



TRAFFIC IMPACT STUDY

Proposed Warehouses
Township of Franklin
Somerset County, New Jersey
Block 88.02, Lots 13 & 72

Prepared For:
Elion Partners

Stonefield Engineering & Design, LLC
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EXECUTIVE SUMMARY

1. This Traffic Impact Study was prepared to analyze the traffic impacts of the proposed 425,250-square-foot and 118,800-square-foot warehouse buildings on the adjacent roadway network. Access to the site is proposed via one (1) full-movement driveway along Veronica Avenue.
2. Updated Turning Movement Counts were conducted on at the intersection of NJSH Route 27 and Veronica Avenue/How Lane during the typical weekday morning and weekday evening peak periods. The updated Turning Movement Counts were conducted on Wednesday, February 19, 2020.
3. The Existing, No-Build, and Build analyses were updated based on the counts conducted on February 19, 2020.
4. The analysis of the signalized intersection of NJSH Route 27 and Veronica Avenue/How Lane was updated for the Existing, No-Build, and Build Conditions utilizing a base saturation flow rate of 1950 pc/hr/ln based on the NJDOT publication title *Introduction of New Base Saturation Flow Rates (BSFRs) for New Jersey Department of Transportation's Signal Optimization Practice*.

INTRODUCTION

This Traffic Impact Study was prepared to investigate the potential impacts of the proposed warehouse development on the adjacent roadway network. The subject property is located along Veronica Avenue in the Township of Franklin, Somerset County, New Jersey. The site location is shown on appended **Figure 1**.

The subject property is designated as Block 88.02, Lots 13 & 72 as depicted on the Township of Franklin Tax Map. The site has approximately 210 feet of frontage along NJSH Route 27 and approximately 155 feet of frontage along Veronica Avenue. The existing site is occupied by farmland or is undeveloped. There is currently no access provided to the site. Under the proposed development program, a 425,250-square-foot warehouse (Building 1) and a 118,800-square-foot warehouse (Building 2) would be constructed. Access is proposed via one (1) full-movement driveway along Veronica Avenue.

METHODOLOGY

Stonefield Engineering & Design, LLC has prepared this Traffic Impact Study in accordance with the recommended guidelines and practices outlined by the Institute of Transportation Engineers (ITE) within Transportation Impact Analyses for Site Development. A detailed field investigation was performed to assess the existing conditions of the adjacent roadway network. A data collection effort was completed to identify the existing traffic volumes at the study intersections to serve as a base for the traffic analyses. Capacity analysis, a procedure used to estimate the traffic-carrying ability of roadway facilities over a range of defined operating conditions, was performed using the Highway Capacity Manual, 6th Edition (HCM) and the Synchro 10 Software for all study conditions to assess the roadway operations.

For an unsignalized intersection, Level of Service (LOS) A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 80 seconds per vehicle. The Technical Appendix contains the Highway Capacity Analysis Detail Sheets for the study intersections analyzed in this assessment. The traffic signal timing utilized within the signalized analysis is based on signal timing directives provided by the New Jersey Department of Transportation (NJDOT).

2019 EXISTING CONDITION

2019 EXISTING ROADWAY CONDITIONS

The proposed warehouse development is located along Veronica Avenue in the Township of Franklin, Somerset County, New Jersey. The subject property is designated as Block 88.02, Lots 13 & 72 as depicted

on the Township of Franklin Tax Map. The site has approximately 210 feet of frontage along NJSH Route 27 and approximately 155 feet of frontage along Veronica Avenue. Land uses in the area are a mix of commercial, industrial, and residential.

NJSH Route 27 is classified as an Urban Principal Arterial roadway with a general north-south orientation and is under the jurisdiction of the NJDOT. The roadway provides two (2) lanes of travel in each direction to the north of the intersection with Veronica Avenue/How Lane and one (1) lane of travel in each direction to the south of the intersection with Veronica Avenue/How Lane. NJSH Route 27 has a posted speed limit of 40 mph. Curb is provided along both sides of the roadway. Sidewalk is provided along both sides of the road to the south of the intersection with Veronica Avenue/How Lane and only along the easterly side of the roadway to the north of the intersection with Veronica Avenue/How Lane. Shoulders are not provided along either side of the roadway to the north of the intersection with Veronica Avenue/How Lane and are provided along both sides of the roadway to the south of the intersection with Veronica Avenue/How Lane. On-street parking is not permitted along either side of the roadway. NJSH Route 27 provides north-south mobility through New Jersey for a mix of commercial and residential uses along its length.

Veronica Avenue is classified as an Urban Minor Arterial roadway with a general east-west orientation and is under the jurisdiction of the Township of Franklin. Along the site frontage, the roadway provides one (1) lane of travel in each direction and has a posted speed limit of 40 mph. Curb is provided along both sides of the roadway, sidewalk is provided along the southerly side of the roadway, shoulders are not provided along either side of the roadway, and on-street parking is not permitted along either side of the roadway. Veronica Avenue connects Hamilton Street at its western terminus to NJSH Route 27 at its eastern terminus for a mix of commercial and industrial uses along its length.

How Lane (a.k.a. CR 680) is classified as an Urban Minor Arterial roadway with a general east-west orientation and is under the jurisdiction of Middlesex County. Along the site frontage, the roadway provides one (1) lane of travel in each direction and has a posted speed limit of 40 mph. Curb and sidewalk are provided along the northerly side of the roadway and are not provided along the southerly side of the roadway, shoulders are not provided along either side of the roadway, and on-street parking is not permitted along either side of the roadway. How Lane connects NJSH Route 27 at its western terminus to Livingston Avenue at its eastern terminus and provides access to NJSH Route 91. Land uses along How Lane are a mix of commercial, industrial, and residential.

NJSH Route 27, Veronica Avenue, and How Lane intersect to form a four (4)-leg intersection controlled by a two (2)-phase traffic signal operating on a 100-second fixed background. The northbound approach of NJSH Route 27 provides one (1) exclusive left-turn lane, one (1) exclusive through lane, and one (1) shared

through/right-turn lane and the southbound approach of NJSH Route 27 provides one (1) exclusive left-turn lane, one (1) exclusive through lane, and one (1) exclusive right-turn lane. The eastbound approach of Veronica Avenue and westbound approach of How Lane each provide one (1) exclusive left-turn lane and one (1) shared through/right-turn lane. Crosswalks and pedestrian signals are provided across all legs of the intersection.

2019 EXISTING TRAFFIC VOLUMES

Manual turning movement counts were collected during the typical weekday morning and weekday evening time periods to evaluate existing traffic conditions and identify the specific hours when traffic activity on the adjacent roadways is at a maximum and could be potentially impacted by the development of the site. Turning Movement Counts were collected at the intersection of NJSH Route 27 and Veronica Avenue/How Lane. Specifically, manual turning movement counts were conducted on Wednesday, February 19, 2020 from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 7:00 p.m.

The study time periods were chosen as they are representative of the peak periods of both the adjacent roadway network and the proposed development. The traffic volume data was collected and analyzed to identify the design peak hour in accordance with HCM and ITE guidelines. Based on the review of the count data the weekday morning peak hour occurred from 7:00 a.m. to 8:00 a.m. and the weekday evening peak hour occurred from 5:00 p.m. to 6:00 p.m. The Technical Appendix contains a summary of the turning movement count data. The 2019 Existing weekday morning and weekday evening peak-hour volumes are summarized on appended **Figure 2**.

2019 EXISTING LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was conducted for the 2019 Existing Condition during the weekday morning and weekday evening peak hours at the study intersection. Under the existing condition, the signalized intersection of NJSH Route 27 and Veronica Avenue/How Lane is calculated to operate at overall Level of Service D during the weekday morning peak hour and Level of Service F during the weekday evening peak hour. The westbound through/right-turn approach of How Lane during the weekday morning and the eastbound through/right-turn approach of Veronica Avenue and the southbound through approach of NJSH Route 27 during the weekday evening peak hour are calculated to operate under capacity constraints.

2021 NO-BUILD CONDITION

BACKGROUND GROWTH

The 2019 Existing Condition traffic volume data was grown to a future horizon year of 2021, which is a conservative estimate for when the proposed warehouse is expected to be fully constructed. In accordance with industry guidelines, the existing traffic volumes at the study intersections were increased by 1.00% annually

for two (2) years to generate the 2021 Base Traffic Volumes. These volumes are summarized on appended **Figure 3**. The 1.00% background growth rate was obtained from the NJDOT Annual Background Growth Rate Table.

OTHER PLANNED DEVELOPMENT PROJECTS

To evaluate the future traffic conditions, it is important to consider the potential site-generated traffic of other projects that could influence the traffic volume at the study intersections. Other planned development projects include those that are either in the entitlement process or have recently been approved for building permits in proximity to the proposed development. Based on research the following developments are anticipated to impact traffic volumes within the study area:

- ◆ Warehouse Development – A 923,800-square-foot warehouse has been approved along Veronica Avenue, proximate to the proposed site

Appended **Figure 4** illustrates the site-generated traffic associated with the approved development assigned to the study area network.

2021 NO-BUILD TRAFFIC VOLUMES

The site-generated trips associated with the approved development were added to the 2021 Base Traffic Volumes to calculate the 2021 No-Build Traffic Volumes for the weekday morning and weekday evening peak hours. These volumes are summarized on appended **Figure 5**.

2021 NO-BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2021 No-Build Condition during the peak hours at the study intersection. The signalized intersection of NJSH Route 27 and Veronica Avenue/How Lane is calculated to operate consistent with the findings of the Existing Condition during the weekday morning and weekday evening peak hour. The westbound through/right-turn approach of How Lane during the weekday morning and the eastbound through/right-turn approach of Veronica Avenue and the southbound through approach of NJSH Route 27 during the weekday evening peak hour are calculated to operate under capacity constraints.

2021 BUILD CONDITION

The site-generated traffic volume of the proposed warehouse development was estimated to identify the potential impacts of the project. For the purpose of this analysis, a complete project “build out” is assumed within two (2) years of the preparation of this study.

TRIP GENERATION

Trip generation projections for the proposed warehouse were prepared utilizing the ITE's Trip Generation Manual, 10th Edition. Trip generation rates associated with Land Use 150 "Warehousing" were cited for the 544,050 square feet of warehousing. It is noted that proposed development is located within the M-2 "Light Manufacturing" Zone where warehousing is permitted. **Table I** provides the weekday morning and weekday evening trip generation volumes associated with the proposed development.

TABLE I – PROPOSED TRIP GENERATION

Land Use	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total
544,050 SF Warehousing ITE Land Use 150	72	22	94	28	77	105

Based on a study published by ITE titled *High-Cube Warehouse Vehicle Trip Generation Analysis* published in October 2016, the percentage of truck traffic for Warehouse uses is calculated to be approximately 30% of the total number of trips during the weekday morning peak hour and approximately 20% of the total number of trips during the weekday evening peak hour. **Table 2** provides the weekday morning and evening truck and passenger vehicle trip generation volumes associated with the proposed development.

TABLE 2 – PROPOSED TRUCK AND PASSANGER CAR TRIP GENERATION

Land Use	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total
Truck Trip Generation	22	7	29	6	15	21
Passenger Vehicle Trip Generation	50	15	65	22	62	84
Total	72	22	94	28	77	105

It should be noted, that in the time since this Traffic Impact Study was first published, ITE has published a supplement to the Trip Generation Manual, 10th Edition, which provides heavy vehicle trip generation for multiple land uses, including Land Use 150 "Warehousing." This supplement, which was published in February 2020, indicates that the heavy vehicle trip generation for Land Use 150 "Warehousing" is 0.02 heavy vehicles per 1,000 square-feet of warehouse space and 0.03 heavy vehicles per 1,000 square-feet of warehouse space for the weekday morning and weekday evening peak hours, respectively. This Traffic Impact Study uses 0.05 heavy vehicles per 1,000 square-feet of warehouse space (30% of the total generated trips) and 0.04 heavy vehicles per 1,000 square-feet of warehouse space (20% of the total generated trips) for the weekday morning and weekday evening peak hours, respectively. In order to maintain a conservative analysis, the higher heavy vehicle rates published in the ITE study *High-Cube Warehouse Vehicle Trip Generation Analysis* shall continue to be used.

It should also be noted that the volume of the of traffic being added to the intersection of NJSH 27, Veronica Avenue, and How Lane would be minimal compared to the existing traffic that utilizes the intersection. The existing intersection handles 2,583 vehicles during the weekday morning peak hour and 2,423 vehicles during the weekday evening peak hour. The proposed site would add 94 new vehicular trips during the weekday evening peak hour and 105 trips during the weekday evening peak hour. The additional trips equate to a 4.0% increase in trips during the weekday morning peak hour and the weekday evening peak hour.

TRIP ASSIGNMENT/DISTRIBUTION

The trips generated by the proposed development were distributed according to the existing travel pattern along Veronica Avenue and NJSH Route 27 and the access management plan of the site. The “New” Site-Generated Traffic Volumes are illustrated on **Figure 6**.

2021 BUILD TRAFFIC VOLUMES

The site-generated trips were added to the 2021 No-Build Traffic Volumes to calculate the 2021 Build Traffic Volumes and are shown on appended **Figure 7**.

2021 BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2021 Build Condition during the weekday morning and weekday evening peak hours at the study intersection and proposed site driveways. **Tables 3** through **5** compare the Existing, No-Build, and Build Conditions Level of Service and delay values. The signalized intersection of NJSH Route 27 and Veronica Avenue/How Lane is calculated to operate generally consistent with the findings of the No-Build Condition during the weekday morning and weekday evening peak hours. The westbound through/right-turn approach of How Lane during the weekday morning and the eastbound through/right-turn approach of Veronica Avenue and the southbound through approach of NJSH Route 27 during the weekday evening peak hour are calculated to continue to operate under capacity constraints. The approaches of the unsignalized intersection of Veronica Avenue and the site driveway are calculated to operate at Level of Service C or better during the weekday morning and weekday evening peak hours. It should be noted that despite an increase in delay from the No-Build Condition to the Build Condition, the proposed development would only increase the volume through the intersection of NJSH Route 27 and Veronica Avenue/How Lane by approximately 4% during the studied time periods.

COMPARATIVE LEVEL OF SERVICE (DELAY) TABLES

NJSH ROUTE 27 & VERONICA AVENUE/HOW LANE

EB (Eastbound) approach is the Veronica Avenue approach
 WB (Westbound) approach is the How Lane approach
 NB (Northbound) and SB (Southbound) approaches are the NJSH Route 27 approaches
 X (n) = Level of Service (seconds of delay)

TABLE 3 – WEEKDAY MORNING PEAK HOUR

Lane Group	2019 Existing	2021 No-Build	2021 Build
EB Left	C (29.5)	C (29.6)	C (29.5)
EB Through/Right	D (47.6)	D (51.1)	D (52.8)
WB Left	C (28.3)	C (28.3)	C (28.4)
WB Through/Right	F (89.1)	F (115.7)	F (135.1)
NB Left	B (15.6)	B (16.4)	B (17.5)
NB Through	C (23.3)	C (24.3)	C (24.8)
NB Through/Right	C (23.4)	C (24.5)	C (25.0)
SB Left	B (16.0)	B (17.0)	B (17.5)
SB Through	C (23.5)	C (25.5)	C (26.7)
SB Right	B (17.8)	B (19.6)	C (20.8)
Intersection	D (37.0)	D (42.7)	D (46.7)

TABLE 4 – WEEKDAY EVENING PEAK HOUR

Lane Group	2019 Existing	2021 No-Build	2021 Build
EB Left	C (28.0)	C (30.3)	D (36.6)
EB Through/Right	F (295.0)	F (364.0)	F (409.4)
WB Left	D (36.2)	D (41.1)	D (42.8)
WB Through/Right	D (50.2)	E (58.2)	E (63.1)
NB Left	C (21.6)	C (22.5)	C (22.6)
NB Through	C (23.6)	C (24.5)	C (24.5)
NB Through/Right	C (23.6)	C (24.5)	C (24.6)
SB Left	B (16.2)	B (17.4)	B (17.5)
SB Through	F (88.7)	F (89.2)	F (100.8)
SB Right	B (17.6)	B (18.4)	B (18.8)
Intersection	F (86.9)	F (105.4)	F (118.1)

VERONICA AVENUE & SITE DRIVEWAY

Eb (Eastbound) and WB (Westbound) approaches are the Veronica Avenue approaches
 NB (Northbound) approach is the site driveway approach
 X (n) = Level of Service (seconds of delay)

TABLE 5 – 2021 BUILD CONDITION

Lane Group	Weekday Morning Peak Hour	Weekday Evening Peak Hour
WB Left	A (9.2)	A (9.0)
NB Left/Right	C (15.3)	C (17.4)

SITE CIRCULATION/PARKING SUPPLY

A review was conducted of the proposed warehouse development using the Site Plan prepared by MEH Consulting Engineering, dated March 10, 2020. In completing this review, particular attention was focused on the site access, circulation, and parking supply.

Access is proposed via one (1) full-movement driveway along Veronica Avenue. Building 1 would provide loading docks and trailer parking spaces along the southerly side of the building and passenger vehicle parking along the northerly and westerly sides of the building. Circulation about Building 1 would be provided via two-way drive aisles with a minimum width of 36-feet. Circulation about the passenger vehicle parking lot would be provided via two-way drive aisles with a minimum width of 25 feet. Building 2 would provide loading docks and trailer parking spaces along the easterly side of the building and passenger vehicle parking along the westerly side of the building. Circulation about Building 2 would be provided via two-way drive aisles with a minimum width of 36 feet.

The Township of Franklin Ordinance requires one (1) parking space per 5,000 square-feet of warehouse space. For the proposed 425,250-square-foot warehouse (Building 1), this equates to 85 required spaces. Building 1 would provide 278 total passenger vehicle parking stalls, inclusive of eight (8) ADA-accessible parking stalls. For the proposed 118,800-square-foot warehouse (Building 2), the parking requirement would be 24 required spaces. Building 2 would provide 80 total passenger vehicle parking spaces, inclusive of four (4) ADA-accessible stalls. As such, the proposed parking supplies for Building 1 and 2 would meet the township ordinance. The passenger vehicle parking stalls would be nine (9) feet wide by 18 feet deep, in accordance with industry standards.

Based on data provided in ITE's Parking Manual, 5th Edition, for Land Use 150 "Warehousing," the average passenger vehicle parking demand is 0.39 spaces per 1,000 square-feet of gross floor area. For the 425,250-square-foot Building 1, this equates to a parking demand of 166 spaces and for the 118,800-square-foot Building 2, this equates to a parking demand of 46 spaces. The proposed parking supplies of 278 passenger vehicle spaces and 80 passenger vehicle spaces for Buildings 1 and 2, respectively would be sufficient to support the anticipated passenger vehicle parking demand.

Based on data provided in ITE's Parking Manual, 5th Edition, for Land Use 150 "Warehousing," the average trailer parking demand is 0.11 trailer spaces per 1,000 square-feet of gross floor area. For Building 1 with 425,250 square-feet of space, this equates to a trailer parking demand of 47 spaces and for Building 2 with 118,800 square-feet of space, this equates to a trailer parking demand of 13 spaces. Building 1 would provide 93 trailer spaces and 81 loading docks, for a total trailer parking supply of 174 spaces. Building 2 would provide 21 trailer spaces and 18 loading docks, for a total trailer parking supply of 39 spaces. Based on the anticipated

trailer parking demand, the proposed trailer parking supply would be sufficient. The trailer parking stalls would be 12 feet wide by 60 feet deep in accordance with industry standards.

CONCLUSIONS

This report was prepared to examine the potential traffic impact of the proposed 544,050 square-feet of warehousing. It should be noted that the proposed site is located in the Township of Franklin M-2 zone (Light Manufacturing), in which warehouses are a permitted use and therefore off-site traffic impacts are statutorily not considered by the Planning Board. The analysis findings, which have been based on industry-standard guidelines, indicate that the proposed development would not have a significant impact on the traffic operations of the adjacent roadway network and would only add a minimal percentage of trips to the study intersection. The site driveways and on-site layout have been designed to provide for effective access to and from the subject property and the parking supply would be sufficient to support this project.

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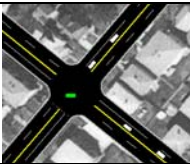
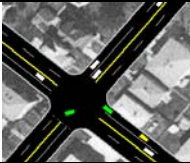


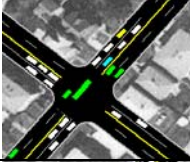

TECHNICAL APPENDIX

LEVEL OF SERVICE/AVERAGE CONTROL DELAY CRITERIA

LEVEL OF SERVICE /AVERAGE CONTROL DELAY CRITERIA

The ability of a roadway to effectively accommodate traffic demand is determined through an assessment of the volume-to-capacity ratio, delay and Level of Service of the lane group and/or intersection. The volume-to-capacity ratio is the ratio of traffic flow rate to capacity for a given transportation facility. As defined within the Highway Capacity Manual, 6th Edition (HCM), intersection delay is the total additional travel time experienced by drivers, passengers, or pedestrians as a result of control measures and interaction with other users of the facility, divided by the volume departing from the corresponding cross section of the facility. Level of service is a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

For an unsignalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle and LOS F denotes operations with delay in excess of 80 seconds per vehicle.

	Level Of Service (LOS)	Signalized Delay Range (average control delay in sec/veh)	Unsignalized Delay Range (average control delay in sec/veh)
	A	<=10	<=10
	B	>10 and <=20	>10 and <=15
	C	>20 and <=35	>15 and <=25
	D	>35 and <=55	>25 and <=35
	E	>55 and <=80	>35 and <=50
	F	>80	>50

Source: Highway Capacity Manual, 6th Edition

TURNING MOVEMENT COUNT DATA

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Intersection of Veronica Avenue/How Lane (E/W)
and Route 27 (N/S)
Franklin Township, Somerset County, New Jersey
Wednesday, February 19, 2020

File Name : S-17115.01_FEB
Site Code : 00017115
Start Date : 2/19/2020
Page No : 1

Groups Printed- Auto - HV - B/SB

Start Time	Veronica Avenue Eastbound					How Lane Westbound					Route 27 Northbound					Route 27 Southbound					Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	
07:00 AM	12	66	14	2	94	18	89	11	2	120	32	115	55	1	203	39	96	13	4	152	569
07:15 AM	12	94	7	0	113	16	78	19	0	113	46	152	57	1	256	34	84	10	6	134	616
07:30 AM	22	77	13	0	112	19	95	14	0	128	53	124	53	1	231	58	88	16	3	165	636
07:45 AM	14	88	9	0	111	14	85	11	1	111	74	162	23	1	260	37	90	4	6	137	619
Total	60	325	43	2	430	67	347	55	3	472	205	553	188	4	950	168	358	43	19	588	2440
08:00 AM	16	79	8	1	104	12	65	12	0	89	29	120	40	1	190	41	72	18	7	138	521
08:15 AM	10	84	9	0	103	9	52	8	0	69	38	120	31	3	192	57	79	11	3	150	514
08:30 AM	11	80	17	2	110	23	88	11	0	122	56	143	22	1	222	42	79	10	4	135	589
08:45 AM	9	60	19	0	88	28	90	16	1	135	35	126	28	6	195	46	86	17	4	153	571
Total	46	303	53	3	405	72	295	47	1	415	158	509	121	11	799	186	316	56	18	576	2195
*** BREAK ***																					
04:00 PM	25	68	16	1	110	32	83	14	0	129	37	119	14	1	171	57	109	12	4	182	592
04:15 PM	31	67	31	0	129	38	73	13	1	125	21	109	12	1	143	48	120	7	4	179	576
04:30 PM	28	67	24	0	119	39	89	16	0	144	25	131	10	1	167	43	123	12	1	179	609
04:45 PM	29	62	30	0	121	44	72	26	0	142	30	97	12	2	141	31	117	12	3	163	567
Total	113	264	101	1	479	153	317	69	1	540	113	456	48	5	622	179	469	43	12	703	2344
05:00 PM	30	64	27	0	121	41	77	17	0	135	20	122	12	0	154	53	102	12	0	167	577
05:15 PM	25	81	24	1	131	40	80	20	3	143	18	112	14	2	146	44	142	13	2	201	621
05:30 PM	32	71	22	0	125	44	87	24	1	156	24	101	11	0	136	46	134	9	1	190	607
05:45 PM	23	77	25	1	126	38	80	34	1	153	18	113	17	0	148	31	112	5	1	149	576
Total	110	293	98	2	503	163	324	95	5	587	80	448	54	2	584	174	490	39	4	707	2381
06:00 PM	16	85	14	0	115	45	86	16	3	150	13	94	18	2	127	30	145	2	2	179	571
06:15 PM	17	81	18	0	116	41	65	29	1	136	21	91	21	4	137	31	117	7	3	158	547
06:30 PM	20	74	20	0	114	43	73	18	3	137	9	110	19	1	139	45	130	4	2	181	571
06:45 PM	20	61	16	3	100	48	80	19	1	148	13	126	27	1	167	29	109	6	1	145	560
Total	73	301	68	3	445	177	304	82	8	571	56	421	85	8	570	135	501	19	8	663	2249
Grand Total	402	1486	363	11	2262	632	1587	348	18	2585	612	2387	496	30	3525	842	2134	200	61	3237	11609
Apprch %	17.8	65.7	16	0.5		24.4	61.4	13.5	0.7		17.4	67.7	14.1	0.9		26	65.9	6.2	1.9		
Total %	3.5	12.8	3.1	0.1	19.5	5.4	13.7	3	0.2	22.3	5.3	20.6	4.3	0.3	30.4	7.3	18.4	1.7	0.5	27.9	
Auto	385	1405	356	11	2157	626	1533	338	18	2515	605	2331	488	29	3453	804	2065	190	57	3116	11241
% Auto	95.8	94.5	98.1	100	95.4	99.1	96.6	97.1	100	97.3	98.9	97.7	98.4	96.7	98	95.5	96.8	95	93.4	96.3	96.8
HV	12	70	4	0	86	2	52	6	0	60	6	8	2	1	17	21	12	6	3	42	205
% HV	3	4.7	1.1	0	3.8	0.3	3.3	1.7	0	2.3	1	0.3	0.4	3.3	0.5	2.5	0.6	3	4.9	1.3	1.8
B/SB	5	11	3	0	19	4	2	4	0	10	1	48	6	0	55	17	57	4	1	79	163
% B/SB	1.2	0.7	0.8	0	0.8	0.6	0.1	1.1	0	0.4	0.2	2	1.2	0	1.6	2	2.7	2	1.6	2.4	1.4

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

201.340.4468 t. 201.340.4472 f.

Intersection of Veronica Avenue/How Lane (E/W)
and Route 27 (N/S)
Franklin Township, Somerset County, New Jersey
Wednesday, February 19, 2020

File Name : S-17115.01_FEB
Site Code : 00017115
Start Date : 2/19/2020
Page No : 2

Start Time	Veronica Avenue Eastbound					How Lane Westbound					Route 27 Northbound					Route 27 Southbound					Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	
Peak Hour Analysis From 07:00 AM to 11:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	12	66	14	2	94	18	89	11	2	120	32	115	55	1	203	39	96	13	4	152	569
07:15 AM	12	94	7	0	113	16	78	19	0	113	46	152	57	1	256	34	84	10	6	134	616
07:30 AM	22	77	13	0	112	19	95	14	0	128	53	124	53	1	231	58	88	16	3	165	636
07:45 AM	14	88	9	0	111	14	85	11	1	111	74	162	23	1	260	37	90	4	6	137	619
Total Volume	60	325	43	2	430	67	347	55	3	472	205	553	188	4	950	168	358	43	19	588	2440
% App. Total	14	75.6	10	0.5		14.2	73.5	11.7	0.6		21.6	58.2	19.8	0.4		28.6	60.9	7.3	3.2		
PHF	.682	.864	.768	.250	.951	.882	.913	.724	.375	.922	.693	.853	.825	1.00	.913	.724	.932	.672	.792	.891	.959
Auto	55	300	40	2	397	64	327	51	3	445	202	546	184	4	936	157	337	41	18	553	2331
% Auto	91.7	92.3	93.0	100	92.3	95.5	94.2	92.7	100	94.3	98.5	98.7	97.9	100	98.5	93.5	94.1	95.3	94.7	94.0	95.5
HV	2	15	1	0	18	1	18	3	0	22	3	2	0	0	5	3	2	1	1	7	52
% HV	3.3	4.6	2.3	0	4.2	1.5	5.2	5.5	0	4.7	1.5	0.4	0	0	0.5	1.8	0.6	2.3	5.3	1.2	2.1
B/SB	3	10	2	0	15	2	2	1	0	5	0	5	4	0	9	8	19	1	0	28	57
% B/SB	5.0	3.1	4.7	0	3.5	3.0	0.6	1.8	0	1.1	0	0.9	2.1	0	0.9	4.8	5.3	2.3	0	4.8	2.3

Peak Hour Analysis From 11:45 AM to 06:30 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 05:00 PM

05:00 PM	30	64	27	0	121	41	77	17	0	135	20	122	12	0	154	53	102	12	0	167	577
05:15 PM	25	81	24	1	131	40	80	20	3	143	18	112	14	2	146	44	142	13	2	201	621
05:30 PM	32	71	22	0	125	44	87	24	1	156	24	101	11	0	136	46	134	9	1	190	607
05:45 PM	23	77	25	1	126	38	80	34	1	153	18	113	17	0	148	31	112	5	1	149	576
Total Volume	110	293	98	2	503	163	324	95	5	587	80	448	54	2	584	174	490	39	4	707	2381
% App. Total	21.9	58.3	19.5	0.4		27.8	55.2	16.2	0.9		13.7	76.7	9.2	0.3		24.6	69.3	5.5	0.6		
PHF	.859	.904	.907	.500	.960	.926	.931	.699	.417	.941	.833	.918	.794	.250	.948	.821	.863	.750	.500	.879	.959
Auto	108	285	98	2	493	163	323	95	5	586	79	440	54	2	575	168	485	37	4	694	2348
% Auto	98.2	97.3	100	100	98.0	100	99.7	100	100	99.8	98.8	98.2	100	100	98.5	96.6	99.0	94.9	100	98.2	98.6
HV	2	8	0	0	10	0	1	0	0	1	1	2	0	0	3	6	3	1	0	10	24
% HV	1.8	2.7	0	0	2.0	0	0.3	0	0	0.2	1.3	0.4	0	0	0.5	3.4	0.6	2.6	0	1.4	1.0
B/SB	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	2	1	0	3	9
% B/SB	0	0	0	0	0	0	0	0	0	0	0	1.3	0	0	1.0	0	0.4	2.6	0	0.4	0.4

FIGURES

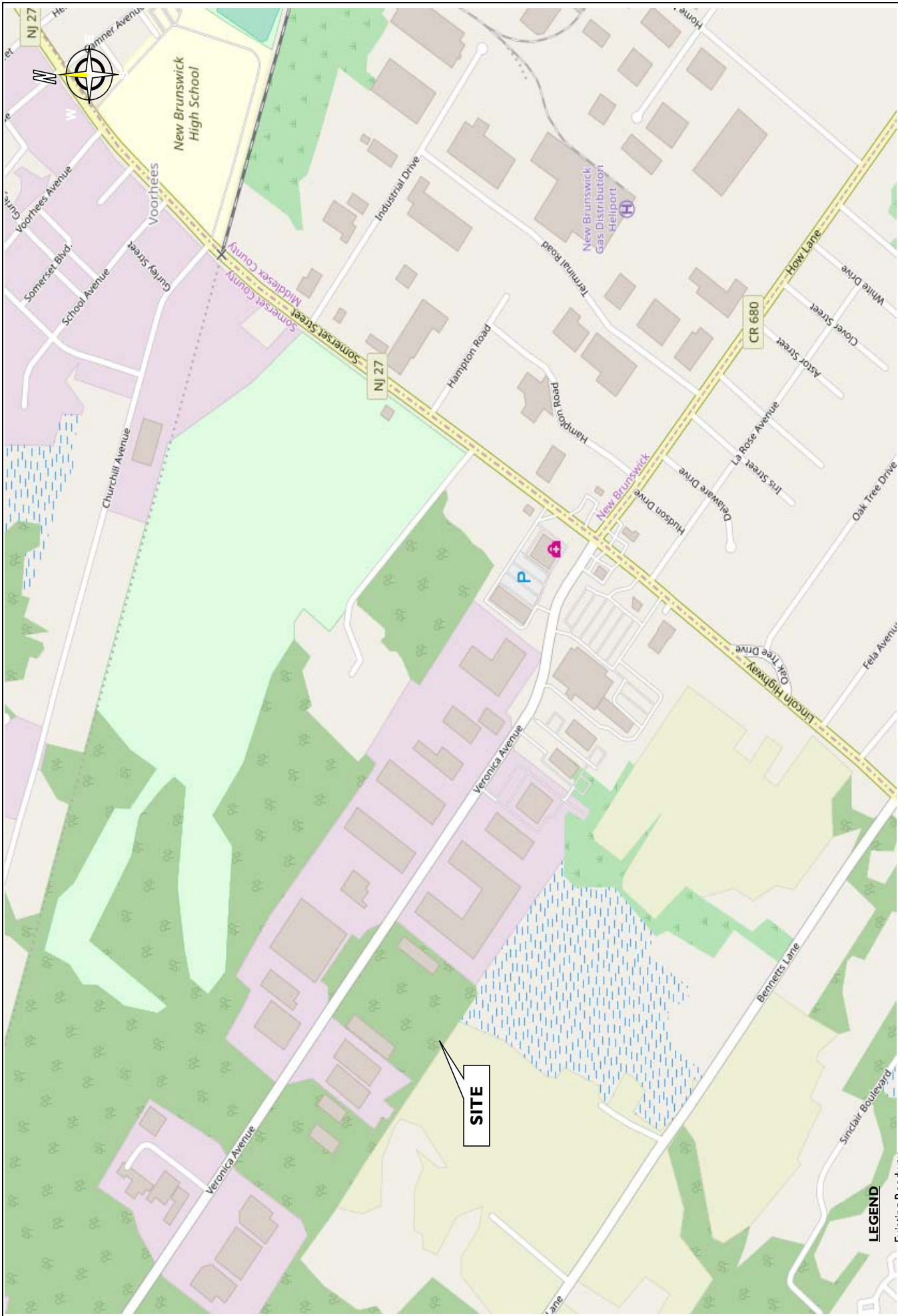


FIGURE I
Site Location Map

Proposed Warehouse
Veronica Avenue
Franklin Township, Somerset County, New Jersey
Traffic Impact Study

STONEFIELD



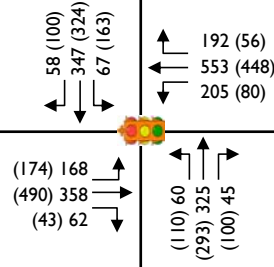
NJSH 27

Other Planned Project

How Lane

Veronica Avenue

Site



6.14 (447)

5.03 430

5.03 430

not to scale

LEGEND

- Existing Roadway
- - - Proposed Driveway
- . . Existing Private Driveway
- ← AM (PM) Peak Hour Volumes
- Signalized Intersection

Proposed Warehouse
Veronica Avenue
 Franklin Township, Somerset County, New Jersey
 Traffic Impact Study

STONEFIELD

FIGURE 2
2019 Existing Traffic Volumes



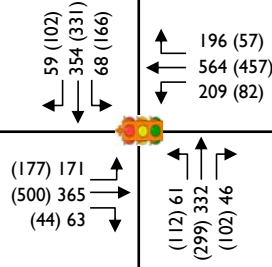
NJSH 27

Other Planned Project

How Lane

Veronica Avenue

Site



← 626 (456)

(513) 439 →

not to scale

LEGEND

- Existing Roadway
- - - Proposed Driveway
- · - Existing Private Driveway
- ← AM (PM) Peak Hour Volumes
- Signalized Intersection

Proposed Warehouse
Veronica Avenue
 Franklin Township, Somerset County, New Jersey
 Traffic Impact Study

STONEFIELD

FIGURE 3
2021 Base Traffic Volumes



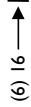
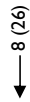
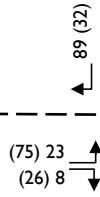
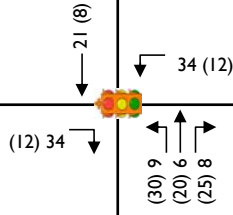
NJSH 27

How Lane

Veronica Avenue

Other Planned Project

Site



not to scale

LEGEND

- Existing Roadway
- - - Proposed Driveway
- . . Existing Private Driveway
- ← AM (PM) Peak Hour Volumes
- Signalized Intersection

Proposed Warehouse
Veronica Avenue
Franklin Township, Somerset County, New Jersey
Traffic Impact Study

STONEFIELD

FIGURE 4
Other Planned Projects
Future Traffic Volumes



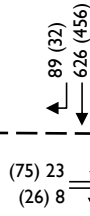
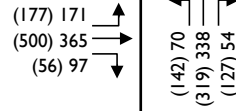
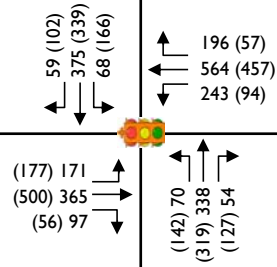
NJSH 27

Other Planned Project

How Lane

Veronica Avenue

Site



not to scale

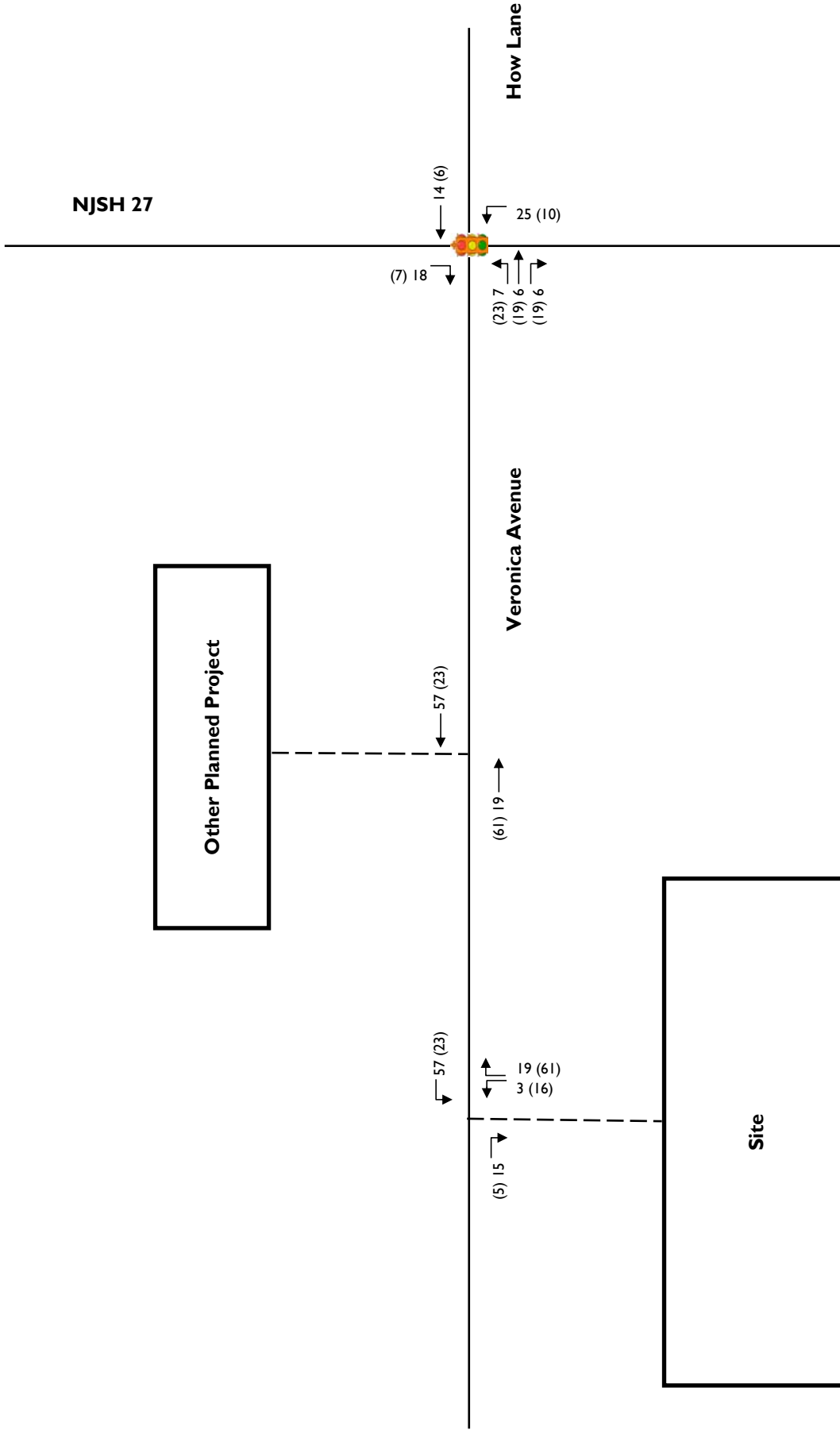
LEGEND

- Existing Roadway
- - - Proposed Driveway
- · - Existing Private Driveway
- ← AM (PM) Peak Hour Volumes
- 🚦 Signalized Intersection

Proposed Warehouse
Veronica Avenue
Franklin Township, Somerset County, New Jersey
Traffic Impact Study

STONEFIELD

FIGURE 5
2021 No-Build Traffic
Volumes



not to scale

- LEGEND**
- Existing Roadway
 - - - Proposed Driveway
 - · - Existing Private Driveway
 - ← AM (PM) Peak Hour Volumes
 - 🚦 Signalized Intersection

Proposed Warehouse
Veronica Avenue
Franklin Township, Somerset County, New Jersey
Traffic Impact Study

STONEFIELD

FIGURE 6
"New" Site-Generated
Traffic Volumes



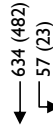
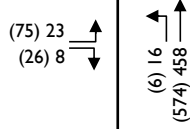
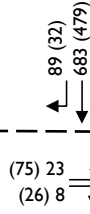
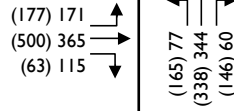
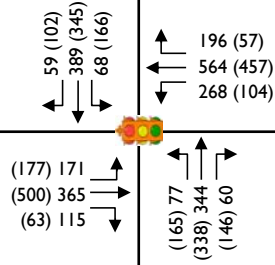
NJSH 27

Other Planned Project

How Lane

Veronica Avenue

Site



not to scale

LEGEND

- Existing Roadway
- - - Proposed Driveway
- . . Existing Private Driveway
- AM (PM) Peak Hour Volumes
- Signalized Intersection

Proposed Warehouse
Veronica Avenue
Franklin Township, Somerset County, New Jersey
Traffic Impact Study

STONEFIELD

FIGURE 7
2021 Build Traffic Volumes

CAPACITY ANALYSIS DETAIL SHEETS

HCM 6th Signalized Intersection Summary
 1: NJSH Route 27 & Veronica Avenue/How Lane

2019 Existing Condition
 Weekday Morning Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	325	45	67	347	58	205	553	192	168	358	62
Future Volume (veh/h)	60	325	45	67	347	58	205	553	192	168	358	62
Initial Q (Qb), veh	0	0	0	0	11	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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	1828	1828	1828	1874	1859	1859	1920	1935	1935	1844	1859	1874
Adj Flow Rate, veh/h	62	339	45	70	361	57	214	576	196	175	373	45
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	8	8	8	5	6	6	2	1	1	7	6	5
Cap, veh/h	150	402	53	200	443	29	498	1147	389	392	773	660
Arrive On Green	0.04	0.25	0.25	0.04	0.25	0.25	0.09	0.44	0.44	0.08	0.43	0.43
Sat Flow, veh/h	1741	1581	210	1785	1567	247	1828	2694	914	1756	1859	1588
Grp Volume(v), veh/h	62	0	384	70	0	418	214	393	379	175	373	45
Grp Sat Flow(s),veh/h/ln	1741	0	1791	1785	0	1814	1828	1838	1770	1756	1859	1588
Q Serve(g_s), s	2.6	0.0	20.6	2.9	0.0	22.5	6.5	15.3	15.4	5.5	14.4	1.7
Cycle Q Clear(g_c), s	2.6	0.0	20.6	2.9	0.0	22.5	6.5	15.3	15.4	5.5	14.4	1.7
Prop In Lane	1.00		0.12	1.00		0.14	1.00		0.52	1.00		1.00
Lane Grp Cap(c), veh/h	150	0	456	200	0	471	498	782	753	392	773	660
V/C Ratio(X)	0.41	0.00	0.84	0.35	0.00	0.89	0.43	0.50	0.50	0.45	0.48	0.07
Avail Cap(c_a), veh/h	233	0	466	255	0	472	553	800	770	458	791	676
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	0.0	35.4	27.9	0.0	36.9	15.4	21.0	21.0	15.7	21.3	17.6
Incr Delay (d2), s/veh	0.7	0.0	12.2	0.4	0.0	17.6	0.2	2.3	2.4	0.3	2.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	34.6	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	0.0	15.2	2.2	0.0	23.4	4.6	11.1	10.8	3.8	10.6	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.5	0.0	47.6	28.3	0.0	89.1	15.6	23.3	23.4	16.0	23.5	17.8
LnGrp LOS	C	A	D	C	A	F	B	C	C	B	C	B
Approach Vol, veh/h		446			488			986			593	
Approach Delay, s/veh		45.1			80.4			21.7			20.9	
Approach LOS		D			F			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.6	50.5	7.3	31.6	11.6	49.5	7.1	31.8				
Change Period (Y+Rc), s	3.0	7.0	3.0	7.0	3.0	7.0	3.0	7.0				
Max Green Setting (Gmax), s	11.0	35.0	8.0	26.0	11.0	35.0	8.0	26.0				
Max Q Clear Time (g_c+I1), s	7.5	17.4	4.9	22.6	8.5	16.4	4.6	24.5				
Green Ext Time (p_c), s	0.1	2.8	0.0	0.5	0.1	1.3	0.0	0.3				
Intersection Summary												
HCM 6th Ctrl Delay			37.0									
HCM 6th LOS			D									

HCM 6th Signalized Intersection Summary
 1: NJSH Route 27 & Veronica Avenue/How Lane

2019 Existing Condition
 Weekday Evening Peak Hour

























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	293	100	163	324	100	80	448	56	174	490	43
Future Volume (veh/h)	110	293	100	163	324	100	80	448	56	174	490	43
Initial Q (Qb), veh	0	44	0	0	0	0	0	0	0	3	44	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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	1920	1904	1904	1950	1950	1950	1935	1920	1920	1904	1935	1874
Adj Flow Rate, veh/h	115	305	102	170	338	99	83	467	56	181	510	41
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	3	3	0	0	0	1	2	2	3	1	5
Cap, veh/h	233	404	26	231	389	114	252	1261	150	481	807	664
Arrive On Green	0.06	0.24	0.24	0.08	0.26	0.26	0.05	0.40	0.40	0.08	0.43	0.43
Sat Flow, veh/h	1828	1366	457	1857	1449	424	1843	3281	392	1814	1935	1588
Grp Volume(v), veh/h	115	0	407	170	0	437	83	259	264	181	510	41
Grp Sat Flow(s),veh/h/ln	1828	0	1822	1857	0	1874	1843	1824	1849	1814	1935	1588
Q Serve(g_s), s	4.7	0.0	21.8	6.8	0.0	22.6	2.6	9.9	10.0	5.6	20.5	1.5
Cycle Q Clear(g_c), s	4.7	0.0	21.8	6.8	0.0	22.6	2.6	9.9	10.0	5.6	20.5	1.5
Prop In Lane	1.00		0.25	1.00		0.23	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	233	0	490	231	0	503	252	701	710	481	807	664
V/C Ratio(X)	0.49	0.00	0.83	0.73	0.00	0.87	0.33	0.37	0.37	0.38	0.63	0.06
Avail Cap(c_a), veh/h	249	0	474	245	0	487	436	733	743	506	829	680
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.4	0.0	37.0	27.4	0.0	34.9	21.3	22.1	22.1	15.6	26.7	17.4
Incr Delay (d2), s/veh	0.6	0.0	11.5	8.8	0.0	15.3	0.3	1.5	1.5	0.2	3.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	246.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	58.3	0.0
%ile BackOfQ(95%),veh/ln	3.5	0.0	52.4	6.1	0.0	17.5	2.0	7.9	8.0	4.3	34.4	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.0	0.0	295.0	36.2	0.0	50.2	21.6	23.6	23.6	16.2	88.7	17.6
LnGrp LOS	C	A	F	D	A	D	C	C	C	B	F	B
Approach Vol, veh/h		522			607			606			732	
Approach Delay, s/veh		236.2			46.2			23.3			66.8	
Approach LOS		F			D			C			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.6	47.2	11.0	31.2	8.0	49.8	9.4	32.8				
Change Period (Y+Rc), s	3.0	7.0	3.0	7.0	3.0	7.0	3.0	7.0				
Max Green Setting (Gmax), s	9.0	37.0	8.0	26.0	9.0	37.0	8.0	26.0				
Max Q Clear Time (g_c+I1), s	7.6	12.0	8.8	23.8	4.6	22.5	6.7	24.6				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.4	0.0	1.7	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay	86.9
HCM 6th LOS	F























HCM 6th Signalized Intersection Summary
 1: NJSH Route 27 & Veronica Avenue/How Lane

2021 No-Build Condition
 Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	338	54	68	375	59	243	564	196	171	365	97
Future Volume (veh/h)	70	338	54	68	375	59	243	564	196	171	365	97
Initial Q (Qb), veh	0	0	0	0	11	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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	1828	1828	1828	1874	1859	1859	1920	1935	1935	1844	1859	1874
Adj Flow Rate, veh/h	73	352	54	71	391	58	253	588	200	178	380	81
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	8	8	8	5	6	6	2	1	1	7	6	5
Cap, veh/h	149	404	62	191	466	15	485	1121	381	383	737	629
Arrive On Green	0.04	0.26	0.26	0.04	0.26	0.26	0.10	0.42	0.42	0.08	0.40	0.40
Sat Flow, veh/h	1741	1548	237	1785	1582	235	1828	2694	914	1756	1859	1588
Grp Volume(v), veh/h	73	0	406	71	0	449	253	401	387	178	380	81
Grp Sat Flow(s),veh/h/ln	1741	0	1786	1785	0	1817	1828	1838	1770	1756	1859	1588
Q Serve(g_s), s	3.0	0.0	21.8	2.9	0.0	24.3	7.9	16.3	16.3	5.9	15.5	3.2
Cycle Q Clear(g_c), s	3.0	0.0	21.8	2.9	0.0	24.3	7.9	16.3	16.3	5.9	15.5	3.2
Prop In Lane	1.00		0.13	1.00		0.13	1.00		0.52	1.00		1.00
Lane Grp Cap(c), veh/h	149	0	466	191	0	481	485	765	737	383	737	629
V/C Ratio(X)	0.49	0.00	0.87	0.37	0.00	0.93	0.52	0.52	0.53	0.46	0.52	0.13
Avail Cap(c_a), veh/h	227	0	466	257	0	472	503	765	737	436	737	629
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	0.0	35.4	27.8	0.0	37.0	16.0	21.8	21.8	16.7	22.9	19.2
Incr Delay (d2), s/veh	0.9	0.0	15.7	0.4	0.0	25.8	0.3	2.6	2.7	0.3	2.6	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	52.8	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.3	0.0	16.5	2.2	0.0	27.9	5.5	11.5	11.2	4.0	11.3	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.6	0.0	51.1	28.3	0.0	115.7	16.4	24.3	24.5	17.0	25.5	19.6
LnGrp LOS	C	A	D	C	A	F	B	C	C	B	C	B
Approach Vol, veh/h		479			520			1041			639	
Approach Delay, s/veh		47.8			103.7			22.5			22.4	
Approach LOS		D			F			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	48.6	7.3	33.1	13.0	46.6	7.4	33.0				
Change Period (Y+Rc), s	3.0	7.0	3.0	7.0	3.0	7.0	3.0	7.0				
Max Green Setting (Gmax), s	11.0	35.0	8.0	26.0	11.0	35.0	8.0	26.0				
Max Q Clear Time (g_c+I1), s	7.9	18.3	4.9	23.8	9.9	17.5	5.0	26.3				
Green Ext Time (p_c), s	0.1	2.8	0.0	0.4	0.0	1.4	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			42.7									
HCM 6th LOS			D									

HCM 6th Signalized Intersection Summary
 1: NJSH Route 27 & Veronica Avenue/How Lane

2021 No-Build Condition
 Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	319	127	166	339	102	94	457	57	177	500	56
Future Volume (veh/h)	142	319	127	166	339	102	94	457	57	177	500	56
Initial Q (Qb), veh	0	44	0	0	0	0	0	0	0	3	44	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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	1920	1904	1904	1950	1950	1950	1935	1920	1920	1904	1935	1874
Adj Flow Rate, veh/h	148	332	130	173	353	101	98	476	57	184	521	54
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	3	3	0	0	0	1	2	2	3	1	5
Cap, veh/h	239	405	33	223	383	110	240	1229	147	460	788	647
Arrive On Green	0.08	0.26	0.26	0.08	0.26	0.26	0.05	0.38	0.38	0.08	0.41	0.41
Sat Flow, veh/h	1828	1303	510	1857	1458	417	1843	3281	391	1814	1935	1588
Grp Volume(v), veh/h	148	0	462	173	0	454	98	264	269	184	521	54
Grp Sat Flow(s),veh/h/ln	1828	0	1813	1857	0	1875	1843	1824	1849	1814	1935	1588
Q Serve(g_s), s	5.8	0.0	25.3	6.8	0.0	23.6	3.2	10.5	10.6	5.9	21.8	2.1
Cycle Q Clear(g_c), s	5.8	0.0	25.3	6.8	0.0	23.6	3.2	10.5	10.6	5.9	21.8	2.1
Prop In Lane	1.00		0.28	1.00		0.22	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	239	0	489	223	0	493	240	683	693	460	788	647
V/C Ratio(X)	0.62	0.00	0.94	0.77	0.00	0.92	0.41	0.39	0.39	0.40	0.66	0.08
Avail Cap(c_a), veh/h	245	0	471	227	0	493	402	694	704	479	789	648
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	0.0	37.0	27.4	0.0	35.8	22.1	22.9	22.9	16.7	27.7	18.2
Incr Delay (d2), s/veh	3.3	0.0	28.3	13.7	0.0	22.4	0.4	1.6	1.6	0.2	4.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	298.8	0.0	0.0	0.0	0.0	0.0	0.0	0.5	66.1	0.0
%ile BackOfQ(95%),veh/ln	4.8	0.0	62.2	6.7	0.0	19.3	2.4	8.2	8.3	4.6	36.6	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.3	0.0	364.0	41.1	0.0	58.2	22.5	24.5	24.5	17.4	98.2	18.4
LnGrp LOS	C	A	F	D	A	E	C	C	C	B	F	B
Approach Vol, veh/h		610			627			631			759	
Approach Delay, s/veh		283.1			53.5			24.2			72.9	
Approach LOS		F			D			C			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.9	45.1	11.0	33.0	8.2	47.8	10.7	33.3				
Change Period (Y+Rc), s	3.0	7.0	3.0	7.0	3.0	7.0	3.0	7.0				
Max Green Setting (Gmax), s	9.0	37.0	8.0	26.0	9.0	37.0	8.0	26.0				
Max Q Clear Time (g_c+I1), s	7.9	12.6	8.8	27.3	5.2	23.8	7.8	25.6				
Green Ext Time (p_c), s	0.0	1.9	0.0	0.0	0.0	1.7	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay	105.4											
HCM 6th LOS	F											

HCM 6th Signalized Intersection Summary
 1: NJSH Route 27 & Veronica Avenue/How Lane

2021 Build Condition
 Weekday Morning Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	344	60	68	389	59	268	564	196	171	365	115
Future Volume (veh/h)	77	344	60	68	389	59	268	564	196	171	365	115
Initial Q (Qb), veh	0	0	0	0	11	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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	1828	1828	1828	1874	1859	1859	1920	1935	1935	1844	1859	1874
Adj Flow Rate, veh/h	80	358	60	71	405	58	279	588	200	178	380	100
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	8	8	8	5	6	6	2	1	1	7	6	5
Cap, veh/h	155	404	68	187	466	15	482	1108	376	381	714	610
Arrive On Green	0.05	0.26	0.26	0.04	0.26	0.26	0.11	0.41	0.41	0.08	0.38	0.38
Sat Flow, veh/h	1741	1526	256	1785	1590	228	1828	2694	914	1756	1859	1588
Grp Volume(v), veh/h	80	0	418	71	0	463	279	401	387	178	380	100
Grp Sat Flow(s),veh/h/ln	1741	0	1782	1785	0	1818	1828	1838	1770	1756	1859	1588
Q Serve(g_s), s	3.3	0.0	22.5	2.9	0.0	25.3	8.8	16.4	16.5	6.0	15.8	4.1
Cycle Q Clear(g_c), s	3.3	0.0	22.5	2.9	0.0	25.3	8.8	16.4	16.5	6.0	15.8	4.1
Prop In Lane	1.00		0.14	1.00		0.13	1.00		0.52	1.00		1.00
Lane Grp Cap(c), veh/h	155	0	472	187	0	481	482	756	728	381	714	610
V/C Ratio(X)	0.52	0.00	0.89	0.38	0.00	0.96	0.58	0.53	0.53	0.47	0.53	0.16
Avail Cap(c_a), veh/h	218	0	472	253	0	473	485	756	728	432	714	610
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.5	0.0	35.3	27.9	0.0	37.0	16.4	22.2	22.2	17.2	23.9	20.3
Incr Delay (d2), s/veh	1.0	0.0	17.5	0.5	0.0	32.2	1.1	2.7	2.8	0.3	2.8	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	65.9	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.5	0.0	17.2	2.2	0.0	30.7	6.3	11.6	11.4	4.2	11.5	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.5	0.0	52.8	28.4	0.0	135.1	17.5	24.8	25.0	17.5	26.7	20.8
LnGrp LOS	C	A	D	C	A	F	B	C	C	B	C	C
Approach Vol, veh/h		498			534			1067			658	
Approach Delay, s/veh		49.1			120.9			23.0			23.3	
Approach LOS		D			F			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.1	48.1	7.3	33.5	13.8	45.4	7.8	33.0				
Change Period (Y+Rc), s	3.0	7.0	3.0	7.0	3.0	7.0	3.0	7.0				
Max Green Setting (Gmax), s	11.0	35.0	8.0	26.0	11.0	35.0	8.0	26.0				
Max Q Clear Time (g_c+I1), s	8.0	18.5	4.9	24.5	10.8	17.8	5.3	27.3				
Green Ext Time (p_c), s	0.1	2.8	0.0	0.3	0.0	1.4	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	46.7
HCM 6th LOS	D

HCM 6th TWSC
3: Site Driveway & Veronica Avenue

2021 Build Condition
Weekday Morning Peak Hour

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	455	15	57	634	3	19
Future Vol, veh/h	455	15	57	634	3	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, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	30	30	4	30	30
Mvmt Flow	495	16	62	689	3	21























Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	511	0	1316
Stage 1	-	-	-	-	503
Stage 2	-	-	-	-	813
Critical Hdwy	-	-	4.4	-	6.7
Critical Hdwy Stg 1	-	-	-	-	5.7
Critical Hdwy Stg 2	-	-	-	-	5.7
Follow-up Hdwy	-	-	2.47	-	3.77
Pot Cap-1 Maneuver	-	-	925	-	152
Stage 1	-	-	-	-	554
Stage 2	-	-	-	-	392
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	925	-	135
Mov Cap-2 Maneuver	-	-	-	-	135
Stage 1	-	-	-	-	494
Stage 2	-	-	-	-	392

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	15.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	373	-	-	925	-
HCM Lane V/C Ratio	0.064	-	-	0.067	-
HCM Control Delay (s)	15.3	-	-	9.2	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-

HCM 6th Signalized Intersection Summary
1: NJSH Route 27 & Veronica Avenue/How Lane

2021 Build Condition
Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	338	146	166	345	102	104	457	57	177	500	63
Future Volume (veh/h)	165	338	146	166	345	102	104	457	57	177	500	63
Initial Q (Qb), veh	0	44	0	0	0	0	0	0	0	3	44	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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	1920	1904	1904	1950	1950	1950	1935	1920	1920	1904	1935	1874
Adj Flow Rate, veh/h	172	352	150	173	359	101	108	476	57	184	521	62
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	3	3	0	0	0	1	2	2	3	1	5
Cap, veh/h	237	399	38	221	381	107	243	1229	147	460	782	642
Arrive On Green	0.08	0.26	0.26	0.08	0.26	0.26	0.06	0.38	0.38	0.08	0.40	0.40
Sat Flow, veh/h	1828	1267	540	1857	1464	412	1843	3281	391	1814	1935	1588
Grp Volume(v), veh/h	172	0	502	173	0	460	108	264	269	184	521	62
Grp Sat Flow(s),veh/h/ln	1828	0	1807	1857	0	1876	1843	1824	1849	1814	1935	1588
Q Serve(g_s), s	6.9	0.0	26.0	6.8	0.0	24.0	3.5	10.5	10.6	5.9	21.9	2.4
Cycle Q Clear(g_c), s	6.9	0.0	26.0	6.8	0.0	24.0	3.5	10.5	10.6	5.9	21.9	2.4
Prop In Lane	1.00		0.30	1.00		0.22	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	237	0	488	221	0	488	243	683	692	460	782	642
V/C Ratio(X)	0.73	0.00	1.03	0.78	0.00	0.94	0.44	0.39	0.39	0.40	0.67	0.10
Avail Cap(c_a), veh/h	237	0	470	221	0	488	397	694	703	479	783	642
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.3	0.0	37.0	27.4	0.0	36.3	22.1	22.9	22.9	16.8	28.0	18.5
Incr Delay (d2), s/veh	9.3	0.0	48.0	15.4	0.0	26.8	0.5	1.6	1.6	0.2	4.5	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	324.3	0.0	0.0	0.0	0.0	0.0	0.0	0.5	68.3	0.0
%ile BackOfQ(95%),veh/ln	6.2	0.0	69.2	6.8	0.0	20.3	2.6	8.2	8.3	4.6	37.1	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.6	0.0	409.4	42.8	0.0	63.1	22.6	24.5	24.6	17.5	100.8	18.8
LnGrp LOS	D	A	F	D	A	E	C	C	C	B	F	B
Approach Vol, veh/h		674			633			641			767	
Approach Delay, s/veh		314.2			57.5			24.2			74.2	
Approach LOS		F			E			C			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	45.0	11.0	33.0	8.5	47.5	11.0	33.0				
Change Period (Y+Rc), s	3.0	7.0	3.0	7.0	3.0	7.0	3.0	7.0				
Max Green Setting (Gmax), s	9.0	37.0	8.0	26.0	9.0	37.0	8.0	26.0				
Max Q Clear Time (g_c+I1), s	7.9	12.6	8.8	28.0	5.5	23.9	8.9	26.0				
Green Ext Time (p_c), s	0.0	1.9	0.0	0.0	0.0	1.7	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	118.1											
HCM 6th LOS	F											

HCM 6th TWSC
3: Site Driveway & Veronica Avenue

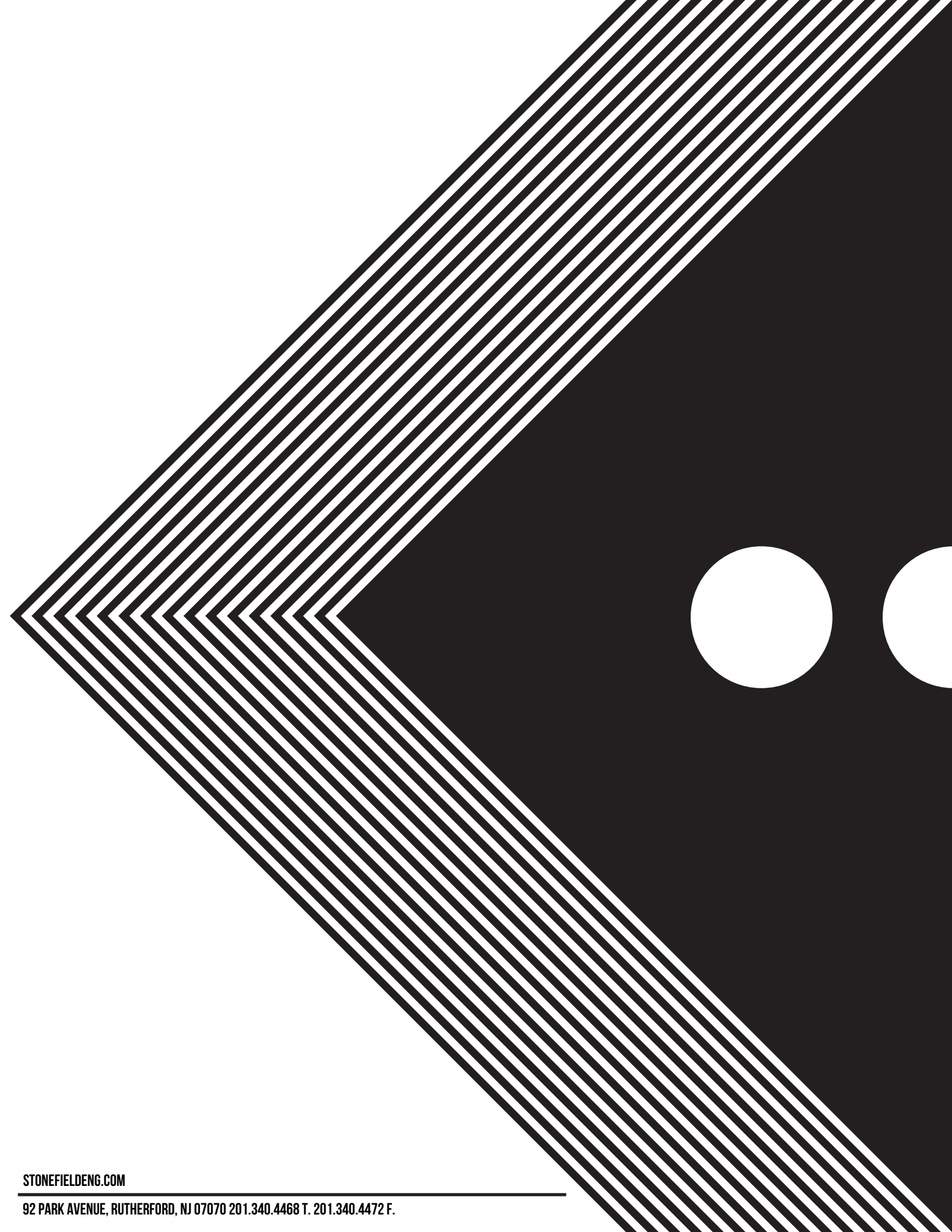
2021 Build Condition
Weekday Evening Peak Hour

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	519	5	23	482	16	61
Future Vol, veh/h	519	5	23	482	16	61
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	20	20	1	20	20
Mvmt Flow	564	5	25	524	17	66

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	569	0	1141
Stage 1	-	-	-	-	567
Stage 2	-	-	-	-	574
Critical Hdwy	-	-	4.3	-	6.6
Critical Hdwy Stg 1	-	-	-	-	5.6
Critical Hdwy Stg 2	-	-	-	-	5.6
Follow-up Hdwy	-	-	2.38	-	3.68
Pot Cap-1 Maneuver	-	-	920	-	205
Stage 1	-	-	-	-	534
Stage 2	-	-	-	-	530
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	920	-	197
Mov Cap-2 Maneuver	-	-	-	-	197
Stage 1	-	-	-	-	514
Stage 2	-	-	-	-	530

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	17.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	374	-	-	920	-
HCM Lane V/C Ratio	0.224	-	-	0.027	-
HCM Control Delay (s)	17.4	-	-	9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-



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