DOLAN&DEAN
CONSULTING ENGINEERS, LLC
181 WEST HIGH STREET
SOMERVILLE, NJ 08876

908 927 0100 p
908 927 0181 f

September 2, 2020

Theresa Snyder, Secretary
Watchung Borough Planning Board
15 Mountain Boulevard
Watchung, NJ 07069

Re: Proposed Daycare
100 Union Avenue
Block 7801, Lot 1
Watchung Borough, Somerset County

Dear Mr. Snyder:

As a follow up to our March 27, 2020 letter, I received a phone call from Joseph Fishinger, P.E. of Bright View Engineering to further discuss level of service calculations for the Union Avenue intersection with New Providence Road. Attached to this letter are the requested calculations for the intersection.

To assist the reviewer, attached the following are figures:

- Figure A – Seasonally Adjusted Existing Traffic Volumes
- Figure B – Drop-off (morning peak hour) and Pick-up (evening peak hour) Distribution
- Figure C – Site Generated Traffic
- Figure D – Future Build Traffic Volumes

The build traffic volumes do not include a background growth rate because they have been adjusted to peak volumes recorded by NJDOT, which are the maximum volumes processed during weekday morning and evening periods when New Providence Road is at capacity.

In addition, Mr. Fishinger and I discussed the extensive data that has been collected by Dolan & Dean at daycares throughout New Jersey. Enclosed is a sampling of that information which was summarized as part of a Primrose School application in Morris County.

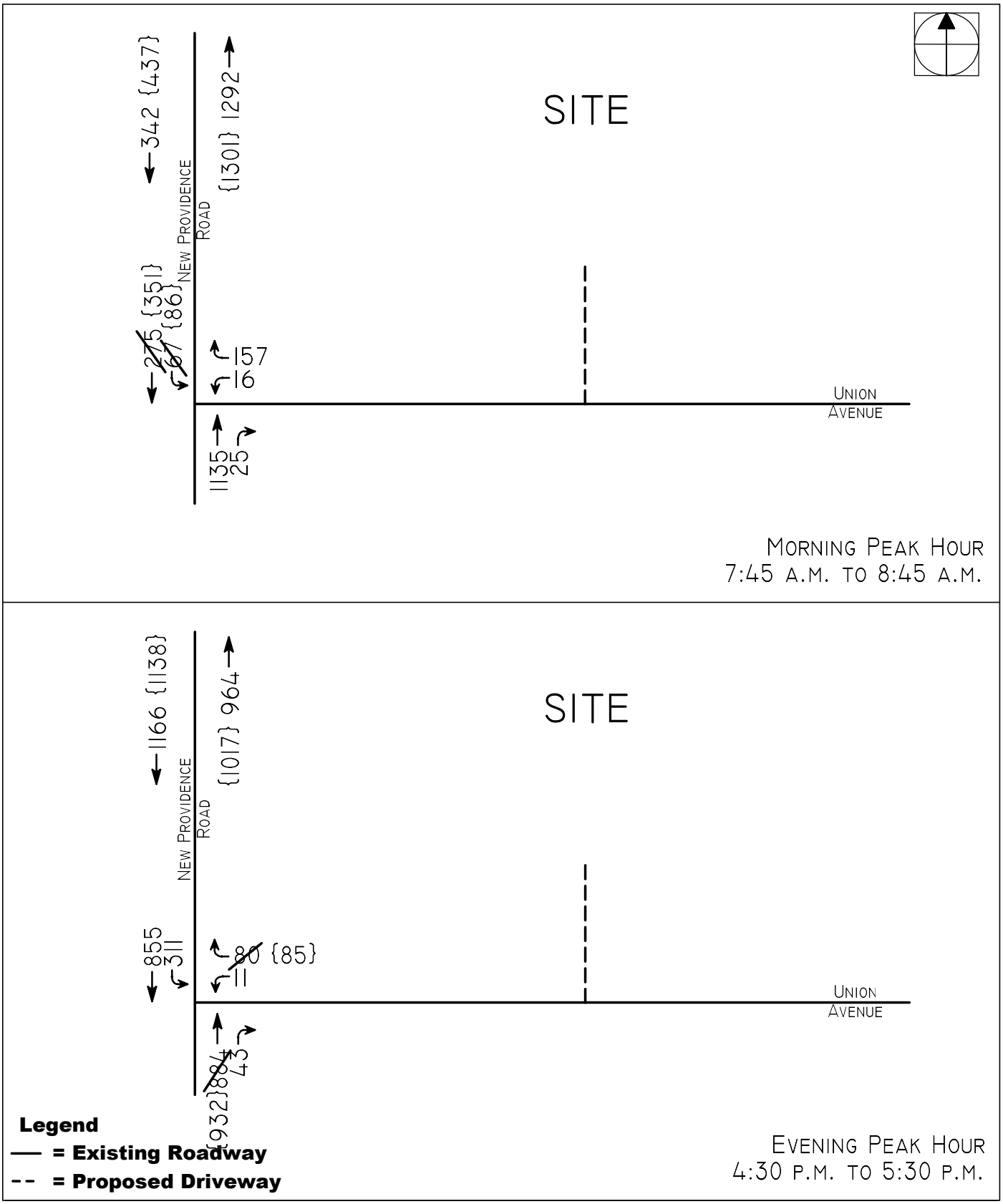
I look forward to discussing the traffic issues with the Board and consultants.

Very truly yours,

DOLAN & DEAN
CONSULTING ENGINEERS, LLC

Elizabeth Dolan, P.E.

cc: Stephen Hehl, Esq. Shehl@LawJW.com
Al Mauti amauti@m-mnj.com
Gerry Gesario ggesario@jkarch.com



100 Union Avenue
Borough of Watchung
Somerset County, New Jersey

FIGURE A

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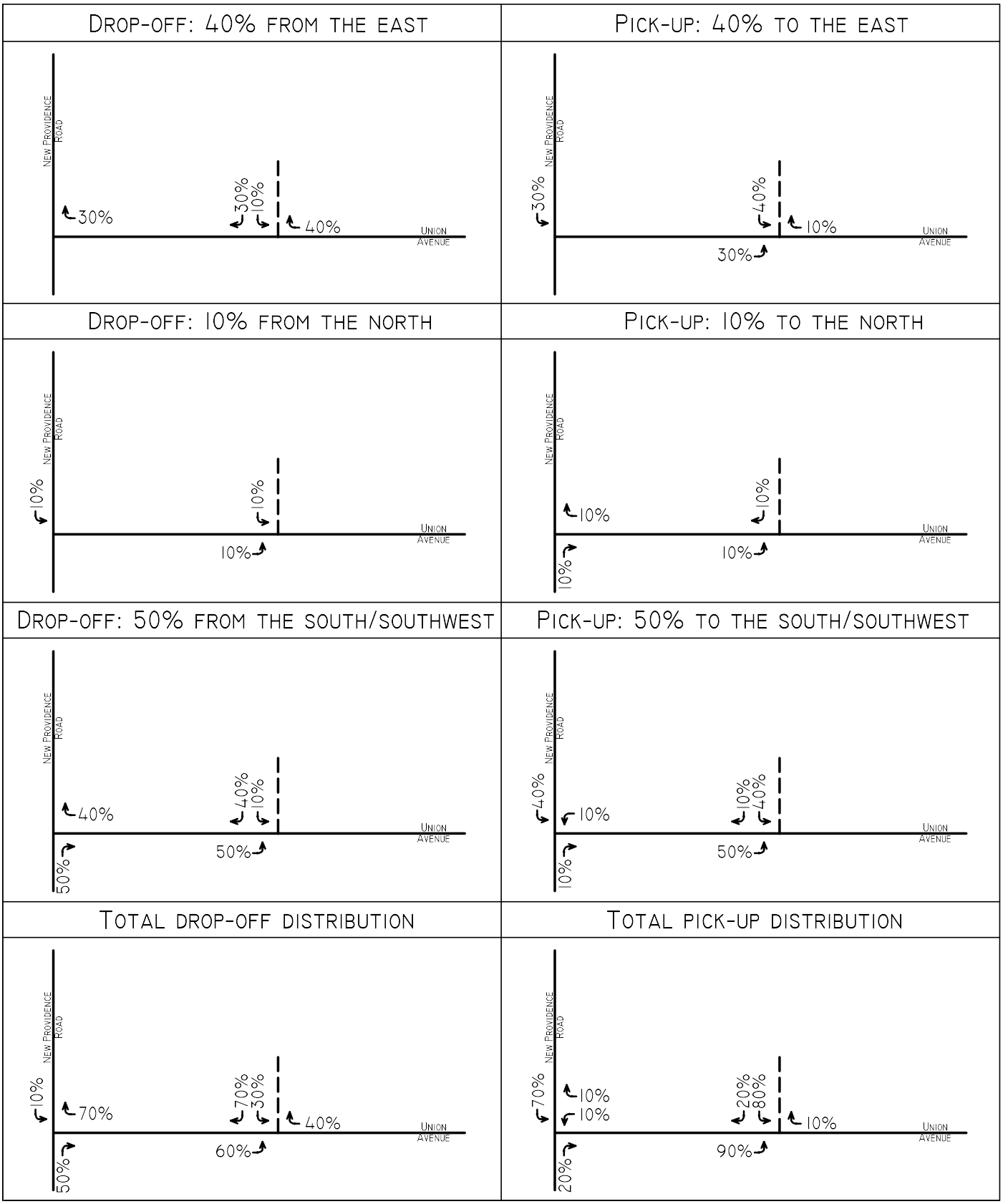
EXISTING TRAFFIC VOLUME COMPARISON
SEASONALLY ADJUSTED



100 UNION AVENUE
BOROUGH OF WATCHUNG
SOMERSET COUNTY, NEW JERSEY

FIGURE B

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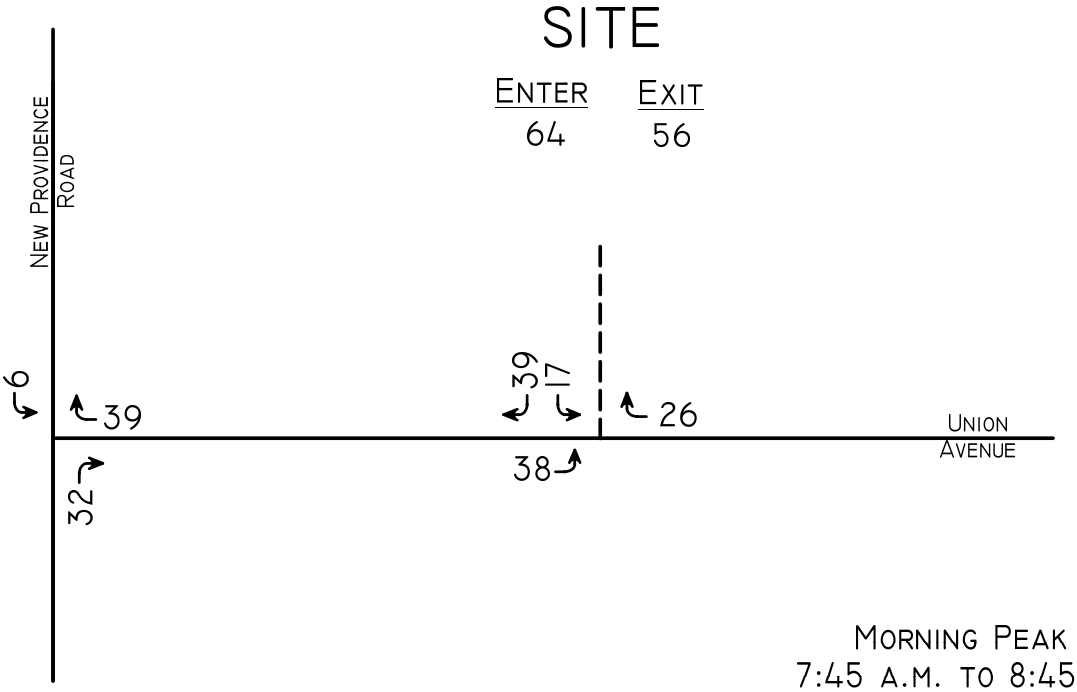
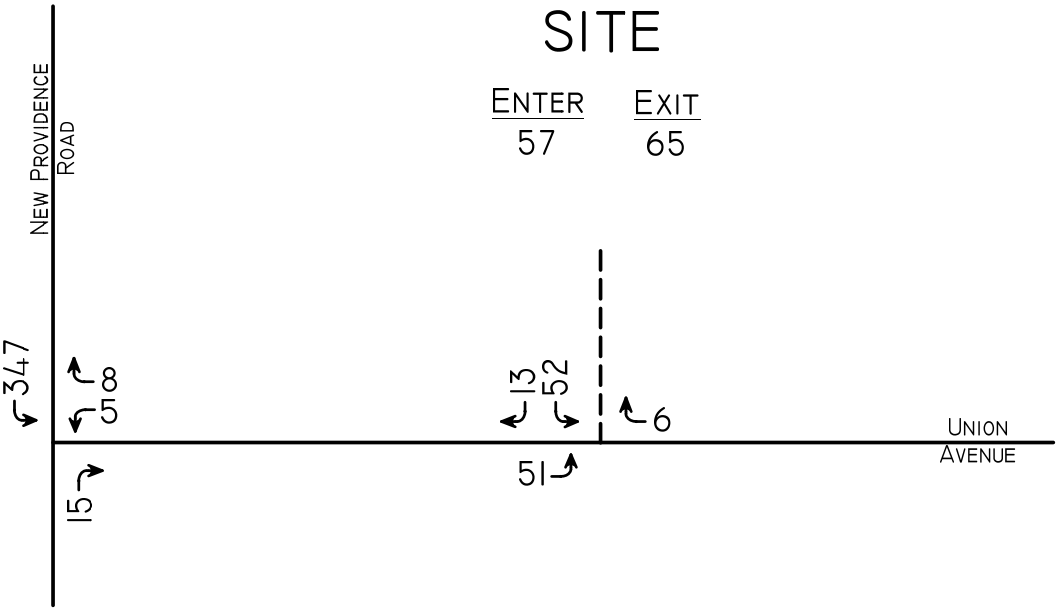
SITE DISTRIBUTION



MORNING PEAK HOUR
7:45 A.M. TO 8:45 A.M.



Legend
— = Existing Roadway
-- = Proposed Driveway

EVENING PEAK HOUR
4:30 P.M. TO 5:30 P.M.

100 UNION AVENUE
BOROUGH OF WATCHUNG
SOMERSET COUNTY, NEW JERSEY

FIGURE C

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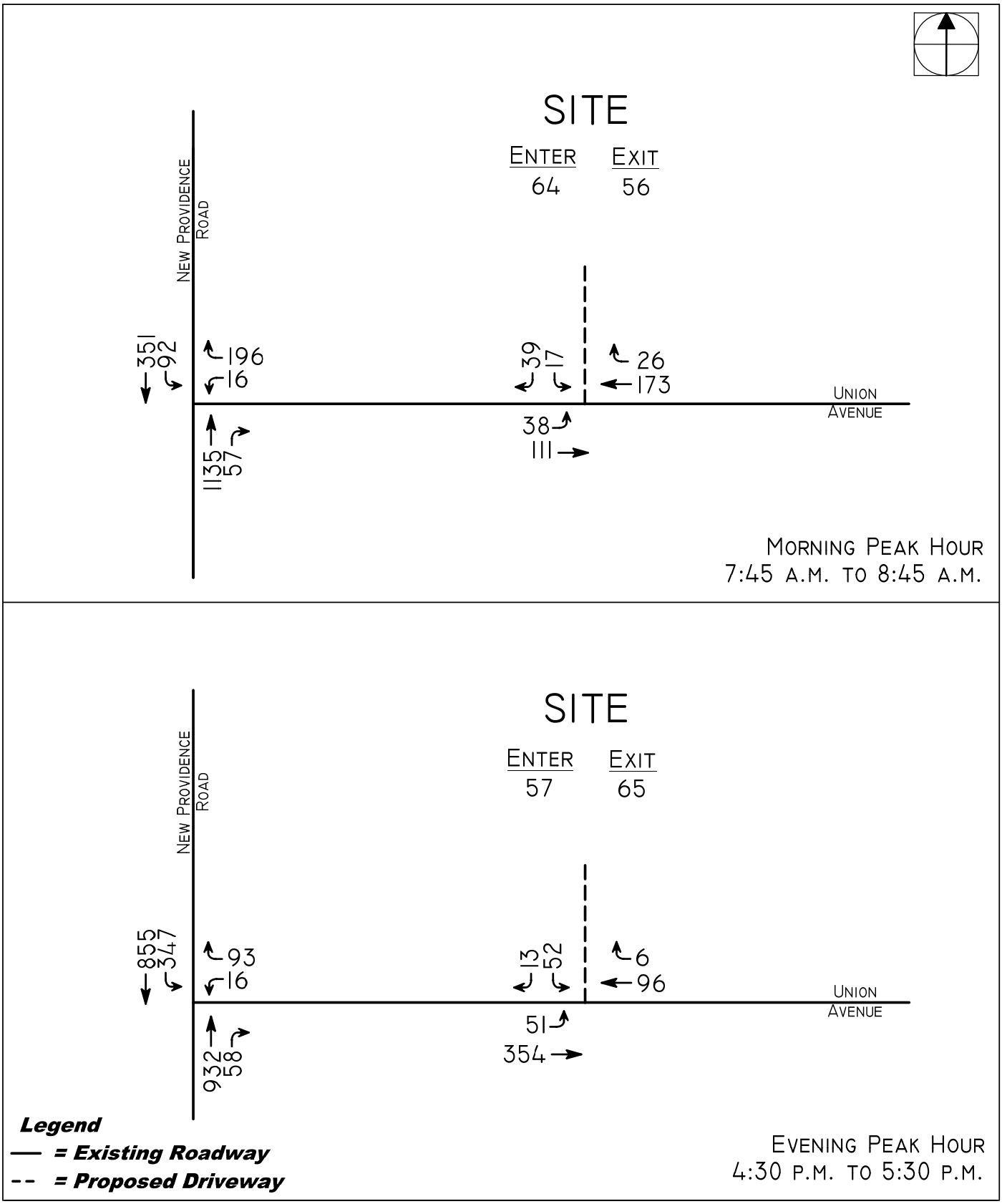
SITE GENERATED TRAFFIC



100 UNION AVENUE
BOROUGH OF WATCHUNG
SOMERSET COUNTY, NEW JERSEY

FIGURE D

DOLAN&DEAN CONSULTING ENGINEERS, LLC

FUTURE BUILD TRAFFIC VOLUMES

HCS7 Two-Way Stop-Control Report

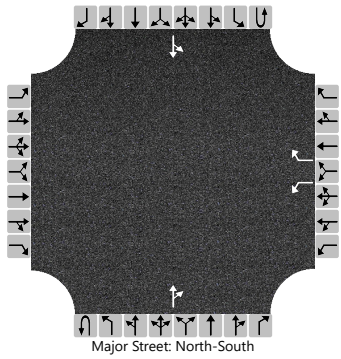
General Information

Analyst	EC
Agency/Co.	DD
Date Performed	4/30/2020
Analysis Year	2020
Time Analyzed	Am Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	New Providence & Union
Jurisdiction	
East/West Street	Union Avenue
North/South Street	New Proveidence Road
Peak Hour Factor	0.96
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	1	0	0	1	0	0	0	1	0
Configuration						L		R				TR		LT		
Volume (veh/h)						16		157			1135	25		86	351	
Percent Heavy Vehicles (%)						9		9						9		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized					No											
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.49		6.29						4.19		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.58		3.38						2.28		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						17		164						90		
Capacity, c (veh/h)						73		220						553		
v/c Ratio						0.23		0.75						0.16		
95% Queue Length, Q_{95} (veh)						0.8		5.1						0.6		
Control Delay (s/veh)						68.2		57.8						12.8		
Level of Service (LOS)						F		F						B		
Approach Delay (s/veh)					58.7								4.6			
Approach LOS					F											

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HCS7 Two-Way Stop-Control Report

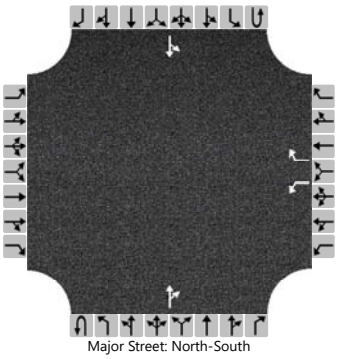
General Information

Analyst	EC
Agency/Co.	DD
Date Performed	4/30/2020
Analysis Year	2020
Time Analyzed	Am Build
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	New Providence & Union
Jurisdiction	
East/West Street	Union Avenue
North/South Street	New Proveidence Road
Peak Hour Factor	0.96
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	1	0	0	1	0	0	0	1	0
Configuration						L		R				TR		LT		
Volume (veh/h)						16		196			1135	57		92	351	
Percent Heavy Vehicles (%)						9		9						9		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized					No											
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.49		6.29						4.19		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.58		3.38						2.28		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						17		204						96		
Capacity, c (veh/h)						68		215						537		
v/c Ratio						0.24		0.95						0.18		
95% Queue Length, Q_{95} (veh)						0.9		8.1						0.6		
Control Delay (s/veh)						73.9		96.3						13.1		
Level of Service (LOS)						F		F						B		
Approach Delay (s/veh)					94.6								5.1			
Approach LOS					F											

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HCS7 Two-Way Stop-Control Report

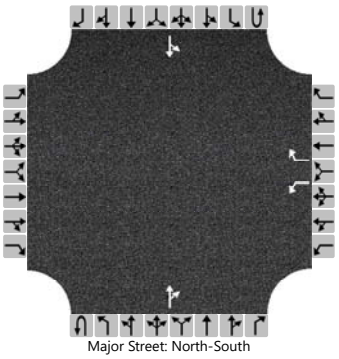
General Information

Analyst	EC
Agency/Co.	DD
Date Performed	4/30/2020
Analysis Year	2020
Time Analyzed	Pm Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	New Providence & Union
Jurisdiction	
East/West Street	Union Avenue
North/South Street	New Proveidence Road
Peak Hour Factor	0.97
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	1	0	0	1	0	0	0	1	0
Configuration						L		R				TR		LT		
Volume (veh/h)						11		85			932	43		311	855	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized					No											
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						11		88						321		
Capacity, c (veh/h)						3		301						685		
v/c Ratio						4.37		0.29						0.47		
95% Queue Length, Q_{95} (veh)						2.7		1.2						2.5		
Control Delay (s/veh)						3970.9		21.8						14.8		
Level of Service (LOS)						F		C						B		
Approach Delay (s/veh)					474.3								13.9			
Approach LOS					F											

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HCS7 Two-Way Stop-Control Report

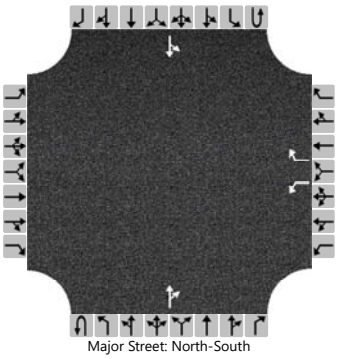
General Information

Analyst	EC
Agency/Co.	DD
Date Performed	4/30/2020
Analysis Year	2020
Time Analyzed	Pm Build
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	New Providence & Union
Jurisdiction	
East/West Street	Union Avenue
North/South Street	New Proveidence Road
Peak Hour Factor	0.97
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	1	0	0	1	0	0	0	1	0
Configuration						L		R				TR		LT		
Volume (veh/h)						16		93			932	58		347	855	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized					No											
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						16		96						358		
Capacity, c (veh/h)								297						676		
v/c Ratio								0.32						0.53		
95% Queue Length, Q_{95} (veh)								1.4						3.1		
Control Delay (s/veh)								22.8						16.1		
Level of Service (LOS)								C						C		
Approach Delay (s/veh)													4.7			
Approach LOS																

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MORRIS COUNTY RESEARCH SITES

Site Data and Parking Demands

Research Site Name & Location	Building Area	# Children & Teachers/Staff	# Parking Spaces	Maximum Parking Demand	Parking Demand/ Number Enrolled
The Learning Experience 1159 Parsippany Boulevard Parsippany, Morris County	±10,000 SF	182 capacity 143 enrolled (79%) 15% same family 29 employees	41	24 October 9,2012	0.17
KinderCare 45 Whippany Road (Route 511) Whippany /Hanover, Morris County	±11,700 SF	181 capacity 140 enrolled (77%) 20 employees	38	16 October 4, 2012	0.11
Maximum Parking Demand					0.17
Proposed Primrose School Florham Park, Morris County	11,869 SF	194 capacity 160 enrolled[1] 25 staff	37	0.17 x 160 enrolled = 28 0.17 x 194 enrolled = 33	

[1] Enrollment is approximately 82% of 194 capacity = 160

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MORRIS COUNTY RESEARCH SITES

Staff & Parent Hourly Parking Accumulation

Hour	The Learning Experience Parsippany 143 enrolled 29 employees	KinderCare Whippany 140 enrolled 20 employees	Proposed Primrose School, Florham Park 160 enrolled[1] 25 staff
6:30 a.m. to 6:45 a.m.	5	4	6
6:45 a.m. to 7:00 a.m.	5	3	6
7:00 a.m. to 7:15 a.m.	5	3	6
7:15 a.m. to 7:30 a.m.	8	6	9
7:30 a.m. to 7:45 a.m.	12	8	14
7:45 a.m. to 8:00 a.m.	14	9	16
8:00 a.m. to 8:15 a.m.	14	16	16
8:15 a.m. to 8:30 a.m.	16	13	18
8:30 a.m. to 8:45 a.m.	21	11	24
8:45 a.m. to 9:00 a.m.	22	11	25
3:00 p.m. to 3:15 p.m.	20	9	23
3:15 p.m. to 3:30 p.m.	17	9	19
3:30 p.m. to 3:45 p.m.	20	9	23
3:45 p.m. to 4:00 p.m.	18	11	21
4:00 p.m. to 4:15 p.m.	22	10	25
4:15 p.m. to 4:30 p.m.	24	10	27
4:30 p.m. to 4:45 p.m.	20	15	23
4:45 p.m. to 5:00 p.m.	18	11	21
5:00 p.m. to 5:15 p.m.	20	14	23
5:15 p.m. to 5:30 p.m.	20	11	23
5:30 p.m. to 5:45 p.m.	18	13	21
5:45 p.m. to 6:00 p.m.	13	15	15
6:00 p.m. to 6:15 p.m.	12	11	14
6:15 p.m. to 6:30 p.m.	4	10	5

[1] Enrollment is approximately 82% of capacity = 160. Hour by hour demands are based on proportional increase of Parsippany demands.

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Hourly Staff Parking Demands

5 Primrose Sites

HOUR	Dunwoody[1] 136 capacity 124 enrolled (91%) 19 staff	Mansell[1] 180 capacity 126 enrolled (70%) 19 staff	Moorefield[2] 184 capacity 84 enrolled (46%) 19 staff	Peachtree[1] 132 capacity 111 enrolled (84%) 19 staff	Savage[3] 181 capacity 152 enrolled (84%) 22 staff	Proposed Florham Park[4] 194 capacity 25 staff
6:00 a.m. to 7:00 a.m.	3	5	4	2	5	5
7:00 a.m. to 8:00 a.m.	10	12	8	7	13	13
8:00 a.m. to 9:00 a.m.	16	18	16	13	20	22
9:00 a.m. to 10:00 a.m.	18	19	19	15	19	23
10:00 a.m. to 11:00 a.m.	18	19	19	16	20	24
11:00 a.m. to 12:00 p.m.	17	18	18	15	18	22
12:00 p.m. to 1:00 p.m.	14	17	14	14	18	20
1:00 p.m. to 2:00 p.m.	16	19	11	15	19	21
2:00 p.m. to 3:00 p.m.	17	19	15	19	22	24
3:00 p.m. to 4:00 p.m.	14	14	13	16	22	20
4:00 p.m. to 5:00 p.m.	10	11	7	16	15	15
5:00 p.m. to 6:00 p.m.	3	6	0	10	7	7
6:00 p.m. to 7:00 p.m.	0	2	0	4	0	2

[1] Atlanta suburb
[2] Washington DC suburb
[3] Minneapolis/St. Paul suburb
[4] average parking demand rate/staff applied to proposed Florham Park staff

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MORRIS COUNTY RESEARCH SITES

Trip Generation

Research Site Name & Location	Peak Hours	Morning Peak Hour		Evening Peak Hour	
		Enter	Exit	Enter	Exit
The Learning Experience Parsippany October 9,2012	8:00 – 9:00 AM 5:05 – 6:05 PM	68	56	53	57
KinderCare Whippany/Hanover October 4, 2012	7:55 – 8:55 AM 5:25 – 6:25 PM	37	36	30	28
Maximum Trip Rate/Number Enrolled		0.48	0.39	0.37	0.40
Proposed Primrose School Florham Park[1]		76	63	60	64

[1] Enrollment is approximately 82% of 194 capacity = 160