1]	Minor St. Volume[2]	Major St. 100%	Minor St. 100%	Major St. 80%	Minor St. 80%	Major St. 100%	Minor St. 100%	Major St. 80%	Minor St. 80%	1A Satisfied	1B Satisfied	Both Satisfied
12:00 AM			-	-	-	-	-	-	-	-	-	-	-
1:00 AM			-	-	-	-	-	-	-	-	-	-	-
2:00 AM			-	-	-	-	-	-	-	-	-	-	-
3:00 AM			-	-	-	-	-	-	-	-	-	-	-
4:00 AM			-	-	-	-	-	-	-	-	-	-	-
5:00 AM			-	-	-	-	-	-	-	-	-	-	-
6:00 AM			-	-	-	-	-	-	-	-	-	-	-
7:00 AM	799	183	X	X	X	X	X	X	X	X	**1**	**1**	**1**
8:00 AM	628	138	X	-	X	X	-	X	X	X	-	-	**1**
9:00 AM	485	97	-	-	X	-	-	X	-	X	-	-	-
10:00 AM	403	57	-	-	X	-	-	-	-	-	-	-	-
11:00 AM	418	68	-	-	X	-	-	-	-	X	-	-	-
12:00 PM	432	57	-	-	X	-	-	-	-	-	-	-	-
1:00 PM	431	57	-	-	X	-	-	-	-	-	-	-	-
2:00 PM	580	69	X	-	X	-	-	-	-	X	-	-	-
3:00 PM	779	89	X	-	X	-	X	X	X	X	-	**1**	-
4:00 PM	887	97	X	-	X	-	X	X	X	X	-	**1**	-
5:00 PM	938	104	X	-	X	-	X	X	X	X	-	**1**	-
6:00 PM	865	103	X	-	X	-	X	X	X	X	-	**1**	-
7:00 PM	617	48	X	-	X	-	-	-	X	-	-	-	-
8:00 PM			-	-	-	-	-	-	-	-	-	-	-
9:00 PM			-	-	-	-	-	-	-	-	-	-	-
10:00 PM			-	-	-	-	-	-	-	-	-	-	-
11:00 PM			-	-	-	-	-	-	-	-	-	-	-

[1] Major Street Volume is the total combined volume of both mainline approaches.

[2] Minor Street volumes is the highest single side street approach volume.

Note: Right turn traffic was removed from side street volume and only one of the two available lanes was considered in the Warrant analysis.

WARRANT 2 - FOUR HOUR VEHICULAR VOLUME **Warrant 2 Satisfied: NO**

Warrant is satisfied if four (4) or more hours satisfy the volume requirements depicted on the four hour warranting graph **(see page 2)**. No. of Points Above Criteria Curve: 1

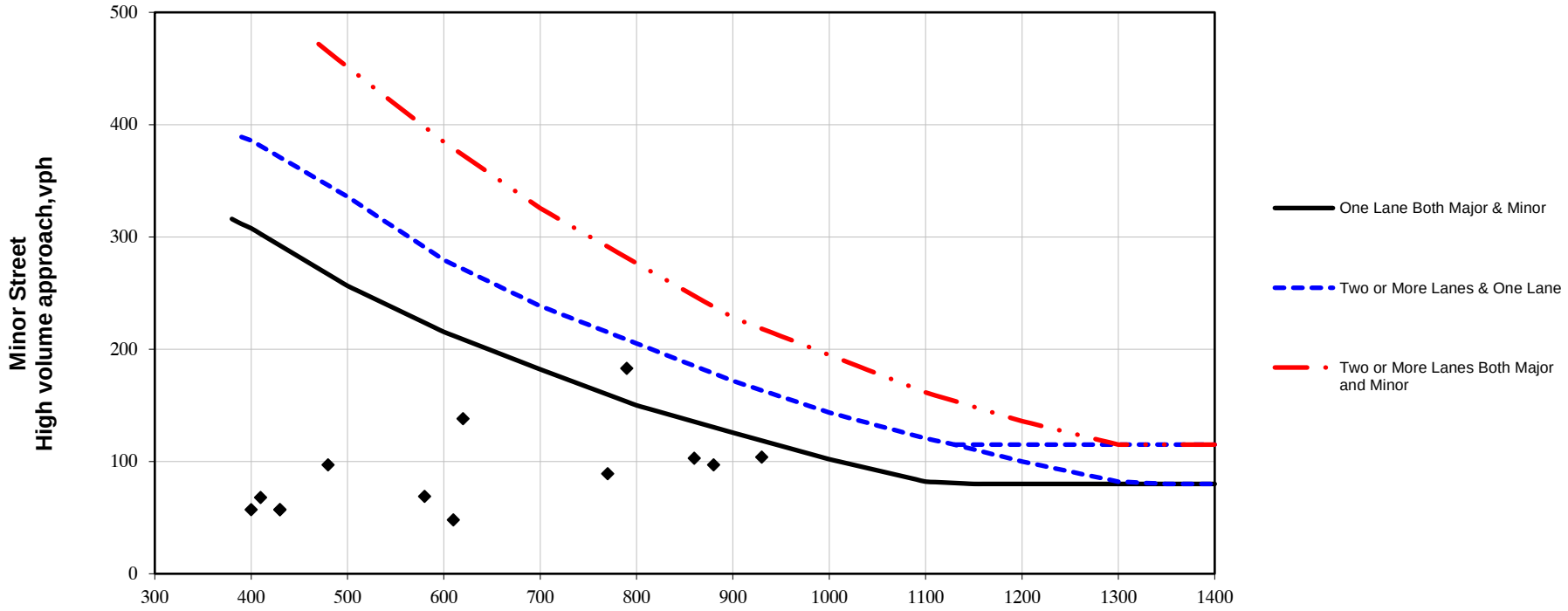
WARRANT 3 - PEAK HOUR VEHICULAR VOLUME **Warrant 3 Satisfied: NO**

Warrant is satisfied if any hour satisfy the volume requirements depicted on the peak hour warranting graph **(see page 3)**, and ALL three of the following requirement are met. No. of Points Above Criteria Curve: 0

1. Total stopped time delay on Minor Street equals or exceeds 4 VHD (single lane) or 5 VHD (two lanes): 0.56 VHD Max. N/A
2. Volume on Minor Street equals or exceeds 100 vehicles (single lane) or 150 vehicles (two lanes): N/A
3. Total intersection volume serviced during the hour equals or exceeds 650 veh. (3-leg) or 800 veh. (4-leg or more): N/A

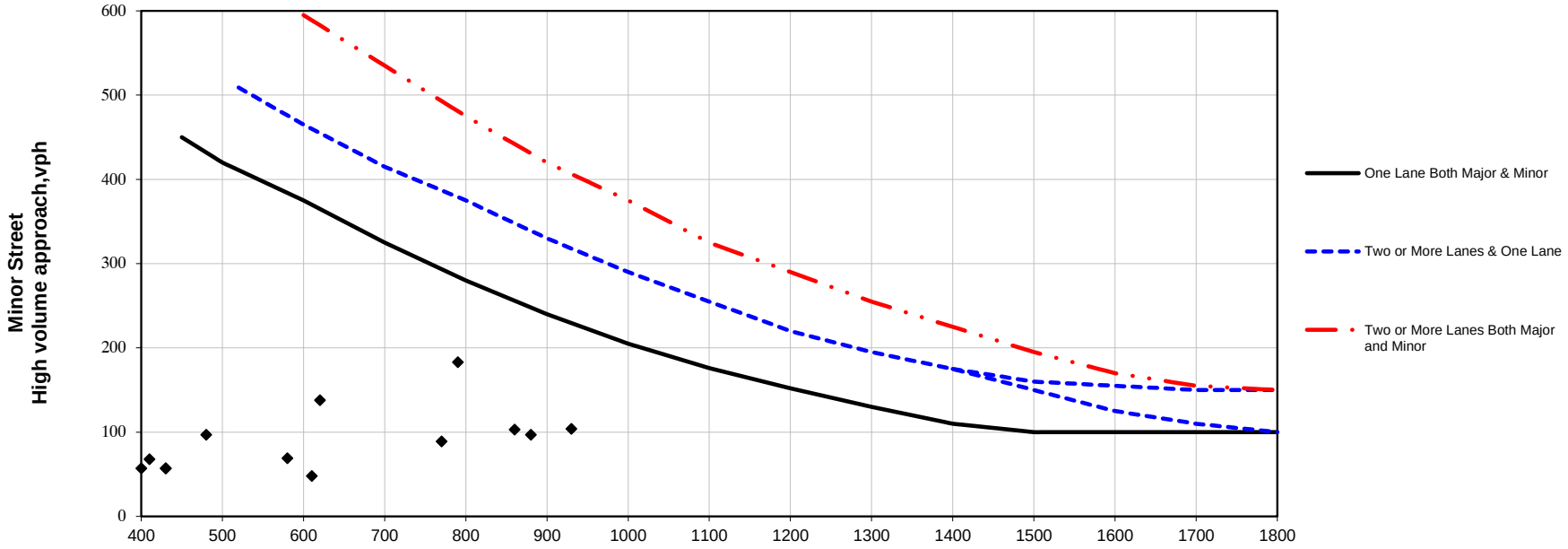
Criteria Source: Manual on Uniform Traffic Control Devices, 2009

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



Note: Points on graph represent hourly volumes. Points above the respective curve satisfy warrant, points below do not satisfy warrant.

Figure 4C-3. Warrant 3, Peak Hour



Note: Points on graph represent hourly volumes. Points above the respective curve satisfy warrant, points below do not satisfy warrant.

Accident Location Information System(ALIS)

Date: 9/5/2019
3:29:12 PM

Accident Verbal Description

16408_VDR

Date in this report covers the period - 2/29/2016-2/28/2019

Complete Accident data from NYSDMV is only available thru 2/28/2019 12:00:00 AM

County: Putnam Muni: Putnam Valley(T) Ref. Marker: Street: BRYANT POND RD
AT INTERSECTION WITH WOOD ST

5/3/2016 Tue 01:40 AM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2016-36208155**
Accident Class: NON-REPORTABLE Police Agency: PUTNAM CO SHERIFF DEPT Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: STOP SIGN
Manner of Collision: REAR END Weather: RAIN
Road Surface Condition: WET Road Char.: STRAIGHT AND LEVEL Light Condition: DARK-ROAD UNLIGHTED
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 4 Driver's Age: 18 Sex: M Citation Issued: N
Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: SLOWED OR STOPPING
Apparent Factors: FOLLOWING TOO CLOSELY, PAVEMENT SLIPPERY

Veh :2 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 4 Driver's Age: 21 Sex: M Citation Issued: N
Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: SLOWED OR STOPPING
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

County: Putnam Muni: Putnam Valley(T) Ref. Marker: Street: SECOR RD
AT INTERSECTION WITH WOOD ST

6/18/2016 Sat 11:19 AM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2016-36271026**
Accident Class: PROPERTY DAMAGE Police Agency: PUTNAM CO SHERIFF DEPT Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NONE
Manner of Collision: UNKNOWN Weather: CLEAR
Road Surface Condition: DRY Road Char.: STRAIGHT AND LEVEL Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :2 OTHER Registered Weight: State of Registration: -3
Num of Occupants: 0 Driver's Age: Sex: Citation Issued:
Direction of Travel: UNKNOWN Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: UNKNOWN
Apparent Factors: UNKNOWN, BACKING UNSAFELY

Veh :1 CAR/VAN/PICKUP Registered Weight: 3504 State of Registration: NY
Num of Occupants: 1 Driver's Age: Sex: Citation Issued:
Direction of Travel: NORTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: PARKED
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

County: Putnam Muni: Putnam Valley(T) Ref. Marker: Street: BRYANT POND RD
AT INTERSECTION WITH WOOD ST
9/25/2016 Sun 00:05 AM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2016-36400378**
Accident Class: PROPERTY DAMAGE Police Agency: PUTNAM CO SHERIFF DEPT Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: STOP SIGN
Manner of Collision: RIGHT ANGLE Weather: CLEAR
Road Surface Condition: DRY Road Char.: STRAIGHT AND LEVEL Light Condition: DARK-ROAD UNLIGHTED
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: 4622 State of Registration: NY
Num of Occupants: 2 Driver's Age: 33 Sex: M Citation Issued: N
Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: GOING STRAIGHT AHEAD
Apparent Factors: FAILURE TO YIELD RIGHT OF WAY, NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: 5616 State of Registration: NY
Num of Occupants: 1 Driver's Age: 34 Sex: F Citation Issued: N
Direction of Travel: SOUTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: GOING STRAIGHT AHEAD
Apparent Factors: FAILURE TO YIELD RIGHT OF WAY, NOT APPLICABLE

County: Putnam Muni: Putnam Valley(T) Ref. Marker: Street: BRYANT POND RD
AT INTERSECTION WITH WOOD ST
9/24/2016 Sat 18:05 PM Persons Killed: 0 Persons Injured: 1 Extent of Injuries: A **Case: 2016-36400382**
Accident Class: PROPERTY DAMAGE AND INJURY Police Agency: PUTNAM CO SHERIFF DEPT Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: STOP SIGN
Manner of Collision: REAR END Weather: CLEAR
Road Surface Condition: DRY Road Char.: STRAIGHT/ GRADE Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: 4582 State of Registration: NY
Num of Occupants: 4 Driver's Age: 42 Sex: M Citation Issued: Y
Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: SLOWED OR STOPPING
Apparent Factors: TRAFFIC CONTROL DEVICES DISREGARDED, FOLLOWING TOO CLOSELY

Veh :2 MOTORCYCLE Registered Weight: 669 State of Registration: NY
Num of Occupants: 1 Driver's Age: 43 Sex: M Citation Issued: N
Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: STOPPED IN TRAFFIC
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

County: Putnam Muni: Putnam Valley(T) Ref. Marker: Street: BRYANT POND RD
AT INTERSECTION WITH WOOD ST
9/18/2017 Mon 16:40 PM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2017-36896316**
Accident Class: PROPERTY DAMAGE Police Agency: PUTNAM CO SHERIFF DEPT Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: STOP SIGN
Manner of Collision: REAR END Weather: CLOUDY
Road Surface Condition: DRY Road Char.: STRAIGHT AND LEVEL Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: 3354 State of Registration: NY
Num of Occupants: 1 Driver's Age: 22 Sex: F Citation Issued: N
Direction of Travel: SOUTH-EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: SLOWED OR STOPPING
Apparent Factors: NOT APPLICABLE, FOLLOWING TOO CLOSELY

Veh :1 CAR/VAN/PICKUP Registered Weight: 3134 State of Registration: NY
Num of Occupants: 1 Driver's Age: 30 Sex: M Citation Issued: N
Direction of Travel: SOUTH-EAST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: SLOWED OR STOPPING
Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

County: Putnam Muni: Putnam Valley(T) Ref. Marker: Street: BRYANT POND RD
141 Meters East of Ramp
3/3/2018 Sat 07:55 AM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2018-37167389**
Accident Class: PROPERTY DAMAGE Police Agency: NYSP CORTLANDT Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NONE
Manner of Collision: RIGHT ANGLE Weather: CLOUDY
Road Surface Condition: WET Road Char.: STRAIGHT AND LEVEL Light Condition: DAYLIGHT
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 1 Driver's Age: 56 Sex: M Citation Issued: N
Direction of Travel: NORTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: GOING STRAIGHT AHEAD
Apparent Factors: DRIVER INATTENTION, NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: 2805 State of Registration: NY
Num of Occupants: 1 Driver's Age: 43 Sex: M Citation Issued: N
Direction of Travel: WEST Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: BACKING
Apparent Factors: NOT APPLICABLE, BACKING UNSAFELY

County: Putnam Muni: Putnam Valley(T) Ref. Marker: Street: SECOR RD
AT INTERSECTION WITH WOOD ST
4/6/2018 Fri 06:03 AM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2018-37262134**
Accident Class: NON-REPORTABLE Police Agency: PUTNAM CO SHERIFF DEPT Num of Veh: 2
Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: STOP SIGN
Manner of Collision: RIGHT ANGLE Weather: CLEAR
Road Surface Condition: DRY Road Char.: STRAIGHT AND LEVEL Light Condition: DARK-ROAD UNLIGHTED
Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: State of Registration: NY
Num of Occupants: 1 Driver's Age: 60 Sex: M Citation Issued: N
Direction of Travel: NORTH Public Property Damage: OTHER School Bus Involved: OTHER
Pre-Accd Action: GOING STRAIGHT AHEAD
Apparent Factors: FAILURE TO YIELD RIGHT OF WAY, NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: State of Registration: NY

Num of Occupants: 1 Driver's Age: 44 Sex: F Citation Issued: N

Direction of Travel: WEST Public Property Damage: OTHER School Bus Involved: OTHER

Pre-Accd Action: GOING STRAIGHT AHEAD

Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

County: Putnam Muni: Putnam Valley(T) Ref. Marker: Street: BRYANT POND RD
AT INTERSECTION WITH WOOD ST

12/9/2018 Sun 12:30 PM Persons Killed: 0 Persons Injured: 0 Extent of Injuries: **Case: 2018-37632457**

Accident Class: PROPERTY DAMAGE Police Agency: PUTNAM CO SHERIFF DEPT Num of Veh: 2

Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: STOP SIGN

Manner of Collision: RIGHT ANGLE Weather: CLEAR

Road Surface Condition: DRY Road Char.: STRAIGHT AND LEVEL Light Condition: DAYLIGHT

Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: 3300 State of Registration: NY

Num of Occupants: 1 Driver's Age: 61 Sex: M Citation Issued: N

Direction of Travel: NORTH Public Property Damage: OTHER School Bus Involved: OTHER

Pre-Accd Action: GOING STRAIGHT AHEAD

Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: 3428 State of Registration: NY

Num of Occupants: 2 Driver's Age: 25 Sex: M Citation Issued: Y

Direction of Travel: EAST Public Property Damage: OTHER School Bus Involved: OTHER

Pre-Accd Action: GOING STRAIGHT AHEAD

Apparent Factors: NOT APPLICABLE, TRAFFIC CONTROL DEVICES DISREGARDED

County: Putnam Muni: Kent(T) Ref. Marker: Street: HILL AND DALE RD
14 Meters North of Amazon Rd

12/24/2018 Mon 15:58 PM Persons Killed: 0 Persons Injured: 1 Extent of Injuries: C **Case: 2018-37658159**

Accident Class: PROPERTY DAMAGE AND INJURY Police Agency: KENT TOWN PD Num of Veh: 2

Type Of Accident: COLLISION WITH MOTOR VEHICLE Traffic Control: NO PASSING ZONE

Manner of Collision: REAR END Weather: CLEAR

Road Surface Condition: DRY Road Char.: STRAIGHT AND LEVEL Light Condition: DAYLIGHT

Loc. of Ped/Bicycle: NOT APPLICABLE Action of Ped/Bicycle: NOT APPLICABLE

Veh :1 CAR/VAN/PICKUP Registered Weight: 3361 State of Registration: NY

Num of Occupants: 1 Driver's Age: 37 Sex: M Citation Issued: N

Direction of Travel: SOUTH Public Property Damage: OTHER School Bus Involved: OTHER

Pre-Accd Action: GOING STRAIGHT AHEAD

Apparent Factors: DRIVER INATTENTION, NOT APPLICABLE

Veh :2 CAR/VAN/PICKUP Registered Weight: 2445 State of Registration: NY

Num of Occupants: 3 Driver's Age: 40 Sex: F Citation Issued: N

Direction of Travel: SOUTH Public Property Damage: OTHER School Bus Involved: OTHER

Pre-Accd Action: STOPPED IN TRAFFIC

Apparent Factors: NOT APPLICABLE, NOT APPLICABLE

Intersection	
Intersection Delay, s/veh	18.7
Intersection LOS	C

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	24	280	32	18	438	7	26	2	18	7	7	168
Future Vol, veh/h	24	280	32	18	438	7	26	2	18	7	7	168
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	1	1	1	12	2	15	1	1	12	1	14	1
Mvmt Flow	26	298	34	19	466	7	28	2	19	7	7	179
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	1

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	15.2	24.6	11.1	12
HCM LOS	C	C	B	B

Lane	NELn1	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	57%	100%	0%	100%	0%	50%	0%
Vol Thru, %	4%	0%	98%	0%	90%	50%	0%
Vol Right, %	39%	0%	2%	0%	10%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	46	18	445	24	312	14	168
LT Vol	26	18	0	24	0	7	0
Through Vol	2	0	438	0	280	7	0
RT Vol	18	0	7	0	32	0	168
Lane Flow Rate	49	19	473	26	332	15	179
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.098	0.035	0.766	0.046	0.546	0.03	0.32
Departure Headway (Hd)	7.244	6.515	5.825	6.501	5.92	7.187	6.444
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	491	549	620	549	607	496	556
Service Time	5.339	4.264	3.574	4.256	3.675	4.955	4.212
HCM Lane V/C Ratio	0.1	0.035	0.763	0.047	0.547	0.03	0.322
HCM Control Delay	11.1	9.5	25.2	9.6	15.6	10.2	12.2
HCM Lane LOS	B	A	D	A	C	B	B
HCM 95th-tile Q	0.3	0.1	7	0.1	3.3	0.1	1.4

Lane Group	SEL	SET	NWL	NWT	NET	SWT	SWR
Lane Group Flow (vph)	26	332	19	473	49	14	179
v/c Ratio	0.06	0.34	0.04	0.50	0.09	0.03	0.27
Control Delay	7.5	8.9	7.2	11.3	9.0	11.5	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	8.9	7.2	11.3	9.0	11.5	4.1
Queue Length 50th (ft)	4	51	3	86	4	2	0
Queue Length 95th (ft)	13	95	10	154	25	13	34
Internal Link Dist (ft)		549		718	564	822	
Turn Bay Length (ft)	200		200				200
Base Capacity (vph)	631	1442	712	1391	610	622	736
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.23	0.03	0.34	0.08	0.02	0.24

Intersection Summary

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	24	280	32	18	438	7	26	2	18	7	7	168
Future Volume (veh/h)	24	280	32	18	438	7	26	2	18	7	7	168
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1722	1870	1870	1885	1885	1885	1693	1693	1885
Adj Flow Rate, veh/h	26	298	34	19	466	7	28	2	19	7	7	179
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	12	2	2	1	1	1	14	14	1
Cap, veh/h	324	595	68	405	658	10	409	62	202	375	320	594
Arrive On Green	0.36	0.36	0.36	0.36	0.36	0.36	0.37	0.37	0.37	0.37	0.37	0.37
Sat Flow, veh/h	928	1661	190	965	1837	28	690	167	543	618	862	1598
Grp Volume(v), veh/h	26	0	332	19	0	473	49	0	0	14	0	179
Grp Sat Flow(s),veh/h/ln	928	0	1851	965	0	1865	1400	0	0	1480	0	1598
Q Serve(g_s), s	0.9	0.0	5.2	0.6	0.0	8.1	0.0	0.0	0.0	0.0	0.0	2.9
Cycle Q Clear(g_c), s	9.0	0.0	5.2	5.8	0.0	8.1	0.7	0.0	0.0	0.2	0.0	2.9
Prop In Lane	1.00		0.10	1.00		0.01	0.57		0.39	0.50		1.00
Lane Grp Cap(c), veh/h	324	0	663	405	0	668	673	0	0	696	0	594
V/C Ratio(X)	0.08	0.00	0.50	0.05	0.00	0.71	0.07	0.00	0.00	0.02	0.00	0.30
Avail Cap(c_a), veh/h	820	0	1651	920	0	1663	792	0	0	822	0	734
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.1	0.0	9.3	11.5	0.0	10.2	7.5	0.0	0.0	7.4	0.0	8.2
Incr Delay (d2), s/veh	0.1	0.0	0.6	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	1.6	0.1	0.0	2.6	0.2	0.0	0.0	0.1	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.2	0.0	9.9	11.6	0.0	11.6	7.6	0.0	0.0	7.4	0.0	8.5
LnGrp LOS	B	A	A	B	A	B	A	A	A	A	A	A
Approach Vol, veh/h		358			492			49			193	
Approach Delay, s/veh		10.2			11.6			7.6			8.4	
Approach LOS		B			B			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		18.3		18.8		18.3		18.8				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		33.0		17.0		33.0		17.0				
Max Q Clear Time (g_c+I1), s		10.1		2.7		11.0		4.9				
Green Ext Time (p_c), s		3.2		0.1		2.1		0.5				

Intersection Summary												
HCM 6th Ctrl Delay			10.4									
HCM 6th LOS			B									

Intersection	
Intersection Delay, s/veh	6.1
Intersection LOS	A

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	358	492	49	193
Demand Flow Rate, veh/h	361	504	51	196
Vehicles Circulating, veh/h	36	56	334	524
Vehicles Exiting, veh/h	684	329	63	36
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.1	6.5	4.3	7.2
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	361	504	51	196
Cap Entry Lane, veh/h	1330	1303	982	809
Entry HV Adj Factor	0.992	0.976	0.960	0.985
Flow Entry, veh/h	358	492	49	193
Cap Entry, veh/h	1319	1271	943	796
V/C Ratio	0.271	0.387	0.052	0.242
Control Delay, s/veh	5.1	6.5	4.3	7.2
LOS	A	A	A	A
95th %tile Queue, veh	1	2	0	1

Intersection	
Intersection Delay, s/veh	21.3
Intersection LOS	C

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	138	415	45	36	320	16	44	18	46	15	7	54
Future Vol, veh/h	138	415	45	36	320	16	44	18	46	15	7	54
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	1	1	1	1	1	1	1	6	2	1	1	1
Mvmt Flow	155	466	51	40	360	18	49	20	52	17	8	61
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	1

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	26	18.3	12.6	10.7
HCM LOS	D	C	B	B

Lane	NELn1	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	41%	100%	0%	100%	0%	68%	0%
Vol Thru, %	17%	0%	95%	0%	90%	32%	0%
Vol Right, %	43%	0%	5%	0%	10%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	108	36	336	138	460	22	54
LT Vol	44	36	0	138	0	15	0
Through Vol	18	0	320	0	415	7	0
RT Vol	46	0	16	0	45	0	54
Lane Flow Rate	121	40	378	155	517	25	61
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.243	0.075	0.641	0.273	0.828	0.054	0.115
Departure Headway (Hd)	7.209	6.656	6.114	6.342	5.766	7.913	6.846
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	496	536	589	564	625	450	520
Service Time	5.287	4.419	3.877	4.096	3.52	5.701	4.632
HCM Lane V/C Ratio	0.244	0.075	0.642	0.275	0.827	0.056	0.117
HCM Control Delay	12.6	10	19.2	11.5	30.4	11.2	10.5
HCM Lane LOS	B	A	C	B	D	B	B
HCM 95th-tile Q	0.9	0.2	4.6	1.1	8.7	0.2	0.4

Lane Group	SEL	SET	NWL	NWT	NET	SWT	SWR
Lane Group Flow (vph)	155	517	40	378	76	25	61
v/c Ratio	0.23	0.42	0.08	0.32	0.12	0.05	0.10
Control Delay	8.0	8.3	7.0	7.4	7.4	13.2	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	8.3	7.0	7.4	7.4	13.2	5.4
Queue Length 50th (ft)	24	92	6	62	4	4	0
Queue Length 95th (ft)	54	159	17	109	30	20	21
Internal Link Dist (ft)		549		718	564	822	
Turn Bay Length (ft)	200		200				200
Base Capacity (vph)	794	1458	618	1418	718	593	675
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.35	0.06	0.27	0.11	0.04	0.09

Intersection Summary

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	138	415	45	36	320	16	4	18	46	15	7	54
Future Volume (veh/h)	138	415	45	36	320	16	4	18	46	15	7	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1811	1811	1811	1885	1885	1885
Adj Flow Rate, veh/h	155	466	51	40	360	18	4	20	52	17	8	61
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	6	6	6	1	1	1
Cap, veh/h	472	717	79	369	765	38	103	151	342	449	184	494
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1013	1670	183	891	1780	89	22	477	1081	935	583	1563
Grp Volume(v), veh/h	155	0	517	40	0	378	76	0	0	25	0	61
Grp Sat Flow(s),veh/h/ln	1013	0	1852	891	0	1869	1580	0	0	1518	0	1563
Q Serve(g_s), s	5.1	0.0	8.7	1.5	0.0	5.7	0.0	0.0	0.0	0.0	0.0	1.1
Cycle Q Clear(g_c), s	10.8	0.0	8.7	10.2	0.0	5.7	1.4	0.0	0.0	0.4	0.0	1.1
Prop In Lane	1.00		0.10	1.00		0.05	0.05		0.68	0.68		1.00
Lane Grp Cap(c), veh/h	472	0	796	369	0	803	596	0	0	634	0	494
V/C Ratio(X)	0.33	0.00	0.65	0.11	0.00	0.47	0.13	0.00	0.00	0.04	0.00	0.12
Avail Cap(c_a), veh/h	885	0	1553	733	0	1567	776	0	0	804	0	675
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.9	0.0	8.9	12.9	0.0	8.0	9.7	0.0	0.0	9.3	0.0	9.6
Incr Delay (d2), s/veh	0.4	0.0	0.9	0.1	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	2.6	0.3	0.0	1.7	0.3	0.0	0.0	0.1	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.3	0.0	9.8	13.0	0.0	8.5	9.8	0.0	0.0	9.4	0.0	9.7
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		672			418			76			86	
Approach Delay, s/veh		10.4			8.9			9.8			9.6	
Approach LOS		B			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		21.9		17.4		21.9		17.4				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		33.0		17.0		33.0		17.0				
Max Q Clear Time (g_c+I1), s		12.2		3.4		12.8		3.1				
Green Ext Time (p_c), s		2.5		0.2		4.1		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			9.8									
HCM 6th LOS			A									

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	672	418	121	86
Demand Flow Rate, veh/h	680	422	123	87
Vehicles Circulating, veh/h	65	227	645	453
Vehicles Exiting, veh/h	475	541	100	196
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.5	7.3	7.1	5.2
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	680	422	123	87
Cap Entry Lane, veh/h	1291	1095	715	869
Entry HV Adj Factor	0.989	0.991	0.982	0.988
Flow Entry, veh/h	672	418	121	86
Cap Entry, veh/h	1277	1085	702	859
V/C Ratio	0.527	0.386	0.172	0.100
Control Delay, s/veh	8.5	7.3	7.1	5.2
LOS	A	A	A	A
95th %tile Queue, veh	3	2	1	0

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

Intersection:	Secor Rd & Wood St		
Client:	Putnam County	GPI No.	2019058.00
Calculated By:	D. Creen	Date:	9/29/2019
Checked By:	M. Wieszchowski	Date:	9/30/2019

ACTUATED TRAFFIC SIGNAL WITH NO GEOMETRIC IMPROVEMENTS

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL COST
ACTUATED TRAFFIC SIGNAL [1]	1	EA	$150,000	$150,000
WORK ZONE TRAFFIC CONTROL	1	LS	$20,000	$20,000
			ESTIMATED CONSTRUCTION COST (CONCEPTUAL)	**$170,000**
CONTIGENCY (20%)	1	LS	$34,000	$35,000
DESIGN AND INSPECTION (25%)	1	LS	$42,500	$45,000
			FINAL TOTAL	**$250,000**

[1] INCLUDES TYPICAL COST FOR CONTROLLER, SIGNAL POLES, LOOPS, WIRING, SIGNAL HEADS, ETC., FOR AN ACTUATED TRAFFIC SIGNAL.

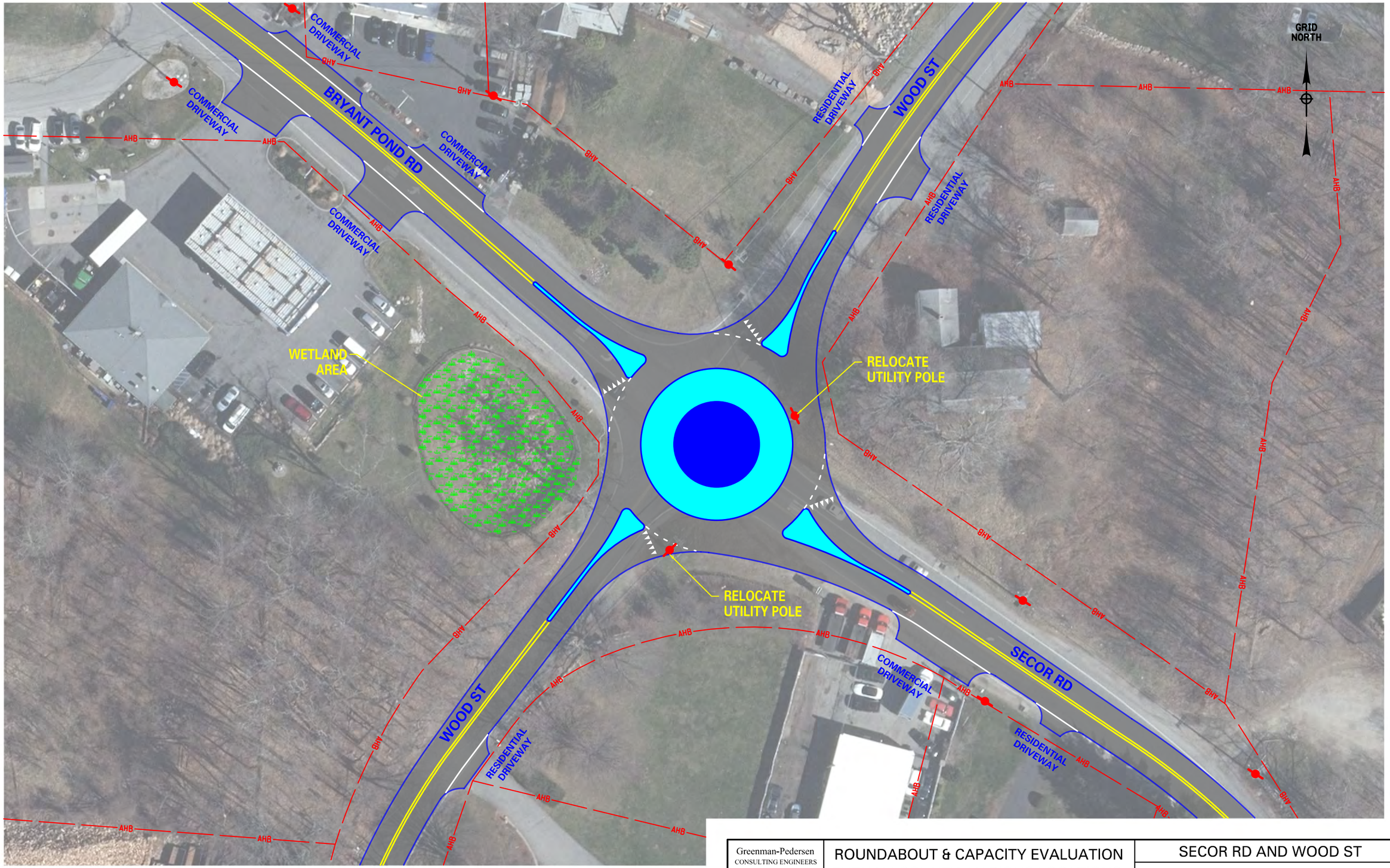
SINGLE LANE ROUNDABOUT (120 FT DIAMETER)

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL COST
SINGLE LANE ROUNDABOUT [2]	1	EA	$750,000	$750,000
UTILITY RELOCATION [3]	0	EA	$75,000	$0
STORMWATER AND TREATMENT [4]	1	LS	$175,000	$175,000
WETLAND MITIGATION	1	LS	$75,000	$75,000
WORK ZONE TRAFFIC CONTROL	1	LS	$150,000	$150,000
			ESTIMATED CONSTRUCTION COST (CONCEPTUAL)	**$1,150,000**
RIGHT OF WAY	0	ACRE	$340,000	$0
CONTIGENCY (20%)	1	LS	$230,000	$230,000
DESIGN AND INSPECTION (25%)	1	LS	$287,500	$290,000
			FINAL TOTAL	**$1,670,000**

[2] INCLUDES TYPICAL COST FOR PAVEMENT, CURB, EARTHWORK, DRAINAGE, LANDSCAPING, ETC., FOR A SINGLE LANE ROUNDABOUT.

[3] ELECTRIC AND GAS RELOCATIONS ARE ASSUMED NO COST FOR MUNICIPAL PROJECTS. WATER AND SEWER RELOCATIONS ARE NOT PRESENT.

[4] IMPACTS OVER 5,000 SF WITHIN DEP WATERSHEDS REQUIRE POST STORMWATER TREATMENT. $175,000 ALLOWANCE FOR EXTRA ROW OR WORK REQUIRED.



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Albany, NY 12205

ROUNDABOUT & CAPACITY EVALUATION
PUTNAM COUNTY (VARIOUS LOCATIONS)
COUNTY OFFICES
842 FAIR ST, CARMEL, NY 10512

SECOR RD AND WOOD ST

ROUNDABOUT CONCEPT SKETCH
(120 FT DIAMETER)

JOB NO.	SCALE:	DATE:	FIGURE NO.
2019058.00	AS SHOWN	OCT 2019	11

GPI

Many Talents One Firm

gpinet.com