TOWN OF NEWBURGH
PLANNING BOARD
TECHNICAL REVIEW COMMENTS

PROJECT NAME:	**ELM FARM**
PROJECT NO.:	**2021-15**
PROJECT LOCATION:	**SECTION 39, BLOCK 1, LOT 12.44**
REVIEW DATE:	**1 APRIL 2022**
MEETING DATE:	**7 APRIL 2022**
PROJECT REPRESENTATIVE:	**PITINGARO & DOETSCH CONSULTING ENGINEERS**

1. The Public Hearing for the project was recently closed with the applicants being tasked to update the Traffic Study. Ken Wersted's comments on the Traffic Study should be received.

2. Several residents have voiced concerns that the traffic counters placed during the winter months may have been impacted by inclement weather and snow plowing. The applicants reprentative are requested to address the data collection and impacts of snow plowing on the traffic counters.

3. A copy of the previous specific conditions issued for the project are attached.

4. Securities in accordance with the previous resolution conditions must be posted prior to signing the plans.

5. The previous deferral of Parkland Fees has been eliminated and will be required to be submitted prior to signing of the maps.

6. Estimates for all on-site and off-site improvements must be provided and reviewed by this office and approved by the Town Board.

7. An NYSDEC Stormwater General Permit must be received for the project.

8. Status of the Outside User Agreement for the project for sewer collection, conveyance and treatment should be addressed.

9. Final sign off of the plans by the Highway Superintendent should be a condition of approval.

Respectfully submitted,

MHE Engineering, D.P.C.

Patrick J. Hines
Principal

PJH/kbw

NEW YORK OFFICE
33 Airport Center Drive, Suite 202, New Windsor, NY 12553
845-567-3100 | F: 845-567-3232 | mheny@mhepc.com

PENNSYLVANIA OFFICE
111 Wheatfield Drive, Suite 1, Milford, PA 18337
570-296-2765 | F: 570-296-2767 | mhepa@mhepc.com

DTS • PROVIDENT
Intelligent Land Use

TRAFFIC IMPACT STUDY

ELM FARM SUBDIVISION

Fostertown Road and Wells Road
Town of Newburgh, Orange County, New York

Prepared for

PITINGARO & DOETSCH CONSULTING ENGINEERS, P.C.
15 Industrial Drive
Middletown, New York 10941

Prepared by

DTS Provident Design Engineering, LLP
One North Broadway
White Plains, New York 10601

January 21, 2022

DTS Provident Project No. 0879

TABLE OF CONTENTS

LIST OF APPENDICES

SECTION 1 – INTRODUCTION

1.0 INTRODUCTION

DTS Provident Design Engineering, LLP (DTS Provident) has prepared this Traffic Impact Study (TIS) to summarize the traffic study methodology and findings associated with the proposed construction of the Elm Farm Subdivision (Proposed Project) to be located along Wells Road and Fostertown Road in the Town of Newburgh, Orange County, New York (see Figure No. 1 in Appendix B).

DTS Provident has been retained to analyze the potential for any traffic impacts associated with the Proposed Project and to identify roadway improvements, if required, to mitigate any potential adverse traffic impacts. The scope of this study was based upon the directives of the Town's Traffic Consultant in an email dated December 16, 2021. This TIS uses standard Traffic Engineering methodology and has been prepared to document the findings and conclusions of the analysis undertaken to measure the traffic impacts, if any, associated with the Proposed Project. For the purposes of this Study, it is anticipated that the Proposed Project will be completed and occupied by the Year 2025.

This Project was originally analyzed by John Collins Engineers, P.C. in a traffic impact study dated October 16, 2002. The Project was approved in the late 2000's and the approval was

extended continuously through 2019. At that time, the approval was allowed to lapse by the owners to pursue an alternate type of approval for the Project. In 2021 a buyer was found for the original Project, and it was requested that the approval be renewed. At a public hearing there was concern on the validity of the original approval due to the fact on how long ago it was completed. This TIS serves to update the validity of the approval of the original Project with a more recent analysis.

1.1 PROJECT BACKGROUND

The Proposed Project is to be comprised of 52 single family housing units. These are to be developed on a plot on the southeast corner of the intersection of Wells Road and Fostertown Road. One stop-controlled driveway is proposed along Fostertown Road and one stop-controlled driveway is proposed along Wells Road. These driveways will provide access to/from the Proposed Project and the surrounding roadway network. It should be noted that several of the housing units proposed along Wells Road have direct access to Wells Road but for analysis purposes it is assumed the traffic associated with these housing units is entering into the site via the Site Driveways.

1.2 DESCRIPTION OF EXISTING ROADWAY NETWORK

The following are brief descriptions of the roadways located in the vicinity of the site:

Fostertown Road (Orange County Route 86) – Fostertown Road (Orange County Route 86) is classified as an urban major collector roadway and runs generally in a southeast-northwest direction. It runs from NY 52 in the west to US 9W in the east. Fostertown Road consists of one lane per direction, centerline and edge pavement markings, a posted speed limit of 45 mph, and is under the jurisdiction of Orange County, NY.

Wells Road –Wells Road is a local roadway that runs in a north-south direction. It runs from Fostertown Road in the north to Brewer Road to the South. Wells Road consists of one travel lane per direction, centerline and edge line pavement markings, and has a posted speed limit of 30 mph. Wells Road is under local jurisdiction.

Brewer Road –Brewer Road is a local roadway that runs in an east-west direction. It runs from Old North Plank Road in the west to Fostertown Road in the east. Brewer Road consists of one travel lane per direction. It does not have pavement markings, and has a posted speed limit of 40 mph. Brewer Road is under local jurisdiction.

SECTION 2 – STUDY

2.0 STUDY LOCATIONS

The following study locations were identified based on a review of the surrounding roadway network, review of the original TIS, and requests from the Town's Traffic Consultant:

1. Wells Road and Fostertown Road
2. Wells Road and Brewer Road

2.1 2022 EXISTING TRAFFIC VOLUMES

To determine the traffic volumes at the study locations identified above, representatives from DTS Provident performed manual traffic counts at the study intersections. Traffic Counts were performed on Wednesday January 5, 2022 from 3:30 PM to 6:30 PM and on Thursday January 6, 2022 from 6:30 AM to 9:30 AM. Field observations were also performed to determine roadway geometry, lane widths, sight distance, and traffic control as well as queueing. Additionally, sight distance measurements were taken.

Based upon the traffic counts conducted, the following Peak Roadway Hours were determined:

Peak AM Roadway Hour -	7:15 AM to 8:15 AM
Peak PM Roadway Hour -	4:15 PM to 5:15 PM

The combination of existing background traffic and Proposed Project-generated traffic would be highest during these time periods. Existing traffic volumes are illustrated on Figure No. 2 in Appendix B.

DTS Provident conducted a comparison of their manual traffic counts to that of the original counts performed by John Collins Engineers, P.C. It was determined that the counts from 2002 were higher than that of the counts conducted in 2022. Historical data from the New York State Department of Transportation (NYSDOT) also suggests that traffic on Fostertown Road in the past was higher than present day. Below is a summary table comparing past traffic to present day.

TABLE NO. 1
FOSTERTOWN ROAD TRAFFIC GROWTH SUMMARY TABLE

YEAR	AM PEAK HOUR COMBINED TOTAL	PM PEAK HOUR COMBINED TOTAL	AADT	% CHANGE PER YEAR
2002	572	450	5,110	-
2010	403	346	4,982	-0.31`%
2012	505	441	5,771	7.92%
2013	301	313	4,089	-29.15%
2015	332	342	4,427	4.13%
2019	221	353	4,419	1.35%
2022	296	374	3,350	-3.48%

*For years 2002 and 2022, the average Peak Hour Combined Total AM and PM was assumed to be 10% of the daily traffic
*The AM and PM combined total volumes for the year 2002 were estimated from the John Collins Engineers, P.C. TIS
*The AM and PM combined total volumes for the year 2022 were estimated from the DTS Provident manual traffic counts
*The remaining data in the Table was received from NYSDOT historical traffic data utilizing the "traffic data viewer" tool

It is possible that the current COVID-19 pandemic is affecting traffic volumes for the present day causing them to be lower than in the past. DTS Provident took this into consideration and decided to utilize the higher 2002 existing traffic volumes from the John

Collins Engineers TIS. In instances where movements from the 2022 counts were higher than 2002 counts, the higher number was used. Discussions were held with the Town's Traffic Consultant and it was determined that this was an suitable approach.

As requested by the Town's Traffic Consultant, DTS Provident installed automatic traffic recorders (ATR's) on Wells Road approximately 200 ft south of the intersection of Wells Road and Fostertown Road and on Fostertown Road approximately 350 ft east of the intersection of Wells Road and Fostertown Road. The ATR's was installed for a one-week period from 01/05/2022 to 01/19/2022 and measured volume, class, and speed. Several snowstorms occurred during this period and so the ATR tubes were replaced once and there are minor gaps in the data. The tubes were left down until January 19, 2022 to ensure a full week's worth of data. Summaries of the speed data and class data experienced on Wells Road and Fostertown Road over the entire recording period are shown in the tables below.

TABLE NO. 2
SPEED DATA SUMMARY TABLE

	WELLS ROAD			**FOSTERTOWN ROAD**		
	NORTHBOUND	SOUTHBOUND	COMBINED	EASTBOUND	WESTBOUND	COMBINED
50th Percentile Speed (Avg)	34	34	34	45	45	45
85th Percentile Speed	39	39	39	50	50	50

*Speed data obtained from Automatic Traffic Recorders (ATR's) on Wells Road and Fostertown Road
*Data was recorded from 01/05/2022 to 01/19/2022

TABLE NO. 3
CLASS DATA SUMMARY TABLE

CLASS	DESCRIPTION	WELLS ROAD			FOSTERTOWN ROAD		
		SOUTH-BOUND	NORTH-BOUND	COMBINED	EAST-BOUND	WEST-BOUND	COMBINED
1	Bikes	0.1	0.2	0.2	0.4	0.3	0.3
2	Cars & Trailers	68.7	74.3	71.8	76.8	78.2	77.5
3	2 Axle Long	20.4	18.7	19.4	15.2	15.1	15.2
4	Buses	1.8	1.6	1.7	1.0	0.9	1.0
5	2 Axle 6 Tire	8.3	4.9	6.4	5.5	4.5	4.9
6	3 Axle Single	0.2	0.1	0.1	0.3	0.3	0.3
7	4 Axle Single	0.0	0.0	0.0	0.0	0.0	0.0
8	<5 Axle Double	0.0	0.0	0.0	0.1	0.1	0.1
9	5 Axle Double	0.0	0.0	0.0	0.0	0.0	0.0
10	>6 Axle Double	0.0	0.0	0.0	0.0	0.0	0.0
11	<6 Axle Multi	0.0	0.0	0.0	0.0	0.0	0.0
12	6 Axle Multi	0.0	0.0	0.0	0.0	0.0	0.0
13	>6 Axle Multi	0.0	0.0	0.0	0.0	0.0	0.0
14	Not Classified	0.4	0.4	0.4	0.6	0.6	0.6
TOTAL		100.0	100.0	100.0	100.0	100.0	100.0

*Class data obtained from Automatic Traffic Recorders (ATR's) placed on Wells Road and Fostertown Road
*Data was recorded from 01/05/2022 to 01/19/2022
*Values shown in Table are percentages

The amounts indicated above are for the entire count period, not the roadway peak hours. The ATR data is similar to that of the manual traffic counts and much lower than the 2002 counts. Therefore, this further reinforces the use of the 2002 data as the base for the traffic analysis.

2.2 2025 NO-BUILD TRAFFIC VOLUMES

The existing traffic volumes were projected to the 2025 Design Year by applying an annually compounded growth rate of 2.0% per year (thus a total 1.06%) to all traffic volumes to form the 2025 No-Build Traffic Volumes. Discussions with the Town's Traffic Consultant concluded that there are no significant adjacent developments planned in the area. The 2.0% growth rate accounts for any unforeseen traffic that may occur over the

growth period. The 2025 No-Build Traffic Volumes are illustrated on Figure No. 3 in Appendix B.

2.3 ARRIVAL/DEPARTURE

DTS Provident utilized the original arrival and departure patterns from the John Collins Engineers P.C. TIS for the Proposed Project. The arrival and departure distributions for the Proposed Project are illustrated on Figures No. 4 and 5 in Appendix B.

2.4 SITE-GENERATED TRAFFIC VOLUMES

The ability of any roadway network to accommodate anticipated traffic volumes is measured by comparing Peak Hour Traffic Volumes to roadway capacities. Thus, it is essential to determine the hourly traffic volumes to be generated by the Proposed Project and add them to the No-Build Traffic Volumes to determine the Build Traffic Volumes.

DTS Provident consulted the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition, to estimate Site-generated traffic volumes attributable to the Proposed Project. Trips for the Proposed Project were estimated based on Land Use 210 (Single Family Detached Housing) utilizing the Peak Hour of Adjacent Street Traffic. The following Table No. 4 summarizes the trip generation anticipated for the Proposed Project:

TABLE NO. 4 **TRIP GNERATION SUMMARY TABLE**				
TYPE OF DEVELOPMENT	AM PEAK HOUR		PM PEAK HR	
	ENTER	EXIT	ENTER	EXIT
52 Single Family Detached Housing Units - LU 210 – Peak Hour of Adjacent Street Traffic - Formula	11	30	34	20
TOTAL	41		54	

*Trip Generation based upon Institute of Transportation Engineers Trip Generation Manual, 11th Edition

The estimated traffic volumes listed in the Trip Generation table above were assigned to the roadway network in accordance with the Arrival and Departure Distributions to form the Site-generated Traffic Volumes, which are illustrated on Figure No. 6 in Appendix B.

2.5 2025 BUILD TRAFFIC VOLUMES

The Site-generated Traffic Volumes were then combined with the 2025 No-Build Traffic Volumes to form the 2025 Build Traffic Volumes, which are illustrated on Figure No. 7 in Appendix B.

2.6 SIGHT DISTANCE

A sight distance analysis was performed by DTS Provident for the proposed Site Driveways. Below is a summary table of the analysis.

TABLE NO. 5
SIGHT DISTANCE SUMMARY TABLE

DESCRIPTION	SITE DRIVEWAY 1 (WELLS ROAD)		SITE DRIVEWAY 2 (FOSTERTOWN ROAD)	
	FIELD MEASUREMENT 14.5 FT FROM TRAVELED WAY	AASHTO REQUIREMENT FOR 39 MPH	FIELD MEASUREMENT 14.5 FT FROM TRAVELED WAY	AASHTO REQUIREMENT FOR 50 MPH
Exiting sight line looking right to the approaching vehicle	338	434	416	555
Exiting sight line looking left to the approaching vehicle	313	375	877	480
Rear end sight line for the left turn entering vehicle from a vehicle approaching from the same direction	295	294	448	425
Sight line from the left turn entering vehicle to a vehicle approaching from the opposite direction	297	294	795	425
Rear end sight line for the right turn entering vehicle from a vehicle approaching from the same direction	297	294	795	425

*Sight Distance Data obtained from field measurements by representatives of DTS Provident
*Data was recorded on 01/05/2022
*AASHTO requirements for 39 MPH and 50 MPH based upon A"A Policy on Geometric Design of Highways and Streets" 2018, 7th Edition

The 85th percentile speed on Wells Road was calculated to be 39 MPH while the 85th Percentile speed on Fostertown Road was calculated to be 50 MPH. The minimum sight distance requirements based on these 85th percentile speeds were obtained from AASHTO "A Policy on Geometric Design of Highways and Streets" 2018, 7th Edition. Interpolation was used where necessary. Based on these requirements, the intersection sight distance is not met for both driveways, but the stopping sight distance is met for both Site Driveway 1 (Wells Road) and Site Driveway 2 (Fostertown Road). DTS Provident does not anticipate any issues related to Sight Distance at the Site Driveways as vehicles will be able to react and stop in time.

2.7 ACCIDENT DATA

DTS Provident requested the latest 3 years of accident data from the New York State Department of Transportation. A summary of this Accident Data is illustrated in Appendix E. As shown in the table there were 10 reported accidents in the last 3 years for the nearby area. It is shown that 5 of these accidents were non-reportable, 3 of these accidents involved property damage, 1 of these accidents involved property damage and injury, and 1 of these accidents included a fatality.

For the fatal accident, it appears the apparent factor for the cause of the accident was a loss of consciousness of one of the drivers. It does not appear to be related to the roadway geometry, traffic patterns, weather, or time of day. DTS Provident does not anticipate the Proposed Project will have an upwards effect on traffic accidents in the area.

SECTION 3 - ANALYSIS

3.0 DESCRIPTION OF ANALYSIS

Capacity analyses were conducted at the key intersections to identify the traffic impact associated with the Proposed. The following is a brief description of the procedure utilized in the preparation of this analysis for all the study locations listed:

- Capacity analysis is a method by which traffic volumes are compared to calculated roadway and intersection capacities to evaluate future traffic conditions. The methodology utilized is described in the Highway Capacity Manual published by the Transportation Research Board. In general, the term "Level of Service" is used to provide a qualitative evaluation based on certain quantitative calculations related to empirical values. The definitions of Level of Service as contained in the Highway Capacity Manual appear in Appendix B.

- In general, Level of Service "A" represents the best traffic operating condition. Levels of Service for signalized and unsignalized intersections are defined in terms of average delay. Delay is used as a measure of driver discomfort, frustration, efficiency, etc.

Capacity analyses were performed for the key locations with the 2022 Existing, 2025 No-Build, and 2025 Build Traffic Volumes utilizing Highway Capacity Software (Synchro)

developed for the Federal Highway Administration (FHWA). The Levels of Service, delays, and queues for each of the key intersections are summarized in tables contained in Appendix C, and copies of the capacity analyses worksheets are contained in Appendix D.

3.1 LOCATION NO. 1 – WELLS ROAD & FOSTERTOWN ROAD

Existing Conditions

Fostertown Road forms the eastbound and westbound approaches to this three-way intersection with Wells Road. The eastbound approach includes one through/right-turn lane while the westbound approach includes one left-turn/through lane. Wells Road forms the northbound approach and includes one left-turn/right-turn lane. The intersection is controlled by a Stop sign facing the northbound Wells Road approach.

Capacity Analysis and Level of Service Results

Capacity analyses were conducted with the 2022 Existing, 2025 No-Build, and 2025 Build (Proposed Project) Traffic Volumes for the Peak Weekday AM and Peak Weekday PM Hours. The Level of Service (LOS) and delay results are presented in Table No. 1 in Appendix C.

As shown in Table No. 1 in Appendix C, the LOS and delay have minimal change from No-Build to Build. The worst side street approach (Wells Road) increases by 0.1 seconds in the AM Peak Hour and by 0.3 seconds in the PM Peak Hour. The overall delay of the intersection only increases by 0.1 seconds in both the AM and PM peak hours and remains an LOS of A. Safe and efficient traffic flow will continue to occur after the construction of the proposed Project and therefore DTS Provident does not recommend any improvements at this location.

3.2 LOCATION NO. 2 – WELLS ROAD/TOLL HOUSE COURT & BREWER ROAD

Existing Conditions

Brewer Road forms the eastbound and westbound approaches to this four-way intersection with Wells Road/Toll House Court. The eastbound approach includes one left-turn/through/right-turn lane while the westbound approach includes one left-turn/through/right-turn lane. Wells Road forms the southbound approach and includes one left-turn/through/right-turn lane. Toll House Court forms the northbound approach and includes one left-turn/through/right-turn lane. The intersection is controlled by a Stop sign facing the northbound Wells Road approach. For analysis purposes it was assumed the Toll House Court approach was controlled by a stop sign as well.

Capacity Analysis and Level of Service Results

Capacity analyses were conducted with the 2022 Existing, 2025 No-Build, and 2025 Build (Proposed Project) Traffic Volumes for the Peak Weekday AM and Peak Weekday PM Hours. The Level of Service (LOS) and delay results are presented in Table No. 2 in Appendix C.

As shown in Table No. 2 in Appendix C, the LOS and delay have minimal change from No-Build to Build. The worst side street approach (Toll House Court) increases by 0.2 seconds in the AM Peak Hour and by 0.5 seconds in the PM Peak Hour. The overall delay of the intersection only increases by 0.2 seconds in both the AM and PM peak hours and

remains an LOS of A. Safe and efficient traffic flow will continue to occur after the construction of the proposed Project and therefore DTS Provident does not recommend any improvements at this location.

3.3 LOCATION NO. 3 – WELLS ROAD & SITE DRIVEWAY 1

Existing Conditions

The Site Driveway will form the westbound approach to the proposed three-way intersection with Wells Road. It will include one left-turn/right-turn lane. Wells Road will form the northbound and southbound approaches. The northbound approach will include one through/right-turn lane while the southbound approach will include one left-turn/through lane. The intersection will be controlled by a Stop sign for the westbound Site Driveway approach.

Capacity Analysis and Level of Service Results

Capacity analyses were conducted with the 2025 Build (Proposed Project) Traffic Volumes for the Peak Weekday AM and Peak Weekday PM Hours. The Level of Service and delay results are presented in Table No. 3.

As shown in Table No. 3 in Appendix C for the Build condition, all movements will operate at a Level of Service "A" during the Peak Weekday AM Hour and Weekday Peak PM Hour. Thus, no improvements are recommended at this location aside from the construction of the Site Driveway.

3.4 LOCATION NO. 4 – WELLS ROAD & SITE DRIVEWAY 2

Existing Conditions

The Site Driveway will form the northbound approach to the proposed three-way intersection with Fostertown Road. It will include one left-turn/right-turn lane. Fostertown Road will form the eastbound and westbound approaches. The eastbound approach will include one through/right-turn lane while the westbound approach will include one left-turn/through lane. The intersection will be controlled by a Stop sign for the northbound Site Driveway approach.

Capacity Analysis and Level of Service Results

Capacity analyses were conducted with the 2025 Build (Proposed Project) Traffic Volumes for the Peak Weekday AM and Peak Weekday PM Hours. The Level of Service and delay results are presented in Table No. 4.

As shown in Table No. 4 in Appendix C for the Build condition, all movements will operate at a Level of Service "B" or better during the Peak Weekday AM Hour and Weekday Peak PM Hour. Thus, no improvements are recommended at this location aside from the construction of the Site Driveway.

3.5 SUMMARY OF LEVELS OF SERVICE AND DELAY

Below is a summary table of the Levels of Service and delays experienced at the study intersections.

TABLE NO. 6
LEVEL OF SERVICE SUMMARY TABLE

INTERSECTION		PEAK AM HOUR		PEAK PM HOUR	
		NO-BUILD	BUILD	NO-BUILD	BUILD
		LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY
Wells Rd & Fostertown Rd	Overall Intersection	A 2.1	A 2.2	A 3.2	A 3.3
	Critical Side Street Approach	C 16.1	C 16.2	B 15.0	C 15.3
Wells Rd & Brewer Rd	Overall Intersection	A 7.1	A 7.3	A 6.6	A 6.8
	Critical Side Street Approach	B 10.8	B 11.0	B 11.9	B 12.4
Wells Rd & Site Driveway 1	Overall Intersection	N/A	A 0.9	N/A	A 0.6
	Critical Side Street Approach	N/A	A 9.6	N/A	A 7.6
Fostertown Rd & Site Driveway 2	Overall Intersection	N/A	A 0.3	N/A	A 0.3
	Critical Side Street Approach	N/A	B 11.0	N/A	B 10.4

* Delays are provided for the most critical side street approach and overall intersection
*Delay is represented in Seconds per Vehicle

DTS Provident also conducted a comparison of the delay of the worst side street approach for each intersection to that of the John Collins Engineers 2002 TIS Report. Below is a summary table of this comparison.

TABLE NO. 7
DELAY CHANGE FROM JOHN COLLINS ENGINEERS 2002 TIS REPORT

INTERSECTION		PEAK AM HOUR		PEAK PM HOUR	
		NO-BUILD	BUILD	NO-BUILD	BUILD
		DELAY CHANGE	DELAY CHANGE	DELAY CHANGE	DELAY CHANGE
Wells Rd & Fostertown Rd	Critical Side Street Approach	+0.3	+0.3	+0.9	+0.9
Wells Rd & Brewer Rd	Critical Side Street Approach	+1.5	+1.6	+2.5	+3.0
Wells Rd & Site Driveway 1	Critical Side Street Approach	N/A	-0.1	N/A	+0.1
Fostertown Rd & Site Driveway 2	Critical Side Street Approach	N/A	-0.3	N/A	-1.3

* Delays are provided for the most critical side street approach and overall intersection
*Delay is represented in Seconds per Vehicle

As seen in the table, Delays were generally similar. The present-day Synchro analysis shows slightly higher delays on the worst side street approach for the study intersections but generally shows lower delays for the Site Driveways.

The original conclusions drawn by the analysis conducted by John Collins Engineers P.C. are still valid and generally agreeable to that of the present-day analysis conducted by DTS Provident.

SECTION 4 – CONCLUSIONS

4.0 CONCLUSIONS

It is the considered professional opinion of PDE that the traffic generated by the proposed Project will not have a significant impact on the adjacent roadway network. Adequate sight distance is provided for the Site Driveways. Safe and efficient traffic operation will be maintained throughout the study area.

Respectfully submitted,

DTS Provident Design Engineering, LLP

Charles S. Holt

Charles S. Holt, P.E., P.T.O.E.
Partner

Brian Haggarty

Brian Haggarty, EIT
Traffic Engineer

Q:\PROJECTS-DTSP\0879 - Newburgh Elm Farm Subdivision Traffic Study\Reports\Traffic Impact Study\TIS Elm Woods_Newburgh.docx

APPENDIX A

LEVEL OF SERVICE STANDARDS

1. LEVEL OF SERVICE

CONCEPT

The Highway Capacity Manual, published by the Transportation Research Board of the U.S. Government, established a system by which highway facilities are examined for their adequacy to handle traffic volumes. The terminology "Level of Service" is used to provide a "qualitative" evaluation based on certain "quantitative" calculations which are related to empirical values.

Intersection Capacity, Delay and resultant Levels of Service are dependent upon a number of factors, including the following:

- Area Type
- Intersection geometrics
- Traffic volumes
- Parking conditions
- Pedestrian activity
- Vehicle Mix
- Bus Stop location and activity
- Peak Hour Factor
- Traffic Signal operation, if applicable

Ramp and weaving area Densities and resultant Levels of Service are dependent upon a number of factors, including the following:

- Number of lanes
- Configuration of weaving area
- Length of acceleration/deceleration lanes
- Vehicle speeds
- Traffic volumes
- Vehicle Mix
- Peak Hour Factor

FACTORS

SIGNALIZED INTERSECTIONS

Level of Service for Signalized Intersections is defined in terms of Delay, which is a measure of driver discomfort, frustration, fuel consumption, and loss of travel time. Specifically, Level of Service criteria are stated in terms of the Average Control Delay per vehicle for the peak 15-minute period within the hour analyzed.

Delay is a complex measure and is dependent upon a number of variables, including:

- Cycle length
- Ratio of Green time to Cycle length (G/C)

- Ratio of Volume to Capacity (V/C) for lane group or approach
- Traffic signal progression

UNSIGNALIZED INTERSECTIONS

Level of Service for Unsignalized Intersections is also defined in terms of Delay. The amount of Delay is based upon the availability of "gaps" in the mainline traffic stream and the acceptance of these gaps by motorists waiting on the side street to enter the main street traffic flow.

RAMP AND RAMP JUNCTIONS

Level of Service for ramp freeway junctions and the ramp proper are defined in terms of Density (passenger cars per mile per lane). Density is related to the traffic flow in the area of influence.

WEAVING AREAS

Level of Service for weaving areas is defined in terms of Density (passenger cars per mile per lane). Density is based on the ratio of weaving vehicles to non-weaving vehicles and on vehicle speeds in the weaving area of influence

CRITERIA

The criteria for the various Level of Service designations are as follows:

	SIGNALIZED	UNSIGNALIZED
LEVEL OF SERVICE	**Average Control Delay per Vehicle (Seconds)**	**Average Control Delay per Vehicle (Seconds)**
A	10.0 or less	10.0 or less
B	10.1 to 20.0	10.1 to 15.0
C	20.1 to 35.0	15.1 to 25.0
D	35.1 to 55.0	25.1 to 35.0
E	55.1 to 80.0	35.1 to 50.0
F	80.1 or greater	50.1 or greater

Level of Service	Ramp-Freeway Junction	Ramp Proper	Weaving Areas	
	Maximum Density pc/mi/ln	Density Range pc/mi/ln	Maximum Density pc/mi/ln	
			Freeway Weaving Area	Multi-lane + C-D Weaving Area
A	≤10	≤11	≤10	≤12
B	>10 - 20	>11 – 18	>10 - 20	>12 - 24
C	>20 - 28	>18 – 26	> 20 - 28	>24 - 32
D	>28 - 35	>26 – 35	>28 - 35	>32 - 36
E	>35	>35 – 45	>35 - 43	>36 - 40
F	Demand exceeds capacity	>45	>43	>40

DESCRIPTION

The following is a brief description of each of the six Level of Service designations as defined by the Highway Capacity Manual:

SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE A

Average Control Delay - 10.0 secs. or less

Describes operations with very low delay. Occurs when progression is extremely favorable and most vehicles arrive during the Green Phase and do not stop at all. Short cycle lengths may also contribute to low delay.

LEVEL OF SERVICE B

Average Control Delay - 10.1 to 20.0 secs.

Generally occurs with good progression and/or short cycle lengths. More vehicles stop than for Level of Service A, causing higher levels of average delay.

LEVEL OF SERVICE C

Average Control Delay - 20.1 to 35.0 secs.

Higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this Level of Service. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.

LEVEL OF SERVICE D

Average Control Delay - 35.1 to 55.0 secs.

The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high Volume/Capacity (V/C) Ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

LEVEL OF SERVICE E

Average Control Delay - 55.1 to 80.0 secs.

The limit of acceptable delay.

Higher delay values generally indicate poor progression, long cycle lengths, and high V/C Ratios. Individual cycle failures are frequent occurrences.

LEVEL OF SERVICE F

Average Control Delay - in excess of 80.0 secs.

Unacceptable to most drivers.

Occurs with oversaturation, i.e., arrival flow rates exceed the capacity of the intersection. May also occur at high V/C Ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.

UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE A
Average Control Delay - 10.0 secs. or less
Operations with little or no delay to minor turning movements.

LEVEL OF SERVICE B
Average Control Delay - 10.1 to 15.0 secs.
Operations with short delays on minor turning movements.

LEVEL OF SERVICE C
Average Control Delay - 15.1 to 25.0 secs.
Operations with average delays on minor turning movements.

LEVEL OF SERVICE D
Average Control Delay - 25.1 to 35.0 secs.
Operations with some delays on minor turning movements.

LEVEL OF SERVICE E
Average Control Delay - 35.1 to 50.0 secs.
Operations with long delays on minor turning movements.

LEVEL OF SERVICE F
Average Control Delay - In excess of 50.0 secs.
Operations where demand exceeds capacity. Very long delays with queuing may be experienced on the minor street approach.

RAMPS AND RAMP JUNCTIONS

LEVEL OF SERVICE A

Maximum Density - 10 pc/mi/ln

Unrestricted operations with no noticeable turbulence in the ramp influence area.

LEVEL OF SERVICE B

Maximum Density - 20 pc/mi/ln

Minimal levels of turbulence exist and speeds of vehicles in the influence area begin to decline.

LEVEL OF SERVICE C

Maximum Density - 28 pc/mi/ln

Level of turbulence becomes noticeable as average speed within the influence area declines. Driving conditions are still relatively comfortable at this level.

LEVEL OF SERVICE D

Maximum Density - 35 pc/mi/ln

.

Turbulence levels become intrusive. Queues may form on some high volume on-ramps but freeway operation remains stable.

LEVEL OF SERVICE E

Maximum Density - >35 pc/mi/ln

.

Conditions approaching and reaching capacity. Speeds are reduced and turbulence of merging/diverging vehicles becomes intrusive to all vehicles in the influence area. Flow levels approach capacity limits and minor changes in demand can cause ramp and freeway queues to occur.

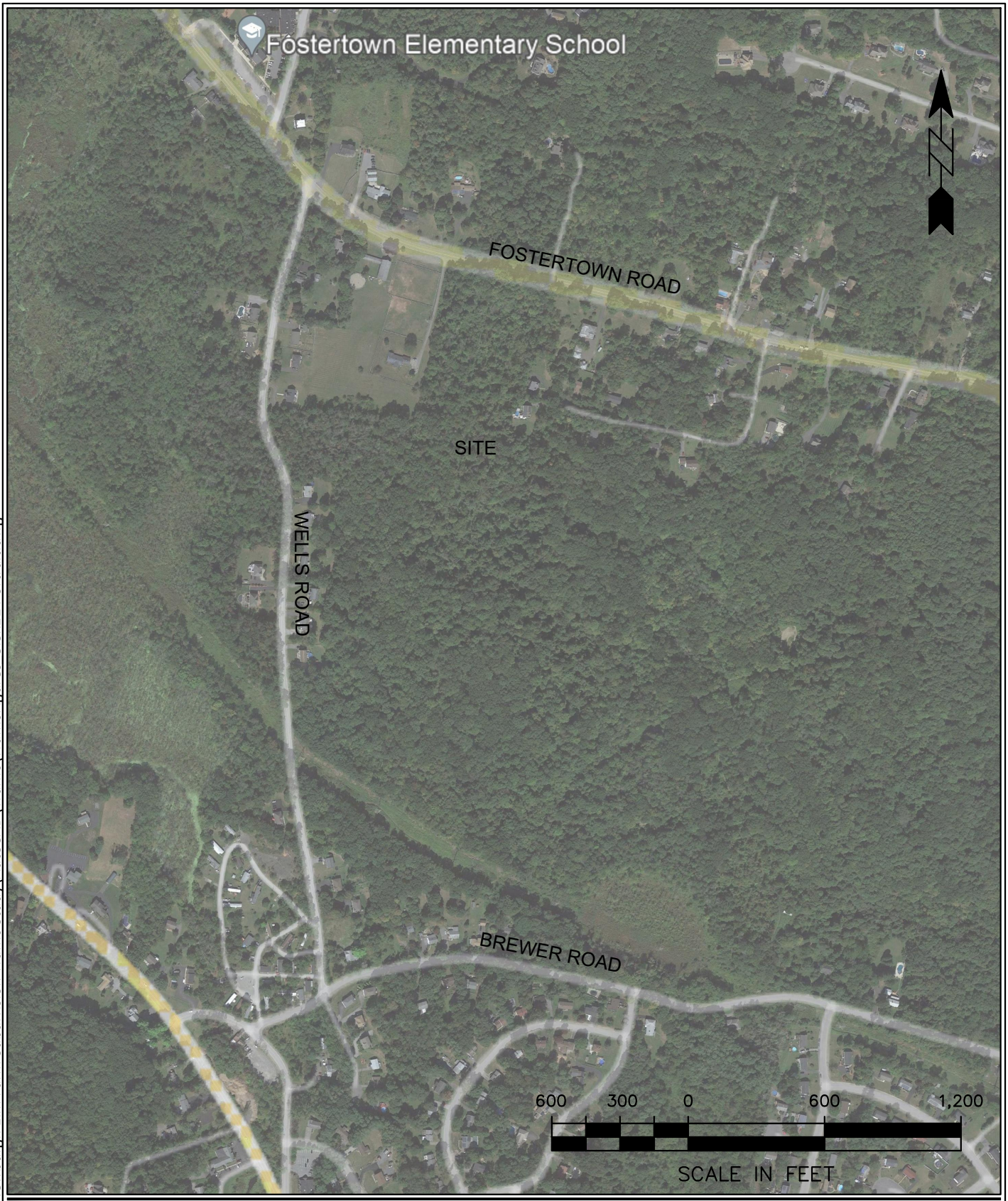
LEVEL OF SERVICE F

Maximum Density – Demand flow exceeds limits

Unstable, or breakdown, operation. Approaching demand flows exceed the discharge capacity of the downstream freeway or ramp. Queues are visibly formed on the freeway and on-ramps and will continue to grow as long as the approaching demand exceeds the discharge capacity.

APPENDIX B

FIGURES



Q:\PROJECTS-DTSP\0879 - Newburgh Elm Farm Subdivision Traffic Study\AutoCAD\Traffic\TrafficFigures 8.5x11 Portrait.dwg

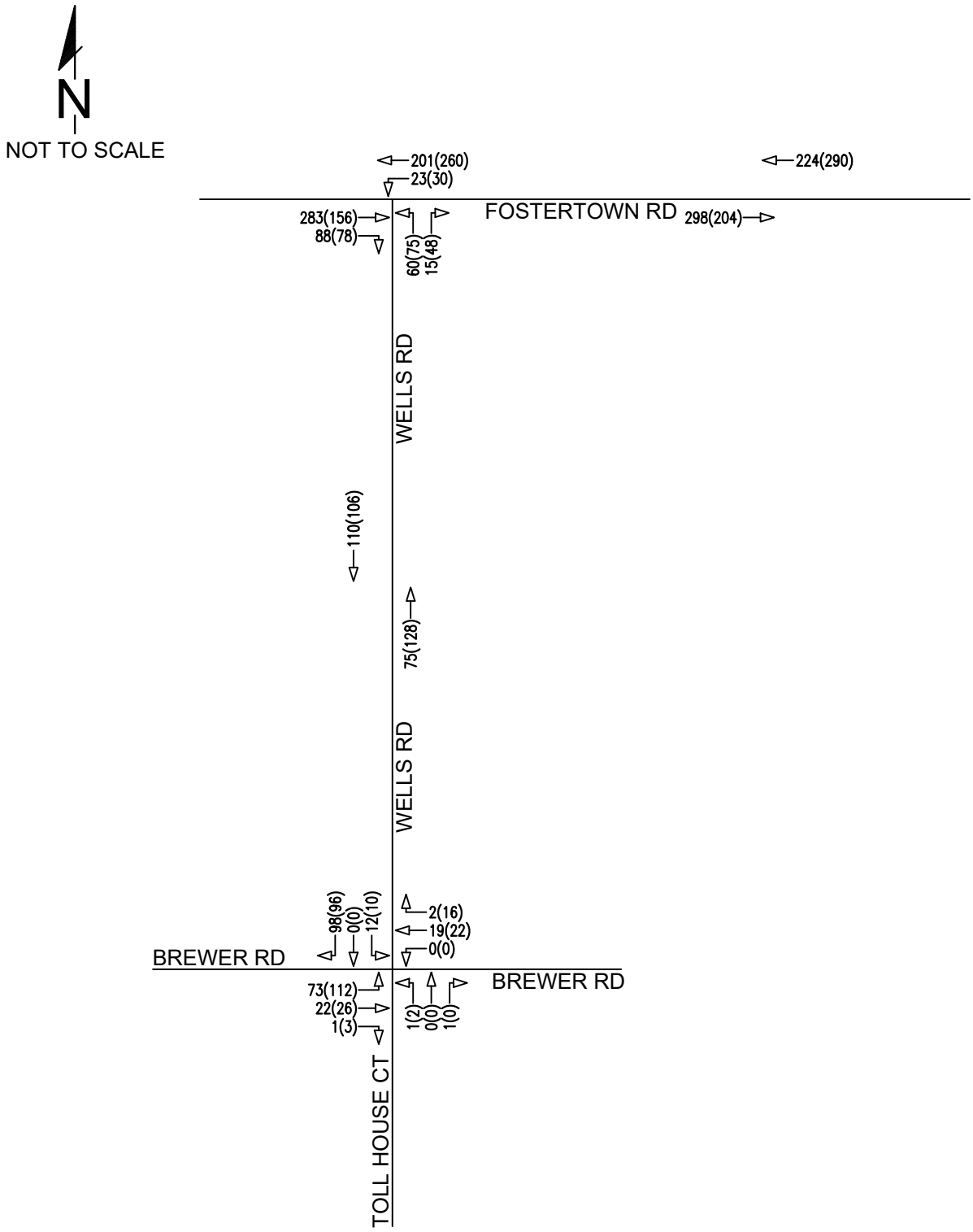
DTS • PROVIDENT
Intelligent Land Use

DTS Provident Design Engineering, LLP
One North Broadway
White Plains, NY 10601
P: 914.428.0010
F: 914.428.0017

Study Area
Newburgh Elm Farm Subdivision
Newburgh, Orange County, NY

Project No. 0879
N.T.S
January 2022

Figure No. 01



LEGEND

00 - VPH-PEAK AM HOUR (7:30-8:30)

(00) - VPH-PEAK PM HOUR (3:30-4:30)

Q:\PROJECTS-DTSP\0879 - Newburgh Elm Farm Subdivision Traffic Study\AutoCAD\Traffic\TrafficFigures 8.5x11 Portrait.dwg

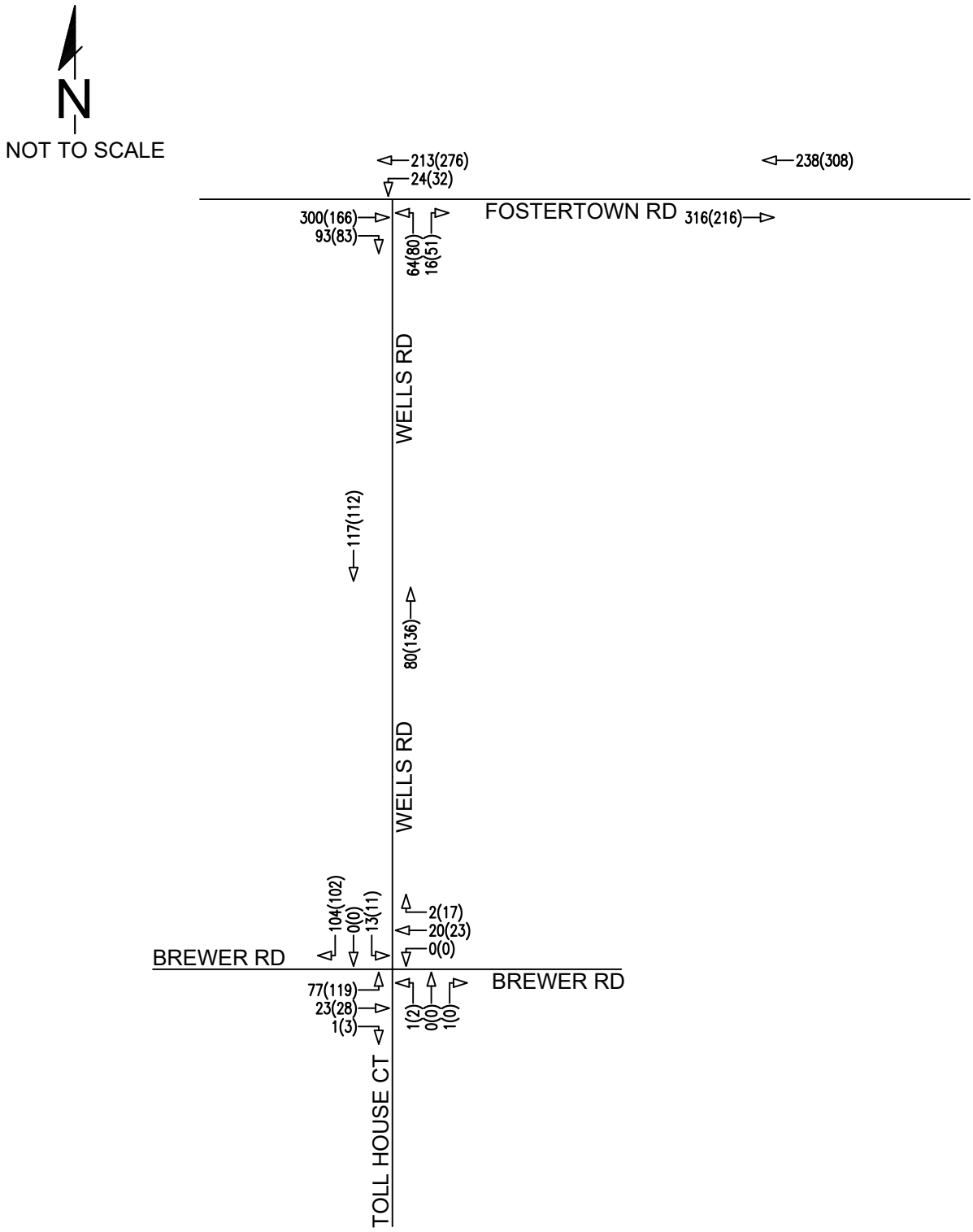
DTS • PROVIDENT
Intelligent Land Use

DTS Provident Design Engineering, LLP
One North Broadway
White Plains, NY 10601
P: 914.428.0010
F: 914.428.0017

Existing Traffic Volumes
Newburgh Elm Farm Subdivision
Newburgh, Orange County, NY

Project No. 0879
N.T.S
January 2022

Figure No. 02



Q:\PROJECTS-DTSP\0879 - Newburgh Elm Farm Subdivision Traffic Study\AutoCAD\Traffic\TrafficFigures 8.5x11 Portrait.dwg

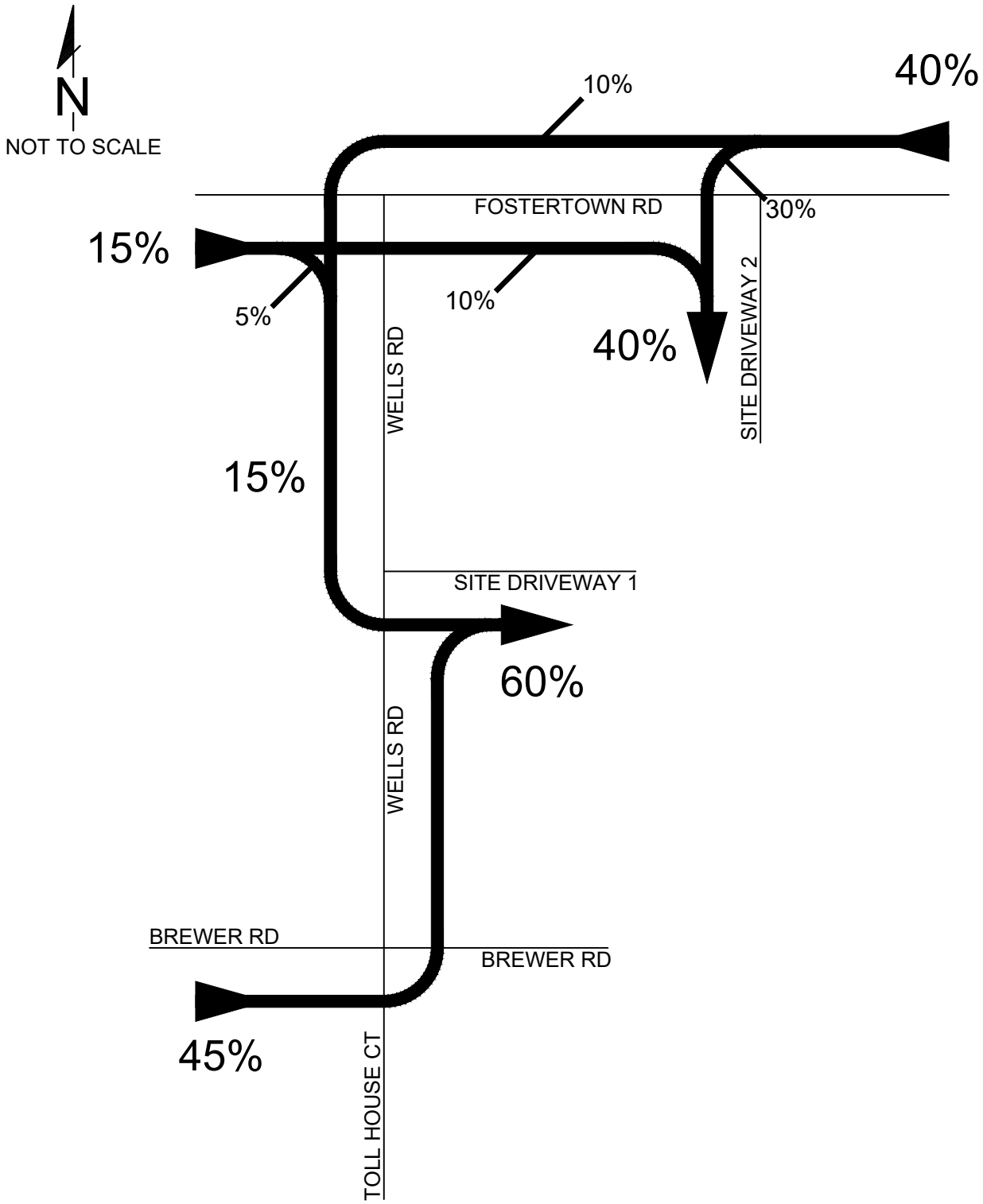
DTS • PROVIDENT
Intelligent Land Use

DTS Provident Design Engineering, LLP
One North Broadway
White Plains, NY 10601
P: 914.428.0010
F: 914.428.0017

No-Build Traffic Volumes
Newburgh Elm Farm Subdivision
Newburgh, Orange County, NY

Project No. 0879
N.T.S
January 2022

Figure No. 03



Q:\PROJECTS-DTSP\0879 - Newburgh Elm Farm Subdivision Traffic Study\AutoCAD\Traffic\TrafficFigures 8.5x11 Portrait.dwg

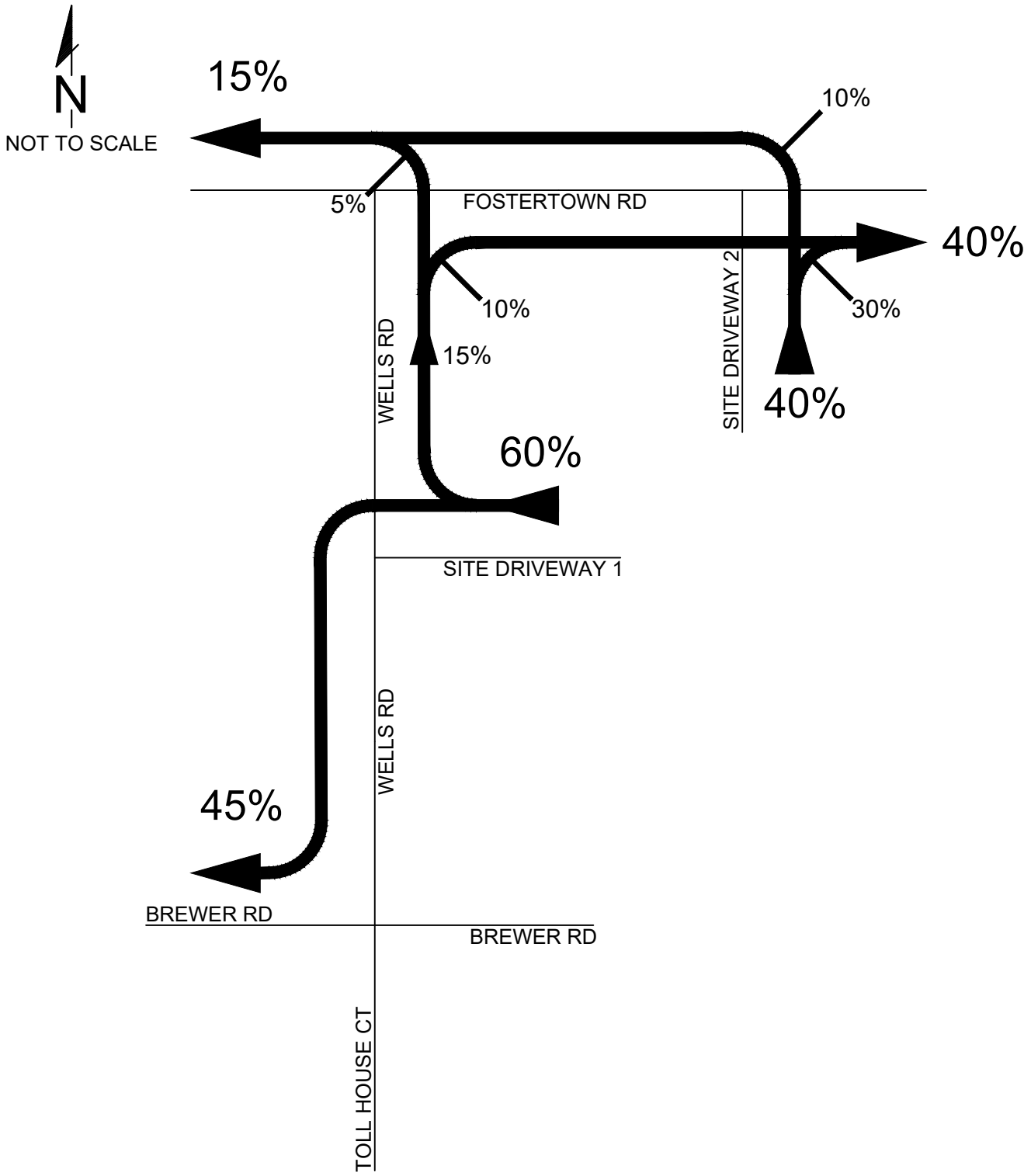
DTS • PROVIDENT
Intelligent Land Use

DTS Provident Design Engineering, LLP
One North Broadway
White Plains, NY 10601
P: 914.428.0010
F: 914.428.0017

Arrival Distribution
Newburgh Elm Farm Subdivision
Newburgh, Orange County, NY

Project No. 0879
N.T.S
January 2022

Figure No. 04



Q:\PROJECTS-DTSP\0879 - Newburgh Elm Farm Subdivision Traffic Study\AutoCAD\Traffic\TrafficFigures 8.5x11 Portrait.dwg

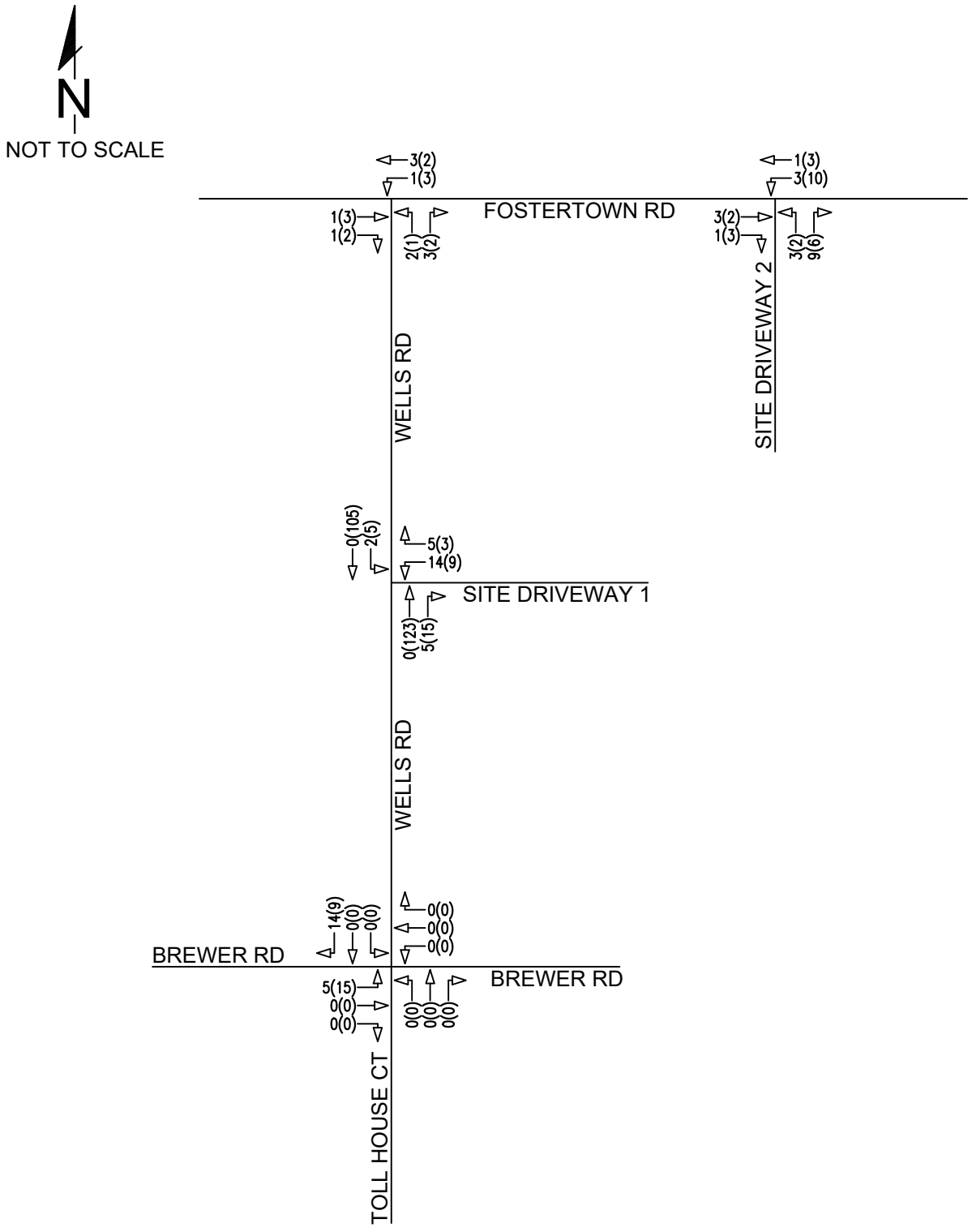
DTS • PROVIDENT
Intelligent Land Use

DTS Provident Design Engineering, LLP
One North Broadway
White Plains, NY 10601
P: 914.428.0010
F: 914.428.0017

Departure Distribution
Newburgh Elm Farm Subdivision
Newburgh, Orange County, NY

Project No. 0879
N.T.S
January 2022

Figure No. 05



Q:\PROJECTS-DTSP\0879 - Newburgh Elm Farm Subdivision Traffic Study\AutoCAD\Traffic\TrafficFigures 8.5x11 Portrait.dwg

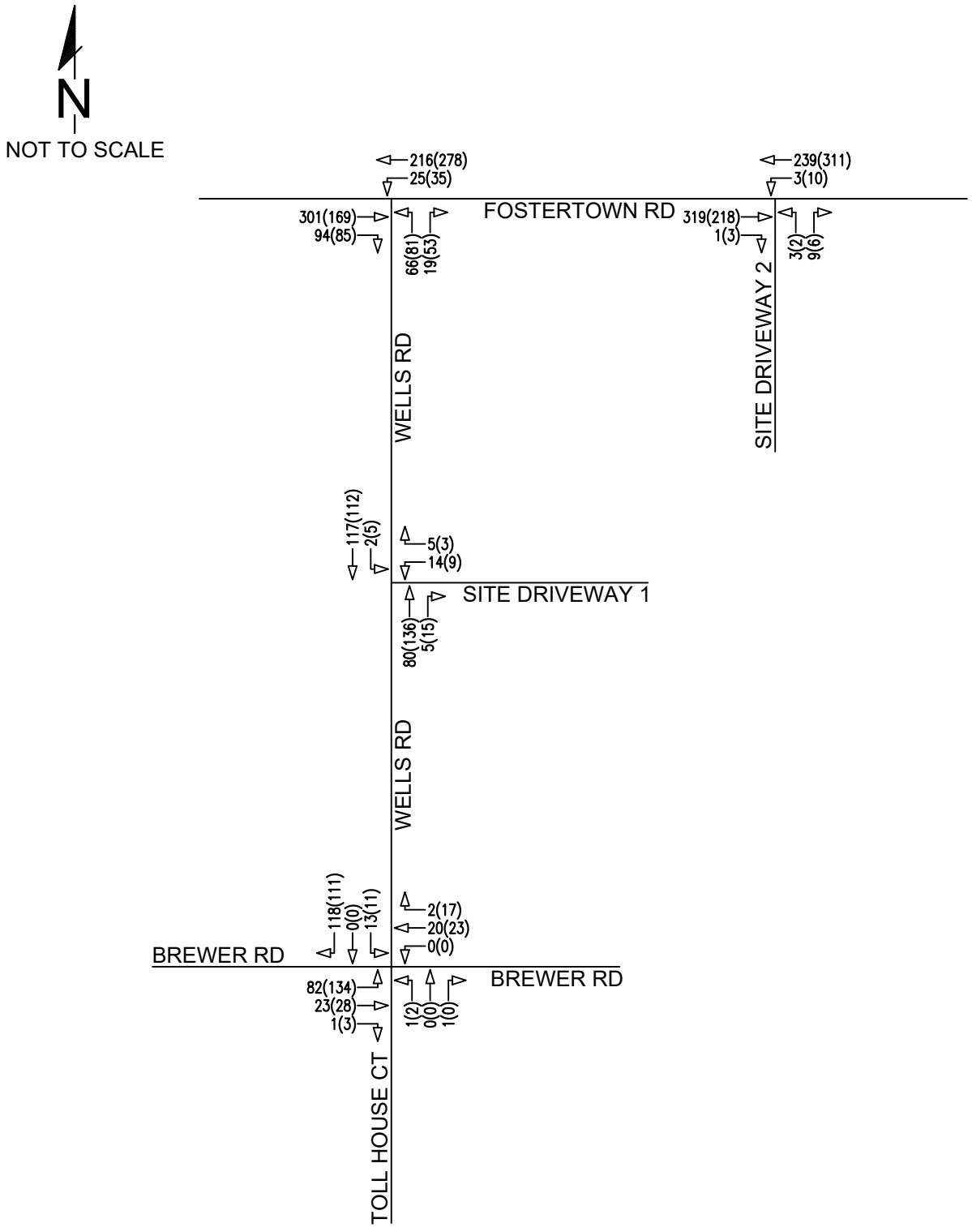
DTS • PROVIDENT
Intelligent Land Use

DTS Provident Design Engineering, LLP
One North Broadway
White Plains, NY 10601
P: 914.428.0010
F: 914.428.0017

Site Generated Traffic Volumes
Newburgh Elm Farm Subdivision
Newburgh, Orange County, NY

Project No. 0879
N.T.S
January 2022

Figure No. 06



Q:\PROJECTS-DTSP\0879 - Newburgh Elm Farm Subdivision Traffic Study\AutoCAD\Traffic\TrafficFigures 8.5x11 Portrait.dwg

DTS • PROVIDENT
Intelligent Land Use

DTS Provident Design Engineering, LLP
One North Broadway
White Plains, NY 10601
P: 914.428.0010
F: 914.428.0017

Build Traffic Volumes
Newburgh Elm Farm Subdivision
Newburgh, Orange County, NY

Project No. 0879
N.T.S
January 2022

Figure No. 07

APPENDIX C

LEVEL OF SERVICE TABLES

TABLE 1
PEAK HOUR LEVEL OF SERVICE SUMMARY TABLE
Wells Road and Fostertown Road

APPROACH		AM			PM		
		2022	**2025**	**2025**	**2022**	**2025**	**2025**
		EXISTING	**NO-BUILD**	**BUILD**	**EXISTING**	**NO-BUILD**	**BUILD**
		LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)
Wells Road							
NB	L	c 15.2	c 16.1	c 16.2	b 14.1	b 15.0	c 15.3
	OVERALL	c 15.2	c 16.1	c 16.2	b 14.1	b 15.0	c 15.3
Fostertown Road							
EB	TR	- 0.0	- 0.0	- 0.0	- 0.0	- 0.0	- 0.0
WB	L	a 8.2	a 8.3	a 8.3	a 7.9	a 7.9	a 7.9
	OVERALL	a 0.8	a 0.8	a 0.9	a 0.8	a 0.8	a 0.9
INTERSECTION		a 2.0	a 2.1	a 2.2	a 3.0	a 3.2	a 3.3

TABLE 2

PEAK HOUR LEVEL OF SERVICE SUMMARY TABLE

Wells Road/Toll House Court and Brewer Road

APPROACH		AM			PM		
		2022	**2025**	**2025**	**2022**	**2025**	**2025**
		EXISTING	**NO-BUILD**	**BUILD**	**EXISTING**	**NO-BUILD**	**BUILD**
		LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)
Toll House Court							
NB	L	b 10.6	b 10.8	b 11.0	b 11.6	b 11.9	b 12.4
	OVERALL	b 10.6	b 10.8	b 11.0	b 11.6	b 11.9	b 12.4
Wells Road							
SB	L	a 9.4	a 9.5	a 9.6	a 9.4	a 9.5	a 9.6
	OVERALL	a 9.4	a 9.5	a 9.6	a 9.4	a 9.5	a 9.6
Brewer Road							
EB	L	a 7.6	a 7.6	a 7.6	a 7.5	a 7.6	a 7.6
	OVERALL	a 5.8	a 5.8	a 5.9	a 6.0	a 6.0	a 6.2
WB	L	a 7.3	a 7.3	a 7.3	a 7.3	a 7.3	a 7.3
	OVERALL	a 0.3	a 0.3	a 0.3	a 0.2	a 0.2	a 0.2
INTERSECTION		a 7.1	a 7.1	a 7.3	a 6.5	a 6.6	a 6.8

TABLE 3
PEAK HOUR LEVEL OF SERVICE SUMMARY TABLE
Wells Road and Site Driveway 1

APPROACH		AM			PM		
		2022	**2025**	**2025**	**2022**	**2025**	**2025**
		EXISTING	**NO-BUILD**	**BUILD**	**EXISTING**	**NO-BUILD**	**BUILD**
		LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)
Wells Road							
NB	TR	- -	- -	- 0.0	- -	- -	- 0.0
SB	L	- -	- -	a 7.4	- -	- -	a 7.6
	OVERALL	- -	- -	a 0.1	- -	- -	a 0.3
Site Driveway 1							
WB	L	- -	- -	a 9.6	- -	- -	a 10.0
	OVERALL	- -	- -	a 9.6	- -	- -	a 10.0
INTERSECTION		- -	- -	a 0.9	- -	- -	a 0.6

TABLE 4
PEAK HOUR LEVEL OF SERVICE SUMMARY TABLE
Fostertown Road and Site Driveway 2

APPROACH		AM			PM		
		2022	**2025**	**2025**	**2022**	**2025**	**2025**
		EXISTING	**NO-BUILD**	**BUILD**	**EXISTING**	**NO-BUILD**	**BUILD**
		LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)	LOS DELAY (sec)
Site Driveway 2							
NB	L	- -	- -	b 11.0	- -	- -	b 10.4
	OVERALL	- -	- -	b 11.0	- -	- -	b 10.4
Fostertown Road							
EB	TR	- -	- -	- 0.0	- -	- -	- 0.0
WB	L	- -	- -	a 8.0	- -	- -	a 7.7
	OVERALL	- -	- -	a 0.1	- -	- -	a 0.2
INTERSECTION		- -	- -	a 0.3	- -	- -	a 0.3

APPENDIX D

CAPACITY ANALYSIS

Intersection	
Int Delay, s/veh	7.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	73	22	1	1	19	2	1	1	1	12	1	98
Future Vol, veh/h	73	22	1	1	19	2	1	1	1	12	1	98
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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, %	-	6	-	-	-6	-	-	5	-	-	3	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	19	14	0	0	5	0	0	0	0	50	0	5
Mvmt Flow	91	28	1	1	24	3	1	1	1	15	1	123

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	29	0	0	301	240	29	240	239	26
Stage 1	-	-	-	-	-	-	211	211	-	28	28	-
Stage 2	-	-	-	-	-	-	90	29	-	212	211	-
Critical Hdwy	4.29	-	-	4.1	-	-	8.1	7.5	6.7	8.2	7.1	6.55
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	6.5	-	7.2	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	6.5	-	7.2	6.1	-
Follow-up Hdwy	2.371	-	-	2.2	-	-	3.5	4	3.3	3.95	4	3.345
Pot Cap-1 Maneuver	1483	-	-	1597	-	-	603	622	1047	600	640	1039
Stage 1	-	-	-	-	-	-	750	690	-	875	872	-
Stage 2	-	-	-	-	-	-	900	868	-	668	706	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1483	-	-	1597	-	-	505	583	1047	569	600	1039
Mov Cap-2 Maneuver	-	-	-	-	-	-	505	583	-	569	600	-
Stage 1	-	-	-	-	-	-	704	647	-	821	871	-
Stage 2	-	-	-	-	-	-	792	867	-	625	662	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.8	0.3	10.6	9.4
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	645	1483	-	-	1597	-	-	948
HCM Lane V/C Ratio	0.006	0.062	-	-	0.001	-	-	0.146
HCM Control Delay (s)	10.6	7.6	0	-	7.3	0	-	9.4
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	283	88	23	201	60	15
Future Vol, veh/h	283	88	23	201	60	15
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, %	4	-	-	-1	2	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	4	1	6	0
Mvmt Flow	311	97	25	221	66	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	408	0	631	360
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	271	-
Critical Hdwy	-	-	4.14	-	6.86	6.4
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	-	-	2.236	-	3.554	3.3
Pot Cap-1 Maneuver	-	-	1140	-	409	675
Stage 1	-	-	-	-	670	-
Stage 2	-	-	-	-	743	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1140	-	399	675
Mov Cap-2 Maneuver	-	-	-	-	399	-
Stage 1	-	-	-	-	670	-
Stage 2	-	-	-	-	724	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	15.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	435	-	-	1140	-
HCM Lane V/C Ratio	0.189	-	-	0.022	-
HCM Control Delay (s)	15.2	-	-	8.2	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	112	26	3	1	22	16	2	1	1	10	1	96
Future Vol, veh/h	112	26	3	1	22	16	2	1	1	10	1	96
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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, %	-	6	-	-	-6	-	-	5	-	-	3	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	7	8	0	0	6	25	0	0	0	33	0	11
Mvmt Flow	120	28	3	1	24	17	2	1	1	11	1	103

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	41	0	0	31	0	0	357	313	30	306	306	33
Stage 1	-	-	-	-	-	-	270	270	-	35	35	-
Stage 2	-	-	-	-	-	-	87	43	-	271	271	-
Critical Hdwy	4.17	-	-	4.1	-	-	8.1	7.5	6.7	8.03	7.1	6.61
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	6.5	-	7.03	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	6.5	-	7.03	6.1	-
Follow-up Hdwy	2.263	-	-	2.2	-	-	3.5	4	3.3	3.797	4	3.399
Pot Cap-1 Maneuver	1537	-	-	1595	-	-	545	555	1046	561	581	1012
Stage 1	-	-	-	-	-	-	687	640	-	902	865	-
Stage 2	-	-	-	-	-	-	904	853	-	642	659	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1537	-	-	1595	-	-	459	511	1046	525	535	1012
Mov Cap-2 Maneuver	-	-	-	-	-	-	459	511	-	525	535	-
Stage 1	-	-	-	-	-	-	633	589	-	831	864	-
Stage 2	-	-	-	-	-	-	810	852	-	590	607	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6	0.2	11.6	9.4
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	550	1537	-	-	1595	-	-	924
HCM Lane V/C Ratio	0.008	0.078	-	-	0.001	-	-	0.125
HCM Control Delay (s)	11.6	7.5	0	-	7.3	0	-	9.4
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0.3	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	156	78	30	260	75	48
Future Vol, veh/h	156	78	30	260	75	48
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, %	4	-	-	-1	2	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	7	10	6	5	8	8
Mvmt Flow	171	86	33	286	82	53

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	257	0	566	214
Stage 1	-	-	-	-	214	-
Stage 2	-	-	-	-	352	-
Critical Hdwy	-	-	4.16	-	6.88	6.48
Critical Hdwy Stg 1	-	-	-	-	5.88	-
Critical Hdwy Stg 2	-	-	-	-	5.88	-
Follow-up Hdwy	-	-	2.254	-	3.572	3.372
Pot Cap-1 Maneuver	-	-	1285	-	447	802
Stage 1	-	-	-	-	789	-
Stage 2	-	-	-	-	672	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1285	-	433	802
Mov Cap-2 Maneuver	-	-	-	-	433	-
Stage 1	-	-	-	-	789	-
Stage 2	-	-	-	-	651	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	14.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	528	-	-	1285	-
HCM Lane V/C Ratio	0.256	-	-	0.026	-
HCM Control Delay (s)	14.1	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.1	-

Intersection	
Int Delay, s/veh	7.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	77	23	1	1	20	2	1	1	1	13	1	104
Future Vol, veh/h	77	23	1	1	20	2	1	1	1	13	1	104
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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, %	-	6	-	-	-6	-	-	5	-	-	3	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	19	14	0	0	5	0	0	0	0	50	0	5
Mvmt Flow	96	29	1	1	25	3	1	1	1	16	1	130

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	28	0	0	30	0	0	316	252	30	252	251	27
Stage 1	-	-	-	-	-	-	222	222	-	29	29	-
Stage 2	-	-	-	-	-	-	94	30	-	223	222	-
Critical Hdwy	4.29	-	-	4.1	-	-	8.1	7.5	6.7	8.2	7.1	6.55
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	6.5	-	7.2	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	6.5	-	7.2	6.1	-
Follow-up Hdwy	2.371	-	-	2.2	-	-	3.5	4	3.3	3.95	4	3.345
Pot Cap-1 Maneuver	1482	-	-	1596	-	-	587	610	1046	588	629	1038
Stage 1	-	-	-	-	-	-	738	680	-	874	871	-
Stage 2	-	-	-	-	-	-	894	867	-	658	697	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1482	-	-	1596	-	-	487	569	1046	556	587	1038
Mov Cap-2 Maneuver	-	-	-	-	-	-	487	569	-	556	587	-
Stage 1	-	-	-	-	-	-	689	635	-	816	870	-
Stage 2	-	-	-	-	-	-	780	866	-	613	651	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.8	0.3	10.8	9.5
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	629	1482	-	-	1596	-	-	942
HCM Lane V/C Ratio	0.006	0.065	-	-	0.001	-	-	0.157
HCM Control Delay (s)	10.8	7.6	0	-	7.3	0	-	9.5
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	300	93	24	213	64	16
Future Vol, veh/h	300	93	24	213	64	16
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, %	4	-	-	-1	2	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	4	1	6	0
Mvmt Flow	330	102	26	234	70	18

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	432	0	667	381
Stage 1	-	-	-	-	381	-
Stage 2	-	-	-	-	286	-
Critical Hdwy	-	-	4.14	-	6.86	6.4
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	-	-	2.236	-	3.554	3.3
Pot Cap-1 Maneuver	-	-	1117	-	388	657
Stage 1	-	-	-	-	654	-
Stage 2	-	-	-	-	730	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1117	-	378	657
Mov Cap-2 Maneuver	-	-	-	-	378	-
Stage 1	-	-	-	-	654	-
Stage 2	-	-	-	-	710	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	16.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	413	-	-	1117	-
HCM Lane V/C Ratio	0.213	-	-	0.024	-
HCM Control Delay (s)	16.1	-	-	8.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	119	28	3	1	23	17	2	1	1	11	1	102
Future Vol, veh/h	119	28	3	1	23	17	2	1	1	11	1	102
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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, %	-	6	-	-	-6	-	-	5	-	-	3	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	7	8	0	0	6	25	0	0	0	33	0	11
Mvmt Flow	128	30	3	1	25	18	2	1	1	12	1	110

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	43	0	0	33	0	0	380	333	32	325	325	34
Stage 1	-	-	-	-	-	-	288	288	-	36	36	-
Stage 2	-	-	-	-	-	-	92	45	-	289	289	-
Critical Hdwy	4.17	-	-	4.1	-	-	8.1	7.5	6.7	8.03	7.1	6.61
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	6.5	-	7.03	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	6.5	-	7.03	6.1	-
Follow-up Hdwy	2.263	-	-	2.2	-	-	3.5	4	3.3	3.797	4	3.399
Pot Cap-1 Maneuver	1534	-	-	1592	-	-	523	538	1043	542	565	1011
Stage 1	-	-	-	-	-	-	668	625	-	901	864	-
Stage 2	-	-	-	-	-	-	897	851	-	626	645	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1534	-	-	1592	-	-	435	492	1043	505	516	1011
Mov Cap-2 Maneuver	-	-	-	-	-	-	435	492	-	505	516	-
Stage 1	-	-	-	-	-	-	611	572	-	824	863	-
Stage 2	-	-	-	-	-	-	798	850	-	571	590	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6	0.2	11.9	9.5
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	527	1534	-	-	1592	-	-	915
HCM Lane V/C Ratio	0.008	0.083	-	-	0.001	-	-	0.134
HCM Control Delay (s)	11.9	7.6	0	-	7.3	0	-	9.5
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0.3	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	3.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	166	83	32	276	80	51
Future Vol, veh/h	166	83	32	276	80	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, %	4	-	-	-1	2	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	7	10	6	5	8	8
Mvmt Flow	182	91	35	303	88	56

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	273	0	601	228
Stage 1	-	-	-	-	228	-
Stage 2	-	-	-	-	373	-
Critical Hdwy	-	-	4.16	-	6.88	6.48
Critical Hdwy Stg 1	-	-	-	-	5.88	-
Critical Hdwy Stg 2	-	-	-	-	5.88	-
Follow-up Hdwy	-	-	2.254	-	3.572	3.372
Pot Cap-1 Maneuver	-	-	1267	-	424	787
Stage 1	-	-	-	-	776	-
Stage 2	-	-	-	-	656	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1267	-	410	787
Mov Cap-2 Maneuver	-	-	-	-	410	-
Stage 1	-	-	-	-	776	-
Stage 2	-	-	-	-	634	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	15
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	504	-	-	1267	-
HCM Lane V/C Ratio	0.286	-	-	0.028	-
HCM Control Delay (s)	15	-	-	7.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	82	23	1	1	20	2	1	1	1	13	1	118
Future Vol, veh/h	82	23	1	1	20	2	1	1	1	13	1	118
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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, %	-	6	-	-	-6	-	-	5	-	-	3	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	19	14	0	0	5	0	0	0	0	50	0	5
Mvmt Flow	103	29	1	1	25	3	1	1	1	16	1	148

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	28	0	0	30	0	0	339	266	30	266	265	27
Stage 1	-	-	-	-	-	-	236	236	-	29	29	-
Stage 2	-	-	-	-	-	-	103	30	-	237	236	-
Critical Hdwy	4.29	-	-	4.1	-	-	8.1	7.5	6.7	8.2	7.1	6.55
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	6.5	-	7.2	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	6.5	-	7.2	6.1	-
Follow-up Hdwy	2.371	-	-	2.2	-	-	3.5	4	3.3	3.95	4	3.345
Pot Cap-1 Maneuver	1482	-	-	1596	-	-	563	597	1046	573	616	1038
Stage 1	-	-	-	-	-	-	723	668	-	874	871	-
Stage 2	-	-	-	-	-	-	882	867	-	644	686	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1482	-	-	1596	-	-	455	554	1046	540	572	1038
Mov Cap-2 Maneuver	-	-	-	-	-	-	455	554	-	540	572	-
Stage 1	-	-	-	-	-	-	672	621	-	812	870	-
Stage 2	-	-	-	-	-	-	755	866	-	596	637	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.9	0.3	11	9.6
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	605	1482	-	-	1596	-	-	946
HCM Lane V/C Ratio	0.006	0.069	-	-	0.001	-	-	0.174
HCM Control Delay (s)	11	7.6	0	-	7.3	0	-	9.6
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	5	80	5	2	117
Future Vol, veh/h	14	5	80	5	2	117
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	-1	-	-	1
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	5	87	5	2	127

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	221	90	0	0	92	0
Stage 1	90	-	-	-	-	-
Stage 2	131	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	767	968	-	-	1503	-
Stage 1	934	-	-	-	-	-
Stage 2	895	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	766	968	-	-	1503	-
Mov Cap-2 Maneuver	766	-	-	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	894	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	811	1503	-
HCM Lane V/C Ratio	-	-	0.025	0.001	-
HCM Control Delay (s)	-	-	9.6	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	301	94	25	216	66	19
Future Vol, veh/h	301	94	25	216	66	19
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, %	4	-	-	-1	2	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	4	1	6	0
Mvmt Flow	331	103	27	237	73	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	434	0	674	383
Stage 1	-	-	-	-	383	-
Stage 2	-	-	-	-	291	-
Critical Hdwy	-	-	4.14	-	6.86	6.4
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	-	-	2.236	-	3.554	3.3
Pot Cap-1 Maneuver	-	-	1115	-	384	655
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	726	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1115	-	373	655
Mov Cap-2 Maneuver	-	-	-	-	373	-
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	706	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	16.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	413	-	-	1115	-
HCM Lane V/C Ratio	0.226	-	-	0.025	-
HCM Control Delay (s)	16.2	-	-	8.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	319	1	3	239	3	9
Future Vol, veh/h	319	1	3	239	3	9
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, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	347	1	3	260	3	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	348	0	614	348
Stage 1	-	-	-	-	348	-
Stage 2	-	-	-	-	266	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1211	-	455	695
Stage 1	-	-	-	-	715	-
Stage 2	-	-	-	-	779	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1211	-	454	695
Mov Cap-2 Maneuver	-	-	-	-	454	-
Stage 1	-	-	-	-	715	-
Stage 2	-	-	-	-	777	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	614	-	-	1211	-
HCM Lane V/C Ratio	0.021	-	-	0.003	-
HCM Control Delay (s)	11	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	134	28	3	1	23	17	2	1	1	11	1	111
Future Vol, veh/h	134	28	3	1	23	17	2	1	1	11	1	111
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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, %	-	6	-	-	-6	-	-	5	-	-	3	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	7	8	0	0	6	25	0	0	0	33	0	11
Mvmt Flow	144	30	3	1	25	18	2	1	1	12	1	119

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	43	0	0	33	0	0	416	365	32	357	357	34
Stage 1	-	-	-	-	-	-	320	320	-	36	36	-
Stage 2	-	-	-	-	-	-	96	45	-	321	321	-
Critical Hdwy	4.17	-	-	4.1	-	-	8.1	7.5	6.7	8.03	7.1	6.61
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	6.5	-	7.03	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	6.5	-	7.03	6.1	-
Follow-up Hdwy	2.263	-	-	2.2	-	-	3.5	4	3.3	3.797	4	3.399
Pot Cap-1 Maneuver	1534	-	-	1592	-	-	490	512	1043	513	539	1011
Stage 1	-	-	-	-	-	-	637	600	-	901	864	-
Stage 2	-	-	-	-	-	-	891	851	-	597	621	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1534	-	-	1592	-	-	399	462	1043	473	487	1011
Mov Cap-2 Maneuver	-	-	-	-	-	-	399	462	-	473	487	-
Stage 1	-	-	-	-	-	-	576	542	-	815	863	-
Stage 2	-	-	-	-	-	-	784	850	-	538	561	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.2	0.2	12.4	9.6
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	492	1534	-	-	1592	-	-	910
HCM Lane V/C Ratio	0.009	0.094	-	-	0.001	-	-	0.145
HCM Control Delay (s)	12.4	7.6	0	-	7.3	0	-	9.6
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0.3	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	3	136	15	5	112
Future Vol, veh/h	9	3	136	15	5	112
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	-1	-	-	1
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	3	148	16	5	122

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	288	156	0	0	164	0
Stage 1	156	-	-	-	-	-
Stage 2	132	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	702	890	-	-	1414	-
Stage 1	872	-	-	-	-	-
Stage 2	894	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	699	890	-	-	1414	-
Mov Cap-2 Maneuver	699	-	-	-	-	-
Stage 1	872	-	-	-	-	-
Stage 2	890	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	739	1414	-
HCM Lane V/C Ratio	-	-	0.018	0.004	-
HCM Control Delay (s)	-	-	10	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	169	85	35	278	81	53
Future Vol, veh/h	169	85	35	278	81	53
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, %	4	-	-	-1	2	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	7	10	6	5	8	8
Mvmt Flow	186	93	38	305	89	58

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	279	0	614	233
Stage 1	-	-	-	-	233	-
Stage 2	-	-	-	-	381	-
Critical Hdwy	-	-	4.16	-	6.88	6.48
Critical Hdwy Stg 1	-	-	-	-	5.88	-
Critical Hdwy Stg 2	-	-	-	-	5.88	-
Follow-up Hdwy	-	-	2.254	-	3.572	3.372
Pot Cap-1 Maneuver	-	-	1261	-	416	781
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	650	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1261	-	401	781
Mov Cap-2 Maneuver	-	-	-	-	401	-
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	627	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	15.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	497	-	-	1261	-
HCM Lane V/C Ratio	0.296	-	-	0.031	-
HCM Control Delay (s)	15.3	-	-	7.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	218	3	10	311	2	6
Future Vol, veh/h	218	3	10	311	2	6
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, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	237	3	11	338	2	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	240	0	599	239
Stage 1	-	-	-	-	239	-
Stage 2	-	-	-	-	360	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1327	-	465	800
Stage 1	-	-	-	-	801	-
Stage 2	-	-	-	-	706	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1327	-	460	800
Mov Cap-2 Maneuver	-	-	-	-	460	-
Stage 1	-	-	-	-	801	-
Stage 2	-	-	-	-	699	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	675	-	-	1327	-
HCM Lane V/C Ratio	0.013	-	-	0.008	-
HCM Control Delay (s)	10.4	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

APPENDIX E

ACCIDENT DATA SUMMARY TABLE

CRASH NUMBER	CASE NUMBER	CASE YEAR	ACCD DATE	DAY OF WEEK	ACCD TIME	ON STREET	CLOSEST CROSS STREET	AT INTERSECTION	ACCIDENT TYPE	COLLISION TYPE	SEVERITY	NUMBER OF INJURIES	NUMBER OF SERIOUS INJURIES	NUMBER OF FATALITIES	NUMBER OF VEHICLES	PED LOC	PED ACTION	APPARENT FACTOR VEH 1	APPARENT FACTOR VEH 2	TRAFFIC CONTROL	LIGHT CONDITION	WEATHER	ROAD SURFACE CONDITION
1	39044458	2021	10/05/2021	Tue	04:28pm			N	COLLISION WITH MOTOR VEHICLE	OTHER	NON-REPORTABLE	0		0	2	NOT APPLICABLE	NOT APPLICABLE	BACKING UNSAFELY	NOT APPLICABLE	NONE	DAYLIGHT	CLOUDY	DRY
2	38432518	2020	03/04/2020	Wed	04:30pm	FOSTERTOWN RD	Brandywine Xing	N	COLLISION WITH MOTOR VEHICLE	HEAD ON	FATAL	1	0	1	2	NOT APPLICABLE	NOT APPLICABLE	LOST CONSCIOUSNESS	NOT APPLICABLE	NONE	DAYLIGHT	CLOUDY	DRY
3	38068901	2019	09/04/2019	Wed	09:44am	FOSTERTOWN RD	Brandywine Xing	Y	COLLISION WITH MOTOR VEHICLE	REAR END	PROPERTY DAMAGE	0		0	2	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	FOLLOWING TOO CLOSELY	NONE	DAYLIGHT	CLEAR	DRY
4	38985570	2021	08/19/2021	Thu	08:29pm	FOSTERTOWN RD	Reggerio Rd	N	COLLISION WITH DEER	OTHER	NON-REPORTABLE	0		0	1	NOT APPLICABLE	NOT APPLICABLE	ANIMAL'S ACTION		NONE	DARK-ROAD UNLIGHTED	CLOUDY	DRY
5	37749875	2019	02/19/2019	Tue	06:06pm	FOSTERTOWN RD	Unnamed Street	N	COLLISION WITH ANIMAL	OTHER	PROPERTY DAMAGE	0		0	1	NOT APPLICABLE	NOT APPLICABLE	ANIMAL'S ACTION		NONE	DARK-ROAD UNLIGHTED	CLEAR	DRY
6	37639839	2018	12/14/2018	Fri	08:22pm	WELLS RD	Fostertown Rd	N	COLLISION WITH DEER	OTHER	NON-REPORTABLE	0		0	1	NOT APPLICABLE	NOT APPLICABLE	ANIMAL'S ACTION		NONE	DARK-ROAD UNLIGHTED	CLEAR	DRY
7	37961045	2019	07/03/2019	Wed	08:26pm	WELLS RD	Fostertown Rd	N	COLLISION WITH TREE	OTHER	NON-REPORTABLE	0		0	1	NOT APPLICABLE	NOT APPLICABLE	ANIMAL'S ACTION		NONE	DUSK	CLOUDY	DRY
8	37856096	2019	04/24/2019	Wed	02:55pm	WELLS RD	Fostertown Rd	Y	COLLISION WITH BUILDING/WALL	OTHER	NON-REPORTABLE	0		0	1	NOT APPLICABLE	NOT APPLICABLE	TIRE FAILURE/INADEQUATE		NONE	DAYLIGHT	CLEAR	DRY
9	38910891	2021	06/24/2021	Thu	08:25am	WELLS RD	Oriole Cir	N	COLLISION WITH MOTOR VEHICLE	SIDESWIPE	PROPERTY DAMAGE	0		0	2	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	PASSING OR LANE USAGE IMPROPERLY	NONE	DAYLIGHT	CLEAR	DRY
10	39044438	2021	09/15/2021	Wed	07:02pm	WELLS RD	Sparrow St	N	COLLISION WITH TREE	OTHER	PROPERTY DAMAGE AND INJURY	1	1	0	1	NOT APPLICABLE	NOT APPLICABLE	UNSAFE SPEED		NONE	DUSK	CLEAR	DRY

DTS • PROVIDENT
Intelligent Land Use