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TRAFFIC ENGINEERING STUDY & SIGNAL WARRANT ANALYSIS

for:

LINWOOD AVENUE, HIGH STREET & UNION STREET

*BOROUGH OF EMERSON
BERGEN COUNTY, NEW JERSEY*

SUBMITTED BY:

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Engineering
For Tomorrow's
Challenges



TABLE OF CONTENTS

PAGE NO.

I.	Introduction.....	1
II.	Existing Conditions.....	3
	Existing Traffic Volumes.....	4
	Existing Pedestrian Movements.....	5
III.	Traffic Signal Warrant Analysis	6
	Warrant 1 (Eight-Hour Vehicular Volume).....	6
	Warrant 2 (Four-Hour Vehicular Volume).....	7
	Warrant 3 (Peak Hour Volume).....	8
	Warrant 8 (Roadway Network).....	10
	Capacity Analyses.....	11
	Summary of Signal Warrant Analysis	12
IV.	One-Way Designation Investigation.....	13
	High Street: One-way Southbound	13
	Union Street: One-Way Investigation.....	14
V.	Summary & Conclusions.....	16

FIGURES

Figure 1 - Study Area.....	2
Figure 2 - Linwood Avenue & High Street	3
Figure 3 - Pedestrian Crossings per Hour	5
Figure 4 - MUTCD Figure 4C-2, Warrant 2, Four-Hour Veh. Vol. Warrant (70% Factor).....	8
Figure 5 - MUTCD Figure 4C-4, Warrant 3, Peak Hour (70% Factor).....	10

TABLES

Table 1 - AM Peak Hour Traffic Volumes: Linwood Avenue & High Street.....	4
Table 2 - Pedestrian Crossings per Hour	5
Table 3 - Warrant 1B, Eight-Hour Vehicular Volume	7
Table 4 - Warrant 2, Four-Hour Vehicular Volume	8
Table 5 - Warrant 3, Peak Hour (70% Factor).....	10
Table 6 - HCM 2000: Signalized and Unsignalized LOS/Delay Criteria.....	11
Table 7 - HCM Analysis: Linwood Avenue & High Street.....	12
Table 8 - AM Peak Hour Traffic Volumes: Linwood Avenue & High Street.....	13
Table 9 - HCM Analysis: Union Street & Main Street (Post One-Way Operation).....	14
Table 10 - If-Then Recommended Improvement Matrix	15

APPENDIX

- Appendix A - ATR & MTC Data Summary Sheets
- Appendix B - Signal Warrant Analysis Data Summary Sheets
- Appendix C - Capacity Analysis Data Summary Sheets



I. INTRODUCTION

This Traffic Engineering Study is submitted by Maser Consulting, P.A. (Maser), at the request of the Borough of Emerson, to conduct a traffic signal warrant analysis for the intersection of High Street & Linwood Avenue, and conduct an investigation of the operation of High Street and Union Street as one-way. This study is in response to concerns expressed by local residents, Police Department and Borough Officials that existing traffic safety conditions and congestion are substandard.

Specifically, it is our understanding that the pedestrian crossings on High Street & Linwood Avenue requires improvement. These crossings provide access to the adjacent elementary school located within the southwestern quadrant of the subject intersection. It has been perceived as being unsafe due to the excessive congestion that occurs along this approach during the AM peak hour, at the same time pedestrian crossings are at the highest frequency. This analysis will investigate the root cause of this congestion and provide recommendations to improve its operation and the pedestrian crossing.

Additionally, Union Street operates poorly during sporting events at the adjacent playing fields associated with Emerson High School. Our observations are that during sporting events, parallel parking occurs on both side of the roadway, leaving very little cartway width for two-way traffic, causing unsafe operations.

This study can be reasonably separated in two sections, traffic signal warrant analysis, and one-way operation analysis. The traffic signal warrant analysis presented within this report will provide an analysis according to the Manual on Uniform Traffic Control Devices (MUTCD), to determine if the signalization of the subject intersection is warranted based on the existing vehicular volumes.

The one-way traffic investigation will examine existing traffic conditions on High Street, Union Street and Clinton Street to establish if one-way traffic control is an appropriate mitigation for this particular area.

Finally, a set of recommendations will be discussed which can be implemented to mitigate the existing operation.

The study area consists of High Street, Clinton Street, Union Street, Linwood Avenue, Main Street, and Palisades Avenue. Emerson Elementary School and Emerson High School are also located within the study area. **Figure 1** details the study area.



Study Area

Figure 1



II. EXISTING CONDITIONS

A field investigation was conducted adjacent to the project site to obtain an inventory of existing roadway conditions, posted traffic controls, adjacent land uses, lane configurations of the intersections in the study area, and existing vehicular and pedestrian traffic patterns. The following is a brief description of the roadways:

Union Street is a north-south oriented local roadway with two-way traffic operations without striping present. Parallel parking is permitted on both side of the roadway. The roadway width varies between eighteen feet (18') and twenty-four feet (24') with no shoulders.

Linwood Avenue is an east-west oriented local roadway with two (2) travel lanes, one in each direction, separated by a double yellow line. The roadway width is thirty feet (30') with no shoulders or on-street parking available.

High Street is a north-south oriented local roadway with two (2) travel lanes, one in each direction, with no striping. The roadway width is thirty feet (30') with no striping or shoulders in the project vicinity and widens at the intersection with Linwood Avenue. The following is a brief description of the intersections studied:

Linwood Avenue and High Street Intersection is a stop-controlled intersection, with the High Street approaches stop-controlled and the Linwood Avenue intersection uncontrolled. The High Street southbound approach to the intersection measures 47'4", with two (2) lanes in the southbound direction and one (1) in the northbound direction. South of the intersection, the roadway width measures thirty-four feet (34') with one (1) lane in each direction. The Linwood Avenue approaches are both thirty-feet (30') wide with one (1) lane in each direction.

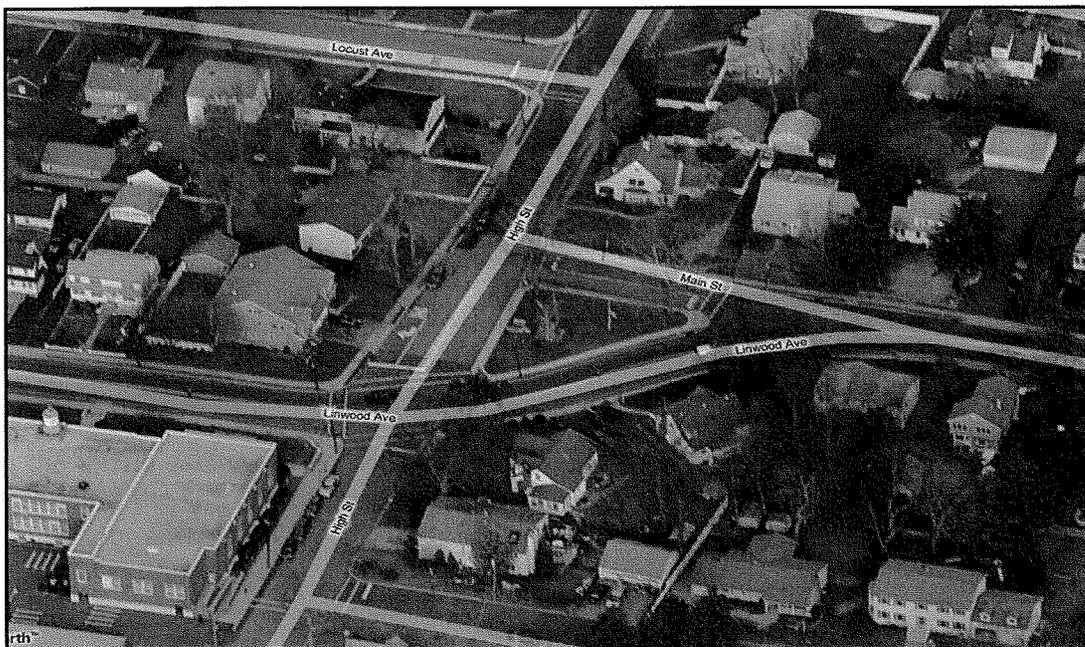


Figure 2 - Linwood Avenue & High Street



Existing Traffic Volumes

A Manual Turning Count (MTC) was conducted at the intersection of High Street & Linwood Avenue. The count was conducted for twelve (12) consecutive hours on Thursday, May 21, 2009 between the hours of 6:00AM and 6:00PM.

Based on the collected data, the AM Peak Hour was found to begin at 7:45AM, the Mid-Day Peak Hour at 12:30PM and the PM Peak Hour at 3:00PM. The AM and PM peak hours of operation coincide with the arrival and dismissal times of Emerson Elementary and High Schools, with the mid-day peak hour occurring at the normal business lunch hour. Traditionally, the PM peak occurs between the hours of 4:00PM and 6:00 PM, the peak between these two hours has also been shown. **Table 1** tabulates the intersection counts for the AM, Mid-Day and PM peak hours, respectively.

Table 1 - AM Peak Hour Traffic Volumes: Linwood Avenue & High Street

PEAK HOUR	High Street			Linwood Avenue			High Street			Linwood Avenue		
	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
7:45AM	5	14	8	106	381	7	29	43	83	114	318	31
12:30PM	10	7	13	17	275	13	25	25	40	48	289	14
3:00PM	16	29	19	61	356	19	27	34	62	85	325	28
5:00 PM	9	11	11	29	368	25	30	29	33	79	368	5

In addition to an MTC count, two (2) automatic traffic recorders (ATRs) were installed for a period of one week within the surrounding roadway network. One ATR was installed at each of the following locations:

- Union Street, between Marianna Place and Palisade Avenue; and
- Main Street, between High Street and Clinton Street

These ATRs, and the existing MTC counts were used to estimate a turning movement count at the intersection of Main Street & Union Street within the one-way analysis portion of this report.

Refer to **Appendix A** for the ATR and MTC data summary sheets.

Field Observations

During the traffic data collection procedures, we observed, that on several occasions during the AM peak hour, the site driveway for Emerson High School caused the eastbound traffic flow to queue to Clinton Street.



Existing Pedestrian Movements

As part of the MTC conducted to collect vehicular traffic volumes, pedestrian counts were also conducted to determine the number of crossings for each leg to the four legged intersection at High Street & Linwood Avenue. **Table 2** tabulates these counts, and **Figure 3** provides a graphical representation of pedestrian counts through the 24 hour period.

Table 2 - Pedestrian Crossings per Hour

Time	Pedestrian Crossings (per hour)				Total
	East Leg (Linwood Ave)	West Leg (Linwood Ave)	North Leg (High St)	South Leg (High St)	
06:00 AM	3	0	2	3	8
07:00 AM	1	3	10	4	18
08:00 AM	57	1	11	0	69
09:00 AM	3	0	4	0	7
10:00 AM	2	3	3	1	9
11:00 AM	2	2	5	1	10
12:00 PM	7	0	1	0	8
01:00 PM	2	1	1	2	6
02:00 PM	3	1	15	0	19
03:00 PM	162	1	30	5	198
04:00 PM	4	1	10	3	18
05:00 PM	2	0	7	2	11

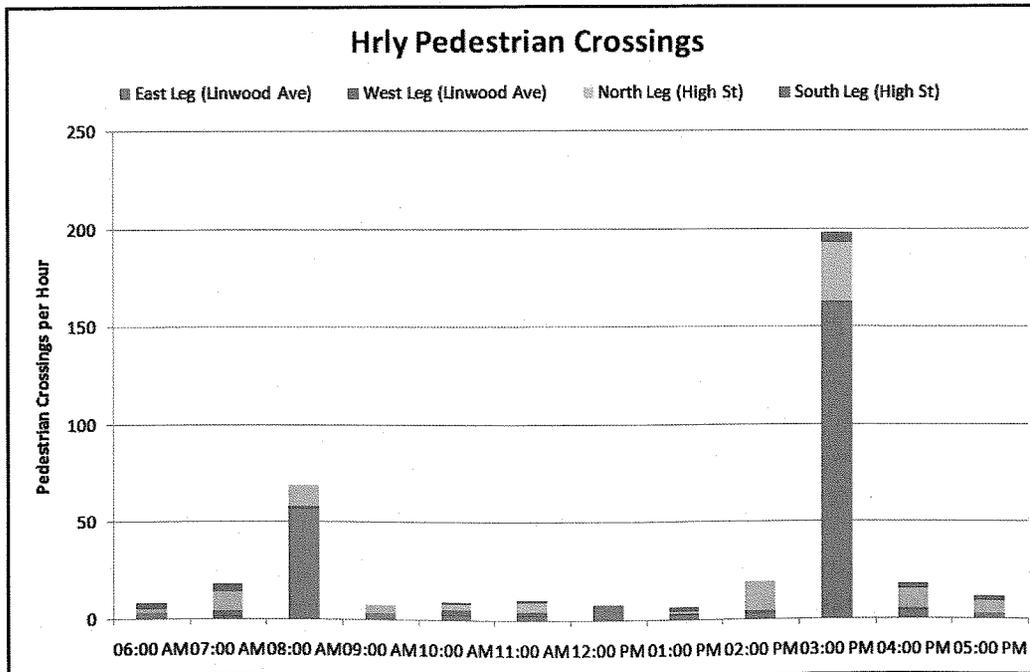


Figure 3 - Pedestrian Crossings per Hour



III. TRAFFIC SIGNAL WARRANT ANALYSIS

A traffic signal warrant analysis has been conducted to determine if a traffic signal is warranted at the intersection of Linwood Avenue & High Street. This analysis was performed using the latest version of *Jamar Traffic Warrants, Version 1.14.4*. This software provides an analysis consistent with the guidelines published in the **Manual on Uniform Traffic Control Devices (MUTCD)**. MUTCD provides specific warrants, only one of which must be met, to justify the installation of a traffic signal.

This analysis shows that the intersection of Linwood Avenue & High Street meets MUTCD Warrants 1, 2, 3 and 8; thus, the intersection qualifies for traffic signalization. The specific warrants and justification are described below.

Warrant 1 (Eight-Hour Vehicular Volume)

Support: The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersection street suffers excessive delay or conflict in entering or crossing the major street.

It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then the criteria for Warrant 1 are satisfied and Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then the criteria for Warrant 1 are satisfied and the combination of Conditions A and B is not needed.

Standard: The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:

- A. *The vehicles per hour given in both of the 100 percent columns in Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or*
- B. *The vehicles per hour given in both of the 100 percent columns in Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.*

In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volumes shall not be required to be on the same approach during each of these 8 hours.



Option: If the posted or statutory speed limit of the 85th-Percentile Speed on the major street exceeds 70 km/h or exceeds 40 mph or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent condition.

Results - Warrant 1 (Eight-Hour Vehicular Volume)

The results show that Condition B is met for nine (9) hours during the twelve-hour study. Condition B "Interruption of Continuous Traffic" states that the major-street approach volumes should exceed 525 vehicles and the minor street traffic should exceed 53 vehicles, applying the 70 percent columns of Table 4C-1. **Table 3** depicts the results for the MUTCD Warrant 1.

Table 3 - Warrant 1B, Eight-Hour Vehicular Volume

Time	Linwood Avenue			High Street Approach Volume	MUTCD Vol. Req. Met
	EB	WB	Total		
7:00AM – 8:00AM	368	442	810	113	YES
8:00AM – 9:00AM	413	474	887	156	YES
9:00AM – 10:00AM	310	478	588	55	YES
12:00PM – 1:00PM	329	298	627	94	YES
1:00PM – 2:00PM	337	275	612	86	YES
2:00PM – 3:00PM	435	381	816	72	YES
3:00PM – 4:00PM	438	436	874	123	YES
4:00PM – 5:00PM	399	393	792	81	YES
5:00PM – 6:00PM	452	422	874	92	YES

Warrant 2 (Four-Hour Vehicular Volume)

Support: The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

Standard: The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.

Option: If the posted or statutory speed limit of the 85th-Percentile Speed on the major street exceeds 70 km/h or exceeds 40 mph or if the intersection lies within the



built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 (70% Factor) may be used in place of Figure 4C-1.

Results - Warrant 2 (Four Hour Vehicular Volume)

Applying Figure 4C-2, the results of the analysis determined that the signal warrant is met for seven (7) hours. The time and volumes for these locations are detailed below. Figure 4C-2 is included on the following page. **Table 4 & Figure 4** depict the results for MUTCD Warrant 2.

Table 4 - Warrant 2, Four-Hour Vehicular Volume

Time	Linwood Avenue			High Street Approach Volume	MUTCD Vol. Req. Met
	EB	WB	Total		
7:00AM – 8:00AM	368	442	810	113	YES
8:00AM – 9:00AM	413	474	887	156	YES
12:00PM – 1:00PM	329	298	627	94	YES
2:00PM – 3:00PM	435	381	816	72	YES
3:00PM – 4:00PM	438	436	874	123	YES
4:00PM – 5:00PM	399	393	792	81	YES
5:00PM – 6:00PM	452	422	874	92	YES

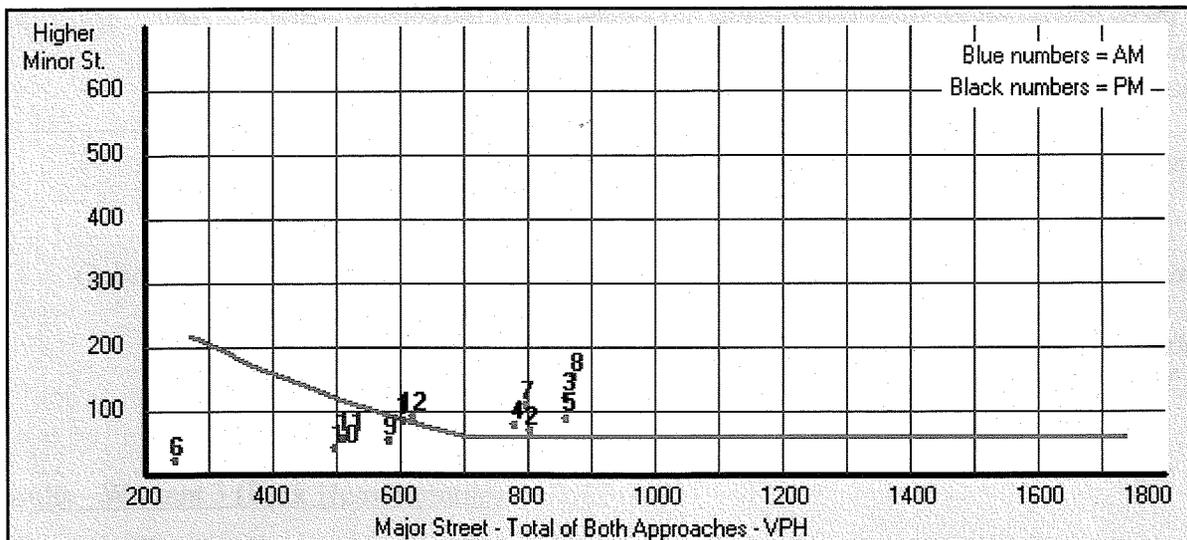


Figure 4 - MUTCD Figure 4C-2, Warrant 2, Four-Hour Veh. Vol. Warrant (70% Factor)

Warrant 3 (Peak Hour Volume)

Support: The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

Standard: This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy



vehicle facilities that attract or discharge large number of vehicles over a short time.

The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:

- A. If **all** three of the following conditions exist for the same one hour (any four consecutive 15-minute periods) of an average day:
- 1- The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach, and
 - 2- The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and
 - 3- The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.
- B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes. "

Option: If the posted or statutory speed limit of the 85th-Percentile Speed on the major street exceeds 70 km/h or exceeds 40 mph or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to satisfy the criteria of the second part of the standard.

Results - Warrant 3 (Peak Hour Volume)

Applying Figure 4C-4, the results of the analysis determined that two (2) hourly volumes exceed the criteria for a signal warrant. Additionally, nine (9) peak hour approach volumes exceed the requirement. The time and volumes for these locations are detailed in **Table 5**; **Figure 5** depicts each hourly volume plotted on **Figure 4C-4** of MUTCD.



- A. *It is part of the street or highway system that serves as the principal roadway network for through traffic flow; or*
- B. *It included rural or suburban highways outside, entering, or traversing a City; or*
- C. *It appears as major route on an official plan, such as a major street plan in an urban area and transportation study.*

Results - Warrant 8 (Roadway Network)

Warrant 8 is met, as traffic signal warrants 1, 2 and 3 are satisfied and the total intersection volumes exceed 1,000 vehicles during the peak hour time period.

Capacity Analyses

It has been shown that a traffic signal is warranted at the intersection of High Street & Linwood Avenue as the intersection currently meets Warrants 1, 2, 3 & 8. Therefore, to provide a representation of what the operating conditions would be if a signal were installed, capacity analysis, with signalization has been conducted according to the Highway Capacity Manual (HCM).

The capacity Analyses was performed using the latest version of *Synchro, Version 7.0*; a traffic analysis and simulation program published by Trafficware. The results of these analyses provide Level of Service (LOS), volume/capacity descriptions and average seconds of delay for the intersection movements in accordance with the principle and guidelines published by HCM.

The efficiency with which an intersection operates is a function of volume and capacity. The capacity of an intersection is the volume of vehicles it can accommodate during a peak hour. Level of Service is a qualitative measure describing operational conditions within a traffic stream in terms of traffic characteristics such as freedom to maneuver, traffic interruption, comfort and convenience. Six LOS are defined for each type of facility with analysis procedures available. Levels of Service range from "A" through "F", with "A" representing excellent conditions with no delays and failure and deficient operations denoted by Level "F". The LOS criteria for intersections are summarized in **Table 6** on the following page.

Table 6 - HCM 2000: Signalized and Unsignalized LOS/Delay Criteria

Level of Service	Average Control Delay (sec/veh)	
	Signalized Intersection	Unsignalized Intersection
A	< 10	0 - 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50



The AM peak hour was identified as the “Worst Case Condition” by a review of the existing traffic volumes. Therefore, capacity analysis has been performed for the AM peak hour only.

Unsignalized Condition (Existing)

The results of the AM Peak Hour capacity analysis show that the existing operating conditions are sufficient for the traffic on Linwood Avenue, as the LOS “A” is present in both the eastbound and westbound direction. On High Street, the southbound volumes operate at LOS “C”; however, northbound traffic operates poorly, with a LOS “F” and an average delay of 63.0 seconds per vehicle (sec/veh). This delay is created by the continuous flow of traffic traveling eastbound and westbound on Linwood Avenue. The southbound traffic would also be impacted by this flow, except the low traffic volumes allow it to operate at LOS “C”.

Signalized Condition

As it is warranted by the preceding signal warrant analysis, the operation of the subject intersection with a traffic signal was analyzed. The signal was analyzed as a semi-actuated, uncoordinated signal with two (2) phase signal timings. The cycle length was optimized to sixty seconds (60s).

Analysis of the intersection with the traffic signal showed significant improvement in the northbound approach, operating at LOS “C”. Additionally, southbound traffic progresses more efficiently, with a LOS “B”. The Linwood Avenue traffic will not advance as efficiently as the existing condition, increasing to LOS “B” and “C” in the eastbound and westbound direction, respectively. However, the considerable improvement to the northbound approach, decreasing average vehicle delay by 41.0s, merits the signalization. **Table 7** details the LOS at the intersection under the existing condition and the signalized condition.

Table 7 - HCM Analysis: Linwood Avenue & High Street

INTERSECTION APPROACH	LEVEL OF SERVICE (DELAY)	
	Unsignalized Condition (Existing)	Signalized Condition
LINWOOD AVE EASTBOUND	LOS A (1.5 sec/veh)	LOS B (15.8 sec/veh)
LINWOOD AVE WESTBOUND	LOS A (0.7 sec/veh)	LOS C (20.2 sec/veh)
HIGH ST NORTHBOUND	LOS F (63.0 sec/veh)	LOS C (21.1 sec/veh)
HIGH ST SOUTHBOUND	LOS C (19.3 sec/veh)	LOS B (13.4 sec/veh)
INTERSECTION	LOS B (10.8 sec/veh)	LOS B (18.5 sec/veh)

Summary of Signal Warrant Analysis

Overall, the signalization of the Linwood Avenue & High Street intersection promotes good traffic operating conditions, as shown by capacity analysis, and is warranted as per the MUTCD. As such, it is recommended by Maser that a traffic signal be installed at the subject intersection. A signal would promote efficient operation and would improve pedestrian crossing opportunities at this intersection.



IV. ONE-WAY DESIGNATION INVESTIGATION

An investigation into the creation of one-way traffic patterns has been conducted. One-way operation along High Street in the southbound direction, between Main St/Linwood Avenue and Palisade Avenue, would eliminate the failing condition as noted within the capacity analysis for the northbound approach of High Street to Main/Linwood, without requiring signalization. However, this would have a limited affect at improving the pedestrian crossing for High Street. Additionally, the existing traffic traveling northbound along High Street would be relocated to residential roadways such as Union and Clinton Streets.

A second, one-way investigation, independent of High Street, has been conducted to determine if the designation of Union Street as one-way in the northbound direction would be appropriate to improve the operation of this roadway, specifically, there are concerns about the interaction of the parallel parking operations with thru traffic along this roadway.

High Street: One-way Southbound

To evaluate the proposal to convert High Street to one-way in the southbound direction, between Linwood Avenue and Palisade Avenue, it is necessary to make an assumption as to where the displaced northbound traffic stream will be relocated too.

It has been assumed that 100% of the displaced northbound traffic along High Street will utilize Union St northbound as an alternative. In reality, the High Street northbound stream will likely be distributed to other alternatives such as Clinton St or Emerson Plaza East. However, to provide a conservative analysis, by maximizing the traffic along Union Street, it has been assumed that 100% of the displaced traffic will use Union Street as an alternative.

An intersection count for the AM peak hour has been synthesized by utilizing the collected ATR data along Union Street, and the existing traffic patterns along Main Street, for the post one-way conditions along High Street. **Table 8** tabulates the conditions for the AM peak hour, as represented by the collected ATR data, and surrounding traffic patterns.

Table 8 - AM Peak Hour Traffic Volumes: Linwood Avenue & High Street

PEAK HOUR	Main Street Eastbound		Main Street Westbound		Union Street Northbound	
	Thru	Right	Left	Thru	Left	Right
7:30AM	330	31	28	490	146	29

To provide a qualitative analysis of the operation of Union Street & Main Street after High Street is converted to one-way in the southbound direction, a HCM Capacity Analysis has been conducted for the AM peak hour, the critical peak hour. **Table 9** tabulates the results of this capacity analysis.



Table 9 - HCM Analysis: Union Street & Main Street (Post One-Way Operation)

INTERSECTION APPROACH	LEVEL OF SERVICE (DELAY)
	Unsignalized Condition (Existing)
Main Street Westbound	LOS A (0.7 sec/veh)
Union Street Northbound	LOS D (34.8 sec/veh)

As shown in the above table, the subject intersection will operate at acceptable levels of service if 100% of the relocated traffic utilized Union Street. However, with the relocation of the northbound traffic to Union Street, signalization could become warranted at this location, as per MUTCD standards.

A primary purpose of designating High Street as one-way in the southbound direction would be to improve congestion and the pedestrian crossing for the southbound leg to High Street & Linwood Avenue. The designation of High St as one-way southbound will improve congestion, but as shown by the level of service 'D' in **Table 11**, the congestion may reappear elsewhere within the immediate roadway network. Additionally, the designation of High Street as one-way southbound will not significantly improve the safety of the pedestrian crossing. Likewise, a traffic signal at High Street & Linwood Avenue would improve safety, congestion, and promote safe operating conditions. However, if the signal is not installed, and instead the Borough elects to designate High Street as one-way southbound, it may only relocate the need for a signal to the intersection of Union Street & Main Street. Additionally, this signal would not have the significant benefit on pedestrian movements as would be present if a signal were installed at High Street & Linwood Avenue.

A secondary concern is the impact of elevating vehicular volumes in the adjacent residential neighborhoods. It is anticipated that any increase in volumes through the adjacent neighborhood will be strongly opposed due to inconvenience, and an increase in vehicular volumes.

Therefore, it is **NOT RECOMMENDED** that High Street be designated as one-way. Likewise, the previous recommendation to signalize High Street & Linwood Avenue, as warranted by MUTCD, is recommended. This will more effectively address the needs of the community than a one-way designation.

Union Street: One-Way Investigation

The designation of Union Street as one-way would decrease the vehicular volumes along this roadway by approximately one-half, thus improving traffic flow through the area. This is specifically needed during sporting events at the adjacent playing fields associated with Emerson High School. The direction of the one-way travel is largely dependent upon improvements which are realized at the intersection of High Street & Linwood Avenue.

Union Street is a variable roadway width of 18.5' - 24', with parallel parking permitted on either side of the roadway through the portion with a width of 24'. Utilizing a standard parking aisle width of 7', if two vehicles are parking on either side of the roadway, an approximately 10'



cartway width would be available for two-way traffic. Thus, when two vehicles, traveling in opposite direction approach this 'Bottle Neck', one of the vehicles must yield to the other. If Union Street were converted to one-way, this would phenomenon would be eliminated, as a 10' cartway width is sufficient for one lane of traffic. This will significantly improve the operation of Union Street.

Similar to the designation of High Street as one-way SB, it will be necessary to understand where the displaced traffic would be relocated. In the existing condition, as shown by the ATR data, there is a maximum of 67 vehicles traveling southbound, and 53 vehicles traveling northbound during the peak hour. This traffic would likely be dispersed to Clinton Street and Union Street. However, this traffic will have very little impact on the operation of flow within the study area due its relatively small size.

If the intersection of High Street & Linwood Avenue is signalized, rather than designated as one-way, it would be preferable to designate Union Street as one-way in the southbound direction. This would ensure that turns from the minor streets are funneled towards the signalized approach, thus improving safety. However, if signalization is not realized, it's recommended that Union Street be designated as one-way in the northbound direction. This would ensure that there are adequate options to safely enter the Main Street / Linwood Avenue major traffic stream.

If Union Street were designated as one-way, there would be a significant improvement to the operation of traffic along this cartway. The existing narrow cartway width supports this conversion. As this would not cause an impact to the surrounding street system, it is **RECOMMENDED** that Union Street be designated as one-way. It is further recommended that the Borough follow the guidance of **Table 10** when determining in which was to designate Union Street as one-way.

Table 10 - If-Then Recommended Improvement Matrix

IF...	Then...
High Street & Linwood Avenue is Signalized (Recommended)	Designate Union Street One-Way SB
High Street is designated as One-Way SB (Not Recommended)	Designate Union Street as One-Way NB
No Improvements are conducted to High Street (Not Recommended)	Designate Union Street as One-Way NB



cartway width would be available for two-way traffic. Thus, when two vehicles, traveling in opposite direction approach this 'Bottle Neck', one of the vehicles must yield to the other. If Union Street were converted to one-way, this phenomenon would be eliminated, as a 10' cartway width is sufficient for one lane of traffic. This will significantly improve the operation of Union Street.

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IF...	Then...
High Street & Linwood Avenue is Signalized (Recommended)	Designate Union Street One-Way SB
High Street is designated as One-Way SB (Not Recommended)	Designate Union Street as One-Way NB
No Improvements are conducted to High Street (Not Recommended)	Designate Union Street as One-Way NB



V. SUMMARY & CONCLUSIONS

The traffic signal warrant analysis determined that a traffic signal is clearly warranted at the study intersection of Linwood Avenue and High Street. The implementation of this signal will significantly improve traffic operations on High Street and create a more balanced traffic condition at all the intersection along Linwood Avenue and Main Street. Incorporated into the all signal designs are substantial pedestrian improvements which will assist the heavy pedestrian crossing.

As an added benefit signalization at this location will create a controlled condition on Linwood Avenue, this signal can be an effective traffic calming measure in metering traffic volumes traveling Eastbound toward Emerson High School.

It is strongly recommended that a traffic signal be installed at this intersection which will improve congestion and pedestrian crossings.

It is not recommended that High Street be designated as one-way in the southbound direction. This will simply relocate an existing problem to an adjacent unsignalized intersection and do little to improve the safety of pedestrian crossings. However, in combination with signalization at High Street & Linwood Avenue, it is recommended that Union Street be designated as one-way in the southbound direction. This will greatly improve the flow of traffic along the narrow cartway width for Union Avenue.

***LINWOOD AVENUE
HIGH STREET
UNION STREET
TRAFFIC IMPACT STUDY***

APPENDIX A

MTC & ATR DATA SUMMARY SHEETS

Maser Consulting, PA

100 American Metro Boulevard, Suite 152
Hamilton, NJ 08618

Engineering for Tomorrow's Challenges

Union St & Main St - Calculated
Data created from ATR and adj. MTC Data
052109 - 600 - 1800
EMT-021

File Name : MTC-Main&Union-Calculated
Site Code : 00000000
Start Date : 5/21/2009
Page No : 1

Groups Printed- Vehicles

Start Time	Southbound					Main St Westbound					Union St Northbound					Main St Eastbound					Int. Total
	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	
	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	0	0	0	0	0	0	11	0	0	11	2	0	3	0	5	0	21	1	0	22	38
06:15 AM	0	0	0	0	0	0	20	0	0	20	2	0	3	0	5	0	29	0	0	29	54
06:30 AM	0	0	0	0	0	1	30	0	0	31	8	0	5	0	13	0	28	2	0	30	74
06:45 AM	0	0	0	0	0	4	45	0	0	49	7	0	2	0	9	0	38	4	0	42	100
Total	0	0	0	0	0	5	106	0	0	111	19	0	13	0	32	0	116	7	0	123	266
07:00 AM	0	0	0	0	0	3	64	0	0	67	15	0	8	0	23	0	38	4	0	42	132
07:15 AM	0	0	0	0	0	3	79	0	0	82	12	0	8	0	20	0	50	4	0	54	156
07:30 AM	0	0	0	0	0	7	127	0	0	134	43	0	7	0	50	0	75	8	0	83	267
07:45 AM	0	0	0	0	0	9	154	0	0	163	44	0	4	0	48	0	108	9	0	117	328
Total	0	0	0	0	0	22	424	0	0	446	114	0	27	0	141	0	271	25	0	296	883
08:00 AM	0	0	0	0	0	4	89	0	0	93	27	0	10	0	37	0	70	5	0	75	205
08:15 AM	0	0	0	0	0	8	120	0	0	128	32	0	8	0	40	0	77	9	0	86	254
08:30 AM	0	0	0	0	0	2	121	0	0	123	33	0	15	0	48	0	63	3	0	66	237
08:45 AM	0	0	0	0	0	4	139	0	0	143	44	0	10	0	54	0	76	4	0	80	277
Total	0	0	0	0	0	18	469	0	0	487	136	0	43	0	179	0	286	21	0	307	973
09:00 AM	0	0	0	0	0	2	65	0	0	67	15	0	5	0	20	0	63	2	0	65	152
09:15 AM	0	0	0	0	0	1	76	0	0	77	5	0	3	0	8	0	78	2	0	80	165
09:30 AM	0	0	0	0	0	1	64	0	0	65	16	0	2	0	18	0	59	1	0	60	143
09:45 AM	0	0	0	0	0	0	56	0	0	56	16	0	5	0	21	0	69	1	0	70	147
Total	0	0	0	0	0	4	261	0	0	265	52	0	15	0	67	0	269	6	0	275	607
10:00 AM	0	0	0	0	0	1	50	0	0	51	15	0	4	0	19	0	50	1	0	51	121
10:15 AM	0	0	0	0	0	1	57	0	0	58	10	0	4	0	14	0	60	1	0	61	133
10:30 AM	0	0	0	0	0	2	53	0	0	55	7	0	4	0	11	0	60	2	0	62	128
10:45 AM	0	0	0	0	0	2	59	0	0	61	5	0	5	0	10	0	61	2	0	63	134
Total	0	0	0	0	0	6	219	0	0	225	37	0	17	0	54	0	231	6	0	237	516
11:00 AM	0	0	0	0	0	1	47	0	0	48	14	0	7	0	21	0	57	2	0	59	128
11:15 AM	0	0	0	0	0	2	56	0	0	58	8	0	5	0	13	0	70	3	0	73	144
11:30 AM	0	0	0	0	0	1	55	0	0	56	14	0	8	0	22	0	54	2	0	56	134
11:45 AM	0	0	0	0	0	4	72	0	0	76	8	0	5	0	13	0	64	5	0	69	158
Total	0	0	0	0	0	8	230	0	0	238	44	0	25	0	69	0	245	12	0	257	564
12:00 PM	0	0	0	0	0	2	71	0	0	73	16	0	7	0	23	0	69	2	0	71	167
12:15 PM	0	0	0	0	0	0	74	0	0	74	28	0	8	0	36	0	54	0	0	54	164
12:30 PM	0	0	0	0	0	1	70	0	0	71	24	0	8	0	32	0	66	2	0	68	171
12:45 PM	0	0	0	0	0	2	78	0	0	80	13	0	11	0	24	0	70	2	0	72	176
Total	0	0	0	0	0	5	293	0	0	298	81	0	34	0	115	0	259	6	0	265	678
01:00 PM	0	0	0	0	0	4	81	0	0	85	23	0	7	0	30	0	85	5	0	90	205
01:15 PM	0	0	0	0	0	0	71	0	0	71	14	0	7	0	21	0	72	1	0	73	165
01:30 PM	0	0	0	0	0	1	56	0	0	57	16	0	7	0	23	0	60	1	0	61	141
01:45 PM	0	0	0	0	0	1	59	0	0	60	22	0	4	0	26	0	58	1	0	59	145
Total	0	0	0	0	0	6	267	0	0	273	75	0	25	0	100	0	275	8	0	283	656
02:00 PM	0	0	0	0	0	0	73	0	0	73	13	0	3	0	16	0	63	1	0	64	153
02:15 PM	0	0	0	0	0	2	86	0	0	88	15	0	8	0	23	0	78	3	0	81	192
02:30 PM	0	0	0	0	0	7	118	0	0	125	16	0	7	0	23	0	100	8	0	108	256
02:45 PM	0	0	0	0	0	1	94	0	0	95	22	0	12	0	34	0	87	2	0	89	218
Total	0	0	0	0	0	10	371	0	0	381	66	0	30	0	96	0	328	14	0	342	819

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Union St & Main St - Calculated
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052109 - 600 - 1800
EMT-021

File Name : MTC-Main&Union-Calculated
Site Code : 00000000
Start Date : 5/21/2009
Page No : 2

Groups Printed- Vehicles

Start Time	Southbound					Main St Westbound					Union St Northbound					Main St Eastbound					Int. Total
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03:15 PM	0	0	0	0	0	2	104	0	0	106	34	0	7	0	41	0	71	3	0	74	221
03:30 PM	0	0	0	0	0	3	93	0	0	96	22	0	16	0	38	0	109	4	0	113	247
03:45 PM	0	0	0	0	0	3	118	0	0	121	31	0	9	0	40	0	94	4	0	98	259
Total	0	0	0	0	0	10	423	0	0	433	113	0	40	0	153	0	336	13	0	349	935
04:00 PM	0	0	0	0	0	1	97	0	0	98	22	0	5	0	27	0	86	2	0	88	213
04:15 PM	0	0	0	0	0	5	101	0	0	106	17	0	7	0	24	0	71	5	0	76	206
04:30 PM	0	0	0	0	0	5	83	0	0	88	14	0	5	0	19	0	93	6	0	99	206
04:45 PM	0	0	0	0	0	3	108	0	0	111	19	0	9	0	28	0	85	4	0	89	228
Total	0	0	0	0	0	14	389	0	0	403	72	0	26	0	98	0	335	17	0	352	853
05:00 PM	0	0	0	0	0	3	92	0	0	95	16	0	8	0	24	0	85	3	0	88	207
05:15 PM	0	0	0	0	0	3	103	0	0	106	15	0	14	0	29	0	103	3	0	106	241
05:30 PM	0	0	0	0	0	1	105	0	0	106	16	0	8	0	24	0	94	1	0	95	225
05:45 PM	0	0	0	0	0	4	111	0	0	115	25	0	10	0	35	0	90	5	0	95	245
Total	0	0	0	0	0	11	411	0	0	422	72	0	40	0	112	0	372	12	0	384	918
Grand Total	0	0	0	0	0	119	3863	0	0	3982	881	0	335	0	1216	0	3323	147	0	3470	8668
Apprch %	0	0	0	0	0	3	97	0	0		72.5	0	27.5	0		0	95.8	4.2	0		
Total %	0	0	0	0	0	1.4	44.6	0	0	45.9	10.2	0	3.9	0	14	0	38.3	1.7	0	40	

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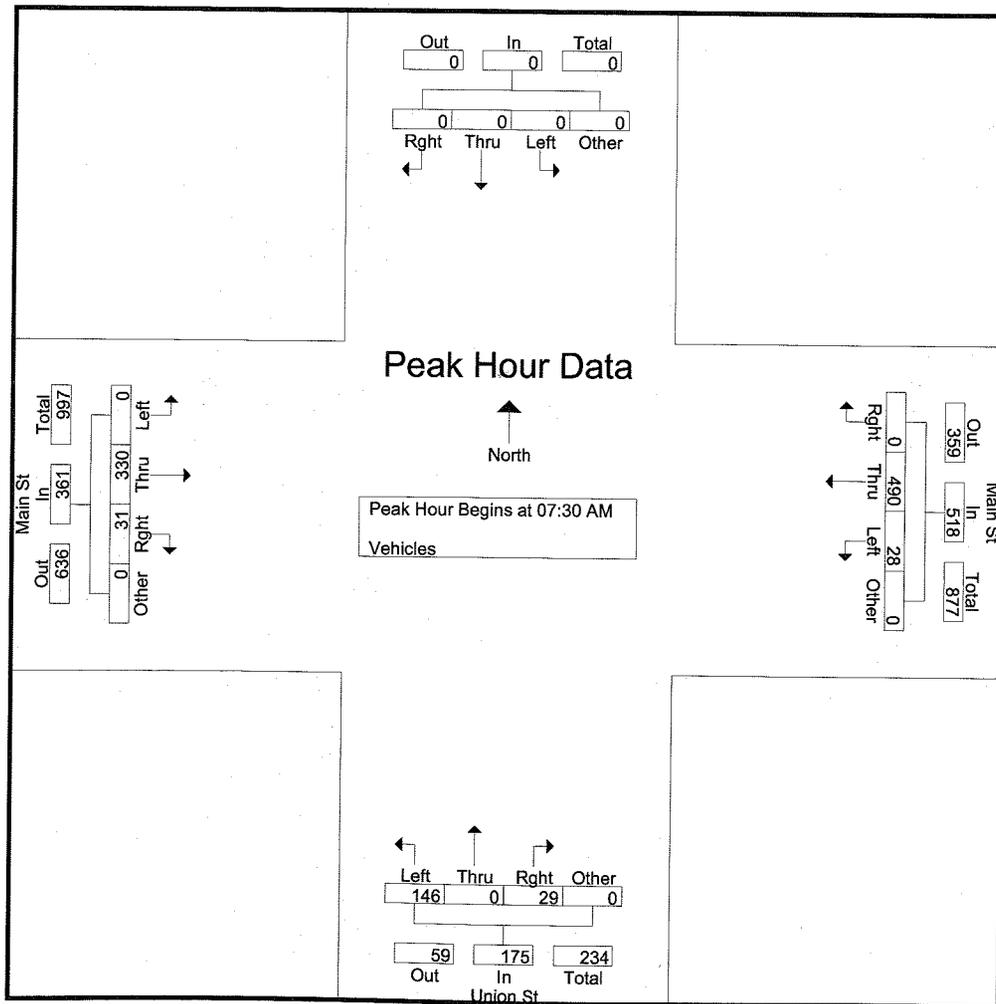
100 American Metro Boulevard, Suite 152
Hamilton, NJ 08618

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Union St & Main St - Calculated
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EMT-021

File Name : MTC-Main&Union-Calculated
Site Code : 00000000
Start Date : 5/21/2009
Page No : 3

Start Time	Southbound					Main St Westbound					Union St Northbound					Main St Eastbound					Int. Total
	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	
Peak Hour Analysis From 06:00 AM to 09:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	7	127	0	0	134	43	0	7	0	50	0	75	8	0	83	267
07:45 AM	0	0	0	0	0	9	154	0	0	163	44	0	4	0	48	0	108	9	0	117	328
08:00 AM	0	0	0	0	0	4	89	0	0	93	27	0	10	0	37	0	70	5	0	75	205
08:15 AM	0	0	0	0	0	8	120	0	0	128	32	0	8	0	40	0	77	9	0	86	254
Total Volume	0	0	0	0	0	28	490	0	0	518	146	0	29	0	175	0	330	31	0	361	1054
% App. Total	0	0	0	0	0	5.4	94.6	0	0		83.4	0	16.6	0		0	91.4	8.6	0		
PHF	.000	.000	.000	.000	.000	.778	.795	.000	.000	.794	.830	.000	.725	.000	.875	.000	.764	.861	.000	.771	.803



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Union St & Main St - Calculated

Data created from ATR and adj. MTC Data

052109 - 600 - 1800

EMT-021

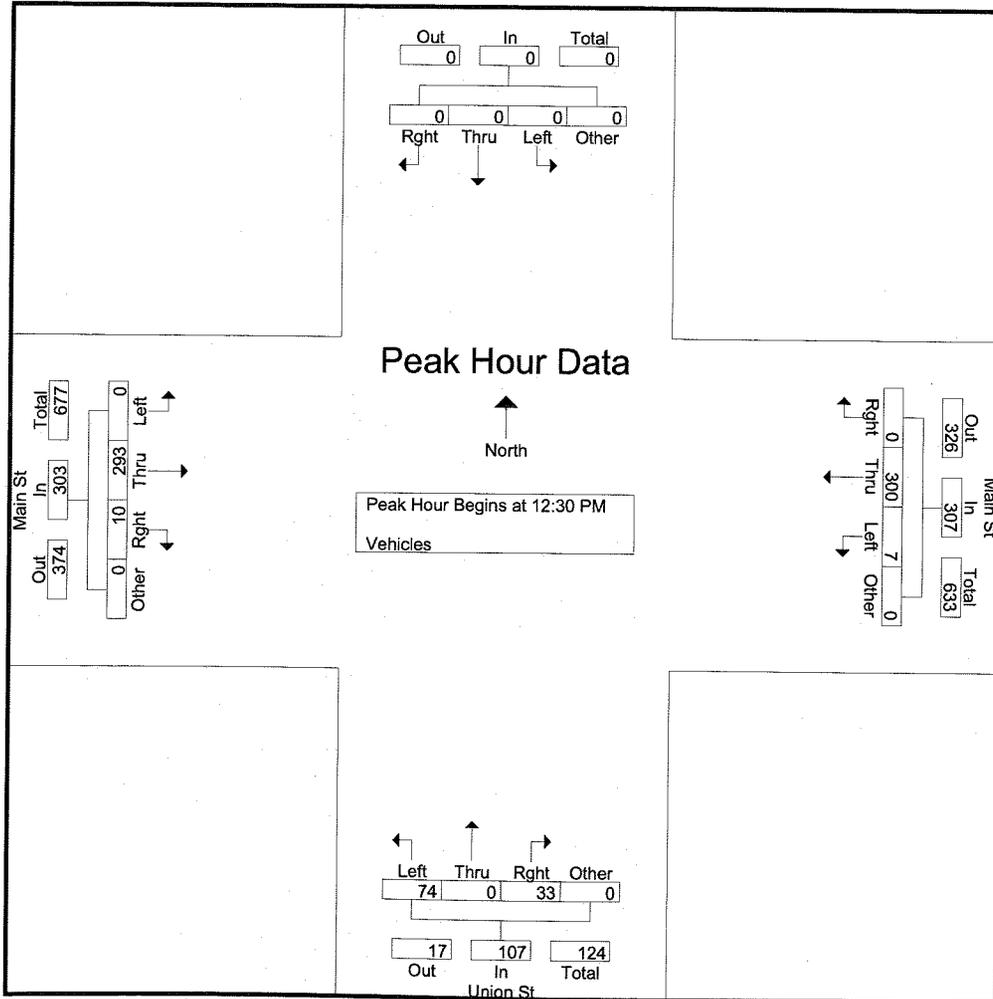
File Name : MTC-Main&Union-Calculated

Site Code : 00000000

Start Date : 5/21/2009

Page No : 4

Start Time	Southbound					Main St Westbound					Union St Northbound					Main St Eastbound					Int. Total
	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:30 PM																					
12:30 PM	0	0	0	0	0	1	70	0	0	71	24	0	8	0	32	0	66	2	0	68	171
12:45 PM	0	0	0	0	0	2	78	0	0	80	13	0	11	0	24	0	70	2	0	72	176
01:00 PM	0	0	0	0	0	4	81	0	0	85	23	0	7	0	30	0	85	5	0	90	205
01:15 PM	0	0	0	0	0	0	71	0	0	71	14	0	7	0	21	0	72	1	0	73	165
Total Volume	0	0	0	0	0	7	300	0	0	307	74	0	33	0	107	0	293	10	0	303	717
% App. Total	0	0	0	0	0	2.3	97.7	0	0	0	69.2	0	30.8	0	0	0	96.7	3.3	0	0	
PHF	.000	.000	.000	.000	.000	.438	.926	.000	.000	.903	.771	.000	.750	.000	.836	.000	.862	.500	.000	.842	.874



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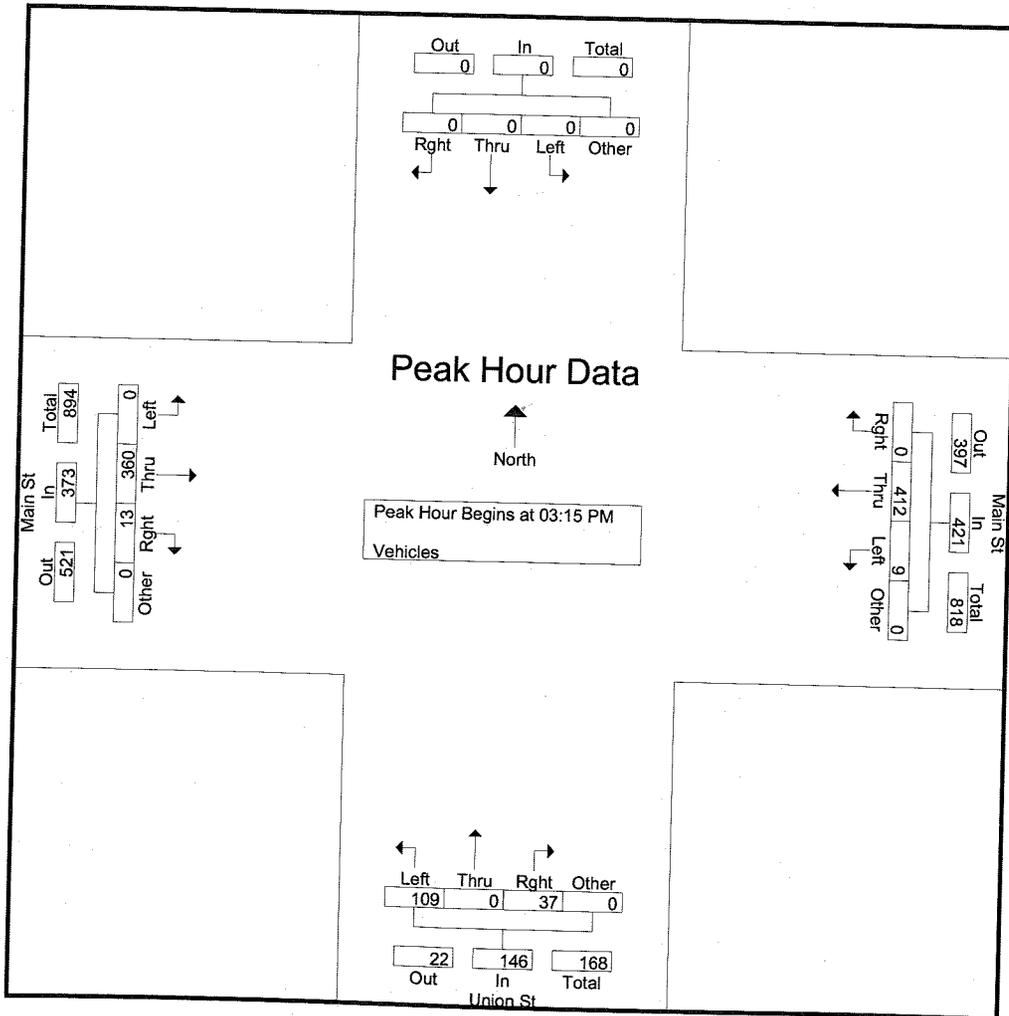
100 American Metro Boulevard, Suite 152
Hamilton, NJ 08618

Engineering for Tomorrow's Challenges

Union St & Main St - Calculated
Data created from ATR and adj. MTC Data
052109 - 600 - 1800
EMT-021

File Name : MTC-Main&Union-Calculated
Site Code : 00000000
Start Date : 5/21/2009
Page No : 5

Start Time	Southbound					Main St Westbound					Union St Northbound					Main St Eastbound					Int. Total
	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:15 PM																					
03:15 PM	0	0	0	0	0	2	104	0	0	106	34	0	7	0	41	0	71	3	0	74	221
03:30 PM	0	0	0	0	0	3	93	0	0	96	22	0	16	0	38	0	109	4	0	113	247
03:45 PM	0	0	0	0	0	3	118	0	0	121	31	0	9	0	40	0	94	4	0	98	259
04:00 PM	0	0	0	0	0	1	97	0	0	98	22	0	5	0	27	0	86	2	0	88	213
Total Volume	0	0	0	0	0	9	412	0	0	421	109	0	37	0	146	0	360	13	0	373	940
% App. Total	0	0	0	0	0	2.1	97.9	0	0		74.7	0	25.3	0		0	96.5	3.5	0		
PHF	.000	.000	.000	.000	.000	.750	.873	.000	.000	.870	.801	.000	.578	.000	.890	.000	.826	.813	.000	.825	.907



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 Engineering for Tomorrow's Challenges

Emerson Borough
 Linwood Ave. & High Street
 Thursday, May 21st 2009
 Weather: Sunny, 78*

File Name : MTC-Linwood&High
 Site Code : EMT022
 Start Date : 5/21/2009
 Page No : 1

Groups Printed- Unshifted - Heavy Vehicles

Start Time	High St. Southbound					Linwood Ave. Westbound					High St. Northbound					Linwood Ave. Eastbound					Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total			
06:00 AM	0	1	1	0	2	0	11	0	0	11	1	0	2	0	3	1	21	4	0	26	0	42	42
06:15 AM	0	1	0	0	1	0	21	0	0	21	2	0	3	0	5	1	29	3	0	33	0	60	60
06:30 AM	1	1	2	0	4	0	30	2	1	32	4	1	3	1	8	1	28	7	0	36	2	80	82
06:45 AM	2	1	0	2	3	1	45	3	2	49	3	3	2	2	8	0	37	2	0	39	6	99	105
Total	3	4	3	2	10	1	107	5	3	113	10	4	10	3	24	3	115	16	0	134	8	281	289
07:00 AM	1	2	3	0	6	0	59	7	0	66	10	3	8	1	21	2	39	5	0	46	1	139	140
07:15 AM	3	1	0	0	4	1	79	3	0	83	8	0	6	2	14	0	48	11	2	59	4	160	164
07:30 AM	2	3	3	5	8	1	130	1	0	132	33	1	1	0	35	4	74	31	1	109	6	284	290
07:45 AM	4	4	2	5	10	6	142	13	1	161	37	4	2	1	43	2	108	44	0	154	7	368	375
Total	10	10	8	10	28	8	410	24	1	442	88	8	17	4	113	8	269	91	3	368	18	951	969
08:00 AM	1	4	0	0	5	1	68	21	4	90	10	16	8	0	34	8	69	22	0	99	4	228	232
08:15 AM	1	3	0	7	4	0	97	25	14	122	17	10	5	0	32	7	78	15	0	100	21	258	279
08:30 AM	2	3	3	1	8	0	74	47	27	121	19	13	14	0	46	14	63	33	0	110	28	285	313
08:45 AM	4	7	4	3	15	1	112	28	12	141	19	18	7	0	44	3	72	29	1	104	16	304	320
Total	8	17	7	11	32	2	351	121	57	474	65	57	34	0	156	32	282	99	1	413	69	1075	1144
09:00 AM	4	3	1	2	8	0	61	5	2	66	9	4	3	0	16	2	61	14	0	77	4	167	171
09:15 AM	0	2	0	1	2	1	78	4	1	83	3	2	2	0	7	1	81	7	0	89	2	181	183
09:30 AM	2	4	1	0	7	3	62	4	0	69	7	6	0	0	13	5	59	8	0	72	0	161	161
09:45 AM	6	1	0	1	7	2	54	4	0	60	11	5	3	0	19	0	68	4	0	72	1	158	159
Total	12	10	2	4	24	6	255	17	3	278	30	17	8	0	55	8	269	33	0	310	7	667	674
10:00 AM	4	3	1	0	8	1	50	1	0	52	11	3	3	0	17	2	47	9	0	58	0	135	135
10:15 AM	2	1	1	0	4	4	52	5	2	61	4	4	2	0	10	2	59	7	0	68	2	143	145
10:30 AM	5	0	0	0	5	0	47	7	0	54	3	3	2	1	8	1	58	13	0	72	1	139	140
10:45 AM	2	6	0	3	8	1	58	4	0	63	4	0	5	0	9	1	64	11	3	76	6	156	162
Total	13	10	2	3	25	6	207	17	2	230	22	10	12	1	44	6	228	40	3	274	9	573	582
11:00 AM	3	5	2	0	10	1	47	0	0	48	9	5	6	0	20	0	54	12	1	66	1	144	145
11:15 AM	4	4	1	0	9	1	52	3	0	56	3	4	3	0	10	0	68	4	0	72	0	147	147
11:30 AM	3	6	0	0	9	1	50	6	0	57	6	6	7	0	19	2	53	10	0	65	0	150	150
11:45 AM	3	1	1	5	5	0	66	9	2	75	4	3	4	1	11	5	61	10	1	76	9	167	176
Total	13	16	4	5	33	3	215	18	2	236	22	18	20	1	60	7	236	36	2	279	10	608	618
12:00 PM	8	8	2	0	18	1	61	11	0	73	6	7	4	0	17	7	61	26	0	94	0	202	202
12:15 PM	0	2	2	0	4	4	68	3	4	75	17	6	5	0	28	3	56	9	0	68	4	175	179
12:30 PM	3	3	2	0	8	4	62	4	0	70	20	3	8	0	31	2	67	7	0	76	0	185	185
12:45 PM	3	2	5	1	10	1	73	6	3	80	6	4	8	0	18	5	69	16	0	90	4	198	202
Total	14	15	11	1	40	10	264	24	7	298	49	20	25	0	94	17	253	58	0	328	8	760	768
01:00 PM	4	1	1	0	6	6	72	4	1	82	10	11	4	1	25	5	82	15	0	102	2	215	217
01:15 PM	3	1	2	0	6	2	68	3	1	73	4	7	5	0	16	2	71	10	0	83	1	178	179
01:30 PM	1	2	1	0	4	1	54	2	0	57	11	4	6	0	21	3	62	13	0	78	0	160	160
01:45 PM	3	2	2	1	7	3	55	5	0	63	16	5	3	1	24	2	59	13	1	74	3	168	171
Total	11	6	6	1	23	12	249	14	2	275	41	27	18	2	86	12	274	51	1	337	6	721	727
02:00 PM	6	3	2	0	11	1	68	6	1	75	8	3	3	0	14	4	59	10	0	73	1	173	174
02:15 PM	5	4	2	0	11	1	85	4	0	90	9	3	5	0	17	1	76	11	0	88	0	206	206
02:30 PM	1	0	3	7	4	4	109	9	0	122	11	2	5	0	18	3	102	29	1	134	8	278	286
02:45 PM	3	5	3	8	11	0	81	13	2	94	13	3	7	0	23	5	90	45	0	140	10	268	278
Total	15	12	10	15	37	6	343	32	3	381	41	11	20	0	72	13	327	95	1	435	19	925	944
03:00 PM	2	3	3	11	8	5	86	20	11	111	15	8	6	0	29	8	60	22	0	90	22	238	260
03:15 PM	6	7	2	7	15	4	81	25	140	110	17	13	4	2	34	11	66	24	0	101	149	260	409
03:30 PM	7	13	7	10	27	5	85	6	11	96	12	6	12	1	30	6	107	27	0	140	22	293	315
03:45 PM	4	6	4	2	14	5	104	10	0	119	18	7	5	2	30	3	92	12	1	107	5	270	275

Total 19 29 16 30 64 19 356 *Mason Consulting, PA* 28 325 85 1 438 198 1061 1259

100 American Metro Boulevard, Suite 152
Hamilton, NJ 08618
Engineering for Tomorrow's Challenges

Emerson Borough
Linwood Ave. & High Street
Thursday, May 21st 2009
Weather: Sunny, 78*

File Name : MTC-Linwood&High
Site Code : EMT022
Start Date : 5/21/2009
Page No : 2

Groups Printed- Unshifted - Heavy Vehicles

Start Time	High St. Southbound					Linwood Ave. Westbound					High St. Northbound					Linwood Ave. Eastbound					Excl. Total	Incl. Total	Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total			
04:00 PM	2	3	2	2	7	5	88	5	1	98	12	8	4	1	24	2	85	19	0	106	4	235	239
04:15 PM	3	8	2	2	13	6	89	8	0	103	10	3	6	0	19	4	70	22	0	96	2	231	233
04:30 PM	4	3	0	1	7	3	73	8	3	84	6	6	2	1	14	3	90	8	0	101	5	206	211
04:45 PM	3	7	1	5	11	1	101	6	0	108	10	7	7	1	24	3	82	11	1	96	7	239	246
Total	12	21	5	10	38	15	351	27	4	393	38	24	19	3	81	12	327	60	1	399	18	911	929
05:00 PM	2	4	0	2	6	4	82	8	0	94	13	2	8	0	23	1	87	25	0	113	2	236	238
05:15 PM	2	2	3	1	7	4	96	6	0	106	7	4	9	1	20	1	103	21	0	125	2	258	260
05:30 PM	2	4	1	4	7	8	93	8	0	109	3	10	5	1	18	2	92	16	0	110	5	244	249
05:45 PM	5	1	5	0	11	9	97	7	2	113	10	13	8	0	31	1	86	17	0	104	2	259	261
Total	11	11	9	7	31	25	368	29	2	422	33	29	30	2	92	5	368	79	0	452	11	997	1008
Grand Total	141	161	83	99	385	113	3476	389	248	3978	501	259	240	21	1000	151	3273	743	13	4167	381	9530	9911
Apprch %	36.6	41.8	21.6			2.8	87.4	9.8			50.1	25.9	24			3.6	78.5	17.8					
Total %	1.5	1.7	0.9		4	1.2	36.5	4.1		41.7	5.3	2.7	2.5		10.5	1.6	34.3	7.8		43.7	3.8	96.2	
Unshifted	139	158	79		475	111	3377	375		4111	494	256	233		1004	148	3184	724		4069	0	0	9659
% Unshifted	98.6	98.1	95.2	100	98.1	98.2	97.2	96.4	100	97.3	98.6	98.8	97.1	100	98.3	98	97.3	97.4	100	97.3	0	0	97.5
Heavy Vehicles	2	3	4		9	2	99	14		115	7	3	7		17	3	89	19		111	0	0	252
% Heavy Vehicles	1.4	1.9	4.8	0	1.9	1.8	2.8	3.6	0	2.7	1.4	1.2	2.9	0	1.7	2	2.7	2.6	0	2.7	0	0	2.5

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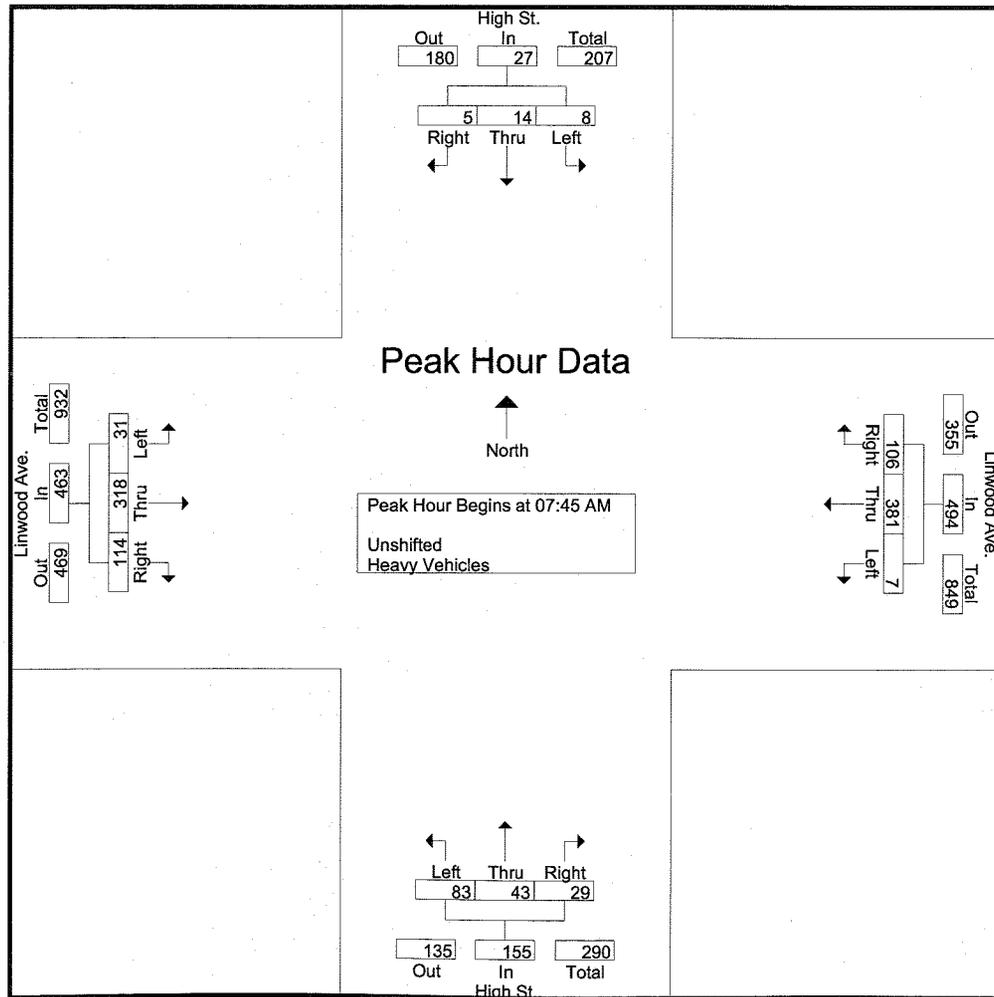
100 American Metro Boulevard, Suite 152
Hamilton, NJ 08618

Engineering for Tomorrow's Challenges

Emerson Borough
Linwood Ave. & High Street
Thursday, May 21st 2009
Weather: Sunny, 78*

File Name : MTC-Linwood&High
Site Code : EMT022
Start Date : 5/21/2009
Page No : 3

Start Time	High St. Southbound				Linwood Ave. Westbound				High St. Northbound				Linwood Ave. Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 06:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	4	4	2	10	6	142	13	161	37	4	2	43	2	108	44	154	368
08:00 AM	1	4	0	5	1	68	21	90	10	16	8	34	8	69	22	99	228
08:15 AM	1	3	0	4	0	97	25	122	17	10	5	32	7	78	15	100	258
08:30 AM	2	3	3	8	0	74	47	121	19	13	14	46	14	63	33	110	285
Total Volume	8	14	5	27	7	381	106	494	83	43	29	155	31	318	114	463	1139
% App. Total	29.6	51.9	18.5		1.4	77.1	21.5		53.5	27.7	18.7		6.7	68.7	24.6		
PHF	.500	.875	.417	.675	.292	.671	.564	.767	.561	.672	.518	.842	.554	.736	.648	.752	.774

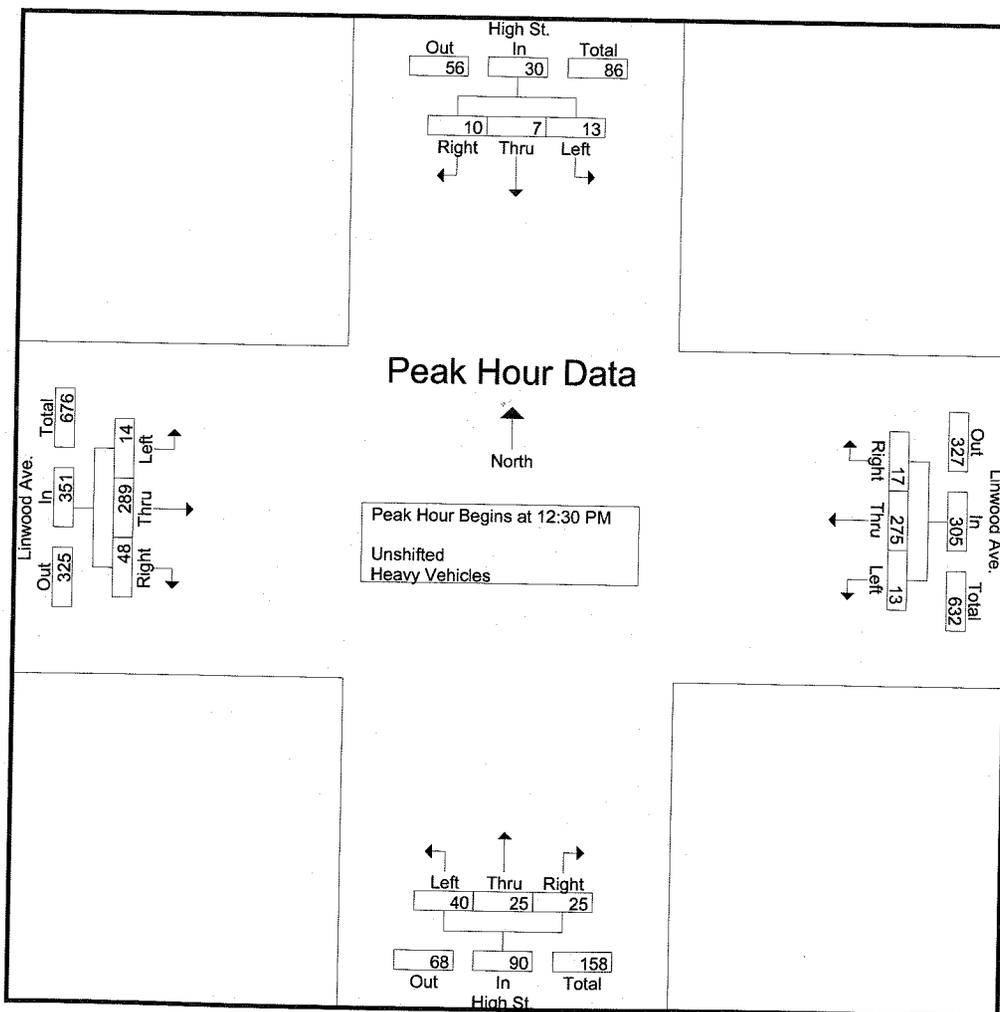


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Engineering for Tomorrow's Challenges

Emerson Borough
 Linwood Ave. & High Street
 Thursday, May 21st 2009
 Weather: Sunny, 78*

File Name : MTC-Linwood&High
 Site Code : EMT022
 Start Date : 5/21/2009
 Page No : 4

Start Time	High St. Southbound				Linwood Ave. Westbound				High St. Northbound				Linwood Ave. Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:30 PM																	
12:30 PM	3	3	2	8	4	62	4	70	20	3	8	31	2	67	7	76	185
12:45 PM	3	2	5	10	1	73	6	80	6	4	8	18	5	69	16	90	198
01:00 PM	4	1	1	6	6	72	4	82	10	11	4	25	5	82	15	102	215
01:15 PM	3	1	2	6	2	68	3	73	4	7	5	16	2	71	10	83	178
Total Volume	13	7	10	30	13	275	17	305	40	25	25	90	14	289	48	351	776
% App. Total	43.3	23.3	33.3		4.3	90.2	5.6		44.4	27.8	27.8		4	82.3	13.7		
PHF	.813	.583	.500	.750	.542	.942	.708	.930	.500	.568	.781	.726	.700	.881	.750	.860	.902

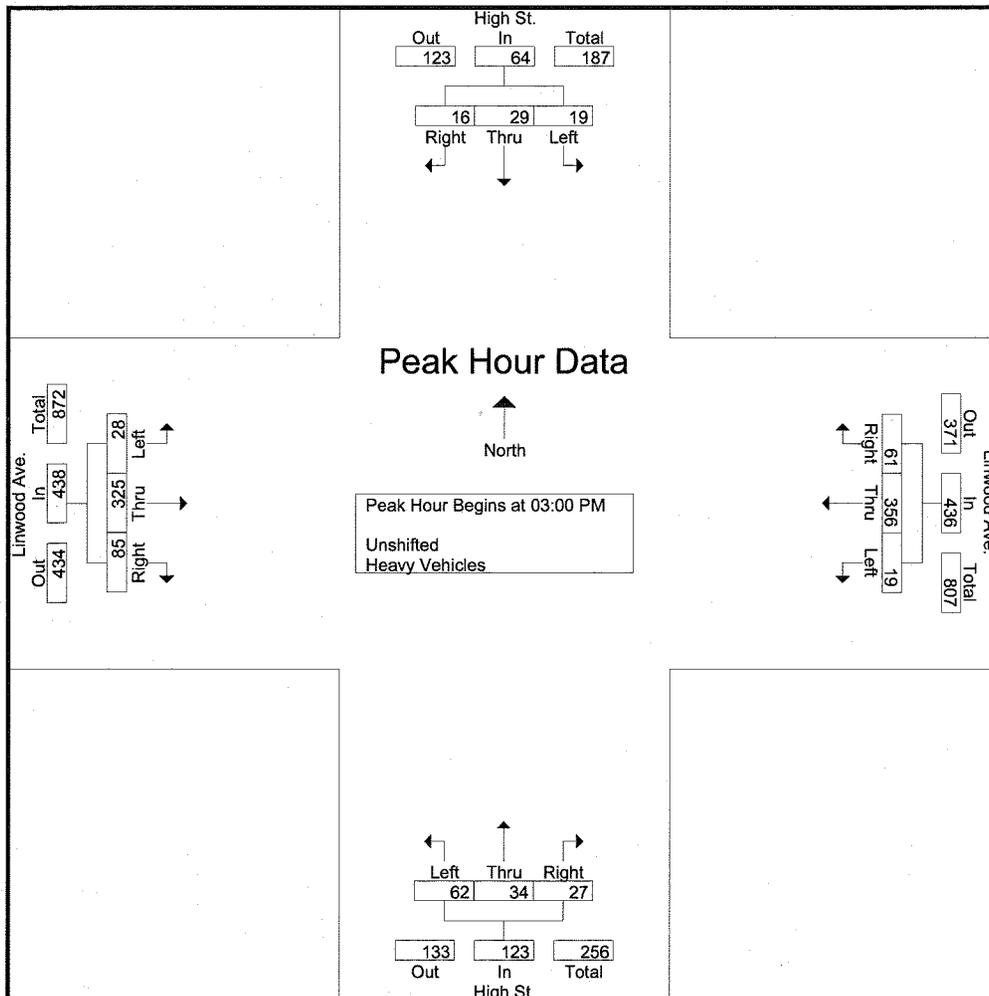


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 100 American Metro Boulevard, Suite 152
 Hamilton, NJ 08618
 Engineering for Tomorrow's Challenges

Emerson Borough
 Linwood Ave. & High Street
 Thursday, May 21st 2009
 Weather: Sunny, 78*

File Name : MTC-Linwood&High
 Site Code : EMT022
 Start Date : 5/21/2009
 Page No : 5

Start Time	High St. Southbound				Linwood Ave. Westbound				High St. Northbound				Linwood Ave. Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	2	3	3	8	5	86	20	111	15	8	6	29	8	60	22	90	238
03:15 PM	6	7	2	15	4	81	25	110	17	13	4	34	11	66	24	101	260
03:30 PM	7	13	7	27	5	85	6	96	12	6	12	30	6	107	27	140	293
03:45 PM	4	6	4	14	5	104	10	119	18	7	5	30	3	92	12	107	270
Total Volume	19	29	16	64	19	356	61	436	62	34	27	123	28	325	85	438	1061
% App. Total	29.7	45.3	25		4.4	81.7	14		50.4	27.6	22		6.4	74.2	19.4		
PHF	.679	.558	.571	.593	.950	.856	.610	.916	.861	.654	.563	.904	.636	.759	.787	.782	.905



Maser Consulting, PA
 100 American Metro Boulevard, Suite 152
 Hamilton, NJ 08619
Engineering for Tomorrow's Challenges

051709
 Union Street
 Between Linwood Avenue & Palisade Avenue
 Maser Job No. EMT-022

Site Code: 000000017003

Start Time	17-May Sun		Toward Linwood		Away From Linwo		Combined		18-May Mon		Toward Linwood		Away From Linwo		Combined	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00	*	*	*	*	*	*	*	*			2	3	0	5	2	8
12:15	*	*	*	*	*	*	*	*			2	3	1	3	3	6
12:30	*	*	*	*	*	*	*	*			0	2	0	4	0	6
12:45	*	*	*	*	*	*	*	*			0	7	0	6	0	13
01:00	*	*	*	*	*	*	*	*			0	2	0	12	0	14
01:15	*	*	*	*	*	*	*	*			1	8	1	4	2	12
01:30	*	*	*	*	*	*	*	*			0	2	0	0	0	2
01:45	*	*	*	*	*	*	*	*			1	9	0	7	1	16
02:00	*	*	*	*	*	*	*	*			0	5	0	8	0	13
02:15	*	*	*	*	*	*	*	*			0	4	1	3	1	7
02:30	*	*	*	*	*	*	*	*			0	6	0	16	0	22
02:45	*	*	*	*	*	*	*	*			0	12	0	5	0	17
03:00	*	*	*	*	*	*	*	*			0	9	0	11	0	20
03:15	*	*	*	*	*	*	*	*			0	5	0	9	0	14
03:30	*	*	*	*	*	*	*	*			1	4	0	7	1	11
03:45	*	*	*	*	*	*	*	*			0	12	0	6	0	18
04:00	*	*	*	*	*	*	*	*			0	8	0	8	0	16
04:15	*	*	*	*	*	*	*	*			1	12	0	8	1	20
04:30	*	*	*	*	*	*	*	*			2	7	0	13	2	20
04:45	*	*	*	*	*	*	*	*			0	8	0	5	0	13
05:00	*	*	*	*	*	*	*	*			0	6	0	10	0	16
05:15	*	*	*	*	*	*	*	*			1	7	0	10	1	17
05:30	*	*	*	*	*	*	*	*			1	5	0	11	1	16
05:45	*	*	*	*	*	*	*	*			0	10	0	10	0	20
06:00	*	7	*	9	*	16	*	16			0	8	0	7	0	15
06:15	*	8	*	4	*	12	*	12			2	5	0	7	2	12
06:30	*	1	*	3	*	4	*	4			5	6	2	5	7	11
06:45	*	1	*	2	*	3	*	3			4	7	8	6	12	13
07:00	*	3	*	2	*	5	*	5			3	8	0	5	3	13
07:15	*	3	*	5	*	8	*	8			4	8	5	3	9	11
07:30	*	4	*	1	*	5	*	5			19	3	8	7	27	10
07:45	*	4	*	5	*	9	*	9			11	2	4	4	15	6
08:00	*	2	*	2	*	4	*	4			8	6	6	2	14	8
08:15	*	1	*	2	*	3	*	3			10	9	3	6	13	15
08:30	*	2	*	0	*	2	*	2			8	3	10	1	18	4
08:45	*	2	*	2	*	4	*	4			4	3	4	3	8	6
09:00	*	5	*	2	*	7	*	7			6	2	5	8	11	10
09:15	*	1	*	1	*	2	*	2			2	1	2	2	4	3
09:30	*	1	*	1	*	2	*	2			1	0	2	2	3	2
09:45	*	3	*	3	*	6	*	6			2	0	4	2	6	2
10:00	*	1	*	1	*	2	*	2			3	1	6	0	9	1
10:15	*	0	*	2	*	2	*	2			2	0	2	1	4	1
10:30	*	1	*	2	*	3	*	3			2	1	2	1	4	2
10:45	*	0	*	1	*	1	*	1			6	0	1	0	7	0
11:00	*	0	*	1	*	1	*	1			3	1	4	1	7	2
11:15	*	1	*	0	*	1	*	1			3	1	5	0	8	1
11:30	*	0	*	1	*	1	*	1			3	1	4	0	7	1
11:45	*	0	*	2	*	2	*	2			6	0	6	0	12	0
Total		0	51	0	54	0	105			129	232	96	254	225	486	
Day Total		51		54		105			361		350		711			
% Total		0.0%	48.6%	0.0%	51.4%				18.1%	32.6%	13.5%	35.7%				
Peak		06:00		06:00		06:00			07:30	03:45	07:15	02:30	07:30	03:45		
Vol.		17		18		35			48	39	23	41	69	74		
P.H.F.		0.531		0.500		0.547			0.632	0.813	0.719	0.641	0.639	0.925		

Maser Consulting, PA

100 American Metro Boulevard, Suite 152
Hamilton, NJ 08619

Engineering for Tomorrow's Challenges

051709
Union Street
Between Linwood Avenue & Palisade Avenue
Maser Job No. EMT-022

Site Code: 00000017003

Start Time	19-May Tue	Toward Linwood		Away From Linwo		Combined		20-May Wed	Toward Linwood		Away From Linwo		Combined	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00		0	6	0	5	0	11		1	5	3	1	4	6
12:15		0	7	0	6	0	13		0	7	1	6	1	13
12:30		0	7	1	3	1	10		0	5	0	4	0	9
12:45		1	7	0	5	1	12		0	4	0	7	0	11
01:00		0	7	0	5	0	12		1	7	1	7	2	14
01:15		0	5	0	4	0	9		0	2	0	4	0	6
01:30		0	6	1	9	1	15		0	2	0	4	0	6
01:45		0	7	0	8	0	15		0	4	0	3	0	7
02:00		0	2	0	5	0	7		0	6	0	8	0	14
02:15		0	10	0	6	0	16		0	6	0	8	0	14
02:30		0	7	0	24	0	31		0	8	0	10	0	18
02:45		0	22	0	12	0	34		0	20	0	11	0	31
03:00		0	11	0	13	0	24		0	8	0	9	0	17
03:15		0	12	0	13	0	25		0	8	0	8	0	16
03:30		0	7	0	8	0	15		0	6	0	5	0	11
03:45		0	4	0	10	0	14		0	3	0	8	0	11
04:00		1	5	0	9	1	14		0	3	0	7	0	10
04:15		0	2	0	9	0	11		2	7	0	8	2	15
04:30		2	11	1	6	3	17		1	6	0	6	1	12
04:45		0	5	0	7	0	12		2	7	0	11	2	18
05:00		0	3	0	6	0	9		0	12	0	9	0	21
05:15		2	8	0	14	2	22		1	7	3	7	4	14
05:30		0	10	0	12	0	22		0	4	2	7	2	11
05:45		1	3	0	8	1	11		1	9	1	12	2	21
06:00		0	8	0	7	0	15		1	9	0	10	1	19
06:15		2	6	0	14	2	20		1	7	0	8	1	15
06:30		5	3	3	7	8	10		6	9	10	8	16	17
06:45		4	4	9	8	13	12		0	9	9	2	9	11
07:00		3	7	0	4	3	11		1	7	7	2	8	9
07:15		7	5	3	5	10	10		5	4	7	6	12	10
07:30		18	4	14	3	32	7		17	4	22	4	39	8
07:45		10	3	5	3	15	6		5	4	12	3	17	7
08:00		8	3	3	6	11	9		9	2	14	1	23	3
08:15		17	3	11	10	28	13		8	3	19	6	27	9
08:30		8	2	9	12	17	14		9	1	13	5	22	6
08:45		8	2	3	1	11	3		9	3	11	10	20	13
09:00		1	3	2	1	3	4		1	3	4	6	5	9
09:15		4	2	0	5	4	7		2	5	4	1	6	6
09:30		3	2	4	1	7	3		6	2	6	2	12	4
09:45		3	0	5	4	8	4		2	0	6	1	8	1
10:00		1	2	4	3	5	5		5	2	4	3	9	5
10:15		3	2	5	2	8	4		9	0	4	0	13	0
10:30		3	0	4	3	7	3		5	2	5	1	10	3
10:45		4	2	2	1	6	3		5	7	6	1	11	8
11:00		2	0	3	1	5	1		4	0	4	1	8	1
11:15		2	0	2	1	4	1		3	1	4	2	7	3
11:30		5	3	3	2	8	5		6	1	5	0	11	1
11:45		4	2	5	2	9	4		2	0	5	0	7	0
Total		132	242	102	313	234	555		130	241	192	253	322	494
Day Total		374		415		789			371		445		816	
% Total		16.7%	30.7%	12.9%	39.7%				15.9%	29.5%	23.5%	31.0%		
Peak		07:30	02:30	07:30	02:30	07:30	02:30		07:30	02:30	07:30	02:15	07:30	02:30
Vol.		53	52	33	62	86	114		39	44	67	38	106	82
P.H.F.		0.736	0.591	0.589	0.646	0.672	0.838		0.574	0.550	0.761	0.864	0.679	0.661

Maser Consulting, PA
 100 American Metro Boulevard, Suite 152
 Hamilton, NJ 08619
Engineering for Tomorrow's Challenges

051709
 Union Street
 Between Linwood Avenue & Palisade Avenue
 Maser Job No. EMT-022

Site Code: 000000017003

Start Time	21-May Thu		Toward Linwood		Away From Linwo		Combined		22-May Fri		Toward Linwood		Away From Linwo		Combined	
			A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	Fri			A.M.	P.M.	A.M.	P.M.	A.M.
12:00			0	6	0	4	0	10			0	12	1	3	1	15
12:15			1	8	0	0	1	8			0	3	0	2	0	5
12:30			1	2	0	3	1	5			0	7	0	7	0	14
12:45			1	7	0	4	1	11			1	2	0	8	1	10
01:00			1	5	2	9	3	14			2	6	3	5	5	11
01:15			0	5	1	1	1	6			1	4	0	6	1	10
01:30			0	2	0	2	0	4			1	7	0	6	1	13
01:45			0	2	2	2	2	4			0	2	1	3	1	5
02:00			0	3	0	1	0	4			0	5	1	3	1	8
02:15			0	7	0	5	0	12			0	7	0	8	0	15
02:30			0	5	0	15	0	20			0	14	0	10	0	24
02:45			0	11	0	3	0	14			0	15	0	9	0	24
03:00			0	6	0	4	0	10			0	6	0	13	0	19
03:15			0	8	0	5	0	13			0	10	0	7	0	17
03:30			0	8	0	7	0	15			0	8	0	8	0	16
03:45			0	11	0	7	0	18			0	7	0	13	0	20
04:00			0	3	0	3	0	6			0	11	1	6	1	17
04:15			0	7	0	10	0	17			0	6	0	9	0	15
04:30			1	6	0	11	1	17			3	5	2	9	5	14
04:45			0	4	2	7	2	11			0	11	1	9	1	20
05:00			3	1	0	6	3	7			0	6	0	9	0	15
05:15			2	9	1	6	3	15			2	5	1	4	3	9
05:30			1	6	1	2	2	8			0	7	0	11	0	18
05:45			2	4	2	9	4	13			0	2	1	6	1	8
06:00			2	8	1	6	3	14			0	7	0	16	0	23
06:15			0	7	0	12	0	19			0	5	1	10	1	15
06:30			5	7	3	6	8	13			7	11	7	9	14	20
06:45			1	8	8	4	9	12			2	4	6	8	8	12
07:00			3	2	7	12	10	14			2	7	2	6	4	13
07:15			6	7	7	8	13	15			4	6	4	9	8	15
07:30			15	5	15	8	30	13			17	9	22	6	39	15
07:45			6	5	18	2	24	7			8	8	8	7	16	15
08:00			4	6	9	6	13	12			5	2	6	2	11	4
08:15			9	9	17	6	26	15			5	4	5	1	10	5
08:30			2	2	5	1	7	3			7	1	7	4	14	5
08:45			10	5	8	5	18	10			9	1	5	4	14	5
09:00			4	5	4	6	8	11			4	6	6	1	10	7
09:15			1	1	3	6	4	7			3	2	5	1	8	3
09:30			5	2	2	5	7	7			4	3	9	1	13	4
09:45			3	3	1	2	4	5			2	2	6	6	8	8
10:00			2	2	2	2	4	4			7	2	8	3	15	5
10:15			4	1	2	3	6	4			6	2	5	1	11	3
10:30			3	1	4	0	7	1			1	3	0	4	1	7
10:45			2	2	4	1	6	3			2	3	4	1	6	4
11:00			1	0	3	4	4	4			4	3	2	3	6	6
11:15			4	1	5	0	9	1			3	2	5	2	8	4
11:30			3	1	3	1	6	2			4	0	2	1	6	1
11:45			2	0	9	0	11	0			5	1	10	1	15	2
Total			110	226	151	232	261	458			121	262	147	281	268	543
Day Total			336		383		719				383		428		811	
% Total			15.3%	31.4%	21.0%	32.3%					14.9%	32.3%	18.1%	34.6%		
Peak Vol.			07:30	02:45	07:30	04:15	07:30	05:45			07:30	02:30	07:30	05:30	07:30	02:30
P.H.F.			34	33	59	34	93	59			35	45	41	43	76	84
			0.567	0.750	0.819	0.773	0.775	0.776			0.515	0.750	0.466	0.672	0.487	0.875

Maser Consulting, PA

100 American Metro Boulevard, Suite 152
Hamilton, NJ 08619

051709
Union Street
Between Linwood Avenue & Palisade Avenue
Maser Job No. EMT-022

Engineering for Tomorrow's Challenges

Site Code: 00000017003

Start Time	23-May Sat	Toward Linwood		Away From Linwood		Combined		24-May Sun	Toward Linwood		Away From Linwood		Combined	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00		2	2	1	3	3	5		0	5	2	4	2	9
12:15		0	4	2	5	2	9		1	1	3	3	4	4
12:30		0	2	0	0	0	2		0	6	0	8	0	14
12:45		0	2	0	9	0	11		0	5	1	2	1	7
01:00		0	2	0	4	0	6		2	3	2	10	4	13
01:15		0	10	0	4	0	14		1	3	0	9	1	12
01:30		0	7	0	5	0	12		0	2	0	7	0	9
01:45		0	5	0	6	0	11		0	4	1	9	1	13
02:00		3	2	0	3	3	5		0	4	1	4	1	8
02:15		0	1	0	3	0	4		0	3	0	6	0	9
02:30		0	8	0	5	0	13		0	3	0	5	0	8
02:45		0	4	0	2	0	6		2	7	0	2	2	9
03:00		0	3	0	2	0	5		0	1	0	7	0	8
03:15		0	9	0	6	0	15		0	4	0	5	0	9
03:30		0	3	0	5	0	8		0	7	2	10	2	17
03:45		0	4	0	2	0	6		0	1	0	6	0	7
04:00		0	3	0	5	0	8		0	3	0	4	0	7
04:15		0	4	0	3	0	7		0	4	0	7	0	11
04:30		3	2	0	6	3	8		0	0	0	4	0	4
04:45		0	6	0	5	0	11		0	8	0	1	0	9
05:00		0	9	0	2	0	11		0	5	0	5	0	10
05:15		1	0	0	3	1	3		0	10	0	3	0	13
05:30		2	2	2	2	4	4		0	0	1	7	1	7
05:45		1	7	0	4	1	11		0	5	0	2	0	7
06:00		1	3	0	3	1	6		1	4	1	4	2	8
06:15		0	8	1	3	1	11		0	7	0	3	0	10
06:30		1	4	0	5	1	9		0	1	2	2	2	3
06:45		2	5	1	2	3	7		0	2	0	7	0	9
07:00		3	2	1	3	4	5		1	1	1	3	2	4
07:15		2	2	0	5	2	7		0	3	1	6	1	9
07:30		0	4	1	8	1	12		5	4	2	6	7	10
07:45		3	3	5	1	8	4		1	4	5	2	6	6
08:00		6	3	0	5	6	8		1	2	3	3	4	5
08:15		3	5	4	2	7	7		3	2	2	6	5	8
08:30		2	3	0	5	2	8		1	2	3	2	4	4
08:45		1	2	3	3	4	5		4	4	5	4	9	8
09:00		4	2	8	4	12	6		5	0	3	3	8	3
09:15		3	4	3	6	6	10		4	4	6	4	10	8
09:30		4	0	4	2	8	2		4	4	5	2	9	6
09:45		3	2	2	3	5	5		2	3	5	4	7	7
10:00		4	3	3	2	7	5		5	1	2	0	7	1
10:15		0	2	0	0	0	2		4	3	1	1	5	4
10:30		6	1	2	1	8	2		2	0	2	0	4	0
10:45		8	2	3	5	11	7		2	0	4	1	6	1
11:00		5	0	4	1	9	1		3	2	1	0	4	2
11:15		3	1	4	1	7	2		4	2	2	1	6	3
11:30		7	0	3	4	10	4		5	2	7	1	12	3
11:45		1	0	3	0	4	0		1	3	7	4	8	7
Total		84	162	60	168	144	330		64	154	83	199	147	353
Day Total		246		228		474			218		282		500	
% Total		17.7%	34.2%	12.7%	35.4%				12.8%	30.8%	16.6%	39.8%		
Peak		10:45	01:00	08:45	00:45	10:45	00:45		08:45	04:30	08:45	01:00	08:45	01:00
Vol.		23	24	18	22	37	43		17	23	19	35	36	47
P.H.F.		0.719	0.600	0.563	0.611	0.841	0.768		0.850	0.575	0.792	0.875	0.900	0.904

051709
Main Street
Between High Street & Clinton Street
Maser Project No. EMT-022

Maser Consulting, PA
100 American Metro Boulevard, Suite 152
Hamilton, NJ 08619
Engineering for Tomorrow's Challenges

Site Code: 017

Start Time	17-May Sun		Toward Elementa		Toward High Sch		Combined		18-May Mon		Toward Elementa		Toward High Sch		Combined	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00	*	*	*	*	*	*	*	*	9	93	2	75	11	168		
12:15	*	*	*	*	*	*	*	*	5	91	5	78	10	169		
12:30	*	*	*	*	*	*	*	*	0	79	3	77	3	156		
12:45	*	*	*	*	*	*	*	*	3	98	2	79	5	177		
01:00	*	*	*	*	*	*	*	*	2	64	5	73	7	137		
01:15	*	*	*	*	*	*	*	*	0	79	3	67	3	146		
01:30	*	*	*	*	*	*	*	*	2	65	1	61	3	126		
01:45	*	*	*	*	*	*	*	*	2	80	3	75	5	155		
02:00	*	*	*	*	*	*	*	*	1	61	3	81	4	142		
02:15	*	*	*	*	*	*	*	*	1	79	1	117	2	196		
02:30	*	*	*	*	*	*	*	*	1	147	1	112	2	259		
02:45	*	*	*	*	*	*	*	*	0	120	1	111	1	231		
03:00	*	*	*	*	*	*	*	*	1	115	0	102	1	217		
03:15	*	*	*	*	*	*	*	*	0	95	0	144	0	239		
03:30	*	*	*	*	*	*	*	*	1	113	1	115	2	228		
03:45	*	*	*	*	*	*	*	*	1	97	2	120	3	217		
04:00	*	*	*	*	*	*	*	*	4	99	4	133	8	232		
04:15	*	*	*	*	*	*	*	*	2	110	6	116	8	226		
04:30	*	*	*	*	*	*	*	*	4	103	7	98	11	201		
04:45	*	*	*	*	*	*	*	*	6	105	4	83	10	188		
05:00	*	60	*	59	*	119	*	8	131	7	113	15	244			
05:15	*	62	*	66	*	128	*	11	159	8	116	19	275			
05:30	*	61	*	59	*	120	*	10	128	12	95	22	223			
05:45	*	68	*	63	*	131	*	20	125	15	114	35	239			
06:00	*	46	*	49	*	95	*	22	106	19	115	41	221			
06:15	*	42	*	48	*	90	*	28	101	28	96	56	197			
06:30	*	67	*	46	*	113	*	37	87	42	83	79	170			
06:45	*	38	*	42	*	80	*	47	69	59	71	106	140			
07:00	*	41	*	46	*	87	*	58	70	60	87	118	157			
07:15	*	31	*	42	*	73	*	70	83	110	66	180	149			
07:30	*	40	*	40	*	80	*	123	68	192	54	315	122			
07:45	*	33	*	51	*	84	*	130	61	140	69	270	130			
08:00	*	44	*	30	*	74	*	94	57	130	59	224	116			
08:15	*	38	*	33	*	71	*	103	39	91	45	194	84			
08:30	*	38	*	38	*	76	*	106	43	106	43	212	86			
08:45	*	27	*	30	*	57	*	70	39	135	33	205	72			
09:00	*	28	*	22	*	50	*	70	39	78	34	148	73			
09:15	*	23	*	14	*	37	*	62	37	74	48	136	85			
09:30	*	26	*	30	*	56	*	73	32	54	34	127	66			
09:45	*	15	*	20	*	35	*	63	18	46	21	109	39			
10:00	*	12	*	15	*	27	*	66	19	56	22	122	41			
10:15	*	12	*	13	*	25	*	55	17	57	26	112	43			
10:30	*	13	*	9	*	22	*	54	12	51	21	105	33			
10:45	*	9	*	17	*	26	*	58	18	67	18	125	36			
11:00	*	11	*	9	*	20	*	69	10	46	10	115	20			
11:15	*	4	*	15	*	19	*	73	12	54	13	127	25			
11:30	*	8	*	6	*	14	*	75	10	71	9	146	19			
11:45	*	8	*	6	*	14	*	107	10	79	9	186	19			
Total Day		0	905	0	918	0	1823		1807	3493	1941	3441	3748	6934		
Total		905		918		1823		5300		5382		10682				
% Total		0.0%	49.6%	0.0%	50.4%			16.9%	32.7%	18.2%	32.2%					
Peak Vol.			05:00		05:00		05:00		07:30	05:00	07:15	03:15	07:30	05:00		
P.H.F.			0.923		0.936		0.950		0.865	0.854	0.745	0.889	0.796	0.892		

Maser Consulting, PA
 100 American Metro Boulevard, Suite 152
 Hamilton, NJ 08619
Engineering for Tomorrow's Challenges

051709
 Main Street
 Between High Street & Clinton Street
 Maser Project No. EMT-022

Site Code: 017

Start Time	19-May Tue		Toward Elementa		Toward High Sch		Combined		20-May Wed		Toward Elementa		Toward High Sch		Combined	
			A.M.	P.M.	A.M.	P.M.	A.M.	P.M.			A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00			9	95	4	66	13	161			11	85	5	69	16	154
12:15			10	70	8	86	18	156			4	65	8	109	12	174
12:30			3	75	2	69	5	144			5	95	0	74	5	169
12:45			5	74	1	80	6	154			1	79	4	93	5	172
01:00			1	81	2	77	3	158			4	102	3	84	7	186
01:15			1	70	0	81	1	151			1	85	2	78	3	163
01:30			3	71	0	65	3	136			2	84	2	65	4	149
01:45			3	76	1	72	4	148			0	73	3	89	3	162
02:00			2	81	1	75	3	156			0	82	1	74	1	156
02:15			1	77	2	94	3	171			0	99	0	105	0	204
02:30			1	135	2	112	3	247			0	148	4	122	4	270
02:45			0	130	1	111	1	241			0	123	0	90	0	213
03:00			0	118	1	112	1	230			2	129	2	107	4	236
03:15			0	134	0	125	0	259			3	139	3	116	6	255
03:30			1	133	0	106	1	239			1	125	1	109	2	234
03:45			3	109	1	127	4	236			3	141	4	100	7	241
04:00			1	105	4	135	5	240			1	113	4	105	5	218
04:15			7	84	5	133	12	217			4	105	5	106	9	211
04:30			3	100	5	111	8	211			1	103	3	83	4	186
04:45			7	76	2	111	9	187			9	109	6	85	15	194
05:00			5	113	8	117	13	230			4	117	5	104	9	221
05:15			9	133	11	106	20	239			7	140	8	99	15	239
05:30			13	133	6	96	19	229			13	123	10	95	23	218
05:45			17	128	20	121	37	249			15	113	19	114	34	227
06:00			30	113	16	115	46	228			33	98	12	130	45	228
06:15			27	121	25	94	52	215			31	89	26	109	57	198
06:30			39	84	35	117	74	201			37	73	44	132	81	205
06:45			59	75	64	94	123	169			48	91	60	103	108	194
07:00			59	80	50	75	109	155			70	75	78	88	148	163
07:15			94	87	112	72	206	159			75	86	121	74	196	160
07:30			115	51	195	66	310	117			103	76	197	74	300	150
07:45			131	69	146	56	277	125			122	67	151	69	273	136
08:00			108	50	106	70	214	120			90	66	110	52	200	118
08:15			95	50	127	54	222	104			105	64	98	57	203	121
08:30			105	47	93	50	198	97			90	55	94	58	184	113
08:45			72	32	110	47	182	79			84	93	127	48	211	141
09:00			63	48	74	33	137	81			74	85	90	45	164	130
09:15			67	36	66	46	133	82			92	35	90	37	182	72
09:30			65	35	55	41	120	76			79	34	60	43	139	77
09:45			67	26	63	44	130	70			67	19	65	46	132	65
10:00			72	29	69	25	141	54			71	27	64	36	135	63
10:15			66	19	70	23	136	42			71	20	49	24	120	44
10:30			76	14	64	28	140	42			78	17	53	30	131	47
10:45			66	14	63	19	129	33			69	10	58	14	127	24
11:00			63	16	60	10	123	26			64	27	62	15	126	42
11:15			61	24	80	13	141	37			83	19	50	15	133	34
11:30			81	7	66	12	147	19			64	9	67	12	131	21
11:45			93	9	53	9	146	18			97	3	79	11	176	14
Total			1879	3537	1949	3601	3828	7138			1888	3815	2007	3597	3895	7412
Day Total			5416		5550		10966				5703		5604		11307	
% Total			17.1%	32.3%	17.8%	32.8%					16.7%	33.7%	17.8%	31.8%		
Peak Vol.			07:30	02:30	07:30	03:45	07:30	02:30			07:30	02:30	07:15	05:45	07:30	02:30
P.H.F.			449	517	574	506	1023	977			420	539	579	485	976	974
			0.857	0.957	0.736	0.937	0.825	0.943			0.861	0.910	0.735	0.919	0.813	0.902

Maser Consulting, PA
 100 American Metro Boulevard, Suite 152
 Hamilton, NJ 08619
Engineering for Tomorrow's Challenges

051709
 Main Street
 Between High Street & Clinton Street
 Maser Project No. EMT-022

Site Code: 017

Start Time	21-May Thu		Toward Elementa		Toward High Sch'		Combined		22-May Fri		Toward Elementa		Toward High Sch		Combined	
			A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	Fri		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00			16	108	6	71	22	179			10	100	5	98	15	198
12:15			8	101	7	99	15	200			5	63	11	84	16	147
12:30			3	84	8	84	11	168			8	87	7	85	15	172
12:45			3	94	3	84	6	178			2	78	5	93	7	171
01:00			5	69	5	89	10	158			0	109	9	76	9	185
01:15			1	74	4	89	5	163			2	85	3	70	5	155
01:30			1	79	2	92	3	171			5	78	2	90	7	168
01:45			3	91	1	61	4	152			1	88	3	84	4	172
02:00			1	87	0	96	1	183			4	79	2	91	6	170
02:15			1	91	2	98	3	189			4	95	5	123	9	218
02:30			2	159	3	115	5	274			2	147	1	134	3	281
02:45			0	111	3	88	3	199			0	109	3	103	3	212
03:00			3	92	2	82	5	174			3	123	1	96	4	219
03:15			1	108	1	130	2	238			1	122	0	94	1	216
03:30			1	144	4	114	5	258			1	128	2	107	3	235
03:45			4	105	1	110	5	215			1	119	4	146	5	265
04:00			2	111	2	93	4	204			2	128	2	117	4	245
04:15			6	111	4	111	10	222			4	112	2	109	6	221
04:30			6	94	4	96	10	190			4	105	4	98	8	203
04:45			7	110	4	112	11	222			5	105	6	92	11	197
05:00			6	122	3	101	9	223			9	87	7	112	16	199
05:15			6	130	8	91	14	221			6	112	6	79	12	191
05:30			13	119	12	84	25	203			11	97	12	94	23	191
05:45			18	102	18	114	36	216			25	87	16	98	41	185
06:00			29	140	16	90	45	230			25	106	17	87	42	193
06:15			37	144	29	98	66	242			27	125	22	90	49	215
06:30			34	100	38	92	72	192			42	132	31	77	73	209
06:45			42	83	56	108	98	191			45	76	59	61	104	137
07:00			49	90	69	72	118	162			55	63	57	96	112	159
07:15			74	85	97	70	171	155			85	82	100	70	185	152
07:30			129	69	178	69	307	138			109	67	175	79	284	146
07:45			142	70	145	69	287	139			114	55	132	59	246	114
08:00			74	54	99	68	173	122			100	57	74	49	174	106
08:15			91	51	103	75	194	126			85	50	102	53	187	103
08:30			86	56	115	63	201	119			93	44	102	42	195	86
08:45			87	50	114	56	201	106			88	52	87	44	175	96
09:00			65	40	94	50	159	90			55	32	82	35	137	67
09:15			76	31	64	37	140	68			69	37	64	30	133	67
09:30			66	29	72	48	138	77			78	35	53	29	131	64
09:45			76	39	59	40	135	79			79	23	68	32	147	55
10:00			85	24	72	29	157	53			78	28	65	41	143	69
10:15			75	21	69	26	144	47			78	30	56	34	134	64
10:30			79	18	46	19	125	37			90	37	53	29	143	66
10:45			53	15	63	18	116	33			92	23	56	39	148	62
11:00			91	12	66	9	157	21			70	22	67	22	137	44
11:15			73	14	63	13	136	27			69	28	60	19	129	47
11:30			84	21	65	7	149	28			100	24	59	15	159	39
11:45			102	12	64	13	166	25			94	10	72	15	166	25
Total			1916	3764	1963	3543	3879	7307			1935	3681	1831	3520	3766	7201
Day Total			5680		5506		11186				5616		5351		10967	
% Total			17.1%	33.6%	17.5%	31.7%					17.6%	33.6%	16.7%	32.1%		
Peak			07:30	05:30	07:30	03:15	07:30	03:15			07:15	02:30	07:30	03:30	07:30	03:30
Vol.			436	505	525	447	961	915			408	501	483	479	891	966
P.H.F.			0.768	0.877	0.737	0.860	0.783	0.887			0.895	0.852	0.690	0.820	0.784	0.911

Maser Consulting, PA
 100 American Metro Boulevard, Suite 152
 Hamilton, NJ 08619
Engineering for Tomorrow's Challenges

051709
 Main Street
 Between High Street & Clinton Street
 Maser Project No. EMT-022

Site Code: 017

Start Time	23-May Sat	Toward Elementa		Toward High Sch		Combined		24-May Sun	Toward Elementa		Toward High Sch		Combined	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00		7	86	11	63	18	149		13	69	17	51	30	120
12:15		7	73	11	77	18	150		7	67	12	60	19	127
12:30		9	74	8	98	17	172		12	72	8	52	20	124
12:45		6	92	8	77	14	169		3	45	9	53	12	98
01:00		3	124	5	83	8	207		4	73	17	53	21	126
01:15		5	83	4	91	9	174		7	64	6	65	13	129
01:30		4	79	7	95	11	174		5	69	4	74	9	143
01:45		8	77	11	86	19	163		1	57	1	59	2	116
02:00		3	64	0	77	3	141		4	66	3	81	7	147
02:15		4	78	2	65	6	143		2	59	2	49	4	108
02:30		2	77	2	81	4	158		1	63	3	46	4	109
02:45		2	63	4	82	6	145		1	56	1	51	2	107
03:00		3	86	3	65	6	151		2	54	6	52	8	106
03:15		3	126	4	66	7	192		3	64	4	54	7	118
03:30		2	114	1	60	3	174		0	50	0	37	0	87
03:45		1	67	3	69	4	136		0	56	3	53	3	109
04:00		1	63	3	69	4	132		3	50	2	53	5	103
04:15		3	46	1	67	4	113		2	39	5	56	7	95
04:30		3	66	5	76	8	142		1	39	4	32	5	71
04:45		3	69	5	68	8	137		3	55	4	53	7	108
05:00		5	61	3	65	8	126		2	40	2	44	4	84
05:15		7	46	8	44	15	90		0	29	2	31	2	60
05:30		7	55	6	67	13	122		2	31	2	39	4	70
05:45		8	59	8	74	16	133		11	44	12	49	23	93
06:00		7	72	7	61	14	133		4	48	12	23	16	71
06:15		12	61	17	47	29	108		5	33	11	32	16	65
06:30		15	69	24	35	39	104		15	28	9	48	24	76
06:45		23	44	29	58	52	102		10	35	23	38	33	73
07:00		19	58	20	58	39	116		20	39	23	46	43	85
07:15		20	40	21	43	41	83		16	31	18	35	34	66
07:30		26	56	30	35	56	91		18	36	23	38	41	74
07:45		36	40	33	54	69	94		24	28	23	39	47	67
08:00		34	35	32	48	66	83		25	37	30	39	55	76
08:15		57	35	47	42	104	77		43	29	30	30	73	59
08:30		55	37	38	45	93	82		28	28	24	24	52	52
08:45		51	43	48	32	99	75		34	32	30	42	64	74
09:00		39	33	46	30	85	63		42	26	45	27	87	53
09:15		45	24	59	38	104	62		42	24	65	29	107	53
09:30		58	25	40	29	98	54		54	22	43	18	97	40
09:45		62	26	51	31	113	57		50	12	47	26	97	38
10:00		60	19	81	29	141	48		41	19	42	23	83	42
10:15		68	26	59	20	127	46		43	12	48	13	91	25
10:30		67	18	63	32	130	50		42	19	49	11	91	30
10:45		83	17	88	23	171	40		61	10	59	23	120	33
11:00		55	29	85	17	140	46		62	14	61	10	123	24
11:15		67	13	73	12	140	25		65	6	51	10	116	16
11:30		81	7	78	3	159	10		62	15	57	19	119	34
11:45		79	11	70	5	149	16		66	10	52	17	118	27
Total		1225	2666	1262	2592	2487	5258		961	1904	1004	1907	1965	3811
Day Total		3891		3854		7745			2865		2911		5776	
% Total		15.8%	34.4%	16.3%	33.5%				16.6%	33.0%	17.4%	33.0%		
Peak		10:45	03:00	10:45	01:00	10:45	00:45		11:00	01:00	10:45	01:15	10:45	01:15
Vol.		286	393	324	355	610	724		255	263	228	279	478	535
P.H.F.		0.861	0.780	0.920	0.934	0.892	0.874		0.966	0.901	0.934	0.861	0.972	0.910

Maser Consulting, PA

100 American Metro Boulevard, Suite 152
Hamilton, NJ 08619

Engineering for Tomorrow's Challenges

051709
High Street
Between Linwood Avenue & Palisade Avenue
Maser Job No. EMT-022

Site Code: 00000017002

Start Time	17-May Sun		To Linwood		Away from Linwo		Combined		18-May Mon		To Linwood		Away from Linwo		Combined	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00	*	*	*	*	*	*	*	*	0	3	1	6	1	9		
12:15	*	*	*	*	*	*	*	*	0	4	1	7	1	11		
12:30	*	*	*	*	*	*	*	*	0	5	0	13	0	18		
12:45	*	*	*	*	*	*	*	*	0	7	0	6	0	13		
01:00	*	*	*	*	*	*	*	*	0	3	0	11	0	14		
01:15	*	*	*	*	*	*	*	*	0	9	0	12	0	21		
01:30	*	*	*	*	*	*	*	*	0	9	0	14	0	23		
01:45	*	*	*	*	*	*	*	*	1	11	0	12	1	23		
02:00	*	*	*	*	*	*	*	*	0	4	1	9	1	13		
02:15	*	*	*	*	*	*	*	*	0	6	0	6	0	12		
02:30	*	*	*	*	*	*	*	*	0	5	0	7	0	12		
02:45	*	*	*	*	*	*	*	*	0	9	0	19	0	28		
03:00	*	*	*	*	*	*	*	*	0	13	0	29	0	42		
03:15	*	*	*	*	*	*	*	*	0	8	0	32	0	40		
03:30	*	*	*	*	*	*	*	*	0	10	0	15	0	25		
03:45	*	*	*	*	*	*	*	*	0	9	0	16	0	25		
04:00	*	*	*	*	*	*	*	*	0	12	0	10	0	22		
04:15	*	*	*	*	*	*	*	*	1	10	1	13	2	23		
04:30	*	*	*	*	*	*	*	*	0	10	0	15	0	25		
04:45	*	*	*	*	*	*	*	*	1	4	2	11	3	15		
05:00	*	*	*	*	*	*	*	*	0	14	0	10	0	24		
05:15	*	*	*	*	*	*	*	*	1	14	1	17	2	31		
05:30	*	11	*	11	*	11	*	22	1	14	1	28	2	42		
05:45	*	12	*	6	*	6	*	18	1	7	3	16	4	23		
06:00	*	2	*	5	*	5	*	7	3	9	0	15	3	24		
06:15	*	8	*	3	*	3	*	11	1	4	1	10	2	14		
06:30	*	4	*	7	*	7	*	11	1	9	2	13	3	22		
06:45	*	5	*	1	*	1	*	6	4	10	1	12	5	22		
07:00	*	3	*	7	*	7	*	10	4	10	2	16	6	26		
07:15	*	4	*	3	*	3	*	7	1	7	0	9	1	16		
07:30	*	1	*	4	*	4	*	5	12	10	3	7	15	17		
07:45	*	1	*	5	*	5	*	6	3	3	6	4	9	7		
08:00	*	4	*	1	*	1	*	5	14	8	15	9	29	17		
08:15	*	6	*	3	*	3	*	9	8	9	45	13	53	22		
08:30	*	3	*	9	*	9	*	12	16	4	35	6	51	10		
08:45	*	1	*	4	*	4	*	5	1	4	18	1	19	5		
09:00	*	1	*	2	*	2	*	3	9	1	6	7	15	8		
09:15	*	2	*	0	*	0	*	2	6	7	3	7	9	14		
09:30	*	2	*	2	*	2	*	4	2	2	6	5	8	7		
09:45	*	2	*	2	*	2	*	4	6	2	10	2	16	4		
10:00	*	1	*	3	*	3	*	4	5	0	7	4	12	4		
10:15	*	1	*	0	*	0	*	1	4	0	6	0	10	0		
10:30	*	0	*	1	*	1	*	1	4	4	1	1	5	5		
10:45	*	1	*	1	*	1	*	2	3	1	2	1	5	2		
11:00	*	0	*	1	*	1	*	1	9	2	5	3	14	5		
11:15	*	0	*	0	*	0	*	0	8	1	4	0	12	1		
11:30	*	1	*	0	*	0	*	1	7	0	9	3	16	3		
11:45	*	0	*	0	*	0	*	0	5	0	6	0	11	0		
Total Day		0	76	0	81	0	157		142	307	204	482	346	789		
Total		76		81		157			449		686		1135			
% Total		0.0%	48.4%	0.0%	51.6%				12.5%	27.0%	18.0%	42.5%				
Peak Vol.			05:30		05:30		05:30		07:45	05:00	08:00	02:45	08:00	02:45		
P.H.F.			33		25		58		41	49	113	95	152	135		
			0.688		0.568		0.659		0.641	0.875	0.628	0.742	0.717	0.804		

Maser Consulting, PA
 100 American Metro Boulevard, Suite 152
 Hamilton, NJ 08619
Engineering for Tomorrow's Challenges

051709
 High Street
 Between Linwood Avenue & Palisade Avenue
 Maser Job No. EMT-022

Site Code: 00000017002

Start Time	19-May Tue	To Linwood		Away from Linwo		Combined		20-May Wed	To Linwood		Away from Linwo		Combined	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00		0	9	0	12	0	21		2	7	1	12	3	19
12:15		2	7	2	13	4	20		0	4	1	8	1	12
12:30		0	6	1	11	1	17		1	4	4	8	5	12
12:45		0	7	1	11	1	18		0	8	2	16	2	24
01:00		0	9	0	17	0	26		1	10	0	12	1	22
01:15		0	7	0	8	0	15		0	5	2	5	2	10
01:30		1	5	0	4	1	9		1	4	0	8	1	12
01:45		0	8	0	11	0	19		0	4	0	9	0	13
02:00		0	7	1	15	1	22		0	9	0	10	0	19
02:15		0	8	0	7	0	15		0	5	0	4	0	9
02:30		0	9	0	13	0	22		0	3	0	10	0	13
02:45		0	10	0	34	0	44		0	7	1	12	1	19
03:00		1	11	0	24	1	35		0	13	0	29	0	42
03:15		0	7	0	41	0	48		0	2	0	36	0	38
03:30		0	7	0	21	0	28		0	8	0	18	0	26
03:45		1	10	1	17	2	27		0	7	0	12	0	19
04:00		1	14	0	13	1	27		1	4	0	15	1	19
04:15		0	7	1	11	1	18		0	6	1	10	1	16
04:30		0	6	0	8	0	14		0	11	0	22	0	33
04:45		0	6	0	6	0	12		0	7	1	15	1	22
05:00		1	5	0	14	1	19		1	10	1	7	2	17
05:15		1	13	1	15	2	28		0	10	0	24	0	34
05:30		0	8	1	26	1	34		3	12	1	23	4	35
05:45		2	5	3	15	5	20		1	6	2	17	3	23
06:00		3	13	0	13	3	26		1	14	0	10	1	24
06:15		2	10	1	8	3	18		0	9	1	11	1	20
06:30		1	8	1	10	2	18		3	4	2	12	5	16
06:45		4	11	2	8	6	19		5	9	3	11	8	20
07:00		3	15	2	15	5	30		2	10	3	9	5	19
07:15		9	8	6	15	15	23		5	12	3	10	8	22
07:30		7	7	6	9	13	16		8	7	3	8	11	15
07:45		6	3	10	13	16	16		8	7	19	6	27	13
08:00		12	5	18	8	30	13		12	12	21	13	33	25
08:15		12	11	32	10	44	21		12	5	31	6	43	11
08:30		11	6	41	5	52	11		11	4	44	2	55	6
08:45		5	9	18	10	23	19		3	7	14	3	17	10
09:00		4	5	9	5	13	10		2	3	11	8	13	11
09:15		4	8	10	6	14	14		2	2	8	6	10	8
09:30		11	1	9	4	20	5		3	0	7	5	10	5
09:45		1	1	5	4	6	5		7	5	5	4	12	9
10:00		4	3	5	4	9	7		5	1	6	3	11	4
10:15		4	1	6	3	10	4		0	2	9	2	9	4
10:30		3	4	6	1	9	5		7	0	9	2	16	2
10:45		7	0	10	0	17	0		4	1	1	0	5	1
11:00		10	1	11	2	21	3		9	1	2	0	11	1
11:15		4	0	9	1	13	1		8	1	8	2	16	3
11:30		1	0	10	2	11	2		4	2	10	3	14	5
11:45		4	1	10	1	14	2		6	0	11	0	17	0
Total		142	322	249	524	391	846		138	284	248	478	386	762
Day Total		464		773		1237			422		726		1148	
% Total		11.5%	26.0%	20.1%	42.4%				12.0%	24.7%	21.6%	41.6%		
Peak Vol.		41	44	109	120	149	155		43	42	115	95	158	125
P.H.F.		0.854	0.733	0.665	0.732	0.716	0.807		0.896	0.750	0.653	0.660	0.718	0.744

Maser Consulting, PA
 100 American Metro Boulevard, Suite 152
 Hamilton, NJ 08619
Engineering for Tomorrow's Challenges

051709
 High Street
 Between Linwood Avenue & Palisade Avenue
 Maser Job No. EMT-022

Site Code: 000000017002

Start Time	21-May Thu		To Linwood		Away from Linwo		Combined		22-May Fri		To Linwood		Away from Linwo		Combined	
			A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	Fri		P.M.	A.M.	P.M.	A.M.	P.M.	A.M.
12:00			0	7	2	12	2	19			2	12	1	7	3	19
12:15			1	3	1	12	2	15			1	4	3	18	4	22
12:30			1	10	0	10	1	20			0	8	0	6	0	14
12:45			0	9	0	19	0	28			0	7	0	13	0	20
01:00			1	2	1	6	2	8			1	9	0	16	1	25
01:15			2	7	0	7	2	14			0	7	0	21	0	28
01:30			1	5	0	6	1	11			0	9	0	10	0	19
01:45			0	5	0	11	0	16			2	8	0	14	2	22
02:00			0	6	0	10	0	16			0	6	0	9	0	15
02:15			0	4	0	13	0	17			2	10	1	7	3	17
02:30			0	5	0	11	0	16			0	10	0	16	0	26
02:45			0	9	0	13	0	22			0	10	0	24	0	34
03:00			0	12	0	25	0	37			0	11	0	27	0	38
03:15			0	9	0	35	0	44			0	8	0	46	0	54
03:30			0	9	0	25	0	34			0	15	0	16	0	31
03:45			0	6	0	11	0	17			1	7	0	8	1	15
04:00			0	7	0	15	0	22			0	11	0	15	0	26
04:15			0	11	1	20	1	31			0	11	2	22	2	33
04:30			0	3	0	12	0	15			0	9	0	18	0	27
04:45			1	10	3	9	4	19			0	14	0	20	0	34
05:00			1	3	1	11	2	14			0	16	2	19	2	35
05:15			2	4	0	8	2	12			1	11	0	20	1	31
05:30			0	7	1	18	1	25			0	13	0	16	0	29
05:45			3	7	1	16	4	23			3	9	3	18	6	27
06:00			2	9	1	11	3	20			1	9	1	28	2	37
06:15			1	6	2	10	3	16			1	11	3	17	4	28
06:30			3	9	3	13	6	22			1	5	2	12	3	17
06:45			2	11	7	15	9	26			6	16	1	6	7	22
07:00			5	6	10	16	15	22			2	10	3	17	5	27
07:15			2	6	5	4	7	10			7	16	2	10	9	26
07:30			6	4	8	6	14	10			6	12	4	11	10	23
07:45			12	6	13	12	25	18			2	9	13	8	15	17
08:00			12	15	15	10	27	25			7	11	18	20	25	31
08:15			7	5	33	16	40	21			18	8	44	6	62	14
08:30			14	1	36	6	50	7			9	6	33	4	42	10
08:45			5	4	13	9	18	13			5	6	12	5	17	11
09:00			5	5	6	6	11	11			5	5	8	7	13	12
09:15			1	2	7	2	8	4			6	1	1	6	7	7
09:30			7	0	6	6	13	6			6	5	3	3	9	8
09:45			6	2	2	6	8	8			4	3	10	5	14	8
10:00			8	0	9	1	17	1			5	2	11	5	16	7
10:15			5	4	4	0	9	4			1	5	2	3	3	8
10:30			3	2	5	2	8	4			4	2	8	6	12	8
10:45			0	0	0	1	0	1			6	1	6	6	12	7
11:00			11	3	5	0	16	3			9	1	6	3	15	4
11:15			4	1	10	2	14	3			4	1	6	2	10	3
11:30			6	2	6	1	12	3			5	7	10	1	15	8
11:45			2	0	12	2	14	2			5	2	9	1	14	3
Total Day			142	263	229	492	371	755			138	389	228	598	366	987
Total			405		721		1126				527		826		1353	
% Total			12.6%	23.4%	20.3%	43.7%					10.2%	28.8%	16.9%	44.2%		
Peak			07:45	02:45	07:45	02:45	07:45	02:45			08:00	04:45	07:45	02:30	08:00	02:45
Vol.			45	39	97	98	142	137			39	54	108	113	146	157
P.H.F.			0.804	0.813	0.674	0.700	0.710	0.778			0.542	0.844	0.614	0.614	0.589	0.727

Maser Consulting, PA
 100 American Metro Boulevard, Suite 152
 Hamilton, NJ 08619
Engineering for Tomorrow's Challenges

051709
 High Street
 Between Linwood Avenue & Palisade Avenue
 Maser Job No. EMT-022

Site Code: 00000017002

Start Time	23-May Sat	To Linwood		Away from Linwo		Combined		24-May Sun	To Linwood		Away from Linwo		Combined	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00		0	3	2	12	2	15		0	8	1	8	1	16
12:15		0	9	1	10	1	19		1	8	0	5	1	13
12:30		1	7	1	8	2	15		0	2	1	4	1	6
12:45		3	17	1	14	4	31		1	6	1	5	2	11
01:00		1	10	0	15	1	25		1	7	0	7	1	14
01:15		0	11	0	20	0	31		0	8	0	13	0	21
01:30		0	9	1	3	1	12		2	1	0	10	2	11
01:45		0	6	0	10	0	16		0	12	2	14	2	26
02:00		0	6	0	13	0	19		0	7	0	6	0	13
02:15		0	11	0	11	0	22		0	7	0	13	0	20
02:30		0	7	0	5	0	12		1	2	0	4	1	6
02:45		0	5	1	9	1	14		0	3	0	7	0	10
03:00		1	3	0	10	1	13		0	4	0	5	0	9
03:15		0	4	0	10	0	14		0	1	0	8	0	9
03:30		0	7	0	7	0	14		1	4	0	4	1	8
03:45		0	11	0	10	0	21		0	1	0	7	0	8
04:00		0	14	1	13	1	27		0	2	0	4	0	6
04:15		1	12	1	8	2	20		0	3	1	3	1	6
04:30		0	11	0	6	0	17		0	1	0	6	0	7
04:45		0	7	0	7	0	14		0	7	0	6	0	13
05:00		1	5	1	3	2	8		0	8	0	2	0	10
05:15		0	5	1	1	1	6		0	0	0	4	0	4
05:30		0	4	3	10	3	14		0	6	1	4	1	10
05:45		2	12	3	6	5	18		1	1	1	5	2	6
06:00		0	7	0	11	0	18		0	4	0	4	0	8
06:15		1	4	2	11	3	15		0	2	1	6	1	8
06:30		0	0	2	7	2	7		0	5	2	4	2	9
06:45		1	5	2	5	3	10		3	2	2	4	5	6
07:00		1	5	3	6	4	11		2	3	6	5	8	8
07:15		2	6	3	3	5	9		1	3	2	2	3	5
07:30		4	1	7	4	11	5		3	5	6	3	9	8
07:45		3	4	4	6	7	10		0	4	4	6	4	10
08:00		5	7	6	4	11	11		6	1	11	2	17	3
08:15		11	4	16	4	27	8		7	3	8	5	15	8
08:30		13	5	15	2	28	7		8	3	5	5	13	8
08:45		5	4	8	5	13	9		3	4	7	4	10	8
09:00		4	2	11	2	15	4		3	2	10	6	13	8
09:15		6	2	9	1	15	3		2	0	6	2	8	2
09:30		6	1	7	4	13	5		2	1	7	3	9	4
09:45		6	0	11	2	17	2		9	1	2	2	11	3
10:00		11	3	7	2	18	5		2	0	9	1	11	1
10:15		23	2	12	1	35	3		6	4	7	1	13	5
10:30		15	1	20	2	35	3		18	2	17	4	35	6
10:45		12	1	13	3	25	4		8	1	15	2	23	3
11:00		6	4	18	0	24	4		6	1	12	0	18	1
11:15		12	1	16	0	28	1		8	1	14	1	22	2
11:30		10	4	13	1	23	5		7	1	15	4	22	5
11:45		10	1	12	0	22	1		5	0	10	1	15	1
Total		177	270	234	307	411	577		117	162	186	231	303	393
Day Total		447		541		988			279		417		696	
% Total		17.9%	27.3%	23.7%	31.1%				16.8%	23.3%	26.7%	33.2%		
Peak		10:00	03:45	10:30	00:30	10:15	00:30		10:30	01:00	10:30	01:00	10:30	01:00
Vol.		61	48	67	57	119	102		40	28	58	44	98	72
P.H.F.		0.663	0.857	0.838	0.713	0.850	0.823		0.556	0.583	0.853	0.786	0.700	0.692

***LINWOOD AVENUE
HIGH STREET
UNION STREET
TRAFFIC IMPACT STUDY***

APPENDIX B

**JAMAR PC WARRANTS
TRAFFIC SIGNAL ANALYSIS**

Maser Consulting, P.A.
Traffic Signal Warrant Analysis
 LINWOOD AVENUE & HIGH STREET

Signal Warrants - Summary

Major Street Approaches

Eastbound: Linwood Avenue
 Number of Lanes: 1
 Approach Speed: 30
 Total Approach Volume: 4,168

Westbound: Linwood Avenue
 Number of Lanes: 1
 Approach Speed: 30
 Total Approach Volume: 3,978

Minor Street Approaches

Northbound: High Street
 Number of Lanes: 1
 Total Approach Volume: 1,000

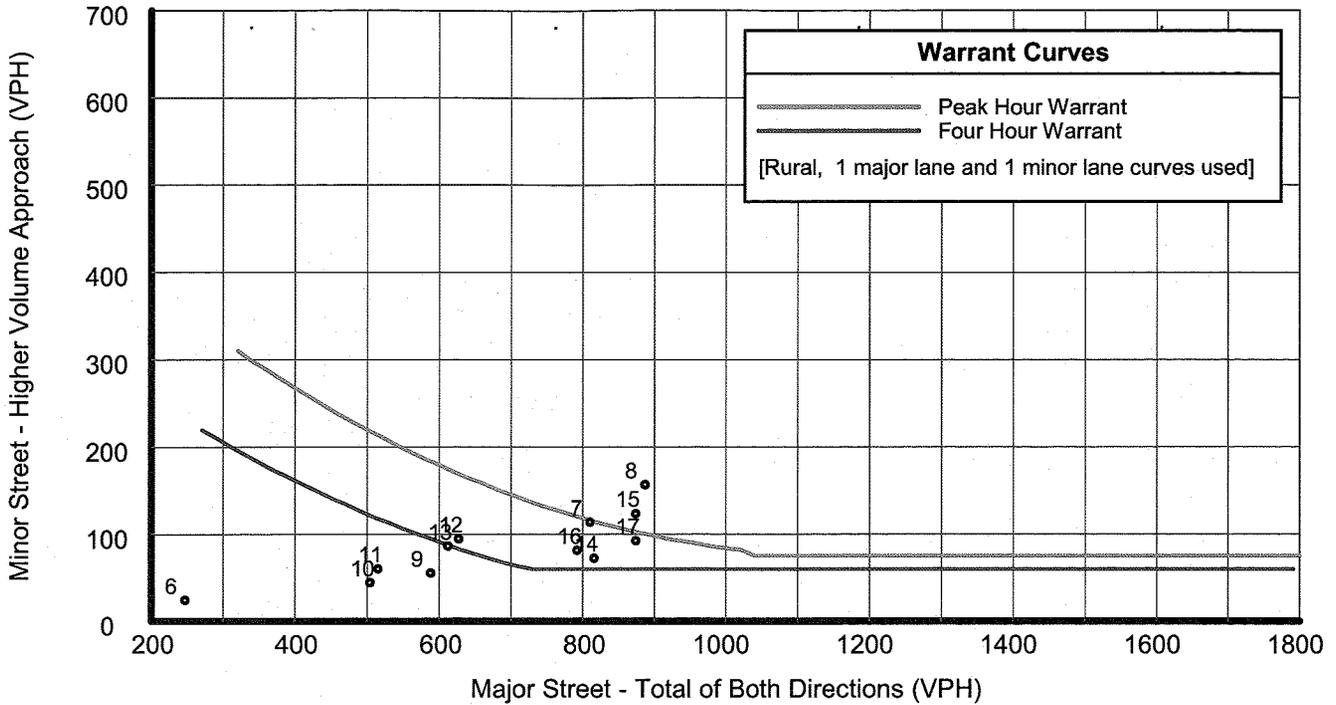
Southbound: High Street
 Number of Lanes: 1
 Total Approach Volume: 385

Warrant Summary (Rural values apply.)

Warrant 1 - Eight Hour Vehicular Volumes	Satisfied
Warrant 1A - Minimum Vehicular Volume Not Satisfied	
Required volumes reached for 3 hours, 8 are needed	
Warrant 1B - Interruption of Continuous Traffic Satisfied	
Required volumes reached for 9 hours, 8 are needed	
Warrant 1 A&B - Combination of Warrants Not Satisfied	
Required volumes reached for 6 hours, 8 are needed	
Warrant 2 - Four Hour Volumes	Satisfied
Number of hours (7) volumes exceed minimum >= minimum required (4).	
Warrant 3 - Peak Hour	Satisfied
Warrant 3A - Peak Hour Delay Not Satisfied	
Total approach volumes and delays on minor street do not exceed minimums for any hour.	
Warrant 3B - Peak Hour Volumes Satisfied	
Volumes exceed minimums for at least one hour.	
Warrant 4 - Pedestrian Volumes	Not Satisfied
Required 4 Hr pedestrian volume reached for 0 hour(s) and the single hour volume for 0 hour(s)	
Warrant 5 - School Crossing	Not Satisfied
Number of gaps > .0 seconds (0) exceeds the number of minutes in the crossing period (0).	
Warrant 6 - Coordinated Signal System	Not Satisfied
No adjacent coordinated signals are present	
Warrant 7 - Crash Experience	Not Satisfied
Number of accidents (-1) is less than minimum (5). Volume minimums are met.	
Warrant 8 - Roadway Network	Satisfied
Major Route conditions met. Volume requirements met.	

Maser Consulting, P.A.
 Traffic Signal Warrant Analysis
 LINWOOD AVENUE & HIGH STREET

Signal Warrants - Summary



Analysis of 8-Hour Volume Warrants:

Hour Begin	Major Total	Higher Minor Vol	Dir	War-1A			War-1B			War-1A&B		
				Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	350-No	105-No	---	525-No	53-No	---	420-No	84-No	---
01:00	0	0	NB	350-No	105-No	---	525-No	53-No	---	420-No	84-No	---
02:00	0	0	NB	350-No	105-No	---	525-No	53-No	---	420-No	84-No	---
03:00	0	0	NB	350-No	105-No	---	525-No	53-No	---	420-No	84-No	---
04:00	0	0	NB	350-No	105-No	---	525-No	53-No	---	420-No	84-No	---
05:00	0	0	NB	350-No	105-No	---	525-No	53-No	---	420-No	84-No	---
06:00	247	24	NB	350-No	105-No	---	525-No	53-No	---	420-No	84-No	---
07:00	810	113	NB	350-Yes	105-Yes	Both	525-Yes	53-Yes	Both	420-Yes	84-Yes	Both
08:00	887	156	NB	350-Yes	105-Yes	Both	525-Yes	53-Yes	Both	420-Yes	84-Yes	Both
09:00	588	55	NB	350-Yes	105-No	Major	525-Yes	53-Yes	Both	420-Yes	84-No	Major
10:00	504	44	NB	350-Yes	105-No	Major	525-No	53-No	---	420-Yes	84-No	Major
11:00	515	60	NB	350-Yes	105-No	Major	525-No	53-Yes	Minor	420-Yes	84-No	Major
12:00	627	94	NB	350-Yes	105-No	Major	525-Yes	53-Yes	Both	420-Yes	84-Yes	Both
13:00	612	86	NB	350-Yes	105-No	Major	525-Yes	53-Yes	Both	420-Yes	84-Yes	Both
14:00	816	72	NB	350-Yes	105-No	Major	525-Yes	53-Yes	Both	420-Yes	84-No	Major
15:00	874	123	NB	350-Yes	105-Yes	Both	525-Yes	53-Yes	Both	420-Yes	84-Yes	Both
16:00	792	81	NB	350-Yes	105-No	Major	525-Yes	53-Yes	Both	420-Yes	84-No	Major
17:00	874	92	NB	350-Yes	105-No	Major	525-Yes	53-Yes	Both	420-Yes	84-Yes	Both
18:00	0	0	NB	350-No	105-No	---	525-No	53-No	---	420-No	84-No	---
19:00	0	0	NB	350-No	105-No	---	525-No	53-No	---	420-No	84-No	---
20:00	0	0	NB	350-No	105-No	---	525-No	53-No	---	420-No	84-No	---
21:00	0	0	NB	350-No	105-No	---	525-No	53-No	---	420-No	84-No	---
22:00	0	0	NB	350-No	105-No	---	525-No	53-No	---	420-No	84-No	---
23:00	0	0	NB	350-No	105-No	---	525-No	53-No	---	420-No	84-No	---

***LINWOOD AVENUE
HIGH STREET
UNION STREET
TRAFFIC IMPACT STUDY***

APPENDIX C

**CAPACITY ANALYSIS
DATA SUMMARY SHEETS**

Post High Street to One-Way SB
AM Peak Hour

Unsignalized
9: Main Street & Union Street



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	
Volume (veh/h)	330	31	28	490	146	29
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	359	34	30	533	159	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			392		969	376
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			392		969	376
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		42	95
cM capacity (veh/h)			1166		274	671

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	392	563	190
Volume Left	0	30	159
Volume Right	34	0	32
cSH	1700	1166	304
Volume to Capacity	0.23	0.03	0.63
Queue Length 95th (ft)	0	2	98
Control Delay (s)	0.0	0.7	34.8
Lane LOS		A	D
Approach Delay (s)	0.0	0.7	34.8
Approach LOS			D

Intersection Summary			
Average Delay		6.1	
Intersection Capacity Utilization		65.2%	ICU Level of Service C
Analysis Period (min)		15	

Build Conditions
AM Peak Hour

Signalized Condition
1: Linwood Avenue & High Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	31	318	114	7	381	106	83	43	29	8	14	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	5.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frbp, ped/bikes		0.99			0.99			0.98			1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00			0.98	1.00
Frt		0.96			0.97			0.97			1.00	0.85
Flt Protected		1.00			1.00			0.97			0.98	1.00
Satd. Flow (prot)		1768			1781			1726			1776	1583
Flt Permitted		0.92			0.97			0.81			0.83	1.00
Satd. Flow (perm)		1637			1734			1438			1502	1583
Peak-hour factor, PHF	0.65	0.74	0.55	0.29	0.67	0.56	0.56	0.67	0.52	0.50	0.88	0.42
Adj. Flow (vph)	48	430	207	24	569	189	148	64	56	16	16	12
RTOR Reduction (vph)	0	29	0	0	22	0	0	15	0	0	0	8
Lane Group Flow (vph)	0	656	0	0	760	0	0	253	0	0	32	4
Confl. Peds. (#/hr)	13		1	1		13			46	46		
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)		27.2			27.2			16.3			16.3	16.3
Effective Green, g (s)		27.2			27.2			16.3			16.3	16.3
Actuated g/C Ratio		0.51			0.51			0.30			0.30	0.30
Clearance Time (s)		5.0			5.0			5.0			5.0	5.0
Vehicle Extension (s)		3.0			3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		832			882			438			458	482
v/s Ratio Prot												
v/s Ratio Perm		0.40			0.44			0.18			0.02	0.00
v/c Ratio		0.79			0.86			0.58			0.07	0.01
Uniform Delay, d1		10.8			11.5			15.7			13.2	13.0
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		5.0			8.7			5.4			0.3	0.0
Delay (s)		15.8			20.2			21.1			13.5	13.0
Level of Service		B			C			C			B	B
Approach Delay (s)		15.8			20.2			21.1			13.4	
Approach LOS		B			C			C			B	

Intersection Summary

HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	53.5	Sum of lost time (s)	10.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

No Improvements
AM Peak Hour

Unsignalized Condition
1: Linwood Avenue & High Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↑			↑	↗
Volume (veh/h)	31	318	114	7	381	106	83	43	29	8	14	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.65	0.74	0.55	0.29	0.67	0.56	0.56	0.67	0.52	0.50	0.88	0.42
Hourly flow rate (vph)	48	430	207	24	569	189	148	64	56	16	16	12
Pedestrians					46			1			13	
Lane Width (ft)					12.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					4			0			1	
Right turn flare (veh)												
Median type		None			TWLTL							
Median storage veh					2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	771			638			1361	1449	580	1487	1458	676
vC1, stage 1 conf vol							630	630		725	725	
vC2, stage 2 conf vol							731	819		763	733	
vCu, unblocked vol	771			638			1361	1449	580	1487	1458	676
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			97			46	77	89	93	95	97
cM capacity (veh/h)	835			945			277	279	494	215	295	448

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	685	782	268	32	12
Volume Left	48	24	148	16	0
Volume Right	207	189	56	0	12
cSH	835	945	305	248	448
Volume to Capacity	0.06	0.03	0.88	0.13	0.03
Queue Length 95th (ft)	5	2	199	11	2
Control Delay (s)	1.5	0.7	63.0	21.6	13.2
Lane LOS	A	A	F	C	B
Approach Delay (s)	1.5	0.7	63.0	19.3	
Approach LOS			F	C	

Intersection Summary		
Average Delay		10.8
Intersection Capacity Utilization	65.2%	ICU Level of Service C
Analysis Period (min)		15