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STIMMEL ENGINEERING
William P. Stimmel, P.E., P.P., PTOE

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Traffic Impact Analysis

for

Shameer Properties, LLC

212-216 Ernston Road – Block 444.04, Lots 23-25, 28

Borough of Sayreville, Middlesex County, New Jersey

William P. Stimmel, P.E., P.P., PTOE
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Revised August 8, 2023

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September 28, 2022
Revised August 8, 2023

Borough of Sayreville – Planning Board
167 Main Street
Sayreville, NJ 08872

Re: Masjid Sadar & Community Center
212 – 216 Ernston Road – Block 444.04, Lots 23-25, 28
Borough of Sayreville, Middlesex County, New Jersey

Honorable Board Members:

This report has been prepared to address traffic impacts associated with the re-development of the referenced site. Specifically, this report will determine existing traffic volumes at the site driveways and nearest roadway intersection, project future traffic volumes based on the proposed use and provide a comparison of same. Site access, site circulation and parking concerns will also be discussed.

Existing Site Conditions

The site consists of Lots 23-25 and 28 in Block 444.04 and has an area of 2.49 acres. 212 and 214 Ernston Road are developed with existing single-family residential structures. 216 Ernston Road is developed with the existing Masjid Sadar. The site is located along the westbound side of Ernston Road, to the west of the intersection with Center Avenue, as shown on the attached **Figure 1**.

Vehicular access to the properties is provided four driveways along westbound Ernston Road.

Proposed Site Conditions

The applicant intends to remove all existing structures on the subject property and construct a new mosque with associated community space and offices. The proposed mosque will be centrally located on the subject property. Parking and circulation areas will be located to the east of the building. Portions of the site to the north, south and west of the principal structure will be landscaped.

A total of 109 parking spaces will be provided on site. 64 parking spaces will be located in a below-grade parking garage underneath the building. The remaining 45 parking spaces will be located in the surface parking lot.

Access to the facility will be provided via two full-movement driveways along westbound Ernston Road. The centerlines of the proposed driveways will be separated by approximately 130 feet. Note that the location and design of the driveways is ultimately subject to review and approval by Middlesex County.

Schedule of Events

The client has provided a schedule of events which is attached to this report. A summary of the traffic and parking associated with regular events is as follows:

- Regular Prayers (Daily) – 15-30 vehicles/15-30 parking spaces
- Friday Afternoon Prayers – 2 sessions with 60-90 vehicles/60-90 parking spaces at each sessions
- Religious Education (Sunday afternoons) – 32 children attending, < 32 vehicles/minimal parking due to drop-off
- Prayer for the Deceased (as needed) – 60-100 persons attending, 30-50 vehicles/30-50 parking spaces
- Religious Wedding (as needed, typically Saturday afternoon) – 20-30 persons attending, 10-15 vehicles/10-15 parking spaces
- Family Nights (once/month, Friday night) – 90-100 persons attending, 20-25 vehicles/20-25 parking spaces

It is important to note that these are all scheduled events. There will not be a situation where two events are scheduled at the same time.

Existing Roadway Network

Ernston Road, also known as County Route 673, is under the jurisdiction of Middlesex County. One lane is provided for each direction of travel in the eastbound and westbound directions. The speed limit along Ernston Road is posted as 35 miles per hour.

Bordentown Avenue, also known as County Route 615, is under the jurisdiction of Middlesex County. One lane is provided for each direction of travel in the northbound and southbound directions. The speed limit along Bordentown Avenue is posted as 40 miles per hour in the vicinity of the site.

There are four driveways which intersect Ernston Road along the site frontage. 212 and 214 Ernston Road have typical residential driveways. 216 Ernston Road has one residential driveway and one driveway with a width of approximately 40 feet which leads to a paved parking lot to the west of the principal structure.

The intersection of Ernston Road and Bordentown Avenue is a four-leg intersection controlled by a traffic signal. The northbound, southbound and eastbound approaches to the intersection each provide a left-turn lane, a through lane and a right-turn lane. The westbound approach to the intersection provides a left-turn lane, a through lane and a shared through/right-turn lane.

There are two minor intersections along Ernston Road between the site frontage and the intersection with Bordentown Avenue (Parkway Place, Rutgers Road). These are stop controlled intersections with the Ernston Road traffic having the right-of-way. Any site-generated traffic added to the intersection is expected to consist primarily of through traffic along Ernston Road and will have a minimal impact on operations at these locations. Therefore, these intersections were not included in the analysis.

Existing Traffic Volumes

Manual turning movement counts were conducted on Friday, April 29, 2022 from 12:00 p.m. until 4:00 p.m. at the two driveways for 216 Ernston Road. Given the existing development pattern and low volumes of traffic associated with 212 Ernston Road and 214 Ernston Road, these driveways were not included in the traffic count program. Note that at the time these traffic counts were performed, the mosque on the property was being used and experienced higher than typical driveway volumes due to holiday traffic.

These time periods were selected to capture the concurrent peaks of street traffic and site-generated traffic, as well as traffic associated with the dismissal of the nearby Samsel Upper Elementary School. The existing peak hour traffic volumes at the mosque driveways were found to occur from 1:00 p.m. until 2:00 p.m. which reflects the peak times for Friday prayers.

At the request of the Board Engineer, additional traffic counts were conducted at the intersection of Ernston Road and Bordentown Avenue on Friday, June 16, 2023 from 12:00 p.m. until 4:00 p.m. and again on Sunday, June 18, 2023 from 9:30 a.m. until 1:30 p.m. This intersection was selected due the potential for site-generated traffic and turning movements impacting operations. The Sunday peak hour was included in the analysis due to the relatively high volume of street traffic during the Sunday peak hour.

Peak hour traffic volumes for the intersection of Ernston Road and Bordentown Avenue are shown on the attached Figure 2, which provides a schematic representation of the study area.

Other Nearby Mosques

At the request of the Board Engineer, traffic data was collected at existing mosques in the vicinity of the site to establish vehicle occupancy rates. Specifically traffic counts were conducted during Friday prayers at the Anjuman e Burhani Mosque in East Brunswick and Dawatul Islamia Mosque in Somerset. These counts showed average occupancies of 1.82 persons/vehicle and 1.88 persons/vehicle, respectively.

Analysis of Existing Traffic Volumes

Existing Traffic Volumes at the study intersection were analyzed utilizing Highway Capacity Software ("HCS"), which is based on methodologies contained in the Highway Capacity Manual. This software evaluates the operational efficiency of individual movements, approaches and for the intersection as a whole, based on average delay in seconds per vehicle. This average delay translates to a letter grade on an "A" through "F" scale, with "A" representing the best conditions and "F" being the worst. These letter grades are referred to as Levels of Service. The Level of Service and average delay for existing conditions are summarized in the appendix of this report.

Results of the analyses of existing traffic volumes for the study intersection are shown on attached **Figure 3**. As indicated, all movements at the intersection operate at Level of Service "C" or "D" under existing conditions.

Site Generated Traffic Volumes

Typically, site generated traffic for proposed developments is based on data presented by the Institute of Transportation Engineers ("ITE") in the publication Trip Generation, which is currently in its 11th Edition. In this case, the ITE has very limited data available for mosques (2 sample sites) and no data was available through NJDOT. Therefore, projections of future traffic volumes are based on a comparison of existing traffic volumes at the site versus those anticipated by the client as a result of the proposed development.

Currently the site has Friday prayers once during the Friday afternoon period. 150 vehicles enter the site for Friday prayers based on the traffic counts during a holiday period.

Based on a schedule of events provided by the client, the Friday afternoon prayers are expected to be the main generator of traffic associated with the proposed mosque. Attendance at the regular Friday services is expected to be no greater than 90 vehicles (180 trips).

The Board Engineer had also requested that the traffic associated with the religious instruction for children on Sundays be included in the analysis of traffic operations. It is expected that the religious instruction would generate 30 vehicles (60 trips) at the start of the session and 30 vehicles (60 trips) at the end of the session as parents would likely drop-off their children and return at the end of the session.

The projected site-generated traffic was routed to/from the site based on existing travel patterns and the distribution of site generated traffic counted at the site driveways during June 2022.

The projected site-generated traffic volumes are shown on attached **Figure 4**. These volumes reflect the existing distribution of traffic to/from the east and west, projected driveway volumes and the proposed driveway configuration at the site.

Comparison to Church

The ITE has published data for Churches based on 16 studies. Using the assemblage area of 14,941 s.f., the traffic associated with a church would be 105 vehicles (211 trips) during the critical Sunday peak hour. This is comparable to traffic associated with the proposed mosque, although the church would experience its peak traffic generation on Sunday morning as opposed to Friday afternoon.

Future Traffic Volumes

In order to account for background traffic growth in the area as well as other developments in Sayreville, existing traffic volumes were increased by an annual 1% growth rate over a two year year build-out period (2023 to 2025), to develop the future "No-Build" Traffic volumes. The 1% growth rate was selected based on data published by NJDOT for minor arterial roadways in Middlesex County. Future "No-Build" traffic volumes are shown on attached **Figure 5**. Site-generated traffic volumes were added to the "No-Build" traffic volumes to develop the future "Build" traffic volumes, which are shown on attached **Figure 6**.

Analysis of Future Traffic Volumes

Future "No-Build" and "Build" traffic volumes were analyzed using HCS. Results of these analyses are shown on the attached **Figures 7 and 8**, for the "No-Build" and "Build" traffic volumes, respectively.

Note that there is no change when comparing Levels of Service for movements under existing, "No-Build" and "Build" conditions at the study intersection. In addition, all movements at the site driveways are projected to operate at Level of Service "C" or better during both the Friday and Sunday peak periods. As with existing conditions, the Level of Service and average Delay for "No-Build" and "Build" analyses is summarized in the appendix of this report.

The applicant has also agreed to hire an off-duty officer from the Sayreville Police Department to control traffic at the site driveways during and after Friday prayer services as well as at periodic events which are expected to have higher than typical attendance.

Per the results of these analyses, the impact of site-generated traffic on Levels of Service is negligible.

Parking Supply

Based on a review of the site plan prepared by AWZ Engineering, last revised February 3, 2023, the applicant is required to provide 113 parking spaces for the combined place of worship, gymnasium, offices and classrooms. A total of 109 parking spaces are proposed. Accordingly a variance is required.

The gymnasium will not be in use when the prayer services are being conducted. Parking required for the gymnasium constitutes 46 of the total 113 required parking spaces. Therefore the proposed parking supply is adequate for the intended use of the property.

Site Layout/Circulation

The following site layout and circulation comments are based on the site plan prepared by AWZ Engineering, Inc.:

- The typical parking spaces on site measure nine feet wide by eighteen feet deep in accordance with accepted engineering standards.
- Six ADA accessible parking spaces are provided, including two van-accessible parking spaces, which satisfies accessibility requirements.
- Twenty-four foot wide circulation aisles are adequate for parking with two-way traffic.
- The provision of multiple access allows for safe and efficient access to the site.

Middlesex County Review

Note that application materials have been provided to Middlesex County for review. As noted above, the proposed driveways are subject to review and approval of the County as Ernston Road is under County jurisdiction. At this point, the County has not granted final approval, but the substance of their

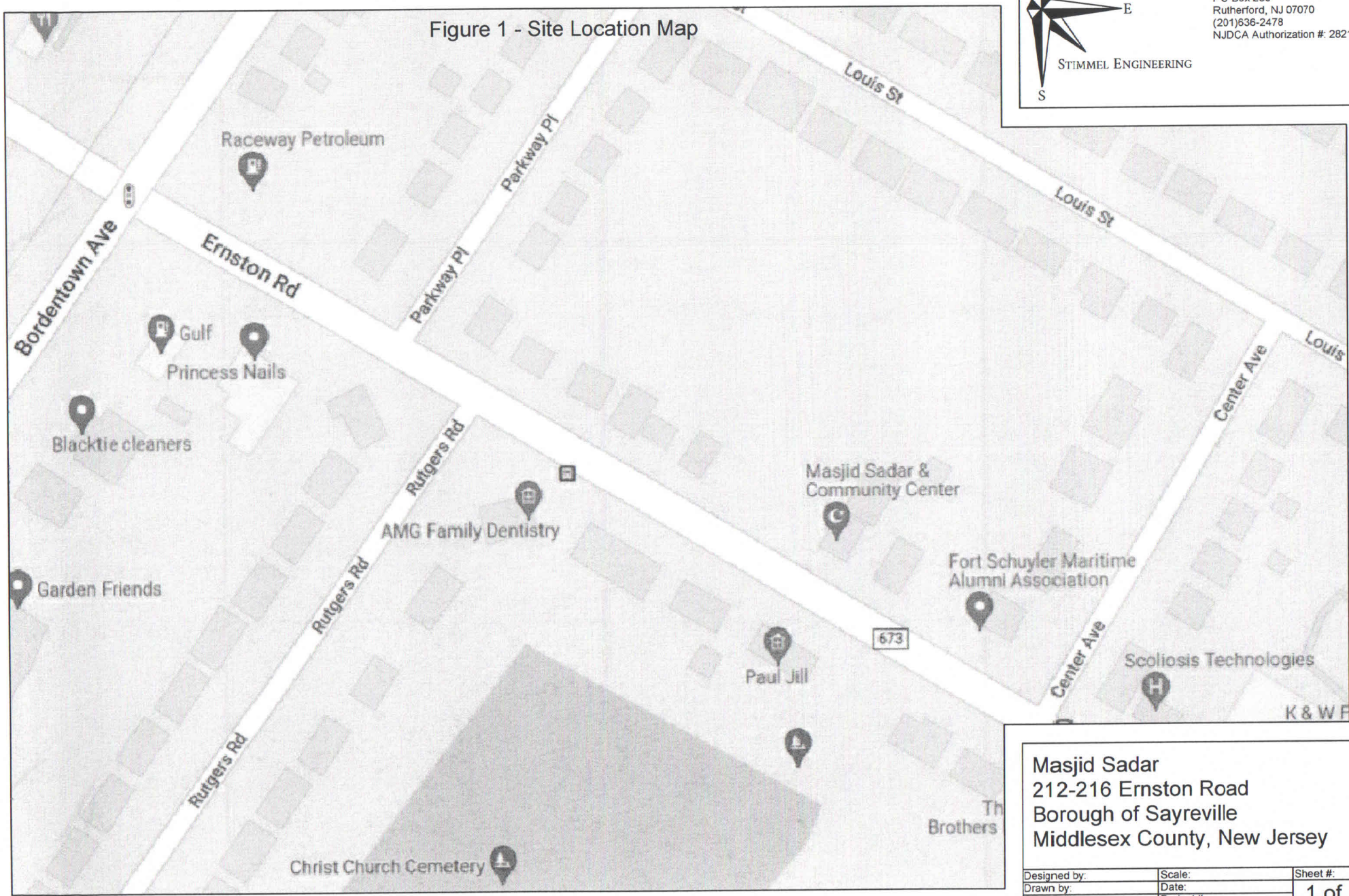
comments has been addressed by the preparation of revised plans and documents, and it is anticipated that final approval from Middlesex County will be received within the next three months.

Conclusion

The proposed development will have minimal impact on operations at the study intersection and site driveways. Adequate parking and circulation areas are provided on the site to accommodate the volume of traffic expected for the proposed use and the types of vehicles expected to access the facility on a regular basis.

Attachments
Figures 1-8
HCS Reports
Traffic Count Data
NJDOT Growth Rates
LOS/Delay Table
Weekly Schedule
Church Traffic Projections

Figure 1 - Site Location Map



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Masjid Sadar
212-216 Ernston Road
Borough of Sayreville
Middlesex County, New Jersey

Designed by:	Scale:	Sheet #:
Drawn by:	Date:	1 of 1
Checked by:	Project #:	

Figure 2
Existing Traffic Volumes
Friday (Sunday) Peak Hour

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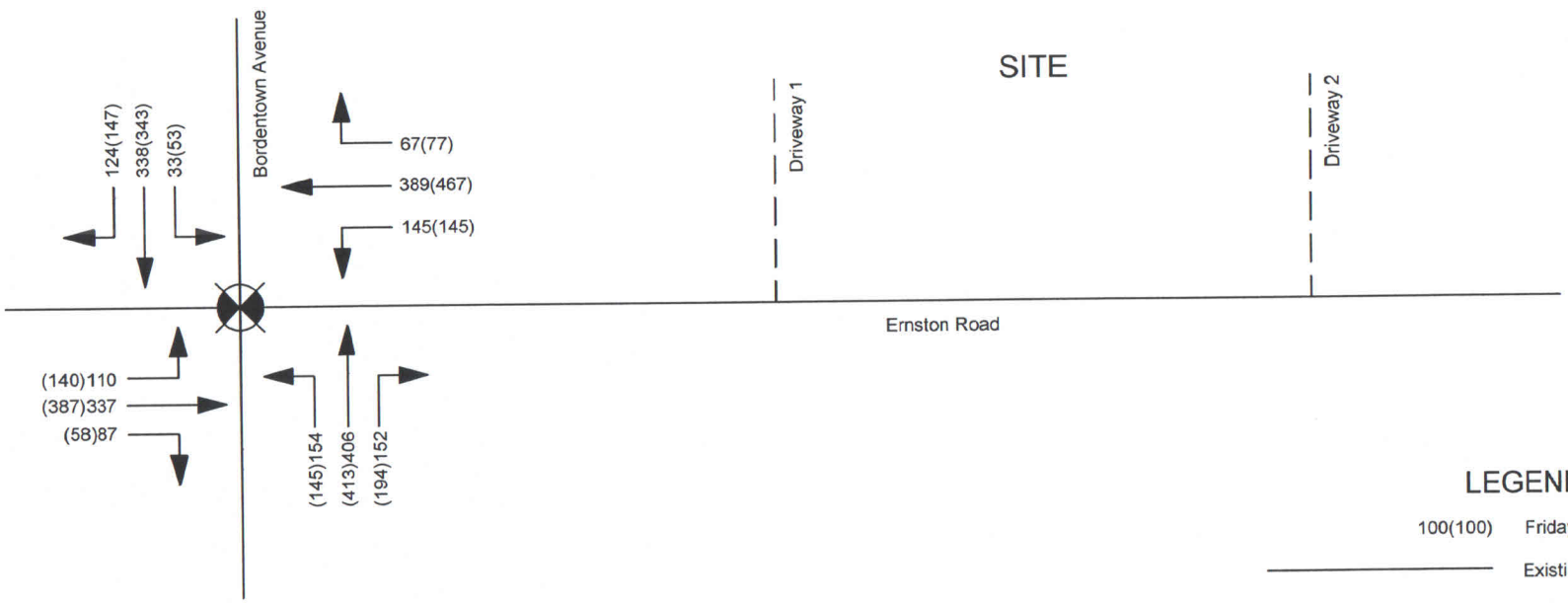

LEGEND

100(100) Friday(Sunday) Peak Hour

Existing Roadway

Proposed Driveway

Masjid Sadar
212-216 Ernston Road
Borough of Sayreville
Middlesex County, New Jersey

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Figure 3
Existing Levels of Service
Friday (Sunday) Peak Hour

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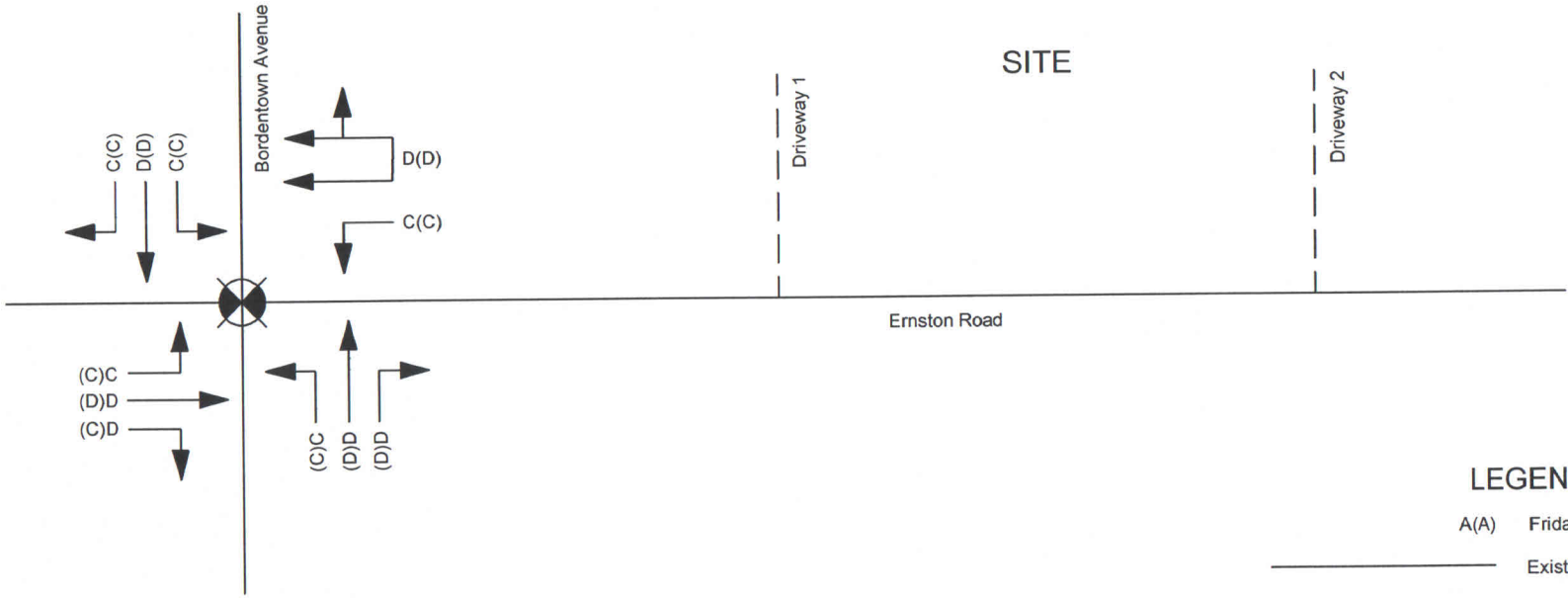

LEGEND

A(A) Friday(Sunday) Peak Hour

Existing Roadway

Proposed Driveway

Masjid Sadar
212-216 Ernston Road
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Figure 4
Site-Generated Traffic Volumes
Friday (Sunday) Peak Hour

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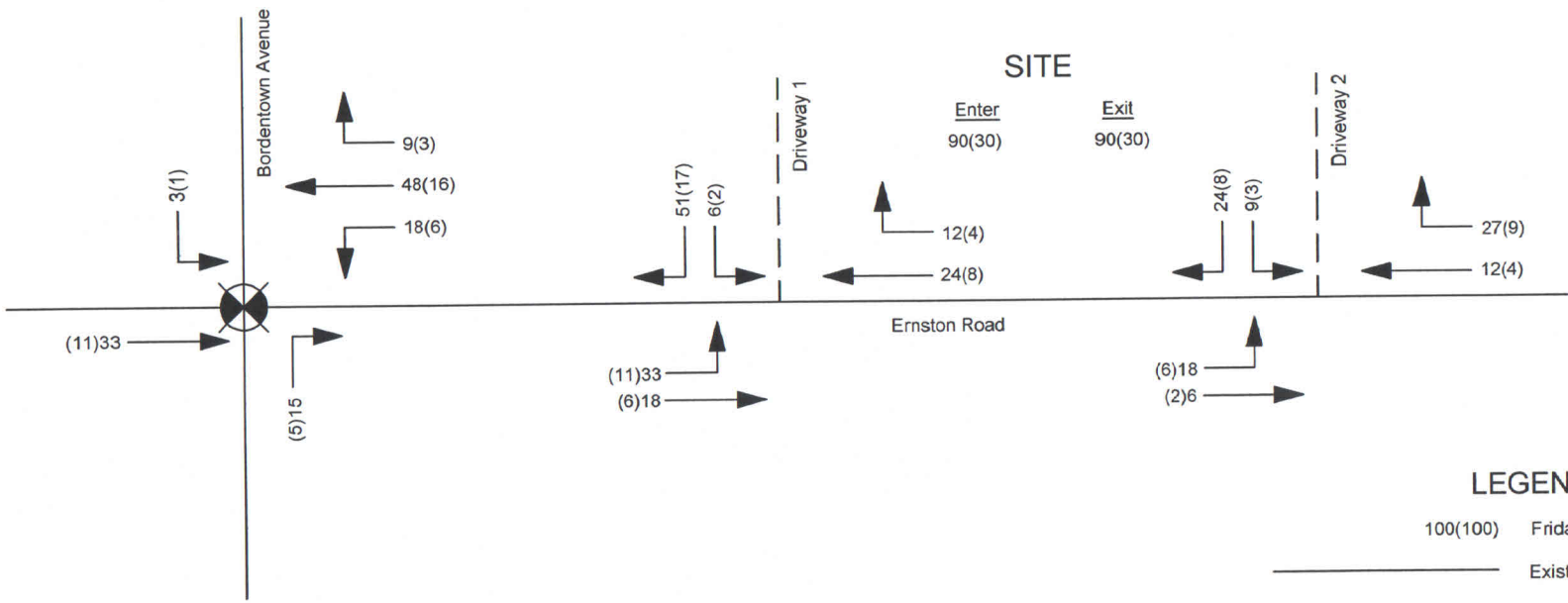

LEGEND

100(100)	Friday(Sunday) Peak Hour
———	Existing Roadway
— — — — —	Proposed Driveway

Masjid Sadar
212-216 Ernston Road
Borough of Sayreville
Middlesex County, New Jersey

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Figure 5
"No-Build" Traffic Volumes
Friday (Sunday) Peak Hour

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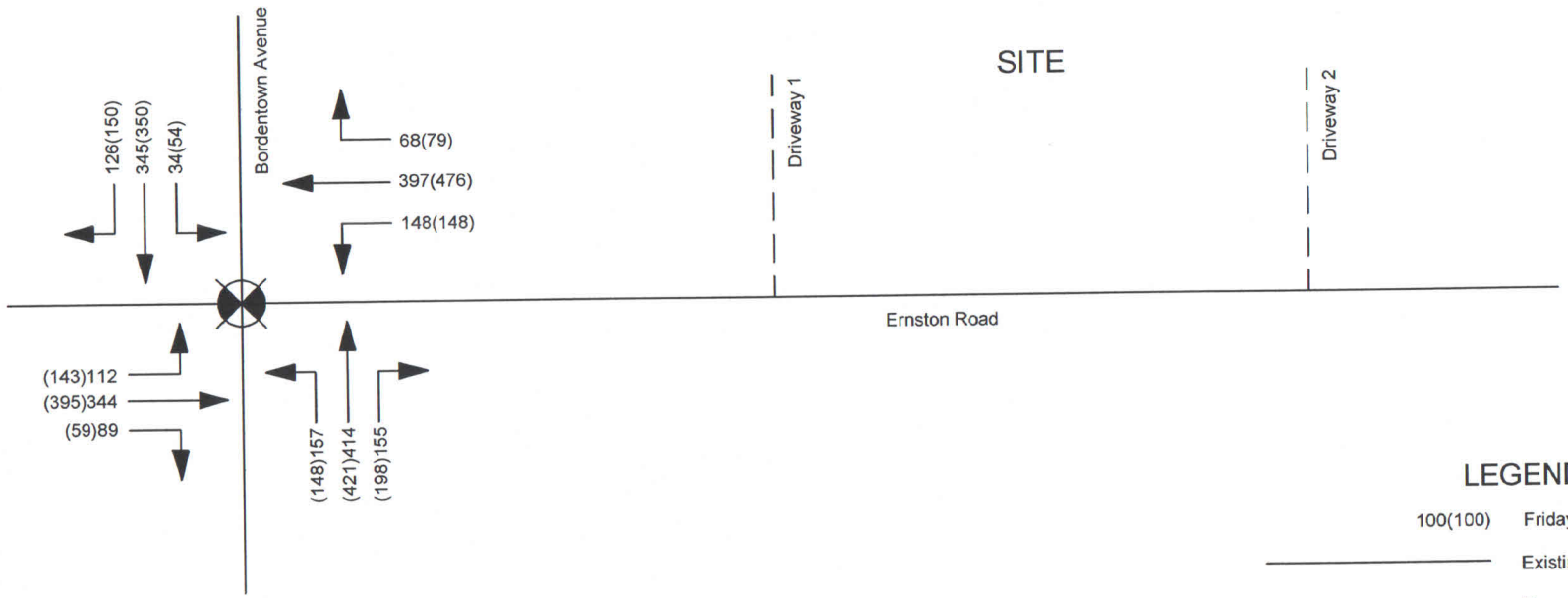

LEGEND

100(100)	Friday(Sunday) Peak Hour
———	Existing Roadway
— — — — —	Proposed Driveway

Masjid Sadar
212-216 Ernston Road
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Middlesex County, New Jersey

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Figure 6
"Build" Traffic Volumes
Friday (Sunday) Peak Hour

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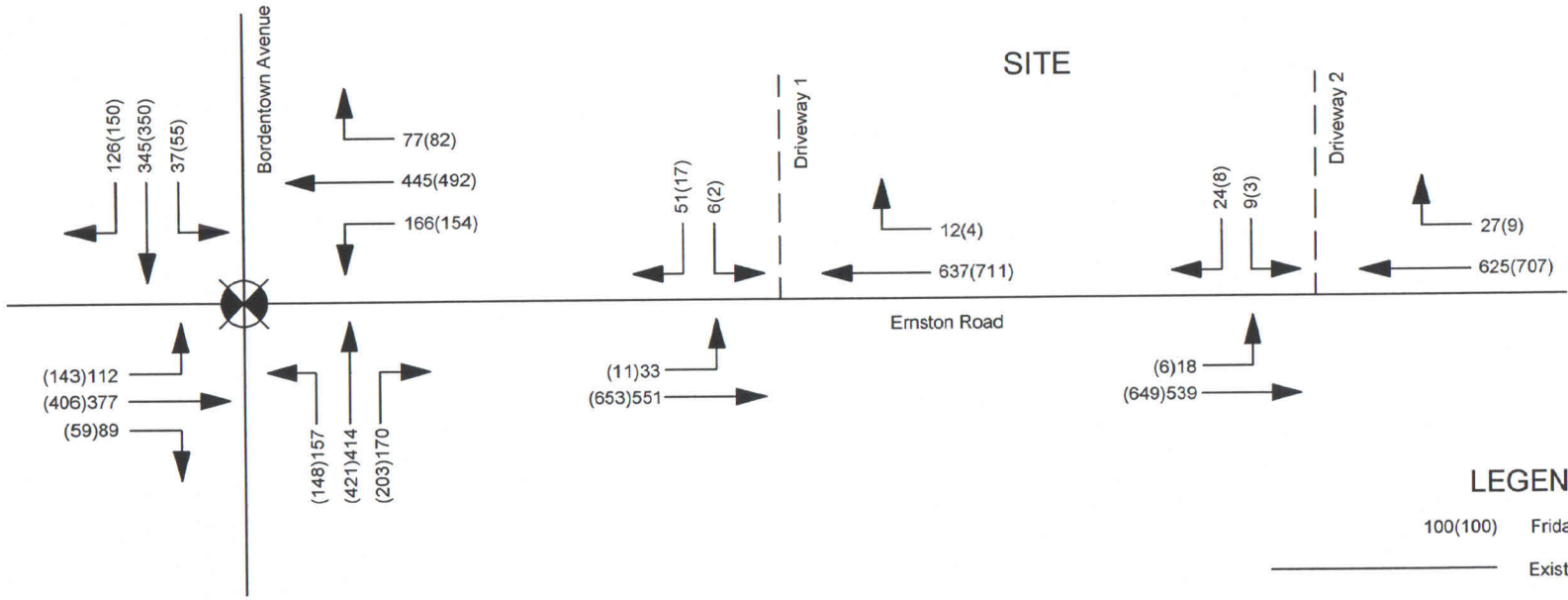

LEGEND

100(100) Friday(Sunday) Peak Hour

Existing Roadway

Proposed Driveway

Masjid Sadar
212-216 Ernston Road
Borough of Sayreville
Middlesex County, New Jersey

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Checked by:	Project #:	

Figure 7
"No-Build" Levels of Service
Friday (Sunday) Peak Hour

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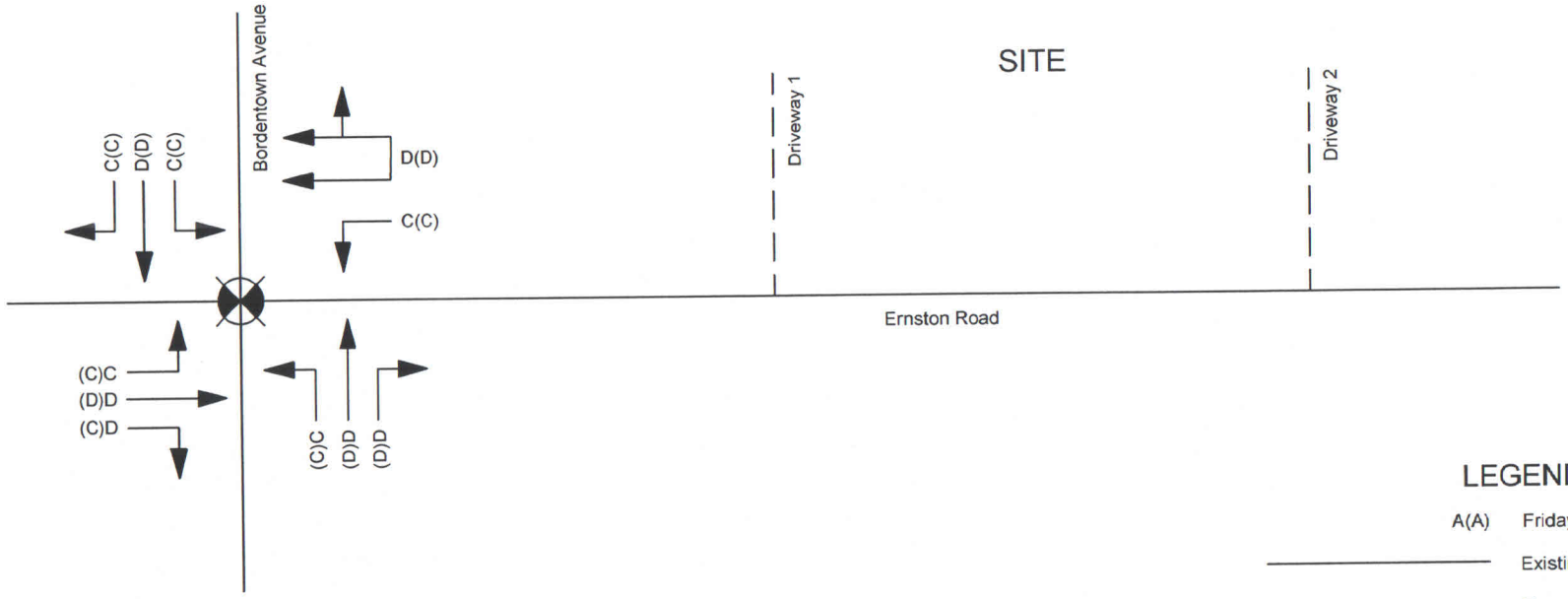

LEGEND

A(A) Friday(Sunday) Peak Hour

Existing Roadway

Proposed Driveway

Masjid Sadar
212-216 Ernston Road
Borough of Sayreville
Middlesex County, New Jersey

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Figure 8
"Build" Levels of Service
Friday (Sunday) Peak Hour

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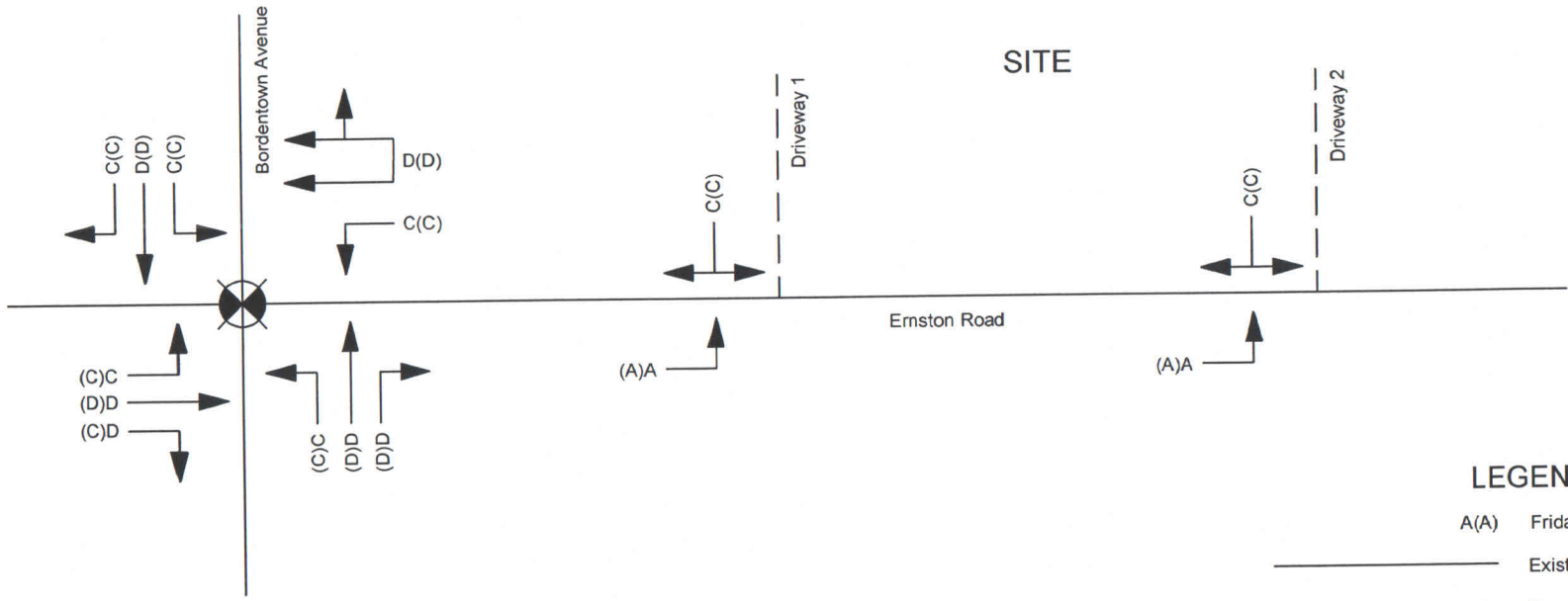


LEGEND

A(A) Friday(Sunday) Peak Hour

Existing Roadway

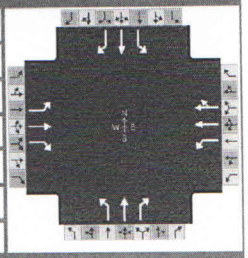
Proposed Driveway

Masjid Sadar
212-216 Ernston Road
Borough of Sayreville
Middlesex County, New Jersey

Designed by:	Scale:	Sheet #:
Drawn by:	Date:	1 of 1
Checked by:	Project #:	

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	8/2/2023	Area Type	Other
Jurisdiction		Time Period		PHF	0.97
Urban Street		Analysis Year	2023	Analysis Period	1> 7:00
Intersection	Ernston Road/Bordento...	File Name	i1 friday existing.xus		
Project Description	ernston road - friday existing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	110	337	87	145	389	67	154	406	152	33	338	124

Signal Information			
Cycle, s	131.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	18.0	38.0	19.0	40.0	0.0	0.0	1	2	3	4		
Yellow	4.0	4.0	4.0	4.0	0.0	0.0	5	6	7	8		
Red	0.0	0.0	0.0	0.0	0.0	0.0						

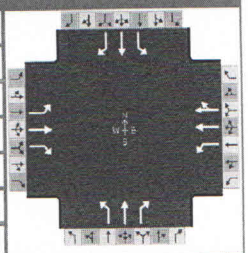
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	3.0	1.1	3.0
Phase Duration, s	22.0	42.0	22.0	42.0	23.0	44.0	23.0	44.0
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	7.2	23.6	9.0	16.1	9.2	28.8	3.4	23.2
Green Extension Time (g_e), s	0.1	1.6	0.2	1.7	0.2	1.8	0.0	2.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.00	0.01	0.00	0.00	0.00	0.07	0.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	113	347	90	149	240	230	159	419	157	34	348	128
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753	1841	1560	1753	1841	1747	1753	1841	1560	1753	1841	1560
Queue Service Time (g_s), s	5.2	21.6	5.7	7.0	13.9	14.1	7.2	26.8	10.2	1.4	21.2	8.1
Cycle Queue Clearance Time (g_c), s	5.2	21.6	5.7	7.0	13.9	14.1	7.2	26.8	10.2	1.4	21.2	8.1
Green Ratio (*g/C*)	0.43	0.29	0.29	0.43	0.29	0.29	0.45	0.31	0.31	0.45	0.31	0.31
Capacity (*c*), veh/h	447	534	452	407	534	507	439	562	476	391	562	476
Volume-to-Capacity Ratio (*X*)	0.253	0.651	0.198	0.367	0.449	0.455	0.362	0.745	0.329	0.087	0.620	0.268
Back of Queue (*Q*), ft/ln (50 th percentile)	55.5	259.4	56	75.1	162.3	151.6	76.4	328.7	100.1	15.1	252	80
Back of Queue (*Q*), veh/ln (50 th percentile)	2.2	10.1	2.2	2.9	6.3	6.1	3.0	12.7	3.9	0.6	9.8	3.1
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	24.1	40.7	35.0	26.0	38.0	38.0	24.2	40.9	35.1	23.5	39.0	34.4
Incremental Delay (d_2), s/veh	0.1	2.2	0.1	0.2	0.2	0.2	0.2	4.8	0.1	0.0	1.6	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	24.2	42.9	35.1	26.2	38.2	38.3	24.4	45.7	35.3	23.5	40.5	34.5
Level of Service (LOS)	C	D	D	C	D	D	C	D	D	C	D	C
Approach Delay, s/veh / LOS	37.8	D		35.3	D		38.8	D		37.9	D	
Intersection Delay, s/veh / LOS	37.5						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	2.13	B	2.13	B	2.30	B
Bicycle LOS Score / LOS	1.40	A	1.00	A	1.70	B	1.33	A

HCS7 Signalized Intersection Results Summary

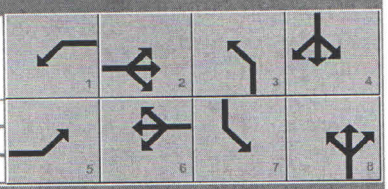
General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	8/2/2023	Area Type	Other
Jurisdiction		Time Period		PHF	0.99
Urban Street		Analysis Year	2023	Analysis Period	1> 7:00
Intersection	Ernston Road/Bordento...	File Name	i1 sunday existing.xus		
Project Description	ernston road - sunday existing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	140	387	58	145	467	77	145	413	194	53	343	147

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	40.0	18.0	41.0	0.0	0.0	
Yellow	4.0	4.0	4.0	4.0	0.0	0.0	
Red	0.0	0.0	0.0	0.0	0.0	0.0	



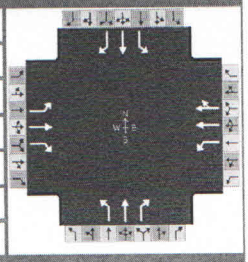
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	3.0	1.1	3.0
Phase Duration, s	19.0	44.0	19.0	44.0	22.0	45.0	22.0	45.0
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	8.6	26.3	8.8	18.4	8.5	28.1	4.2	22.6
Green Extension Time (g_e), s	0.1	1.8	0.1	1.9	0.2	2.0	0.0	2.2
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.02	0.02	0.03	0.00	0.00	0.05	0.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	141	391	59	146	280	269	146	417	196	54	346	148
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753	1841	1560	1753	1841	1750	1753	1841	1560	1753	1841	1560
Queue Service Time (g_s), s	6.6	24.3	3.5	6.8	16.2	16.4	6.5	26.1	12.8	2.2	20.6	9.4
Cycle Queue Clearance Time (g_c), s	6.6	24.3	3.5	6.8	16.2	16.4	6.5	26.1	12.8	2.2	20.6	9.4
Green Ratio (*g/C*)	0.42	0.31	0.31	0.42	0.31	0.31	0.45	0.32	0.32	0.45	0.32	0.32
Capacity (*c*), veh/h	398	566	480	361	566	538	442	581	492	393	581	492
Volume-to-Capacity Ratio (*X*)	0.355	0.690	0.122	0.406	0.495	0.500	0.331	0.719	0.398	0.136	0.597	0.302
Back of Queue (*Q*), ft/ln (50 th percentile)	70.6	292.3	34.5	73.4	187.7	175	68.7	315.9	125.5	23.7	242.8	91.9
Back of Queue (*Q*), veh/ln (50 th percentile)	2.7	11.3	1.3	2.8	7.3	7.0	2.7	12.2	4.9	0.9	9.4	3.6
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	25.1	39.6	32.4	26.7	36.8	36.8	23.5	39.4	34.8	23.2	37.5	33.7
Incremental Delay (d_2), s/veh	0.2	3.0	0.0	0.3	0.2	0.3	0.2	3.7	0.2	0.1	1.2	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	25.3	42.5	32.4	27.0	37.0	37.1	23.6	43.1	35.0	23.3	38.7	33.8
Level of Service (LOS)	C	D	C	C	D	D	C	D	D	C	D	C
Approach Delay, s/veh / LOS	37.4	D		34.9	C		37.3	D		35.9	D	
Intersection Delay, s/veh / LOS	36.4						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	2.13	B	2.13	B	2.29	B
Bicycle LOS Score / LOS	1.46	A	1.06	A	1.74	B	1.39	A

HCS7 Signalized Intersection Results Summary

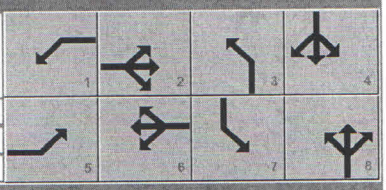
General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	8/2/2023	Area Type	Other
Jurisdiction		Time Period		PHF	0.97
Urban Street		Analysis Year	2023	Analysis Period	1> 7:00
Intersection	Ernston Road/Bordento...	File Name	i1 friday no build.xus		
Project Description	ernston road - friday no build				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	112	344	89	148	397	68	157	414	155	34	345	126

Signal Information			
Cycle, s	131.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	18.0	38.0	19.0	40.0	0.0	0.0	
Yellow	4.0	4.0	4.0	4.0	0.0	0.0	
Red	0.0	0.0	0.0	0.0	0.0	0.0	



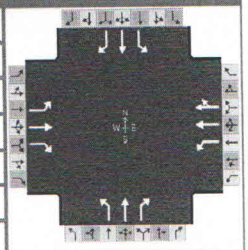
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	3.0	1.1	3.0
Phase Duration, s	22.0	42.0	22.0	42.0	23.0	44.0	23.0	44.0
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	7.3	24.2	9.1	16.5	9.3	29.5	3.5	23.8
Green Extension Time (g_e), s	0.1	1.6	0.2	1.7	0.2	1.8	0.0	2.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.00	0.02	0.00	0.00	0.00	0.09	0.00	0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	115	355	92	153	244	235	162	427	160	35	356	130
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753	1841	1560	1753	1841	1747	1753	1841	1560	1753	1841	1560
Queue Service Time (g_s), s	5.3	22.2	5.8	7.1	14.2	14.5	7.3	27.5	10.4	1.5	21.8	8.3
Cycle Queue Clearance Time (g_c), s	5.3	22.2	5.8	7.1	14.2	14.5	7.3	27.5	10.4	1.5	21.8	8.3
Green Ratio (*g/C*)	0.43	0.29	0.29	0.43	0.29	0.29	0.45	0.31	0.31	0.45	0.31	0.31
Capacity (*c*), veh/h	444	534	452	402	534	507	434	562	476	385	562	476
Volume-to-Capacity Ratio (*X*)	0.260	0.664	0.203	0.379	0.458	0.464	0.373	0.759	0.335	0.091	0.633	0.273
Back of Queue (*Q*), ft/ln (50 th percentile)	56.6	267.1	57.4	76.7	166	155.1	78	339.1	102.3	15.6	259.2	81.4
Back of Queue (*Q*), veh/ln (50 th percentile)	2.2	10.4	2.2	3.0	6.4	6.2	3.0	13.1	4.0	0.6	10.0	3.2
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	24.2	40.9	35.1	26.1	38.1	38.1	24.4	41.1	35.2	23.6	39.2	34.5
Incremental Delay (d_2), s/veh	0.1	2.5	0.1	0.2	0.2	0.2	0.2	5.4	0.2	0.0	1.8	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	24.3	43.4	35.2	26.4	38.3	38.4	24.6	46.5	35.4	23.7	40.9	34.6
Level of Service (LOS)	C	D	D	C	D	D	C	D	D	C	D	C
Approach Delay, s/veh / LOS	38.1	D		35.4	D		39.4	D		38.2	D	
Intersection Delay, s/veh / LOS	37.8						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	2.13	B	2.13	B	2.30	B
Bicycle LOS Score / LOS	1.41	A	1.01	A	1.72	B	1.35	A

HCS7 Signalized Intersection Results Summary

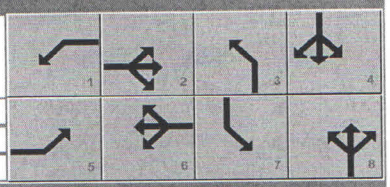
General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	8/2/2023	Area Type	Other
Jurisdiction		Time Period		PHF	0.99
Urban Street		Analysis Year	2023	Analysis Period	1> 7:00
Intersection	Ernston Road/Bordento...	File Name	i1 sunday no build.xus		
Project Description	ernston road - sunday no build				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	143	395	59	148	476	79	148	421	198	54	350	150

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	40.0		18.0	41.0		0.0	0.0				
Yellow	4.0	4.0		4.0	4.0		0.0	0.0				
Red	0.0	0.0		0.0	0.0		0.0	0.0				



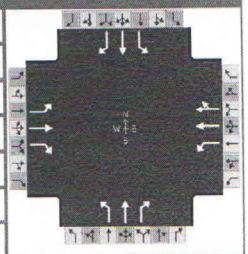
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	3.0	1.1	3.0
Phase Duration, s	19.0	44.0	19.0	44.0	22.0	45.0	22.0	45.0
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	8.7	26.9	9.0	18.7	8.6	28.7	4.3	23.2
Green Extension Time (g_e), s	0.1	1.8	0.1	1.9	0.2	2.1	0.0	2.2
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.03	0.03	0.04	0.00	0.00	0.07	0.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	144	399	60	149	286	274	149	425	200	55	354	152
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753	1841	1560	1753	1841	1749	1753	1841	1560	1753	1841	1560
Queue Service Time (g_s), s	6.7	24.9	3.6	7.0	16.6	16.7	6.6	26.7	13.1	2.3	21.2	9.6
Cycle Queue Clearance Time (g_c), s	6.7	24.9	3.6	7.0	16.6	16.7	6.6	26.7	13.1	2.3	21.2	9.6
Green Ratio (*g/C*)	0.42	0.31	0.31	0.42	0.31	0.31	0.45	0.32	0.32	0.45	0.32	0.32
Capacity (*c*), veh/h	394	566	480	355	566	538	437	581	492	387	581	492
Volume-to-Capacity Ratio (*X*)	0.366	0.704	0.124	0.421	0.505	0.510	0.342	0.733	0.407	0.141	0.609	0.308
Back of Queue (Q), ft/ln (50 th percentile)	72.3	301.3	35.1	75.2	192.5	179.3	70.3	325.5	128.6	24.2	249.3	94
Back of Queue (Q), veh/ln (50 th percentile)	2.8	11.7	1.4	2.9	7.5	7.2	2.7	12.6	5.0	0.9	9.7	3.6
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	25.2	39.8	32.4	26.9	36.9	37.0	23.6	39.6	34.9	23.4	37.7	33.7
Incremental Delay (d_2), s/veh	0.2	3.4	0.0	0.3	0.3	0.3	0.2	4.2	0.2	0.1	1.3	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	25.4	43.1	32.4	27.2	37.2	37.3	23.8	43.8	35.1	23.4	39.1	33.9
Level of Service (LOS)	C	D	C	C	D	D	C	D	D	C	D	C
Approach Delay, s/veh / LOS	37.8	D		35.1	D		37.7	D		36.1	D	
Intersection Delay, s/veh / LOS	36.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	2.13	B	2.13	B	2.29	B
Bicycle LOS Score / LOS	1.48	A	1.07	A	1.77	B	1.41	A

HCS7 Signalized Intersection Results Summary

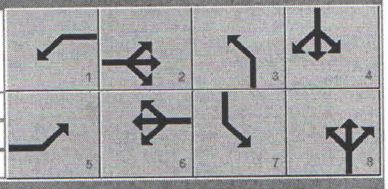
General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	8/2/2023	Area Type	Other
Jurisdiction		Time Period		PHF	0.97
Urban Street		Analysis Year	2023	Analysis Period	1> 7:00
Intersection	Ernston Road/Bordento...	File Name	i1 friday build.xus		
Project Description	ernston road - friday build				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	112	377	89	166	445	77	157	414	170	37	345	126

Signal Information			
Cycle, s	131.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	18.0	38.0	19.0	40.0	0.0	0.0	
Yellow	4.0	4.0	4.0	4.0	0.0	0.0	
Red	0.0	0.0	0.0	0.0	0.0	0.0	



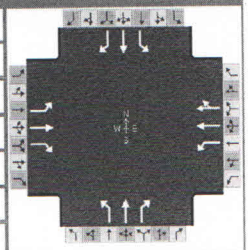
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	3.0	1.1	3.0
Phase Duration, s	22.0	42.0	22.0	42.0	23.0	44.0	23.0	44.0
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	7.3	26.9	10.1	18.5	9.3	29.5	3.6	23.8
Green Extension Time (g_e), s	0.1	1.7	0.2	1.9	0.2	1.9	0.0	2.1
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.00	0.06	0.01	0.00	0.00	0.10	0.00	0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	115	389	92	171	275	263	162	427	175	38	356	130
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753	1841	1560	1753	1841	1746	1753	1841	1560	1753	1841	1560
Queue Service Time (g_s), s	5.3	24.9	5.8	8.1	16.3	16.5	7.3	27.5	11.5	1.6	21.8	8.3
Cycle Queue Clearance Time (g_c), s	5.3	24.9	5.8	8.1	16.3	16.5	7.3	27.5	11.5	1.6	21.8	8.3
Green Ratio (*g/C*)	0.43	0.29	0.29	0.43	0.29	0.29	0.45	0.31	0.31	0.45	0.31	0.31
Capacity (*c*), veh/h	423	534	452	379	534	506	434	562	476	385	562	476
Volume-to-Capacity Ratio (*X*)	0.273	0.728	0.203	0.452	0.515	0.520	0.373	0.759	0.368	0.099	0.633	0.273
Back of Queue (Q), ft/ln (50 th percentile)	56.7	305.2	57.4	87.2	190.7	177.7	78	339.1	113.5	17	259.2	81.4
Back of Queue (Q), veh/ln (50 th percentile)	2.2	11.8	2.2	3.4	7.4	7.1	3.0	13.1	4.4	0.7	10.0	3.2
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	24.5	41.8	35.1	27.1	38.8	38.9	24.4	41.1	35.6	23.7	39.2	34.5
Incremental Delay (d_2), s/veh	0.1	4.3	0.1	0.3	0.4	0.4	0.2	5.4	0.2	0.0	1.8	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	24.6	46.2	35.2	27.5	39.2	39.3	24.6	46.5	35.8	23.7	40.9	34.6
Level of Service (LOS)	C	D	D	C	D	D	C	D	D	C	D	C
Approach Delay, s/veh / LOS	40.3	D		36.4	D		39.4	D		38.1	D	
Intersection Delay, s/veh / LOS	38.5						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	2.13	B	2.13	B	2.30	B
Bicycle LOS Score / LOS	1.47	A	1.07	A	1.75	B	1.35	A

HCS7 Signalized Intersection Results Summary

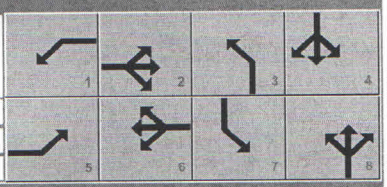
General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	8/2/2023	Area Type	Other
Jurisdiction		Time Period		PHF	0.99
Urban Street		Analysis Year	2023	Analysis Period	1> 7:00
Intersection	Ernston Road/Bordento...	File Name	i1 sunday build.xus		
Project Description	ernston road - sunday build				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	143	406	59	154	492	82	148	421	203	55	350	150

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	40.0	18.0	41.0	0.0	0.0	
Yellow	4.0	4.0	4.0	4.0	0.0	0.0	
Red	0.0	0.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	3.0	1.1	3.0
Phase Duration, s	19.0	44.0	19.0	44.0	22.0	45.0	22.0	45.0
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	8.7	27.8	9.3	19.4	8.6	28.7	4.3	23.2
Green Extension Time (g_e), s	0.1	1.8	0.1	2.0	0.2	2.1	0.0	2.2
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.03	0.05	0.06	0.00	0.00	0.07	0.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	144	410	60	156	296	284	149	425	205	56	354	152
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1753	1841	1560	1753	1841	1749	1753	1841	1560	1753	1841	1560
Queue Service Time (g_s), s	6.7	25.8	3.6	7.3	17.3	17.4	6.6	26.7	13.5	2.3	21.2	9.6
Cycle Queue Clearance Time (g_c), s	6.7	25.8	3.6	7.3	17.3	17.4	6.6	26.7	13.5	2.3	21.2	9.6
Green Ratio (*g/C*)	0.42	0.31	0.31	0.42	0.31	0.31	0.45	0.32	0.32	0.45	0.32	0.32
Capacity (*c*), veh/h	388	566	480	348	566	538	437	581	492	387	581	492
Volume-to-Capacity Ratio (*X*)	0.373	0.724	0.124	0.447	0.523	0.527	0.342	0.733	0.417	0.143	0.609	0.308
Back of Queue (*Q*), ft/ln (50 th percentile)	72.4	313.9	35.1	78.5	201	187	70.3	325.5	132.3	24.7	249.3	94
Back of Queue (*Q*), veh/ln (50 th percentile)	2.8	12.2	1.4	3.0	7.8	7.5	2.7	12.6	5.1	1.0	9.7	3.6
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	25.3	40.1	32.4	27.3	37.1	37.2	23.6	39.6	35.1	23.4	37.7	33.7
Incremental Delay (d_2), s/veh	0.2	4.0	0.0	0.3	0.4	0.5	0.2	4.2	0.2	0.1	1.3	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	25.6	44.1	32.4	27.6	37.6	37.7	23.8	43.8	35.3	23.5	39.1	33.9
Level of Service (LOS)	C	D	C	C	D	D	C	D	D	C	D	C
Approach Delay, s/veh / LOS	38.6	D		35.5	D		37.7	D		36.1	D	
Intersection Delay, s/veh / LOS	37.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	2.13	B	2.13	B	2.29	B
Bicycle LOS Score / LOS	1.50	B	1.09	A	1.77	B	1.41	A

HCS7 Two-Way Stop-Control Report

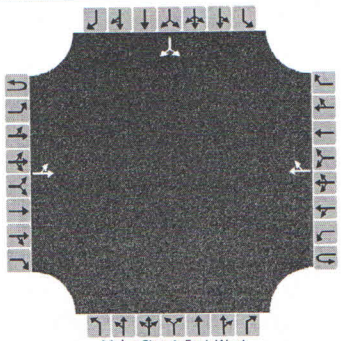
General Information

Analyst	W Stimmel
Agency/Co.	
Date Performed	8/2/2023
Analysis Year	2023
Time Analyzed	
Intersection Orientation	East-West
Project Description	ernston road - friday build

Site Information

Intersection	Ernston-West Drive (d1)
Jurisdiction	
East/West Street	Ernston Road
North/South Street	West Driveway
Peak Hour Factor	0.97
Analysis Time Period (hrs)	0.25

Lanes



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	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		33	551				637	12						6		51
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		34													59	
Capacity, c (veh/h)		930													393	
v/c Ratio		0.04													0.15	
95% Queue Length, Q_{95} (veh)		0.1													0.5	
Control Delay (s/veh)		9.0													15.8	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)	1.0												15.8			
Approach LOS													C			

HCS7 Two-Way Stop-Control Report

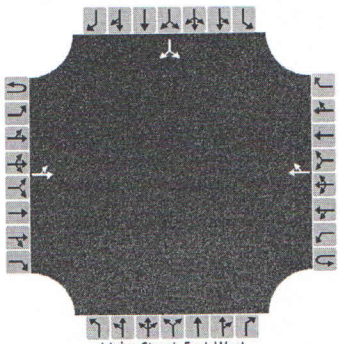
General Information

Analyst	W Stimmel
Agency/Co.	
Date Performed	8/2/2023
Analysis Year	2023
Time Analyzed	
Intersection Orientation	East-West
Project Description	ernston road - friday build

Site Information

Intersection	Ernston-East Drive (d2)
Jurisdiction	
East/West Street	Ernston Road
North/South Street	East Driveway
Peak Hour Factor	0.99
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

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	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		18	539				625	27						9		24
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		18													33	
Capacity, c (veh/h)		939													341	
v/c Ratio		0.02													0.10	
95% Queue Length, Q_{95} (veh)		0.1													0.3	
Control Delay (s/veh)		8.9													16.7	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)	0.5												16.7			
Approach LOS													C			

HCS7 Two-Way Stop-Control Report

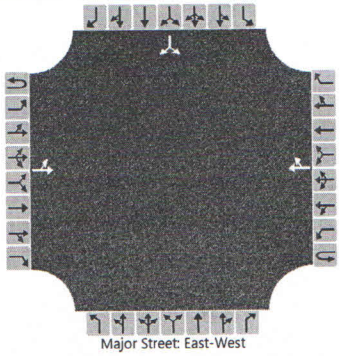
General Information

Analyst	W Stimmel
Agency/Co.	
Date Performed	8/2/2023
Analysis Year	2023
Time Analyzed	
Intersection Orientation	East-West
Project Description	ernston road - sunday build

Site Information

Intersection	Ernston-West Drive (d1)
Jurisdiction	
East/West Street	Ernston Road
North/South Street	West Driveway
Peak Hour Factor	0.99
Analysis Time Period (hrs)	0.25

Lanes



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	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		11	653				711	4						2		17
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		11													19	
Capacity, c (veh/h)		889													362	
v/c Ratio		0.01													0.05	
95% Queue Length, Q_{95} (veh)		0.0													0.2	
Control Delay (s/veh)		9.1													15.5	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)	0.3												15.5			
Approach LOS													C			

HCS7 Two-Way Stop-Control Report

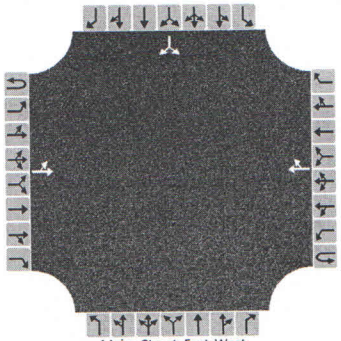
General Information

Analyst	W Stimmel
Agency/Co.	
Date Performed	8/2/2023
Analysis Year	2023
Time Analyzed	
Intersection Orientation	East-West
Project Description	ernston road - sunday build

Site Information

Intersection	Ernston-East Drive (d2)
Jurisdiction	
East/West Street	Ernston Road
North/South Street	East Driveway
Peak Hour Factor	0.99
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

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	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		6	649				707	9						3		8
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		6													11	
Capacity, c (veh/h)		888													293	
v/c Ratio		0.01													0.04	
95% Queue Length, Q_{95} (veh)		0.0													0.1	
Control Delay (s/veh)		9.1													17.8	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)	0.2												17.8			
Approach LOS													C			

Study Name 1- ERNSTON RD & BORDENTOWN AVE-FRI
Start Date 06-16-2023
Start Time 12:00 PM
Site Code

	BORDENTOWN AVE Southbound				ERNSTON RD Westbound				BORDENTOWN AVE Northbound				ERNSTON RD Eastbound			
Start Time	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn
12:00 PM	11	93	31	0	31	111	22	0	29	90	61	0	27	89	19	0
12:15 PM	13	74	33	0	31	114	23	0	37	96	48	0	31	92	10	0
12:30 PM	13	100	30	0	38	113	21	0	22	98	39	0	34	90	18	0
12:45 PM	8	87	38	0	41	111	19	0	30	103	43	0	28	92	14	0
1:00 PM	8	75	38	0	41	97	19	0	29	92	42	0	32	96	24	0
1:15 PM	10	92	29	0	41	100	14	0	38	106	34	0	30	86	22	0
1:30 PM	3	79	27	0	36	107	18	0	49	106	35	0	20	81	27	0
1:45 PM	12	92	30	0	27	85	16	0	38	102	41	0	28	74	14	0
2:00 PM	9	87	23	0	35	86	10	0	42	80	51	0	26	74	14	0
2:15 PM	5	82	39	0	34	88	18	0	42	96	52	0	20	72	17	0
2:30 PM	5	94	30	0	34	77	9	0	30	113	56	0	27	94	21	0
2:45 PM	9	104	26	0	26	92	12	0	35	110	40	0	25	83	27	0
3:00 PM	12	103	31	0	28	83	24	0	49	133	53	0	26	92	23	0
3:15 PM	11	75	33	0	40	110	21	0	42	92	52	0	28	83	19	0
3:30 PM	10	86	41	0	39	96	26	0	45	111	63	0	35	80	34	0
3:45 PM	10	83	34	0	51	90	18	0	33	95	41	0	32	105	30	0
peak hour vol.	33	338	124	0	145	389	67	0	154	406	152	0	110	337	87	0

Study Name 1- ERNSTON RD & BORDENTOWN AVE-SUN
Start Date 06-18-2023
Start Time 9:30 AM
Site Code

	BORDENTOWN AVE Southbound				ERNSTON RD Westbound				BORDENTOWN AVE Northbound				ERNSTON RD Eastbound			
Start Time	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn
9:30 AM	8	44	19	0	22	86	27	0	31	47	28	0	28	73	11	0
9:45 AM	14	60	27	0	20	97	19	0	26	55	33	0	33	121	13	0
10:00 AM	11	49	30	0	23	88	18	0	26	86	29	0	30	110	14	0
10:15 AM	10	46	26	0	33	95	29	0	30	68	29	0	19	81	17	0
10:30 AM	10	49	42	0	26	87	22	0	34	85	39	0	28	108	19	0
10:45 AM	6	75	25	0	35	64	22	0	25	92	35	0	42	119	19	0
11:00 AM	15	53	32	0	23	118	21	0	29	87	38	0	37	100	27	0
11:15 AM	14	66	25	0	40	97	16	0	38	79	36	0	37	83	27	0
11:30 AM	11	81	32	0	24	92	22	0	39	94	32	0	38	111	24	0
11:45 AM	10	68	39	0	27	122	19	0	22	86	42	0	36	114	21	0
12:00 PM	16	60	39	0	26	80	12	0	36	96	42	0	38	104	27	0
12:15 PM	8	80	34	0	26	113	26	0	24	97	37	0	40	97	15	0
12:30 PM	15	75	34	0	26	115	21	0	37	112	47	0	46	97	20	0
12:45 PM	15	94	36	0	33	138	22	0	40	74	36	0	36	90	19	0
1:00 PM	13	97	36	0	45	95	22	0	36	117	60	0	25	96	7	0
1:15 PM	10	77	41	0	41	119	12	0	32	110	51	0	33	104	12	0
peak hour vol.	53	343	147	0	145	467	77	0	145	413	194	0	140	387	58	0

Study Name 1-ERNSTON RD AT DRIVEWAYS
Start Date 04-29-2022
Start Time 12:00 PM
Site Code

	EAST DRIVEWAY Southbound				ERNSTON RD Westbound				ERNSTON RD Eastbound				WEST DRIVEWAY Southeastbound			
Start Time	Left	Right	Hard Right	U-Turn	Thru	Bear Right	Right	U-Turn	Hard Left	Left	Thru	U-Turn	Hard Left	Bear Left	Hard Right	U-Turn
12:00 PM	0	1	0	0	137	0	1	0	0	2	147	0	0	0	0	0
12:15 PM	0	0	0	0	169	0	0	0	0	1	156	0	0	0	0	0
12:30 PM	0	1	0	0	166	0	10	0	0	3	144	0	0	0	0	0
12:45 PM	0	1	0	0	143	0	13	0	0	10	147	0	0	0	0	0
1:00 PM	0	0	0	0	154	4	30	0	1	26	158	0	0	1	0	0
1:15 PM	0	0	0	0	151	1	20	0	5	30	155	0	1	0	0	0
1:30 PM	0	0	0	0	168	0	11	0	3	16	144	0	0	0	1	0
1:45 PM	1	8	0	0	132	0	2	0	0	1	166	0	0	3	25	0
2:00 PM	1	21	0	0	99	0	0	0	0	0	160	0	0	7	63	0
2:15 PM	0	3	0	0	183	1	1	0	0	0	155	0	0	2	12	0
2:30 PM	0	3	0	0	172	0	0	0	0	1	139	0	0	1	0	0
2:45 PM	0	2	0	0	169	0	1	0	0	0	148	0	0	0	1	0
3:00 PM	0	3	0	0	187	1	0	0	0	1	171	0	0	0	0	0
3:15 PM	0	1	0	0	156	0	0	0	0	1	162	0	0	0	0	0
3:30 PM	0	1	0	0	170	0	0	0	0	0	165	0	0	0	0	0
3:45 PM	0	1	0	0	164	0	0	0	0	1	157	0	0	0	0	0
peak hour	**1**	**8**	**0**	**0**	**605**	**5**	**63**	**0**	**9**	**73**	**623**	**0**	**1**	**4**	**26**	**0**

Study Name Churchill Dawatul Islamia
Start Date 06-16-2023
Start Time 12:00 PM
Site Code

	Exit		Entrance				Pedestrains	
Start Time	Left-Veh	Right -Veh	Left-Veh	Left-Occupancy	Right -Veh	Right-Occupancy	Enter	Exit
12:00 PM	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0
12:30 PM	0	0	9	1,2,2,2,1,3,3,1,2	6	1,1,1,3,2,2	2	0
12:45 PM	0	2	14	1,2,3,3,1,4,2,3,1,2,1,1,4,1	9	2,1,1,3,4,3,2,1,1	1	0
1:00 PM	0	3	0	0	6	2,1,2,2,1,1,	5	0
1:15 PM	1	0	0	0	3	2,2,1	4	11
1:30 PM	0	0	0	0	0	0	4	3
1:45 PM	14	6	0	0	0	0	0	0
2:00 PM	5	7	0	0	0	0	0	0
2:15 PM	3	2	0	0	0	0	0	0
2:30 PM	2	2	1	2	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0
3:15 PM	0	3	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0

average occupancy 1.88

Study Name Dunhams Corner Rd & Anjuman Mosque Driveway

Start Date 6/30/2023

Start Time 12:00 PM

Site Code

	Exit		Entrance				Pedestrains	
Start Time	Left-Veh	Right -Veh	Left-Veh	Left-Occupancy	Right -Veh	Right-Occupancy	Enter	Exit
12:00 PM	1	0	2	1,1	0	0	0	0
12:15 PM	1	2	0	0	0	0	0	0
12:30 PM	0	0	2	1,2	1	2	0	0
12:45 PM	1	0	4	2,3,3,2	8	4,2,2,1,1,2,1,2	0	0
1:00 PM	1	1	6	2,2,1,1,1,4	5	1,2,2,4,3,	1	0
1:15 PM	0	0	4	1,1,2,2	2	2,2	2	0
1:30 PM	6	7	0	0	0	0	0	1
1:45 PM	6	6	0	0	1	2	0	0
2:00 PM	0	2	0	0	0	0	0	0
2:15 PM	2	0	0	0	0	0	0	0
2:30 PM	0	1	2	1,1	0	0	0	0
2:45 PM	1	2	0	0	1	3	0	0
3:00 PM	3	2	0	0	1	2	0	0
3:15 PM	1	2	0	0	1	1	1	0
3:30 PM	1	1	0	0	2	2,1	0	0
3:45 PM	4	1	6	1,1,2,3,2,2	2	1,1	0	0

average occupancy 1.82

NJDOT ACCESS PERMIT
ANNUAL BACKGROUND GROWTH RATE TABLE
Valid for NJDOT Access Permits submitted April 2019 - April 2021

COUNTY	Functional Classification											
	RURAL						URBAN					
	Interstate	Other Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Local	Interstate	Freeway	Principal Arterial	Minor Arterial	Collector	Local
ATLANTIC	N/A	1.00%	1.50%	1.00%	1.00%	2.75%	N/A	1.00%	1.00%	1.00%	1.75%	1.00%
BERGEN	N/A	N/A	N/A	N/A	N/A	N/A	2.50%	2.00%	1.50%	2.50%	1.00%	1.00%
BURLINGTON	1.50%	1.75%	1.00%	1.25%	1.00%	1.25%	2.00%	2.00%	1.00%	1.50%	1.50%	1.00%
CAMDEN	1.50%	1.25%	1.00%	1.25%	1.00%	1.00%	2.25%	1.75%	1.00%	1.00%	2.25%	1.00%
CAPE MAY	N/A	1.50%	2.25%	1.00%	2.25%	1.25%	N/A	1.00%	1.00%	1.00%	1.00%	1.00%
CUMBERLAND	N/A	1.00%	1.00%	1.00%	1.00%	2.00%	N/A	1.00%	1.00%	1.25%	1.25%	1.00%
ESSEX	N/A	N/A	N/A	N/A	N/A	N/A	2.00%	3.00%	1.00%	2.00%	1.00%	1.50%
GLOUCESTER	1.50%	1.25%	1.00%	1.25%	1.75%	1.00%	2.50%	1.75%	1.00%	1.00%	2.25%	1.50%
HUDSON	N/A	N/A	N/A	N/A	N/A	N/A	1.00%	1.00%	1.00%	1.00%	1.00%	1.50%
HUNTERDON	1.00%	1.00%	1.00%	2.00%	1.00%	1.00%	2.25%	2.00%	1.25%	1.00%	2.50%	1.00%
MERCER	1.50%	1.00%	1.75%	1.50%	1.00%	1.00%	1.50%	2.50%	1.00%	1.00%	1.00%	1.00%
MIDDLESEX	1.00%	1.00%	1.75%	1.25%	1.00%	1.00%	1.50%	2.00%	1.00%	1.00%	1.00%	1.00%
MONMOUTH	1.50%	2.25%	1.00%	1.00%	1.00%	1.75%	1.00%	1.75%	1.25%	1.00%	2.50%	1.00%
MORRIS	1.25%	3.00%	1.00%	1.25%	2.50%	1.25%	1.50%	1.00%	1.00%	1.50%	1.00%	1.00%
OCEAN	1.00%	1.00%	1.00%	1.75%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.50%
PASSAIC	N/A	N/A	N/A	N/A	N/A	N/A	1.00%	1.00%	1.00%	1.00%	2.00%	1.00%
SALEM	1.50%	1.00%	1.00%	1.00%	1.50%	3.00%	2.00%	1.50%	1.25%	1.00%	1.00%	2.00%
SOMERSET	2.00%	1.00%	1.75%	1.00%	1.50%	1.00%	1.75%	2.25%	1.25%	1.00%	1.75%	1.00%
SUSSEX	1.00%	1.00%	1.75%	1.50%	1.50%	1.25%	1.00%	1.00%	1.00%	1.50%	1.50%	1.75%
UNION	N/A	N/A	N/A	N/A	N/A	N/A	1.25%	1.50%	1.00%	1.00%	1.00%	1.00%
WARREN	1.00%	1.00%	1.00%	1.00%	1.00%	1.25%	2.25%	1.00%	1.00%	1.00%	1.00%	1.00%

NOTE: For use in short term (within 1-3 years) background growth ONLY.

Example: Assume existing condition is 1,500 peak hour trips and the applicable growth rate is 2%. The multiplication factor for 2% compounded for 3 years is 1.0612. The three-year peak hour forecast is 1,591.8, or 1,592 peak hour trips. [$1592 = 1500(1+ 0.02)^3 = 1500(1.0612)$]

Future Growth (compounded) = Present Growth * (1+Growth Rate) $^{\#\ of\ years}$

Levels of Service (Delay)
Masjid Sadar
216 Ernston Road
Township of Sayreville, Middlesex County, New Jersey

			Friday			Sunday		
			Existing	No-Build	Build	Existing	No-Build	Build
Ernston Road / Bordentown Avenue	Northbound	Left	C (24.4)	C (24.6)	C (24.6)	C (23.6)	C (23.8)	C (23.8)
		Through	D (45.7)	D (46.5)	D (46.5)	D (43.1)	D (43.8)	D (43.8)
		Right	D (35.3)	D (35.4)	D (35.8)	D (35.0)	D (35.1)	D (35.3)
	Southbound	Left	C (23.5)	C (23.7)	C (23.7)	C (23.3)	C (23.4)	C (23.5)
		Through	D (40.5)	D (40.9)	D (40.9)	D (38.7)	D (39.1)	D (39.1)
		Right	C(34.5)	C (34.6)	C (34.6)	C (33.8)	C (33.9)	C (33.9)
	Eastbound	Left	C (24.2)	C (24.3)	C (24.6)	C (25.3)	C (25.4)	C (25.6)
		Through	D (42.9)	D (43.4)	D (46.2)	D (42.5)	D (43.1)	D (44.1)
		Right	D (35.1)	D (35.2)	D (35.2)	C (32.4)	C (32.4)	C (32.4)
	Westbound	Left	C (26.2)	C (26.4)	C (27.5)	C (27.0)	C (27.2)	C (27.6)
		Through	D (38.2)	D (38.3)	D (39.2)	D (37.0)	D (37.2)	D (37.6)
		Right	D (38.3)	D (38.4)	D (39.3)	D (37.1)	D (37.3)	D (37.7)
Ernston Road / West Driveway	Southbound	Left/Right	-	-	C (15.8)	-	-	C (15.5)
	Eastbound	Left	-	-	A (9.0)	-	-	A (9.1)
Ernston Road / East Driveway	Southbound	Left/Right	-	-	C (16.7)	-	-	C (17.8)
	Eastbound	Left	-	-	A (8.9)	-	-	A (9.1)

Masjid Sadar & Community Center located at 216 Ernston Rd, Parlin, NJ 08859, has been a central hub for the Muslim community in the area. The center hosts a range of events, catering to the community's religious and social needs. The proposed Masjid Sadar & Community Center will have 105 parking spots, highlighting the center's high level of activity. The events will be for various reasons, such as meetings, seminars, or other gatherings. However, the following is a summary of events hosted by the center with an approximate number of attendees.

Note: There is ONLY ONE activity taking place at a time in the Building.

Janaza: Prayer for the Deceased

Janazah is a funeral prayer performed in the Muslim faith. The funeral prayer was conducted in accordance with Islamic customs and traditions, and the community members gathered to pay their respects to the deceased. Masjid Sadar & Community Center hosted 60-100 people for this event. After the 1:20 pm prayer on a weekday, the family would join with congregants to pray the funeral prayer which last for 15 min

Family Nights:

The community center occasionally organized family nights that offered families an opportunity to come together, learn and bond. The events attracted 90-100 attendees, with an average of 4-5 people per carpool. The initiative not only helped to reduce traffic congestion but also promoted social cohesion within the community. Once a Month, this time is on Friday Nights 7pm to 8pm

Nikah: Religious Wedding

Masjid Sadar & Community Center served as a location for nikah events, which is a Muslim marriage ceremony. The events were generally attended by 20-30 people with an average of 2-4 people per car, and the center's staff helped the couples and their families in arranging the ceremony as per Islamic customs and traditions. This usually happens on Saturday at 4pm

Jumah: Friday Prayer

Jummah is a congregational prayer that is performed every Friday in the Muslim faith. Masjid Sadar & Community Center hosted Jummah events, with two prayer sessions. The events were attended by 60-90 cars with an average of 2 people per car, indicating a decent number of attendees. This times are: 1st Prayer 12:15 to 12:45, 2nd Prayer 1:20-1:45

Regular Prayers:

The community center hosted regular prayer sessions attended by 15-30 cars. These sessions provided community members with the opportunity to engage in religious practices within a communal environment. Prayer Times changes with change of time, summer months, winter months

Regular Prayers is Fajr-6am, Zuhr-1:20pm, Asr-4:30pm, Magrib-7pm, Easha-8:30pm

Sunday School is from 10am to 1pm

It has about 32 students learning about their religion.

Conclusion:

Masjid Sadar & Community Center at 216 Ernston Rd, Parlin, NJ 08859, plays a critical role in serving the Muslim community's religious and social needs. The range of events hosted by the center is indicative of the community's diversity and the center's commitment to serving its members. The center's management should continue to provide a welcoming and safe environment for the community's various needs, fostering a sense of belonging and inclusion.

Church
(560)

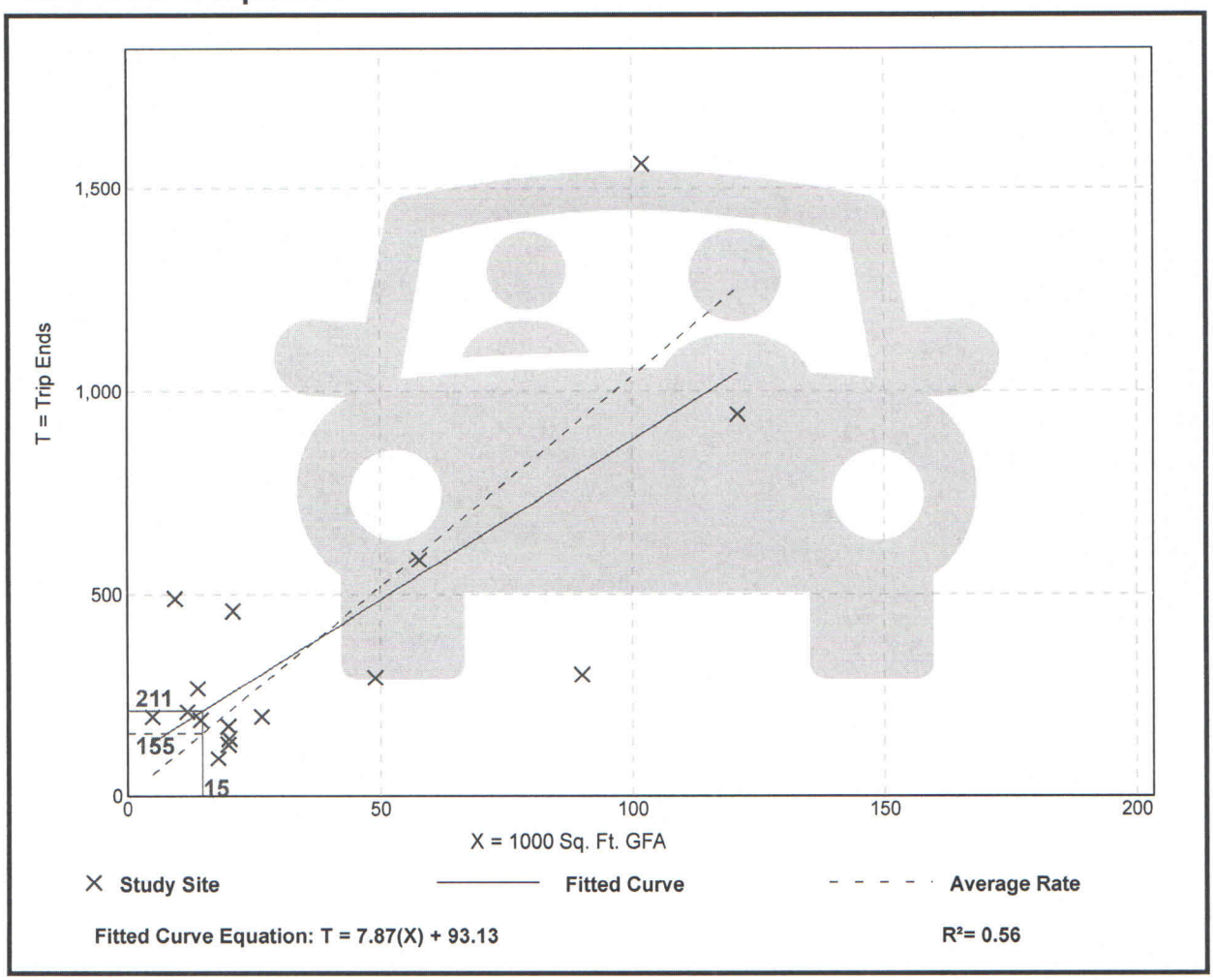
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Sunday, Peak Hour of Generator**

Setting/Location: **General Urban/Suburban**
Number of Studies: 16
Avg. 1000 Sq. Ft. GFA: 38
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
10.36	3.36 - 51.31	7.83

Data Plot and Equation



Fitted Curve Equation: T = 7.87(X) + 93.13

R^2= 0.56