STONEFIELD
engineering & design

May 24, 2018

Planning Board
City of Englewood
2-10 North Van Brunt Street
Englewood, NJ 07631

RE: Traffic Assessment Letter Report
Proposed Multi-family Residential Development
Block 2302, Lot 3.01 & Block 2307, Lot 1
40 Bennett Road
City of Englewood, Bergen County, New Jersey
SE&D Job No. S-17059

Dear Board Members:

Stonefield Engineering and Design, LLC ("Stonefield") has prepared this analysis to examine the potential traffic and parking impacts of the proposed multi-family residential building on the adjacent roadway network. The subject property is located at the northeast quadrant of the intersection of Lafayette Avenue and West Englewood Avenue in the City of Englewood, Bergen County, New Jersey. The subject property is designated as Block 2302, Lot 3.01 and Block 2307, Lot 1 on the City of Englewood Tax Map. The existing site is currently occupied by a church and a commercial building consisting of a restaurant and a check cashing service with associated off-street parking. Access to the church parking lot is currently provided via one (1) driveway along West Englewood Avenue and one (1) driveway along Elmore Avenue, and access to the commercial building is provided via two (2) driveways along Elmore Avenue. Under the proposed development program, the existing structures would be razed and the site would be redeveloped with a four (4)-story residential building consisting of 220 dwelling units. Access is proposed via one (1) full-movement driveway along Elmore Avenue.

2017 Existing Condition

2017 Existing Roadway Conditions

The subject property is located at the northeast quadrant of the intersection of Lafayette Avenue and West Englewood in the City of Englewood. The subject property is designated as Block 2302, Lot 3.01 and Block 2307, Lot 1 as depicted on the City of Englewood Tax Map. The site has approximately 370 feet of frontage along Lafayette Avenue, approximately 360 feet of frontage along West Englewood Avenue, approximately 334 feet of frontage along Elmore Avenue, and approximately 180 feet of frontage along Bennett Road. This site is currently occupied by a church and a commercial building consisting of a restaurant and a check cashing service with associated off-street parking. Land uses in the area are a mix of office, commercial, and residential.

Lafayette Avenue (CR 537) is classified as an Urban Minor Arterial roadway with a general north-south orientation and is under Bergen County jurisdiction. Along the site frontage, the roadway provides one (1) lane of travel in each direction and has a posted speed limit of 25 mph. Curb and sidewalk are provided along both sides of the roadway, shoulders are not provided, and on-street parking is permitted along both sides of the roadway. Lafayette Avenue provides connections to West Palisade Avenue to the north and West Englewood Avenue to the south. NJ Transit Bus Routes 178 and 780 make stops along

Lafayette Avenue in the vicinity of the site providing connections to Passaic, Hackensack, and the George Washington Bridge Bus Terminal in New York.

West Englewood Avenue is classified as an Urban Major Collector roadway with a general east-west orientation and is under the City of Englewood jurisdiction. Along the site frontage, the roadway provides one (1) lane of travel in each direction. Curb and sidewalk are provided along both sides of the roadway, shoulders are not provided, and on-street parking is permitted along the southerly side of the roadway. West Englewood Avenue provides east-west mobility within Englewood for residential and commercial uses.

Bennett Road is a local roadway with a general north-south orientation. Along the site frontage, the roadway provides one (1) lane of travel in each direction. Curb and sidewalk are provided along both sides of the roadway, shoulders are not provided, and on-street parking is permitted along both sides of the roadway. The roadway surface and pavement striping appear to be in good condition. Bennett Road provides is approximately 600 feet in length and provides a connection between CR 505 to the north and Englewood Avenue to the south. An NJ Transit bus stop is located at the Bennett Road/Lafayette Avenue/West Palisade Avenue intersection servicing Bus Routes 178, 186, 756, and 780 providing connections to Paramus, Fort Lee, and the George Washington Bridge Bus Terminal.

Elmore Avenue is a local roadway with a general north-south and provides one (1) lane in each direction. Curb and sidewalk are provided along both sides of the roadway, shoulders are not provided, and on-street parking is permitted along both sides of the roadway. As part of the development plan, Elmore Avenue would be vacated between Lafayette Avenue and West Englewood Avenue.

West Englewood Avenue and Lafayette Avenue intersect to form a three (3)-leg intersection with the westbound approach of West Englewood Avenue operating under stop control. The eastbound approach of West Englewood Avenue provides one (1) shared left-turn/through lane. The westbound approach of West Englewood Avenue provides one (1) exclusive through lane with a right-turn restriction. The southbound approach of Lafayette Avenue provides one (1) exclusive right-turn lane with a left-turn restriction. A crosswalk is provided across the westerly leg of the intersection.

West Englewood Avenue and Elmore Avenue intersect to form a four (4)-leg intersection with the northbound and southbound approaches of Elmore Avenue operating under stop control. The eastbound and westbound approaches of West Englewood Avenue provide one (1) shared left-turn/through/right-turn lane. The northbound and southbound approaches of Elmore Avenue provide one (1) shared left-turn/through/right-turn lane. Crosswalks are provided across all legs of the intersection.

2017 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 following locations:

- Intersection of West Englewood Avenue and Elmore Avenue
- Intersection of West Englewood Avenue and Lafayette Avenue

Specifically, manual turning movement counts were conducted on Thursday, May 4, 2018 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 have been chosen as they are representative of the peak periods of both the adjacent roadway network and the proposed residential development. The traffic volume data was collected and analyzed to identify the design peak hour in accordance with Highway Capacity Manual (HCM) and recommended guidelines outlined by the Institute of Transportation Engineers (ITE). Based on the review

of the count data the weekday morning peak hour occurred from 7:30 a.m. to 8:30 a.m. and the weekday evening peak hour occurred from 5:15 p.m. to 6:15 p.m. The 2017 Existing weekday morning and weekday evening peak hour volumes are summarized on appended **Figure 2**.

2017 Existing LOS/Capacity Analysis

A Level of Service and Volume/Capacity analysis was conducted for the 2017 Existing Condition during the weekday morning and weekday evening peak hours at the critical intersection of Englewood Avenue and Lafayette Avenue. Under the Existing Condition, the stop-controlled westbound approach of Englewood Avenue is calculated to operate at Level of Service C during the weekday morning and weekday evening peak hours.

2019 No-Build Condition

Background Growth

The 2017 traffic volume data was grown to a future horizon year of 2019, which is a conservative estimate for when the proposed residential development is expected to be fully constructed. In accordance with industry guidelines, the existing traffic volumes at the study intersections were increased by 1.50% annually for two (2) years to generate the 2019 Base Traffic Volumes. These volumes are summarized on appended **Figure 3**. The 1.50% background growth rate was obtained from the New Jersey Department of Transportation (NJDOT) Annual Background Growth Rate Table.

Other Planned Projects

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

- Lincoln Street School site Redevelopment – 185 apartment units with 333 parking spaces located at the site of the former Lincoln Street School.

Appended **Figure 4** illustrates the other planned project's traffic assigned to the study area network.

2019 No-Build Traffic Volumes

The other planned development trips were added to the 2019 Base Traffic Volumes to calculate the 2019 No-Build Traffic Volumes for the weekday morning and weekday evening peak hours. These volumes are summarized on appended **Figure 5**.

2019 No-Build LOS/Capacity Analysis

A Level of Service and Volume/Capacity analysis was also conducted for the 2019 No-Build Condition during the weekday morning and weekday evening peak hours at the study intersection. Under the No-Build Condition, the stop-controlled westbound approach of Englewood Avenue is calculated to continue to operate at Level of Service C during the weekday morning peak hour and would operate at acceptable Level of Service D during the weekday evening peak hour.

2019 Build Condition

The site-generated traffic volume of the proposed residential 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 residential building were prepared utilizing the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 10th Edition. Trip Generation rates associated with Land Use 221 "Multifamily Housing (Mid-Rise)" were cited for the 220-unit residential building. **Table 1** provides the weekday morning and weekday evening peak-hour trip generation volumes associated with the proposed development.

TABLE 1 – PROPOSED TRIP GENERATION

	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
Land Use	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**
220 Dwelling Units *ITE Land Use 221*	21	58	79	59	38	97

Based on data published by the US Census Bureau, approximately 30% of Englewood residents use public transportation, walk, or use means other than passenger vehicles to commute to work and approximately 10% of Englewood residents do not own a vehicle. The location of the proposed residential building is particularly suited to foster reduced vehicle utilization by its occupants as it is located within walking distance from downtown Englewood and from bus stops servicing NJ Transit Bus Routes 178, 186, 756 and 780. As such, a portion of the site-generated trips would likely be accomplished by public transportation and pedestrian trips. However, to provide a conservative analysis, no transit or walkability credits have been taken.

As indicated in Table 1, the proposed development is expected to generate 79 new trips during the weekday morning peak hour and 97 new trips during the weekday evening peak hour. Based on Transportation Impact Analysis for Site Development published by ITE, a trip increase of less than 100 vehicle trips would likely not change the level of service of the roadway system or appreciably increase the volume-to-capacity ratio of an intersection approach. As such, the proposed development is not anticipated to significantly impact the operations of the adjacent roadway network.

Trip Assignment/Distribution

The trips generated by the proposed development were distributed according to the existing travel pattern along the surrounding roadway network, the location of major arterial roadways, and the access management plan of the site. The Site-Generated Traffic Volumes are illustrated on **Figure 6**.

2019 Build Traffic Volumes

The site-generated trips were added to the 2019 No-Build Traffic Volumes to calculate the 2019 Build Traffic Volumes and are shown on appended **Figure 7**.

2019 Build LOS/Capacity Analysis

A Level of Service and Volume/Capacity analysis was also conducted for the 2019 Build Condition during the weekday morning and weekday evening peak hours at the study intersection. Under the Build Condition, the stop-controlled westbound approach of Englewood Avenue is calculated to operate generally consistently with the No-Build Condition. **Tables 2** and **3** compare the Existing, No-Build, and Build Conditions Level of Service and delay values.

COMPARATIVE LEVEL OF SERVICE (DELAY) TABLES

WEST ENGLEWOOD AVENUE & LAFAYETTE AVENUE

EB (Eastbound) and WB (Westbound) approaches are the West Englewood Avenue approaches
SB (Southbound) approach is the Lafayette Avenue approach
X (n) = Level of Service (seconds of delay)

TABLE 2 – WEEKDAY MORNING PEAK HOUR

Lane Group	2017 Existing	2019 No-Build	2019 Build
WB Left	C (16.9)	C (19.6)	C (21.8)

TABLE 3 – WEEKDAY EVENING PEAK HOUR

Lane Group	2017 Existing	2019 No-Build	2019 Build
WB Left	C (23.0)	D (28.5)	D (33.0)

Site Circulation/Parking Supply

A review was conducted of the proposed multi-family residential development using the Site Plan prepared by our office, dated May 24, 2018. In completing this review, particular attention was focused on the site access, circulation, and parking supply.

Under proposed conditions, the existing structures would be razed, and the site would be redeveloped with a four (4)-story residential building consisting of 220 dwelling units. Access is proposed via one (1) full-movement driveway along Elmore Avenue.

The City of Englewood Ordinance requires one (1) parking space per studio/one-bedroom units and 1.5 spaces for units with two (2) or more bedrooms. For the proposed 220-unit multi-family residential building with 172 one-bedroom units and 48 two-bedroom units, this equates to 244 required spaces. The site would provide 264 total parking spaces, inclusive of seven (7) ADA-accessible parking stalls, which meets the parking requirement and would be sufficient to support this project's parking demand.

When analyzing the adequacy of parking supply, it is important to consider the urban form in which the development is proposed as well as the availability of transit options. Based on the February 2013 ITE Journal article, "Do Land Use, Transit, and Walk Access Affect Residential Parking Demand," there is a direct correlation between land use (i.e. rural/suburban/urban) and parking utilization, which "suggests that low auto ownership households often self-select locations that can support their transportation needs without a private vehicle." According to the journal article data, residential developments in suburban areas were found to have parking utilization rates of 1.18 vehicles per residential units (which would translate to 260 parking stalls for the proposed development) and residential developments in areas which moderate transit access were found to have parking utilization rates of 0.95 vehicles per residential unit (which would translate to 209 parking stalls for the proposed development). As such, the proposed parking supply of 128 stalls would be adequate to support the demand of the site.

The proposed parking stalls would be a minimum of 9 feet wide by 19 feet deep per City of Englewood Ordinance. The parking stalls would be facilitated by 24-foot-wide two-way drive aisles in accordance with industry standards.

Conclusions

This report was prepared to examine the potential traffic impact of the proposed residential development. Based on the findings of the traffic assessment contained herein, the construction of the 220-unit multi-family residential building would not have a significant adverse impact on the traffic operations of the adjacent roadway network. The proposed site driveway along Elmore Avenue has been designed to provide for effective access to and from the subject property. Finally, the proposed parking supply would be sufficient to accommodate the anticipated parking demand of the site.

If you have any comments regarding the above information, please contact our office.

Best regards,

Charles D. Olivo, PE, PP, PTOE
Stonefield Engineering and Design, LLC

Matthew J. Seckler, PE, PP, PTOE
Stonefield Engineering and Design, LLC

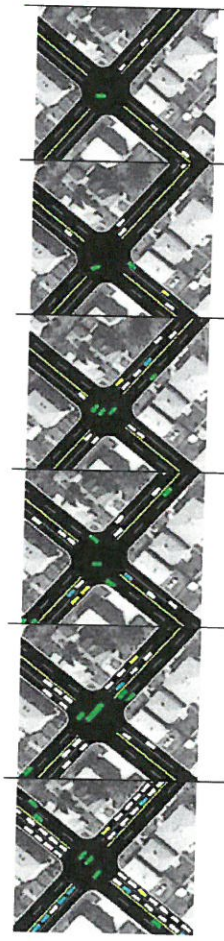
TECHNICAL APPENDIX

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

Stonefield Engineering & Design, LLC

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Intersection of West Englewood Ave (E/W)
and Lafayette Ave (N/S)
Englewood, Bergen County, New Jersey
Thursday, May 4, 2017

File Name : s-17059.01
Site Code : 00017059
Start Date : 5/4/2017
Page No : 1

Groups Printed- Auto - HV - B/SB

	W Englewood Avenue Eastbound				W Englewood Avenue Westbound				Lafayette Avenue Northbound				Lafayette Avenue Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	32	18	0	50	0	9	0	9	0	0	0	0	0	0	36	36	95
07:15 AM	48	18	0	66	0	23	1	24	0	0	0	0	0	0	43	43	133
07:30 AM	74	34	0	108	0	20	0	20	0	0	0	0	0	0	72	72	200
07:45 AM	89	29	0	118	0	31	1	32	0	0	0	0	0	0	57	57	207
Total	243	99	0	342	0	83	2	85	0	0	0	0	0	0	208	208	635
08:00 AM	73	38	0	111	0	27	0	27	0	0	0	0	0	0	74	74	212
08:15 AM	85	52	0	137	0	21	0	21	0	0	0	0	0	0	64	64	222
08:30 AM	59	46	0	105	0	20	1	21	0	0	0	0	0	0	58	58	184
08:45 AM	76	34	0	110	0	23	1	24	0	0	0	0	0	0	56	56	190
Total	293	170	0	463	0	91	2	93	0	0	0	0	0	0	252	252	808
*** BREAK ***																	
04:00 PM	39	18	0	57	0	33	7	40	0	0	0	0	0	0	34	34	131
04:15 PM	61	30	0	91	0	28	0	28	0	0	0	0	0	0	74	74	193
04:30 PM	83	42	0	125	0	47	2	49	0	0	0	0	0	0	75	75	249
04:45 PM	63	19	0	82	0	23	1	24	0	0	0	0	0	0	56	56	162
Total	246	109	0	355	0	131	10	141	0	0	0	0	0	0	239	239	735
05:00 PM	73	36	0	109	0	45	0	45	0	0	0	0	0	0	57	57	211
05:15 PM	75	43	0	118	0	49	1	50	0	0	0	0	0	0	50	50	218
05:30 PM	84	15	0	99	0	48	0	48	0	0	0	0	0	0	76	76	223
05:45 PM	76	23	0	99	0	36	1	37	0	0	0	0	0	0	50	50	186
Total	308	117	0	425	0	178	2	180	0	0	0	0	0	0	233	233	838
06:00 PM	87	14	0	101	0	45	1	46	0	0	0	0	0	0	71	71	218
06:15 PM	81	36	0	117	0	41	1	42	0	0	0	0	0	0	68	68	227
06:30 PM	80	24	0	104	0	34	1	35	0	0	0	0	0	0	69	69	208
06:45 PM	72	20	0	92	0	36	0	36	0	0	0	0	0	0	60	60	188
Total	320	94	0	414	0	156	3	159	0	0	0	0	0	0	268	268	841
Grand Total	1410	589	0	1999	0	639	19	658	0	0	0	0	0	0	1200	1200	3857
Apprch %	70.5	29.5	0		0	97.1	2.9		0	0	0		0	0	100		
Total %	36.6	15.3	0	51.8	0	16.6	0.5	17.1	0	0	0	0	0	0	31.1	31.1	
Auto	1371	557	0	1928	0	628	19	647	0	0	0	0	0	0	1164	1164	3739
% Auto	97.2	94.6	0	96.4	0	98.3	100	98.3	0	0	0	0	0	0	97	97	96.9
HV	2	0	0	2	0	3	0	3	0	0	0	0	0	0	5	5	10
% HV	0.1	0	0	0.1	0	0.5	0	0.5	0	0	0	0	0	0	0.4	0.4	0.3
B/SB	37	32	0	69	0	8	0	8	0	0	0	0	0	0	31	31	108
% B/SB	2.6	5.4	0	3.5	0	1.3	0	1.2	0	0	0	0	0	0	2.6	2.6	2.8

Stonefield Engineering & Design, LLC

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Intersection of West Englewood Ave (E/W)
and Lafayette Ave (N/S)
Englewood, Bergen County, New Jersey
Thursday, May 4, 2017

File Name : s-17059.01
Site Code : 00017059
Start Date : 5/4/2017

	W Englewood Avenue Eastbound				W Englewood Avenue Westbound				Lafayette Avenue Northbound				Lafayette Avenue Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	74	34	0	108	0	20	0	20	0	0	0	0	0	0	72	72	200
07:45 AM	89	29	0	118	0	31	1	32	0	0	0	0	0	0	57	57	207
08:00 AM	73	38	0	111	0	27	0	27	0	0	0	0	0	0	74	74	212
08:15 AM	85	52	0	137	0	21	0	21	0	0	0	0	0	0	64	64	222
Total Volume	321	153	0	474	0	99	1	100	0	0	0	0	0	0	267	267	841
% App. Total	67.7	32.3	0		0	99	1		0	0	0		0	0	100		
PHF	.902	.736	.000	.865	.000	.798	.250	.781	.000	.000	.000	.000	.000	.000	.902	.902	.947
Auto	308	146	0	454	0	98	1	99	0	0	0	0	0	0	254	254	807
% Auto	96.0	95.4	0	95.8	0	99.0	100	99.0	0	0	0	0	0	0	95.1	95.1	96.0
HV	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
% HV	0.6	0	0	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0.2
B/SB	11	7	0	18	0	1	0	1	0	0	0	0	0	0	13	13	32
% B/SB	3.4	4.6	0	3.8	0	1.0	0	1.0	0	0	0	0	0	0	4.9	4.9	3.8
Peak Hour Analysis From 05:15 PM to 06:00 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:15 PM																	
05:15 PM	75	43	0	118	0	49	1	50	0	0	0	0	0	0	50	50	218
05:30 PM	84	15	0	99	0	48	0	48	0	0	0	0	0	0	76	76	223
05:45 PM	76	23	0	99	0	36	1	37	0	0	0	0	0	0	50	50	186
06:00 PM	87	14	0	101	0	45	1	46	0	0	0	0	0	0	71	71	218
Total Volume	322	95	0	417	0	178	3	181	0	0	0	0	0	0	247	247	845
% App. Total	77.2	22.8	0		0	98.3	1.7		0	0	0		0	0	100		
PHF	.925	.552	.000	.883	.000	.908	.750	.905	.000	.000	.000	.000	.000	.000	.813	.813	.947
Auto	318	87	0	405	0	177	3	180	0	0	0	0	0	0	244	244	829
% Auto	98.8	91.6	0	97.1	0	99.4	100	99.4	0	0	0	0	0	0	98.8	98.8	98.1
HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0.4	0.1
B/SB	4	8	0	12	0	1	0	1	0	0	0	0	0	0	2	2	15
% B/SB	1.2	8.4	0	2.9	0	0.6	0	0.6	0	0	0	0	0	0	0.8	0.8	1.8

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Start Date : 5/4/2017
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	Englewood Avenue Eastbound				Englewood Avenue Westbound				Elmore Avenue Northbound				Elmore Avenue Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	19	0	20	0	15	0	15	3	2	2	7	0	2	0	2	44
07:15 AM	0	25	0	25	1	20	2	23	2	1	3	6	1	4	0	5	59
07:30 AM	1	27	0	28	0	19	2	21	1	3	3	7	0	1	0	1	57
07:45 AM	0	31	1	32	1	19	2	22	2	2	7	11	0	4	0	4	69
Total	2	102	1	105	2	73	6	81	8	8	15	31	1	11	0	12	229
08:00 AM	0	28	1	29	3	28	0	31	5	2	3	10	2	1	1	4	74
08:15 AM	4	45	0	49	2	21	0	23	2	2	3	7	1	6	1	8	87
08:30 AM	0	38	0	38	6	20	0	26	3	1	3	7	0	2	0	2	73
08:45 AM	1	32	0	33	1	17	1	19	0	1	3	4	0	0	0	0	56
Total	5	143	1	149	12	86	1	99	10	6	12	28	3	9	2	14	290
*** BREAK ***																	
04:00 PM	0	23	1	24	1	38	3	42	2	1	0	3	2	1	4	7	76
04:15 PM	4	26	2	32	3	34	3	40	1	1	2	4	4	4	2	10	86
04:30 PM	2	32	1	35	7	42	2	51	2	1	6	9	4	1	2	7	102
04:45 PM	2	24	0	26	3	29	4	36	1	0	2	3	1	2	1	4	69
Total	8	105	4	117	14	143	12	169	6	3	10	19	11	8	9	28	333
05:00 PM	4	35	1	40	3	45	3	51	2	3	2	7	2	2	2	6	104
05:15 PM	4	37	1	42	2	47	5	54	3	3	2	8	3	2	0	5	109
05:30 PM	1	19	1	21	3	60	6	69	2	3	2	7	7	2	0	9	106
05:45 PM	2	24	1	27	1	49	4	54	2	2	5	9	0	1	0	1	91
Total	11	115	4	130	9	201	18	228	9	11	11	31	12	7	2	21	410
06:00 PM	4	32	1	37	4	44	2	50	0	3	1	4	3	2	6	11	102
06:15 PM	2	25	1	28	5	37	3	45	0	2	5	7	4	1	1	6	86
06:30 PM	4	21	0	25	4	37	0	41	2	2	3	7	1	2	0	3	76
06:45 PM	1	21	0	22	1	29	3	33	0	0	2	2	0	1	1	2	59
Total	11	99	2	112	14	147	8	169	2	7	11	20	8	6	8	22	323
Grand Total	37	564	12	613	51	650	45	746	35	35	59	129	35	41	21	97	1585
Apprch %	6	92	2		6.8	87.1	6		27.1	27.1	45.7		36.1	42.3	21.6		
Total %	2.3	35.6	0.8	38.7	3.2	41	2.8	47.1	2.2	2.2	3.7	8.1	2.2	2.6	1.3	6.1	
Auto	37	564	12	613	51	650	45	746	35	35	59	129	35	41	21	97	1585
% Auto	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

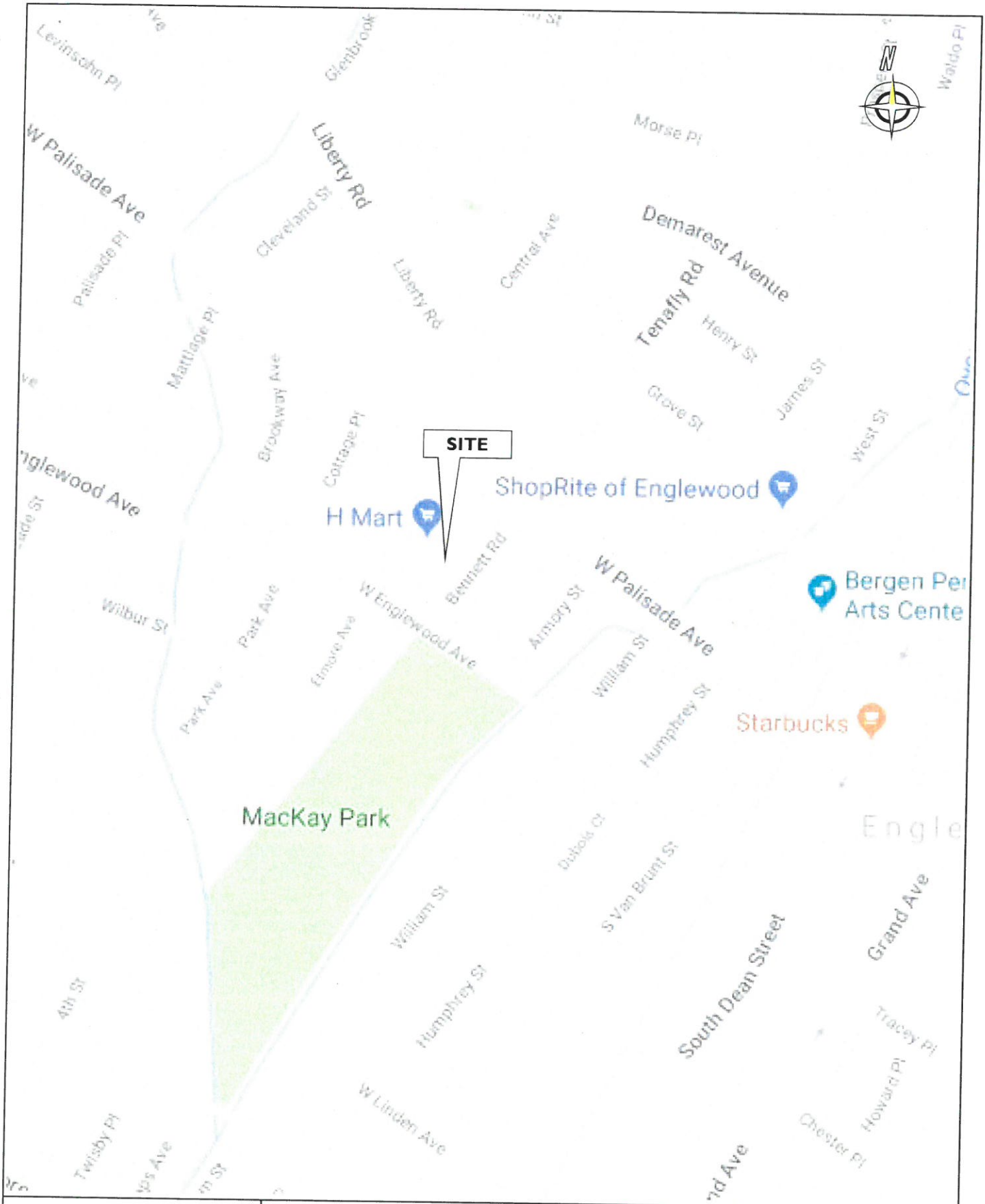
201.340.4468 t. 201.340.4472 f.

Intersection of Englewood Avenue (E/W)
and Elmore Avenue (N/S)
Englewood, Bergen County, New Jersey
Thursday, May 4, 2017

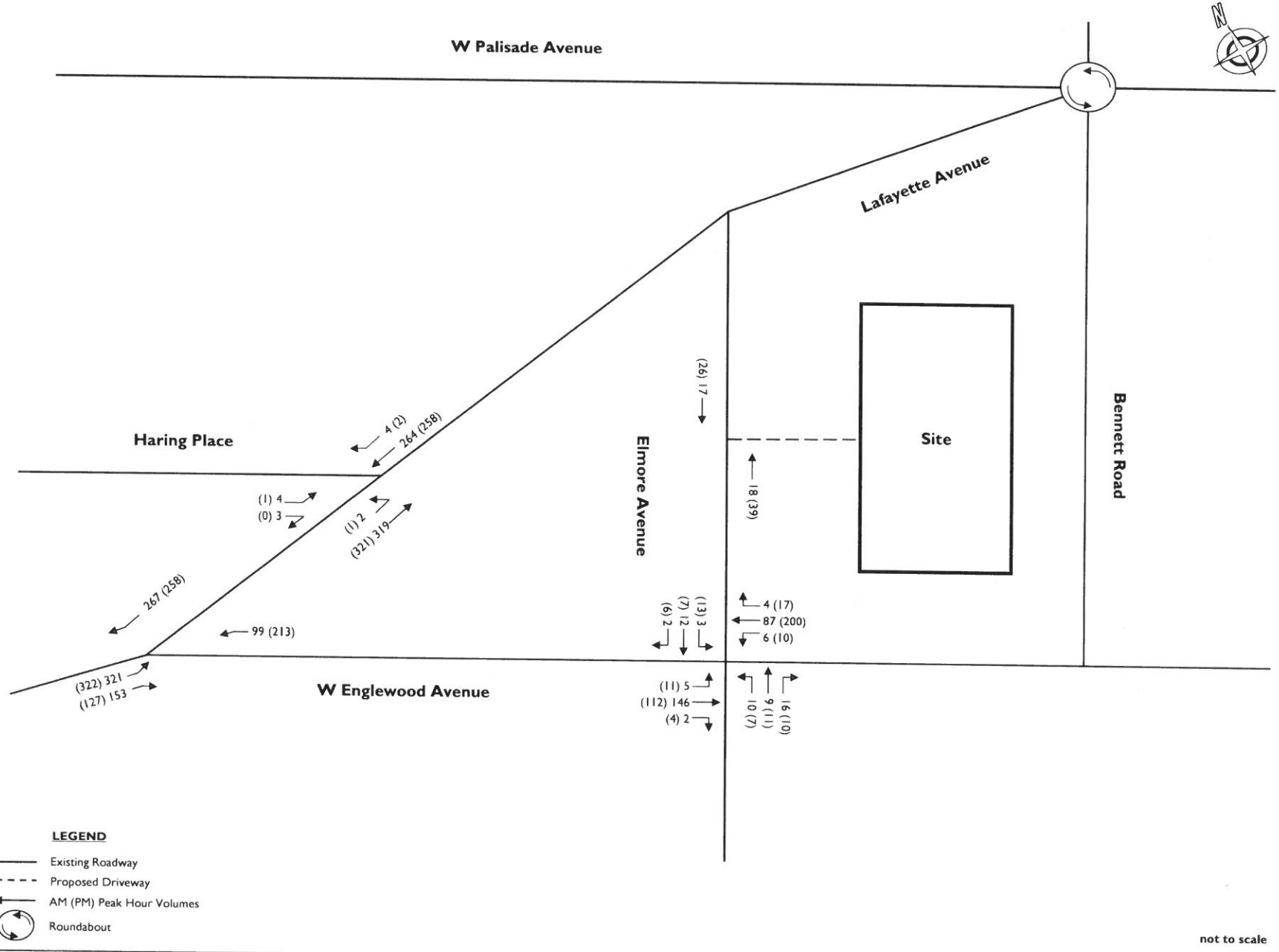
File Name : S-17059.02
Site Code : 00017059
Start Date : 5/4/2017
Page No : 2

	Englewood Avenue Eastbound				Englewood Avenue Westbound				Elmore Avenue Northbound				Elmore Avenue Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	1	27	0	28	0	19	2	21	1	3	3	7	0	1	0	1	57
07:45 AM	0	31	1	32	1	19	2	22	2	2	7	11	0	4	0	4	69
08:00 AM	0	28	1	29	3	28	0	31	5	2	3	10	2	1	1	4	74
08:15 AM	4	45	0	49	2	21	0	23	2	2	3	7	1	6	1	8	87
Total Volume	5	131	2	138	6	87	4	97	10	9	16	35	3	12	2	17	287
% App. Total	3.6	94.9	1.4		6.2	89.7	4.1		28.6	25.7	45.7		17.6	70.6	11.8		
PHF	.313	.728	.500	.704	.500	.777	.500	.782	.500	.750	.571	.795	.375	.500	.500	.531	.825
Auto	5	131	2	138	6	87	4	97	10	9	16	35	3	12	2	17	287
% Auto	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Analysis From 05:15 PM to 06:00 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:15 PM																	
05:15 PM	4	37	1	42	2	47	5	54	3	3	2	8	3	2	0	5	109
05:30 PM	1	19	1	21	3	60	6	69	2	3	2	7	7	2	0	9	106
05:45 PM	2	24	1	27	1	49	4	54	2	2	5	9	0	1	0	1	91
06:00 PM	4	32	1	37	4	44	2	50	0	3	1	4	3	2	6	11	102
Total Volume	11	112	4	127	10	200	17	227	7	11	10	28	13	7	6	26	408
% App. Total	8.7	88.2	3.1		4.4	88.1	7.5		25	39.3	35.7		50	26.9	23.1		
PHF	.688	.757	1.00	.756	.625	.833	.708	.822	.583	.917	.500	.778	.464	.875	.250	.591	.936
Auto	11	112	4	127	10	200	17	227	7	11	10	28	13	7	6	26	408
% Auto	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FIGURES



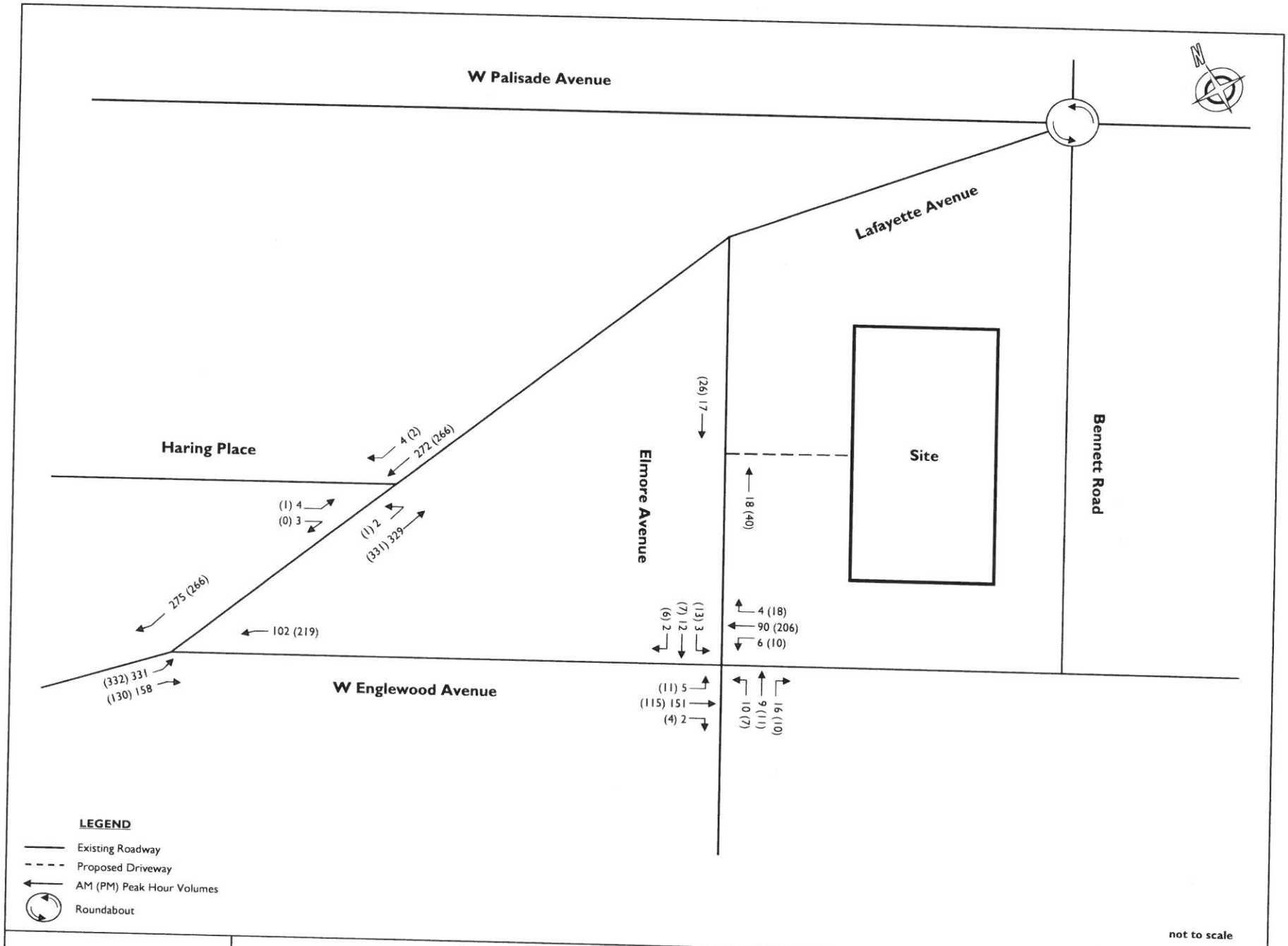
STONEFIELD engineering & design	**Proposed Multi-Family Residential Development** **40 Bennett Road** **Englewood, Bergen County, New Jersey** **Traffic Assessment Letter Report**	**FIGURE 1** **Site Location Map**



STONEFIELD engineering & design

Proposed Multi-Family Residential Development
40 Bennett Road
Englewood, Bergen County, New Jersey
Traffic Assessment Letter Report

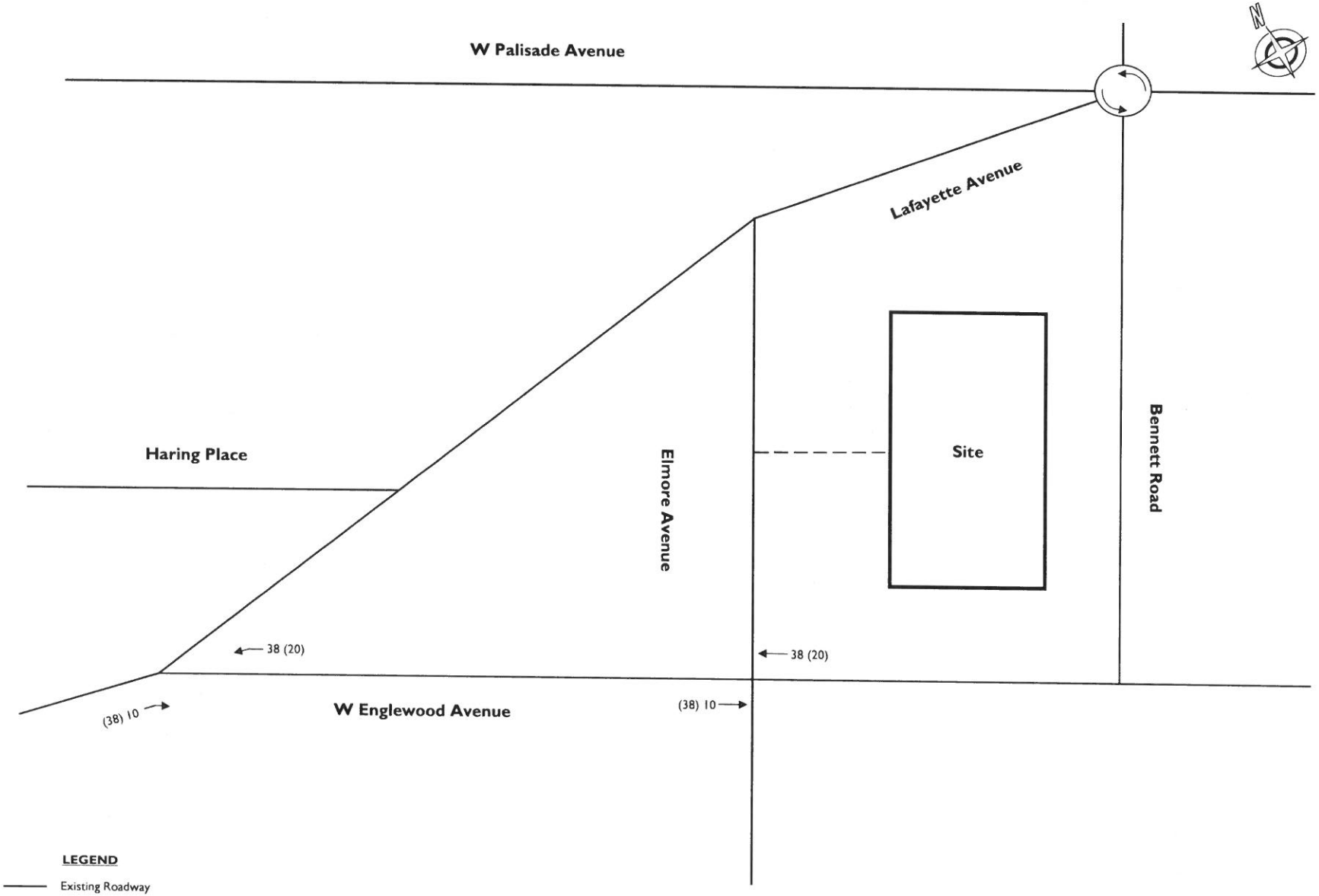
FIGURE 2
2017 Existing Traffic Volumes



STONEFIELD engineering & design

Proposed Multi-Family Residential Development
40 Bennett Road
Englewood, Bergen County, New Jersey
Traffic Assessment Letter Report

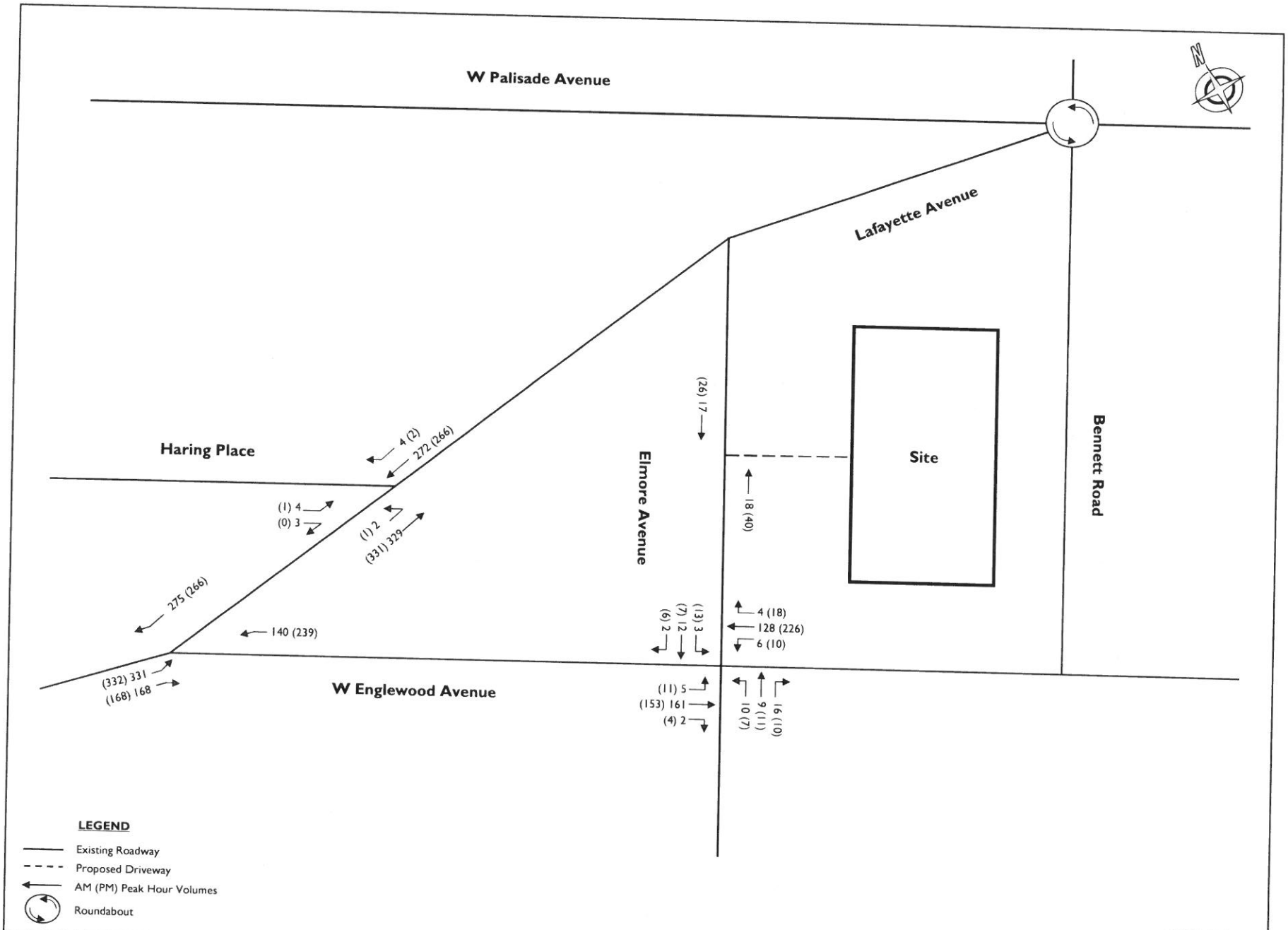
FIGURE 3
2019 Base Traffic Volumes



STONEFIELD engineering & design

Proposed Multi-Family Residential Development
40 Bennett Road
Englewood, Bergen County, New Jersey
Traffic Assessment Letter Report

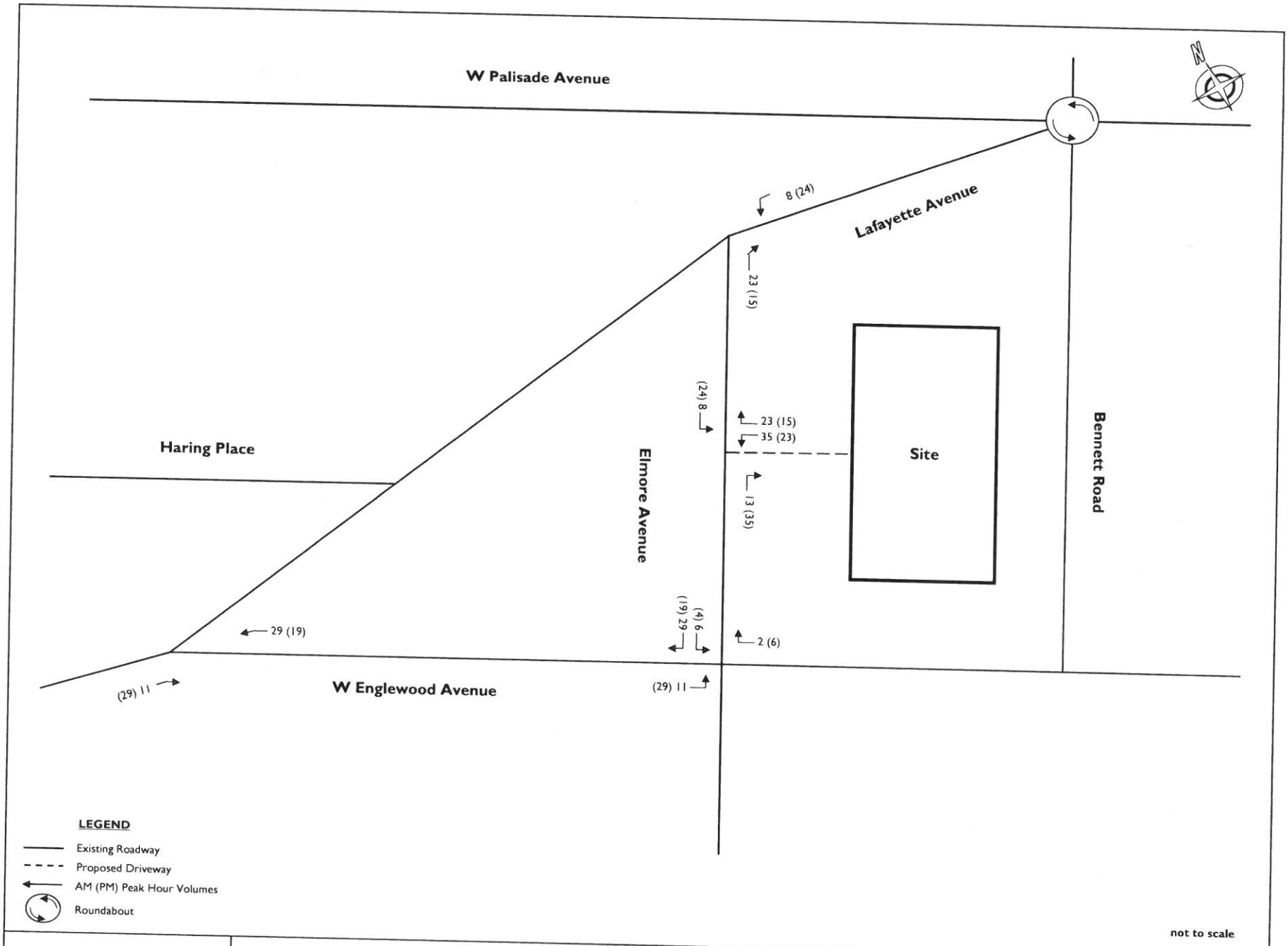
FIGURE 3
Lincoln School Development
Future Traffic Volumes



STONEFIELD engineering & design

Proposed Multi-Family Residential Development
40 Bennett Road
Englewood, Bergen County, New Jersey
Traffic Assessment Letter Report

FIGURE 5
2019 No-Build Traffic Volumes



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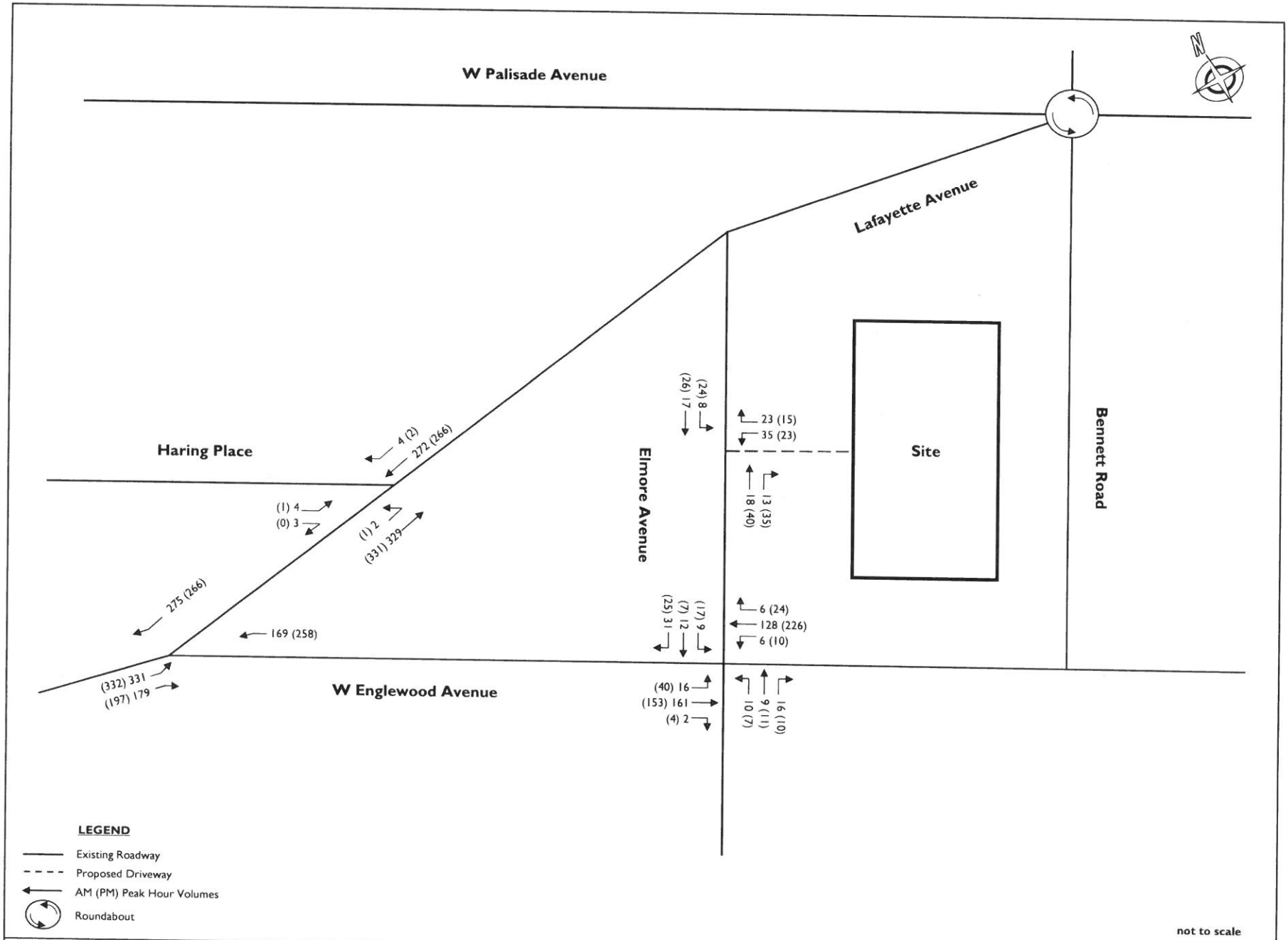
Proposed Multi-Family Residential Development
40 Bennett Road
Englewood, Bergen County, New Jersey
Traffic Assessment Letter Report

FIGURE 6
Site-Generated Traffic Volumes



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Proposed Multi-Family Residential Development
40 Bennett Road
Englewood, Bergen County, New Jersey
Traffic Assessment Letter Report

FIGURE 7
2019 Build Traffic Volumes

CAPACITY ANALYSIS DETAIL SHEETS

HCS7 Two-Way Stop-Control Report

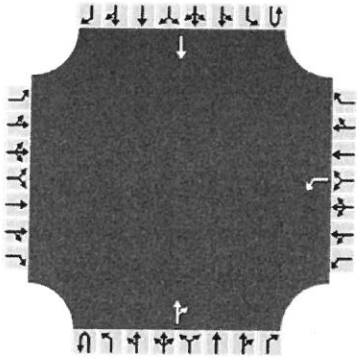
General Information

Analyst	MR
Agency/Co.	SE&D
Date Performed	5/23/2018
Analysis Year	2017
Time Analyzed	Existing Weekday Morning
Intersection Orientation	North-South
Project Description	S.17059 W.Englewood Ave (E/W) & Lafayette Ave (S)

Site Information

Intersection	EXAM
Jurisdiction	
East/West Street	West Englewood Avenue
North/South Street	Lafayette Avenue
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	0	0	0	1	0	0	0	1	0
Configuration						L						TR			T	
Volume, V (veh/h)						99					321	153			267	
Percent Heavy Vehicles (%)						1										
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1										
Critical Headway (sec)						6.41										
Base Follow-Up Headway (sec)						3.5										
Follow-Up Headway (sec)						3.51										

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						104										
Capacity, c (veh/h)						408										
v/c Ratio						0.26										
95% Queue Length, Q_{95} (veh)						1.0										
Control Delay (s/veh)						16.8										
Level of Service, LOS						C										
Approach Delay (s/veh)						16.8										
Approach LOS						C										

HCS7 Two-Way Stop-Control Report

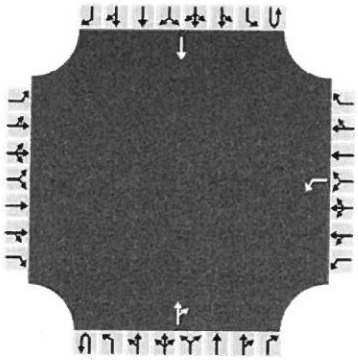
General Information

Analyst	MR
Agency/Co.	SE&D
Date Performed	5/23/2018
Analysis Year	2017
Time Analyzed	Existing Weekday Evening
Intersection Orientation	North-South
Project Description	S.17059 W.Englewood Ave (E/W) & Lafayette Ave (S)

Site Information

Intersection	EXPM
Jurisdiction	
East/West Street	West Englewood Avenue
North/South Street	Lafayette Avenue
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	0	0	0	1	0	0	0	1	0
Configuration						L						TR			T	
Volume, V (veh/h)						213					322	127			258	
Percent Heavy Vehicles (%)						1										
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1										
Critical Headway (sec)						6.41										
Base Follow-Up Headway (sec)						3.5										
Follow-Up Headway (sec)						3.51										

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						224										
Capacity, c (veh/h)						420										
v/c Ratio						0.53										
95% Queue Length, Q_{95} (veh)						3.1										
Control Delay (s/veh)						23.0										
Level of Service, LOS						C										
Approach Delay (s/veh)						23.0										
Approach LOS						C										

HCS7 Two-Way Stop-Control Report

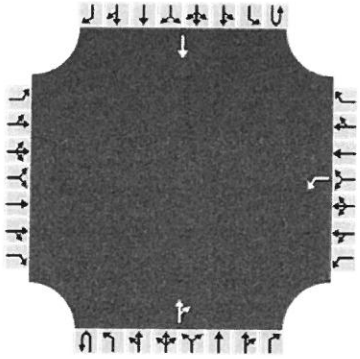
General Information

Analyst	MR
Agency/Co.	SE&D
Date Performed	5/23/2018
Analysis Year	2019
Time Analyzed	No-Build Weekday Morning
Intersection Orientation	North-South
Project Description	S.17059 W.Englewood Ave (E/W) & Lafayette Ave (S)

Site Information

Intersection	NBAM
Jurisdiction	
East/West Street	West Englewood Avenue
North/South Street	Lafayette Avenue
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	0	0	0	1	0	0	0	1	0
Configuration						L						TR			T	
Volume, V (veh/h)						140					331	168			275	
Percent Heavy Vehicles (%)						1										
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1										
Critical Headway (sec)						6.41										
Base Follow-Up Headway (sec)						3.5										
Follow-Up Headway (sec)						3.51										

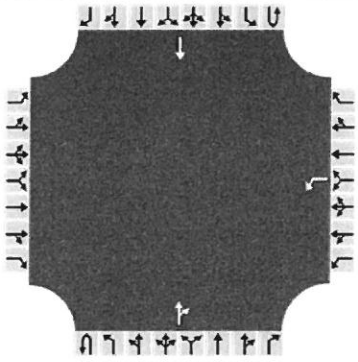
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						147										
Capacity, c (veh/h)						393										
v/c Ratio						0.38										
95% Queue Length, Q_{95} (veh)						1.7										
Control Delay (s/veh)						19.6										
Level of Service, LOS						C										
Approach Delay (s/veh)						19.6										
Approach LOS						C										

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MR	Intersection	NBPM
Agency/Co.	SE&D	Jurisdiction	
Date Performed	5/23/2018	East/West Street	West Englewood Avenue
Analysis Year	2019	North/South Street	Lafayette Avenue
Time Analyzed	No-Build Weekday Evening	Peak Hour Factor	0.95
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	S.17059 W.Englewood Ave (E/W) & Lafayette Ave (S)		

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	0	0	0	1	0	0	0	1	0
Configuration						L						TR			T	
Volume, V (veh/h)						239					332	168			266	
Percent Heavy Vehicles (%)						1										
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1										
Critical Headway (sec)						6.41										
Base Follow-Up Headway (sec)						3.5										
Follow-Up Headway (sec)						3.51										

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						252										
Capacity, c (veh/h)						397										
v/c Ratio						0.63										
95% Queue Length, Q_{95} (veh)						4.2										
Control Delay (s/veh)						28.5										
Level of Service, LOS						D										
Approach Delay (s/veh)						28.5										
Approach LOS						D										

HCS7 Two-Way Stop-Control Report

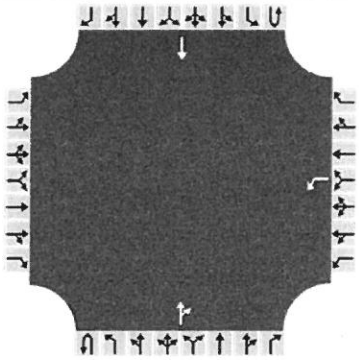
General Information

Analyst	MR
Agency/Co.	SE&D
Date Performed	5/23/2018
Analysis Year	2019
Time Analyzed	Build Weekday Morning
Intersection Orientation	North-South
Project Description	S.17059 W.Englewood Ave (E/W) & Lafayette Ave (S)

Site Information

Intersection	BAM
Jurisdiction	
East/West Street	West Englewood Avenue
North/South Street	Lafayette Avenue
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	0	0	0	1	0	0	0	1	0
Configuration						L						TR			T	
Volume, V (veh/h)						169					331	179			275	
Percent Heavy Vehicles (%)						1										
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1										
Critical Headway (sec)						6.41										
Base Follow-Up Headway (sec)						3.5										
Follow-Up Headway (sec)						3.51										

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						178										
Capacity, c (veh/h)						390										
v/c Ratio						0.46										
95% Queue Length, Q_{95} (veh)						2.3										
Control Delay (s/veh)						21.8										
Level of Service, LOS						C										
Approach Delay (s/veh)						21.8										
Approach LOS						C										

HCS7 Two-Way Stop-Control Report

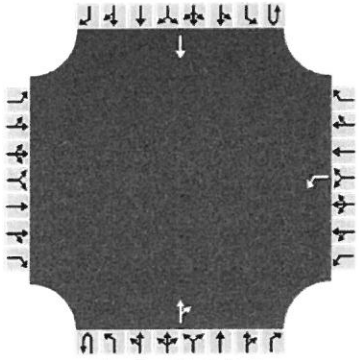
General Information

Analyst	MR
Agency/Co.	SE&D
Date Performed	5/23/2018
Analysis Year	2019
Time Analyzed	Build Weekday Evening
Intersection Orientation	North-South
Project Description	S.17059 W.Englewood Ave (E/W) & Lafayette Ave (S)

Site Information

Intersection	BPM
Jurisdiction	
East/West Street	West Englewood Avenue
North/South Street	Lafayette Avenue
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	0	0	0	1	0	0	0	1	0
Configuration						L						TR			T	
Volume, V (veh/h)						258					332	197			266	
Percent Heavy Vehicles (%)						1										
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1										
Critical Headway (sec)						6.41										
Base Follow-Up Headway (sec)						3.5										
Follow-Up Headway (sec)						3.51										

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						272										
Capacity, c (veh/h)						389										
v/c Ratio						0.70										
95% Queue Length, Q_{95} (veh)						5.1										
Control Delay (s/veh)						33.0										
Level of Service, LOS						D										
Approach Delay (s/veh)						33.0										
Approach LOS						D										