

**TRAFFIC IMPACT ANALYSIS
ROSEBROOK COMMONS
MIDDLETOWN, RHODE ISLAND**

SUBMITTED TO:

**WEST X CAPITAL, LLC
210 WEST EXCHANGE STREET
PROVIDENCE, RI 02903**

SUBMITTED BY:

**PARE CORPORATION
8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865**

NOVEMBER 2021



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INTRODUCTION

Pare Corporation (Pare) has conducted a Traffic Impact Analysis (TIA) to determine the potential impacts to the surrounding roadway network associated with the construction of Rosebrook Commons, a proposed 144-unit residential development with approximately 23,000 square feet of commercial space and 2,000 square feet of office space, on the east side of West Main Road (Route 114) across from Marshall Lane in Middletown, RI. Rosebrook Commons will be comprised of eight total buildings. The two buildings nearest West Main Road will contain a total of 64 residential units on the upper floors and 23,000 square feet of commercial space and 2,000 square feet of office space on the first floor. The remaining six buildings will contain a total of 80 residential units on multiple floors. The 144 residential units will include 70 1- bedroom units, 62 2-bedroom units and 12 3-bedroom units. Access to the development will be provided by two access points on West Main Road. The primary access to the development will be located opposite Marshall Lane, while the secondary access will be a right-in only driveway near the southern edge of the site frontage.

This study includes an assessment of the existing conditions of the surrounding roadway network area including an inventory of roadway and intersection geometrics, including pedestrian and bicycle facilities, public transportation services, collection of peak period traffic counts, traffic capacity and a traffic safety review of the study area. In addition, Future (2026) No-Build and Future (2026) Build conditions were analyzed to determine the impact of the proposed development on the adjacent transportation network. A locus map of the site is provided in Figure 1 and the proposed site layout is provided in Figure 2.

DATA COLLECTION

Manual turning movement counts (MTMCs) were completed from Tuesday, October 19, 2021 through Friday, October 22, 2021 from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. at the following intersections:

- West Main Road/ Greene Lane/Pasture Farm Drive
- West Main Road/ Marshall Lane
- West Main Road/ Rogers Lane/ Thelma Lane

Pedestrian counts were captured during all MTMCs. Peak hour volumes were determined at each intersection for the morning and afternoon commuter peak periods.

Crash data for the roadway network in the vicinity of the project site was requested from the Middletown Police Department for the most recent three-year period available. A crash review is included in this report to identify any potential trends that may lend themselves to mitigation.





 = STUDY INTERSECTION



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 LINCOLN, RI 02865
 401-334-4100

Project No. 13018.01 Date: October 2021

Figure 1 Locus Map

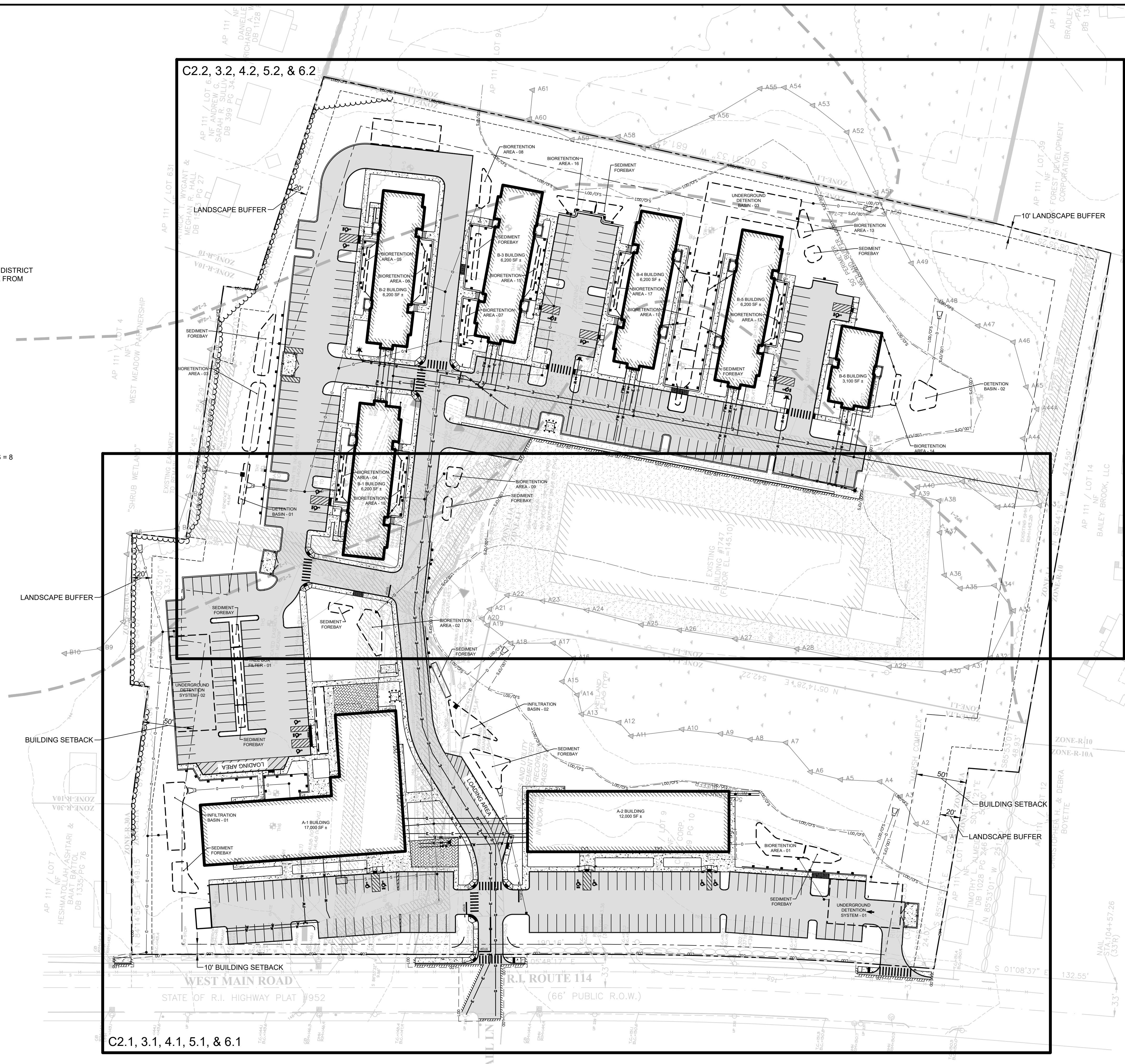
Middletown, Rhode Island

ZONING TABLE		
EXISTING ZONE: LI - LIGHT INDUSTRIAL		
LOT AREA AP 111 LOT 8 = 527,522 SF (12.11 ACRES) AP 111 LOT 9 = 150,066 SF (3.45 ACRES) TOTAL = 677,588 SF (15.56 ACRES)		
DEVELOPABLE LAND AREA = 469,267 SF (10.77 ACRES)		
BUILDING AREA WAREHOUSE (EXISTING) = 30,405 SF MIXED USE = 29,000 SF RESIDENTIAL = 34,000 SF		
	REQUIRED (LI)	PROVIDED
BUILDING SETBACK		
FRONT SETBACK	10 FT	88 FT
SIDE SETBACK	50 FT**	68 FT
REAR SETBACK	40 FT	59 FT
MAX. BUILDING HEIGHT (PRIMARY)	35, 40 FT*	40 FT
BUILDING COVERAGE	35%	20%
MIN. LOT AREA	40,000 SF	677,588 SF
MIN. FRONTAGE	150 FT	795 FT

* MAX. BUILDING HEIGHT FOR MIXED-USE DEVELOPMENT = 35 FT.
MAX. BUILDING HEIGHT PER LI ZONE = 40 FT
**724.B.4, WHERE A LIGHT INDUSTRIAL DISTRICT ABUTS A RESIDENTIAL DISTRICT OR USE, ALL BUILDINGS SHALL MAINTAIN A MINIMUM 50 FOOT SETBACK FROM PROPERTY LINES ABUTTING THE RESIDENTIAL DISTRICT OR USE.

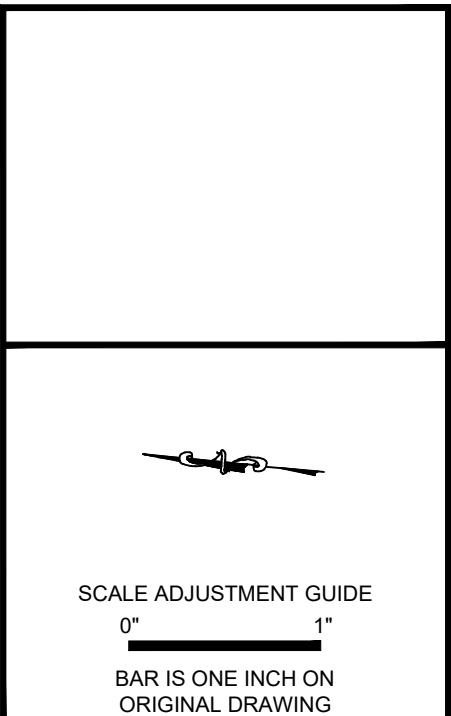
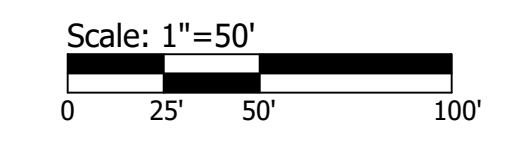
PARKING SUMMARY		
	REQUIRED*	PROVIDED
STANDARD SPACES (9'x18')	349	319
ACCESSIBLE SPACES**	8	17
TOTAL SPACES	357	336

+ SMALL SCALE SHOPPING CENTER: 3 SPACES/1,000 SF GFA
23,000 x 3 = 69 SPACES
RESIDENTIAL DWELLINGS: 2 SPACES PER DWELLING UNIT
144 x 2 = 288 SPACES
++ ADA REQUIREMENT FOR PARKING LOT 301 TO 400 TOTAL SPACES = 8 SPACES



C2.1, 3.1, 4.1, 5.1, & 6.1

C2.2, 3.2, 4.2, 5.2, & 6.2



Rosebrook Commons Mixed Use Development

AP 111, Lots 8 & 9
1747 West Main Road
Middletown, Rhode Island

REVISIONS:	
1	09/10/2021 TOWN COMMENT

PROJECT NO.: 13018.00
DATE: MARCH 18, 2022
SCALE: 1"=50'
DESIGNED BY: ACB
CHECKED BY: JW
DRAWN BY: AKL
APPROVED BY: VAH
DRAWING TITLE:

OVERALL PLAN

DRAWING NO.:
C1.2
SHEET NO. OF

EXISTING CONDITIONS

A field inventory of the existing conditions within the study area was conducted on Wednesday, October 13, 2021. The study area is defined as the significant roadways and intersections in the vicinity of the proposed site that may be impacted by traffic generated by the proposed development. The following roadways and intersections are included in the study area.

Study Area Roadways

1. West Main Road

Study Area Intersections

1. West Main Road/Greene Lane/Pasture Farm Drive
2. West Main Road/Marshall Lane
3. West Main Road/Rogers Lane/Thelma Lane

Roadways

West Main Road

West Main Road is classified as an urban principal arterial and is owned and maintained by the Rhode Island Department of Transportation (RIDOT). In the vicinity of the site, West Main Road runs in the north/south direction and has a straight alignment in the vicinity of the site. It has a 48-foot paved width with two 11-foot travel lanes and a two-foot paved shoulder in each direction. Opposing directions of travel are separated by a double yellow center line and lanes for vehicles traveling in the same direction are separated by dashed white lines. Concrete curb and 5.5-foot-wide concrete sidewalks are provided along both sides of the roadway. The posted speed limit along West Main Road is 35 miles per hour in both directions. Land use along the West Main Road corridor within the project area is primarily residential with some small-scale commercial uses, and a church is located at the southeast corner of the intersection of West Main Road with Greene Lane and Pasture Farm Drive. Slightly south of the study area there is a mix of commercial and recreational uses along West Main Road. Regionally, West Main Road provides connections to Newport and Portsmouth.



Photo 1: West Main Road.

Intersections

West Main Road/ Greene Lane/ Pasture Farm Drive

The intersection of West Main Road with Greene Lane and Pasture Farm Drive forms a four-legged signalized intersection. West Main Road forms the north and south legs, Greene Lane forms the west leg and Pasture Farm Drive forms the east leg. The north and south legs of West Main Road consist of one 11-foot thru-right travel lane, one 11-foot thru-left travel lane, two 11-foot receiving lanes and a two-foot shoulder on each side of the roadway. The northbound and



southbound travel lanes are separated by a double yellow center line. There is a 5.5-foot sidewalk with concrete curbing along both sides of both legs in the vicinity of the intersection.

The west leg, Greene Lane, is classified as an urban major collector and has a paved curb-to-curb width of approximately 44 feet. The approach on Greene Lane consists of one 11-foot dedicated left-turn lane and one 11-foot thru-right travel lane with no shoulder in the eastbound direction. In the westbound direction there is one 11-foot-wide travel lane which widens to approximately 38-foot wide at the intersection and an 11-foot shoulder. The eastbound and westbound travel lanes are separated by a double yellow center line. There is a 5.5-foot-wide concrete sidewalk with a concrete curb along the north side of Greene Lane. A 5.5-foot-wide sidewalk with concrete curb also exists on the south side but terminates approximately 40 feet west of the intersection.

The east leg, Pasture Farm Drive, is classified as an urban local roadway and has a paved curb-to-curb width of approximately 24 feet. The approach on Pasture Farm Drive consists of one 12-foot travel lane with no shoulder in the westbound direction. In the eastbound direction there is one 12-foot-wide travel lane with no shoulder. The eastbound and westbound travel lanes are separated by a double yellow center line. There is a 4.5-foot-wide concrete sidewalk with a concrete curb along the north side of the leg which terminates approximately 30 feet east of the intersection. A 4.5-foot-wide sidewalk with concrete curb also exists on the south side of the leg which terminates approximately 30 feet east of the intersection. Approximately 15 feet east of the termination of the southern concrete sidewalk, a three-foot-wide bituminous sidewalk with a five-foot-wide grass buffer continues east.



Photo 2: West Main Road at Greene Lane/Pasture Farm Drive looking north.

Crosswalks are present across the north, west and east legs of the intersection. Curb ramps are installed at all crossing locations. A traffic signal plan for the intersection was obtained from RIDOT and is included in Appendix E. Movements at the intersection are controlled by RIDOT Traffic Signal No. 255 which operates as a fully actuated, coordinated intersection. The signal operates under a 3-phase control. One phase allows only the northbound movements of West Main Road to proceed, allowing for protected left turns into Greene Lane. The next phase allows both northbound and southbound movements along West Main Road to proceed, including concurrent pedestrian movements crossing the east and west legs on Pasture Farm Drive and Greene Lane, respectively. The final phase allows the eastbound and westbound movements on Greene Lane and Pasture Farm Drive to proceed, including concurrent pedestrian movements crossing West Main Road on the north side of the intersection. Pedestrian signal heads and signed, voice assisted push buttons are present at all crossings of the intersection. All traffic signal heads, pedestrian signal heads and push buttons appeared to be functioning properly.



West Main Road/ Marshall Lane

The intersection of West Main Road with Marshall Lane forms a 3-legged “T” intersection. West Main Road forms the north and south legs and runs freely, and Marshall Lane forms the west leg and is stop-sign controlled. The West Main Road layout and lane configurations are the same through this intersection as they are at Greene Lane. Marshall Lane is classified as an urban local roadway and has a paved width of 23 feet, including one 11.5-foot travel lane in each direction with no shoulders. The eastbound and westbound travel lanes are separated by a double yellow center line. There are no sidewalks or curbing on either side of Marshall Lane except for a small section of bituminous curb at the southwest corner of the intersection.



Photo 3: West Main Road at Marshall Lane.

There is no striped crosswalk at this location, however wheelchair ramps are located at the corners of the intersection.

West Main Road/ Rogers Lane/ Thelma Lane

The intersection of West Main Road with Rogers Lane and Thelma Lane forms a four-legged signalized intersection. West Main Road forms the north and south legs, Rogers Lane forms the west leg and Thelma Lane forms the east leg. The West Main Road layout and lane configurations are the same through this intersection as they are at the previous intersections discussed.

Rogers Lane is classified as an urban local collector and has a paved curb-to-curb width of approximately 30 feet, consisting of one 15-foot travel lane in each direction with no shoulders. The eastbound and westbound travel lanes are separated by a double yellow center line. There is a five-foot-wide concrete sidewalk with a 4.5-foot-wide grass buffer strip and concrete curbs along both sides of Rogers Lane.

Thelma Lane is classified as an urban local roadway and has a paved width of approximately 25 feet, consisting of one 12.5-foot travel lane in each direction with no shoulders. The eastbound and westbound travel lanes are separated by a double yellow center line. There is a five-foot-wide bituminous sidewalk and bituminous concrete curb along the south side of the road. There is no existing sidewalk or curbing located on the north side of Thelma Lane.

Crosswalks are present across the north and west legs of the intersection. Curb ramps are installed at the ends of all crosswalks. A traffic signal plan for the intersection was obtained from RIDOT and is included in Appendix E. Movements at the intersection are controlled by RIDOT Traffic Signal No. 343 which operates as a fully actuated,



Photo 4: West Main Road at Rogers Lane/Thelma Lane looking south.



coordinated intersection. The signal operates under four phases. The first phase allows only the northbound movements of West Main Road to proceed, allowing for protected left turns into Rogers Lane. The next phase allows both northbound and southbound movements along West Main Road to proceed. There is a designated pedestrian phase allowing all pedestrian movements to proceed simultaneously, which is only activated if a pedestrian push button is pressed. The final phase allows traffic on Rogers Lane and Thelma Lane to proceed. Pedestrian signal heads and signed, voice-assisted push buttons are present at all crossings of the intersection. All traffic signal heads, pedestrian signal heads, and push buttons appeared to be functioning properly.

EXISTING TRAFFIC VOLUMES

Due to the impacts of the COVID-19 pandemic, current count data likely differs from typical conditions in the area. Through coordination with RIDOT it has been indicated that volumes are approximately 90% of what they were previously before COVID-19, therefore the counts taken were inflated by 10% to account for the expected volumes post COVID-19. The traffic count data is included in Appendix A.

Public Transportation

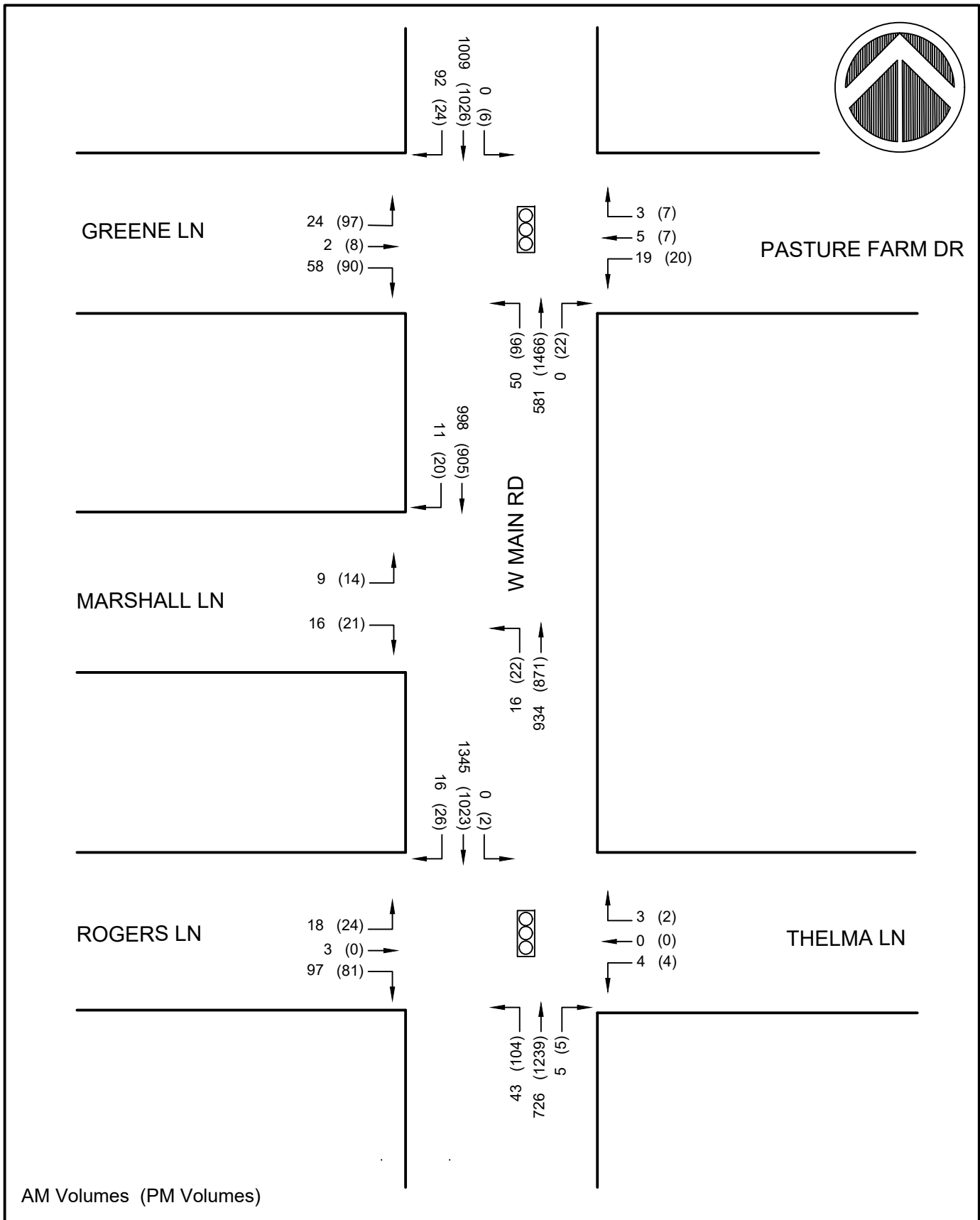
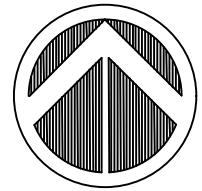
The Rhode Island Public Transit Authority (RIPTA) has bus stops on both sides of West Main Road within the project study area. These stops are a part of RIPTA Route 60 (Providence/Newport). The closest stops to the site are located at the nearby West Main Road intersections with Greene Lane and Pasture Farm Drive, as well as at Rogers Lane and Thelma Lane.

Pedestrian & Bicycle Facilities

In the vicinity of the site entrance, sidewalks are present along both sides of the roadway. There are no existing crossings in the vicinity of the site entrance but, there are crossings located at each of the two signalized study intersections. There are no designated bicycle facilities located within the study limits.

Figure 3 on the next page shows the existing peak hour volumes, adjusted for COVID-19 impacts.





AM Volumes (PM Volumes)

PROJECT NO. 13018.01

DATE: OCTOBER 2021



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FIGURE 3 EXISTING TRAFFIC VOLUMES

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SAFETY ANALYSIS

Crash Data

Crash data for the study area was requested from the Middletown Police Department for the most recent three-year period from September 2018 through September 2021. Crash reports were received for the length of West Main Road within the study area. A breakdown of the incidents by severity and type can be seen below in Table 1.

Table 1: Crash Data Summary

Roadway/ Intersection	Total Crashes	Property Damage Only	Crashes w/ Non-Fatal Injuries	Rear End	Pedestrian	Angle	Head-On	Loss of Control	Sideswipe
West Main Road/ Greene Lane/ Pasture Farm Drive	23	16	7	11	1	7	-	3	1
West Main Road/ Marshall Lane	8	4	4	5	-	2	-	-	1
West Main Road/ Rogers Lane/ Thelma Lane	25	18	7	15	-	-	1	3	6
Total	56	38	18	31	1	9	1	6	8

A total of 23 crashes occurred at the signalized intersection of West Main Road at Greene Lane and Pasture Farm Drive. The 11 rear-end collisions were the most common type at this intersection, which is typical at signalized intersections. Seven angle collisions, which are typically between a through vehicle and a turning vehicle, three collisions due to loss of control, one collision involving a pedestrian/bicyclist, and one sideswipe collision. Seven of the 23 crashes resulted in non-fatal injuries and none of the incidents resulted in a fatality.

A total of eight crashes occurred at the unsignalized intersection of West Main Road at Marshall Lane. These crashes included five rear-end collisions, two angle collisions and one sideswipe collision. Four of the eight crashes resulted in non-fatal injuries and none of the incidents resulted in fatality.

A total of 25 crashes occurred at the signalized intersection West Main Road at Rogers Lane and Thelma Lane. These crashes included 15 rear-end collisions, one head-on collision, three collisions due to loss of control, and six sideswipe collisions. Seven of the 23 crashes resulted in non-fatal injuries and none of the incidents resulted in a fatality. A majority of the rear-end crashes occurred at the northbound approach of the intersection where West Main Road intersects Rogers Lane.

There were a total of 56 collisions within the study limits over the three-year study period. The patterns of the crashes are generally consistent with typical crash patterns on busy arterials such as West Main Road where there are few dedicated turn lanes. Injury rates are also generally consistent with typical rates in these environments. It is not anticipated that the addition of the proposed development’s traffic volumes will alter these patterns.



Sight Distance Analysis

A spot speed study was performed for West Main Road in the vicinity of the proposed site, where the posted speed limit is 35 mph. The data collected is summarized in Table 2 below. The full speed study results are included in Appendix B.

Table 2: Speed Study Results

Direction	Posted Speed	Average Speed	True Median (50 th Percentile)	85 th Percentile	10 MPH Pace	Percent Over 35 MPH
Northbound	35	38	38	44	31-40	70
Southbound	35	38	38	42	33-42	64

Based on the speed study performed, a conservatively high design speed of 45 miles per hour was selected for West Main Road, which is 10 miles per hour greater than the posted speed limit and slightly higher than the observed 85th percentile speeds. Intersection sight distance was measured at both the primary access to the site and the right-in driveway at the southern end of the site, even though there should not be any exiting traffic movements at this access. Per the latest edition of *A Policy on Geometric Design of Highways and Streets*, published by the American Association of State Highway and Transportation Officials (AASHTO) in 2018, the minimum intersection sight distance to allow oncoming vehicles to recognize, react and stop to avoid a collision with an entering vehicle is the equivalent of the required stopping sight distance for the uncontrolled major street. A more desirable intersection sight distance is far enough that oncoming vehicles do not need to slow below 70 percent of their original speed to avoid a collision.

According to AASHTO the minimum stopping sight distance for a 45 mile per hour design speed is 360 feet. Recommended intersection sight distance standards for a 45 mile per hour design speed on a four-lane roadway are 430 feet for right turns and 530 feet for left turns. The results of the sight distance analyses are summarized in Table 3 below.

Table 3: Sight Distance Analysis Results

Site Access	Direction	Required SSD (ft)	Desirable ISD (ft)	Measured ISD (ft)
Main Site Driveway	North	360	530	490/980*
	South	360	430	100/695*
Right-In Driveway	North	360	530	490/980*
	South	360	430	100/695*

*Anticipated values assuming vegetation that currently limits sight distance is removed during construction

SSD- Stopping Sight Distance
 ISD- Intersection Sight Distance

Currently, sight distance along the site frontage is limited by vegetation along the side of the roadway. Assuming this vegetation is removed there is ample sight distance along the entire site frontage to exceed both minimum and desirable sight distance standards.



FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2026 to cover a five-year horizon from the existing 2021 condition. Two future scenarios were analyzed, including a Future No-Build scenario and a Future Build scenario. Under the Future No-Build scenario, the traffic volumes include existing adjusted traffic volumes and new traffic volumes associated with expected background growth. The Future Build scenario includes all traffic volumes under the Future No-Build scenario and traffic associated with the proposed development.

No-Build Traffic Volumes

The Future No-Build traffic volume scenario includes all existing adjusted traffic volumes and the traffic volumes associated with expected background growth. To provide a conservative analysis, the background growth in traffic volumes consists of a general background traffic growth rate consistent with recent population growth in the area surrounding the study area and any additional traffic projected from additional known development projects near the study area.

General Background Traffic Growth

To account for background growth along the roadways within the vicinity of the project site, the existing traffic volumes were projected over a five-year horizon from 2021 to 2026. United States Census data for the Town of Middletown was reviewed to aid in determining the appropriate background growth rate. The background growth assessment results are summarized in Table 4.

Table 4: Population Growth Summary

Data Source	2010 Population	2020 Population	Annual Growth Rate
US Census Data – Town of Middletown	16,150	17,075	0.56%

Source: <https://www.census.gov/quickfacts/middletowntownnewportcountyrhodeisland>

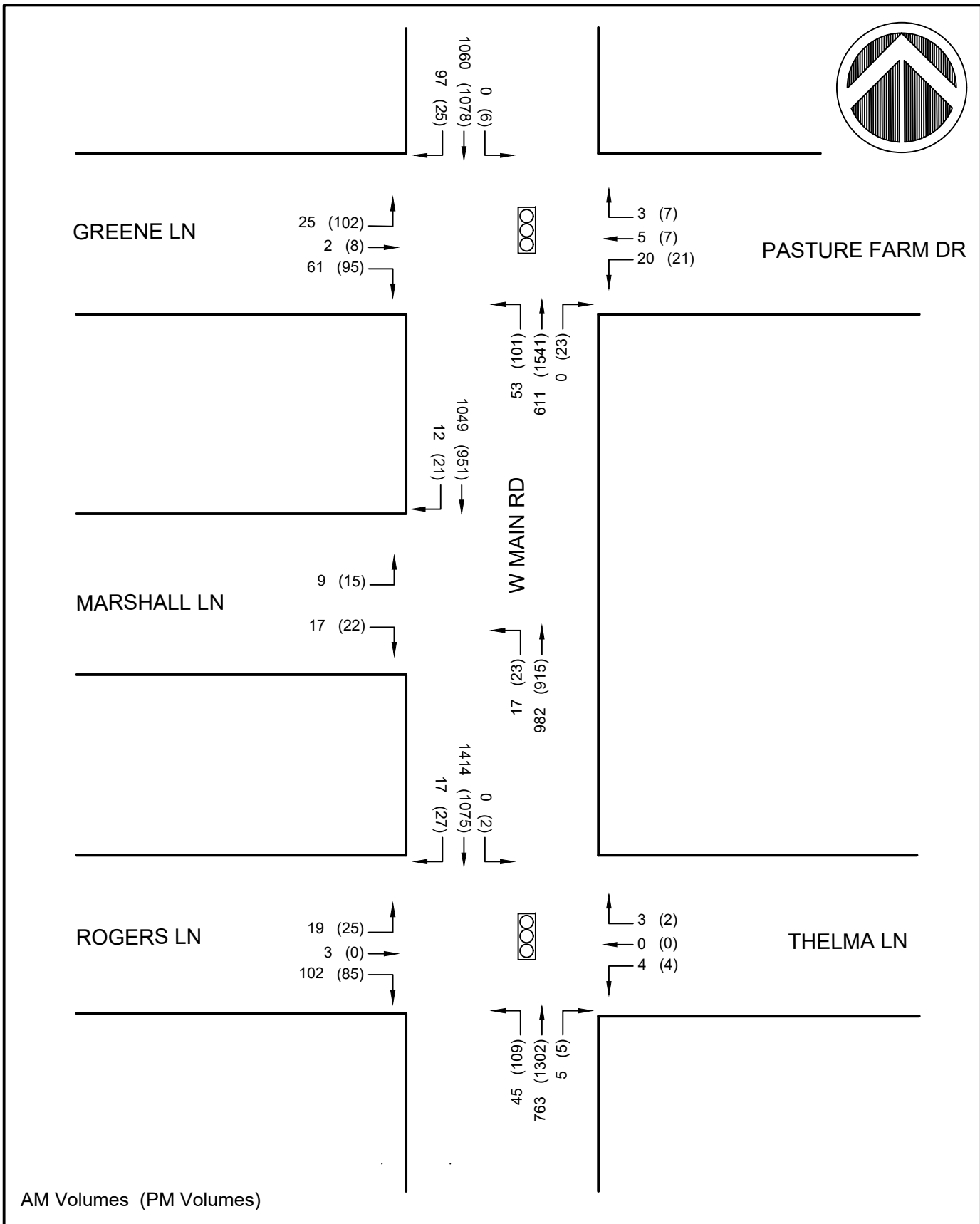
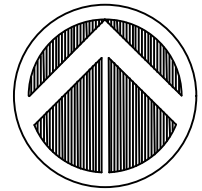
The US Census indicated an annual population growth rate of 0.56% per year between 2010 and 2020. To provide a conservative analysis of the project area growth and account for any unforeseen future developments in the area, a conservative growth rate of 1.0% per year was used for the five-year projection.

Nearby Developments

The Town of Middletown Planning Department was contacted to determine if there are currently any developments proposed within the vicinity of the proposed development whose trip generation information should be included in this study. No such developments were identified.

Based on the evaluation of the appropriate general background traffic growth and the assessment of additional future developments, the Future No-Build scenario traffic volumes were calculated and are shown in Figure 4.





AM Volumes (PM Volumes)

PROJECT NO. 13018.01

DATE: OCTOBER 2021



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FIGURE 4 FUTURE NO-BUILD VOLUMES

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 MIDDLETOWN, RHODE ISLAND

Trip Generation

The proposed project includes the construction of a 144-unit residential development with amenities and 23,000 square feet of commercial space.

The proposed development has multiple uses that have differing Land Use Codes (LUCs) which are used to determine the anticipated site generated volumes. Trip generation calculations were estimated using the latest edition of the industry standard *Trip Generation, 11th Edition*¹ published by the Institute of Transportation Engineers (ITE). The resulting volumes are then summed together to determine trip generation for the entire development.

The trip generation for the proposed development utilized LUC 220, Multifamily Housing (Low-Rise) to generate the trips for the 80 dwelling units located within the six buildings not along West Main Road. This land use includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). In addition, LUC 230, Low-Rise Residential with Ground-Floor Commercial was utilized to generate the trips for the 64 dwelling units and commercial space located in the two buildings along West Main Road. This land use includes a mixed-use multifamily housing building with two or three floors of residential living space and commercial space open to the public on the ground level. In addition, there is a 2,000 square foot leasing office for the development which is considered an ancillary use for the development, therefore a separate calculation for this land use was not required or performed. A summary of the proposed trip generation for the development is provided in Table 5, and the trip generation worksheets are included in Appendix C.

Table 5: Trip Generation Summary

Land Use		Number of Vehicle Trips	
		Weekday AM Peak Hour	Weekday PM Peak Hour
LUC 220 – Multifamily Housing (Low-Rise) – 80 Units	Entering	11	35
	Exiting	37	20
	Total	48	55
LUC 230 – Low-Rise Residential w/Ground-Floor Comm. – 64 Units	Entering	6	16
	Exiting	22	7
	Total	28	23
Total Site Generation	Entering	17	51
	Exiting	59	27
	Total	76	78

¹ Trip Generation, 11th Edition; Institute of Transportation Engineers; Washington, DC; 2021.



Trip Distribution

Trip distribution was completed for the Rosebrook Commons development based on the existing travel patterns in the study area. As a result, approximately 66 percent of the site’s traffic is expected to be oriented towards the south on West Main Road, and 34 percent oriented to the north. A negligible amount of the site traffic is expected to be oriented towards Marshall Lane. To be conservative, it was assumed all site traffic would enter and exit the site at the main site driveway. At the adjacent intersections of Greene Lane and Rogers Lane, site-generated volumes were also distributed based on existing travel patterns.

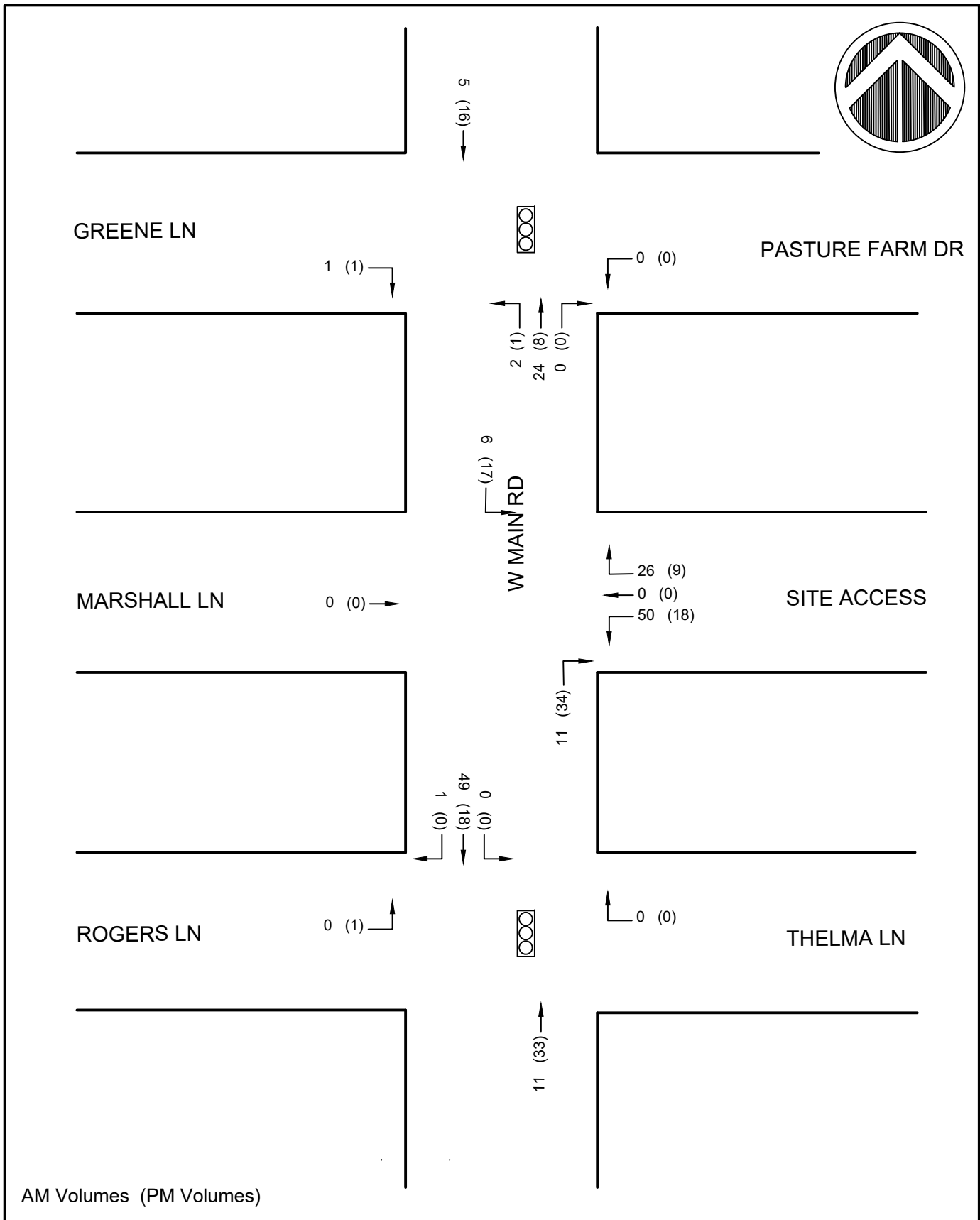
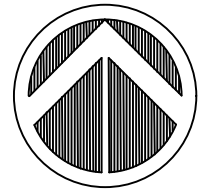
Future Build Traffic Volumes

The Future Build traffic volumes consist of the Future No-Build traffic volumes with the addition of the Project generated traffic volumes. The Future Build weekday morning peak hour and weekday afternoon peak hour traffic volumes are shown in Figure 6. A comparison of the difference between the Existing conditions, Future No-Build Conditions, and Future Build Conditions is located in Table 6.

Table 6: Analysis Scenario Summary

Analysis Scenario		
Existing Condition	No-Build Condition	Build Condition
Existing (2021) traffic volumes – these volumes are the peak hour traffic volumes collected in the intersection turning movement counts with the appropriate Covid-19 adjustment factor applied.	Future (2026) traffic volumes without the proposed development – these volumes are the existing traffic volumes inflated with a 0.5% annual growth rate over 5 years. This represents the anticipated future conditions if the proposed development is not constructed.	Future (2026) traffic volumes with the proposed development – these volumes include the volumes established under the No-Build Condition plus the trips generated by the proposed development. This represents the anticipated future conditions if the proposed development is constructed.





AM Volumes (PM Volumes)

PROJECT NO. 13018.01

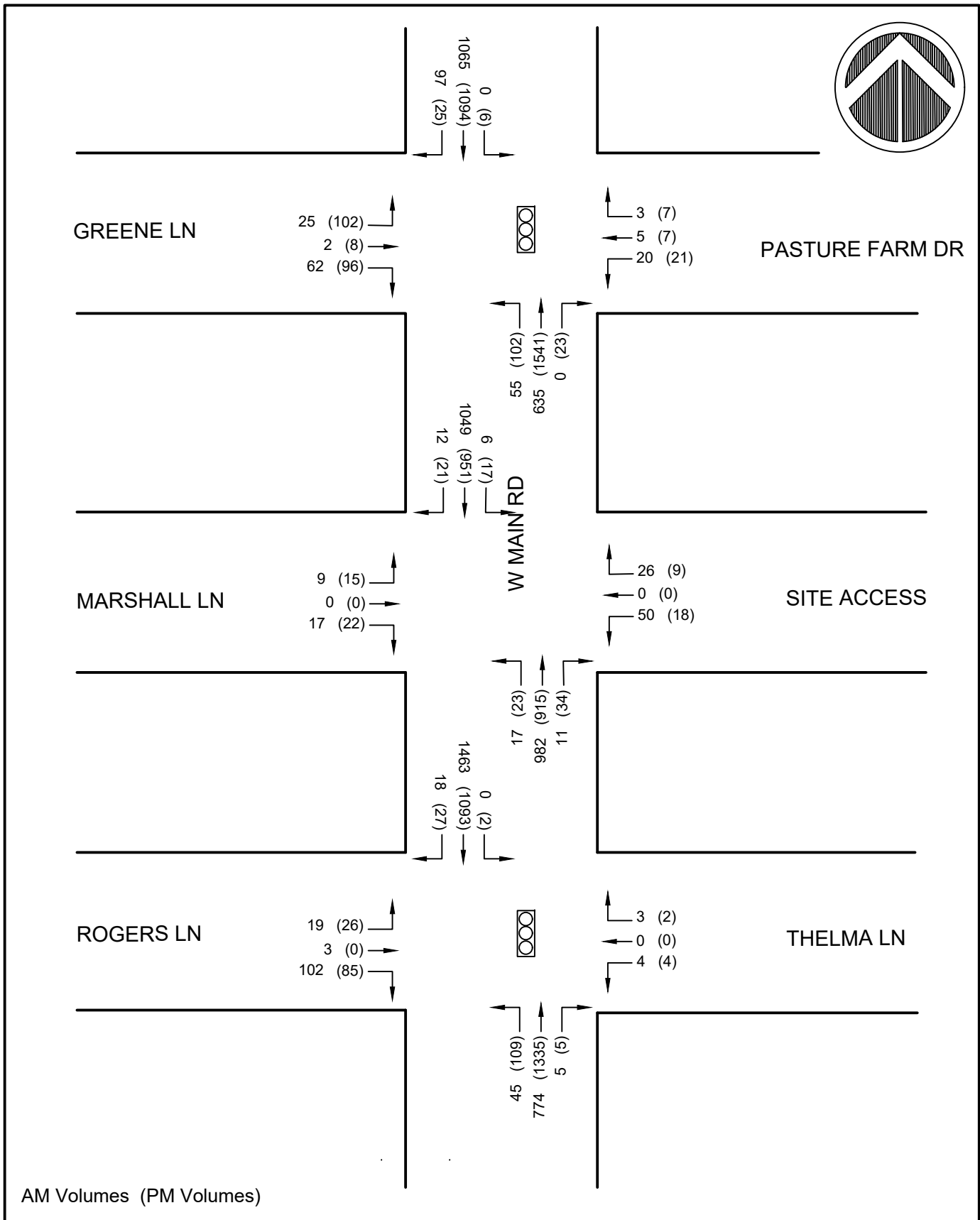
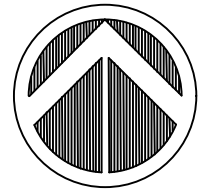
DATE: OCTOBER 2021



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FIGURE 5 SITE GENERATED TRAFFIC VOLUMES

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MIDDLETOWN, RHODE ISLAND



AM Volumes (PM Volumes)

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FIGURE 6 FUTURE BUILD VOLUMES

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 MIDDLETOWN, RHODE ISLAND

CAPACITY ANALYSIS

Capacity analyses were completed for all study intersections for Existing, Future No-Build and Future Build conditions. The capacity analyses characterize intersections based on their level of service (LOS). LOS is a quality measure describing operational conditions within a traffic stream, generally in terms of service measures such as speed, travel times, traffic interruptions, etc. Six LOS values, from A to F, are defined for each type of facility, with A representing the best operating conditions and F representing overly congested operating conditions. The LOS criteria for signalized and unsignalized intersections are provided in Table 7 below. Tables 8 and 9 provide the capacity analysis results for all intersections for the morning and afternoon peak hours, respectively. The complete capacity analysis worksheets can be found in Appendix D.

Table 7: LOS Criteria for Signalized and Unsignalized Intersections

LOS	Total Average Delay Per Vehicle in Seconds	
	Unsignalized Intersections	Signalized Intersections
A	0-10	0-10
B	> 10-15	> 10-20
C	> 15-25	> 20-35
D	> 25-35	> 35-55
E	> 35-50	> 55-80
F	> 50	> 80

Table 8: Capacity Analysis Results - Weekday Morning Peak Hour

Intersection	Lane/Movement		Existing Condition		No-Build Condition		Build Condition	
			LOS (Delay ¹)	Queue Length ²	LOS (Delay ¹)	Queue Length ²	LOS (Delay ¹)	Queue Length ²
West Main Road/ Greene Lane/ Pasture Farm Drive	NB	LTR	A (3.1)	89	A (3.3)	95	A (3.4)	94
	SB	LTR	B (11.8)	321	B (12.4)	346	B (13.3)	329
	EB	L	D (39.5)	32	D (39.8)	33	D (39.8)	33
		TR	B (13.4)	19	B (13.3)	19	B (13.3)	19
	WB	LTR	D (37.9)	33	D (38.1)	33	D (38.1)	33
Intersection			A (9.9)	-	B (10.3)	-	B (10.4)	-
West Main Road/ Marshall Lane	NB	L	B (11.9)	3	B (12.3)	3	B (12.3)	3
	SB	L	N/A	-	N/A	-	B (10.6)	0
	EB	LTR	D (33.0)	23	E (36.8)	28	F (57.8)	40
	WB	LTR	N/A	-	N/A	-	F (213.4)	148
West Main Road/ Rogers Lane/ Thelma Lane	NB	LTR	A (7.1)	224	A (7.5)	238	A (7.6)	243
	SB	LTR	B (16.7)	#725	B (17.5)	#788	B (18.0)	#832
	EB	LTR	C (27.2)	60	C (27.0)	62	C (27.0)	62
	WB	LTR	A (1.1)	0	A (1.0)	0	A (1.0)	0
	Intersection			B (14.0)	-	B (14.6)	-	B (15.0)

L - Left-turn; T - Through Movement; R - Right-turn

1. Delay is measured in seconds per vehicle.

2. Queue Length shown represents the 95th percentile queue length in feet.

- 95th percentile volume exceeds capacity. Queue shown is queue after two consecutive 95th percentile cycles.

N/A- Not Applicable



Table 9: Capacity Analysis Results - Weekday Afternoon Peak Hour

Intersection	Lane/Movement		Existing Condition		No-Build Condition		Build Condition	
			LOS (Delay ¹)	Queue Length ²	LOS (Delay ¹)	Queue Length ²	LOS (Delay ¹)	Queue Length ²
West Main Road/ Greene Lane/ Pasture Farm Drive	NB	LTR	B (13.7)	#439	B (19.2)	#603	C (20.4)	#626
	SB	LTR	C (21.8)	328	C (22.9)	352	C (23.2)	360
	EB	L	D (42.5)	92	D (42.6)	95	D (42.6)	95
		TR	B (10.2)	27	A (9.8)	27	A (9.8)	28
	WB	LTR	C (27.5)	36	C (27.2)	36	C (27.2)	36
	Intersection		B (18.0)	-	C (21.3)	-	C (22.0)	-
West Main Road/ Marshall Lane	NB	L	B (11.2)	3	B (11.6)	5	B (11.6)	5
	SB	L	N/A	-	N/A	-	B (11.7)	3
	EB	LTR	E (39.3)	33	E (49.0)	43	F (89.5)	65
	WB	LTR	N/A	-	N/A	-	F (141.1)	55
West Main Road/ Rogers Lane/ Thelma Lane	NB	LTR	B (13.2)	#654	B (15.7)	#821	B (16.9)	#851
	SB	LTR	B (14.1)	462	B (14.9)	502	B (15.1)	514
	EB	LTR	C (25.0)	46	C (26.3)	51	C (26.6)	51
	WB	LTR	A (0.7)	0	A (0.7)	0	A (0.7)	0
	Intersection		B (14.1)	-	B (15.8)	-	C (21.7)	-

L - Left-turn; T - Through Movement; R - Right-turn

1. Delay is measured in seconds per vehicle.

2. Queue Length shown represents the 95th percentile queue length in feet.

- 95th percentile volume exceeds capacity. Queue shown is queue after two consecutive 95th percentile cycles.

N/A- Not Applicable

At the signalized intersection of West Main Road at Greene Lane and Pasture Farm Drive, the intersection operates at a LOS B or better conditions during the morning peak hour under all three scenarios, with the most delay occurring for left turns from the side streets, which operate at an acceptable LOS D under all analyzed conditions. During the afternoon peak hour, the intersection operates at LOS B for all conditions. Similar to the morning, the eastbound left turn from Greene Lane is the most difficult movement, but it operates at an acceptable LOS D under all conditions.

The signalized intersection of West Main Road at Rogers Lane and Thelma Lane operates at a LOS C or better under all conditions. The most difficult approach for this intersection is the eastbound approach from Rogers Lane, which operates at LOS C under all analyzed scenarios.

During both peak hours at the unsignalized West Main Road at Marshall Lane intersection, the level of service for all West Main Road left turn movements are anticipated to operate at LOS B. The analyses indicate more significant delays for vehicles exiting Marshall Lane and the site. Marshall Lane approach delays increase due to the traffic friction added through the addition of the fourth leg to the intersection for the site driveway. However, these analysis results are typical for stop-controlled approaches on arterial roadways with four or more lanes. In addition, the analysis does not consider the platooning effect from the nearby signals, which will create gaps in the traffic stream along West Main Road. It is anticipated that actual delays for these movements will not be as long as indicated in the analyses. Finally, the traffic volumes from these driveways are not heavy enough to warrant signalization of this intersection.



CONCLUSIONS AND RECOMMENDATIONS

Pare Corporation conducted analyses of the potential impacts from the construction of Rosebrook Commons, a 144-unit residential development with leasing office and 23,000 square feet of retail space adjacent to West Main Road in Middletown, Rhode Island.

Capacity analyses were conducted at the site entrance and two nearby signalized intersections. The analyses indicate that the development will have little impact to the Levels of service (LOS) on West Main Road and at the adjacent signalized intersections along West Main Road to the north and south of the site.

Based on the sight distance analysis, it is anticipated that access to and from the site can safely occur and additional safety issues occurring from this development are not anticipated, provided the vegetation adjacent to West Main Road along the site frontage is cleared during site construction. From the crash data received and reviewed there were no existing abnormal crash patterns identified, and the proposed development is not anticipated to alter these patterns.

In summary, Pare Corporation is of the opinion that the proposed Rosebrook Commons will have minimal impacts on the traffic capacity and safety operations for the roadways and intersections within the study area.



APPENDIX A

Traffic Counts



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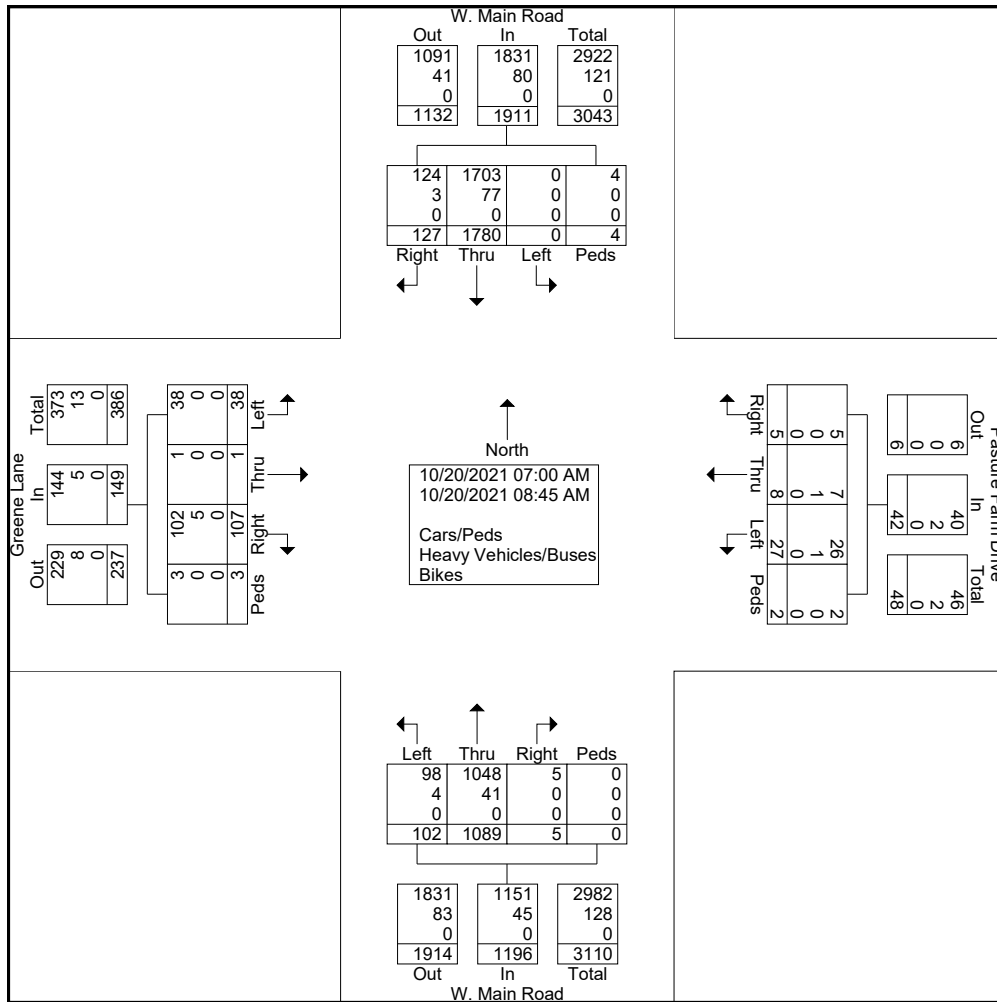
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File Name : Green Lane & W. Main Road AM

Site Code : 13018.01

Start Date : 10/20/2021

Page No : 2

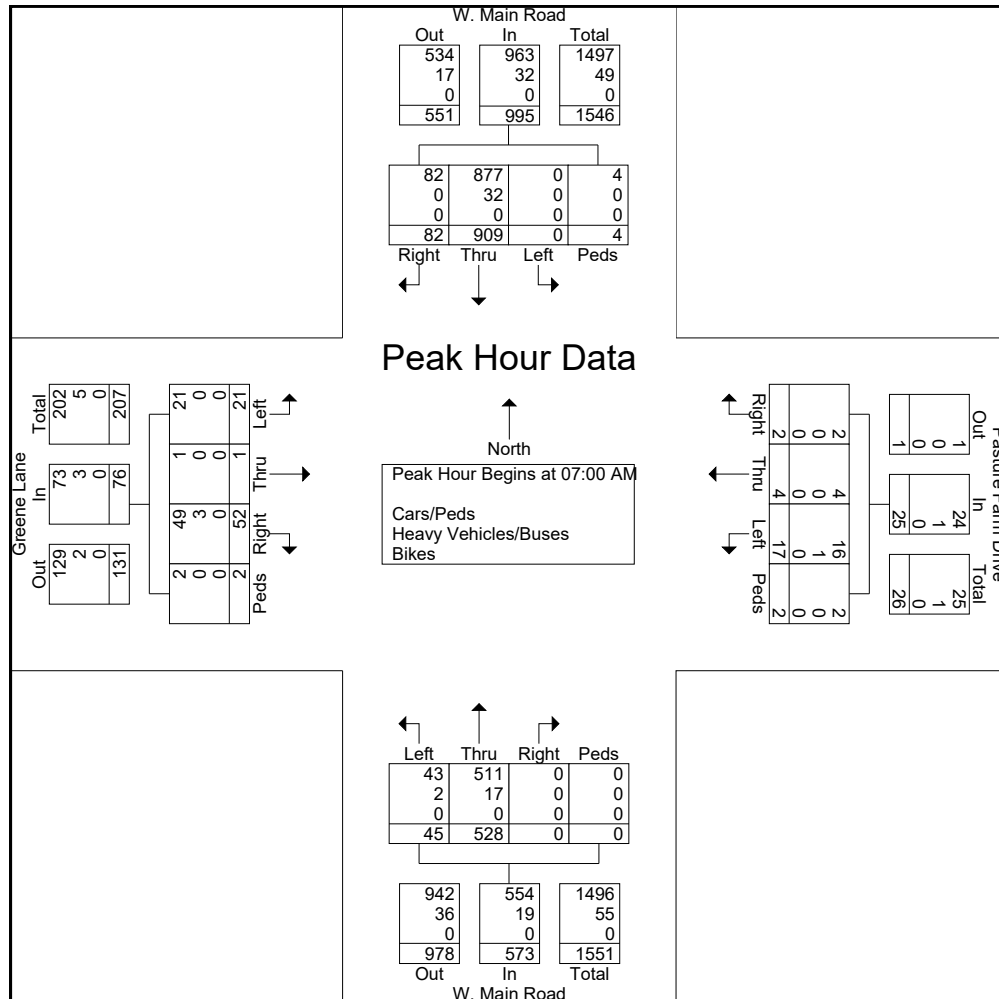


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 Site Code : 13018.01
 Start Date : 10/20/2021
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Start Time	W. Main Road From North					Pasture Farm Drive From East					W. Main Road From South					Greene Lane From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	18	284	0	0	302	1	1	5	0	7	0	158	7	0	165	22	0	6	0	28	502
07:15 AM	30	244	0	0	274	0	1	7	1	9	0	134	12	0	146	15	1	7	0	23	452
07:30 AM	14	198	0	1	213	1	0	3	1	5	0	109	9	0	118	10	0	5	0	15	351
07:45 AM	20	183	0	3	206	0	2	2	0	4	0	127	17	0	144	5	0	3	2	10	364
Total Volume	82	909	0	4	995	2	4	17	2	25	0	528	45	0	573	52	1	21	2	76	1669
% App. Total	8.2	91.4	0	0.4		8	16	68	8		0	92.1	7.9	0		68.4	1.3	27.6	2.6		
PHF	.683	.800	.000	.333	.824	.500	.500	.607	.500	.694	.000	.835	.662	.000	.868	.591	.250	.750	.250	.679	.831
Cars/Peds	82	877	0	4	963	2	4	16	2	24	0	511	43	0	554	49	1	21	2	73	1614
% Cars/Peds	100	96.5	0	100	96.8	100	100	94.1	100	96.0	0	96.8	95.6	0	96.7	94.2	100	100	100	96.1	96.7
Heavy Vehicles/Buses	0	32	0	0	32	0	0	1	0	1	0	17	2	0	19	3	0	0	0	3	55
% Heavy Vehicles/Buses	0	3.5	0	0	3.2	0	0	5.9	0	4.0	0	3.2	4.4	0	3.3	5.8	0	0	0	3.9	3.3
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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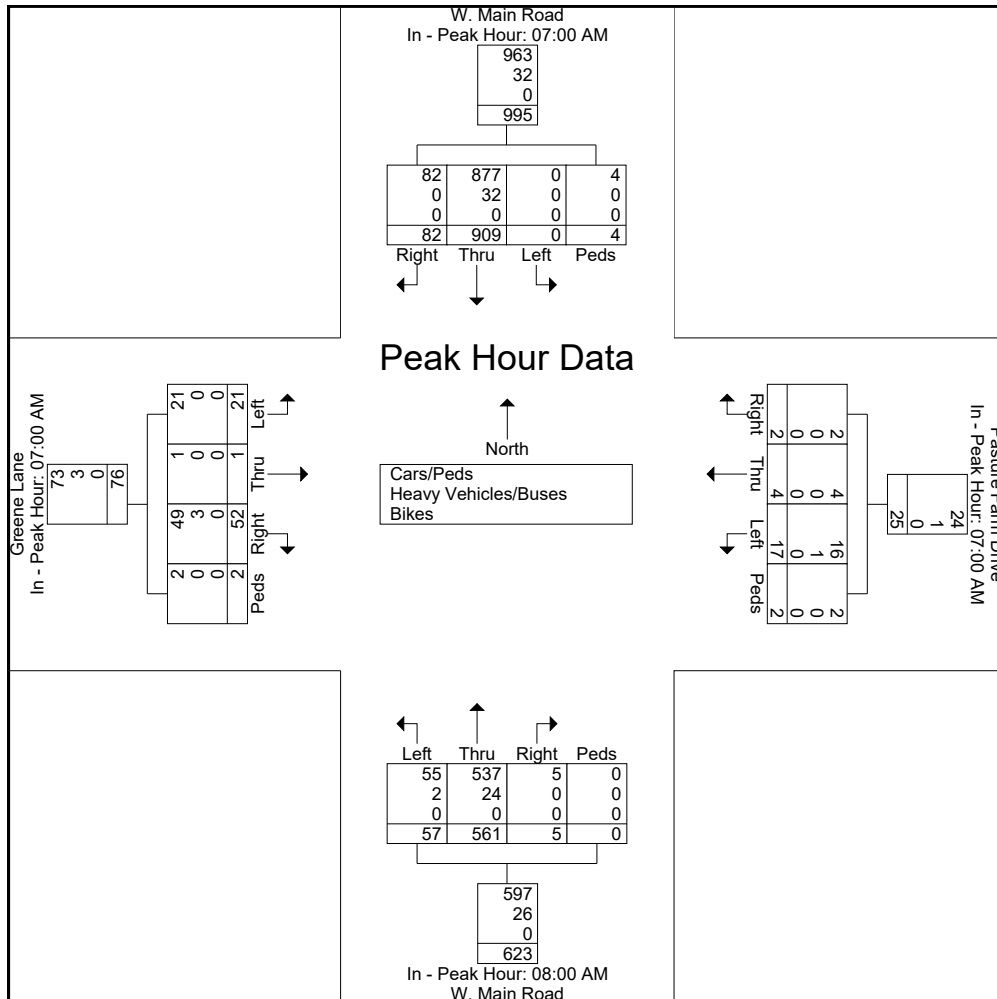
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 Start Date : 10/20/2021
 Page No : 4

Start Time	W. Main Road From North					Pasture Farm Drive From East					W. Main Road From South					Greene Lane From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	07:00 AM					07:00 AM					08:00 AM					07:00 AM				
+0 mins.	18	284	0	0	302	1	1	5	0	7	1	101	7	0	109	22	0	6	0	28
+15 mins.	30	244	0	0	274	0	1	7	1	9	2	163	7	0	172	15	1	7	0	23
+30 mins.	14	198	0	1	213	1	0	3	1	5	1	147	22	0	170	10	0	5	0	15
+45 mins.	20	183	0	3	206	0	2	2	0	4	1	150	21	0	172	5	0	3	2	10
Total Volume	82	909	0	4	995	2	4	17	2	25	5	561	57	0	623	52	1	21	2	76
% App. Total	8.2	91.4	0	0.4		8	16	68	8		0.8	90	9.1	0		68.4	1.3	27.6	2.6	
PHF	.683	.800	.000	.333	.824	.500	.500	.607	.500	.694	.625	.860	.648	.000	.906	.591	.250	.750	.250	.679
Cars/Peds	82	877	0	4	963	2	4	16	2	24	5	537	55	0	597	49	1	21	2	73
% Cars/Peds	100	96.5	0	100	96.8	100	100	94.1	100	96	100	95.7	96.5	0	95.8	94.2	100	100	100	96.1
Heavy Vehicles/Buses	0	32	0	0	32	0	0	1	0	1	0	24	2	0	26	3	0	0	0	3
% Heavy Vehicles/Buses	0	3.5	0	0	3.2	0	0	5.9	0	4	0	4.3	3.5	0	4.2	5.8	0	0	0	3.9
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



N/S: West Main Road
 E: Green Lane W: Pasture Farm Drive
 City, State: Middletown, RI
 Taken By: HA

File Name : Green Lane & W. Main Road PM
 Site Code : 13018.01
 Start Date : 10/19/2021
 Page No : 1

Groups Printed- Cars/Peds - Heavy Vehicles/Buses - Bikes

	W. Main Road From North					Pasture Farm Drive From East					W. Main Road From South					Greene Lane From West					
			Left					Left					Left					Left			
04:00 PM	3	204	0	0	207	1	2	2	0	5	3	309	18	0	330	13	1	30	0	44	586
04:15 PM	3	228	2	0	233	2	3	5	0	10	8	319	21	0	348	14	0	19	0	33	624
04:30 PM	6	235	1	0	242	2	1	3	0	6	5	339	27	2	373	28	3	30	0	61	682
04:45 PM	5	227	0	0	232	2	2	6	0	10	4	349	20	0	373	22	2	17	0	41	656
Total	17	894	3	0	914	7	8	16	0	31	20		86	2	1424	77	6	96	0	179	2548
05:00 PM	7	242	2	0	251	0	0	4	0	4	3	325	19	1	348	17	2	22	0	41	644
05:15 PM	4	253	0	0	257	1	1	3	0	5	1	295	14	1	311	12	0	9	0	21	594
05:30 PM	6	229	0	0	235	0	0	8	0	8	4	304	11	0	319	17	0	7	0	24	586
05:45 PM	16	322	2	0	340	7	1	4	0	12	4	291	34	0	329	32	3	30	0	65	746
Total	33		4	0	1083	8	2	19	0	29	12		78	2	1307	78	5	68	0	151	2570
Aprch %	50		7	0	1997	15	10	35	0	60	32		164	4	2731	155	11	164	0	330	5118
Total %	2.5		0.4	0		25			0		1.2		6	0.1		47	3.3		0		
	1		0.1	0	39	0.3	0.2	0.7	0	1.2	0.6		3.2	0.1	53.4	3	0.2	3.2	0	6.4	
	50		7	0	1969	15	10	35	0	60	32		138	2	2703	155	11	164	0	330	5062
	100		100	0	98.6	100	100	100	0	100	100	100		50	99	100	100	100	0	100	98.9
	0	28	0	0	28	0	0	0	0	0	0	0	26	0	26	0	0	0	0	0	54
	0	1.4	0	0	1.4	0	0	0	0	0	0	0		0	1	0	0	0	0	0	1.1
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	2
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0.1	0	0	0	0	0	0

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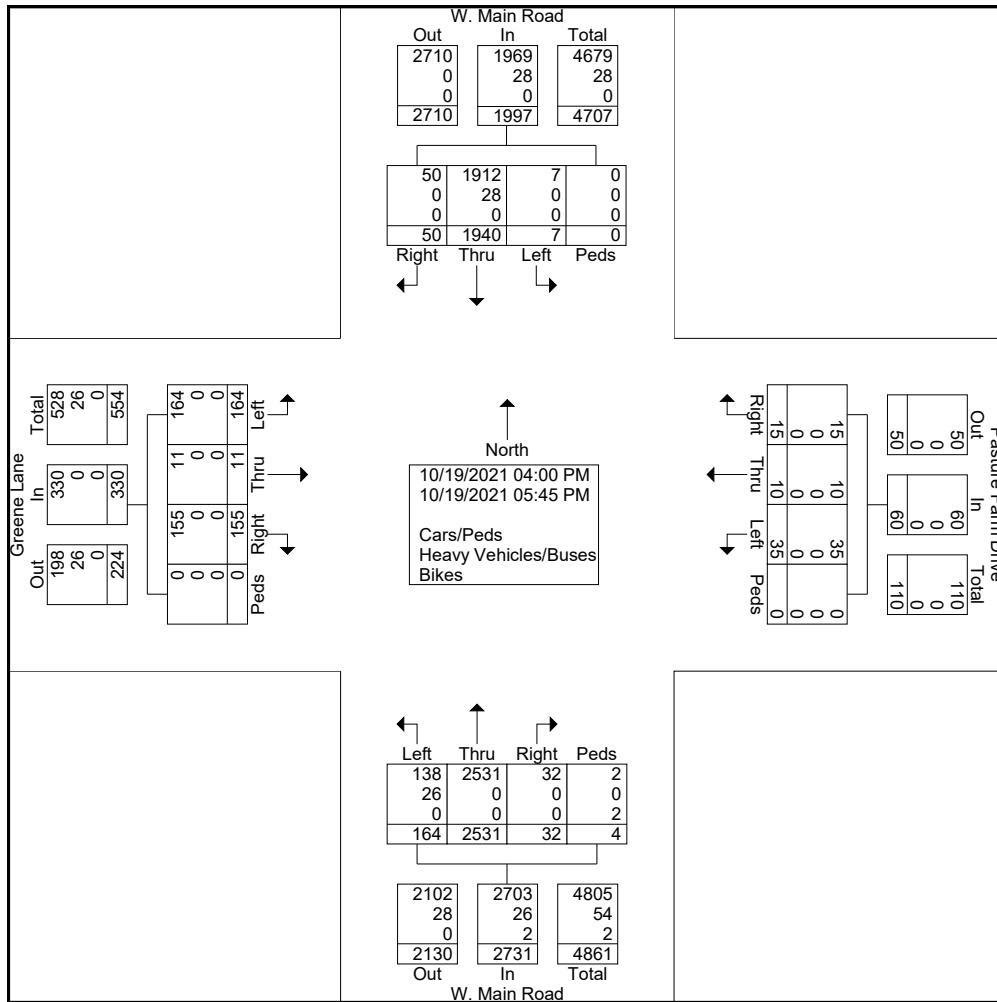
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File Name : Green Lane & W. Main Road PM

Site Code : 13018.01

Start Date : 10/19/2021

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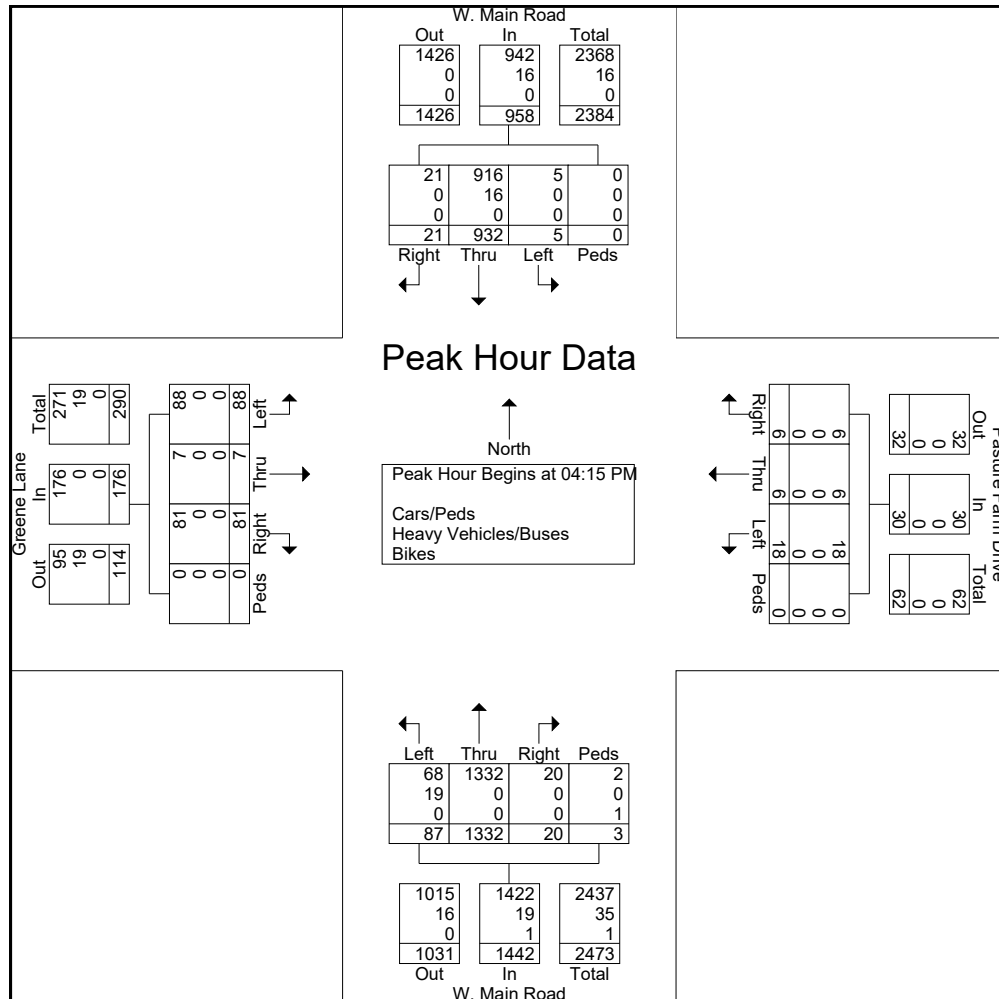


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File Name : Green Lane & W. Main Road PM
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Start Time	W. Main Road From North					Pasture Farm Drive From East					W. Main Road From South					Greene Lane From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	3	228	2	0	233	2	3	5	0	10	8	319	21	0	348	14	0	19	0	33	624
04:30 PM	6	235	1	0	242	2	1	3	0	6	5	339	27	2	373	28	3	30	0	61	682
04:45 PM	5	227	0	0	232	2	2	6	0	10	4	349	20	0	373	22	2	17	0	41	656
05:00 PM	7	242	2	0	251	0	0	4	0	4	3	325	19	1	348	17	2	22	0	41	644
Total Volume	21	932	5	0	958	6	6	18	0	30	20	1332	87	3	1442	81	7	88	0	176	2606
% App. Total	2.2	97.3	0.5	0		20	20	60	0		1.4	92.4	6	0.2		46	4	50	0		
PHF	.750	.963	.625	.000	.954	.750	.500	.750	.000	.750	.625	.954	.806	.375	.966	.723	.583	.733	.000	.721	.955
Cars/Peds	21	916	5	0	942	6	6	18	0	30	20	1332	68	2	1422	81	7	88	0	176	2570
% Cars/Peds	100	98.3	100	0	98.3	100	100	100	0	100	100	100	78.2	66.7	98.6	100	100	100	0	100	98.6
Heavy Vehicles/Buses	0	16	0	0	16	0	0	0	0	0	0	0	19	0	19	0	0	0	0	0	35
% Heavy Vehicles/Buses	0	1.7	0	0	1.7	0	0	0	0	0	0	0	21.8	0	1.3	0	0	0	0	0	1.3
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	33.3	0.1	0	0	0	0	0	0.0



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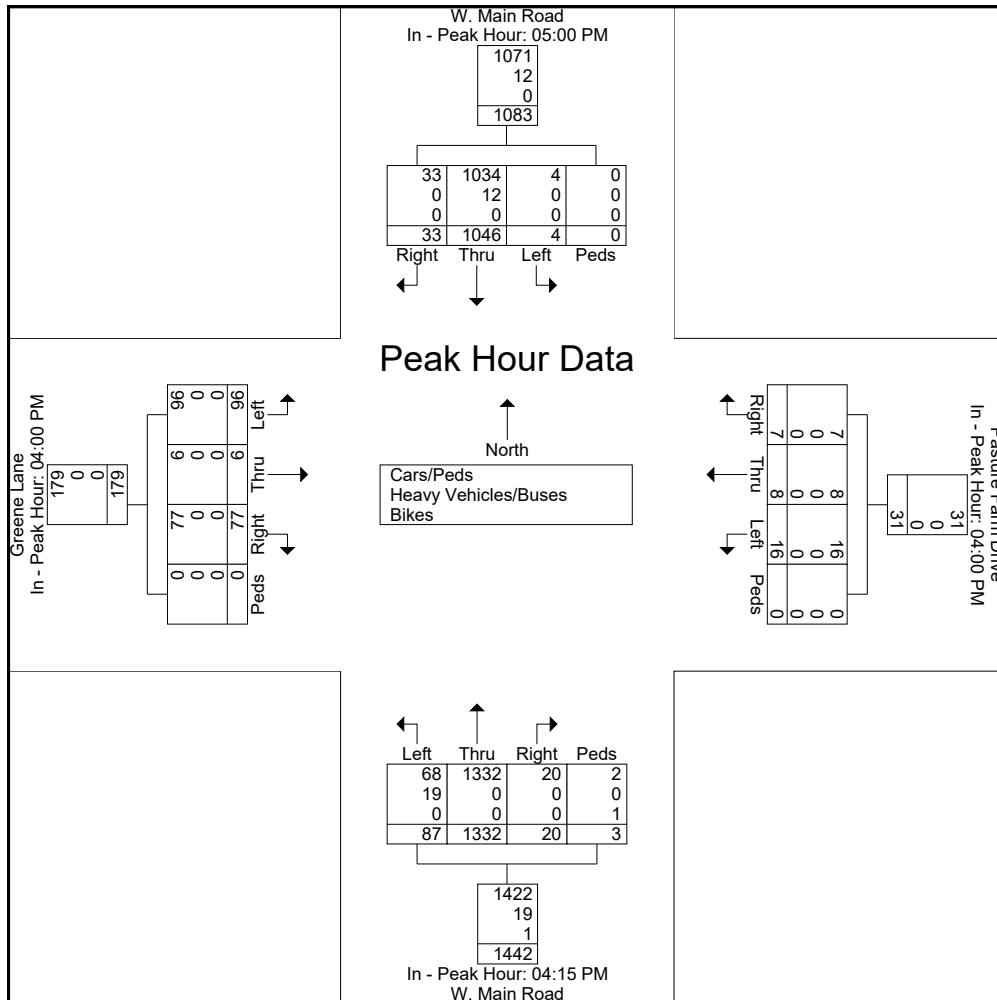
File Name : Green Lane & W. Main Road PM
 Site Code : 13018.01
 Start Date : 10/19/2021
 Page No : 4

Start Time	W. Main Road From North					Pasture Farm Drive From East					W. Main Road From South					Greene Lane From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	05:00 PM					04:00 PM					04:15 PM					04:00 PM					
+0 mins.	7	242	2	0	251	1	2	2	0	5	8	319	21	0	348	13	1	30	0	44	
+15 mins.	4	253	0	0	257	2	3	5	0	10	5	339	27	2	373	14	0	19	0	33	
+30 mins.	6	229	0	0	235	2	1	3	0	6	4	349	20	0	373	28	3	30	0	61	
+45 mins.	16	322	2	0	340	2	2	6	0	10	3	325	19	1	348	22	2	17	0	41	
Total Volume	33	1046	4	0	1083	7	8	16	0	31	20	1332	87	3	1442	77	6	96	0	179	
% App. Total	3	96.6	0.4	0		22.6	25.8	51.6	0		1.4	92.4	6	0.2		43	3.4	53.6	0		
PHF	.516	.812	.500	.000	.796	.875	.667	.667	.000	.775	.625	.954	.806	.375	.966	.688	.500	.800	.000	.734	
Cars/Peds	33	1034	4	0	1071	7	8	16	0	31	20	1332	68	2	1422	77	6	96	0	179	
% Cars/Peds	100	98.9	100	0	98.9	100	100	100	0	100	100	100	78.2	66.7	98.6	100	100	100	0	100	
Heavy Vehicles/Buses	0	12	0	0	12	0	0	0	0	0	0	0	19	0	19	0	0	0	0	0	
% Heavy Vehicles/Buses	0	1.1	0	0	1.1	0	0	0	0	0	0	0	21.8	0	1.3	0	0	0	0	0	
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	33.3	0.1	0	0	0	0	0	

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 Start Date : 10/19/2021
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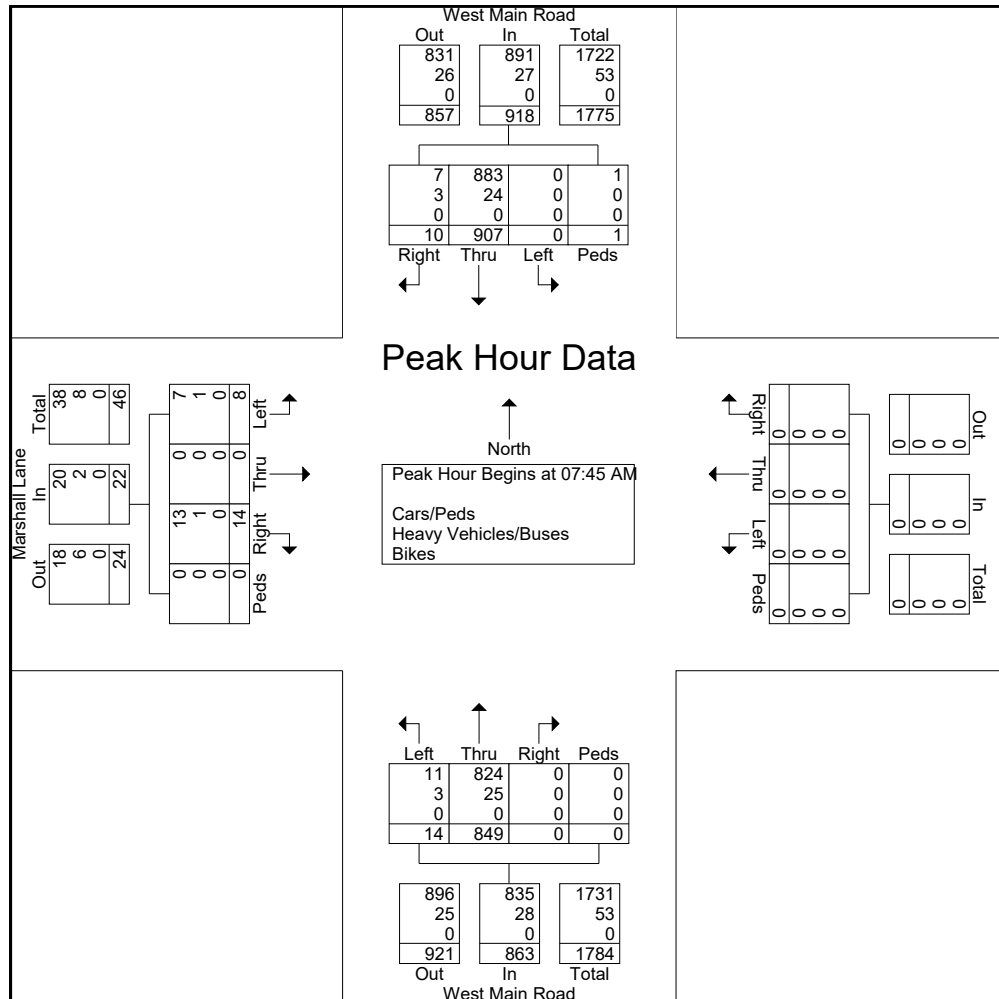


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File Name : Marshall Lane & W. Main Road AM
 Site Code : 13018.01
 Start Date : 10/22/2021
 Page No : 3

Start Time	West Main Road From North					From East					West Main Road From South					Marshall Lane From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	2	228	0	0	230	0	0	0	0	0	0	214	3	0	217	4	0	2	0	6	453
08:00 AM	4	242	0	1	247	0	0	0	0	0	0	204	5	0	209	6	0	3	0	9	465
08:15 AM	3	231	0	0	234	0	0	0	0	0	0	225	4	0	229	3	0	2	0	5	468
08:30 AM	1	206	0	0	207	0	0	0	0	0	0	206	2	0	208	1	0	1	0	2	417
Total Volume	10	907	0	1	918	0	0	0	0	0	0	849	14	0	863	14	0	8	0	22	1803
% App. Total	1.1	98.8	0	0.1		0	0	0	0	0	0	98.4	1.6	0		63.6	0	36.4	0		
PHF	.625	.937	.000	.250	.929	.000	.000	.000	.000	.000	.000	.943	.700	.000	.942	.583	.000	.667	.000	.611	.963
Cars/Peds	7	883	0	1	891	0	0	0	0	0	0	824	11	0	835	13	0	7	0	20	1746
% Cars/Peds	70.0	97.4	0	100	97.1	0	0	0	0	0	0	97.1	78.6	0	96.8	92.9	0	87.5	0	90.9	96.8
Heavy Vehicles/Buses	3	24	0	0	27	0	0	0	0	0	0	25	3	0	28	1	0	1	0	2	57
% Heavy Vehicles/Buses	30.0	2.6	0	0	2.9	0	0	0	0	0	0	2.9	21.4	0	3.2	7.1	0	12.5	0	9.1	3.2
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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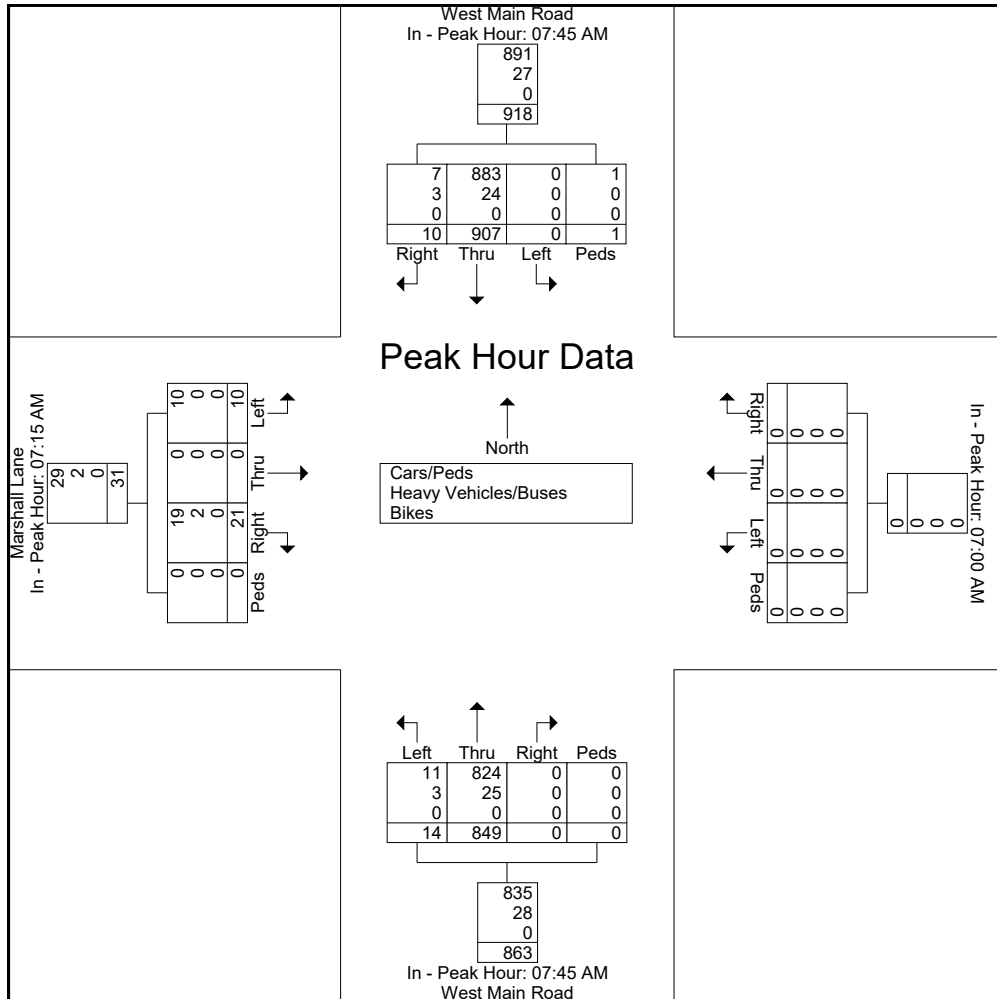
File Name : Marshall Lane & W. Main Road AM
Site Code : 13018.01
Start Date : 10/22/2021
Page No : 4

Start Time	West Main Road From North					From East					West Main Road From South					Marshall Lane From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

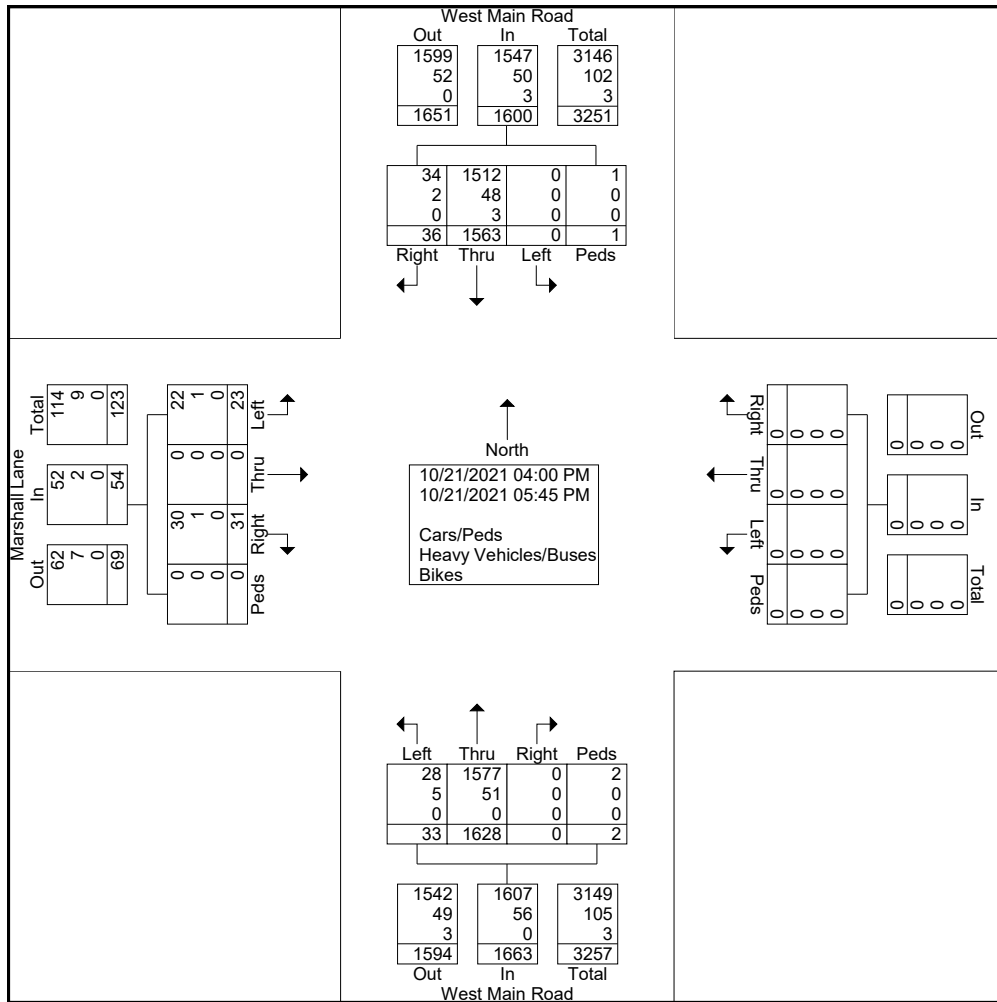
	07:45 AM					07:00 AM					07:45 AM					07:15 AM				
+0 mins.	2	228	0	0	230	0	0	0	0	0	0	214	3	0	217	6	0	3	0	9
+15 mins.	4	242	0	1	247	0	0	0	0	0	0	204	5	0	209	5	0	2	0	7
+30 mins.	3	231	0	0	234	0	0	0	0	0	0	225	4	0	229	4	0	2	0	6
+45 mins.	1	206	0	0	207	0	0	0	0	0	0	206	2	0	208	6	0	3	0	9
Total Volume	10	907	0	1	918	0	0	0	0	0	0	849	14	0	863	21	0	10	0	31
% App. Total	1.1	98.8	0	0.1		0	0	0	0		0	98.4	1.6	0		67.7	0	32.3	0	
PHF	.625	.937	.000	.250	.929	.000	.000	.000	.000	.000	.000	.943	.700	.000	.942	.875	.000	.833	.000	.861
Cars/Peds	7	883	0	1	891	0	0	0	0	0	0	824	11	0	835	19	0	10	0	29
% Cars/Peds	70	97.4	0	100	97.1	0	0	0	0	0	0	97.1	78.6	0	96.8	90.5	0	100	0	93.5
Heavy Vehicles/Buses	3	24	0	0	27	0	0	0	0	0	0	25	3	0	28	2	0	0	0	2
% Heavy Vehicles/Buses	30	2.6	0	0	2.9	0	0	0	0	0	0	2.9	21.4	0	3.2	9.5	0	0	0	6.5
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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File Name : Marshall Lane & W. Main Road PM
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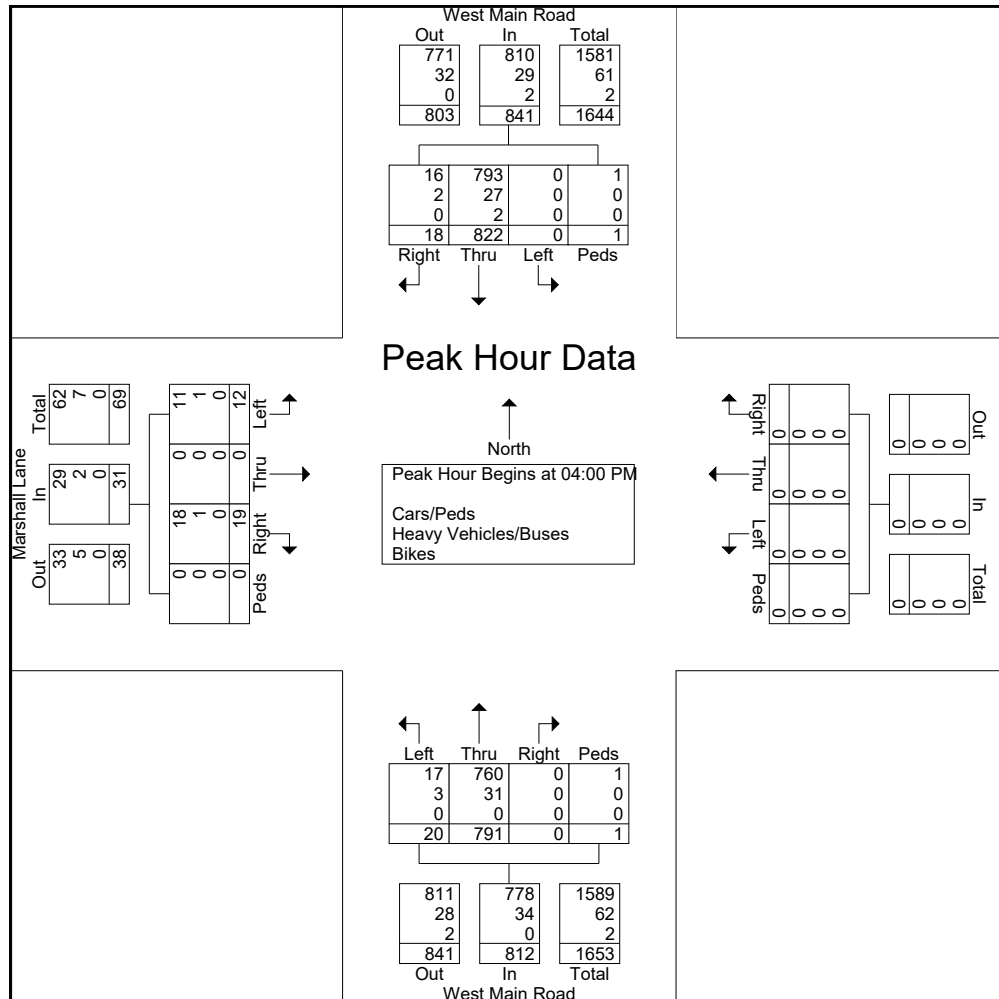


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File Name : Marshall Lane & W. Main Road PM
 Site Code : 13018.01
 Start Date : 10/21/2021
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Start Time	West Main Road From North					From East					West Main Road From South					Marshall Lane From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	1	212	0	0	213	0	0	0	0	0	0	260	6	0	266	5	0	3	0	8	487
04:15 PM	6	223	0	1	230	0	0	0	0	0	0	180	1	1	182	7	0	4	0	11	423
04:30 PM	7	189	0	0	196	0	0	0	0	0	0	146	4	0	150	4	0	1	0	5	351
04:45 PM	4	198	0	0	202	0	0	0	0	0	0	205	9	0	214	3	0	4	0	7	423
Total Volume	18	822	0	1	841	0	0	0	0	0	0	791	20	1	812	19	0	12	0	31	1684
% App. Total	2.1	97.7	0	0.1		0	0	0	0	0	0	97.4	2.5	0.1		61.3	0	38.7	0		
PHF	.643	.922	.000	.250	.914	.000	.000	.000	.000	.000	.000	.761	.556	.250	.763	.679	.000	.750	.000	.705	.864
Cars/Peds	16	793	0	1	810	0	0	0	0	0	0	760	17	1	778	18	0	11	0	29	1617
% Cars/Peds	88.9	96.5	0	100	96.3	0	0	0	0	0	0	96.1	85.0	100	95.8	94.7	0	91.7	0	93.5	96.0
Heavy Vehicles/Buses	2	27	0	0	29	0	0	0	0	0	0	31	3	0	34	1	0	1	0	2	65
% Heavy Vehicles/Buses	11.1	3.3	0	0	3.4	0	0	0	0	0	0	3.9	15.0	0	4.2	5.3	0	8.3	0	6.5	3.9
Bikes	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Bikes	0	0.2	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1



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N/S: West Main Road
 E: Green Lane W: Thelma Lane
 City, State: Middletown, RI
 Taken By: HA

File Name : Rogers Lane & W. Main Road AM
 Site Code : 13018.01
 Start Date : 10/21/2021
 Page No : 1

Groups Printed- Cars/Peds - Heavy Vehicles/Buses - Bikes

Start Time	From North					From East					From South					From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	1	274	1	0	276	1	0	0	1	2	0	125	6	0	131	24	0	6	0	30	439
07:15 AM	3	279	0	0	282	2	0	1	0	3	1	162	9	0	172	19	0	4	0	23	480
07:30 AM	3	325	0	2	330	0	0	0	0	0	0	157	11	0	168	25	2	4	0	31	529
07:45 AM	8	295	0	0	303	0	0	1	0	1	2	169	7	0	178	28	0	5	0	33	515
Total	15	1173	1	2	1191	3	0	2	1	6	3	613	33	0	649	96	2	19	0	117	1963
08:00 AM	0	323	0	0	323	0	0	1	0	1	1	172	12	0	185	16	0	3	0	19	528
08:15 AM	4	271	0	1	276	0	0	0	0	0	1	170	9	0	180	17	0	1	0	18	474
08:30 AM	1	282	1	0	284	2	0	0	0	2	1	157	9	0	167	23	0	2	0	25	478
08:45 AM	1	283	0	0	284	0	0	1	1	2	0	143	13	1	157	19	0	1	0	20	463
Total	6	1159	1	1	1167	2	0	2	1	5	3	642	43	1	689	75	0	7	0	82	1943
Grand Total	21	2332	2	3	2358	5	0	4	2	11	6	1255	76	1	1338	171	2	26	0	199	3906
Apprch %	0.9	98.9	0.1	0.1		45.5	0	36.4	18.2		0.4	93.8	5.7	0.1		85.9	1	13.1	0		
Total %	0.5	59.7	0.1	0.1	60.4	0.1	0	0.1	0.1	0.3	0.2	32.1	1.9	0	34.3	4.4	0.1	0.7	0	5.1	
Cars/Peds	19	2256	2	3	2280	5	0	4	2	11	6	1196	72	1	1275	162	1	24	0	187	3753
% Cars/Peds	90.5	96.7	100	100	96.7	100	0	100	100	100	100	95.3	94.7	100	95.3	94.7	50	92.3	0	94	96.1
Heavy Vehicles/Buses	2	76	0	0	78	0	0	0	0	0	0	59	4	0	63	9	0	2	0	11	152
% Heavy Vehicles/Buses	9.5	3.3	0	0	3.3	0	0	0	0	0	0	4.7	5.3	0	4.7	5.3	0	7.7	0	5.5	3.9
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0.5	0

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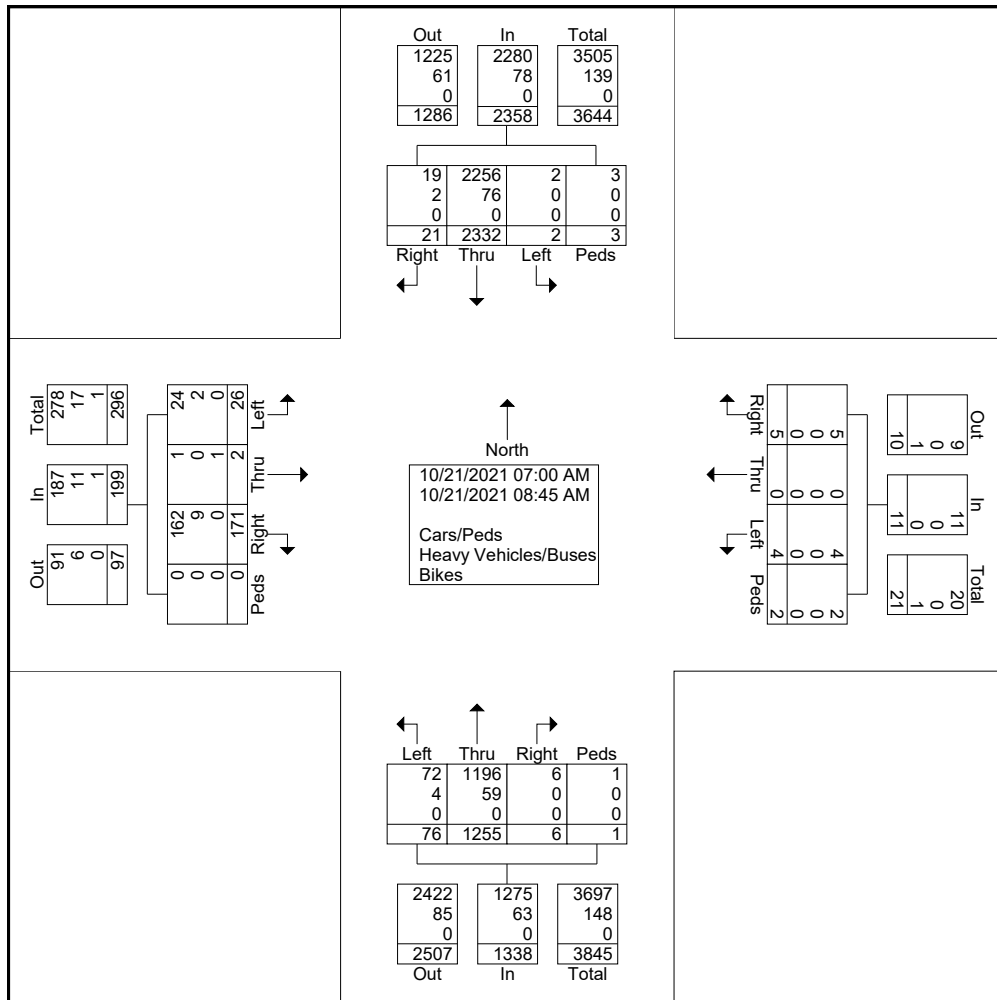
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File Name : Rogers Lane & W. Main Road AM

Site Code : 13018.01

Start Date : 10/21/2021

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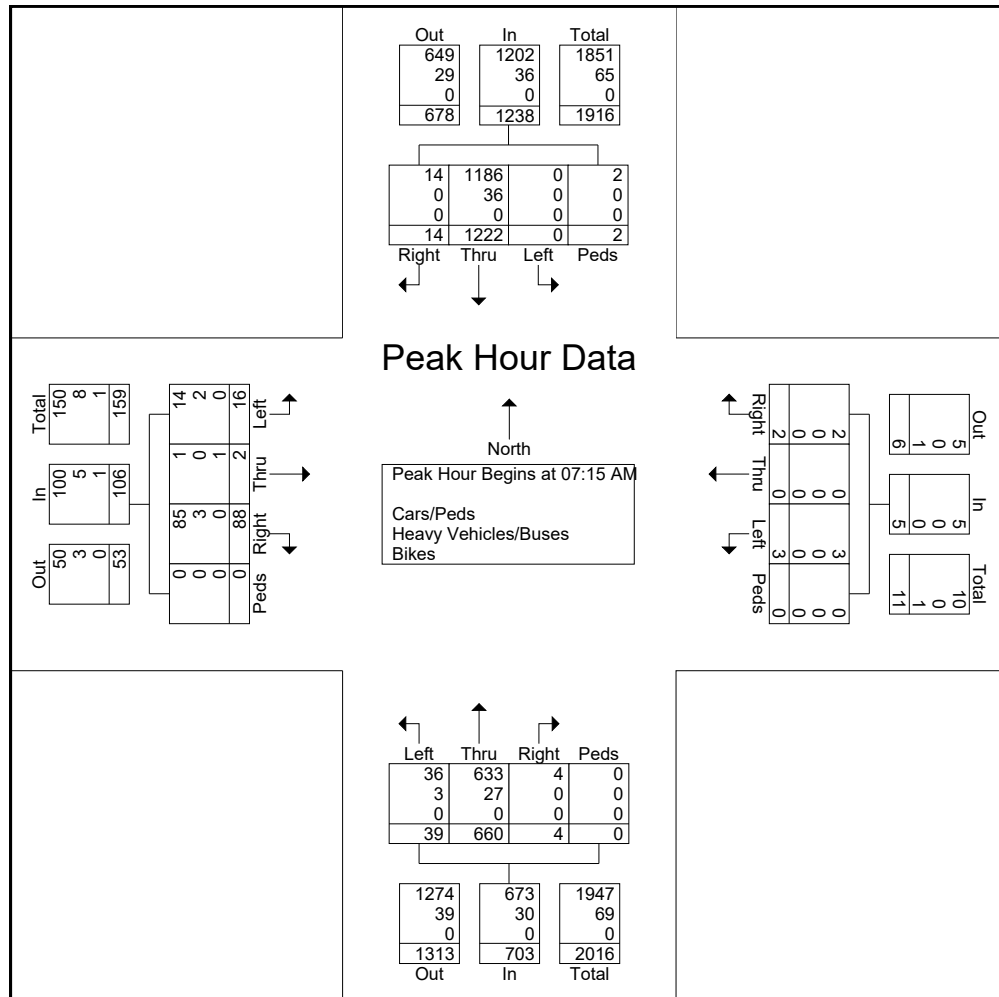


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File Name : Rogers Lane & W. Main Road AM
 Site Code : 13018.01
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Start Time	From North					From East					From South					From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	3	279	0	0	282	2	0	1	0	3	1	162	9	0	172	19	0	4	0	23	480
07:30 AM	3	325	0	2	330	0	0	0	0	0	0	157	11	0	168	25	2	4	0	31	529
07:45 AM	8	295	0	0	303	0	0	1	0	1	2	169	7	0	178	28	0	5	0	33	515
08:00 AM	0	323	0	0	323	0	0	1	0	1	1	172	12	0	185	16	0	3	0	19	528
Total Volume	14	1222	0	2	1238	2	0	3	0	5	4	660	39	0	703	88	2	16	0	106	2052
% App. Total	1.1	98.7	0	0.2		40	0	60	0		0.6	93.9	5.5	0		83	1.9	15.1	0		
PHF	.438	.940	.000	.250	.938	.250	.000	.750	.000	.417	.500	.959	.813	.000	.950	.786	.250	.800	.000	.803	.970
Cars/Peds	14	1186	0	2	1202	2	0	3	0	5	4	633	36	0	673	85	1	14	0	100	1980
% Cars/Peds	100	97.1	0	100	97.1	100	0	100	0	100	100	95.9	92.3	0	95.7	96.6	50.0	87.5	0	94.3	96.5
Heavy Vehicles/Buses	0	36	0	0	36	0	0	0	0	0	0	27	3	0	30	3	0	2	0	5	71
% Heavy Vehicles/Buses	0	2.9	0	0	2.9	0	0	0	0	0	0	4.1	7.7	0	4.3	3.4	0	12.5	0	4.7	3.5
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50.0	0	0	0.9	0.0



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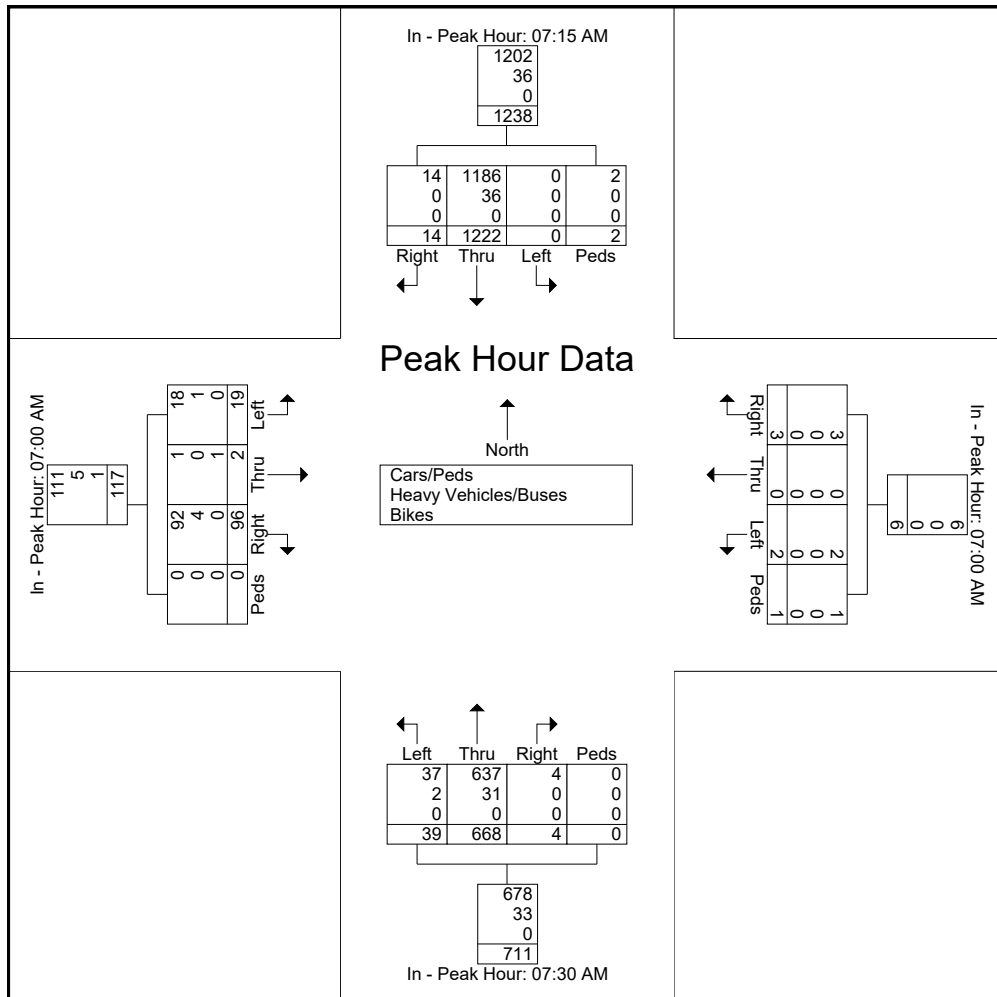
8 Blackstone Valley Place
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File Name : Rogers Lane & W. Main Road AM
Site Code : 13018.01
Start Date : 10/21/2021
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Start Time	From North					From East					From South					From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM					07:00 AM					07:30 AM					07:00 AM				
+0 mins.	3	279	0	0	282	1	0	0	1	2	0	157	11	0	168	24	0	6	0	30
+15 mins.	3	325	0	2	330	2	0	1	0	3	2	169	7	0	178	19	0	4	0	23
+30 mins.	8	295	0	0	303	0	0	0	0	0	1	172	12	0	185	25	2	4	0	31
+45 mins.	0	323	0	0	323	0	0	1	0	1	1	170	9	0	180	28	0	5	0	33
Total Volume	14	1222	0	2	1238	3	0	2	1	6	4	668	39	0	711	96	2	19	0	117
% App. Total	1.1	98.7	0	0.2		50	0	33.3	16.7		0.6	94	5.5	0		82.1	1.7	16.2	0	
PHF	.438	.940	.000	.250	.938	.375	.000	.500	.250	.500	.500	.971	.813	.000	.961	.857	.250	.792	.000	.886
Cars/Peds	14	1186	0	2	1202	3	0	2	1	6	4	637	37	0	678	92	1	18	0	111
% Cars/Peds	100	97.1	0	100	97.1	100	0	100	100	100	100	95.4	94.9	0	95.4	95.8	50	94.7	0	94.9
Heavy Vehicles/Buses	0	36	0	0	36	0	0	0	0	0	0	31	2	0	33	4	0	1	0	5
% Heavy Vehicles/Buses	0	2.9	0	0	2.9	0	0	0	0	0	0	4.6	5.1	0	4.6	4.2	0	5.3	0	4.3
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0.9



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N/S: West Main Road
 E: Green Lane W: Thelma Lane
 City, State: Middletown, RI
 Taken By: HA

File Name : Rogers Lane & W. Main Road PM
 Site Code : 13018.01
 Start Date : 10/20/2021
 Page No : 1

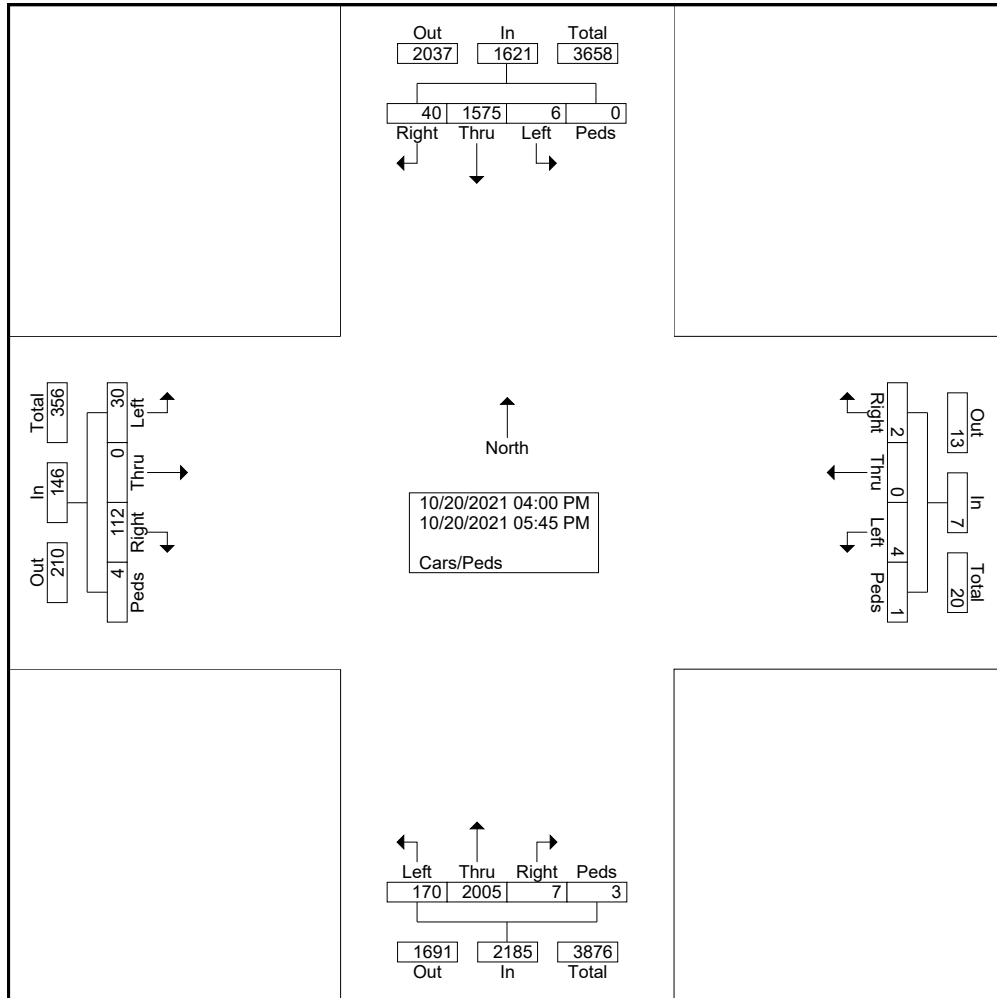
Groups Printed- Cars/Peds

Start Time	From North					From East					From South					From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	4	200	0	0	204	0	0	1	0	1	0	289	21	0	310	10	0	1	1	12	527
04:15 PM	3	97	1	0	101	0	0	1	0	1	1	103	12	0	116	8	0	1	0	9	227
04:30 PM	6	171	1	0	178	1	0	1	0	2	2	281	16	0	299	13	0	6	0	19	498
04:45 PM	3	223	1	0	227	0	0	0	0	0	1	273	20	1	295	8	0	1	0	9	531
Total	16	691	3	0	710	1	0	3	0	4	4	946	69	1	1020	39	0	9	1	49	1783
05:00 PM	14	235	0	0	249	0	0	0	1	1	0	275	19	0	294	23	0	2	1	26	570
05:15 PM	2	227	0	0	229	0	0	0	0	0	2	278	21	1	302	14	0	6	1	21	552
05:30 PM	4	228	0	0	232	1	0	0	0	1	1	280	33	1	315	20	0	7	1	28	576
05:45 PM	4	194	3	0	201	0	0	1	0	1	0	226	28	0	254	16	0	6	0	22	478
Total	24	884	3	0	911	1	0	1	1	3	3	1059	101	2	1165	73	0	21	3	97	2176
Grand Total	40	1575	6	0	1621	2	0	4	1	7	7	2005	170	3	2185	112	0	30	4	146	3959
Apprch %	2.5	97.2	0.4	0		28.6	0	57.1	14.3		0.3	91.8	7.8	0.1		76.7	0	20.5	2.7		
Total %	1	39.8	0.2	0	40.9	0.1	0	0.1	0	0.2	0.2	50.6	4.3	0.1	55.2	2.8	0	0.8	0.1	3.7	

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File Name : Rogers Lane & W. Main Road PM
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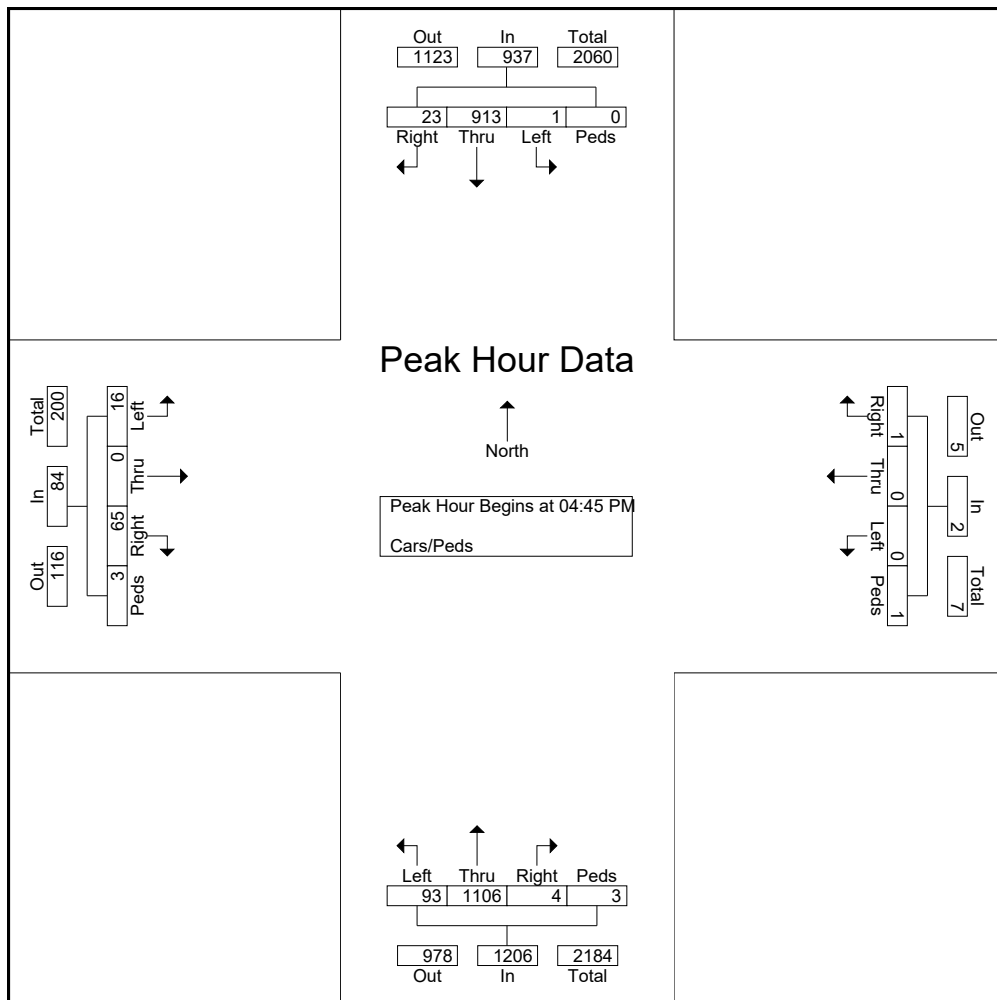


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File Name : Rogers Lane & W. Main Road PM
 Site Code : 13018.01
 Start Date : 10/20/2021
 Page No : 3

Start Time	From North					From East					From South					From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	3	223	1	0	227	0	0	0	0	0	1	273	20	1	295	8	0	1	0	9	531
05:00 PM	14	235	0	0	249	0	0	0	1	1	0	275	19	0	294	23	0	2	1	26	570
05:15 PM	2	227	0	0	229	0	0	0	0	0	2	278	21	1	302	14	0	6	1	21	552
05:30 PM	4	228	0	0	232	1	0	0	0	1	1	280	33	1	315	20	0	7	1	28	576
Total Volume	23	913	1	0	937	1	0	0	1	2	4	1106	93	3	1206	65	0	16	3	84	2229
% App. Total	2.5	97.4	0.1	0		50	0	0	50		0.3	91.7	7.7	0.2		77.4	0	19	3.6		
PHF	.411	.971	.250	.000	.941	.250	.000	.000	.250	.500	.500	.988	.705	.750	.957	.707	.000	.571	.750	.750	.967



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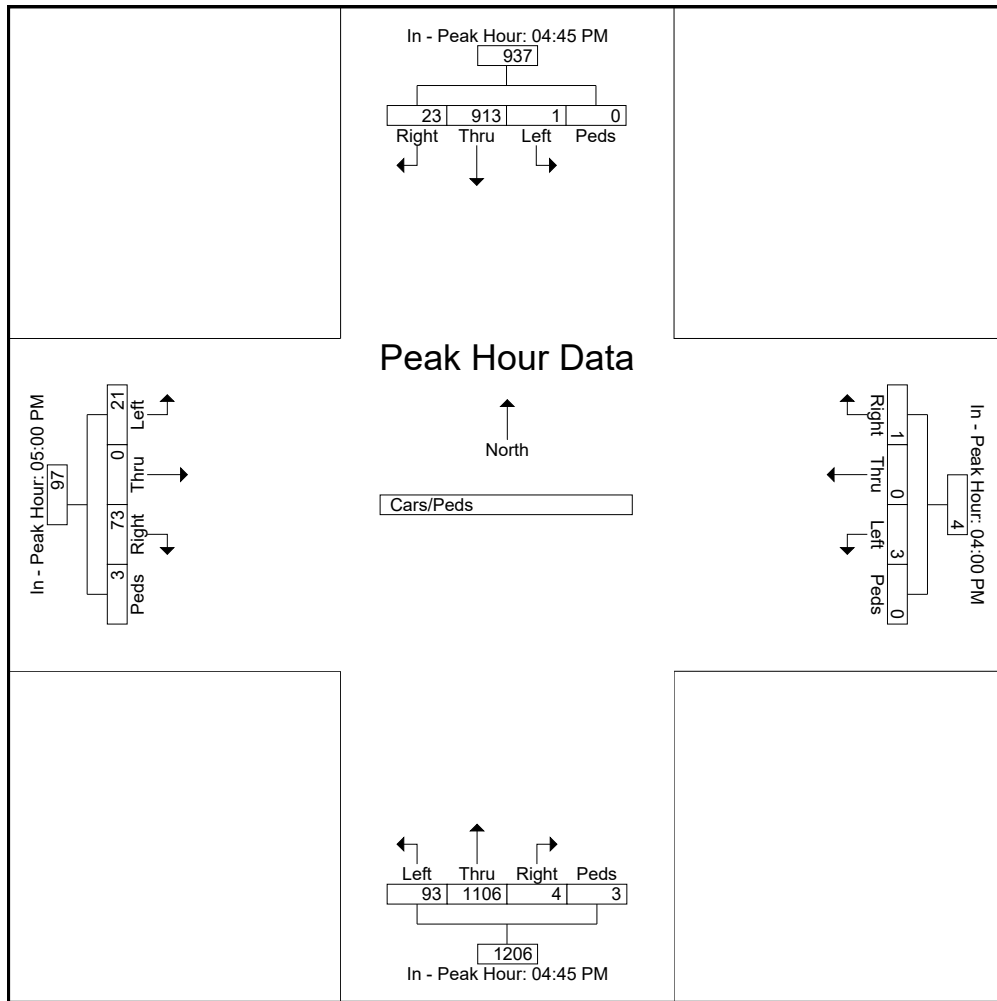
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Site Code : 13018.01
Start Date : 10/20/2021
Page No : 4

Start Time	From North					From East					From South					From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:45 PM					04:00 PM					04:45 PM					05:00 PM				
+0 mins.	3	223	1	0	227	0	0	1	0	1	1	273	20	1	295	23	0	2	1	26
+15 mins.	14	235	0	0	249	0	0	1	0	1	0	275	19	0	294	14	0	6	1	21
+30 mins.	2	227	0	0	229	1	0	1	0	2	2	278	21	1	302	20	0	7	1	28
+45 mins.	4	228	0	0	232	0	0	0	0	0	1	280	33	1	315	16	0	6	0	22
Total Volume	23	913	1	0	937	1	0	3	0	4	4	1106	93	3	1206	73	0	21	3	97
% App. Total	2.5	97.4	0.1	0		25	0	75	0		0.3	91.7	7.7	0.2		75.3	0	21.6	3.1	
PHF	.411	.971	.250	.000	.941	.250	.000	.750	.000	.500	.500	.988	.705	.750	.957	.793	.000	.750	.750	.866



APPENDIX B
Speed Study Results



Pare Corporation

8 Blackstone Valley Place
 Lincoln, RI, 02865
 401-334-4100
 www.parecorp.com

N/S East Main Road
 Middletown RI
 Sunny 70 Degrees
 MSC

File Name : 13018.01 SS Rosebrook Commons
 Site Code : 1301801_
 Start Date : 10/18/2021
 Page No : 1

#	NB	SB
1	32	42
2	45	38
3	42	34
4	36	40
5	32	33
6	43	40
7	40	41
8	34	42
9	31	35
10	45	31
11	40	38
12	35	34
13	31	39
14	40	40
15	35	40
16	31	41
17	34	43
18	33	45
19	36	36
20	38	44
21	48	37
22	46	35
23	37	31
24	48	34
25	35	45
26	38	32
27	42	46
28	50	43
29	39	38
30	39	35
31	41	39
32	40	29
33	36	41
34	35	28
35	39	34
36	44	39
37	33	38
38	41	41
39	36	34
40	43	33
41	36	40
42	38	29
43	37	40
44	48	38
45	40	42
46	34	35
47	27	32
48	40	46
49	36	39
50	45	41
51		

Class	Vehicle Count	85 Percentile	10 MPH Pace Speed	Number in Pace	Percent in Pace	Number of Vehicles Over 35 MPH	Percent of Vehicles Over 35 MPH	Average Speed	True Median (50th Percentile)
NB	50	44	31 - 40	34	68	35	70	38	38
SB	50	42	33 - 42	36	72	32	64	38	38
Summary	100	43	33 - 42	69	69	67	67	38	38

APPENDIX C

Trip Generation Worksheets



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

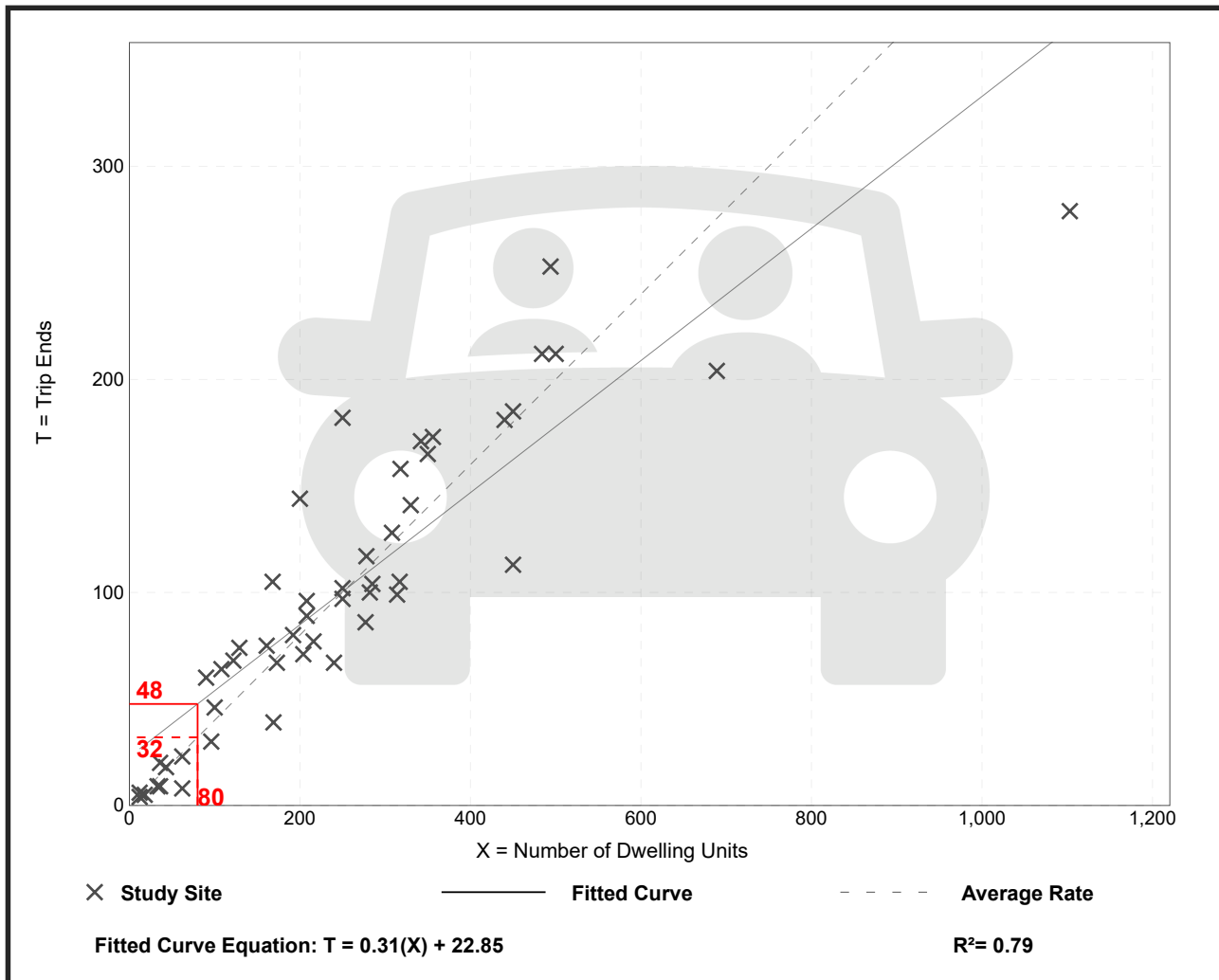
Setting/Location: General Urban/Suburban

Number of Studies: 49
Avg. Num. of Dwelling Units: 249
Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

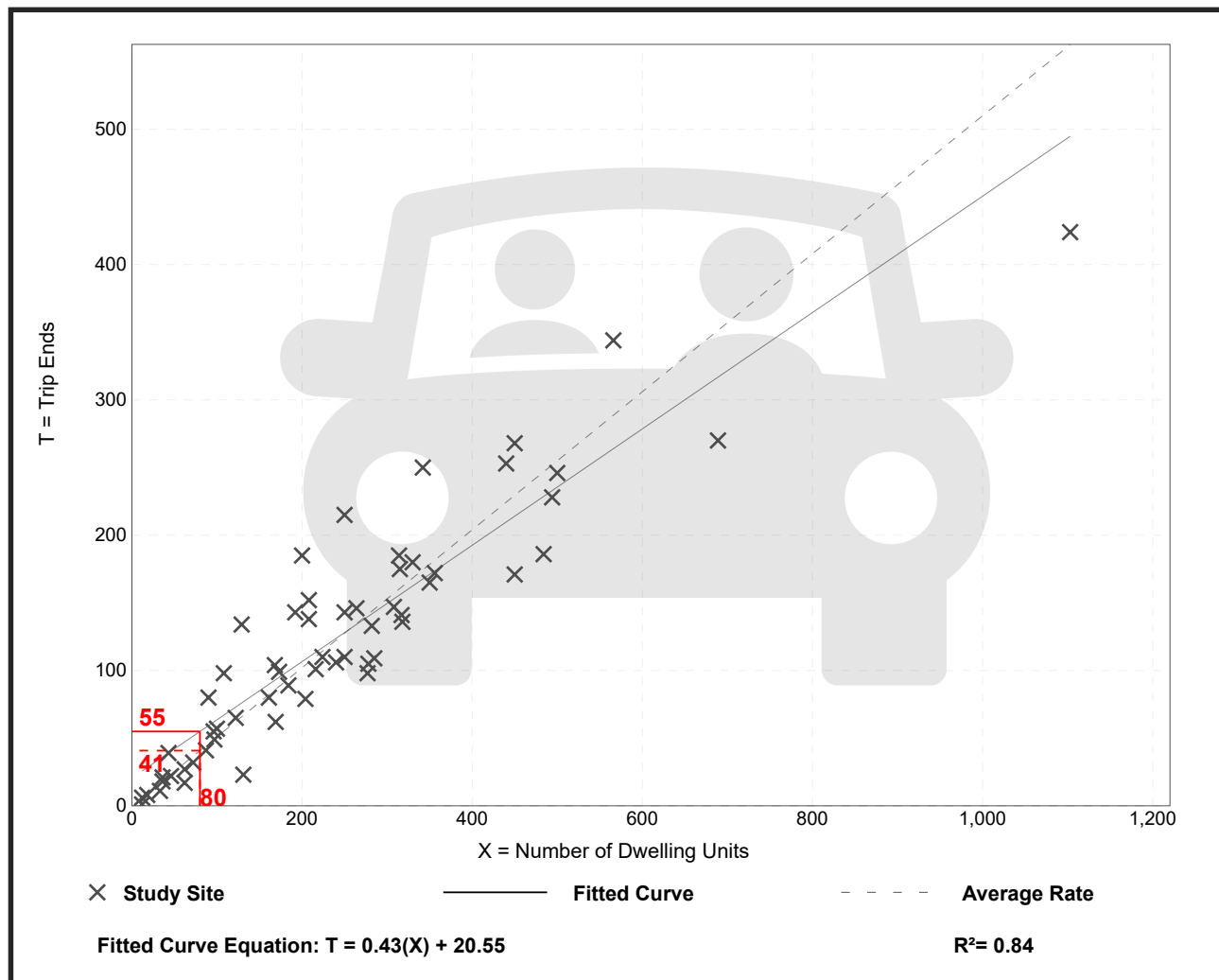
Setting/Location: General Urban/Suburban

Number of Studies: 59
Avg. Num. of Dwelling Units: 241
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

Data Plot and Equation



Low-Rise Residential with Ground-Floor Commercial GFA (1-25k) (230)

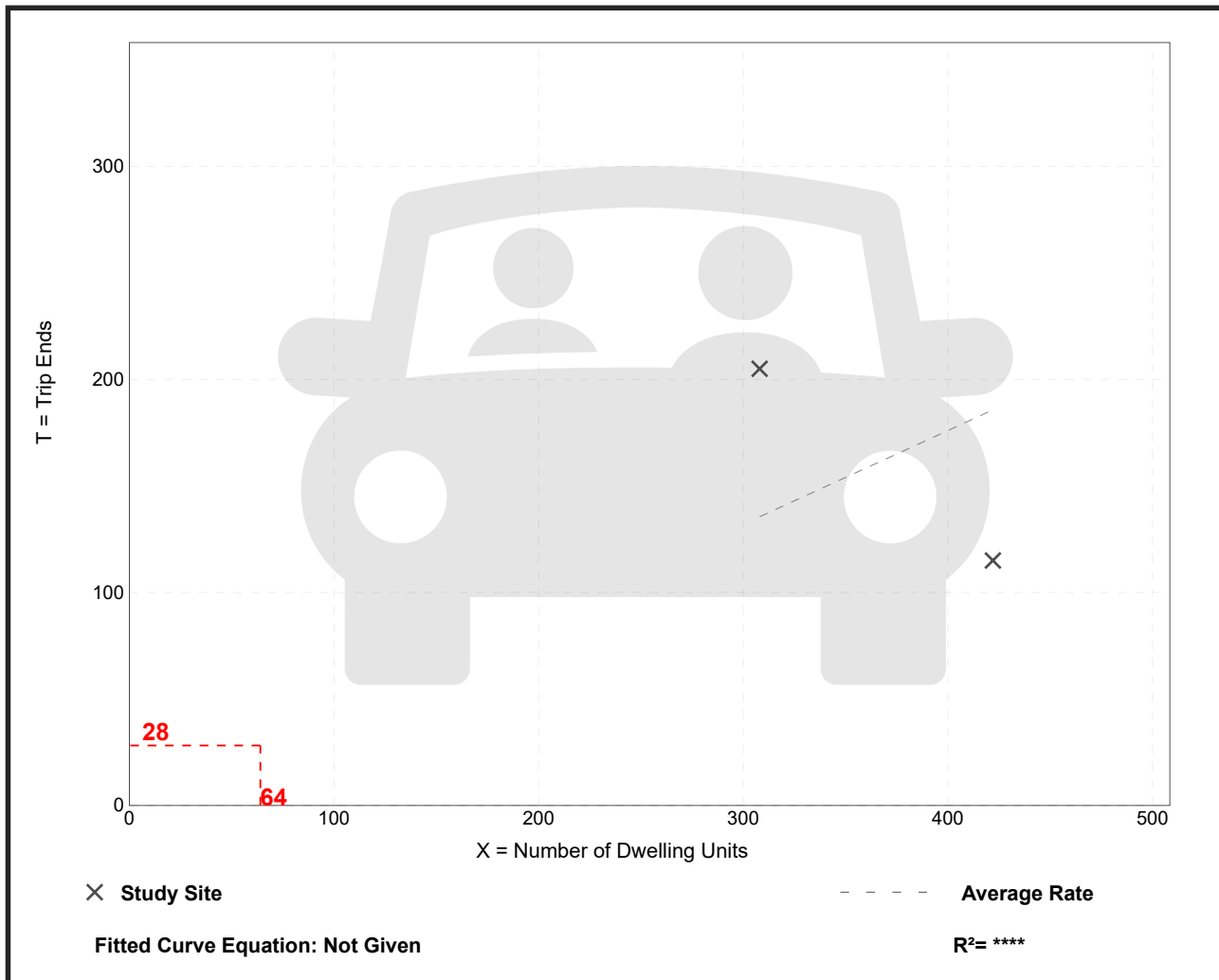
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
 Number of Studies: 2
 Avg. Num. of Dwelling Units: 365
 Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.27 - 0.67	*

Data Plot and Equation

Caution – Small Sample Size



Low-Rise Residential with Ground-Floor Commercial GFA (1-25k) (230)

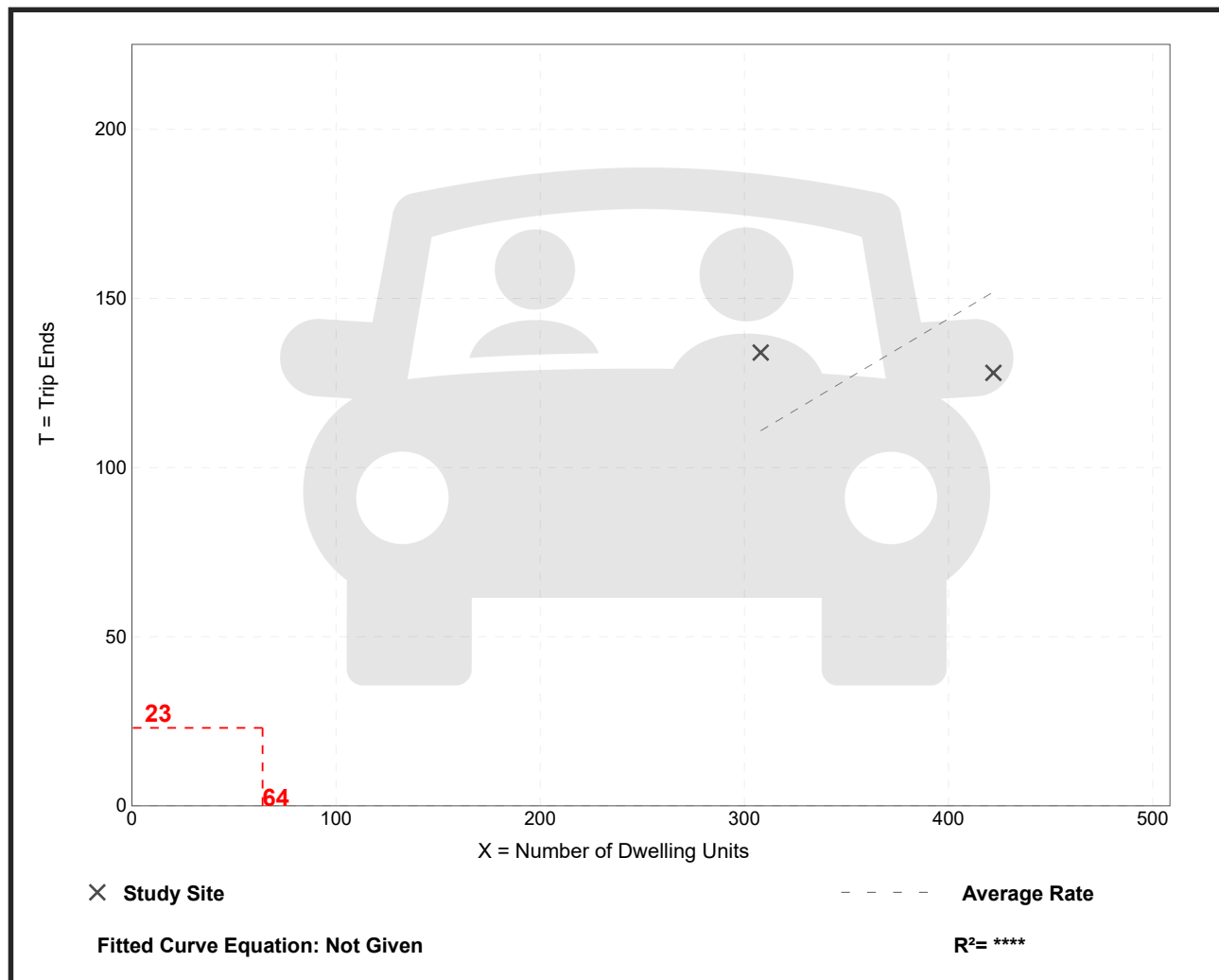
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
 Number of Studies: 2
 Avg. Num. of Dwelling Units: 365
 Directional Distribution: 71% entering, 29% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.30 - 0.44	*

Data Plot and Equation

Caution – Small Sample Size



APPENDIX D

Traffic Capacity Analysis Worksheets



Lanes, Volumes, Timings
 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive

Existing Volumes
 AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	2	58	19	5	3	50	581	0	0	1009	92
Future Volume (vph)	24	2	58	19	5	3	50	581	0	0	1009	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Fr _t		0.855			0.986							0.987
Fl _t Protected	0.950				0.965			0.996				
Satd. Flow (prot)	1805	1536	0	0	1733	0	0	3488	0	0	3437	0
Fl _t Permitted	0.732				0.732			0.773				
Satd. Flow (perm)	1391	1536	0	0	1315	0	0	2707	0	0	3437	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		85			4							14
Link Speed (mph)		30			30			30				30
Link Distance (ft)		206			276			414				324
Travel Time (s)		4.7			6.3			9.4				7.4
Peak Hour Factor	0.68	0.68	0.68	0.69	0.69	0.69	0.87	0.87	0.87	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	6%	6%	0%	0%	4%	3%	0%	0%	4%	0%
Adj. Flow (vph)	35	3	85	28	7	4	57	668	0	0	1230	112
Shared Lane Traffic (%)												
Lane Group Flow (vph)	35	88	0	0	39	0	0	725	0	0	1342	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA			NA	
Protected Phases		3			3		1	1 2				2
Permitted Phases	3			3			2			2		
Detector Phase	3	3		3	3		1	1 2		2		2
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0			10.0	10.0	
Minimum Split (s)	10.5	10.5		10.5	10.5		10.5			15.5	15.5	
Total Split (s)	27.0	27.0		27.0	27.0		15.0			48.0	48.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		16.7%			53.3%	53.3%	
Maximum Green (s)	22.5	22.5		22.5	22.5		10.5			42.5	42.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.5			4.0	4.0	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.0			1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0							0.0
Total Lost Time (s)	4.5	4.5			4.5							5.5
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.6			2.8	2.8	
Recall Mode	None	None		None	None		None			C-Max	C-Max	
Walk Time (s)	5.0	5.0		5.0	5.0					5.0	5.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0					16.0	16.0	
Pedestrian Calls (#/hr)	5	5		5	5					5	5	
Act Effct Green (s)	9.1	9.1			9.1			69.5				59.0
Actuated g/C Ratio	0.10	0.10			0.10			0.77				0.66
v/c Ratio	0.25	0.38			0.29			0.33				0.59
Control Delay	39.5	13.4			37.9			3.1				11.8
Queue Delay	0.0	0.0			0.0			0.0				0.0
Total Delay	39.5	13.4			37.9			3.1				11.8
LOS	D	B			D			A				B
Approach Delay		20.8			37.9			3.1				11.8

Lanes, Volumes, Timings
 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive

Existing Volumes
 AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			D			A			B	
Queue Length 50th (ft)	19	2			19			33			207	
Queue Length 95th (ft)	32	19			33			89			321	
Internal Link Dist (ft)		126			196			334			244	
Turn Bay Length (ft)												
Base Capacity (vph)	347	447			331			2210			2257	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.10	0.20			0.12			0.33			0.59	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	0 (0%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	9.9
Intersection LOS:	A
Intersection Capacity Utilization	68.6%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive



Lanes, Volumes, Timings
6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

Existing Volumes
AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	18	3	97	4	0	3	43	726	5	0	1345	16
Future Volume (vph)	18	3	97	4	0	3	43	726	5	0	1345	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Fr _t		0.890			0.944			0.999			0.998	
Fl _t Protected		0.992			0.971			0.997				
Satd. Flow (prot)	0	1606	0	0	1742	0	0	3451	0	0	3499	0
Fl _t Permitted		0.941			0.484			0.765				
Satd. Flow (perm)	0	1523	0	0	868	0	0	2648	0	0	3499	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		121			121			1			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		273			331			412			402	
Travel Time (s)		6.2			7.5			9.4			9.1	
Peak Hour Factor	0.80	0.80	0.80	0.42	0.42	0.42	0.95	0.95	0.95	0.94	0.94	0.94
Heavy Vehicles (%)	13%	0%	3%	0%	0%	0%	8%	4%	0%	0%	3%	0%
Adj. Flow (vph)	23	4	121	10	0	7	45	764	5	0	1431	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	148	0	0	17	0	0	814	0	0	1448	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA			NA	
Protected Phases		4			4		1	1 2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		1	1 2		2	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0			15.0	15.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.5			21.0	21.0	
Total Split (s)	18.0	18.0		18.0	18.0		15.0			46.0	46.0	
Total Split (%)	15.9%	15.9%		15.9%	15.9%		13.3%			40.7%	40.7%	
Maximum Green (s)	13.0	13.0		13.0	13.0		9.5			40.0	40.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.5			4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0			2.0	2.0	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.0			5.0						6.0	
Lead/Lag	Lag	Lag		Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.6			2.8	2.8	
Recall Mode	None	None		None	None		None			C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		8.5			8.5			83.1			73.1	
Actuated g/C Ratio		0.08			0.08			0.74			0.65	
v/c Ratio		0.65			0.10			0.40			0.64	
Control Delay		27.2			1.1			7.1			16.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		27.2			1.1			7.1			16.7	
LOS		C			A			A			B	
Approach Delay		27.2			1.1			7.1			16.7	

Lanes, Volumes, Timings
 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

Existing Volumes
 AM Peak

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Fr _t	
Fl _t Protected	
Satd. Flow (prot)	
Fl _t Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	34.0
Total Split (s)	34.0
Total Split (%)	30%
Maximum Green (s)	30.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	

Lanes, Volumes, Timings
 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

Existing Volumes
 AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C				A				B		
Queue Length 50th (ft)		19				0				44		
Queue Length 95th (ft)		60				0				224		
Internal Link Dist (ft)		193				251				332		
Turn Bay Length (ft)												
Base Capacity (vph)		284				207				2014		
Starvation Cap Reductn		0				0				0		
Spillback Cap Reductn		0				0				0		
Storage Cap Reductn		0				0				0		
Reduced v/c Ratio		0.52				0.08				0.40		

Intersection Summary

Area Type: Other
 Cycle Length: 113
 Actuated Cycle Length: 113
 Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 14.0
 Intersection LOS: B
 Intersection Capacity Utilization 68.3%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane



Lane Group	Ø3
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

HCM 6th TWSC
 9: W. Main Road (RTE 114) & Marshall Lane

Existing Volumes
 AM Peak

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	9	16	16	934	998	11
Future Vol, veh/h	9	16	16	934	998	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	61	94	94	93	93
Heavy Vehicles, %	13	7	21	3	3	30
Mvmt Flow	15	26	17	994	1073	12

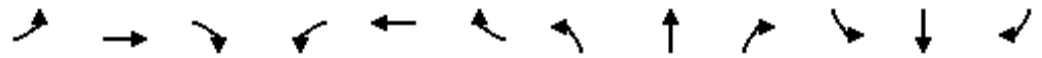
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1610	543	1085	0	-	0
Stage 1	1079	-	-	-	-	-
Stage 2	531	-	-	-	-	-
Critical Hdwy	7.06	7.04	4.52	-	-	-
Critical Hdwy Stg 1	6.06	-	-	-	-	-
Critical Hdwy Stg 2	6.06	-	-	-	-	-
Follow-up Hdwy	3.63	3.37	2.41	-	-	-
Pot Cap-1 Maneuver	85	471	538	-	-	-
Stage 1	265	-	-	-	-	-
Stage 2	524	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	79	471	538	-	-	-
Mov Cap-2 Maneuver	79	-	-	-	-	-
Stage 1	246	-	-	-	-	-
Stage 2	524	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	33	0.6	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	538	-	169	-	-
HCM Lane V/C Ratio	0.032	-	0.243	-	-
HCM Control Delay (s)	11.9	0.4	33	-	-
HCM Lane LOS	B	A	D	-	-
HCM 95th %tile Q(veh)	0.1	-	0.9	-	-

Lanes, Volumes, Timings
 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive

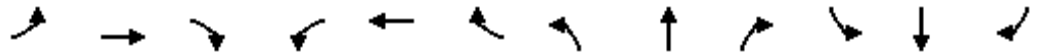
No-Build Volumes
 AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	2	61	20	5	3	53	611	0	0	1060	97
Future Volume (vph)	25	2	61	20	5	3	53	611	0	0	1060	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Fr _t		0.855			0.986							0.987
Fl _t Protected	0.950				0.965			0.996				
Satd. Flow (prot)	1805	1535	0	0	1732	0	0	3488	0	0	3437	0
Fl _t Permitted	0.731				0.727			0.751				
Satd. Flow (perm)	1389	1535	0	0	1305	0	0	2630	0	0	3437	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		90			4							14
Link Speed (mph)		30			30			30				30
Link Distance (ft)		206			276			414				324
Travel Time (s)		4.7			6.3			9.4				7.4
Peak Hour Factor	0.68	0.68	0.68	0.69	0.69	0.69	0.87	0.87	0.87	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	6%	6%	0%	0%	4%	3%	0%	0%	4%	0%
Adj. Flow (vph)	37	3	90	29	7	4	61	702	0	0	1293	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	93	0	0	40	0	0	763	0	0	1411	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA			NA	
Protected Phases		3			3		1	1 2				2
Permitted Phases	3			3			2			2		
Detector Phase	3	3		3	3		1	1 2		2		2
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0			10.0	10.0	
Minimum Split (s)	10.5	10.5		10.5	10.5		10.5			15.5	15.5	
Total Split (s)	27.0	27.0		27.0	27.0		15.0			48.0	48.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		16.7%			53.3%	53.3%	
Maximum Green (s)	22.5	22.5		22.5	22.5		10.5			42.5	42.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.5			4.0	4.0	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.0			1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0							0.0
Total Lost Time (s)	4.5	4.5			4.5							5.5
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.6			2.8	2.8	
Recall Mode	None	None		None	None		None			C-Max	C-Max	
Walk Time (s)	5.0	5.0		5.0	5.0					5.0	5.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0					16.0	16.0	
Pedestrian Calls (#/hr)	5	5		5	5					5	5	
Act Effct Green (s)	9.1	9.1			9.1			69.5				58.9
Actuated g/C Ratio	0.10	0.10			0.10			0.77				0.65
v/c Ratio	0.26	0.39			0.29			0.36				0.63
Control Delay	39.8	13.3			38.1			3.3				12.4
Queue Delay	0.0	0.0			0.0			0.0				0.0
Total Delay	39.8	13.3			38.1			3.3				12.4
LOS	D	B			D			A				B
Approach Delay		20.8			38.1			3.3				12.4

Lanes, Volumes, Timings
 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive

No-Build Volumes
 AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	C			D			A			B		
Queue Length 50th (ft)	20	2			20			36			226	
Queue Length 95th (ft)	33	19			33			95			346	
Internal Link Dist (ft)		126			196			334			244	
Turn Bay Length (ft)												
Base Capacity (vph)	347	451			329			2156			2252	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.11	0.21			0.12			0.35			0.63	

Intersection Summary

















Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	0 (0%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	10.3
Intersection LOS:	B
Intersection Capacity Utilization	71.1%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive



Lanes, Volumes, Timings
6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

No-Build Volumes
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	3	102	4	0	3	45	763	5	0	1414	17
Future Volume (vph)	19	3	102	4	0	3	45	763	5	0	1414	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Fr _t		0.889			0.944			0.999			0.998	
Fl _t Protected		0.992			0.971			0.997				
Satd. Flow (prot)	0	1604	0	0	1742	0	0	3451	0	0	3499	0
Fl _t Permitted		0.942			0.486			0.738				
Satd. Flow (perm)	0	1523	0	0	872	0	0	2554	0	0	3499	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		128			121			1			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		273			331			412			402	
Travel Time (s)		6.2			7.5			9.4			9.1	
Peak Hour Factor	0.80	0.80	0.80	0.42	0.42	0.42	0.95	0.95	0.95	0.94	0.94	0.94
Heavy Vehicles (%)	13%	0%	3%	0%	0%	0%	8%	4%	0%	0%	3%	0%
Adj. Flow (vph)	24	4	128	10	0	7	47	803	5	0	1504	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	156	0	0	17	0	0	855	0	0	1522	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA			NA	
Protected Phases		4			4		1	1 2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		1	1 2		2	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0			15.0	15.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.5			21.0	21.0	
Total Split (s)	18.0	18.0		18.0	18.0		15.0			46.0	46.0	
Total Split (%)	15.9%	15.9%		15.9%	15.9%		13.3%			40.7%	40.7%	
Maximum Green (s)	13.0	13.0		13.0	13.0		9.5			40.0	40.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.5			4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0			2.0	2.0	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.0			5.0						6.0	
Lead/Lag	Lag	Lag		Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.6			2.8	2.8	
Recall Mode	None	None		None	None		None			C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		8.6			8.6			83.0			73.0	
Actuated g/C Ratio		0.08			0.08			0.73			0.65	
v/c Ratio		0.67			0.10			0.44			0.67	
Control Delay		27.0			1.0			7.5			17.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		27.0			1.0			7.5			17.5	
LOS		C			A			A			B	
Approach Delay		27.0			1.0			7.5			17.5	

Lanes, Volumes, Timings
 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

No-Build Volumes
 AM Peak

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	34.0
Total Split (s)	34.0
Total Split (%)	30%
Maximum Green (s)	30.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	

Lanes, Volumes, Timings
 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

No-Build Volumes
 AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			A			A			B	
Queue Length 50th (ft)		20			0			48			266	
Queue Length 95th (ft)		62			0			238			#788	
Internal Link Dist (ft)		193			251			332			322	
Turn Bay Length (ft)												
Base Capacity (vph)		291			208			1950			2259	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.54			0.08			0.44			0.67	

Intersection Summary

Area Type: Other
 Cycle Length: 113
 Actuated Cycle Length: 113
 Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 14.6
 Intersection LOS: B
 Intersection Capacity Utilization 71.2%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane



Lane Group	Ø3
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

HCM 6th TWSC
 9: W. Main Road (RTE 114) & Marshall Lane

No-Build Volumes
 AM Peak

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	9	17	17	982	1049	12
Future Vol, veh/h	9	17	17	982	1049	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	61	94	94	93	93
Heavy Vehicles, %	13	7	21	3	3	30
Mvmt Flow	15	28	18	1045	1128	13

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1694	571	1141	0	-	0
Stage 1	1135	-	-	-	-	-
Stage 2	559	-	-	-	-	-
Critical Hdwy	7.06	7.04	4.52	-	-	-
Critical Hdwy Stg 1	6.06	-	-	-	-	-
Critical Hdwy Stg 2	6.06	-	-	-	-	-
Follow-up Hdwy	3.63	3.37	2.41	-	-	-
Pot Cap-1 Maneuver	75	451	510	-	-	-
Stage 1	246	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	69	451	510	-	-	-
Mov Cap-2 Maneuver	69	-	-	-	-	-
Stage 1	225	-	-	-	-	-
Stage 2	506	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	36.8	0.7	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	510	-	155	-	-
HCM Lane V/C Ratio	0.035	-	0.275	-	-
HCM Control Delay (s)	12.3	0.5	36.8	-	-
HCM Lane LOS	B	A	E	-	-
HCM 95th %tile Q(veh)	0.1	-	1.1	-	-

Lanes, Volumes, Timings
 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive

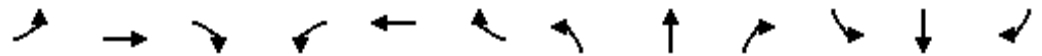
Build Volumes
 AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	2	62	20	5	3	55	635	0	0	1065	97
Future Volume (vph)	25	2	62	20	5	3	55	635	0	0	1065	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Fr _t		0.855			0.986							0.988
Fl _t Protected	0.950				0.965			0.996				
Satd. Flow (prot)	1805	1535	0	0	1732	0	0	3488	0	0	3441	0
Fl _t Permitted	0.731				0.724			0.744				
Satd. Flow (perm)	1389	1535	0	0	1300	0	0	2606	0	0	3441	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		91			4							14
Link Speed (mph)		30			30			30				30
Link Distance (ft)		206			276			414				324
Travel Time (s)		4.7			6.3			9.4				7.4
Peak Hour Factor	0.68	0.68	0.68	0.69	0.69	0.69	0.87	0.87	0.87	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	6%	6%	0%	0%	4%	3%	0%	0%	4%	0%
Adj. Flow (vph)	37	3	91	29	7	4	63	730	0	0	1299	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	94	0	0	40	0	0	793	0	0	1417	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA			NA	
Protected Phases		3			3		1	1 2				2
Permitted Phases	3			3			2			2		
Detector Phase	3	3		3	3		1	1 2		2		2
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0			10.0	10.0	
Minimum Split (s)	10.5	10.5		10.5	10.5		10.5			15.5	15.5	
Total Split (s)	27.0	27.0		27.0	27.0		15.0			48.0	48.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		16.7%			53.3%	53.3%	
Maximum Green (s)	22.5	22.5		22.5	22.5		10.5			42.5	42.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.5			4.0	4.0	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.0			1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0							0.0
Total Lost Time (s)	4.5	4.5			4.5							5.5
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.6			2.8	2.8	
Recall Mode	None	None		None	None		None			C-Max	C-Max	
Walk Time (s)	5.0	5.0		5.0	5.0					5.0	5.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0					16.0	16.0	
Pedestrian Calls (#/hr)	5	5		5	5					5	5	
Act Effct Green (s)	9.1	9.1			9.1			69.5				58.7
Actuated g/C Ratio	0.10	0.10			0.10			0.77				0.65
v/c Ratio	0.26	0.40			0.30			0.38				0.63
Control Delay	39.8	13.3			38.1			3.4				12.5
Queue Delay	0.0	0.0			0.0			0.0				0.0
Total Delay	39.8	13.3			38.1			3.4				12.5
LOS	D	B			D			A				B
Approach Delay		20.8			38.1			3.4				12.5

Lanes, Volumes, Timings
 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive

Build Volumes
 AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	C			D			A			B		
Queue Length 50th (ft)	20	2			20			38			228	
Queue Length 95th (ft)	33	20			33			99			348	
Internal Link Dist (ft)		126			196			334			244	
Turn Bay Length (ft)												
Base Capacity (vph)	347	452			328			2134			2248	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.11	0.21			0.12			0.37			0.63	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	0 (0%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	10.4
Intersection LOS:	B
Intersection Capacity Utilization:	72.0%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive



Lanes, Volumes, Timings
6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

Build Volumes
AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	19	3	102	4	0	3	45	774	5	0	1463	18
Future Volume (vph)	19	3	102	4	0	3	45	774	5	0	1463	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Fr _t		0.889			0.944			0.999			0.998	
Fl _t Protected		0.992			0.971			0.997				
Satd. Flow (prot)	0	1604	0	0	1742	0	0	3451	0	0	3499	0
Fl _t Permitted		0.942			0.486			0.726				
Satd. Flow (perm)	0	1523	0	0	872	0	0	2513	0	0	3499	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		128			121			1			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		273			331			412			402	
Travel Time (s)		6.2			7.5			9.4			9.1	
Peak Hour Factor	0.80	0.80	0.80	0.42	0.42	0.42	0.95	0.95	0.95	0.94	0.94	0.94
Heavy Vehicles (%)	13%	0%	3%	0%	0%	0%	8%	4%	0%	0%	3%	0%
Adj. Flow (vph)	24	4	128	10	0	7	47	815	5	0	1556	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	156	0	0	17	0	0	867	0	0	1575	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA			NA	
Protected Phases		4			4		1	1 2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		1	1 2		2	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0			15.0	15.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.5			21.0	21.0	
Total Split (s)	18.0	18.0		18.0	18.0		15.0			46.0	46.0	
Total Split (%)	15.9%	15.9%		15.9%	15.9%		13.3%			40.7%	40.7%	
Maximum Green (s)	13.0	13.0		13.0	13.0		9.5			40.0	40.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.5			4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0			2.0	2.0	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.0			5.0						6.0	
Lead/Lag	Lag	Lag		Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.6			2.8	2.8	
Recall Mode	None	None		None	None		None			C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		8.6			8.6			83.0			73.0	
Actuated g/C Ratio		0.08			0.08			0.73			0.65	
v/c Ratio		0.67			0.10			0.45			0.70	
Control Delay		27.0			1.0			7.6			18.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		27.0			1.0			7.6			18.0	
LOS		C			A			A			B	
Approach Delay		27.0			1.0			7.6			18.0	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	34.0
Total Split (s)	34.0
Total Split (%)	30%
Maximum Green (s)	30.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	

Lanes, Volumes, Timings
 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

Build Volumes
 AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			A			A			B	
Queue Length 50th (ft)		20			0			48			283	
Queue Length 95th (ft)		62			0			243			#832	
Internal Link Dist (ft)		193			251			332			322	
Turn Bay Length (ft)												
Base Capacity (vph)		291			208			1923			2259	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.54			0.08			0.45			0.70	

Intersection Summary

Area Type: Other
 Cycle Length: 113
 Actuated Cycle Length: 113
 Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 15.0
 Intersection LOS: B
 Intersection Capacity Utilization 71.5%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane



Lane Group	Ø3
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

HCM 6th TWSC
 9: W. Main Road (RTE 114) & Marshall Lane

Build Volumes
 AM Peak

Intersection												
Int Delay, s/veh	9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	0	17	50	0	26	17	982	11	6	1049	12
Future Vol, veh/h	9	0	17	50	0	26	17	982	11	6	1049	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	92	61	92	92	92	94	94	92	92	93	93
Heavy Vehicles, %	13	2	7	2	2	2	21	3	2	2	3	30
Mvmt Flow	15	0	28	54	0	28	18	1045	12	7	1128	13

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1708	2242	571	1665	2242	529	1141	0	0	1057	0	0
Stage 1	1149	1149	-	1087	1087	-	-	-	-	-	-	-
Stage 2	559	1093	-	578	1155	-	-	-	-	-	-	-
Critical Hdwy	7.76	6.54	7.04	7.54	6.54	6.94	4.52	-	-	4.14	-	-
Critical Hdwy Stg 1	6.76	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.76	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.63	4.02	3.37	3.52	4.02	3.32	2.41	-	-	2.22	-	-
Pot Cap-1 Maneuver	52	42	451	63	42	494	510	-	-	655	-	-
Stage 1	194	271	-	231	290	-	-	-	-	-	-	-
Stage 2	454	288	-	468	269	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	45	37	451	~ 54	37	494	510	-	-	655	-	-
Mov Cap-2 Maneuver	45	37	-	~ 54	37	-	-	-	-	-	-	-
Stage 1	177	263	-	211	265	-	-	-	-	-	-	-
Stage 2	391	263	-	426	261	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB		
HCM Control Delay, s	57.8		213.4		0.7		0.3		
HCM LOS	F		F						

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	510	-	-	109	78	655	-
HCM Lane V/C Ratio	0.035	-	-	0.391	1.059	0.01	-
HCM Control Delay (s)	12.3	0.5	-	57.8	213.4	10.6	0.2
HCM Lane LOS	B	A	-	F	F	B	A
HCM 95th %tile Q(veh)	0.1	-	-	1.6	5.9	0	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lanes, Volumes, Timings
 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive

Existing Volumes
 PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	8	90	20	7	7	96	1466	22	6	1026	24
Future Volume (vph)	97	8	90	20	7	7	96	1466	22	6	1026	24
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		150	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.862			0.973			0.998			0.997	
Flt Protected	0.950				0.971			0.997				
Satd. Flow (prot)	1805	1638	0	0	1795	0	0	3545	0	0	3531	0
Flt Permitted	0.820				0.790			0.707			0.943	
Satd. Flow (perm)	1558	1638	0	0	1460	0	0	2514	0	0	3329	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		125			9			3			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		206			276			414			324	
Travel Time (s)		4.7			6.3			9.4			7.4	
Peak Hour Factor	0.72	0.72	0.72	0.75	0.75	0.75	0.97	0.97	0.97	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	22%	0%	0%	0%	2%	0%
Adj. Flow (vph)	135	11	125	27	9	9	99	1511	23	6	1080	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	135	136	0	0	45	0	0	1633	0	0	1111	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		Perm	NA	
Protected Phases		3			3		1	1 2			2	
Permitted Phases	3			3			2			2		
Detector Phase	3	3		3	3		1	1 2		2	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0			10.0	10.0	
Minimum Split (s)	10.5	10.5		10.5	10.5		10.5			15.5	15.5	
Total Split (s)	27.0	27.0		27.0	27.0		15.0			48.0	48.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		16.7%			53.3%	53.3%	
Maximum Green (s)	22.5	22.5		22.5	22.5		10.5			42.5	42.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.5			4.0	4.0	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.0			1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0						0.0	
Total Lost Time (s)	4.5	4.5			4.5						5.5	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0			3.0	3.0	
Recall Mode	None	None		None	None		None			C-Max	C-Max	
Walk Time (s)										5.0	5.0	
Flash Dont Walk (s)										11.0	11.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)	14.2	14.2			14.2			62.3			42.5	
Actuated g/C Ratio	0.16	0.16			0.16			0.69			0.47	
v/c Ratio	0.55	0.37			0.19			0.83			0.71	
Control Delay	42.5	10.2			27.5			13.7			21.8	
Queue Delay	0.0	0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive

Existing Volumes
 PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	42.5	10.2			27.5			13.7			21.8	
LOS	D	B			C			B			C	
Approach Delay		26.3			27.5			13.7			21.8	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	72	5			18			187			252	
Queue Length 95th (ft)	92	27			36			#439			328	
Internal Link Dist (ft)		126			196			334			244	
Turn Bay Length (ft)												
Base Capacity (vph)	389	503			371			1957			1573	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.35	0.27			0.12			0.83			0.71	

Intersection Summary

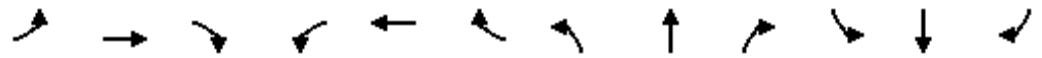
Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 8 (9%), Referenced to phase 2:NBSB, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 18.0
 Intersection LOS: B
 Intersection Capacity Utilization 94.0%
 ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive



Lanes, Volumes, Timings
6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

Existing Volumes
PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	24	0	81	4	0	2	104	1239	5	2	1023	26
Future Volume (vph)	24	0	81	4	0	2	104	1239	5	2	1023	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Fr _t		0.896			0.955			0.999			0.996	
Fl _t Protected		0.989			0.968			0.996				
Satd. Flow (prot)	0	1658	0	0	1756	0	0	3524	0	0	3527	0
Fl _t Permitted		0.917			0.507			0.665			0.953	
Satd. Flow (perm)	0	1537	0	0	920	0	0	2353	0	0	3361	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		121			121							2
Link Speed (mph)		30			30			30				30
Link Distance (ft)		273			331			412				402
Travel Time (s)		6.2			7.5			9.4				9.1
Peak Hour Factor	0.76	0.76	0.76	0.50	0.50	0.50	0.96	0.96	0.96	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	1%	2%	0%	0%	2%	0%
Adj. Flow (vph)	32	0	107	8	0	4	108	1291	5	2	1100	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	139	0	0	12	0	0	1404	0	0	1130	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		Perm	NA	
Protected Phases		4			4		1	1 2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		1	1 2		2	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0			15.0	15.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.5			21.0	21.0	
Total Split (s)	18.0	18.0		18.0	18.0		15.0			46.0	46.0	
Total Split (%)	15.9%	15.9%		15.9%	15.9%		13.3%			40.7%	40.7%	
Maximum Green (s)	13.0	13.0		13.0	13.0		9.5			40.0	40.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.5			4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0			2.0	2.0	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.0			5.0						6.0	
Lead/Lag	Lag	Lag		Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.6			2.8	2.8	
Recall Mode	None	None		None	None		None			C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		8.0			8.0			83.6			73.6	
Actuated g/C Ratio		0.07			0.07			0.74			0.65	
v/c Ratio		0.63			0.07			0.76			0.52	
Control Delay		25.0			0.7			13.2			14.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		25.0			0.7			13.2			14.1	
LOS		C			A			B			B	
Approach Delay		25.0			0.7			13.2			14.1	

Lanes, Volumes, Timings
 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

Existing Volumes
 PM Peak

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Fr _t	
Fl _t Protected	
Satd. Flow (prot)	
Fl _t Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	34.0
Total Split (s)	34.0
Total Split (%)	30%
Maximum Green (s)	30.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	

Lanes, Volumes, Timings
 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

Existing Volumes
 PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			A			B			B	
Queue Length 50th (ft)		13			0			92			163	
Queue Length 95th (ft)		46			0			#654			462	
Internal Link Dist (ft)		193			251			332			322	
Turn Bay Length (ft)												
Base Capacity (vph)		283			212			1838			2188	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.49			0.06			0.76			0.52	

Intersection Summary

Area Type: Other
 Cycle Length: 113
 Actuated Cycle Length: 113
 Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 14.1
 Intersection LOS: B
 Intersection Capacity Utilization 86.6%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane



Lane Group	Ø3
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

HCM 6th TWSC
 9: W. Main Road (RTE 114) & Marshall Lane

Existing Volumes
 PM Peak

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	14	21	22	871	905	20
Future Vol, veh/h	14	21	22	871	905	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	71	71	76	76	91	91
Heavy Vehicles, %	8	5	15	4	3	11
Mvmt Flow	20	30	29	1146	995	22

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	1637	509	1017	0	0
Stage 1	1006	-	-	-	-
Stage 2	631	-	-	-	-
Critical Hdwy	6.96	7	4.4	-	-
Critical Hdwy Stg 1	5.96	-	-	-	-
Critical Hdwy Stg 2	5.96	-	-	-	-
Follow-up Hdwy	3.58	3.35	2.35	-	-
Pot Cap-1 Maneuver	86	501	605	-	-
Stage 1	301	-	-	-	-
Stage 2	476	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	75	501	605	-	-
Mov Cap-2 Maneuver	75	-	-	-	-
Stage 1	261	-	-	-	-
Stage 2	476	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	39.3	1	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	605	-	153	-	-
HCM Lane V/C Ratio	0.048	-	0.322	-	-
HCM Control Delay (s)	11.2	0.7	39.3	-	-
HCM Lane LOS	B	A	E	-	-
HCM 95th %tile Q(veh)	0.1	-	1.3	-	-

Lanes, Volumes, Timings
 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive

No Build Volumes
 PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	8	95	21	7	7	101	1541	23	6	1078	25
Future Volume (vph)	102	8	95	21	7	7	101	1541	23	6	1078	25
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		150	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.862			0.974			0.998			0.997	
Flt Protected	0.950				0.970			0.997				
Satd. Flow (prot)	1805	1638	0	0	1795	0	0	3545	0	0	3530	0
Flt Permitted	0.814				0.784			0.677			0.943	
Satd. Flow (perm)	1547	1638	0	0	1451	0	0	2407	0	0	3329	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		132			9			3			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		206			276			414			324	
Travel Time (s)		4.7			6.3			9.4			7.4	
Peak Hour Factor	0.72	0.72	0.72	0.75	0.75	0.75	0.97	0.97	0.97	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	22%	0%	0%	0%	2%	0%
Adj. Flow (vph)	142	11	132	28	9	9	104	1589	24	6	1135	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	142	143	0	0	46	0	0	1717	0	0	1167	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		Perm	NA	
Protected Phases		3			3		1	1 2			2	
Permitted Phases	3			3			2			2		
Detector Phase	3	3		3	3		1	1 2		2	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0			10.0	10.0	
Minimum Split (s)	10.5	10.5		10.5	10.5		10.5			15.5	15.5	
Total Split (s)	27.0	27.0		27.0	27.0		15.0			48.0	48.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		16.7%			53.3%	53.3%	
Maximum Green (s)	22.5	22.5		22.5	22.5		10.5			42.5	42.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.5			4.0	4.0	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.0			1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0						0.0	
Total Lost Time (s)	4.5	4.5			4.5						5.5	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0			3.0	3.0	
Recall Mode	None	None		None	None		None			C-Max	C-Max	
Walk Time (s)										5.0	5.0	
Flash Dont Walk (s)										11.0	11.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)	14.6	14.6			14.6			61.9			42.5	
Actuated g/C Ratio	0.16	0.16			0.16			0.69			0.47	
v/c Ratio	0.57	0.38			0.19			0.91			0.74	
Control Delay	42.6	9.8			27.2			19.2			22.9	
Queue Delay	0.0	0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive

No Build Volumes
 PM Peak

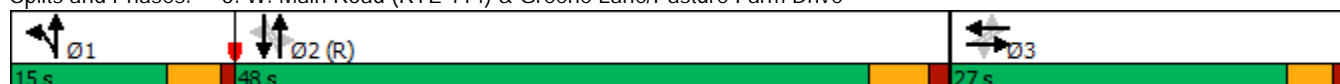


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	42.6	9.8			27.2			19.2			22.9	
LOS	D	A			C			B			C	
Approach Delay		26.1			27.2			19.2			22.9	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	75	5			18			212			272	
Queue Length 95th (ft)	95	27			36			#603			352	
Internal Link Dist (ft)		126			196			334			244	
Turn Bay Length (ft)												
Base Capacity (vph)	386	508			369			1888			1573	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.37	0.28			0.12			0.91			0.74	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 8 (9%), Referenced to phase 2:NBSB, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 21.3
 Intersection LOS: C
 Intersection Capacity Utilization 97.7%
 ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

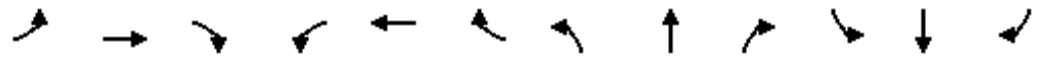
Splits and Phases: 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive



Lanes, Volumes, Timings
6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

No Build Volumes

PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	25	0	85	4	0	2	109	1302	5	2	1075	27
Future Volume (vph)	25	0	85	4	0	2	109	1302	5	2	1075	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Fr _t		0.896			0.955			0.999			0.996	
Fl _t Protected		0.989			0.968			0.996				
Satd. Flow (prot)	0	1658	0	0	1756	0	0	3524	0	0	3527	0
Fl _t Permitted		0.918			0.515			0.640			0.953	
Satd. Flow (perm)	0	1539	0	0	934	0	0	2265	0	0	3361	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		121			121							2
Link Speed (mph)		30			30			30				30
Link Distance (ft)		273			331			412				402
Travel Time (s)		6.2			7.5			9.4				9.1
Peak Hour Factor	0.76	0.76	0.76	0.50	0.50	0.50	0.96	0.96	0.96	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	1%	2%	0%	0%	2%	0%
Adj. Flow (vph)	33	0	112	8	0	4	114	1356	5	2	1156	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	145	0	0	12	0	0	1475	0	0	1187	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		Perm	NA	
Protected Phases		4			4		1	1 2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		1	1 2		2	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0			15.0	15.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.5			21.0	21.0	
Total Split (s)	18.0	18.0		18.0	18.0		15.0			46.0	46.0	
Total Split (%)	15.9%	15.9%		15.9%	15.9%		13.3%			40.7%	40.7%	
Maximum Green (s)	13.0	13.0		13.0	13.0		9.5			40.0	40.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.5			4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0			2.0	2.0	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.0			5.0						6.0	
Lead/Lag	Lag	Lag		Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.6			2.8	2.8	
Recall Mode	None	None		None	None		None			C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		8.3			8.3			83.3			73.3	
Actuated g/C Ratio		0.07			0.07			0.74			0.65	
v/c Ratio		0.64			0.07			0.83			0.54	
Control Delay		26.3			0.7			15.7			14.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		26.3			0.7			15.7			14.9	
LOS		C			A			B			B	
Approach Delay		26.3			0.7			15.7			14.9	

Lanes, Volumes, Timings
 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

No Build Volumes
 PM Peak

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	34.0
Total Split (s)	34.0
Total Split (%)	30%
Maximum Green (s)	30.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	

Lanes, Volumes, Timings
 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

No Build Volumes
 PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C				A				B		
Queue Length 50th (ft)		17			0			104			178	
Queue Length 95th (ft)		51			0			#821			502	
Internal Link Dist (ft)		193			251			332			322	
Turn Bay Length (ft)												
Base Capacity (vph)		285			215			1774			2179	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.51			0.06			0.83			0.54	

Intersection Summary

Area Type: Other
 Cycle Length: 113
 Actuated Cycle Length: 113
 Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 15.8
 Intersection LOS: B
 Intersection Capacity Utilization 90.2%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane



Lane Group	Ø3
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

HCM 6th TWSC
 9: W. Main Road (RTE 114) & Marshall Lane

No Build Volumes
 PM Peak

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	15	22	23	915	951	21
Future Vol, veh/h	15	22	23	915	951	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	71	71	76	76	91	91
Heavy Vehicles, %	8	5	15	4	3	11
Mvmt Flow	21	31	30	1204	1045	23

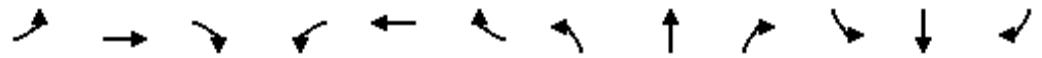
Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	1719	534	1068	0	0
Stage 1	1057	-	-	-	-
Stage 2	662	-	-	-	-
Critical Hdwy	6.96	7	4.4	-	-
Critical Hdwy Stg 1	5.96	-	-	-	-
Critical Hdwy Stg 2	5.96	-	-	-	-
Follow-up Hdwy	3.58	3.35	2.35	-	-
Pot Cap-1 Maneuver	76	483	577	-	-
Stage 1	282	-	-	-	-
Stage 2	459	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	64	483	577	-	-
Mov Cap-2 Maneuver	64	-	-	-	-
Stage 1	238	-	-	-	-
Stage 2	459	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	49	1.2	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	577	-	132	-	-
HCM Lane V/C Ratio	0.052	-	0.395	-	-
HCM Control Delay (s)	11.6	0.9	49	-	-
HCM Lane LOS	B	A	E	-	-
HCM 95th %tile Q(veh)	0.2	-	1.7	-	-

Lanes, Volumes, Timings
 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive

Build Volumes
 PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	8	96	21	7	7	102	1549	23	6	1094	25
Future Volume (vph)	102	8	96	21	7	7	102	1549	23	6	1094	25
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		150	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.861			0.974			0.998			0.997	
Flt Protected	0.950				0.970			0.997				
Satd. Flow (prot)	1805	1636	0	0	1795	0	0	3545	0	0	3530	0
Flt Permitted	0.814				0.784			0.669			0.943	
Satd. Flow (perm)	1547	1636	0	0	1451	0	0	2378	0	0	3329	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		133			9			3			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		206			276			414			324	
Travel Time (s)		4.7			6.3			9.4			7.4	
Peak Hour Factor	0.72	0.72	0.72	0.75	0.75	0.75	0.97	0.97	0.97	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	22%	0%	0%	0%	2%	0%
Adj. Flow (vph)	142	11	133	28	9	9	105	1597	24	6	1152	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	142	144	0	0	46	0	0	1726	0	0	1184	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		Perm	NA	
Protected Phases		3			3		1	1 2			2	
Permitted Phases	3			3			2			2		
Detector Phase	3	3		3	3		1	1 2		2	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0			10.0	10.0	
Minimum Split (s)	10.5	10.5		10.5	10.5		10.5			15.5	15.5	
Total Split (s)	27.0	27.0		27.0	27.0		15.0			48.0	48.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		16.7%			53.3%	53.3%	
Maximum Green (s)	22.5	22.5		22.5	22.5		10.5			42.5	42.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.5			4.0	4.0	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.0			1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0						0.0	
Total Lost Time (s)	4.5	4.5			4.5						5.5	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0			3.0	3.0	
Recall Mode	None	None		None	None		None			C-Max	C-Max	
Walk Time (s)										5.0	5.0	
Flash Dont Walk (s)										11.0	11.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)	14.6	14.6			14.6			61.9			42.5	
Actuated g/C Ratio	0.16	0.16			0.16			0.69			0.47	
v/c Ratio	0.57	0.38			0.19			0.92			0.75	
Control Delay	42.6	9.8			27.2			20.4			23.2	
Queue Delay	0.0	0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive

Build Volumes
 PM Peak

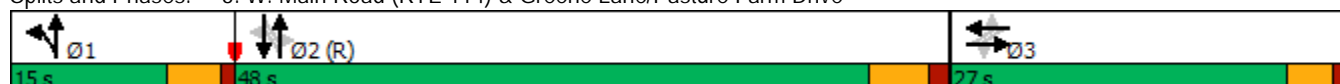


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	42.6	9.8			27.2			20.4			23.2	
LOS	D	A			C			C			C	
Approach Delay		26.1			27.2			20.4			23.2	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	75	5			18			215			277	
Queue Length 95th (ft)	95	28			36			#626			360	
Internal Link Dist (ft)		126			196			334			244	
Turn Bay Length (ft)												
Base Capacity (vph)	386	508			369			1874			1573	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.37	0.28			0.12			0.92			0.75	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 8 (9%), Referenced to phase 2:NBSB, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 22.0
 Intersection LOS: C
 Intersection Capacity Utilization 98.4%
 ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: W. Main Road (RTE 114) & Greene Lane/Pasture Farm Drive



Lanes, Volumes, Timings
6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

Build Volumes
PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	26	0	85	4	0	2	109	1335	5	2	1093	27
Future Volume (vph)	26	0	85	4	0	2	109	1335	5	2	1093	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Fr _t		0.896			0.955							0.996
Fl _t Protected		0.988			0.968			0.996				
Satd. Flow (prot)	0	1657	0	0	1756	0	0	3528	0	0	3527	0
Fl _t Permitted		0.916			0.521			0.636			0.953	
Satd. Flow (perm)	0	1536	0	0	945	0	0	2253	0	0	3361	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		121			121							2
Link Speed (mph)		30			30			30				30
Link Distance (ft)		273			331			412				402
Travel Time (s)		6.2			7.5			9.4				9.1
Peak Hour Factor	0.76	0.76	0.76	0.50	0.50	0.50	0.96	0.96	0.96	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	1%	2%	0%	0%	2%	0%
Adj. Flow (vph)	34	0	112	8	0	4	114	1391	5	2	1175	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	146	0	0	12	0	0	1510	0	0	1206	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		Perm	NA	
Protected Phases		4			4		1	1 2				2
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		1	1 2		2		2
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0			15.0	15.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.5			21.0	21.0	
Total Split (s)	18.0	18.0		18.0	18.0		15.0			46.0	46.0	
Total Split (%)	15.9%	15.9%		15.9%	15.9%		13.3%			40.7%	40.7%	
Maximum Green (s)	13.0	13.0		13.0	13.0		9.5			40.0	40.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.5			4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0			2.0	2.0	
Lost Time Adjust (s)		0.0			0.0							0.0
Total Lost Time (s)		5.0			5.0							6.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.6			2.8	2.8	
Recall Mode	None	None		None	None		None			C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		8.4			8.4			83.2				73.2
Actuated g/C Ratio		0.07			0.07			0.74				0.65
v/c Ratio		0.65			0.07			0.86				0.55
Control Delay		26.6			0.7			16.9				15.1
Queue Delay		0.0			0.0			0.0				0.0
Total Delay		26.6			0.7			16.9				15.1
LOS		C			A			B				B
Approach Delay		26.6			0.7			16.9				15.1

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	34.0
Total Split (s)	34.0
Total Split (%)	30%
Maximum Green (s)	30.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	

Lanes, Volumes, Timings
 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane

Build Volumes
 PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C				A				B		
Queue Length 50th (ft)		18				0				109		
Queue Length 95th (ft)		51				0				#851		
Internal Link Dist (ft)		193				251				332		
Turn Bay Length (ft)												
Base Capacity (vph)		285				216				1765		
Starvation Cap Reductn		0				0				0		
Spillback Cap Reductn		0				0				0		
Storage Cap Reductn		0				0				0		
Reduced v/c Ratio		0.51				0.06				0.86		

Intersection Summary

Area Type: Other
 Cycle Length: 113
 Actuated Cycle Length: 113
 Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 16.6
 Intersection LOS: B
 Intersection Capacity Utilization 91.7%
 ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 6: W. Main Road (RTE 114) & Rogers Lane/Thelma Lane



Lane Group	Ø3
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

HCM 6th TWSC
 9: W. Main Road (RTE 114) & Marshall Lane

Build Volumes
 PM Peak

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	15	0	22	18	0	9	23	915	34	17	951	21
Future Vol, veh/h	15	0	22	18	0	9	23	915	34	17	951	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	71	92	71	92	92	92	76	76	92	92	91	91
Heavy Vehicles, %	8	2	5	2	2	2	15	4	2	2	3	11
Mvmt Flow	21	0	31	20	0	10	30	1204	37	18	1045	23

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1755	2394	534	1842	2387	621	1068	0	0	1241	0	0
Stage 1	1093	1093	-	1283	1283	-	-	-	-	-	-	-
Stage 2	662	1301	-	559	1104	-	-	-	-	-	-	-
Critical Hdwy	7.66	6.54	7	7.54	6.54	6.94	4.4	-	-	4.14	-	-
Critical Hdwy Stg 1	6.66	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.66	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.58	4.02	3.35	3.52	4.02	3.32	2.35	-	-	2.22	-	-
Pot Cap-1 Maneuver	51	33	483	47	34	430	577	-	-	557	-	-
Stage 1	218	288	-	175	234	-	-	-	-	-	-	-
Stage 2	403	229	-	481	285	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	41	25	483	36	26	430	577	-	-	557	-	-
Mov Cap-2 Maneuver	41	25	-	36	26	-	-	-	-	-	-	-
Stage 1	181	265	-	145	194	-	-	-	-	-	-	-
Stage 2	327	190	-	414	262	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	89.5		141.1		1.1		0.7	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	577	-	-	90	52	557	-
HCM Lane V/C Ratio	0.052	-	-	0.579	0.564	0.033	-
HCM Control Delay (s)	11.6	0.9	-	89.5	141.1	11.7	0.5
HCM Lane LOS	B	A	-	F	F	B	A
HCM 95th %tile Q(veh)	0.2	-	-	2.6	2.2	0.1	-

APPENDIX E

Traffic Signal Plans



ITEM NO. ITEM CODE ITEM DESCRIPTION

1	T05.0100	Precast Type "A" Handhole Std. 18.2.0
1b	T05.9902	Fiber Optic Splice Manhole
1c	T05.9903	Break Into Existing Handhole
2	T12.9150	Meter Socket W/ Manual Bypass
3	T12.9906	Actuated Controller TS-2, Type 1 w/8 Phase Assembly Ground Mounted Inc. Foundation and Cabinet Std. 19.1.0 (SEE NOTE 3)
4a	T11.1020	20 Foot Galvanized Steel Mast Arm Traffic Signal Post and Foundation Std. 19.2.0
4b	T11.1025	25 Foot Galvanized Steel Mast Arm Traffic Signal Post and Foundation Std. 19.2.0
4k	T11.2008	Traffic Signal Standard, 8 Foot, Std. 19.4.0 Aluminum Pedestal Pole
4p	T11.9904	25 Foot Galvanized Steel Mast Arm Traffic Signal Post and Foundation Std. 19.2.0 (Modified III) (SEE NOTE 4)
5a	T14.3513	1 Way 3 Section Mast Arm Mounted Signal Head 12 Inch
5b	T14.3516	1 Way 4 Section Mast Arm Mounted Signal Head 12 Inch (With Dual Indication Dual Row LED Arrow)
5o	T14.9901	1 Way Pedestal Mounted LED Pedestrian Signal Head With Countdown Timer 12 Inch
5q	T14.9903	1 Way Bracket Mounted LED Pedestrian Signal Head With Countdown Timer 12 Inch
6b	T06.5130	3 Inch Schedule 40 Polyvinyl Chloride Conduit - Underground
6e	T06.5320	2 Inch Schedule 40 Polyvinyl Chloride Plastic Conduit - Under Existing Pavement
6f	T06.5330	3 Inch Schedule 40 Polyvinyl Chloride Plastic Conduit - Under Existing Pavement
6h	T06.5430	3 Inch Schedule 80 Polyvinyl Chloride Plastic Conduit - Under Existing Pavement
6i	T06.3020	2 Inch Rigid Steel Conduit - Under Existing Pavement
6n	T06.9901	Dual 1-1/4 Inch High Density Polyethylene Duct - Under Existing Pavement
6o	T06.9902	Single 1-1/4 Inch High Density Polyethylene Duct - Under Existing Pavement
6p	T06.2020	2 Inch Rigid Steel Conduit Overhead
6q	T06.6020	2 Inch Polyvinyl Chloride Plastic Conduit Overhead
7	T04.5302	14 AWG 2 Conductor Twisted Shielded Cable
7a	T04.5303	14 AWG 3 Conductor Cable
7b	T04.5305	14 AWG 5 Conductor Cable
7c	T04.5307	14 AWG 7 Conductor Cable
7g	T04.9901	Optical Detector Cable
7h	T04.9902	12 Strand Single Mode Fiber Optic Cable
7i	T04.9903	72 Strand Single Mode Fiber Optic Cable
7m	T04.5001	6 AWG Single Conductor Cable 600v Insulation
8a	T12.9901	Fiber Optic Splice Enclosure - 72 Strand
8b	T12.9902	Fiber Optic Patch Panel - 12 Position
8c	T12.9903	Fiber Optic Patch Cord
8d	T12.9904	Ethernet Switch
9	T13.1000	Traffic Detector - Loop Std. 19.6.0
9a	T13.1004	Traffic Detector Relay - Loop 4 Channel
9b	T13.9901	Optical Detector - Single Channel, One-Way
9c	T13.9902	Optical Detector Phase Selector and Chassis
10	T13.9903	Heavy Duty Pedestrian Detector - Pushbutton With Sign
11	201.9901	Remove And Salvage Traffic Signal System

TRAFFIC SIGNAL CONSTRUCTION NOTES:

- THE ITEM "REMOVE AND SALVAGE TRAFFIC SIGNAL SYSTEM" SHALL INCLUDE THE FOLLOWING MAJOR ITEMS AND SHALL BE ACCOMPLISHED IN ACCORDANCE WITH SPECIAL PROVISION FOR ITEM CODE 201.9901:
 - LOCAL CONTROLLER, CONTROLLER CABINET/FOUNDATION AND ASSOCIATED EQUIPMENT
 - TRAFFIC SIGNAL HEADS, (4) PEDESTRIAN SIGNAL HEADS
 - TRAFFIC SIGNAL SPAN POLES AND FOUNDATIONS, (1) SPAN WIRE ASSEMBLY
 - TRAFFIC SIGNAL PEDESTAL POLES AND FOUNDATIONS
- MISCELLANEOUS CABLE, WIRING, HANDHOLES, CONDUIT, ETC.
- FINISHED GRADE OF TRAFFIC SIGNAL POLE FOUNDATIONS SHALL BE FLUSH WITH THE PROPOSED FINISHED GRADE OF THE ADJACENT SIDEWALK OR DRIVEWAY.
- TRAFFIC SIGNAL CONTROL CABINET SHALL BE SUPPLIED AND INSTALLED WITH PEDESTRIAN PRIORITY CONTROL IN ACCORDANCE WITH SPECIAL PROVISION FOR ITEM CODE T12.9906.
- PROPOSED MAST ARM ON THE SOUTHWEST CORNER SHALL BE FABRICATED AND INSTALLED TO ACCOMMODATE REQUIRED CLEARANCES FROM RELOCATED OVERHEAD UTILITIES AS SHOWN IN MISCELLANEOUS DETAILS PLAN NO. 3. THE CONTRACTOR SHALL COORDINATE OVERHEAD UTILITY RELOCATION WITH THE UTILITY COMPANIES.

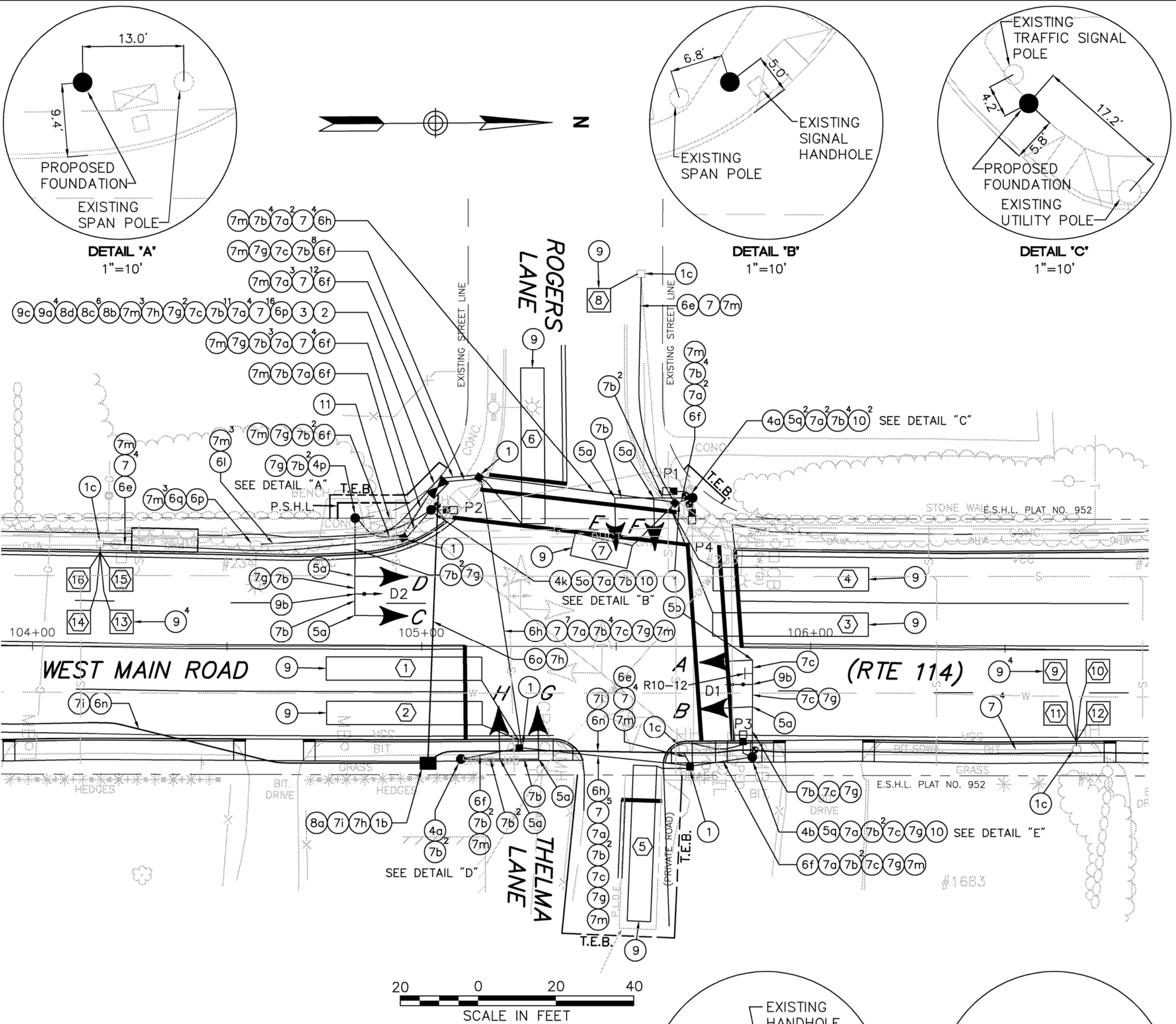
SEQUENCE AND TIMING DIAGRAM

APPROACH	DIRECTION	HOUSING	Ø1	Ø2	Ø3	Ø4	FLASHING OPERATION
MINIMUM INTERVAL			6	15	-	6	
VEHICLE EXTENSION			2.6	2.8	-	2.4	
MAXIMUM 1			10	35	-	20	
MAXIMUM 2			10	35	-	20	
YELLOW CLEARANCE			3.5	4	3	3	
RED CLEARANCE			2	2	1	2	
PED. WALK/CLEARANCE					7/19		
WEST MAIN ROAD NB-LT	A	G	Y	R	R	R	FY
WEST MAIN ROAD NB	B	G	Y	R	R	R	FY
WEST MAIN ROAD SB	C,D	R	R	R	R	R	FY
THELMA LANE WB	E,F	R	R	R	R	R	FR
ROGERS LANE EB	G,H	R	R	R	R	R	FR
PEDESTRIAN X-ING N-S	P1-P2	DW	DW	DW	DW	DW	DARK
PEDESTRIAN X-ING E-W	P3-P4	DW	DW	DW	DW	DW	DARK
DETECTOR			NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	
RECALL			OFF	MIN	OFF	OFF	

SEQUENCE AND TIMING NOTES:

- FLASHING OPERATION PER M.U.T.C.D. SECTION 4D.12.
- MAXIMUM 1 = NORMAL OPERATION
- MAXIMUM 2 = NOT USED
- PED. W/FDW UPON PUSHBUTTON ACTUATION ONLY
- PED. CLEARANCE TIME SHALL NOT EXTEND THROUGH CONCURRENT PHASE YELLOW INTERVAL

PERM = PERMISSIVE

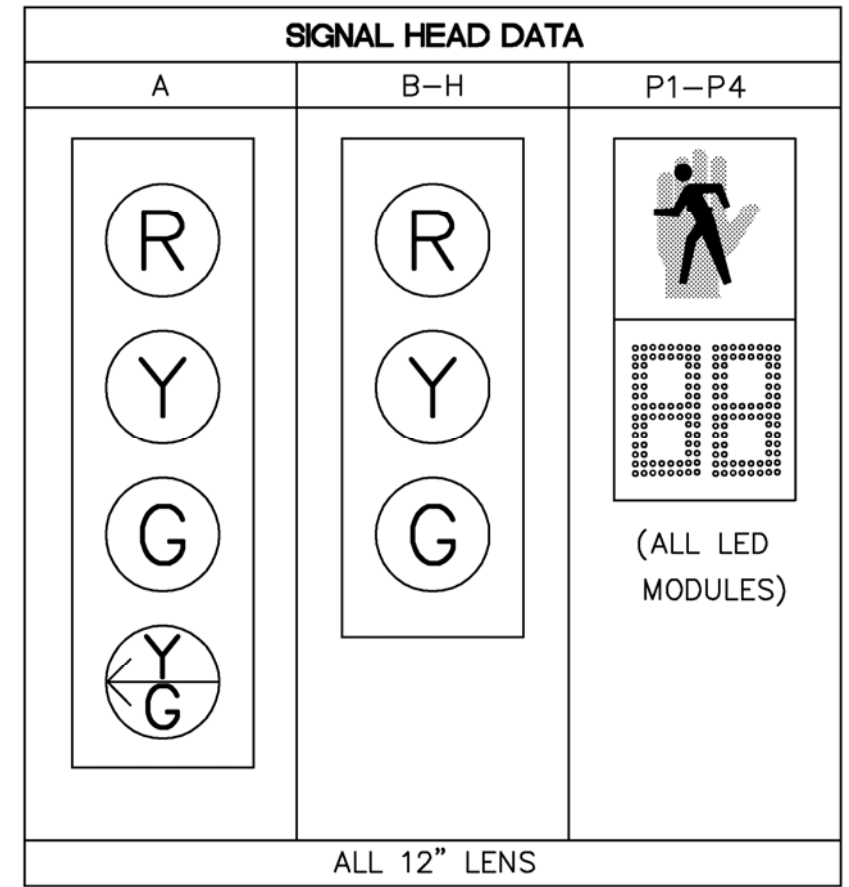


COORDINATION DATA (ALL ENTRIES IN SECONDS)

	PLAN 1	PLAN 2	PLAN 3
CYCLE LENGTH	90	90	90
OFFSET	67	62	62
SPLIT Ø1	15	15	15
SPLIT Ø2	46	46	46
SPLIT Ø3	11	11	11
SPLIT Ø4	18	18	18
COORDINATED PHASE	Ø2	Ø2	Ø2
PLAN 1 - MONDAY-FRIDAY	7:00AM-11:00AM		
PLAN 2 - MONDAY-FRIDAY	11:00AM-3:00PM		
SATURDAY-SUNDAY	9:00AM-5:00PM		
PLAN 3 - MONDAY-FRIDAY	3:00PM-7:00PM		
FREE	- ALL OTHER TIME PERIODS		

- NOTES:**
- Ø2 "CALL NON ACTUATED" DURING COORDINATION.
 - OFFSET: BEGINNING OF Ø2 GREEN.
 - PLAN FORCE OFF/FLOATING FORCE OFF SHALL BE IN EFFECT.
 - SPLIT TIMES EQUAL GREEN PLUS CLEARANCES.
 - INHIBIT MAX. TERMINATION SHALL BE IN EFFECT DURING COORDINATION.
 - PEDESTRIAN PRIORITY FUNCTION SHALL OVERRIDE COORDINATION.

FED. ROAD DIV. NO.	STATE	FEDERAL AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	R.I.			48	62



SIGNAL HEAD SPACING

SIGNAL HEAD	DISTANCE FROM CENTER OF MAST ARM POLE
A	25'
B	13'
C	25'
D	15'
E	20'
F	10'
G	20'
H	10'

- NOTES:**
- ALL TRAFFIC AND PEDESTRIAN SIGNAL HEADS ARE PROPOSED AND SHALL BE EQUIPPED WITH BACKPLATES.
 - ALL RED, YELLOW, AND GREEN SIGNAL DISPLAYS SHALL BE EQUIPPED WITH LED MODULES.
 - ARROW DISPLAYS SHALL BE MADE UP OF TWO ROWS OF LED MODULES.

DETECTOR DATA

DETECTOR NO.	NO. SECTION/ SIZE	RELAY NUMBER	SLOT	DELAY (SEC)	CALL PHASE	REMARKS
1	1-6'x40'	1	2	3	Ø1/Ø2	PROPOSED
2	1-6'x40'	1	2	3	Ø2	PROPOSED
3	1-6'x40'	1	2	3	Ø2	PROPOSED
4	1-6'x40'	1	2	3	Ø2	PROPOSED
5	1-6'x40'	2	4	5	Ø4	PROPOSED
6	1-6'x40'	2	4	5	Ø4	PROPOSED
7	1-6'x15'	2	4	25	Ø1	PROPOSED
8	1-6'x6'	2	4	-	SYSTEM DETECTOR	PROPOSED
9	1-6'x6'	3	6	-	SYSTEM DETECTOR	PROPOSED
10	1-6'x6'	3	6	-	SYSTEM DETECTOR	PROPOSED
11	1-6'x6'	3	6	-	SYSTEM DETECTOR	PROPOSED
12	1-6'x6'	3	6	-	SYSTEM DETECTOR	PROPOSED
13	1-6'x6'	4	8	-	SYSTEM DETECTOR	PROPOSED
14	1-6'x6'	4	8	-	SYSTEM DETECTOR	PROPOSED
15	1-6'x6'	4	8	-	SYSTEM DETECTOR	PROPOSED
16	1-6'x6'	4	8	-	SYSTEM DETECTOR	PROPOSED

- NOTES:**
- DETECTOR 1 SHALL CALL PHASE 1 AND EXTEND PHASE 2.
 - SYSTEM DETECTORS TO BE INITIALLY PROGRAMMED TO MEASURE VEHICULAR VOLUME AND SPEED (WHERE DUAL DETECTORS ARE PROPOSED).

TRAFFIC SIGNAL NO. 343

REVISIONS

NO.	DATE	BY

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

1R SAFETY IMPROVEMENTS WEST MAIN ROAD (FROM CODDINGTON HWY. TO JOHN KESSON LN.) MIDDLETOWN, RHODE ISLAND

TRAFFIC SIGNAL PLAN NO. 10 WEST MAIN ROAD AT ROGERS LANE/THELMA LANE

CHECKED BY _____ DATE _____ SCALE AS SHOWN

