

Traffic Impact Study

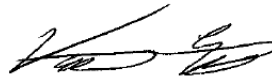
Proposed Primrose
Child Care Center
885 Main Street
Town of Reading, Middlesex
County, Massachusetts

Prepared for:
Primrose School Franchising
Company

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EXECUTIVE SUMMARY

The revised Traffic Impact Study was prepared to update the May 12, 2025 issuance of the Traffic Impact Study. This revision addresses the comments contained within the Traffic Engineering Peer Review letter prepared by Green International Affiliates, Inc. (“Green”), dated June 26, 2025. The following is a summary of the revisions contained herein:

1. Detailed motor vehicle collision tables were added to the Technical Appendix as requested in the Traffic Engineering Peer Review letter. The MassDOT crash rate analyses performed for the signalized intersections of Main Street and Birch Meadow Drive/Lawrence Road and Main Street and Salem Street, and the segment of Main Street between the study intersections were also revised to utilize the Annual Average Daily Traffic (AADT) and “K” Factor data most recently published by the MassDOT along Main Street where applicable. The findings remain generally consistent with the findings of the previous Traffic Impact study regarding motor vehicle collision rates at the study intersections and segment of Main Street.
2. The future 2032 No-Build Condition and 2032 Build Condition Level of Service/Capacity analyses were revised to apply a Peak Hour Factor (PHF) of 0.92 at the signalized intersections of Main Street and Birch Meadow Drive/Lawrence Drive and Main Street and Salem Street during the study peak hours in accordance with MassDOT standards. The findings remain generally consistent with the original findings indicating that the proposed development would not have a significant adverse impact on the operations of the adjacent roadway network.
3. The future 2032 Build Condition Level of Service/Capacity analysis was revised to correct pass-by calculations based on the existing traffic volumes along the property frontage. The findings remain generally consistent with the original findings indicating that the proposed driveway turning movements would operate at an acceptable Level of Service and therefore would not likely have a significant adverse impact on the operations of the adjacent roadway network.

INTRODUCTION

This Traffic Impact Study was prepared to investigate the potential impacts of the proposed day care development on the adjacent roadway network. The subject property is located along the easterly side of Main Street (Route 28) in the Town of Reading, Middlesex County, Massachusetts. The site location is shown on appended **Figure 1**.

The subject property is designated as Map 28, Lot 133 as depicted on the Town of Reading Tax Map. The site has approximately 80 feet of frontage along Main Street. The existing site is presently occupied by a residential house. Access is presently provided via one (1) full-movement driveway along Main Street. Under the proposed development program, the existing structure would be razed and a 14,058-square-foot day care center with an accessory parking lot would be constructed. Access is proposed to remain via one (1) full-movement driveway.

METHODOLOGY

Stonefield Engineering & Design, LLC has prepared this Traffic Impact Study in accordance with the recommended guidelines and practices outlined by the Institute of Transportation Engineers (ITE) within Transportation Impact Analyses for Site Development and by the Massachusetts Department of Transportation (MassDOT) within Transportation Impact Assessment (TIA) Guidelines. A detailed field investigation was performed to assess the existing conditions of the adjacent roadway network. A data collection effort was completed to identify the existing traffic volumes at the study intersections to serve as a base for the traffic analyses. Capacity analysis, a procedure used to estimate the traffic-carrying ability of roadway facilities over a range of defined operating conditions, was performed using the Highway Capacity Manual, 7th Edition (HCM), HCM 2000, and the Synchro 12 Software for all study conditions to assess the roadway operations.

For an unsignalized intersection, Level of Service (LOS) A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 80 seconds per vehicle. The Technical Appendix contains the Highway Capacity Analysis Detail Sheets for the study intersections analyzed in this assessment. The traffic signal timing utilized within the signalized analysis is based on timing directives provided by MassDOT and the Town of Reading Department of Public Works.

2025 EXISTING CONDITION

2025 EXISTING ROADWAY CONDITIONS

The proposed day care center is located along the easterly side of Main Street in the Town of Reading, Middlesex County, Massachusetts. The subject property is designated as Map 28, Lot 133 as depicted on the Town of Reading Tax Map. The site has approximately 80 feet of frontage along Main Street. Land uses in the area are predominantly residential, commercial, and institutional.

Main Street (MA Route 28) is classified as an urban principal arterial roadway with a general north-south orientation and is under the jurisdiction of MassDOT. Along the site frontage, the roadway provides one (1) travel lane in each direction and a median two (2)-way left-turn lane, carries approximately 11,635 vehicles daily (Source: MassDOT TCDS), and has a posted speed limit of 40 mph. Along the site frontage, curb and sidewalk are provided along both sides of the roadway, shoulders are provided along both sides of the roadway, and on-street parking is not permitted along either side of the roadway. Main Street provides north-south mobility throughout eastern Middlesex County for predominantly residential and commercial uses along its length.

Birch Meadow Drive is a local roadway with a general east-west orientation and is under the jurisdiction of the Town of Reading. The roadway generally provides one (1) travel lane in each direction and has a posted speed limit of 30 mph proximate to its intersection with Main Street; in accordance with Traffic and Parking Regulations published by the Town of Reading, Birch Meadow Drive operates with a reduced speed limit of 20 mph within the defined school-zone limits. Curb and sidewalk are provided along both sides of the roadway, shoulders are not provided along either side of the roadway, and on-street parking is permitted intermittently in accordance with the Town of Reading's Traffic and Parking Regulations along both sides of the roadway. Birch Meadow Drive provides connectivity between Main Street at its eastern terminus and John Carver Road at its western terminus for predominantly institutional and residential uses along its length.

Lawrence Road is a local roadway with a general east-west orientation and is under the jurisdiction of the Town of Reading. The roadway generally provides one (1) travel lane in each direction and operates under a town-wide speed limit of 30 mph in accordance with the Town of Reading's Traffic and Parking Regulations. Curb and sidewalk are provided intermittently along both sides of the roadway, shoulders are not provided along either side of the roadway, and on-street parking is permitted along both sides of the roadway. Lawrence Road provides connectivity between Main Street and Hampshire Road for predominantly residential uses along its length.

Salem Street (MA Route 129) is classified as an urban principal arterial roadway with a general east-west orientation and is under the jurisdiction of the Town of Reading. Within the study limits, the roadway provides one (1) travel lane in each direction, with additional turning lanes provided at key intersections, and has a posted speed limit of 20 mph. Curb and sidewalk are provided along both sides of the roadway, shoulders are not provided along either side of the roadway, and on-street parking is permitted intermittently along the northerly side of the roadway in accordance with the Town of Reading's Traffic and Parking Regulations. Salem Street provides connectivity between Lowell Street and Interstate 95 for predominantly residential and commercial uses along its length.

Main Street, Birch Meadow Drive, and Lawrence Road intersect to form a signalized four (4)-leg intersection. The eastbound approach of Birch Meadow Drive provides one (1) shared left-turn/through lane and one (1) exclusive right-turn lane. The westbound approach of Lawrence Road provides one (1) shared left-turn/through/right-turn lane. The northbound approach of Main Street provides one (1) exclusive left-turn lane and one (1) shared through/right-turn lane. The southbound approach of Main Street provides one (1) shared left-turn/through lane and one (1) exclusive right-turn lane. Crosswalks, pedestrian signals, and pedestrian ramps are provided across all legs of the intersection.

Main Street and Salem Street intersect to form a signalized four (4)-leg intersection. The eastbound approach of Salem Street provides one (1) exclusive left-turn lane and one (1) shared through/right turn lane and the westbound approach of Salem Street provides one (1) shared left-turn/through lane and one (1) exclusive right-turn lane. The northbound and southbound approaches of Main Street each provide one (1) shared left-turn/through lane and one (1) shared through/right-turn lane. Crosswalks, pedestrian signals, and pedestrian ramps are provided across all legs of the intersection.

2025 EXISTING TRANSIT SERVICE

The subject site is located within one (1) mile (22-minute walk) from the Reading Train Station which serves the Massachusetts Bay Transportation Authority (MBTA) Haverhill Line and provides direct service to Boston's North Station. Further, the proposed development is located within 0.6 miles (13-minute walk) from the MBTA Bus Route 137 stop located at the intersection of Woburn Street and Lowell Street.

2025 EXISTING TRAFFIC VOLUMES

Turning movement counts were collected during the typical weekday morning, weekday midday, and weekday evening time periods to evaluate existing traffic conditions and identify the specific hours when traffic activity on the adjacent roadways is at a maximum and could be potentially impacted by the development of the site. Turning movement counts were collected at the following intersections:

- ◆ Main Street and Birch Meadow Drive/Lawrence Road
- ◆ Main Street and Salem Street

Turning movement counts were conducted on Thursday, March 6, 2025, from 7:00 a.m. to 9:00 a.m. and from 2:00 p.m. to 6:00 p.m. The study time periods were chosen as they are representative of the peak periods of both the adjacent roadway network and the proposed development. Note the Reading Memorial High School, Arthur W. Coolidge Middle School, and Birch Meadow Elementary School are located proximate to the subject development and are therefore anticipated to influence traffic patterns within the study roadway network. As such, the study periods were selected to capture school arrival and dismissal periods; the local school dismissal period is referred to and analyzed as the “weekday midday” peak period herein.

The traffic volume data was collected and analyzed to identify the design peak hour in accordance with HCM and ITE guidelines. Based on the review of the count data, the weekday morning peak hour occurred from 7:45 a.m. to 8:45 a.m.; the weekday midday peak hour occurred from 2:45 p.m. to 3:45 p.m.; and the weekday evening peak hour occurred from 4:45 p.m. to 5:45 p.m. Based on a review of the “2023 Weekday Seasonal Factors” published by the MassDOT, traffic activity during the month of March is generally considered greater than average month conditions for urban principal arterial roadways; therefore, a seasonal adjustment factor was not applied. The Technical Appendix contains a summary of the turning movement count data. The 2025 Existing weekday morning, weekday midday, and weekday evening peak-hour volumes are summarized on appended **Figure 2**.

2025 EXISTING LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was conducted for the 2025 Existing Condition during the weekday morning, weekday midday, and weekday evening peak hours at the study intersections. To accurately reflect existing conditions observed at the intersection of Main Street and Salem Street, the calculated intersection peak hour factor was applied to all approaches in accordance with standard HCM practices. Under the 2025 Existing Condition, the signalized intersection of Main Street, Birch Meadow Drive, and Lawrence Road is calculated to operate at overall Level of Service C during the weekday morning peak hour and Level of Service B during the weekday midday and weekday evening peak hours. The signalized intersection of Main Street and Salem Street is calculated to operate at overall Level of Service D during the weekday morning and weekday midday peak hours and Level of Service C during the weekday evening peak hour.

MOTOR VEHICLE COLLISION ANALYSIS

In order to assess the safety of the study roadway network, five (5) years of motor vehicle collision data were obtained from the MassDOT Crash Query and Visualization web application. Motor vehicle collision data was extracted for the time period spanning from January 1, 2019 to December 31, 2023. Detailed crash analysis

tables are provided within the Technical Appendix. **Table I** provides a summary of the manner and severity of the motor vehicle collisions reported at the study intersections.

TABLE I – MOTOR VEHICLE COLLISION ANALYSIS SUMMARY

Location	Crash Year	Crash Type	Number of Crashes	Crashes Resulting in Injury	Crashes Resulting in Fatality
Main Street & Birch Meadow Drive/Lawrence Road	2019	Rear End	1	1	0
	2020	Rear End	1	0	0
	2022	Rear End	3	1	0
	2023	Angle	1	0	0
		Rear End	1	1	0
Main Street & Salem Street	2019	Angle	5	0	0
		Rear End	1	0	0
		Sideswipe (Opposite Direction)	2	0	0
		Sideswipe (Same Direction)	1	0	0
		Collision with Fixed Object	1	0	0
		Backing	2	1	0
	2020	Angle	4	1	0
		Rear End	1	0	0
		Sideswipe (Same Direction)	2	0	0
	2021	Angle	5	1	0
		Rear End	1	0	0
		Sideswipe (Same Direction)	1	0	0
		Collision with Fixed Object	2	0	0
	2022	Angle	5	1	0
	2023	Angle	2	1	0
		Rear End	3	0	0
		Sideswipe (Same Direction)	1	0	0
		Collision with Fixed Object	2	0	0
Main Street between Salem Street & Birch Meadow Drive/Lawrence Road	2019	Angle	2	0	0
		Rear End	5	2	0
		Sideswipe (Same Direction)	2	0	0
	2020	Angle	1	0	0
		Rear End	1	0	0
	2021	Rear End	1	0	0
		Sideswipe (Same Direction)	3	1	0
		Single Vehicle Crash	1	0	0
	2022	Angle	3	0	0
		Rear End	2	0	0
		Sideswipe (Same Direction)	1	0	0
		Collision with Bicyclist	1	1	0
	2023	Angle	2	0	0
		Rear End	1	0	0
		Collision with Fixed Object	2	0	0
Network Total			76	12	0

As shown in **Table 1**, a total of 76 collisions were reported at the study network over the 60-month period; this equates to approximately four (4) collisions every three (3) months. It is important to note that zero (0) fatalities occurred as a result of the reported motor vehicle collisions in the study network, and minimal collisions resulted in injury. Of the 76 total collisions reported at the study network, 30 were angle collisions and 22 were rear end collisions, which are common collision types along signalized corridors with permissive left-turn phasing such as the study roadway network. It is important to note that the majority of the reported collisions (approximately 47%) occurred between 10:00 a.m. and 4:00 p.m., generally outside of the typical pick-up and drop-off hours anticipated for the proposed day care center.

Based on historical data published by MassDOT, provided within the Technical Appendix, and turning movement counts collected at the study locations, the signalized intersection of Main Street, Birch Meadow Drive, and Lawrence Road experienced approximately 28.7 million entering vehicles over the five (5)-year study period and has a calculated rate of 0.24 crashes per million entering vehicles. The signalized intersection of Main Street and Salem Street experienced approximately 45.12 million entering vehicles over the five (5)-year study period and has a calculated rate of 0.91 crashes per million entering vehicles. According to average accident rate data published by the MassDOT for District 4, where the subject site is located, a typical signalized intersection has an average rate of 0.73 crashes per million entering vehicles. The roadway segment of Main Street between the two (2) study intersections experienced approximately 21.23 million entering vehicles over the five (5)-year study period and has a calculated rate of 1.93 crashes per million entering vehicles. According to average accident rate data published by the MassDOT for District 4, a typical urban principal arterial roadway has an average rate of 3.05 crashes per million entering vehicles. As such, crash rates within the study network are generally consistent with or below the average crash rates published for the region. It should be noted that the study locations are not identified as high crash locations based on a review of the MassDOT “Top Crash Locations” interactive crash cluster map. MassDOT intersection and segment crash rate worksheets for the study network are contained within the Technical Appendix.

2032 NO-BUILD CONDITION

BACKGROUND GROWTH

The 2025 Existing Condition traffic volume data was grown to a future horizon year of 2032, which is a conservative estimate for when the proposed day care center development is expected to be fully constructed. In accordance with MassDOT guidelines, the existing traffic volumes at the study intersections were increased by 0.5% annually for seven (7) years. The 0.5% background growth rate is a conservative rate based on the negligible growth forecasted by the Metropolitan Area Planning Council (MAPC) for the Town of Reading and a recent contraction in traffic rather than growth reported by MassDOT along the study roadway network.

OTHER PLANNED DEVELOPMENT PROJECTS

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

- ◆ 346-348 Main Street – mixed-use development consisting of 15 residential dwelling units and 2,164 SF of retail located along Main Street to the south of the study area.

Based on a review of the Trip Generation Letter prepared by Greenman-Pederson, Inc. (GPI), dated September 10, 2024, traffic increases associated with the planned development project are anticipated to be negligible. As such, the application of the background growth rate is expected to adequately account for traffic growth associated with the aforementioned development.

2032 NO-BUILD TRAFFIC VOLUMES

The background growth rate was applied to the 2025 Existing Traffic Volumes to calculate the 2032 No-Build Traffic Volumes for the weekday morning, weekday midday, and weekday evening peak hours. These volumes are summarized on appended **Figure 3**.

2032 NO-BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2032 No-Build Condition during the weekday morning, weekday midday, and weekday evening peak hours at the study intersection. Please note that in accordance with MassDOT standards, and to address the comments contained in the Traffic Engineering Peer Review Letter prepared by Green International Affiliates, Inc. ("Green"), dated June 26, 2025, a peak hour factor of 0.92 was applied to all study locations for future year analysis during the weekday morning, weekday midday, and weekday evening peak hours.

Under the 2032 No-Build Condition, the signalized intersection of Main Street, Birch Meadow Drive, and Lawrence Road is calculated to operate generally consistent with the findings of the 2025 Existing Condition during the weekday midday and weekday evening peak hours. The intersection is calculated to operate at Level of Service B during the weekday morning peak hour. The signalized intersection of Main Street and Salem Street is calculated to operate generally consistent with the findings of the 2025 Existing Condition during the weekday morning and weekday midday peak hours. The intersection is calculated to operate at acceptable Level of Service D during the weekday evening peak hour.

2032 BUILD CONDITION

The site-generated traffic volume of the proposed day care center was estimated to identify the potential impacts of the project. For the purpose of this analysis, a complete project “build out” is assumed within seven (7) years of the preparation of this study in accordance with MassDOT guidelines.

TRIP GENERATION

Trip generation projections for the proposed development were prepared utilizing ITE’s Trip Generation Manual, 11th Edition. Trip generation rates associated with Land Use 565 “Day Care Center” were cited for the proposed 14,058-square-foot day care center with a licensed capacity of 177 children during the standard study periods as required by MassDOT. To accurately portray the anticipated site-generated traffic volumes during the weekday midday peak hour, ITE’s “Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use” published for Land Use 565 “Day Care Center” were utilized. Specifically, the total number of trips was conservatively calculated by applying a ratio of the percentage of total daily trips cited from 3:00 p.m. to 4:00 p.m., which generally aligns with the weekday midday peak hour, and the percentage cited during the critical peak hours. Entering and exiting distributions were then established based on the published percentages of entering versus exiting trips during the 3:00 p.m. to 4:00 p.m. hour. The published hourly distribution for Land Use 565 “Day Care Center” are contained within the Technical Appendix. **Table 2** provides the weekday morning peak hour, weekday midday peak hour, weekday evening peak hour, and weekday trip generation volumes associated with the proposed development.

TABLE 2 – PROPOSED TRIP GENERATION

Land Use	Weekday Morning Peak Hour			Weekday Midday Peak Hour			Weekday Evening Peak Hour			Weekday Daily		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
14,058 SF Day Care Center <i>ITE Land Use 565</i>	82	73	155	32	30	62	73	83	156	335	335	670
177 Student Day Care Center <i>ITE Land Use 565</i>	73	65	138	29	26	55	66	74	140	362	362	724

As shown in **Table 2**, the projected trip generation based on gross floor area provides for a more conservative analysis during all peak hours and is hence utilized for analysis herein.

As stated within Chapter 10 of ITE’s Trip Generation Handbook, 3rd Edition, there are instances when the total number of trips generated by a site is different from the amount of new traffic added to the street system by the generator. The subject site is located proximate to several Town of Reading public schools such as the Birch Meadow and Wood End Elementary Schools; as such, it is reasonable that a parent or guardian may

coordinate drop-off and pick-up for multiple children attending the various schools in a vehicle single trip. Therefore, the proposed day care center development would be expected to attract a portion of its trips from the traffic passing the site on the way from an origin to an ultimate destination. These trips do not add new traffic to the adjacent roadway system and are referred to as “pass-by” trips.

Based upon the published ITE data for Land Use 565 “Day Care Center,” 44% of the site-generated traffic during the weekday evening peak hour is comprised of pass-by traffic. It is reasonable to assume that a similar percentage of pass-by trips would be generated during the weekday morning and weekday midday peak hours, and therefore to provide a comprehensive analysis, a pass-by rate of 44% has been applied to the weekday morning peak hour, weekday midday, and weekday evening peak hours. **Table 3** shows the additional site generated traffic for the proposed development in terms of new and pass-by trips.

TABLE 3 – PROPOSED TRIP GENERATION – NEW & PASS-BY TRIPS

Trip Type	Weekday Morning Peak Hour			Weekday Midday Peak Hour			Weekday Evening Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
“New” Trips	50	41	91	19	17	36	41	51	92
“Pass-By” Trips	32	32	64	13	13	26	32	32	64
Total	82	73	155	32	30	62	73	83	156

At the site driveway, the calculated number of pass-by trips is shown as a negative number at the through movements as the vehicles are temporarily diverted from the through travel stream into and out of the site access point.

TRIP ASSIGNMENT/DISTRIBUTION

The trips generated by the proposed development were distributed according to the existing travel pattern along the adjacent roadways, the access management plan of the site, and engineering judgement of local neighborhood characteristics. The “New” Site-Generated Traffic Volumes are illustrated on **Figure 4** and the “Pass-By” Site-Generated Traffic Volumes expected to access the site are depicted on **Figure 5**.

2032 BUILD TRAFFIC VOLUMES

The site-generated trips were added to the 2032 No-Build Traffic Volumes to calculate the 2032 Build Traffic Volumes and are shown on appended **Figure 6**.

2032 BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2032 Build Condition during the weekday morning, weekday midday, and weekday evening peak hours at the study intersections and

proposed site driveway. Please note that in accordance with MassDOT standards, and to address the comments contained in the aforementioned Traffic Engineering Peer Review Letter prepared by Green, a peak hour factor of 0.92 was applied to all study locations for future year analysis during the weekday morning, weekday midday, and weekday evening peak hours. **Tables 4 through 10** compare the 2025 Existing, 2032 No-Build, and 2032 Build Conditions Level of Service and delay values. **Tables 11 through 17** compare the 2025 Existing, 2032 No-Build, and 2032 Build Conditions calculated average and 95th percentile queue lengths.

Under the 2032 Build Condition, the signalized intersection of Main Street, Birch Meadow Drive, and Lawrence Road is calculated to operate generally consistent with the findings of the 2032 No-Build Condition during the weekday morning, weekday midday, and weekday evening peak hours. The signalized intersection of Main Street and Salem Street is calculated to operate generally consistent with the 2032 No-Build Condition during the weekday morning, weekday midday, and weekday evening peak hours. As such, the proposed development is not expected to have a significant adverse impact on the operations of the adjacent roadway network.

Under the 2032 Build Condition, the turning movements at the proposed site driveway are calculated to operate at Level of Service C or better during the weekday morning, weekday midday, and weekday evening peak hours. The calculated 95th percentile queue lengths would be accommodated by the proposed driveway throat length without impacting on-site circulation during the study peak hours.

COMPARATIVE LEVEL OF SERVICE (DELAY) TABLES

MAIN STREET & BIRCH MEADOW DRIVE/LAWRENCE ROAD

EB (Eastbound) approach is the Birch Meadow Drive approach

WB (Westbound) approach is the Lawrence Road approach

NB (Northbound) and SB (Southbound) approaches are the Main Street approaches

X (n) = Level of Service (seconds of delay)

TABLE 4 – WEEKDAY MORNING PEAK HOUR

Lane Group	2025 Existing	2032 No-Build	2032 Build
EB Left/Through	C (34.1)	C (29.8)	C (29.8)
EB Right	C (25.1)	C (25.0)	C (25.0)
WB Left/Through/Right	C (30.3)	C (31.0)	C (31.0)
NB Left	B (19.2)	B (11.4)	B (11.9)
NB Through/Right	A (9.7)	A (8.3)	A (8.5)
SB Left/Through	C (31.9)	C (23.7)	C (24.6)
SB Right	B (15.7)	B (14.3)	B (14.3)
Intersection	C (24.1)	B (19.2)	B (19.5)

TABLE 5 – WEEKDAY MIDDAY PEAK HOUR

Lane Group	2025 Existing	2032 No-Build	2032 Build
EB Left/Through	C (27.7)	C (26.9)	C (26.9)
EB Right	C (22.4)	C (23.0)	C (23.0)
WB Left/Through/Right	C (28.0)	C (28.9)	C (28.9)
NB Left	A (9.3)	A (8.5)	A (8.6)
NB Through/Right	B (12.8)	B (10.8)	B (10.8)
SB Left/Through	C (21.0)	C (20.2)	C (20.4)
SB Right	B (14.5)	B (13.4)	B (13.4)
Intersection	B (18.0)	B (16.6)	B (16.7)

TABLE 6 – WEEKDAY EVENING PEAK HOUR

Lane Group	2025 Existing	2032 No-Build	2032 Build
EB Left/Through	C (30.1)	C (29.1)	C (29.1)
EB Right	C (27.2)	C (26.3)	C (26.3)
WB Left/Through/Right	C (34.2)	C (32.7)	C (32.7)
NB Left	A (6.2)	A (6.9)	A (7.1)
NB Through/Right	A (6.6)	A (7.6)	A (7.7)
SB Left/Through	B (15.6)	B (16.7)	B (17.1)
SB Right	B (10.6)	B (11.3)	B (11.3)
Intersection	B (13.7)	B (14.2)	B (14.4)

MAIN STREET & SALEM STREET

EB (Eastbound) and WB (Westbound) approaches are the Salem Street approaches

NB (Northbound) and SB (Southbound) approaches are the Main Street approaches

X (n) = Level of Service (seconds of delay)

TABLE 7 – WEEKDAY MORNING PEAK HOUR

Lane Group	2025 Existing	2032 No-Build	2032 Build
EB Left	B (19.3)	C (20.5)	C (21.8)
EB Through/Right	C (25.9)	C (28.4)	C (30.3)
WB Left/Through	C (33.0)	D (38.1)	D (45.6)
WB Right	C (21.6)	C (22.7)	C (23.8)
NB Left/Through/Right	C (31.0)	C (30.5)	C (29.5)
SB Left/Through/Right	D (47.8)	D (47.9)	D (48.0)
Intersection	D (35.3)	D (36.7)	D (38.4)

TABLE 8 – WEEKDAY MIDDAY PEAK HOUR

Lane Group	2025 Existing	2032 No-Build	2032 Build
EB Left	B (17.5)	B (19.0)	B (19.5)
EB Through/Right	C (25.6)	C (29.1)	C (30.0)
WB Left/Through	C (26.5)	C (29.0)	C (29.9)
WB Right	C (21.2)	C (22.5)	C (23.0)
NB Left/Through/Right	D (43.6)	D (13.3)	D (42.4)
SB Left/Through/Right	D (51.6)	D (50.8)	D (50.8)
Intersection	D (37.6)	D (38.6)	D (38.8)

TABLE 9 – WEEKDAY EVENING PEAK HOUR

Lane Group	2025 Existing	2032 No-Build	2032 Build
EB Left	C (22.8)	B (18.1)	B (19.8)
EB Through/Right	C (30.1)	C (23.6)	C (25.9)
WB Left/Through	D (35.3)	C (28.0)	C (31.4)
WB Right	C (27.3)	C (21.4)	C (24.1)
NB Left/Through/Right	C (28.5)	D (53.4)	D (47.4)
SB Left/Through/Right	C (30.0)	D (50.5)	D (48.0)
Intersection	C (30.1)	D (40.3)	D (39.1)

MAIN STREET & SITE DRIVEWAY

WB (Westbound) approach is the site driveway approach

NB (Northbound) and SB (Southbound) approaches are the Main Street approaches

X (n) = Level of Service (seconds of delay)

TABLE 10 – 2032 BUILD CONDITION

Lane Group	Weekday Morning Peak Hour	Weekday Midday Peak Hour	Weekday Evening Peak Hour
WB Left/Right	C (16.6)	C (15.2)	C (16.4)
SB Left	A (8.4)	A (8.8)	A (8.6)

COMPARATIVE AVERAGE AND 95TH PERCENTILE QUEUE LENGTH TABLES**MAIN STREET & BIRCH MEADOW DRIVE/LAWRENCE ROAD**

EB (Eastbound) approach is the Birch Meadow Drive approach

WB (Westbound) approach is the Lawrence Road approach

NB (Northbound) and SB (Southbound) approaches are the Main Street approaches

X = Queue Length (ft)

TABLE 11 – WEEKDAY MORNING PEAK HOUR

Lane Group	2025 Existing		2032 No-Build		2032 Build	
	50 TH	95 TH	50 TH	95 TH	50 TH	95 TH
EB Left/Through	120	131	82	144	82	144
EB Right	<25	28	<25	37	<25	37
WB Left/Through/Right	<25	<25	<25	<25	<25	<25
NB Left	33	73	28	74	28	74
NB Through/Right	62	123	51	126	55	131
SB Left/Through	274	418	219	429	230	459
SB Right	<25	<25	<25	46	<25	46

TABLE 12 – WEEKDAY MIDDAY PEAK HOUR

Lane Group	2025 Existing		2032 No-Build		2032 Build	
	50 TH	95 TH	50 TH	95 TH	50 TH	95 TH
EB Left/Through	94	123	73	131	73	131
EB Right	<25	<25	<25	26	<25	26
WB Left/Through/Right	<25	<25	<25	<25	<25	<25
NB Left	<25	45	<25	46	<25	46
NB Through/Right	141	284	110	269	113	274
SB Left/Through	144	273	145	304	148	310
SB Right	<25	<25	<25	25	<25	25

TABLE 13 – WEEKDAY EVENING PEAK HOUR

Lane Group	2025 Existing		2032 No-Build		2032 Build	
	50 TH	95 TH	50 TH	95 TH	50 TH	95 TH
EB Left/Through	40	80	43	84	43	84
EB Right	<25	<25	<25	<25	<25	<25
WB Left/Through/Right	<25	<25	<25	<25	<25	<25
NB Left	<25	45	<25	46	<25	46
NB Through/Right	59	196	67	209	71	220
SB Left/Through	131	317	132	318	138	331
SB Right	<25	<25	<25	<25	<25	<25

MAIN STREET & SALEM STREET

EB (Eastbound) and WB (Westbound) approaches are the Salem Street approaches
 NB (Northbound) and SB (Southbound) approaches are the Main Street approaches
 X = Queue Length (ft)

TABLE 14 – WEEKDAY MORNING PEAK HOUR

Lane Group	2025 Existing		2032 No-Build		2032 Build	
	50 TH	95 TH	50 TH	95 TH	50 TH	95 TH
EB Left	<25	64	25	74	27	77
EB Through/Right	296	728	318	761	326	761
WB Left/Through	273	691	291	712	312	738
WB Right	<25	<25	<25	<25	<25	<25
NB Left/Through/Right	167	197	173	208	177	216
SB Left/Through/Right	274	313	285	332	297	354

TABLE 15 – WEEKDAY MIDDAY PEAK HOUR

Lane Group	2025 Existing		2032 No-Build		2032 Build	
	50 TH	95 TH	50 TH	95 TH	50 TH	95 TH
EB Left	<25	68	<25	70	25	74
EB Through/Right	289	712	323	759	327	759
WB Left/Through	171	428	189	459	193	463
WB Right	<25	<25	<25	<25	<25	<25
NB Left/Through/Right	238	278	250	301	250	304
SB Left/Through/Right	230	274	240	295	244	304

TABLE 16 – WEEKDAY EVENING PEAK HOUR

Lane Group	2025 Existing		2032 No-Build		2032 Build	
	50 TH	95 TH	50 TH	95 TH	50 TH	95 TH
EB Left	35	79	31	89	35	97
EB Through/Right	279	486	249	611	259	611
WB Left/Through	197	404	181	451	189	452
WB Right	<25	<25	<25	<25	<25	<25
NB Left/Through/Right	180	274	253	298	255	310
SB Left/Through/Right	159	246	224	268	236	291

MAIN STREET & SITE DRIVEWAY

WB (Westbound) approach is the site driveway approach

NB (Northbound) and SB (Southbound) approaches are the Main Street approaches

X = 95th Percentile Queue (ft)

TABLE 17 – 2032 BUILD CONDITION

Lane Group	Weekday Morning Peak Hour	Weekday Midday Peak Hour	Weekday Evening Peak Hour
WB Left/Right	<25	<25	<25
SB Left	<25	<25	<25

SITE CIRCULATION/PARKING SUPPLY

A review was conducted of the proposed day care center development using the Site Plan prepared by Stonefield Engineering & Design, LLC., dated June 26, 2025. In completing this review, particular attention was focused on the site access, circulation, and parking supply.

Access is proposed to be maintained via the existing one (1) full-movement driveway along Main Street. The proposed day care center building will be situated on the southern portion of the property. An approximately 9,300-square-foot play area will be constructed along the easterly building frontage. Off-street parking will be provided on the central, western, and northwestern portions of the property. One (1)-way and two (2)-way vehicular circulation will be facilitated on site via minimum 16-foot and 24-foot-wide drive aisles, respectively. A concrete sidewalk will be provided to facilitate pedestrian mobility between the off-street parking supply and the building frontages, and bollards will be installed along key parking spaces to provide the building protection.

Sight lines for the proposed site driveway were evaluated in accordance with the American Association of State Highway Transportation Officials (AASHTO) guidance for a conservative design speed of 45 mph. Main Street provides one (1) lane in each direction and is separated by a two (2)-way left-turn median lane which provides adequate storage space for a vehicle. Therefore, in accordance with AASHTO guidelines, the sight lines required for right turns from the minor road typically provide sufficient sight distance for a passenger vehicle to cross the near roadway and reach the median. As such, per AASHTO guidelines for Case B2 “Right

Turn from Stop,” a minimum intersection sight distance of 430 feet looking left is required for vehicles exiting the minor approach. Per AASHTO guidelines for Case BI “Left Turn from Stop,” a minimum intersection sight distance of 500 feet is required looking right from the median lane. Regarding stopping sight distance, the northbound Main Street approach operates with an approximate 4% downgrade within the study limits. As such, based on AASHTO standards a minimum stopping sight distance of 385 feet is required for northbound traveling vehicles (downgrade) and 360 feet for southbound traveling vehicles (level roadway) along the major approach. The measured sight lines exceed the minimum intersection sight distance and stopping sight distance requirements, and therefore the proposed driveway would provide safe and effective access to and from the site. The sight distance evaluation is summarized in **Table 18**.

TABLE 18 – SIGHT DISTANCE EVALUATION SUMMARY

Location	Stopping Sight Distance (ft)		Intersection Sight Distance (ft)	
	Measured	Minimum Required	Measured	Minimum Required
Main Street driveway		45 mph		45 mph
Main Street Northbound	440	385	440	430
Main Street Southbound	900+	360	900+	500

Regarding the parking requirements for the proposed development, the Town of Reading Zoning Bylaw requires one (1) parking space per each employee on the largest shift plus one (1) parking space per seven (7) students for a day care center. For the proposed day care center, which is anticipated to operate with a maximum capacity of 28 employees and 177 students, this equates to 53 required spaces. The site would provide 53 total parking spaces, inclusive of three (3) ADA accessible parking spaces, which meets the parking requirement and would be sufficient to support the parking demand. The spaces would be nine (9) feet wide by 18 feet deep in accordance with the Town of Reading Zoning Bylaw and industry standards.

The parking supply was evaluated with respect to data published within the ITE’s Parking Generation, 6th Edition, for Land Use 565 “Day Care Center.” The average parking demand rate during the peak weekday period for Land Use 565 “Day Care Center” is 2.27 vehicles per 1,000 square feet of gross-floor-area and 0.25 vehicles per student. For the proposed 14,058-square-foot day care center with a licensed capacity of 177 children, this equates to a peak parking demand ranging from 32 to 44 vehicles at maximum capacity. As such, the proposed parking supply of 53 spaces would be sufficient to support the anticipated parking demand of the site.

CONCLUSIONS

This report was prepared to examine the potential traffic impact of the proposed day care center. The analysis findings, which have been based on industry-standard guidelines, indicate that the proposed development would not have a significant impact on the traffic operations of the adjacent roadway network. The site driveway and on-site layout have been designed to provide for effective access to and from the subject property, and the parking supply would be sufficient to support this project.

\\us.stonefieldeng.com\Shares\Boston\BOS\2024\BOS-240115 Primrose Schools - 885 Main Street, Reading, MA\Calculations & Reports\Traffic\Reports\2025-05 TIS - Copy\2025-07 TIS.docx

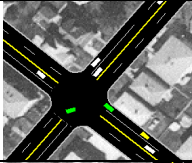
TECHNICAL APPENDIX

LEVEL OF SERVICE/AVERAGE CONTROL DELAY CRITERIA

LEVEL OF SERVICE /AVERAGE CONTROL DELAY CRITERIA

The ability of a roadway to effectively accommodate traffic demand is determined through an assessment of the volume-to-capacity ratio, delay and Level of Service of the lane group and/or intersection. The volume-to-capacity ratio is the ratio of traffic flow rate to capacity for a given transportation facility. As defined within the Highway Capacity Manual 2010 (HCM 2010), intersection delay is the total additional travel time experienced by drivers, passengers, or pedestrians as a result of control measures and interaction with other users of the facility, divided by the volume departing from the corresponding cross section of the facility. Level of service is a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

For an unsignalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle and LOS F denotes operations with delay in excess of 80 seconds per vehicle.

	Level Of Service (LOS)	Signalized Delay Range (average control delay in sec/veh)	Unsignalized Delay Range (average control delay in sec/veh)
	A	≤ 10	≤ 10
	B	> 10 and ≤ 20	> 10 and ≤ 15
	C	> 20 and ≤ 35	> 15 and ≤ 25
	D	> 35 and ≤ 55	> 25 and ≤ 35
	E	> 55 and ≤ 80	> 35 and ≤ 50
	F	> 80	> 50

Source: Highway Capacity Manual 2010

TURNING MOVEMENT COUNT DATA

National Data & Surveying Services

Intersection Turning Movement Count

Location: Main St/SR 28 & Birch Meadow Dr/Lawrence Rd
City: Reading
Control: Signalized

Project ID: 25-430032-002
Date: 3/6/2025

Data - Total

NS/EW Streets:	Main St/SR 28				Main St/SR 28				Birch Meadow Dr/Lawrence Rd				Birch Meadow Dr/Lawrence Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	1 NT	0 NR	0 NU	0 SL	1 ST	1 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	1 WT	0 WR	0 WU	
7:00 AM	15	25	0	0	0	95	16	0	12	0	5	0	0	2	0	0	170
7:15 AM	30	48	0	0	1	115	41	0	8	0	13	0	2	3	0	0	261
7:30 AM	36	41	0	0	0	112	78	0	28	2	26	0	0	2	0	0	325
7:45 AM	28	64	2	0	0	121	40	0	43	0	13	0	2	0	0	0	313
8:00 AM	45	49	0	0	0	145	53	0	31	0	22	0	1	1	0	0	347
8:15 AM	55	68	0	0	1	119	126	0	53	1	49	0	3	2	0	0	477
8:30 AM	14	53	0	0	0	128	25	0	27	0	30	0	2	0	0	0	279
8:45 AM	13	65	0	0	0	115	11	0	11	0	9	0	0	0	0	0	224
TOTAL VOLUMES:	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s:	36.25%	63.44%	0.31%	0.00%	0.15%	70.79%	29.06%	0.00%	55.61%	0.78%	43.60%	0.00%	50.00%	50.00%	0.00%	0.00%	2396
PEAK HR:	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL:	142	234	2	0	1	513	244	0	154	1	114	0	8	3	0	0	1416
PEAK HR FACTOR:	0.645	0.860	0.250	0.000	0.250	0.884	0.484	0.000	0.726	0.250	0.582	0.000	0.667	0.375	0.000	0.000	0.742
	0.768				0.770				0.653				0.550				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	1 NT	0 NR	0 NU	0 SL	1 ST	1 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	1 WT	0 WR	0 WU	
2:00 PM	16	93	1	0	0	70	13	0	14	1	11	0	3	0	1	0	223
2:15 PM	22	81	2	0	0	85	24	0	9	1	10	0	1	2	0	0	237
2:30 PM	24	97	0	0	0	75	31	0	40	0	24	0	1	0	1	0	293
2:45 PM	22	94	0	0	0	103	29	0	24	0	37	0	1	0	0	0	310
3:00 PM	27	124	2	0	0	87	34	0	36	0	32	0	3	0	0	0	345
3:15 PM	19	138	0	0	0	108	20	0	66	3	18	0	1	0	1	0	374
3:30 PM	17	113	2	0	0	108	22	0	24	0	12	0	0	0	0	0	298
3:45 PM	12	107	1	0	0	96	19	0	28	1	20	0	0	0	0	0	284
4:00 PM	14	113	2	0	0	78	9	0	20	0	13	0	0	1	0	0	250
4:15 PM	9	102	0	0	0	84	14	0	11	1	14	0	1	0	0	0	236
4:30 PM	21	101	0	0	0	96	20	0	13	1	12	0	1	0	1	0	266
4:45 PM	16	99	1	0	0	118	26	0	15	0	26	0	0	0	0	0	301
5:00 PM	22	101	0	0	0	106	26	0	26	0	18	0	3	1	0	0	303
5:15 PM	20	88	0	0	0	97	19	0	24	0	12	0	0	0	1	0	261
5:30 PM	26	97	0	0	0	99	22	0	19	1	24	0	2	0	1	0	291
5:45 PM	24	87	1	0	1	103	10	0	23	0	16	0	1	0	1	0	267
TOTAL VOLUMES:	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s:	15.88%	83.50%	0.61%	0.00%	0.05%	81.70%	18.25%	0.00%	56.00%	1.29%	42.71%	0.00%	62.07%	13.79%	24.14%	0.00%	4539
PEAK HR:	02:45 PM - 03:45 PM																TOTAL
PEAK HR VOL:	85	469	4	0	0	406	105	0	150	3	99	0	5	0	1	0	1327
PEAK HR FACTOR:	0.787	0.850	0.500	0.000	0.000	0.940	0.772	0.000	0.568	0.250	0.669	0.000	0.417	0.000	0.250	0.000	0.887
	0.889				0.968				0.724				0.500				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Main St/SR 28 & Birch Meadow Dr/Lawrence Rd
City: Reading
Control: Signalized

Project ID: 25-430032-002
Date: 3/6/2025

Data - Cars

NS/EW Streets:	Main St/SR 28				Main St/SR 28				Birch Meadow Dr/Lawrence Rd				Birch Meadow Dr/Lawrence Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	1 NT	0 NR	0 NU	0 SL	1 ST	1 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	1 WT	0 WR	0 WU	
7:00 AM	15	23	0	0	0	91	16	0	11	0	5	0	0	2	0	0	163
7:15 AM	30	43	0	0	1	111	40	0	8	0	12	0	2	3	0	0	250
7:30 AM	36	38	0	0	0	105	78	0	28	2	25	0	0	2	0	0	314
7:45 AM	27	60	1	0	0	118	40	0	43	0	13	0	2	0	0	0	304
8:00 AM	45	48	0	0	0	140	53	0	31	0	22	0	1	1	0	0	341
8:15 AM	55	64	0	0	1	118	126	0	51	1	49	0	3	2	0	0	470
8:30 AM	14	51	0	0	0	124	25	0	27	0	30	0	2	0	0	0	273
8:45 AM	13	59	0	0	0	109	11	0	11	0	9	0	0	0	0	0	212
TOTAL VOLUMES:	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s:	235	386	1	0	2	916	389	0	210	3	165	0	10	10	0	0	2327
PEAK HR:	37.78%	62.06%	0.16%	0.00%	0.15%	70.08%	29.76%	0.00%	55.56%	0.79%	43.65%	0.00%	50.00%	50.00%	0.00%	0.00%	
PEAK HR VOL:	141	223	1	0	1	500	244	0	152	1	114	0	8	3	0	0	1388
PEAK HR FACTOR:	0.641	0.871	0.250	0.000	0.250	0.893	0.484	0.000	0.745	0.250	0.582	0.000	0.667	0.375	0.000	0.000	0.738
			0.767				0.760				0.661				0.550		

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	1 NT	0 NR	0 NU	0 SL	1 ST	1 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	1 WT	0 WR	0 WU	
2:00 PM	16	91	1	0	0	67	13	0	13	1	11	0	3	0	1	0	217
2:15 PM	22	79	2	0	0	82	22	0	8	1	9	0	1	2	0	0	228
2:30 PM	24	96	0	0	0	71	31	0	40	0	24	0	1	0	0	0	287
2:45 PM	20	93	0	0	0	101	29	0	24	0	37	0	1	0	0	0	305
3:00 PM	27	122	2	0	0	83	34	0	36	0	32	0	3	0	0	0	339
3:15 PM	19	134	0	0	0	106	20	0	65	3	18	0	1	0	1	0	367
3:30 PM	15	109	2	0	0	105	22	0	23	0	12	0	0	0	0	0	288
3:45 PM	12	102	1	0	0	93	19	0	28	1	20	0	0	0	0	0	276
4:00 PM	14	109	2	0	0	78	9	0	20	0	13	0	0	1	0	0	246
4:15 PM	9	102	0	0	0	83	14	0	11	1	14	0	1	0	0	0	235
4:30 PM	21	99	0	0	0	95	20	0	13	1	12	0	1	0	1	0	263
4:45 PM	16	98	1	0	0	118	25	0	15	0	26	0	0	0	0	0	299
5:00 PM	22	100	0	0	0	105	26	0	26	0	18	0	3	1	0	0	301
5:15 PM	20	88	0	0	0	96	19	0	24	0	12	0	0	0	1	0	260
5:30 PM	26	97	0	0	0	99	22	0	19	1	24	0	1	0	1	0	290
5:45 PM	24	87	1	0	1	103	10	0	23	0	16	0	1	0	1	0	267
TOTAL VOLUMES:	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s:	307	1606	12	0	1	1485	335	0	388	9	298	0	17	4	6	0	4468
PEAK HR:	15.95%	83.43%	0.62%	0.00%	0.05%	81.55%	18.40%	0.00%	55.83%	1.29%	42.88%	0.00%	62.96%	14.81%	22.22%	0.00%	
PEAK HR VOL:	81	458	4	0	0	395	105	0	148	3	99	0	5	0	1	0	1299
PEAK HR FACTOR:	0.750	0.854	0.500	0.000	0.000	0.932	0.772	0.000	0.569	0.250	0.669	0.000	0.417	0.000	0.250	0.000	0.885
			0.887				0.962				0.727				0.500		

National Data & Surveying Services

Intersection Turning Movement Count

Location: Main St/SR 28 & Birch Meadow Dr/Lawrence Rd
City: Reading
Control: Signalized

Project ID: 25-430032-002
Date: 3/6/2025

Data - Buses

NS/EW Streets:	Main St/SR 28				Main St/SR 28				Birch Meadow Dr/Lawrence Rd				Birch Meadow Dr/Lawrence Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	1 NT	0 NR	0 NU	0 SL	1 ST	1 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	1 WT	0 WR	0 WU	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
7:30 AM	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2
7:45 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s:	0.00%	100.00%	0.00%	0.00%	0.00%	66.67%	33.33%	0.00%	50.00%	0.00%	50.00%	0.00%	0	0	0	0	9
PEAK HR:	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL:	0	2	0	0	0	1	0	0	2	0	0	0	0	0	0	0	5
PEAK HR FACTOR:	0.000	0.500	0.000	0.000	0.000	0.250	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.417
	0.500				0.250				0.250								
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	1 NT	0 NR	0 NU	0 SL	1 ST	1 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	1 WT	0 WR	0 WU	
2:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2:15 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
3:15 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
3:30 PM	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3
3:45 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s:	33.33%	66.67%	0.00%	0.00%	0.00%	66.67%	33.33%	0.00%	100.00%	0.00%	0.00%	0.00%	0	0	0	0	15
PEAK HR:	02:45 PM - 03:45 PM																TOTAL
PEAK HR VOL:	2	1	0	0	0	2	0	0	2	0	0	0	0	0	0	0	7
PEAK HR FACTOR:	0.250	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.583
	0.375				0.250				0.500								

National Data & Surveying Services

Intersection Turning Movement Count

Location: Main St/SR 28 & Birch Meadow Dr/Lawrence Rd
City: Reading
Control: Signalized

Project ID: 25-430032-002
Date: 3/6/2025

Data - HT

NS/EW Streets:	Main St/SR 28				Main St/SR 28				Birch Meadow Dr/Lawrence Rd				Birch Meadow Dr/Lawrence Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	1 NT	0 NR	0 NU	0 SL	1 ST	1 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	1 WT	0 WR	0 WU	
7:00 AM	0	2	0	0	0	4	0	0	1	0	0	0	0	0	0	0	7
7:15 AM	0	5	0	0	0	4	0	0	0	0	0	0	0	0	0	0	9
7:30 AM	0	3	0	0	0	6	0	0	0	0	0	0	0	0	0	0	9
7:45 AM	1	3	1	0	0	2	0	0	0	0	0	0	0	0	0	0	7
8:00 AM	0	1	0	0	0	5	0	0	0	0	0	0	0	0	0	0	6
8:15 AM	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
8:30 AM	0	2	0	0	0	4	0	0	0	0	0	0	0	0	0	0	6
8:45 AM	0	6	0	0	0	6	0	0	0	0	0	0	0	0	0	0	12
TOTAL VOLUMES:	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s:	3.70%	92.59%	3.70%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0	0	0	0	60
PEAK HR:	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL:	1	9	1	0	0	12	0	0	0	0	0	0	0	0	0	0	23
PEAK HR FACTOR:	0.250	0.750	0.250	0.000	0.000	0.600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.821
	0.550				0.600												
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	1 NT	0 NR	0 NU	0 SL	1 ST	1 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	1 WT	0 WR	0 WU	
2:00 PM	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0	5
2:15 PM	0	2	0	0	0	3	0	0	1	0	1	0	0	0	0	0	7
2:30 PM	0	1	0	0	0	4	0	0	0	0	0	0	0	0	1	0	6
2:45 PM	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
3:00 PM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
3:15 PM	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	6
3:30 PM	0	4	0	0	0	3	0	0	0	0	0	0	0	0	0	0	7
3:45 PM	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	6
4:00 PM	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
4:45 PM	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
5:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s:	7.41%	92.59%	0.00%	0.00%	0.00%	96.00%	4.00%	0.00%	50.00%	0.00%	50.00%	0.00%	50.00%	0.00%	50.00%	0.00%	56
PEAK HR:	02:45 PM - 03:45 PM																TOTAL
PEAK HR VOL:	2	10	0	0	0	9	0	0	0	0	0	0	0	0	0	0	21
PEAK HR FACTOR:	0.250	0.625	0.000	0.000	0.000	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.750
	0.750				0.750												

National Data & Surveying Services

Intersection Turning Movement Count

Location: Main St/SR 28 & Birch Meadow Dr/Lawrence Rd
City: Reading
Control: Signalized

Project ID: 25-430032-002
Date: 3/6/2025

Data - Bikes

NS/EW Streets:	Main St/SR 28				Main St/SR 28				Birch Meadow Dr/Lawrence Rd				Birch Meadow Dr/Lawrence Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	1 NT	0 NR	0 NU	0 SL	1 ST	1 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	1 WT	0 WR	0 WU	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
PEAK HR :	07:45 AM - 08:45 AM				0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	1 NT	0 NR	0 NU	0 SL	1 ST	1 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	1 WT	0 WR	0 WU	
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:15 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	2	0	0	0	0	0	0	0	2	1	2	0	0	0	0	0	7
PEAK HR :	02:45 PM - 03:45 PM				0	0	0	0	40.00%	20.00%	40.00%	0.00%	0	0	0	0	2
PEAK HR VOL :	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
PEAK HR FACTOR :	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500

National Data & Surveying Services
Intersection Turning Movement Count

Location: Main St/SR 28 & Birch Meadow Dr/Lawrence Rd
City: Reading

Project ID: 25-430032-002
Date: 3/6/2025

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Main St/SR 28		Main St/SR 28		Birch Meadow Dr/Lawrence Rd		Birch Meadow Dr/Lawrence Rd		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
7:00 AM	0	1	0	0	0	0	0	0	1
7:15 AM	0	3	0	0	0	0	0	0	3
7:30 AM	0	3	0	0	1	0	1	0	5
7:45 AM	0	5	0	0	1	0	1	0	7
8:00 AM	0	3	0	0	0	0	0	0	3
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	1	0	0	1
8:45 AM	0	2	0	0	0	0	0	0	2
TOTAL VOLUMES :	EB 0	WB 17	EB 0	WB 0	NB 2	SB 1	NB 2	SB 0	TOTAL 22
APPROACH %'s :	0.00%	100.00%			66.67%	33.33%	100.00%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM								TOTAL
PEAK HR VOL :	0	8	0	0	1	1	1	0	11
PEAK HR FACTOR :		0.400			0.250	0.250	0.250	0.250	0.393
		0.400				0.500		0.250	

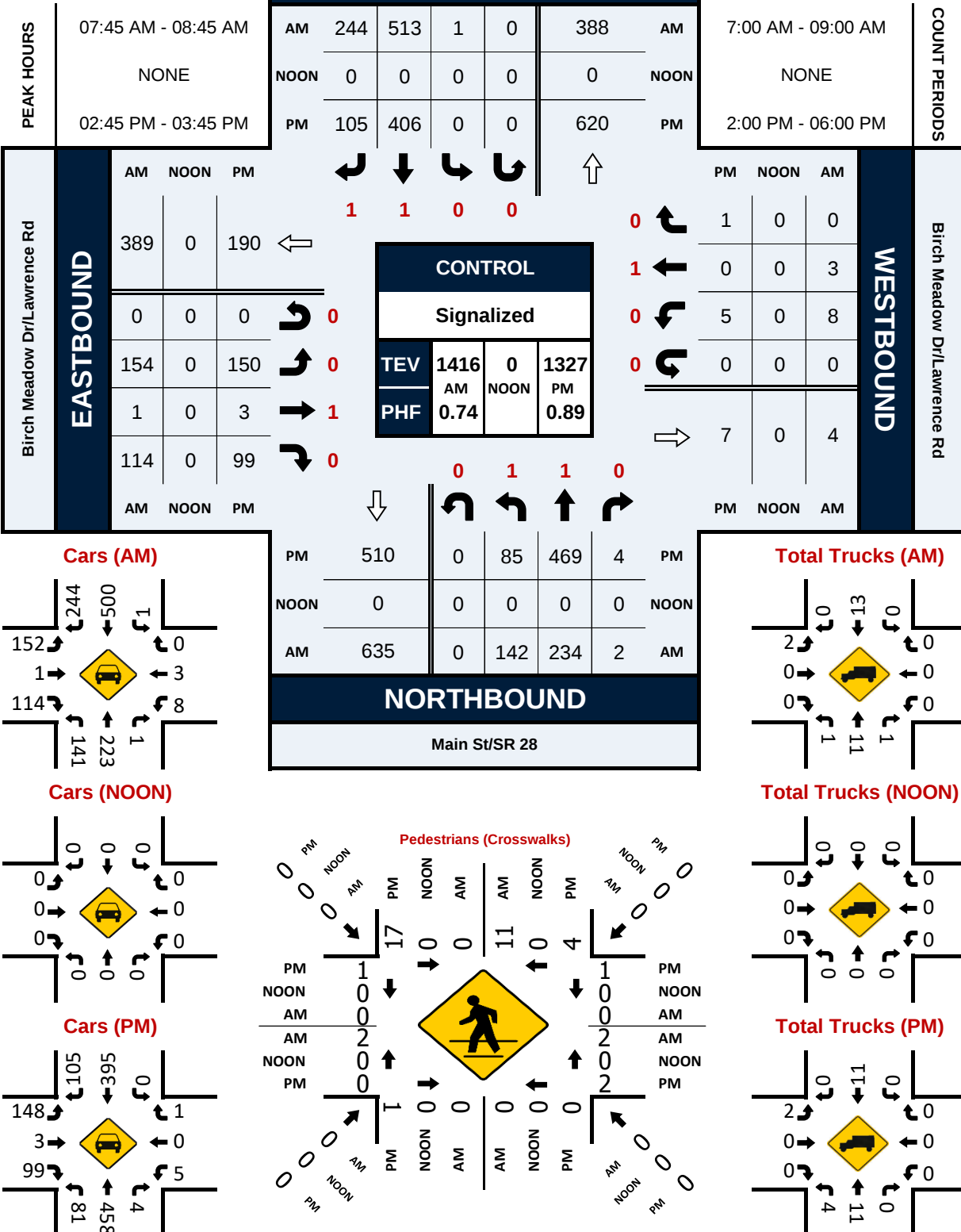
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
2:00 PM	0	0	0	0	0	0	0	1	1
2:15 PM	0	0	0	0	0	1	0	0	1
2:30 PM	4	0	4	0	0	0	0	0	8
2:45 PM	7	0	0	0	0	0	0	0	7
3:00 PM	6	2	0	0	2	1	0	0	11
3:15 PM	4	2	0	0	0	0	0	0	6
3:30 PM	0	0	1	0	0	0	0	1	2
3:45 PM	1	0	0	1	0	0	1	0	3
4:00 PM	1	0	0	0	1	1	0	0	3
4:15 PM	3	0	0	0	0	1	0	1	5
4:30 PM	0	0	0	0	0	1	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	2	0	1	0	3
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	EB 26	WB 4	EB 5	WB 1	NB 5	SB 5	NB 2	SB 3	TOTAL 51
APPROACH %'s :	86.67%	13.33%	83.33%	16.67%	50.00%	50.00%	40.00%	60.00%	
PEAK HR :	02:45 PM - 03:45 PM								TOTAL
PEAK HR VOL :	17	4	1	0	2	1	0	1	26
PEAK HR FACTOR :	0.607	0.500	0.250		0.250	0.250		0.250	0.591
		0.656		0.250		0.250		0.250	

Main St/SR 28 & Birch Meadow Dr/Lawrence Rd

Peak Hour Turning Movement Count

ID: 25-430032-002
City: Reading

Day: Thursday
Date: 3/6/2025



Project ID: 25-430032-002

Location: Main St/SR 28 & Birch Meadow Dr/Lawrence Rd

City: Reading

Day: Thursday

Date: 3/6/2025

Groups Printed - Cars, PU, Vans - Heavy Trucks

	Main St/SR 28 Northbound						Main St/SR 28 Southbound						Birch Meadow Dr/Lawrence Rd Eastbound						Birch Meadow Dr/Lawrence Rd Westbound								
Start Time	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Int. Total		
7:00 AM	15	25	0	0	0	40	0	95	16	0	1	111	12	0	5	0	0	17	0	2	0	0	0	0	2	170	
7:15 AM	30	48	0	0	0	78	1	115	41	0	3	157	8	0	13	0	0	21	2	3	0	0	0	0	5	261	
7:30 AM	36	41	0	0	0	77	0	112	78	0	3	190	28	2	26	0	1	56	0	2	0	0	0	1	2	325	
7:45 AM	28	64	2	0	0	94	0	121	40	0	5	161	43	0	13	0	1	56	2	0	0	0	0	1	2	313	
Total	109	178	2	0	0	289	1	443	175	0	12	619	91	2	57	0	2	150	4	7	0	0	0	2	11	1069	
8:00 AM	45	49	0	0	0	94	0	145	53	0	3	198	31	0	22	0	0	53	1	1	0	0	0	0	2	347	
8:15 AM	55	68	0	0	0	123	1	119	126	0	0	246	53	1	49	0	0	103	3	2	0	0	0	0	5	477	
8:30 AM	14	53	0	0	0	67	0	128	25	0	0	153	27	0	30	0	0	57	2	0	0	0	0	1	2	279	
8:45 AM	13	65	0	0	0	78	0	115	11	0	2	126	11	0	9	0	0	20	0	0	0	0	0	0	0	224	
Total	127	235	0	0	0	362	1	507	215	0	5	723	122	1	110	0	0	233	6	3	0	0	0	1	9	1327	
BREAK																											
2:00 PM	16	93	1	0	0	110	0	70	13	0	0	83	14	1	11	0	1	26	3	0	1	0	0	0	4	223	
2:15 PM	22	81	2	0	0	105	0	85	24	0	0	109	9	1	10	0	0	20	1	2	0	0	0	1	3	237	
2:30 PM	24	97	0	0	0	121	0	75	31	0	4	106	40	0	24	0	0	64	1	0	1	0	0	0	2	293	
2:45 PM	22	94	0	0	0	116	0	103	29	0	7	132	24	0	37	0	0	61	1	0	0	0	0	0	1	310	
Total	84	365	3	0	4	452	0	333	97	0	11	430	87	2	82	0	1	171	6	2	2	0	1	10	1	1063	
3:00 PM	27	124	2	0	0	153	0	87	34	0	8	121	36	0	32	0	0	68	3	0	0	0	0	3	3	345	
3:15 PM	19	138	0	0	0	157	0	108	20	0	6	128	66	3	18	0	0	87	1	0	1	0	0	0	2	374	
3:30 PM	17	113	2	0	1	132	0	108	22	0	0	130	24	0	12	0	1	36	0	0	0	0	0	0	0	298	
3:45 PM	12	107	1	0	1	120	0	96	19	0	1	115	28	1	20	0	1	49	0	0	0	0	0	0	0	284	
Total	75	482	5	0	2	562	0	399	95	0	15	494	154	4	82	0	2	240	4	0	1	0	3	5	1	1301	
4:00 PM	14	113	2	0	0	129	0	78	9	0	1	87	20	0	13	0	0	33	0	1	0	0	0	2	1	250	
4:15 PM	9	102	0	0	0	111	0	84	14	0	3	98	11	1	14	0	1	26	1	0	0	0	0	1	1	236	
4:30 PM	21	101	0	0	0	122	0	96	20	0	0	116	13	1	12	0	0	26	1	0	1	0	1	2	2	266	
4:45 PM	16	99	1	0	0	116	0	118	26	0	0	144	15	0	26	0	0	41	0	0	0	0	0	0	0	301	
Total	60	415	3	0	0	478	0	376	69	0	4	445	59	2	65	0	1	126	2	1	1	0	4	4	4	1053	
5:00 PM	22	101	0	0	0	123	0	106	26	0	0	132	26	0	18	0	0	44	3	1	0	0	0	0	4	303	
5:15 PM	20	88	0	0	0	108	0	97	19	0	0	116	24	0	12	0	1	36	0	0	1	0	0	2	1	261	
5:30 PM	26	97	0	0	0	123	0	99	22	0	0	121	19	1	24	0	0	44	2	0	1	0	0	0	3	291	
5:45 PM	24	87	1	0	0	112	1	103	10	0	0	114	23	0	16	0	0	39	1	0	1	0	0	0	2	267	
Total	92	373	1	0	0	466	1	405	77	0	0	483	92	1	70	0	1	163	6	1	3	0	2	10	1	1122	
Grand Total	547	2048	14	0	6	2609	3	2463	728	0	47	3194	605	12	466	0	7	1083	28	14	7	0	13	49	6	6935	
Apprch %	21.0	78.5	0.5	0.0	0.2		0.1	77.1	22.8	0.0	1.5		55.9	1.1	43.0	0.0	0.6		57.1	28.6	14.3	0.0	26.5				
Total %	7.9	29.5	0.2	0.0	0.1	37.6	0.0	35.5	10.5	0.0	0.7	46.1	8.7	0.2	6.7	0.0	0.1	15.6	0.4	0.2	0.1	0.0	0.2	0.7			
Cars, PU, Vans	542	1992	13	0		2547	3	2401	724	0		3128	598	12	463	0		1073	27	14	6	0		47	6795		
% Cars, PU, Vans	99.1	97.3	92.9	0.0		97.6	100.0	97.5	99.5	0.0		97.9	98.8	100.0	99.4	0.0		99.1	96.4	100.0	85.7	0.0		95.9	98.0		
Buses	2	6	0	0		8	0	6	3	0		9	5	0	2	0		7	0	0	0	0		0	24		
%Buses	0.4	0.3	0.0	0.0		0.3	0.0	0.2	0.4	0.0		0.3	0.8	0.0	0.4	0.0		0.6	0.0	0.0	0.0	0.0		0.0	0.3		
HT	3	50	1	0		54	0	56	1	0		57	2	0	1	0		3	1	0	1	0		2	116		
%HT	0.5	2.4	7.1	0.0		2.1	0.0	2.3	0.1	0.0		1.8	0.3	0.0	0.2	0.0		0.3	3.6	0.0	14.3	0.0		4.1	1.7		

Project ID: 25-430032-002

Location: Main St/SR 28 & Birch Meadow Dr/Lawrence Rd

City: Reading

PEAK HOURS

Day: Thursday

Date: 3/6/2025

AM

	Main St/SR 28 Northbound					Main St/SR 28 Southbound					Birch Meadow Dr/Lawrence Rd Eastbound					Birch Meadow Dr/Lawrence Rd Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 07:00 AM - 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
7:45 AM	28	64	2	0	94	0	121	40	0	161	43	0	13	0	56	2	0	0	0	2	313
8:00 AM	45	49	0	0	94	0	145	53	0	198	31	0	22	0	53	1	1	0	0	2	347
8:15 AM	55	68	0	0	123	1	119	126	0	246	53	1	49	0	103	3	2	0	0	5	477
8:30 AM	14	53	0	0	67	0	128	25	0	153	27	0	30	0	57	2	0	0	0	2	279
Total Volume	142	234	2	0	378	1	513	244	0	758	154	1	114	0	269	8	3	0	0	11	1416
% App. Total	37.6	61.9	0.5	0.0	100	0.1	67.7	32.2	0.0	100	57.2	0.4	42.4	0.0	100	72.7	27.3	0.0	0.0	100	
PHF	0.768					0.770					0.653					0.550					0.742
Cars, PU, Vans	141	222	1	0	364	1	497	244	0	742	152	1	113	0	266	8	3	0	0	11	1383
% Cars, PU, Vans	99.3	94.9	50.0	0.0	96.3	100.0	96.9	100.0	0.0	97.9	98.7	100.0	99.1	0.0	98.9	100.0	100.0	0.0	0.0	100.0	97.7
Buses	0	2	0	0	2	0	2	0	0	2	2	0	1	0	3	0	0	0	0	0	7
%Buses	0.0	0.9	0.0	0.0	0.5	0.0	0.4	0.0	0.0	0.3	1.3	0.0	0.9	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.5
HT	1	10	1	0	12	0	14	0	0	14	0	0	0	0	0	0	0	0	0	0	26
%HT	0.7	4.3	50.0	0.0	3.2	0.0	2.7	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8

PM

	Main St/SR 28 Northbound					Main St/SR 28 Southbound					Birch Meadow Dr/Lawrence Rd Eastbound					Birch Meadow Dr/Lawrence Rd Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 02:00 PM - 06:00 PM																					
Peak Hour for Entire Intersection Begins at 02:45 PM																					
2:45 PM	22	94	0	0	116	0	103	29	0	132	24	0	37	0	61	1	0	0	0	1	310
3:00 PM	27	124	2	0	153	0	87	34	0	121	36	0	32	0	68	3	0	0	0	3	345
3:15 PM	19	138	0	0	157	0	108	20	0	128	66	3	18	0	87	1	0	1	0	2	374
3:30 PM	17	113	2	0	132	0	108	22	0	130	24	0	12	0	36	0	0	0	0	0	298
Total Volume	85	469	4	0	558	0	406	105	0	511	150	3	99	0	252	5	0	1	0	6	1327
% App. Total	15.2	84.1	0.7	0.0	100	0.0	79.5	20.5	0.0	100	59.5	1.2	39.3	0.0	100	83.3	0.0	16.7	0.0	100	
PHF	0.889					0.968					0.724					0.500					0.887
Cars, PU, Vans	81	458	4	0	543	0	395	105	0	500	148	3	99	0	250	5	0	1	0	6	1299
% Cars, PU, Vans	95.3	97.7	100.0	0.0	97.3	0.0	97.3	100.0	0.0	97.8	98.7	100.0	100.0	0.0	99.2	100.0	0.0	100.0	0.0	100.0	97.9
Buses	2	1	0	0	3	0	2	0	0	2	2	0	0	0	2	0	0	0	0	0	7
%Buses	2.4	0.2	0.0	0.0	0.5	0.0	0.5	0.0	0.0	0.4	1.3	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.5
HT	2	10	0	0	12	0	9	0	0	9	0	0	0	0	0	0	0	0	0	0	21
%HT	2.4	2.1	0.0	0.0	2.2	0.0	2.2	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6

Project ID: 25-430032-002

Location: Main St/SR 28 & Birch Meadow Dr/Lawrence Rd

City: Reading

PEAK HOURS

Day: Thursday

Date: 3/6/2025

PM

	Main St/SR 28 Northbound						Main St/SR 28 Southbound					Birch Meadow Dr/Lawrence Rd Eastbound					Birch Meadow Dr/Lawrence Rd Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total		Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 04:00 PM - 06:00 PM																						
Peak Hour for Entire Intersection Begins at 04:45 PM																						
4:45 PM	16	99	1	0	116		0	118	26	0	144	15	0	26	0	41	0	0	0	0	0	301
5:00 PM	22	101	0	0	123		0	106	26	0	132	26	0	18	0	44	3	1	0	0	4	303
5:15 PM	20	88	0	0	108		0	97	19	0	116	24	0	12	0	36	0	0	1	0	1	261
5:30 PM	26	97	0	0	123		0	99	22	0	121	19	1	24	0	44	2	0	1	0	3	291
Total Volume	84	385	1	0	470		0	420	93	0	513	84	1	80	0	165	5	1	2	0	8	1156
% App. Total	17.9	81.9	0.2	0.0	100		0.0	81.9	18.1	0.0	100	50.9	0.6	48.5	0.0	100	62.5	12.5	25.0	0.0	100	
PHF	0.955						0.891					0.938					0.500					0.954
Cars, PU, Vans	84	384	1	0	469		0	419	92	0	511	84	1	80	0	165	4	1	2	0	7	1152
% Cars, PU, Vans	100.0	99.7	100.0	0.0	99.8		0.0	99.8	98.9	0.0	99.6	100.0	100.0	100.0	0.0	100.0	80.0	100.0	100.0	0.0	87.5	99.7
Heavy trucks	0	1	0	0	1		0	1	1	0	2	0	0	0	0	0	1	0	0	0	1	4
% Heavy trucks	0.0	0.3	0.0	0.0	0.2		0.0	0.2	1.1	0.0	0.4	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	12.5	0.3

National Data & Surveying Services

Intersection Turning Movement Count

Location: Main St/SR 28 & Salem St/SR 129
City: Reading
Control: Signalized

Project ID: 25-430032-001
Date: 3/6/2025

Data - Total

NS/EW Streets:	Main St/SR 28				Main St/SR 28				Salem St/SR 129				Salem St/SR 129				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	2 NT	0 NR	0 NU	0 SL	2 ST	0 SR	0 SU	1 EL	1 ET	0 ER	0 EU	0 WL	1 WT	1 WR	0 WU	
7:00 AM	14	40	1	0	16	82	7	0	7	82	4	0	4	92	5	0	354
7:15 AM	17	60	1	0	21	105	8	0	6	106	10	0	3	124	7	0	468
7:30 AM	28	71	3	0	28	115	10	0	12	94	14	0	2	107	4	0	488
7:45 AM	20	86	1	0	30	125	3	0	18	118	14	0	7	87	6	0	515
8:00 AM	26	119	2	0	17	153	4	0	14	81	21	0	6	107	14	0	564
8:15 AM	19	129	4	0	53	137	19	0	9	108	15	0	12	91	6	0	602
8:30 AM	20	78	1	0	47	125	10	0	8	130	20	0	6	95	4	0	544
8:45 AM	33	79	0	0	32	96	9	0	7	135	13	0	12	92	10	0	518
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	177	662	13	0	244	938	70	0	81	854	111	0	52	795	56	0	4053
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	85	412	8	0	147	540	36	0	49	437	70	0	31	380	30	0	2225
PEAK HR FACTOR :	0.817	0.798	0.500	0.000	0.693	0.882	0.474	0.000	0.681	0.840	0.833	0.000	0.646	0.888	0.536	0.000	0.924
	0.831				0.865				0.880				0.868				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	2 NT	0 NR	0 NU	0 SL	2 ST	0 SR	0 SU	1 EL	1 ET	0 ER	0 EU	0 WL	1 WT	1 WR	0 WU	
2:00 PM	18	98	6	0	12	63	12	0	12	92	16	0	10	54	15	0	408
2:15 PM	20	98	8	0	25	79	6	0	8	83	15	0	7	66	14	0	429
2:30 PM	18	100	2	0	24	69	8	0	19	88	19	0	5	67	14	0	433
2:45 PM	23	125	3	0	29	93	14	0	11	117	17	0	3	67	9	0	511
3:00 PM	26	130	7	0	45	110	13	0	14	113	17	0	7	82	30	0	594
3:15 PM	24	122	2	0	42	99	11	0	11	112	13	0	6	68	21	0	531
3:30 PM	26	141	2	0	22	112	9	0	21	133	19	0	3	75	10	0	573
3:45 PM	17	104	3	0	30	70	12	0	15	129	9	0	9	71	14	0	483
4:00 PM	20	122	6	0	21	84	7	0	10	123	7	0	7	77	13	0	497
4:15 PM	22	137	1	0	29	87	11	0	9	95	8	0	7	70	17	0	493
4:30 PM	20	128	8	0	35	83	14	0	18	110	13	0	6	71	14	0	520
4:45 PM	23	118	3	0	33	98	11	0	12	102	9	0	7	66	9	0	491
5:00 PM	40	114	4	0	39	99	14	0	27	97	17	0	6	69	10	0	536
5:15 PM	39	107	3	0	32	90	14	0	16	103	23	0	5	76	7	0	515
5:30 PM	46	112	5	0	38	84	10	0	21	104	14	0	1	76	9	0	520
5:45 PM	34	90	9	0	38	93	13	0	33	99	10	0	3	69	10	0	501
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	416	1846	72	0	494	1413	179	0	257	1700	226	0	92	1124	216	0	8035
PEAK HR :	02:45 PM - 03:45 PM																TOTAL
PEAK HR VOL :	99	518	14	0	138	414	47	0	57	475	66	0	19	292	70	0	2209
PEAK HR FACTOR :	0.952	0.918	0.500	0.000	0.767	0.924	0.839	0.000	0.679	0.893	0.868	0.000	0.679	0.890	0.583	0.000	0.930
	0.933				0.891				0.864				0.800				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Main St/SR 28 & Salem St/SR 129
City: Reading
Control: Signalized

Project ID: 25-430032-001
Date: 3/6/2025

Data - Cars

NS/EW Streets:	Main St/SR 28				Main St/SR 28				Salem St/SR 129				Salem St/SR 129				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	2 NT	0 NR	0 NU	0 SL	2 ST	0 SR	0 SU	1 EL	1 ET	0 ER	0 EU	0 WL	1 WT	1 WR	0 WU	
7:00 AM	13	36	1	0	14	80	7	0	7	79	4	0	3	86	4	0	334
7:15 AM	13	57	0	0	20	102	8	0	6	99	10	0	3	121	7	0	446
7:30 AM	27	69	2	0	27	110	8	0	10	93	12	0	2	105	3	0	468
7:45 AM	20	83	1	0	30	122	3	0	17	116	14	0	7	84	5	0	502
8:00 AM	26	116	2	0	17	150	4	0	14	75	19	0	5	103	12	0	543
8:15 AM	19	126	4	0	51	136	18	0	9	102	14	0	12	89	6	0	586
8:30 AM	20	76	1	0	44	122	10	0	8	120	19	0	6	91	3	0	520
8:45 AM	32	73	0	0	32	93	9	0	7	131	13	0	10	88	7	0	495
TOTAL VOLUMES:	NL 170	NT 636	NR 11	NU 0	SL 235	ST 915	SR 67	SU 0	EL 78	ET 815	ER 105	EU 0	WL 48	WT 767	WR 47	WU 0	TOTAL 3894
APPROACH %'s:	20.81%	77.85%	1.35%	0.00%	19.31%	75.18%	5.51%	0.00%	7.82%	81.66%	10.52%	0.00%	5.57%	88.98%	5.45%	0.00%	
PEAK HR:	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL:	85	401	8	0	142	530	35	0	48	413	66	0	30	367	26	0	2151
PEAK HR FACTOR:	0.817	0.796	0.500	0.000	0.696	0.883	0.486	0.000	0.706	0.860	0.868	0.000	0.625	0.891	0.542	0.000	0.918
	0.829				0.862				0.896				0.881				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	2 NT	0 NR	0 NU	0 SL	2 ST	0 SR	0 SU	1 EL	1 ET	0 ER	0 EU	0 WL	1 WT	1 WR	0 WU	
2:00 PM	17	97	6	0	12	60	12	0	12	87	15	0	9	51	14	0	392
2:15 PM	18	91	8	0	22	78	6	0	8	74	15	0	7	66	14	0	407
2:30 PM	18	98	2	0	23	66	7	0	19	85	18	0	5	65	13	0	419
2:45 PM	21	123	3	0	29	92	13	0	11	110	17	0	3	65	7	0	494
3:00 PM	25	127	7	0	45	109	13	0	14	110	17	0	7	81	30	0	585
3:15 PM	24	120	2	0	42	96	10	0	11	109	13	0	6	66	20	0	519
3:30 PM	25	139	2	0	22	111	9	0	19	130	18	0	3	73	7	0	558
3:45 PM	17	99	3	0	28	68	12	0	15	127	9	0	9	71	13	0	471
4:00 PM	19	122	5	0	21	84	7	0	10	120	6	0	7	73	13	0	487
4:15 PM	22	134	1	0	29	87	11	0	9	94	8	0	7	68	17	0	487
4:30 PM	19	128	7	0	35	83	13	0	18	109	13	0	6	71	14	0	516
4:45 PM	23	115	3	0	33	98	11	0	12	99	9	0	7	64	9	0	483
5:00 PM	40	114	4	0	39	99	14	0	26	96	17	0	5	67	10	0	531
5:15 PM	37	107	3	0	30	89	14	0	16	100	23	0	5	75	6	0	505
5:30 PM	46	112	5	0	38	84	10	0	20	104	13	0	1	70	9	0	512
5:45 PM	33	90	8	0	38	92	13	0	33	98	10	0	3	68	10	0	496
TOTAL VOLUMES:	NL 404	NT 1816	NR 69	NU 0	SL 486	ST 1396	SR 175	SU 0	EL 253	ET 1652	ER 221	EU 0	WL 90	WT 1094	WR 206	WU 0	TOTAL 7862
APPROACH %'s:	17.65%	79.34%	3.01%	0.00%	23.63%	67.87%	8.51%	0.00%	11.90%	77.70%	10.40%	0.00%	6.47%	78.71%	14.82%	0.00%	
PEAK HR:	02:45 PM - 03:45 PM																TOTAL
PEAK HR VOL:	95	509	14	0	138	408	45	0	55	459	65	0	19	285	64	0	2156
PEAK HR FACTOR:	0.950	0.915	0.500	0.000	0.767	0.919	0.865	0.000	0.724	0.883	0.903	0.000	0.679	0.880	0.533	0.000	0.921
	0.931				0.885				0.867				0.780				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Main St/SR 28 & Salem St/SR 129
City: Reading
Control: Signalized

Project ID: 25-430032-001
Date: 3/6/2025

Data - Buses

NS/EW Streets:	Main St/SR 28				Main St/SR 28				Salem St/SR 129				Salem St/SR 129				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	2 NT	0 NR	0 NU	0 SL	2 ST	0 SR	0 SU	1 EL	1 ET	0 ER	0 EU	0 WL	1 WT	1 WR	0 WU	
7:00 AM	0	0	0	0	1	1	0	0	0	1	0	0	0	1	0	0	4
7:15 AM	0	0	1	0	0	0	0	0	0	2	0	0	0	1	0	0	4
7:30 AM	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	3
7:45 AM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
8:00 AM	0	0	0	0	0	0	0	0	0	2	0	0	1	2	0	0	5
8:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
TOTAL VOLUMES:	NL 0	NT 4	NR 1	NU 0	SL 1	ST 4	SR 0	SU 0	EL 0	ET 6	ER 1	EU 0	WL 1	WT 4	WR 0	WU 0	TOTAL 22
APPROACH %'s:	0.00%	80.00%	20.00%	0.00%	20.00%	80.00%	0.00%	0.00%	0.00%	85.71%	14.29%	0.00%	20.00%	80.00%	0.00%	0.00%	
PEAK HR:	07:45 AM - 08:45 AM																TOTAL 9
PEAK HR VOL:	0	3	0	0	0	1	0	0	0	2	0	0	1	2	0	0	
PEAK HR FACTOR:	0.000	0.375	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.250	0.250	0.000	0.000	0.450
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	2 NT	0 NR	0 NU	0 SL	2 ST	0 SR	0 SU	1 EL	1 ET	0 ER	0 EU	0 WL	1 WT	1 WR	0 WU	
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
3:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
3:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3:30 PM	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	3
3:45 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
4:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	3
5:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	NL 0	NT 6	NR 2	NU 0	SL 0	ST 2	SR 0	SU 0	EL 1	ET 1	ER 1	EU 0	WL 1	WT 3	WR 2	WU 0	TOTAL 19
APPROACH %'s:	0.00%	75.00%	25.00%	0.00%	0.00%	100.00%	0.00%	0.00%	33.33%	33.33%	33.33%	0.00%	16.67%	50.00%	33.33%	0.00%	
PEAK HR:	02:45 PM - 03:45 PM																TOTAL 7
PEAK HR VOL:	0	2	0	0	0	1	0	0	0	0	1	0	0	1	2	0	
PEAK HR FACTOR:	0.000	0.500	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.250	0.500	0.000	0.583

National Data & Surveying Services

Intersection Turning Movement Count

Location: Main St/SR 28 & Salem St/SR 129
City: Reading
Control: Signalized

Project ID: 25-430032-001
Date: 3/6/2025

Data - HT

NS/EW Streets:	Main St/SR 28				Main St/SR 28				Salem St/SR 129				Salem St/SR 129				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	2 NT	0 NR	0 NU	0 SL	2 ST	0 SR	0 SU	1 EL	1 ET	0 ER	0 EU	0 WL	1 WT	1 WR	0 WU	
7:00 AM	1	4	0	0	1	1	0	0	0	2	0	0	1	5	1	0	16
7:15 AM	4	3	0	0	1	3	0	0	0	5	0	0	0	2	0	0	18
7:30 AM	1	2	1	0	1	3	2	0	2	1	1	0	0	2	1	0	17
7:45 AM	0	1	0	0	0	2	0	0	1	2	0	0	0	3	1	0	10
8:00 AM	0	3	0	0	0	3	0	0	0	4	2	0	0	2	2	0	16
8:15 AM	0	2	0	0	2	1	1	0	0	6	1	0	0	2	0	0	15
8:30 AM	0	2	0	0	3	3	0	0	0	10	1	0	0	4	1	0	24
8:45 AM	1	5	0	0	0	3	0	0	0	3	0	0	2	4	3	0	21
TOTAL VOLUMES:	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s:	23.33%	73.33%	3.33%	0.00%	26.67%	63.33%	10.00%	0.00%	7.32%	80.49%	12.20%	0.00%	8.33%	66.67%	25.00%	0.00%	137
PEAK HR:	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL:	0	8	0	0	5	9	1	0	1	22	4	0	0	11	4	0	65
PEAK HR FACTOR:	0.000	0.667	0.000	0.000	0.417	0.750	0.250	0.000	0.250	0.550	0.500	0.000	0.000	0.688	0.500	0.000	0.677
	0.667				0.625				0.614				0.750				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	2 NT	0 NR	0 NU	0 SL	2 ST	0 SR	0 SU	1 EL	1 ET	0 ER	0 EU	0 WL	1 WT	1 WR	0 WU	
2:00 PM	1	1	0	0	0	3	0	0	0	5	1	0	1	2	1	0	15
2:15 PM	2	7	0	0	3	1	0	0	0	9	0	0	0	0	0	0	22
2:30 PM	0	1	0	0	1	3	1	0	0	3	1	0	0	2	1	0	13
2:45 PM	2	2	0	0	0	1	1	0	0	7	0	0	0	2	1	0	16
3:00 PM	1	2	0	0	0	1	0	0	0	3	0	0	0	0	0	0	7
3:15 PM	0	2	0	0	0	2	1	0	0	3	0	0	0	2	1	0	11
3:30 PM	1	1	0	0	0	1	0	0	2	3	0	0	0	2	2	0	12
3:45 PM	0	3	0	0	2	2	0	0	0	2	0	0	0	0	1	0	10
4:00 PM	1	0	0	0	0	0	0	0	0	3	1	0	0	4	0	0	9
4:15 PM	0	2	0	0	0	0	0	0	0	1	0	0	0	2	0	0	5
4:30 PM	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3
4:45 PM	0	3	0	0	0	0	0	0	0	3	0	0	0	2	0	0	8
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
5:15 PM	2	0	0	0	2	0	0	0	0	3	0	0	0	1	1	0	9
5:30 PM	0	0	0	0	0	0	0	0	1	0	1	0	0	5	0	0	7
5:45 PM	1	0	1	0	0	1	0	0	0	1	0	0	0	1	0	0	5
TOTAL VOLUMES:	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s:	32.43%	64.86%	2.70%	0.00%	29.63%	55.56%	14.81%	0.00%	5.56%	87.04%	7.41%	0.00%	2.78%	75.00%	22.22%	0.00%	154
PEAK HR:	02:45 PM - 03:45 PM																TOTAL
PEAK HR VOL:	4	7	0	0	0	5	2	0	2	16	0	0	0	6	4	0	46
PEAK HR FACTOR:	0.500	0.875	0.000	0.000	0.000	0.625	0.500	0.000	0.250	0.571	0.000	0.000	0.000	0.750	0.500	0.000	0.719
	0.688				0.583				0.643				0.625				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Main St/SR 28 & Salem St/SR 129
City: Reading
Control: Signalized

Project ID: 25-430032-001
Date: 3/6/2025

Data - Bikes

NS/EW Streets:	Main St/SR 28				Main St/SR 28				Salem St/SR 129				Salem St/SR 129				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	2 NT	0 NR	0 NU	0 SL	2 ST	0 SR	0 SU	1 EL	1 ET	0 ER	0 EU	0 WL	1 WT	1 WR	0 WU	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	NL 1	NT 0	NR 0	NU 0	SL 0	ST 1	SR 0	SU 0	EL 0	ET 0	ER 0	EU 0	WL 0	WT 1	WR 0	WU 0	TOTAL 3
APPROACH %'s :	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0	0	0	0	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL 3
PEAK HR VOL :	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	
PEAK HR FACTOR :	0.250	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.750
	0.250				0.250								0.250				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	2 NT	0 NR	0 NU	0 SL	2 ST	0 SR	0 SU	1 EL	1 ET	0 ER	0 EU	0 WL	1 WT	1 WR	0 WU	
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	NL 0	NT 0	NR 0	NU 0	SL 0	ST 1	SR 0	SU 0	EL 0	ET 0	ER 0	EU 0	WL 0	WT 2	WR 1	WU 0	TOTAL 4
APPROACH %'s :	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	66.67%	33.33%	0.00%	
PEAK HR :	02:45 PM - 03:45 PM																TOTAL 2
PEAK HR VOL :	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.500
					0.250								0.250				

National Data & Surveying Services
Intersection Turning Movement Count

Location: Main St/SR 28 & Salem St/SR 129
City: Reading

Project ID: 25-430032-001
Date: 3/6/2025

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Main St/SR 28		Main St/SR 28		Salem St/SR 129		Salem St/SR 129		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
7:00 AM	1	0	3	0	0	0	0	1	5
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	2	0	0	2	0	0	0	4
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	1	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	2	0	2	0	0	2	0	6
TOTAL VOLUMES :	EB 1	WB 4	EB 4	WB 2	NB 2	SB 0	NB 2	SB 1	TOTAL 16
APPROACH %'s :	20.00%	80.00%	66.67%	33.33%	100.00%	0.00%	66.67%	33.33%	
PEAK HR :	07:45 AM - 08:45 AM								TOTAL
PEAK HR VOL :	0	0	1	0	0	0	0	0	1
PEAK HR FACTOR :			0.250	0.250					0.250

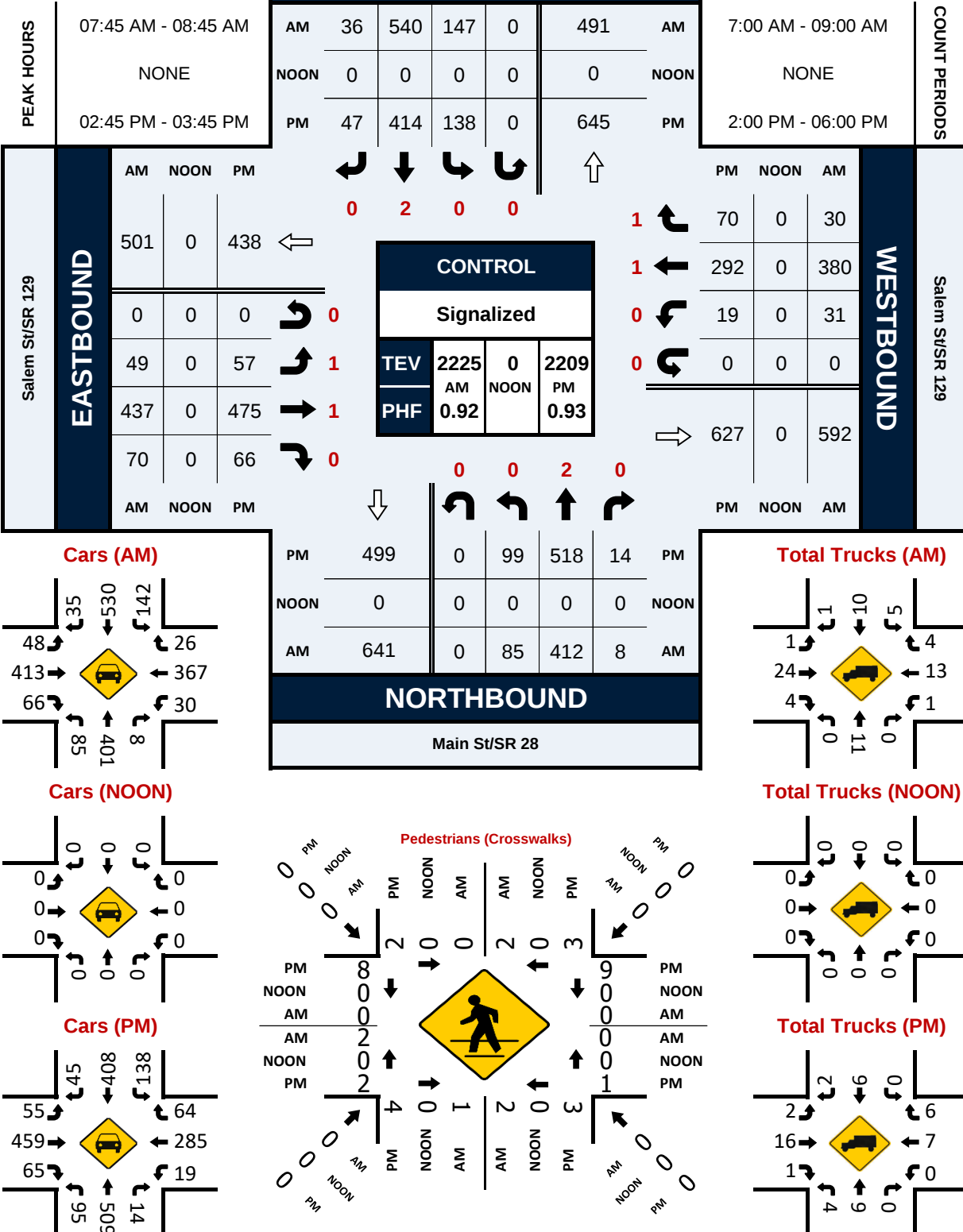
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
2:00 PM	0	0	0	0	0	1	0	0	1
2:15 PM	4	0	0	0	0	3	0	1	8
2:30 PM	0	1	0	0	1	0	0	0	2
2:45 PM	0	3	0	3	0	6	1	1	14
3:00 PM	0	0	0	0	0	0	1	0	1
3:15 PM	2	0	2	0	0	3	0	5	12
3:30 PM	0	0	2	0	1	0	0	2	5
3:45 PM	0	2	2	0	1	0	0	2	7
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	1	0	0	0	0	2	3
4:30 PM	0	0	0	1	0	1	1	0	3
4:45 PM	0	0	0	1	1	1	0	0	3
5:00 PM	0	0	0	3	2	3	0	0	8
5:15 PM	0	2	0	2	1	0	0	3	8
5:30 PM	3	1	11	0	1	0	3	1	20
5:45 PM	0	1	0	0	0	0	0	1	2
TOTAL VOLUMES :	EB 9	WB 10	EB 18	WB 10	NB 8	SB 18	NB 6	SB 18	TOTAL 97
APPROACH %'s :	47.37%	52.63%	64.29%	35.71%	30.77%	69.23%	25.00%	75.00%	
PEAK HR :	02:45 PM - 03:45 PM								TOTAL
PEAK HR VOL :	2	3	4	3	1	9	2	8	32
PEAK HR FACTOR :	0.250	0.250	0.500	0.250	0.250	0.375	0.500	0.400	0.571
	0.417		0.583		0.417		0.500		

Main St/SR 28 & Salem St/SR 129

Peak Hour Turning Movement Count

ID: 25-430032-001
City: Reading

Day: Thursday
Date: 3/6/2025



Project ID: 25-430032-001
 Location: Main St/SR 28 & Salem St/SR 129
 City: Reading

Day: Thursday
 Date: 3/6/2025

Groups Printed - Cars, PU, Vans - Heavy Trucks																									
	Main St/SR 28 Northbound						Main St/SR 28 Southbound						Salem St/SR 129 Eastbound						Salem St/SR 129 Westbound						
Start Time	Left	Thru	Rght	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Int. Total
7:00 AM	14	40	1	0	3	55	16	82	7	0	1	105	7	82	4	0	1	93	4	92	5	0	0	101	354
7:15 AM	17	60	1	0	0	78	21	105	8	0	0	134	6	106	10	0	0	122	3	124	7	0	0	134	468
7:30 AM	28	71	3	0	0	102	28	115	10	0	2	153	12	94	14	0	0	120	2	107	4	0	2	113	488
7:45 AM	20	86	1	0	0	107	30	125	3	0	0	158	18	118	14	0	0	150	7	87	6	0	0	100	515
Total	79	257	6	0	3	342	95	427	28	0	3	550	43	400	42	0	1	485	16	410	22	0	2	448	1825
8:00 AM	26	119	2	0	1	147	17	153	4	0	0	174	14	81	21	0	0	116	6	107	14	0	0	127	564
8:15 AM	19	129	4	0	0	152	53	137	19	0	0	209	9	108	15	0	0	132	12	91	6	0	0	109	602
8:30 AM	20	78	1	0	0	99	47	125	10	0	0	182	8	130	20	0	0	158	6	95	4	0	0	105	544
8:45 AM	33	79	0	0	2	112	32	96	9	0	2	137	7	135	13	0	2	155	12	92	10	0	0	114	518
Total	98	405	7	0	3	510	149	511	42	0	2	702	38	454	69	0	2	561	36	385	34	0	0	455	2228
BREAK																									
2:00 PM	18	98	6	0	0	122	12	63	12	0	0	87	12	92	16	0	0	120	10	54	15	0	1	79	408
2:15 PM	20	98	8	0	0	126	25	79	6	0	4	110	8	83	15	0	1	106	7	66	14	0	3	87	429
2:30 PM	18	100	2	0	0	120	24	69	8	0	1	101	19	88	19	0	0	126	5	67	14	0	1	86	433
2:45 PM	23	125	3	0	3	151	29	93	14	0	3	136	11	117	17	0	2	145	3	67	9	0	6	79	511
Total	79	421	19	0	3	519	90	304	40	0	8	434	50	380	67	0	3	497	25	254	52	0	11	331	1781
3:00 PM	26	130	7	0	0	163	45	110	13	0	0	168	14	113	17	0	1	144	7	82	30	0	0	119	594
3:15 PM	24	122	2	0	2	148	42	99	11	0	2	152	11	112	13	0	5	136	6	68	21	0	3	95	531
3:30 PM	26	141	2	0	2	169	22	112	9	0	0	143	21	133	19	0	2	173	3	75	10	0	1	88	573
3:45 PM	17	104	3	0	2	124	30	70	12	0	2	112	15	129	9	0	2	153	9	71	14	0	1	94	483
Total	93	497	14	0	6	604	139	391	45	0	4	575	61	487	58	0	10	606	25	296	75	0	5	396	2181
4:00 PM	20	122	6	0	0	148	21	84	7	0	0	112	10	123	7	0	0	140	7	77	13	0	0	97	497
4:15 PM	22	137	1	0	1	160	29	87	11	0	0	127	9	95	8	0	2	112	7	70	17	0	0	94	493
4:30 PM	20	128	8	0	1	156	35	83	14	0	0	132	18	110	13	0	1	141	6	71	14	0	1	91	520
4:45 PM	23	118	3	0	1	144	33	98	11	0	0	142	12	102	9	0	0	123	7	66	9	0	2	82	491
Total	85	505	18	0	3	608	118	352	43	0	0	513	49	430	37	0	3	516	27	284	53	0	3	364	2001
5:00 PM	40	114	4	0	3	158	39	99	14	0	0	152	27	97	17	0	0	141	6	69	10	0	5	85	536
5:15 PM	39	107	3	0	2	149	32	90	14	0	2	136	16	103	23	0	3	142	5	76	7	0	1	88	515
5:30 PM	46	112	5	0	11	163	38	84	10	0	4	132	21	104	14	0	4	139	1	76	9	0	1	86	520
5:45 PM	34	90	9	0	0	133	38	93	13	0	1	144	33	99	10	0	1	142	3	69	10	0	0	82	501
Total	159	423	21	0	16	603	147	366	51	0	7	564	97	403	64	0	8	564	15	290	36	0	7	341	2072
Grand Total	593	2508	85	0	34	3186	738	2351	249	0	24	3338	338	2554	337	0	27	3229	144	1919	272	0	28	2335	12088
Apprch %	18.6	78.7	2.7	0.0	1.1		22.1	70.4	7.5	0.0	0.7		10.5	79.1	10.4	0.0	0.8		6.2	82.2	11.6	0.0	1.2		
Total %	4.9	20.7	0.7	0.0	0.3	26.4	6.1	19.4	2.1	0.0	0.2	27.6	2.8	21.1	2.8	0.0	0.2	26.7	1.2	15.9	2.3	0.0	0.2	19.3	
Cars, PU, Vans	574	2452	80	0		3106	721	2311	242	0		3274	331	2467	326	0		3124	138	1861	253	0		2252	11756
% Cars, PU, Vans	96.8	97.8	94.1	0.0		97.5	97.7	98.3	97.2	0.0		98.1	97.9	96.6	96.7	0.0		96.7	95.8	97.0	93.0	0.0		96.4	97.3
Buses	0	10	3	0		13	1	6	0	0		7	1	7	2	0		10	2	7	2	0		11	41
%Buses	0.0	0.4	3.5	0.0		0.4	0.1	0.3	0.0	0.0		0.2	0.3	0.3	0.6	0.0		0.3	1.4	0.4	0.7	0.0		0.5	0.3
HT	19	46	2	0		67	16	34	7	0		57	6	80	9	0		95	4	51	17	0		72	291
%HT	3.2	1.8	2.4	0.0		2.1	2.2	1.4	2.8	0.0		1.7	1.8	3.1	2.7	0.0		2.9	2.8	2.7	6.3	0.0		3.1	2.4

Project ID: 25-430032-001
Location: Main St/SR 28 & Salem St/SR 129
City: Reading

PEAK HOURS

Day: Thursday
Date: 3/6/2025

AM

	Main St/SR 28 Northbound					Main St/SR 28 Southbound					Salem St/SR 129 Eastbound					Salem St/SR 129 Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 07:00 AM - 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
7:45 AM	20	86	1	0	107	30	125	3	0	158	18	118	14	0	150	7	87	6	0	100	515
8:00 AM	26	119	2	0	147	17	153	4	0	174	14	81	21	0	116	6	107	14	0	127	564
8:15 AM	19	129	4	0	152	53	137	19	0	209	9	108	15	0	132	12	91	6	0	109	602
8:30 AM	20	78	1	0	99	47	125	10	0	182	8	130	20	0	158	6	95	4	0	105	544
Total Volume	85	412	8	0	505	147	540	36	0	723	49	437	70	0	556	31	380	30	0	441	2225
% App. Total	16.8	81.6	1.6	0.0	100	20.3	74.7	5.0	0.0	100	8.8	78.6	12.6	0.0	100	7.0	86.2	6.8	0.0	100	
PHF	0.831					0.865					0.880					0.868					0.924
Cars, PU, Vans	84	398	8	0	490	142	530	35	0	707	49	411	66	0	526	28	366	24	0	418	2141
% Cars, PU, Vans	98.8	96.6	100.0	0.0	97.0	96.6	98.1	97.2	0.0	97.8	100.0	94.1	94.3	0.0	94.6	90.3	96.3	80.0	0.0	94.8	96.2
Buses	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	1	2	0	0	3	8
%Buses	0.0	0.5	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.5	3.2	0.5	0.0	0.0	0.7	0.4
HT	1	12	0	0	13	5	10	1	0	16	0	23	4	0	27	2	12	6	0	20	76
%HT	1.2	2.9	0.0	0.0	2.6	3.4	1.9	2.8	0.0	2.2	0.0	5.3	5.7	0.0	4.9	6.5	3.2	20.0	0.0	4.5	3.4

PM

	Main St/SR 28 Northbound					Main St/SR 28 Southbound					Salem St/SR 129 Eastbound					Salem St/SR 129 Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 02:00 PM - 06:00 PM																					
Peak Hour for Entire Intersection Begins at 02:45 PM																					
2:45 PM	23	125	3	0	151	29	93	14	0	136	11	117	17	0	145	3	67	9	0	79	511
3:00 PM	26	130	7	0	163	45	110	13	0	168	14	113	17	0	144	7	82	30	0	119	594
3:15 PM	24	122	2	0	148	42	99	11	0	152	11	112	13	0	136	6	68	21	0	95	531
3:30 PM	26	141	2	0	169	22	112	9	0	143	21	133	19	0	173	3	75	10	0	88	573
Total Volume	99	518	14	0	631	138	414	47	0	599	57	475	66	0	598	19	292	70	0	381	2209
% App. Total	15.7	82.1	2.2	0.0	100	23.0	69.1	7.8	0.0	100	9.5	79.4	11.0	0.0	100	5.0	76.6	18.4	0.0	100	
PHF	0.933					0.891					0.864					0.800					0.930
Cars, PU, Vans	95	509	14	0	618	138	408	45	0	591	55	459	65	0	579	19	285	64	0	368	2156
% Cars, PU, Vans	96.0	98.3	100.0	0.0	97.9	100.0	98.6	95.7	0.0	98.7	96.5	96.6	98.5	0.0	96.8	100.0	97.6	91.4	0.0	96.6	97.6
Buses	0	2	0	0	2	0	1	0	0	1	0	0	1	0	1	0	1	2	0	3	7
%Buses	0.0	0.4	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.2	0.0	0.0	1.5	0.0	0.2	0.0	0.3	2.9	0.0	0.8	0.3
HT	4	7	0	0	11	0	5	2	0	7	2	16	0	0	18	0	6	4	0	10	46
%HT	4.0	1.4	0.0	0.0	1.7	0.0	1.2	4.3	0.0	1.2	3.5	3.4	0.0	0.0	3.0	0.0	2.1	5.7	0.0	2.6	2.1

Project ID: 25-430032-001
Location: Main St/SR 28 & Salem St/SR 129
City: Reading

PEAK HOURS

Day: Thursday
Date: 3/6/2025

PM

	Main St/SR 28 Northbound						Main St/SR 28 Southbound					Salem St/SR 129 Eastbound					Salem St/SR 129 Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total		Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 04:00 PM - 06:00 PM																						
Peak Hour for Entire Intersection Begins at 04:45 PM																						
4:45 PM	23	118	3	0	144		33	98	11	0	142	12	102	9	0	123	7	66	9	0	82	491
5:00 PM	40	114	4	0	158		39	99	14	0	152	27	97	17	0	141	6	69	10	0	85	536
5:15 PM	39	107	3	0	149		32	90	14	0	136	16	103	23	0	142	5	76	7	0	88	515
5:30 PM	46	112	5	0	163		38	84	10	0	132	21	104	14	0	139	1	76	9	0	86	520
Total Volume	148	451	15	0	614		142	371	49	0	562	76	406	63	0	545	19	287	35	0	341	2062
% App. Total	24.1	73.5	2.4	0.0	100		25.3	66.0	8.7	0.0	100	13.9	74.5	11.6	0.0	100	5.6	84.2	10.3	0.0	100	
PHF	0.942						0.924					0.960					0.969					0.962
Cars, PU, Vans	145	451	14	0	610		140	370	49	0	559	75	402	62	0	539	19	278	34	0	331	2039
% Cars, PU, Vans	98.0	100.0	93.3	0.0	99.3		98.6	99.7	100.0	0.0	99.5	98.7	99.0	98.4	0.0	98.9	100.0	96.9	97.1	0.0	97.1	98.9
Heavy trucks	3	0	1	0	4		2	1	0	0	3	1	4	1	0	6	0	9	1	0	10	23
%Heavy trucks	2.0	0.0	6.7	0.0	0.7		1.4	0.3	0.0	0.0	0.5	1.3	1.0	1.6	0.0	1.1	0.0	3.1	2.9	0.0	2.9	1.1

MASSDOT TRAFFIC COUNT DATA STATIONING

chrome-extension://mbniclmhobmnbdlpipghaielnnpqdp/screenshot.html?id=screenshot_0.6289538398564714

MOTOR VEHICLE COLLISION SUMMARY TABLES

STONEFIELD

Table A1: Motor Vehicle Collisions

Crash ID #	Date	Time	Property Damage	Injury	Fatality	Light Conditions	Roadway Conditions	Violations/Contributing Factors	Manner of Collisions	Location
4681891	3/27/2019	9:25 AM	Yes	No	No	Daylight	Dry	No Improper Driving	Rear-end	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
4683059	3/31/2019	12:17 PM	Yes	Yes	No	Daylight	Dry	Inattention	Backing	Main Street & Salem Street
4685084	4/3/2019	1:30 PM	Yes	No	No	Daylight	Dry	Inattention	Rear-end	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
4685930	4/6/2019	1:47 PM	Yes	Yes	No	Daylight	Dry	Followed Too Closely	Rear-end	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
4699712	5/10/2019	2:22 PM	Yes	No	No	Daylight	Wet	Failed to Yield Right of Way	Angle	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
4701664	5/14/2019	2:47 PM	Yes	No	No	Daylight	Wet	Disregarded Traffic Signs	Sideswipe, opposite direction	Main Street & Salem Street
4702733	5/18/2019	11:58 AM	Yes	No	No	Daylight	Dry	Unknown	Collision with Fixed Object	Main Street & Salem Street
4703515	5/21/2019	7:55 AM	Yes	Yes	No	Daylight	Dry	Distracted	Rear-end	Main Street & Birch Meadow Drive/Lawrence Road
4706187	5/28/2019	10:38 AM	Yes	No	No	Daylight	Dry	Made an Improper Turn	Sideswipe, same direction	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
4707567	5/31/2019	8:25 AM	Yes	No	No	Daylight	Dry	Followed Too Closely / Other Improper Action	Angle	Main Street & Salem Street
4708077	6/3/2019	6:27 AM	Yes	No	No	Daylight	Dry	Disregarded Traffic Signs	Angle	Main Street & Salem Street
4710127	6/8/2019	12:24 PM	Yes	No	No	Daylight	Dry	No Improper Driving	Sideswipe, opposite direction	Main Street & Salem Street
4716514	6/24/2019	4:19 PM	Yes	No	No	Daylight	Dry	Followed Too Closely / Distracted	Rear-end	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
4754201	9/26/2019	4:31 PM	Yes	No	No	Daylight	Dry	Inattention	Sideswipe, same direction	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
4757767	10/6/2019	11:53 AM	Yes	No	No	Daylight	Dry	Inattention	Backing	Main Street & Salem Street
4762998	10/18/2019	6:52 PM	Yes	No	No	Dark - lighted roadway	Dry	Failed to Yield Right of Way	Angle	Main Street & Salem Street
4774783	11/14/2019	5:25 PM	Yes	No	No	Dusk	Dry	No Improper Driving	Angle	Main Street & Salem Street
4777718	10/23/2019	8:45 AM	Yes	Yes	No	Daylight	Wet	No Improper Driving	Rear-end	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
4791071	12/17/2019	3:19 PM	Yes	No	No	Daylight	Wet	No Improper Driving	Angle	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
4791867	12/21/2019	3:23 PM	Yes	No	No	Daylight	Dry	Other improper Action	Rear-end	Main Street & Salem Street
4793333	12/24/2019	6:06 PM	Yes	No	No	Dark - lighted roadway	Dry	No Improper Driving	Sideswipe, same direction	Main Street & Salem Street
4793786	12/26/2019	10:14 AM	Yes	No	No	Daylight	Dry	Failed to Yield Right of Way	Angle	Main Street & Salem Street
4807836	1/23/2020	7:24 AM	Yes	No	No	Daylight	Dry	Made an Improper Turn	Sideswipe, same direction	Main Street & Salem Street
4818113	2/15/2020	11:47 AM	Yes	No	No	Daylight	Dry	Followed Too Closely / Distracted	Rear-end	Main Street & Salem Street
4824930	3/3/2020	5:22 PM	Yes	No	No	Dusk	Dry	Failed to Yield Right of Way	Angle	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
4838339	4/25/2020	3:04 PM	Yes	No	No	Daylight	Dry	Followed Too Closely	Rear-end	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
4858473	7/11/2020	9:54 PM	Yes	No	No	Dark - lighted roadway	Dry	Failed to Yield Right of Way	Angle	Main Street & Salem Street
4862535	7/20/2020	1:13 PM	Yes	No	No	Daylight	Dry	Followed Too Closely	Rear-end	Main Street & Birch Meadow Drive/Lawrence Road
4868206	8/11/2020	10:59 AM	Yes	No	No	Daylight	Dry	Inattention	Sideswipe, same direction	Main Street & Salem Street
4878976	9/18/2020	9:57 AM	Yes	Yes	No	Daylight	Dry	Disregarded Traffic Signs	Angle	Main Street & Salem Street
4894578	11/7/2020	12:23 PM	Yes	No	No	Daylight	Dry	Failed to Yield Right of Way	Angle	Main Street & Salem Street
4909882	12/20/2020	7:43 PM	Yes	No	No	Dark - lighted roadway	Ice	Driving Too Fast for Conditions	Angle	Main Street & Salem Street
4921037	1/20/2021	4:48 PM	Yes	No	No	Dusk	Dry	Unknown	Collision with Fixed Object	Main Street & Salem Street
4921904	1/24/2021	10:56 AM	Yes	No	No	Daylight	Dry	Failed to Yield Right of Way	Angle	Main Street & Salem Street
4932944	2/14/2021	12:39 PM	Yes	No	No	Daylight	Dry	Inattention	Collision with Fixed Object	Main Street & Salem Street
4942450	3/21/2021	10:42 AM	Yes	Yes	No	Daylight	Dry	No Improper Driving	Angle	Main Street & Salem Street
4972895	6/17/2021	8:22 AM	Yes	No	No	Daylight	Dry	Unknown	Angle	Main Street & Salem Street
4973462	6/18/2021	7:25 AM	Yes	No	No	Daylight	Dry	Followed Too Closely	Rear-end	Main Street & Salem Street

STONEFIELD

Table A1: Motor Vehicle Collisions

Crash ID #	Date	Time	Property Damage	Injury	Fatality	Light Conditions	Roadway Conditions	Violations/Contributing Factors	Manner of Collisions	Location
4973498	6/21/2021	9:08 PM	Yes	No	No	Dark - lighted roadway	Dry	Made an Improper Turn	Sideswipe, same direction	Main Street & Salem Street
4992096	8/4/2021	3:40 PM	Yes	No	No	Daylight	Dry	No Improper Driving	Single vehicle crash	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
4999935	8/23/2021	2:18 PM	Yes	No	No	Daylight	Dry	No Improper Driving	Sideswipe, same direction	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5018532	10/7/2021	6:34 AM	Yes	No	No	Daylight	Dry	No Improper Driving	Sideswipe, same direction	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5019288	10/12/2021	10:28 AM	Yes	No	No	Daylight	Dry	Disregarded Traffic Signs	Angle	Main Street & Salem Street
5028977	11/4/2021	3:11 PM	Yes	No	No	Daylight	Dry	Inattention	Rear-end	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5037005	11/24/2021	2:41 PM	Yes	No	No	Daylight	Dry	No Improper Driving	Angle	Main Street & Salem Street
5045836	12/15/2021	2:27 PM	Yes	Yes	No	Daylight	Dry	Distracted / Inattention	Sideswipe, same direction	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5090163	4/5/2022	4:14 PM	Yes	No	No	Daylight	Dry	Physical Impairment / Inattention	Angle	Main Street & Salem Street
5092349	4/12/2022	8:18 AM	Yes	Yes	No	Daylight	Wet	Inattention	Collision with Bicyclist	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5094586	4/20/2022	9:17 AM	Yes	Yes	No	Daylight	Dry	Inattention	Rear-end	Main Street & Birch Meadow Drive/Lawrence Road
5094924	4/21/2022	6:10 AM	Yes	No	No	Dawn	Dry	Disregarded Traffic Signs	Angle	Main Street & Salem Street
5095380	4/22/2022	3:37 PM	Yes	No	No	Daylight	Dry	Followed Too Closely	Rear-end	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5095381	4/23/2022	11:39 AM	Yes	No	No	Daylight	Dry	Followed Too Closely	Rear-end	Main Street & Birch Meadow Drive/Lawrence Road
5122600	7/5/2022	8:27 AM	Yes	No	No	Daylight	Dry	Made an Improper Turn	Angle	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5126750	7/15/2022	11:04 AM	Yes	No	No	Daylight	Dry	Inattention	Angle	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5128388	7/20/2022	11:30 AM	Yes	Yes	No	Daylight	Dry	Disregarded Traffic Signs	Angle	Main Street & Salem Street
5138316	8/13/2022	8:25 PM	Yes	No	No	Dark - lighted roadway	Dry	Unknown	Sideswipe, same direction	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5152441	9/20/2022	7:08 AM	Yes	No	No	Daylight	Wet	Inattention	Rear-end	Main Street & Birch Meadow Drive/Lawrence Road
5154066	9/23/2022	4:17 PM	Yes	No	No	Daylight	Dry	Exceeded Authorized Speed Limit / Failure to Yield Right of Way	Angle	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5159649	10/5/2022	7:50 AM	Yes	No	No	Other	Wet	Failure to Keep in Proper Lane or Running Off Road	Rear-end	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5167325	10/24/2022	8:31 PM	Yes	No	No	Dark - lighted roadway	Wet	Failure to Yield Right of Way	Angle	Main Street & Salem Street
5182643	12/2/2022	3:04 PM	Yes	No	No	Daylight	Dry	Inattention	Angle	Main Street & Salem Street
5200705	1/11/2023	8:45 PM	Yes	No	No	Dark - lighted roadway	Dry	No Improper Driving	Angle	Main Street & Birch Meadow Drive/Lawrence Road
5202142	1/16/2023	5:35 PM	Yes	No	No	Dark - lighted roadway	Wet	No Improper Driving	Rear-end	Main Street & Salem Street
5223133	2/5/2023	4:24 PM	Yes	Yes	No	Daylight	Dry	No Improper Driving	Rear-end	Main Street & Birch Meadow Drive/Lawrence Road
5224190	2/18/2023	1:15 AM	Yes	No	No	Dark - lighted roadway	Dry	Failure to Keep in Proper Lane or Running Off Road	Collision with Fixed Object	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5229253	3/3/2023	5:01 PM	Yes	No	No	Daylight	Dry	No Improper Driving	Angle	Main Street & Salem Street
5239536	4/5/2023	12:06 PM	Yes	No	No	Daylight	Dry	Wrong Side or Wrong Way / Made an Improper Turn	Angle	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5283470	8/4/2023	3:15 PM	Yes	No	No	Daylight	Dry	Other improper Action	Collision with Fixed Object	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5286838	8/15/2023	12:37 PM	Yes	No	No	Daylight	Dry	Driving Too Fast for Conditions	Rear-end	Main Street & Salem Street
5304293	9/28/2023	3:13 PM	Yes	No	No	Daylight	Dry	No Improper Driving	Collision with Fixed Object	Main Street & Salem Street
5304993	10/4/2023	8:24 AM	Yes	No	No	Daylight	Dry	No Improper Driving	Angle	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5311696	10/22/2023	9:41 AM	Yes	No	No	Daylight	Dry	Operating Vehicle in Erratic, Reckless, Careless, Negligent or Aggressive Manner	Rear-end	Main Street between Salem Street & Birch Meadow Drive/Lawrence Road
5316168	10/31/2023	7:42 PM	Yes	Yes	No	Dark - lighted roadway	Dry	Disregarded Traffic Signs	Angle	Main Street & Salem Street
5323448	11/19/2023	1:30 PM	Yes	No	No	Daylight	Dry	Unknown	Sideswipe, same direction	Main Street & Salem Street
5337683	12/13/2023	8:48 AM	Yes	No	No	Daylight	Dry	Over-Correcting / Over-Steering	Collision with Fixed Object	Main Street & Salem Street
5339770	12/25/2023	4:48 PM	Yes	No	No	Dark - lighted roadway	Dry	Followed Too Closely	Rear-end	Main Street & Salem Street

STONEFIELD

Table A2: Motor Vehicle Collision Summary

Total Collisions:

76

Day of Week	Number	%
Sunday	9	12%
Monday	8	12%
Tuesday	14	18%
Wednesday	14	18%
Thursday	9	12%
Friday	11	14%
Saturday	11	14%
Time of Day	Number	%
6 am - 10 am	19	25%
10 am - 4 pm	36	47%
4 pm - 7 pm	13	17%
7 pm - 12 am	7	10%
12 am - 6 am	1	1%
Weather	Number	%
Clear	58	76%
Cloudy	9	12%
Rain	7	9%
Snow	2	3%
Pavement	Number	%
Dry	66	87%
Wet	9	12%
Icy	1	1%
Light Conditions	Number	%
Daylight	59	78%
Dark-Road Lighted	12	16%
Dawn	1	1%
Dusk	3	4%
Other	1	1%

Accident Type	2023	2022	2021	2020	2019
Angle	5	8	5	5	7
Backing	0	0	0	0	2
Collision with Bicyclist	0	1	0	0	0
Collision with Fixed Object	4	0	2	0	1
Rear End	5	5	2	3	7
Sideswipe, opposite direction	0	0	0	0	2
Sideswipe, same direction	1	1	4	2	3
Single Vehicle Crash	0	0	1	0	0
Severity	Number	%			
Fatal Injury	0	0%			
Non-Fatal Injury	12	16%			
Property-Damage Only	64	84%			
Time of Year	Number	%			
Fall (Sep-Nov)	20	26%			
Spring (Mar-May)	21	28%			
Summer (Jun-Aug)	17	22%			
Winter (Dec-Feb)	18	24%			
Contributing Factor	Number	%			
Failure to Keep in Proper Lane	2	3%			
Driver Inattention	15	20%			
Failure to Yield Right of Way	8	10%			
Following Too Closely	10	13%			
Excessive Speed	3	4%			
Over-Correcting/Over-Steering	1	1%			
Disregarded Traffic Signs	7	9%			
Made an Improper Turn	5	7%			
Operating Vehicle in Reckless Manner	1	1%			
Other Improper Action	2	3%			
No Improper Driving / Unknown	22	29%			

MASSDOT CRASH RATE WORKSHEETS

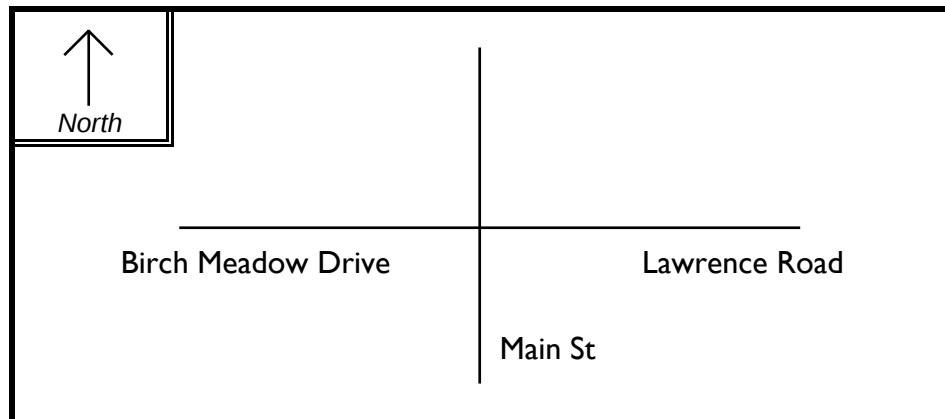
INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Reading COUNT DATE : 3/6/25
 DISTRICT : 4 UNSIGNALIZED : ☐ SIGNALIZED : ☒

~ INTERSECTION DATA ~

MAJOR STREET : Main Street (State Route 28)
 MINOR STREET(S) : Birch Meadow Drive
Lawrence Road

INTERSECTION
 DIAGRAM
 (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	N	S	E	W		
PEAK HOURLY VOLUMES (AM/PM) :	378	758	269	11		1,416

" K " FACTOR :

9

INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

15,733

TOTAL # OF CRASHES :

7

OF YEARS :

5

AVERAGE # OF CRASHES PER YEAR (A) :

1.4

CRASH RATE CALCULATION :

0.24

RATE = $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : _____

Project Title & Date: Proposed Day Care SE&D Job No.: BOS-240115 7/3/25

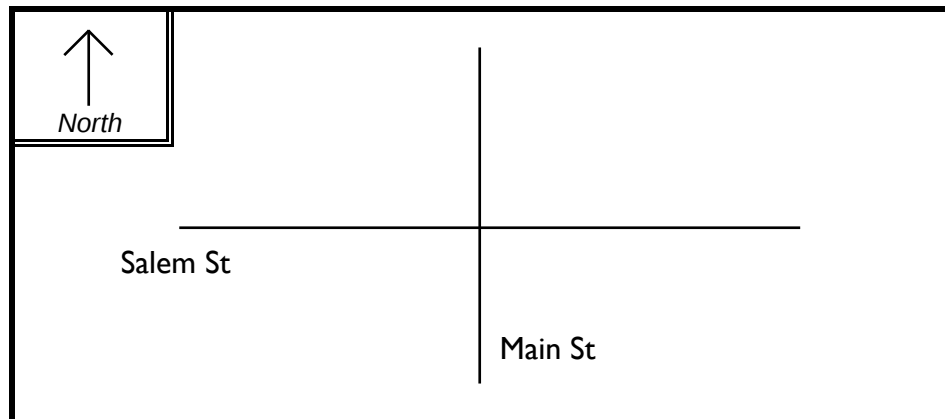
INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Reading COUNT DATE : 3/6/25
 DISTRICT : 4 UNSIGNALIZED : ☐ SIGNALIZED : ☒

~ INTERSECTION DATA ~

MAJOR STREET : Main Street (State Route 28)
 MINOR STREET(S) : Salem Street

INTERSECTION
 DIAGRAM
 (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	N	S	E	W		
PEAK HOURLY VOLUMES (AM/PM) :	505	723	556	441		2,225

" K " FACTOR :

9

INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

24,722

TOTAL # OF CRASHES :

41

OF YEARS :

5

AVERAGE # OF CRASHES PER YEAR (A) :

8.2

CRASH RATE CALCULATION :

0.91

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : _____

Project Title & Date: Proposed Day Care SE&D Job No.: BOS-240115 7/3/25

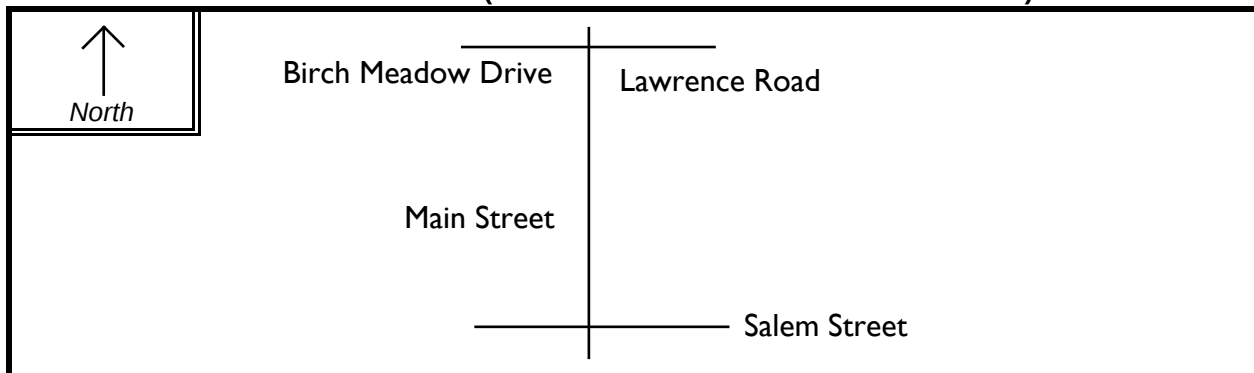
SEGMENT CRASH RATE WORKSHEET

CITY/TOWN : Reading COUNT DATE : 3/6/25
 DISTRICT : 4

~ SEGMENT DATA ~

ROADWAY NAME: Main Street (State Route 28)
 START POINT: Salem Street
 END POINT: Birch Meadow Drive/Lawrence Road
 FUNCTIONAL CLASSIFICATION OF ROADWAY: Principal Arterial - Other

ROADWAY DIAGRAM (LABEL ROADWAY AND CROSS STREETS)



AVERAGE DAILY TRAFFIC

SEGMENT LENGTH IN MILES (L): 0.78
 AVERAGE DAILY TRAFFIC VOLUME (V): 11,635

TOTAL # OF CRASHES: 32 # OF YEARS: 5 AVERAGE # OF CRASHES PER YEAR (A): 6.4

CRASH RATE
 CALCULATION :

1.93

RATE = $\frac{(A * 1,000,000)}{(L * V * 365)}$

Comments : _____
 Project Title & Date: Proposed Day Care SE&D Job No.: BOS-240115 7/3/25

ITE TRIP GENERATION MANUAL, 11TH EDITION

Day Care Center

(565)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

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: 89

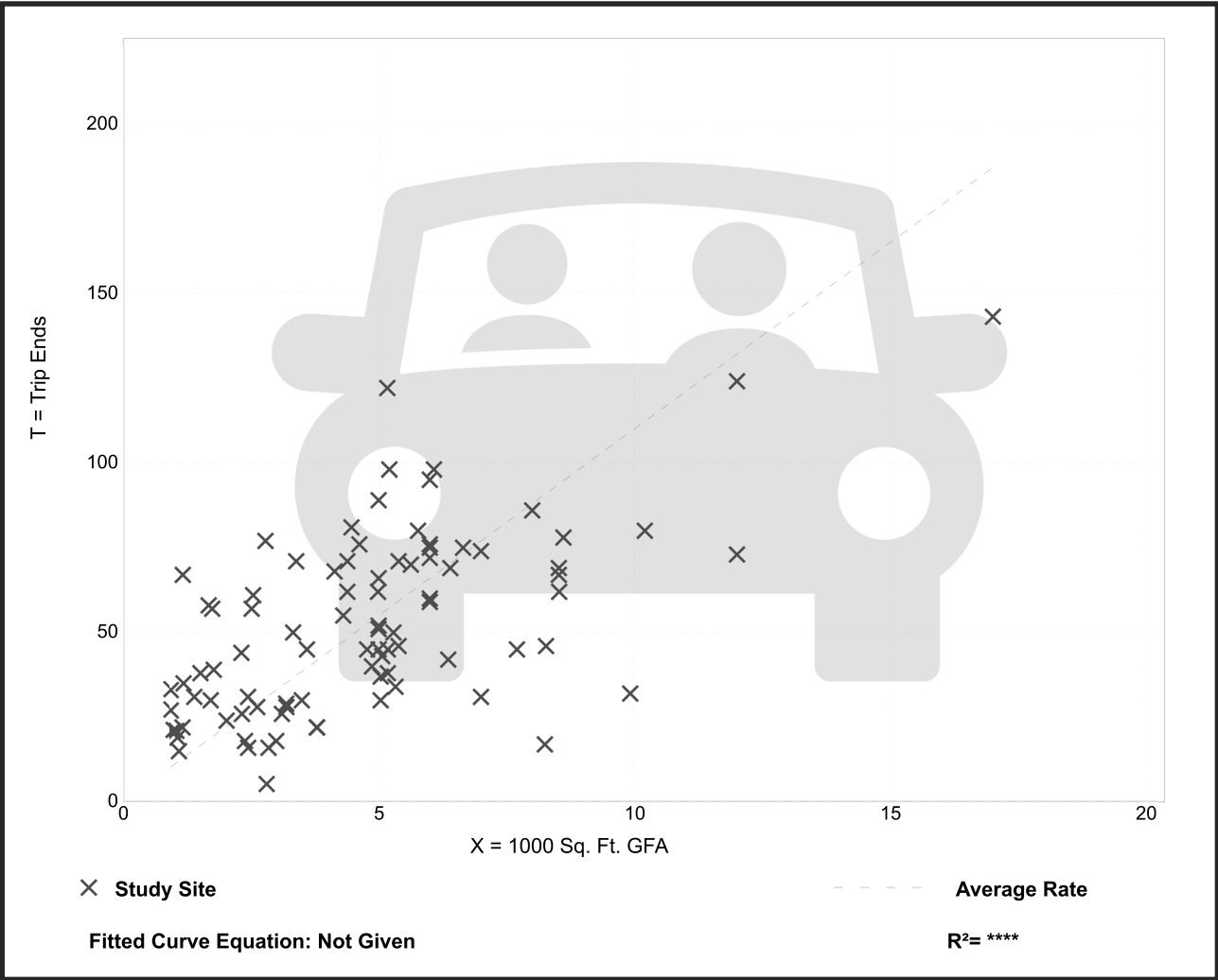
Avg. 1000 Sq. Ft. GFA: 5

Directional Distribution: 53% entering, 47% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
11.00	1.79 - 57.02	6.08

Data Plot and Equation



Day Care Center

(565)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

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: 90

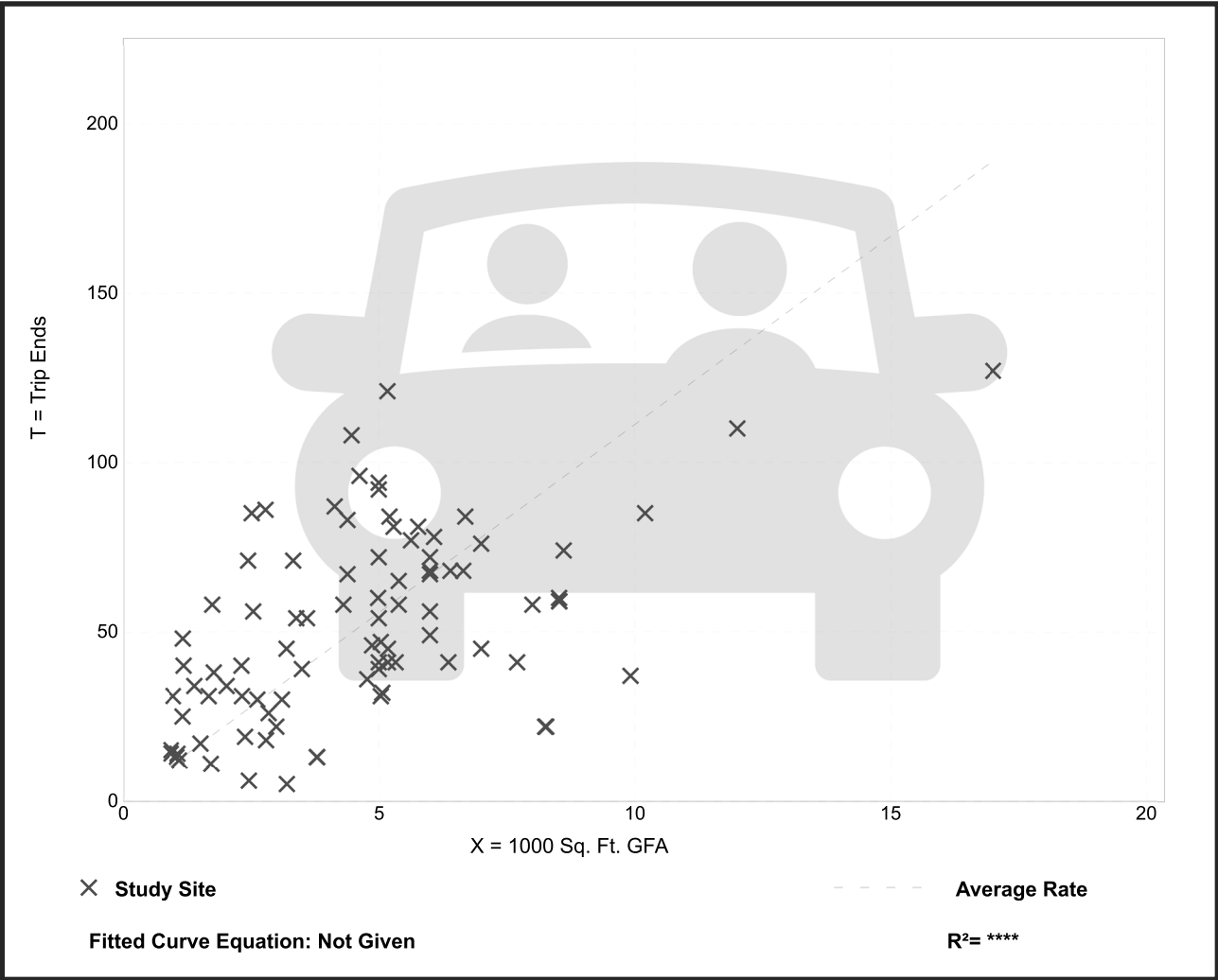
Avg. 1000 Sq. Ft. GFA: 5

Directional Distribution: 47% entering, 53% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
11.12	1.56 - 40.85	6.28

Data Plot and Equation



Day Care Center

(565)

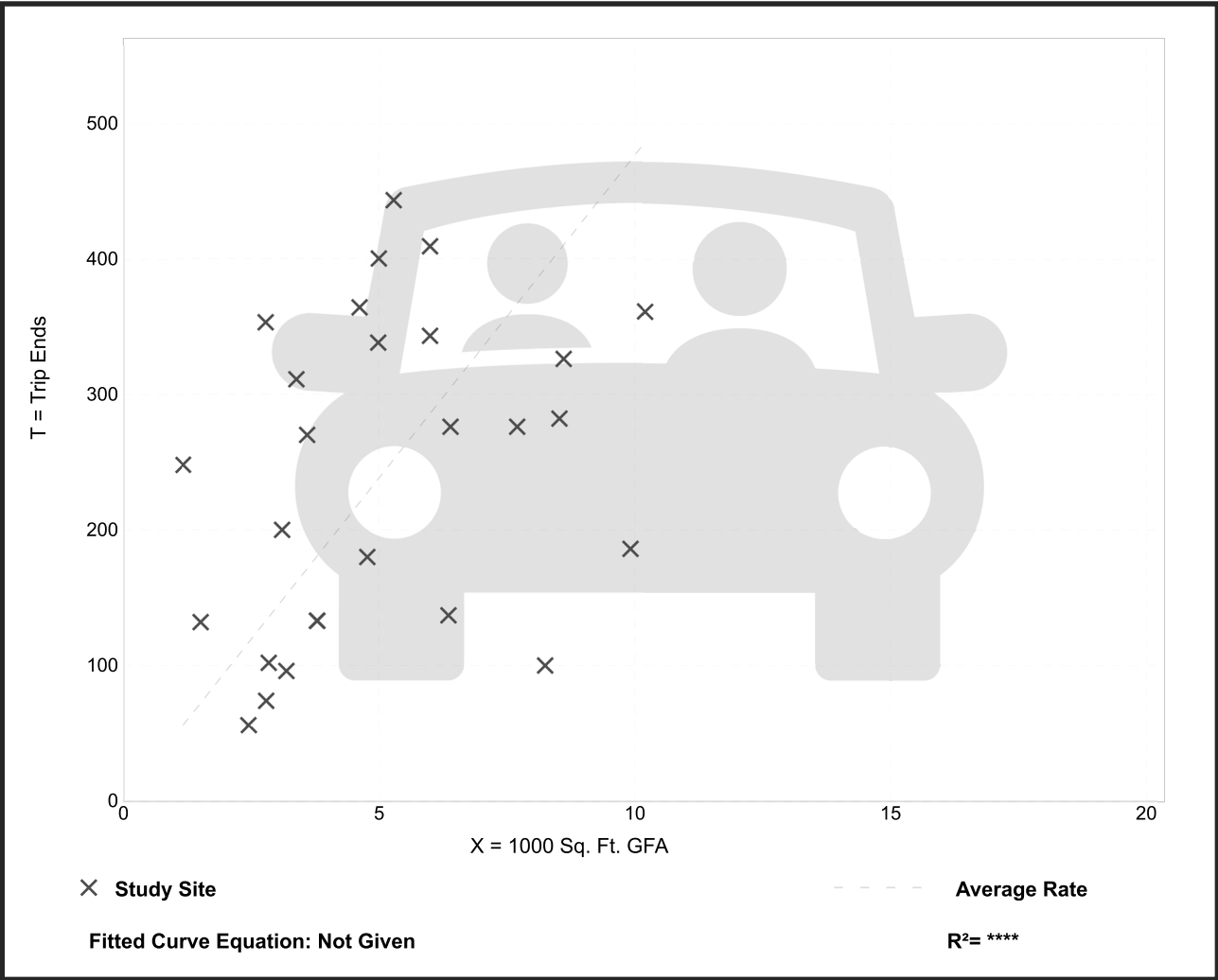
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 27
Avg. 1000 Sq. Ft. GFA: 5
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

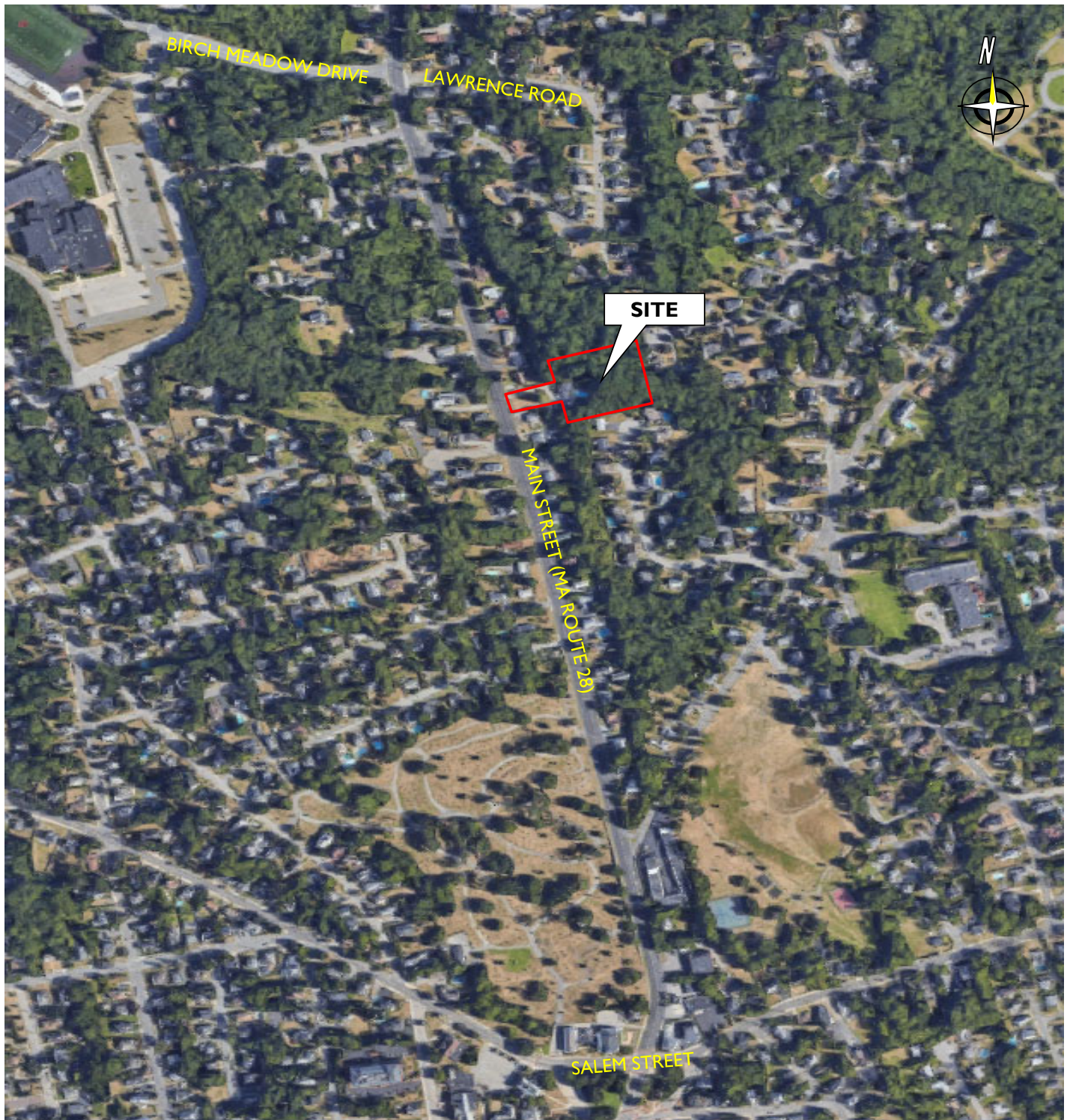
Average Rate	Range of Rates	Standard Deviation
47.62	12.12 - 211.06	29.78

Data Plot and Equation



Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use			
Source: ITE <i>Trip Generation Manual</i> , 11th Edition			
Land Use Code	565		
Land Use	Day Care Center		
Setting	General Urban/Suburban		
Time Period	Weekday		
# Data Sites	19		
	% of 24-Hour Vehicle Trips		
Time	Total	Entering	Exiting
12:00 - 1:00 AM	0.0%	0.0%	0.0%
1:00 - 2:00 AM	0.0%	0.0%	0.0%
2:00 - 3:00 AM	0.0%	0.0%	0.0%
3:00 - 4:00 AM	0.0%	0.0%	0.0%
4:00 - 5:00 AM	0.0%	0.0%	0.0%
5:00 - 6:00 AM	0.6%	1.0%	0.2%
6:00 - 7:00 AM	5.3%	6.2%	4.3%
7:00 - 8:00 AM	17.9%	19.5%	16.3%
8:00 - 9:00 AM	13.0%	13.2%	12.8%
9:00 - 10:00 AM	5.0%	5.4%	4.6%
10:00 - 11:00 AM	2.7%	2.6%	2.9%
11:00 - 12:00 PM	2.6%	2.6%	2.6%
12:00 - 1:00 PM	2.4%	2.1%	2.6%
1:00 - 2:00 PM	3.1%	3.0%	3.2%
2:00 - 3:00 PM	4.3%	4.1%	4.5%
3:00 - 4:00 PM	7.2%	7.5%	6.9%
4:00 - 5:00 PM	13.8%	13.6%	14.0%
5:00 - 6:00 PM	17.7%	16.7%	18.7%
6:00 - 7:00 PM	4.3%	2.4%	6.3%
7:00 - 8:00 PM	0.0%	0.0%	0.0%
8:00 - 9:00 PM	0.0%	0.0%	0.0%
9:00 - 10:00 PM	0.0%	0.0%	0.0%
10:00 - 11:00 PM	0.0%	0.0%	0.0%
11:00 - 12:00 AM	0.0%	0.0%	0.0%

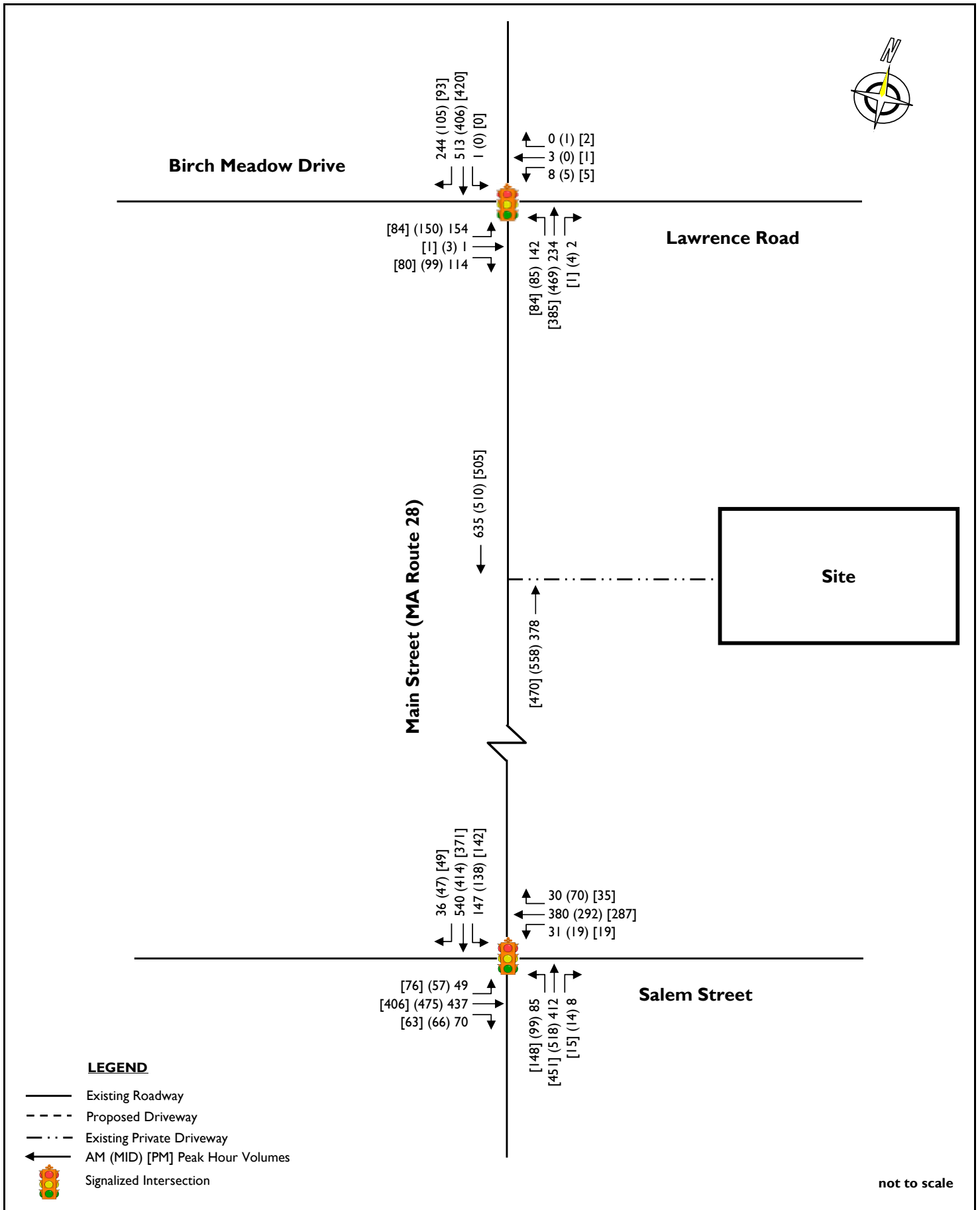
FIGURES



STONEFIELD

Proposed Child Day Care Facility
885 Main Street
Town of Reading, Middlesex County, Massachusetts
Traffic Impact Study

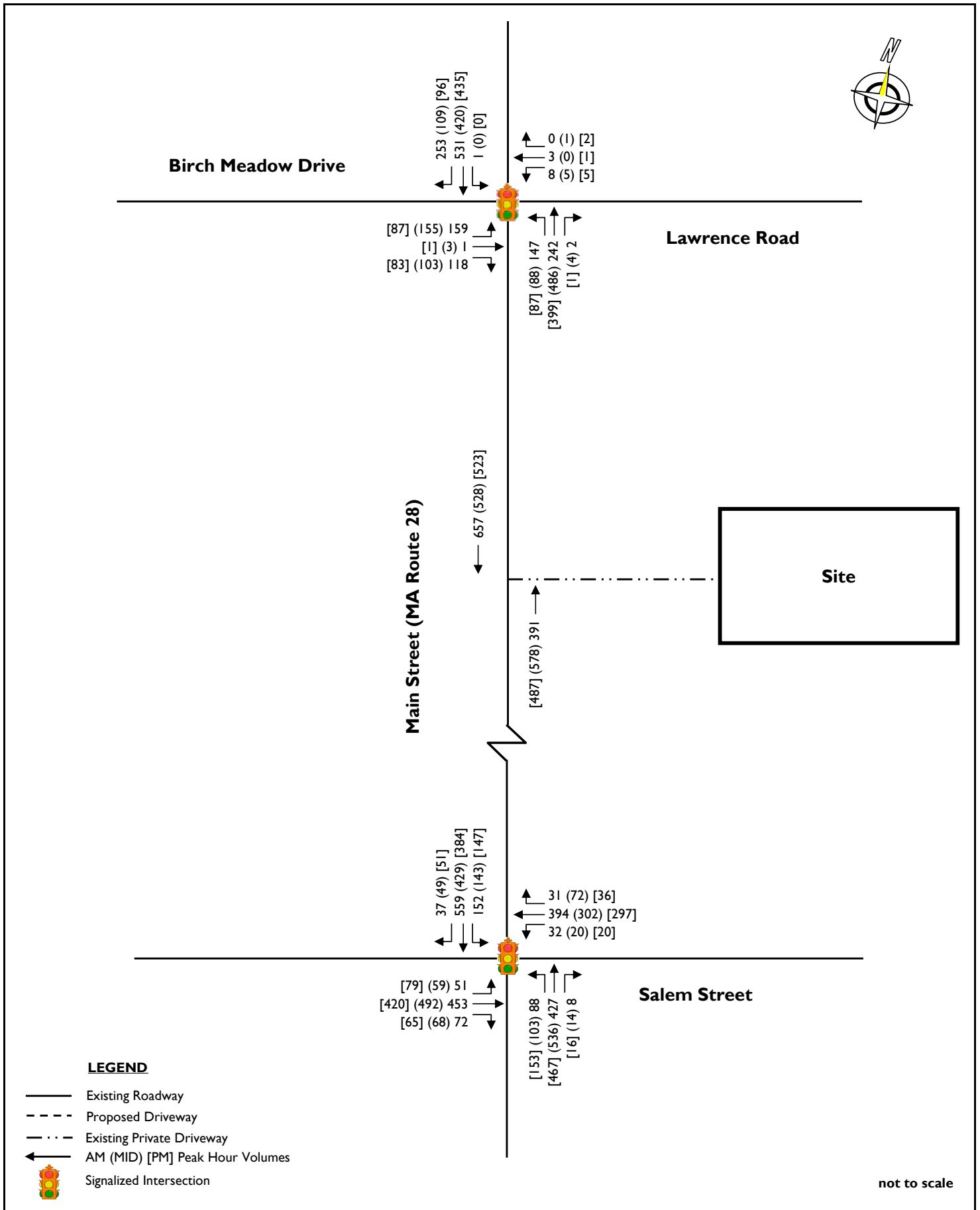
FIGURE I
Site Location Map



STONEFIELD

Proposed Child Day Care Facility
885 Main Street
Town of Reading, Middlesex County, Massachusetts
Traffic Impact Study

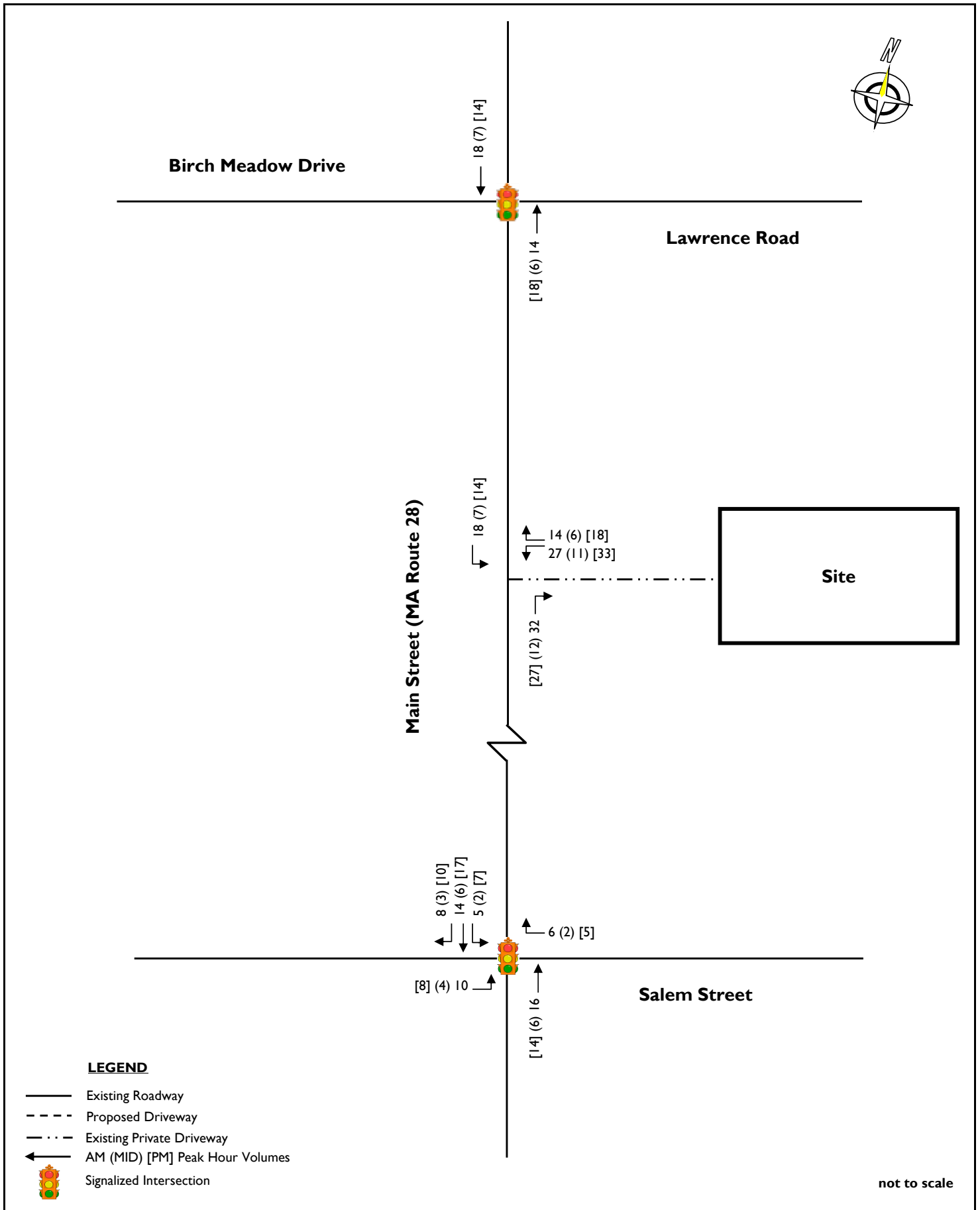
FIGURE 2
2025 Existing Traffic
Volumes



STONEFIELD

Proposed Child Day Care Facility
885 Main Street
Town of Reading, Middlesex County, Massachusetts
Traffic Impact Study

FIGURE 3
2032 No-Build Traffic
Volumes



STONEFIELD

Proposed Child Day Care Facility
885 Main Street
Town of Reading, Middlesex County, Massachusetts
Traffic Impact Study

FIGURE 4
"New" Site-Generated
Traffic Volumes



Birch Meadow Drive

Lawrence Road

Main Street (MA Route 28)

Site

Salem Street

LEGEND

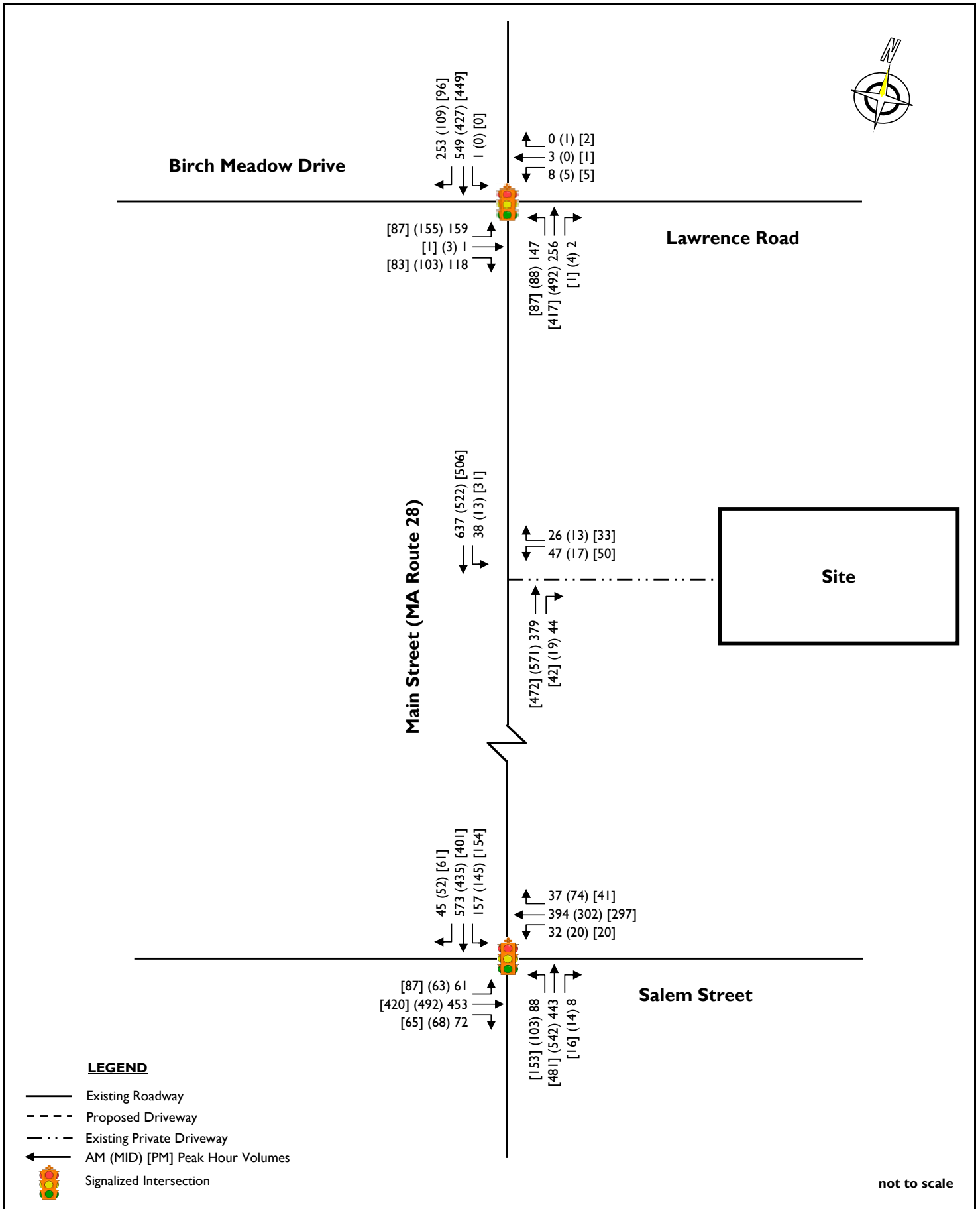
- Existing Roadway
- - - Proposed Driveway
- . . Existing Private Driveway
- ← AM (MID) [PM] Peak Hour Volumes
-  Signalized Intersection

not to scale

STONEFIELD

Proposed Child Day Care Facility
885 Main Street
Town of Reading, Middlesex County, Massachusetts
Traffic Impact Study

FIGURE 5
"Pass-By" Site-Generated
Traffic Volumes



STONEFIELD

Proposed Child Day Care Facility
885 Main Street
Town of Reading, Middlesex County, Massachusetts
Traffic Impact Study

FIGURE 6
2032 Build Traffic Volumes

HIGHWAY CAPACITY ANALYSIS DETAIL SHEETS

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition

Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	1	114	8	3	0	142	234	2	1	513	244
Future Volume (vph)	154	1	114	8	3	0	142	234	2	1	513	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	10	12	12	12	10	11	11	11	11	11
Storage Length (ft)	0		50	0		0	410		0	0		410
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.999				0.850
Flt Protected		0.953			0.964		0.950					
Satd. Flow (prot)	0	1690	1507	0	1832	0	1668	1757	0	0	1783	1561
Flt Permitted		0.727			0.732		0.155					
Satd. Flow (perm)	0	1289	1507	0	1391	0	272	1757	0	0	1783	1561
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			135					1				317
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		757			597			3052			1095	
Travel Time (s)		17.2			13.6			52.0			18.7	
Peak Hour Factor	0.65	0.65	0.65	0.55	0.55	0.55	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	4%	50%	0%	3%	0%
Adj. Flow (vph)	237	2	175	15	5	0	184	304	3	1	666	317
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	239	175	0	20	0	184	307	0	0	667	317
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			10			10	
Link Offset(ft)		0			-30			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.09	1.09	1.00	1.00	1.00	1.09	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition

Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Detector Phase	8	8	8	4	4		1	6		2	2	2
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		8.0	5.0		5.0	5.0	5.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		13.0	11.0		11.0	11.0	11.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0		13.0	59.0		46.0	46.0	46.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	22.9%		12.4%	56.2%		43.8%	43.8%	43.8%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		8.0	53.0		40.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.0		4.0	4.0	4.0
Recall Mode	None	None	None	None	None		Min	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		20.5	20.5		16.6		54.2	53.2			40.1	40.1
Actuated g/C Ratio		0.24	0.24		0.19		0.63	0.62			0.47	0.47
v/c Ratio		0.77	0.37		0.07		0.60	0.28			0.79	0.35
Control Delay (s/veh)		48.4	10.3		33.5		17.5	9.0			29.3	3.1
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)		48.4	10.3		33.5		17.5	9.0			29.3	3.1
LOS		D	B		C		B	A			C	A
Approach Delay (s/veh)		32.3			33.5			12.2			21.0	
Approach LOS		C			C			B			C	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 85.7

Natural Cycle: 100

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.80

Intersection Signal Delay (s/veh): 21.3

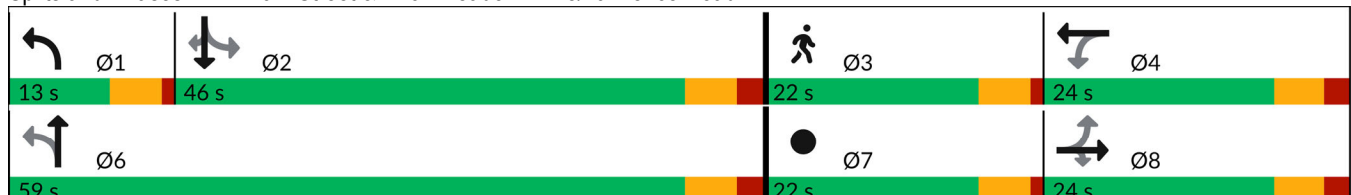
Intersection LOS: C

Intersection Capacity Utilization 65.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Main Street & Birch Meadow Drive/Lawrence Road



Lanes, Volumes, Timings
1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition
Weekday Morning Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	22.0	22.0
Total Split (s)	22.0	22.0
Total Split (%)	21%	21%
Maximum Green (s)	17.0	17.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	7.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	5	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues

1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition

Weekday Morning Peak Hour

	→	↘	←	↙	↑	↓	↗
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	239	175	20	184	307	667	317
v/c Ratio	0.77	0.37	0.07	0.60	0.28	0.79	0.35
Control Delay (s/veh)	48.4	10.3	33.5	17.5	9.0	29.3	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	48.4	10.3	33.5	17.5	9.0	29.3	3.1
Queue Length 50th (ft)	120	17	8	33	62	274	0
Queue Length 95th (ft)	131	28	21	73	123	418	24
Internal Link Dist (ft)	677		517		2972	1015	
Turn Bay Length (ft)		50		410			410
Base Capacity (vph)	307	462	293	302	1090	835	899
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.38	0.07	0.61	0.28	0.80	0.35
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition
Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	1	114	8	3	0	142	234	2	1	513	244
Future Volume (vph)	154	1	114	8	3	0	142	234	2	1	513	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	10	12	12	12	10	11	11	11	11	11
Total Lost time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00		1.00	0.99			1.00	0.85
Flt Protected		0.95	1.00		0.96		0.95	1.00			0.99	1.00
Satd. Flow (prot)		1690	1507		1831		1668	1756			1783	1561
Flt Permitted		0.72	1.00		0.73		0.15	1.00			0.99	1.00
Satd. Flow (perm)		1289	1507		1392		272	1756			1783	1561
Peak-hour factor, PHF	0.65	0.65	0.65	0.55	0.55	0.55	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	237	2	175	15	5	0	184	304	3	1	666	317
RTOR Reduction (vph)	0	0	98	0	0	0	0	0	0	0	0	175
Lane Group Flow (vph)	0	239	77	0	20	0	184	307	0	0	667	142
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	4%	50%	0%	3%	0%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Actuated Green, G (s)		24.6	24.6		16.6		53.2	53.2			40.2	40.2
Effective Green, g (s)		24.6	24.6		16.6		53.2	53.2			40.2	40.2
Actuated g/C Ratio		0.27	0.27		0.18		0.59	0.59			0.45	0.45
Clearance Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	4.0			4.0	4.0
Lane Grp Cap (vph)		353	412		257		285	1040			798	698
v/s Ratio Prot							c0.06	0.17				
v/s Ratio Perm		c0.19	0.05		0.01		0.32				0.37	0.09
v/c Ratio		0.67	0.18		0.07		0.64	0.29			0.83	0.20
Uniform Delay, d1		29.0	24.9		30.2		14.3	9.0			21.8	15.0
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		5.0	0.2		0.1		4.9	0.7			10.1	0.6
Delay (s)		34.1	25.1		30.3		19.2	9.7			31.9	15.7
Level of Service		C	C		C		B	A			C	B
Approach Delay (s/veh)		30.3			30.3			13.3			26.7	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			24.1				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			89.8				Sum of lost time (s)				22.0	
Intersection Capacity Utilization			65.3%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2: Main Street & Salem Street

2025 Existing Condition
Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	437	70	31	380	30	85	412	8	147	540	36
Future Volume (vph)	49	437	70	31	380	30	85	412	8	147	540	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	11	10	10	11	11	11	11	11	11	12
Storage Length (ft)	190		0	0		85	0		0	0		0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (ft)	85			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		0.979				0.850		0.998			0.993	
Flt Protected	0.950				0.996			0.992			0.990	
Satd. Flow (prot)	1685	1710	0	0	1710	1301	0	3367	0	0	3355	0
Flt Permitted	0.274				0.933			0.614			0.649	
Satd. Flow (perm)	486	1710	0	0	1602	1301	0	2084	0	0	2199	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				119		2			5	
Link Speed (mph)		20			20			40			40	
Link Distance (ft)		462			1004			529			863	
Travel Time (s)		15.8			34.2			9.0			14.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	6%	7%	3%	20%	1%	3%	0%	3%	2%	3%
Adj. Flow (vph)	53	475	76	34	413	33	92	448	9	160	587	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	551	0	0	447	33	0	549	0	0	786	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.04	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	

Lanes, Volumes, Timings

2: Main Street & Salem Street

2025 Existing Condition
Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Detector Phase	9	14		10	10	10	5	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	7.0		7.0	7.0	7.0	6.0	7.0		7.0	7.0	
Minimum Split (s)	10.0	11.0		11.0	11.0	11.0	10.0	11.0		11.0	11.0	
Total Split (s)	11.0	36.0		25.0	25.0	25.0	11.0	64.0		53.0	53.0	
Total Split (%)	9.2%	30.3%		21.0%	21.0%	21.0%	9.2%	53.8%		44.5%	44.5%	
Maximum Green (s)	7.0	32.0		21.0	21.0	21.0	7.0	60.0		49.0	49.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	C-Min		C-Min	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	56.1	56.1		47.6	47.6	47.6	51.1			51.1		
Actuated g/C Ratio	0.47	0.47		0.40	0.40	0.40	0.43			0.43		
v/c Ratio	0.17	0.68		0.69	0.69	0.05	0.61			0.83		
Control Delay (s/veh)	23.9	32.1		39.7	39.7	0.1	28.8			37.9		
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0			0.0		
Total Delay (s/veh)	23.9	32.1		39.7	39.7	0.1	28.8			37.9		
LOS	C	C		D	D	A	C			D		
Approach Delay (s/veh)		31.4			37.0		28.8				37.9	
Approach LOS		C			D		C				D	

Intersection Summary

Area Type: Other

Cycle Length: 119

Actuated Cycle Length: 119

Offset: 11 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay (s/veh): 34.1

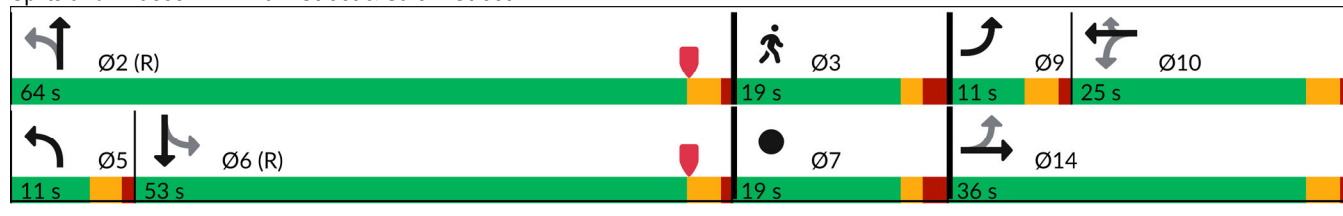
Intersection LOS: C

Intersection Capacity Utilization 90.1%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: Main Street & Salem Street



Stonefield Engineering & Design
EX-AM

Synchro 12 Report
06/30/2025

Lanes, Volumes, Timings
2: Main Street & Salem Street

2025 Existing Condition
Weekday Morning Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	19.0	19.0
Total Split (s)	19.0	19.0
Total Split (%)	16%	16%
Maximum Green (s)	15.0	15.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	4.0	
Flash Dont Walk (s)	11.0	
Pedestrian Calls (#/hr)	2	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues
2: Main Street & Salem Street

2025 Existing Condition
Weekday Morning Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	53	551	447	33	549	786
v/c Ratio	0.17	0.68	0.69	0.05	0.61	0.83
Control Delay (s/veh)	23.9	32.1	39.7	0.1	28.8	37.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.9	32.1	39.7	0.1	28.8	37.9
Queue Length 50th (ft)	20	296	273	0	167	274
Queue Length 95th (ft)	64	#728	#691	0	197	313
Internal Link Dist (ft)		382	924		449	783
Turn Bay Length (ft)	190			85		
Base Capacity (vph)	300	810	640	591	1051	972
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.68	0.70	0.06	0.52	0.81

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: Main Street & Salem Street

2025 Existing Condition

Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	437	70	31	380	30	85	412	8	147	540	36
Future Volume (vph)	49	437	70	31	380	30	85	412	8	147	540	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	10	11	11	11	11	11	11	12
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		0.95			0.95	
Frt	1.00	0.97			1.00	0.85		0.99			0.99	
Flt Protected	0.95	1.00			0.99	1.00		0.99			0.98	
Satd. Flow (prot)	1685	1711			1710	1301		3364			3353	
Flt Permitted	0.27	1.00			0.93	1.00		0.61			0.64	
Satd. Flow (perm)	485	1711			1602	1301		2081			2200	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	475	76	34	413	33	92	448	9	160	587	39
RTOR Reduction (vph)	0	4	0	0	0	20	0	1	0	0	3	0
Lane Group Flow (vph)	53	547	0	0	447	13	0	548	0	0	783	0
Heavy Vehicles (%)	0%	5%	6%	7%	3%	20%	1%	3%	0%	3%	2%	3%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Actuated Green, G (s)	56.9	56.9			47.6	47.6		47.1			47.1	
Effective Green, g (s)	56.9	56.9			47.6	47.6		47.1			47.1	
Actuated g/C Ratio	0.48	0.48			0.40	0.40		0.40			0.40	
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Vehicle Extension (s)	2.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	285	818			640	520		823			870	
v/s Ratio Prot	0.01	c0.32										
v/s Ratio Perm	0.08				0.28	0.01		0.26			c0.36	
v/c Ratio	0.18	0.66			0.69	0.02		0.66			0.89	
Uniform Delay, d1	19.2	23.8			29.7	21.6		29.4			33.7	
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	2.0			3.3	0.0		1.5			14.1	
Delay (s)	19.3	25.9			33.0	21.6		31.0			47.8	
Level of Service	B	C			C	C		C			D	
Approach Delay (s/veh)		25.3			32.2			31.0			47.8	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		35.3			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.81										
Actuated Cycle Length (s)		119.0			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		90.1%			ICU Level of Service			E				
Analysis Period (min)		15										

c Critical Lane Group

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition

Weekday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	3	99	5	0	1	85	496	4	0	406	105
Future Volume (vph)	150	3	99	5	0	1	85	496	4	0	406	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	10	12	12	12	10	11	11	11	11	11
Storage Length (ft)	0		50	0		0	410		0	0		410
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.977			0.999				0.850
Flt Protected		0.953			0.960		0.950					
Satd. Flow (prot)	0	1690	1507	0	1782	0	1652	1799	0	0	1801	1561
Flt Permitted		0.762			0.742		0.342					
Satd. Flow (perm)	0	1351	1507	0	1377	0	595	1799	0	0	1801	1561
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			135		135							135
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		757			596			3061			1095	
Travel Time (s)		17.2			13.5			52.2			18.7	
Peak Hour Factor	0.72	0.72	0.72	0.50	0.50	0.50	0.89	0.89	0.89	0.97	0.97	0.97
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	2%	0%
Adj. Flow (vph)	208	4	138	10	0	2	96	557	4	0	419	108
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	212	138	0	12	0	96	561	0	0	419	108
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			10			10	
Link Offset(ft)		0			-30			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.09	1.09	1.00	1.00	1.00	1.09	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA			NA	Perm

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition

Weekday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Detector Phase	8	8	8	4	4		1	6		2	2	2
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		8.0	5.0		5.0	5.0	5.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		13.0	11.0		11.0	11.0	11.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0		13.0	54.0		41.0	41.0	41.0
Total Split (%)	27.6%	27.6%	27.6%	27.6%	27.6%		12.4%	51.4%		39.0%	39.0%	39.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0		8.0	48.0		35.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.0		4.0	4.0	4.0
Recall Mode	None	None	None	None	None		Min	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		19.0	19.0		15.1		49.2	48.2			35.2	35.2
Actuated g/C Ratio		0.24	0.24		0.19		0.62	0.61			0.44	0.44
v/c Ratio		0.65	0.29		0.03		0.20	0.51			0.52	0.14
Control Delay (s/veh)		36.9	6.4		0.1		8.5	12.0			20.2	2.4
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)		36.9	6.4		0.1		8.5	12.0			20.2	2.4
LOS		D	A		A		A	B			C	A
Approach Delay (s/veh)		24.9			0.2			11.6			16.6	
Approach LOS		C			A			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 79.3

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.65

Intersection Signal Delay (s/veh): 16.2

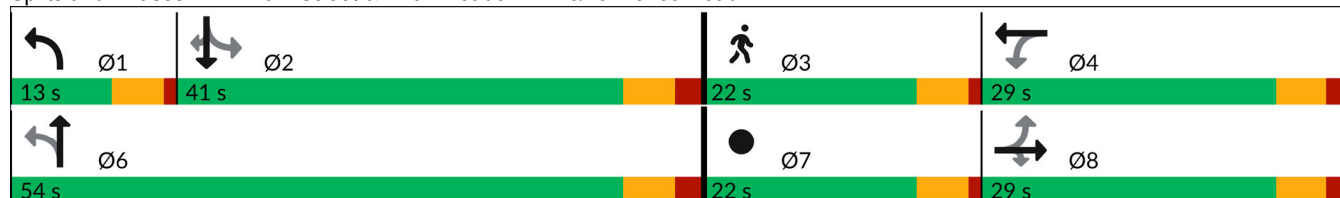
Intersection LOS: B

Intersection Capacity Utilization 72.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Main Street & Birch Meadow Drive/Lawrence Road



Lanes, Volumes, Timings
1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition
Weekday Midday Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	22.0	22.0
Total Split (s)	22.0	22.0
Total Split (%)	21%	21%
Maximum Green (s)	17.0	17.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	7.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	9	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues

1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition

Weekday Midday Peak Hour

	→	↘	←	↙	↑	↓	↗
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	212	138	12	96	561	419	108
v/c Ratio	0.65	0.29	0.03	0.20	0.51	0.52	0.14
Control Delay (s/veh)	36.9	6.4	0.1	8.5	12.0	20.2	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	36.9	6.4	0.1	8.5	12.0	20.2	2.4
Queue Length 50th (ft)	94	1	0	17	141	144	0
Queue Length 95th (ft)	123	21	0	45	284	273	20
Internal Link Dist (ft)	677		516		2981	1015	
Turn Bay Length (ft)		50		410			410
Base Capacity (vph)	408	550	496	476	1093	798	767
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.25	0.02	0.20	0.51	0.53	0.14
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition
Weekday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↱			↰	↱
Traffic Volume (vph)	150	3	99	5	0	1	85	496	4	0	406	105
Future Volume (vph)	150	3	99	5	0	1	85	496	4	0	406	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	10	12	12	12	10	11	11	11	11	11
Total Lost time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.97		1.00	0.99			1.00	0.85
Flt Protected		0.95	1.00		0.96		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1690	1507		1783		1652	1799			1801	1561
Flt Permitted		0.76	1.00		0.74		0.34	1.00			1.00	1.00
Satd. Flow (perm)		1351	1507		1379		595	1799			1801	1561
Peak-hour factor, PHF	0.72	0.72	0.72	0.50	0.50	0.50	0.89	0.89	0.89	0.97	0.97	0.97
Adj. Flow (vph)	208	4	138	10	0	2	96	557	4	0	419	108
RTOR Reduction (vph)	0	0	97	0	10	0	0	0	0	0	0	62
Lane Group Flow (vph)	0	212	41	0	2	0	96	561	0	0	419	46
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA			NA	Perm
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Actuated Green, G (s)		23.2	23.2		15.1		48.2	48.2			35.2	35.2
Effective Green, g (s)		23.2	23.2		15.1		48.2	48.2			35.2	35.2
Actuated g/C Ratio		0.28	0.28		0.18		0.58	0.58			0.42	0.42
Clearance Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	4.0			4.0	4.0
Lane Grp Cap (vph)		375	419		249		445	1039			760	658
v/s Ratio Prot							0.02	0.31			0.23	
v/s Ratio Perm		0.16	0.03		0.00		0.10					0.03
v/c Ratio		0.56	0.09		0.00		0.21	0.53			0.55	0.06
Uniform Delay, d1		25.7	22.3		28.0		9.1	10.7			18.1	14.3
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		1.9	0.1		0.0		0.2	2.0			2.8	0.2
Delay (s)		27.7	22.4		28.0		9.3	12.8			21.0	14.5
Level of Service		C	C		C		A	B			C	B
Approach Delay (s/veh)		25.6			28.0			12.3			19.6	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			18.0									
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			83.4									
Intersection Capacity Utilization			72.1%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2: Main Street & Salem Street

2025 Existing Condition
Weekday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	475	66	19	292	70	99	518	14	138	414	47
Future Volume (vph)	57	475	66	19	292	70	99	518	14	138	414	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	11	10	10	11	11	11	11	11	11	12
Storage Length (ft)	190		0	0		85	0		0	0		0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (ft)	85			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		0.982				0.850		0.997			0.988	
Flt Protected	0.950				0.997			0.992			0.989	
Satd. Flow (prot)	1620	1757	0	0	1735	1473	0	3402	0	0	3376	0
Flt Permitted	0.389				0.953			0.637			0.577	
Satd. Flow (perm)	663	1757	0	0	1659	1473	0	2185	0	0	1970	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				119		2			8	
Link Speed (mph)		20			20			40			40	
Link Distance (ft)		462			1004			529			864	
Travel Time (s)		15.8			34.2			9.0			14.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	3%	0%	0%	2%	6%	4%	1%	0%	0%	1%	4%
Adj. Flow (vph)	61	511	71	20	314	75	106	557	15	148	445	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	582	0	0	334	75	0	678	0	0	644	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.04	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	

Lanes, Volumes, Timings

2: Main Street & Salem Street

2025 Existing Condition
Weekday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Detector Phase	9	14		10	10	10	5	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	7.0		7.0	7.0	7.0	6.0	7.0		7.0	7.0	
Minimum Split (s)	10.0	11.0		11.0	11.0	11.0	10.0	11.0		11.0	11.0	
Total Split (s)	11.0	41.0		30.0	30.0	30.0	11.0	59.0		48.0	48.0	
Total Split (%)	9.2%	34.5%		25.2%	25.2%	25.2%	9.2%	49.6%		40.3%	40.3%	
Maximum Green (s)	7.0	37.0		26.0	26.0	26.0	7.0	55.0		44.0	44.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	C-Min		C-Min	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	57.0	57.0		48.7	48.7	48.7	46.4			46.4		
Actuated g/C Ratio	0.48	0.48		0.41	0.41	0.41	0.39			0.39		
v/c Ratio	0.16	0.68		0.49	0.11	0.11	0.79			0.83		
Control Delay (s/veh)	23.7	32.9		34.5	2.0	2.0	39.1			42.2		
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0			0.0		
Total Delay (s/veh)	23.7	32.9		34.5	2.0	2.0	39.1			42.2		
LOS	C	C		C	A	A	D			D		
Approach Delay (s/veh)		32.1			28.6		39.1			42.2		
Approach LOS		C			C		D			D		

Intersection Summary

Area Type: Other

Cycle Length: 119

Actuated Cycle Length: 119

Offset: 44 (37%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay (s/veh): 36.2

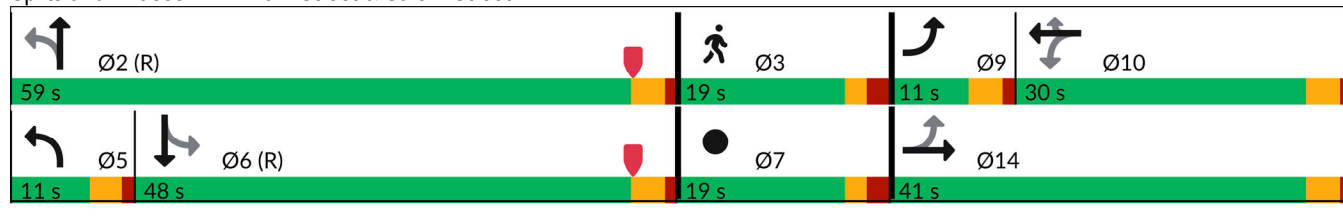
Intersection LOS: D

Intersection Capacity Utilization 92.0%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 2: Main Street & Salem Street



Lanes, Volumes, Timings
2: Main Street & Salem Street

2025 Existing Condition
Weekday Midday Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	19.0	19.0
Total Split (s)	19.0	19.0
Total Split (%)	16%	16%
Maximum Green (s)	15.0	15.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	4.0	
Flash Dont Walk (s)	11.0	
Pedestrian Calls (#/hr)	11	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues
2: Main Street & Salem Street

2025 Existing Condition
Weekday Midday Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	61	582	334	75	678	644
v/c Ratio	0.16	0.68	0.49	0.11	0.79	0.83
Control Delay (s/veh)	23.7	32.9	34.5	2.0	39.1	42.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.7	32.9	34.5	2.0	39.1	42.2
Queue Length 50th (ft)	21	289	171	0	238	230
Queue Length 95th (ft)	68	#712	#428	12	278	274
Internal Link Dist (ft)		382	924		449	784
Turn Bay Length (ft)	190			85		
Base Capacity (vph)	373	844	678	672	1010	793
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.69	0.49	0.11	0.67	0.81

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: Main Street & Salem Street

2025 Existing Condition

Weekday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	475	66	19	292	70	99	518	14	138	414	47
Future Volume (vph)	57	475	66	19	292	70	99	518	14	138	414	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	10	11	11	11	11	11	11	12
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		0.95			0.95	
Frt	1.00	0.98			1.00	0.85		0.99			0.98	
Flt Protected	0.95	1.00			0.99	1.00		0.99			0.98	
Satd. Flow (prot)	1620	1757			1735	1473		3402			3375	
Flt Permitted	0.38	1.00			0.95	1.00		0.63			0.57	
Satd. Flow (perm)	664	1757			1660	1473		2184			1970	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	61	511	71	20	314	75	106	557	15	148	445	51
RTOR Reduction (vph)	0	3	0	0	0	44	0	1	0	0	5	0
Lane Group Flow (vph)	61	579	0	0	334	31	0	677	0	0	639	0
Heavy Vehicles (%)	4%	3%	0%	0%	2%	6%	4%	1%	0%	0%	1%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Actuated Green, G (s)	57.8	57.8			48.7	48.7		43.2			43.2	
Effective Green, g (s)	57.8	57.8			48.7	48.7		43.2			43.2	
Actuated g/C Ratio	0.49	0.49			0.41	0.41		0.36			0.36	
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Vehicle Extension (s)	2.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	363	853			679	602		792			715	
v/s Ratio Prot	0.01	c0.33										
v/s Ratio Perm	0.07				0.20	0.02		0.31			c0.32	
v/c Ratio	0.16	0.67			0.49	0.05		0.85			0.89	
Uniform Delay, d1	17.5	23.4			25.9	21.2		34.9			35.7	
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.0	2.1			0.5	0.0		8.6			15.8	
Delay (s)	17.5	25.6			26.5	21.2		43.6			51.6	
Level of Service	B	C			C	C		D			D	
Approach Delay (s/veh)		24.8			25.5			43.6			51.6	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		37.6			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.79										
Actuated Cycle Length (s)		119.0			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		92.0%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition

Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	1	80	5	1	2	84	385	1	0	420	93
Future Volume (vph)	84	1	80	5	1	2	84	385	1	0	420	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	10	12	12	12	10	11	11	11	11	11
Storage Length (ft)	0		50	0		0	410		0	0		410
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.966							0.850
Flt Protected		0.953			0.970		0.950					
Satd. Flow (prot)	0	1690	1507	0	1583	0	1685	1837	0	0	1837	1546
Flt Permitted		0.680			0.757		0.349					
Satd. Flow (perm)	0	1206	1507	0	1235	0	619	1837	0	0	1837	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			135		4							135
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		757			597			3064			1095	
Travel Time (s)		17.2			13.6			52.2			18.7	
Peak Hour Factor	0.94	0.94	0.94	0.50	0.50	0.50	0.96	0.96	0.96	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	89	1	85	10	2	4	88	401	1	0	472	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	90	85	0	16	0	88	402	0	0	472	104
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			10			10	
Link Offset(ft)		0			-30			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.09	1.09	1.00	1.00	1.00	1.09	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA			NA	Perm

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition

Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Detector Phase	8	8	8	4	4		1	6		2	2	2
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		8.0	5.0		5.0	5.0	5.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		13.0	11.0		11.0	11.0	11.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0		13.0	59.0		46.0	46.0	46.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	22.9%		12.4%	56.2%		43.8%	43.8%	43.8%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		8.0	53.0		40.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.0		4.0	4.0	4.0
Recall Mode	None	None	None	None	None		Min	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		12.9	12.9		9.3		55.2	55.8			40.9	40.9
Actuated g/C Ratio		0.17	0.17		0.12		0.72	0.73			0.54	0.54
v/c Ratio		0.44	0.23		0.10		0.15	0.29			0.47	0.11
Control Delay (s/veh)		35.2	2.7		31.6		6.4	7.1			15.9	2.0
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)		35.2	2.7		31.6		6.4	7.1			15.9	2.0
LOS		D	A		C		A	A			B	A
Approach Delay (s/veh)		19.5			31.6			7.0			13.4	
Approach LOS		B			C			A			B	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 76.2

Natural Cycle: 75

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.48

Intersection Signal Delay (s/veh): 12.0

Intersection LOS: B

Intersection Capacity Utilization 64.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Main Street & Birch Meadow Drive/Lawrence Road

 Ø1	 Ø2	 Ø3	 Ø4
13 s	46 s	22 s	24 s
 Ø6		 Ø7	 Ø8
59 s		22 s	24 s

Lanes, Volumes, Timings
1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition
Weekday Evening Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	22.0	22.0
Total Split (s)	22.0	22.0
Total Split (%)	21%	21%
Maximum Green (s)	17.0	17.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	7.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	1	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues

1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition

Weekday Evening Peak Hour

	→	↘	←	↙	↑	↓	↗
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	90	85	16	88	402	472	104
v/c Ratio	0.44	0.23	0.10	0.15	0.29	0.47	0.11
Control Delay (s/veh)	35.2	2.7	31.6	6.4	7.1	15.9	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	35.2	2.7	31.6	6.4	7.1	15.9	2.0
Queue Length 50th (ft)	40	0	5	10	59	131	0
Queue Length 95th (ft)	80	10	14	45	196	317	17
Internal Link Dist (ft)	677		517		2984	1015	
Turn Bay Length (ft)		50		410			410
Base Capacity (vph)	322	502	301	563	1344	986	892
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.17	0.05	0.16	0.30	0.48	0.12
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

1: Main Street & Birch Meadow Drive/Lawrence Road

2025 Existing Condition
Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	1	80	5	1	2	84	385	1	0	420	93
Future Volume (vph)	84	1	80	5	1	2	84	385	1	0	420	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	10	12	12	12	10	11	11	11	11	11
Total Lost time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.96		1.00	0.99			1.00	0.85
Flt Protected		0.95	1.00		0.96		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1690	1507		1582		1685	1836			1837	1546
Flt Permitted		0.67	1.00		0.75		0.34	1.00			1.00	1.00
Satd. Flow (perm)		1205	1507		1235		619	1836			1837	1546
Peak-hour factor, PHF	0.94	0.94	0.94	0.50	0.50	0.50	0.96	0.96	0.96	0.89	0.89	0.89
Adj. Flow (vph)	89	1	85	10	2	4	88	401	1	0	472	104
RTOR Reduction (vph)	0	0	69	0	4	0	0	0	0	0	0	52
Lane Group Flow (vph)	0	90	16	0	12	0	88	402	0	0	472	52
Heavy Vehicles (%)	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	1%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA			NA	Perm
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Actuated Green, G (s)		15.4	15.4		7.7		54.2	54.2			41.0	41.0
Effective Green, g (s)		15.4	15.4		7.7		54.2	54.2			41.0	41.0
Actuated g/C Ratio		0.19	0.19		0.09		0.66	0.66			0.50	0.50
Clearance Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	4.0			4.0	4.0
Lane Grp Cap (vph)		227	284		116		518	1219			923	776
v/s Ratio Prot							0.02	c0.22			c0.26	
v/s Ratio Perm		c0.07	0.01		0.01		0.10					0.03
v/c Ratio		0.39	0.05		0.10		0.16	0.32			0.51	0.06
Uniform Delay, d1		29.0	27.1		33.8		6.0	5.8			13.5	10.4
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		1.1	0.0		0.4		0.1	0.7			2.0	0.1
Delay (s)		30.1	27.2		34.2		6.2	6.6			15.6	10.6
Level of Service		C	C		C		A	A			B	B
Approach Delay (s/veh)		28.7			34.2			6.5			14.7	
Approach LOS		C			C			A			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			13.7				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			81.6				Sum of lost time (s)				22.0	
Intersection Capacity Utilization			64.2%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Main Street & Salem Street

2025 Existing Condition
Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	406	63	19	287	35	148	451	15	142	371	49
Future Volume (vph)	76	406	63	19	287	35	148	451	15	142	371	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	11	10	10	11	11	11	11	11	11	12
Storage Length (ft)	190		0	0		85	0		0	0		0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (ft)	85			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		0.980				0.850		0.996			0.987	
Flt Protected	0.950				0.997			0.988			0.988	
Satd. Flow (prot)	1668	1780	0	0	1720	1516	0	3412	0	0	3394	0
Flt Permitted	0.337				0.956			0.628			0.603	
Satd. Flow (perm)	592	1780	0	0	1649	1516	0	2169	0	0	2072	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				119		3			10	
Link Speed (mph)		20			20			40			40	
Link Distance (ft)		462			1004			529			866	
Travel Time (s)		15.8			34.2			9.0			14.8	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	2%	0%	3%	3%	2%	0%	7%	1%	0%	0%
Adj. Flow (vph)	79	423	66	20	299	36	154	470	16	148	386	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	489	0	0	319	36	0	640	0	0	585	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.04	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	

Lanes, Volumes, Timings

2: Main Street & Salem Street

2025 Existing Condition
Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Detector Phase	9	14		10	10	10	5	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	7.0		7.0	7.0	7.0	6.0	7.0		7.0	7.0	
Minimum Split (s)	10.0	11.0		11.0	11.0	11.0	10.0	11.0		11.0	11.0	
Total Split (s)	11.0	41.0		30.0	30.0	30.0	11.0	59.0		48.0	48.0	
Total Split (%)	9.2%	34.5%		25.2%	25.2%	25.2%	9.2%	49.6%		40.3%	40.3%	
Maximum Green (s)	7.0	37.0		26.0	26.0	26.0	7.0	55.0		44.0	44.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	C-Min		C-Min	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	48.6	48.6			38.7	38.7		54.8			54.8	
Actuated g/C Ratio	0.41	0.41			0.33	0.33		0.46			0.46	
v/c Ratio	0.25	0.66			0.59	0.06		0.63			0.60	
Control Delay (s/veh)	25.7	34.9			41.8	0.2		28.9			27.9	
Queue Delay	0.0	0.0			0.0	0.0		0.0			0.0	
Total Delay (s/veh)	25.7	34.9			41.8	0.2		28.9			27.9	
LOS	C	C			D	A		C			C	
Approach Delay (s/veh)		33.7			37.6			29.0			27.9	
Approach LOS		C			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 119

Actuated Cycle Length: 119

Offset: 11 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay (s/veh): 31.4

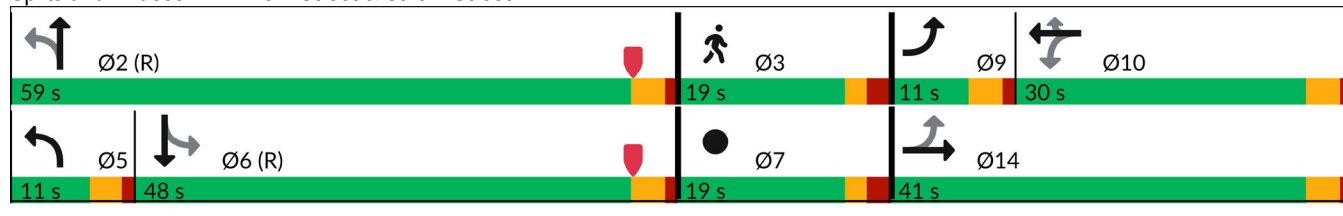
Intersection LOS: C

Intersection Capacity Utilization 87.9%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: Main Street & Salem Street



Lanes, Volumes, Timings
2: Main Street & Salem Street

2025 Existing Condition
Weekday Evening Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	19.0	19.0
Total Split (s)	19.0	19.0
Total Split (%)	16%	16%
Maximum Green (s)	15.0	15.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	4.0	
Flash Dont Walk (s)	11.0	
Pedestrian Calls (#/hr)	14	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues
2: Main Street & Salem Street

2025 Existing Condition
Weekday Evening Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	79	489	319	36	640	585
v/c Ratio	0.25	0.66	0.59	0.06	0.63	0.60
Control Delay (s/veh)	25.7	34.9	41.8	0.2	28.9	27.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.7	34.9	41.8	0.2	28.9	27.9
Queue Length 50th (ft)	35	279	197	0	180	159
Queue Length 95th (ft)	79	#486	#404	0	274	246
Internal Link Dist (ft)		382	924		449	786
Turn Bay Length (ft)	190			85		
Base Capacity (vph)	316	730	535	572	1044	960
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.67	0.60	0.06	0.61	0.61

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: Main Street & Salem Street

2025 Existing Condition

Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	406	63	19	287	35	148	451	15	142	371	49
Future Volume (vph)	76	406	63	19	287	35	148	451	15	142	371	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	10	11	11	11	11	11	11	12
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		0.95			0.95	
Frt	1.00	0.97			1.00	0.85		0.99			0.98	
Flt Protected	0.95	1.00			0.99	1.00		0.98			0.98	
Satd. Flow (prot)	1668	1779			1719	1516		3413			3392	
Flt Permitted	0.33	1.00			0.95	1.00		0.62			0.60	
Satd. Flow (perm)	592	1779			1650	1516		2168			2071	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	79	423	66	20	299	36	154	470	16	148	386	51
RTOR Reduction (vph)	0	4	0	0	0	24	0	2	0	0	6	0
Lane Group Flow (vph)	79	485	0	0	319	12	0	638	0	0	579	0
Heavy Vehicles (%)	1%	1%	2%	0%	3%	3%	2%	0%	7%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Actuated Green, G (s)	49.4	49.4			38.7	38.7		51.6			51.6	
Effective Green, g (s)	49.4	49.4			38.7	38.7		51.6			51.6	
Actuated g/C Ratio	0.42	0.42			0.33	0.33		0.43			0.43	
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Vehicle Extension (s)	2.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	306	738			536	493		940			898	
v/s Ratio Prot	0.01	c0.27										
v/s Ratio Perm	0.09				0.19	0.01		c0.29			0.28	
v/c Ratio	0.25	0.65			0.59	0.02		0.67			0.64	
Uniform Delay, d1	22.7	27.9			33.5	27.3		27.0			26.5	
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	2.1			1.7	0.0		1.5			3.5	
Delay (s)	22.8	30.1			35.3	27.3		28.5			30.0	
Level of Service	C	C			D	C		C			C	
Approach Delay (s/veh)		29.1			34.5			28.5			30.0	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			30.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			119.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			87.9%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 No-Build Condition

Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	1	118	8	3	0	147	242	2	1	531	253
Future Volume (vph)	159	1	118	8	3	0	147	242	2	1	531	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	10	12	12	12	10	11	11	11	11	11
Storage Length (ft)	0		50	0		0	410		0	0		410
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.999				0.850
Flt Protected		0.953			0.964		0.950					
Satd. Flow (prot)	0	1690	1507	0	1832	0	1668	1758	0	0	1783	1561
Flt Permitted		0.732			0.768		0.237					
Satd. Flow (perm)	0	1298	1507	0	1459	0	416	1758	0	0	1783	1561
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			135					1				275
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		757			595			3061			1095	
Travel Time (s)		17.2			13.5			52.2			18.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	4%	50%	0%	3%	0%
Adj. Flow (vph)	173	1	128	9	3	0	160	263	2	1	577	275
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	174	128	0	12	0	160	265	0	0	578	275
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			10			10	
Link Offset(ft)		0			-30			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.09	1.09	1.00	1.00	1.00	1.09	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 No-Build Condition

Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Detector Phase	8	8	8	4	4		1	6		2	2	2
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		8.0	5.0		5.0	5.0	5.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		13.0	11.0		11.0	11.0	11.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0		13.0	59.0		46.0	46.0	46.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	22.9%		12.4%	56.2%		43.8%	43.8%	43.8%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		8.0	53.0		40.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.0		4.0	4.0	4.0
Recall Mode	None	None	None	None	None		Min	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		18.0	18.0		14.1		54.3	53.3			40.2	40.2
Actuated g/C Ratio		0.22	0.22		0.17		0.65	0.64			0.48	0.48
v/c Ratio		0.62	0.29		0.04		0.40	0.23			0.67	0.30
Control Delay (s/veh)		39.3	6.1		34.0		10.0	8.0			22.8	3.0
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)		39.3	6.1		34.0		10.0	8.0			22.8	3.0
LOS		D	A		C		B	A			C	A
Approach Delay (s/veh)		25.3			34.1			8.8			16.5	
Approach LOS		C			C			A			B	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 83.3

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.67

Intersection Signal Delay (s/veh): 16.2

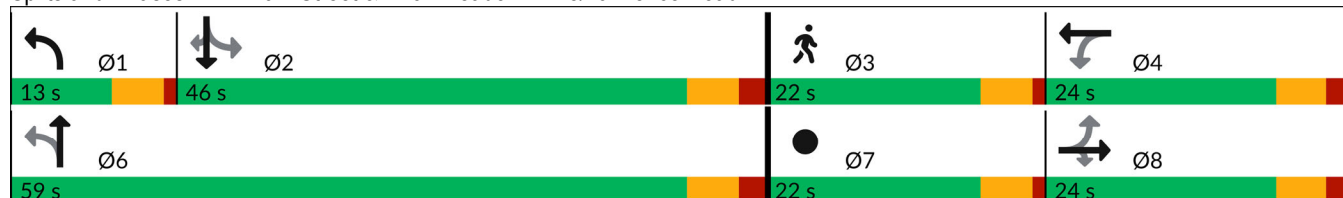
Intersection LOS: B

Intersection Capacity Utilization 67.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Main Street & Birch Meadow Drive/Lawrence Road



Lanes, Volumes, Timings
1: Main Street & Birch Meadow Drive/Lawrence Road

2032 No-Build Condition
Weekday Morning Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	22.0	22.0
Total Split (s)	22.0	22.0
Total Split (%)	21%	21%
Maximum Green (s)	17.0	17.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	7.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	5	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues

2032 No-Build Condition

1: Main Street & Birch Meadow Drive/Lawrence Road

Weekday Morning Peak Hour

	→	↘	←	↙	↑	↓	↗
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	174	128	12	160	265	578	275
v/c Ratio	0.62	0.29	0.04	0.40	0.23	0.67	0.30
Control Delay (s/veh)	39.3	6.1	34.0	10.0	8.0	22.8	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	39.3	6.1	34.0	10.0	8.0	22.8	3.0
Queue Length 50th (ft)	82	0	5	28	51	219	0
Queue Length 95th (ft)	144	37	24	74	123	429	46
Internal Link Dist (ft)	677		515		2981	1015	
Turn Bay Length (ft)		50		410			410
Base Capacity (vph)	314	467	316	391	1124	860	895
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.27	0.04	0.41	0.24	0.67	0.31
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 No-Build Condition
Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	1	118	8	3	0	147	242	2	1	531	253
Future Volume (vph)	159	1	118	8	3	0	147	242	2	1	531	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	10	12	12	12	10	11	11	11	11	11
Total Lost time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00		1.00	0.99			1.00	0.85
Flt Protected		0.95	1.00		0.96		0.95	1.00			0.99	1.00
Satd. Flow (prot)		1689	1507		1831		1668	1758			1783	1561
Flt Permitted		0.73	1.00		0.76		0.23	1.00			0.99	1.00
Satd. Flow (perm)		1298	1507		1458		416	1758			1783	1561
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	173	1	128	9	3	0	160	263	2	1	577	275
RTOR Reduction (vph)	0	0	96	0	0	0	0	0	0	0	0	148
Lane Group Flow (vph)	0	174	32	0	12	0	160	265	0	0	578	127
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	4%	50%	0%	3%	0%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Actuated Green, G (s)		22.1	22.1		14.1		53.3	53.3			40.3	40.3
Effective Green, g (s)		22.1	22.1		14.1		53.3	53.3			40.3	40.3
Actuated g/C Ratio		0.25	0.25		0.16		0.61	0.61			0.46	0.46
Clearance Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	4.0			4.0	4.0
Lane Grp Cap (vph)		328	381		235		368	1072			822	719
v/s Ratio Prot							c0.04	0.15				
v/s Ratio Perm		c0.13	0.02		0.01		0.23				0.32	0.08
v/c Ratio		0.53	0.08		0.05		0.43	0.24			0.70	0.17
Uniform Delay, d1		28.1	24.9		30.9		10.6	7.8			18.7	13.8
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		1.6	0.0		0.0		0.8	0.5			5.0	0.5
Delay (s)		29.8	25.0		31.0		11.4	8.3			23.7	14.3
Level of Service		C	C		C		B	A			C	B
Approach Delay (s/veh)		27.7			31.0			9.5			20.7	
Approach LOS		C			C			A			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			19.2				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			87.4				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			67.0%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2: Main Street & Salem Street

2032 No-Build Condition
Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	453	72	32	384	31	88	427	8	152	559	37
Future Volume (vph)	59	453	72	32	384	31	88	427	8	152	559	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	11	10	10	11	11	11	11	11	11	12
Storage Length (ft)	190		0	0		85	0		0	0		0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (ft)	85			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		0.979				0.850		0.998			0.993	
Flt Protected	0.950				0.996			0.992			0.990	
Satd. Flow (prot)	1685	1710	0	0	1710	1301	0	3367	0	0	3355	0
Flt Permitted	0.255				0.888			0.605			0.645	
Satd. Flow (perm)	452	1710	0	0	1524	1301	0	2053	0	0	2186	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				119		2			5	
Link Speed (mph)		20			20			40			40	
Link Distance (ft)		462			1004			529			874	
Travel Time (s)		15.8			34.2			9.0			14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	6%	7%	3%	20%	1%	3%	0%	3%	2%	3%
Adj. Flow (vph)	64	492	78	35	417	34	96	464	9	165	608	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	570	0	0	452	34	0	569	0	0	813	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.04	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	

Lanes, Volumes, Timings

2: Main Street & Salem Street

2032 No-Build Condition
Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Detector Phase	9	14		10	10	10	5	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	7.0		7.0	7.0	7.0	6.0	7.0		7.0	7.0	
Minimum Split (s)	10.0	11.0		11.0	11.0	11.0	10.0	11.0		11.0	11.0	
Total Split (s)	11.0	36.0		25.0	25.0	25.0	11.0	64.0		53.0	53.0	
Total Split (%)	9.2%	30.3%		21.0%	21.0%	21.0%	9.2%	53.8%		44.5%	44.5%	
Maximum Green (s)	7.0	32.0		21.0	21.0	21.0	7.0	60.0		49.0	49.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	C-Min		C-Min	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	54.7	54.7		45.9	45.9	45.9	52.5			52.5		
Actuated g/C Ratio	0.46	0.46		0.39	0.39	0.39	0.44			0.44		
v/c Ratio	0.23	0.72		0.77	0.77	0.77	0.62			0.84		
Control Delay (s/veh)	25.0	34.5		44.8	44.8	44.8	28.3			37.7		
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0			0.0		
Total Delay (s/veh)	25.0	34.5		44.8	44.8	44.8	28.3			37.7		
LOS	C	C		D	D	D	C			D		
Approach Delay (s/veh)		33.6			41.7	41.7	28.4			37.7		
Approach LOS		C			D	D	C			D		

Intersection Summary

Area Type: Other

Cycle Length: 119

Actuated Cycle Length: 119

Offset: 11 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay (s/veh): 35.3

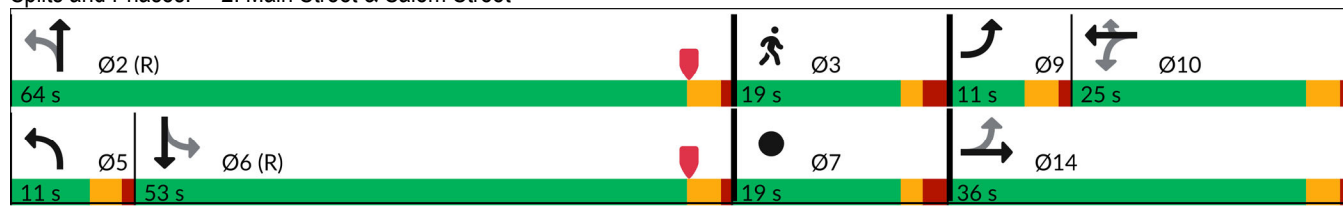
Intersection LOS: D

Intersection Capacity Utilization 94.7%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 2: Main Street & Salem Street



Stonefield Engineering & Design
NB-AM

Synchro 12 Report
06/30/2025

Lanes, Volumes, Timings
2: Main Street & Salem Street

2032 No-Build Condition
Weekday Morning Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	19.0	19.0
Total Split (s)	19.0	19.0
Total Split (%)	16%	16%
Maximum Green (s)	15.0	15.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	4.0	
Flash Dont Walk (s)	11.0	
Pedestrian Calls (#/hr)	2	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues
2: Main Street & Salem Street

2032 No-Build Condition
Weekday Morning Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	64	570	452	34	569	813
v/c Ratio	0.23	0.72	0.77	0.05	0.62	0.84
Control Delay (s/veh)	25.0	34.5	44.8	0.1	28.3	37.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.0	34.5	44.8	0.1	28.3	37.7
Queue Length 50th (ft)	25	318	291	0	173	285
Queue Length 95th (ft)	74	#761	#712	0	208	332
Internal Link Dist (ft)		382	924		449	794
Turn Bay Length (ft)	190			85		
Base Capacity (vph)	282	789	587	575	1036	984
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.72	0.77	0.06	0.55	0.83

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: Main Street & Salem Street

2032 No-Build Condition

Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	453	72	32	384	31	88	427	8	152	559	37
Future Volume (vph)	59	453	72	32	384	31	88	427	8	152	559	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	10	11	11	11	11	11	11	12
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		0.95			0.95	
Frt	1.00	0.97			1.00	0.85		0.99			0.99	
Flt Protected	0.95	1.00			0.99	1.00		0.99			0.98	
Satd. Flow (prot)	1685	1711			1710	1301		3364			3354	
Flt Permitted	0.25	1.00			0.88	1.00		0.60			0.64	
Satd. Flow (perm)	453	1711			1524	1301		2053			2184	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	492	78	35	417	34	96	464	9	165	608	40
RTOR Reduction (vph)	0	4	0	0	0	21	0	1	0	0	3	0
Lane Group Flow (vph)	64	566	0	0	452	13	0	568	0	0	810	0
Heavy Vehicles (%)	0%	5%	6%	7%	3%	20%	1%	3%	0%	3%	2%	3%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Actuated Green, G (s)	55.4	55.4			45.9	45.9		48.6			48.6	
Effective Green, g (s)	55.4	55.4			45.9	45.9		48.6			48.6	
Actuated g/C Ratio	0.47	0.47			0.39	0.39		0.41			0.41	
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Vehicle Extension (s)	2.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	267	796			587	501		838			891	
v/s Ratio Prot	0.01	c0.33										
v/s Ratio Perm	0.10				c0.30	0.01		0.28			c0.37	
v/c Ratio	0.23	0.71			0.77	0.02		0.67			0.90	
Uniform Delay, d1	20.3	25.4			31.9	22.6		28.7			33.1	
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	3.0			6.1	0.0		1.7			14.8	
Delay (s)	20.5	28.4			38.1	22.7		30.5			47.9	
Level of Service	C	C			D	C		C			D	
Approach Delay (s/veh)		27.6			37.0			30.5			47.9	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			36.7				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			119.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			94.7%				ICU Level of Service			F		
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 No-Build Condition

Weekday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	3	103	5	0	1	88	486	4	0	420	109
Future Volume (vph)	155	3	103	5	0	1	88	486	4	0	420	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	10	12	12	12	10	11	11	11	11	11
Storage Length (ft)	0		50	0		0	410		0	0		410
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.977			0.999				0.850
Flt Protected		0.953			0.960		0.950					
Satd. Flow (prot)	0	1690	1507	0	1782	0	1652	1799	0	0	1801	1561
Flt Permitted		0.770			0.761		0.320					
Satd. Flow (perm)	0	1365	1507	0	1413	0	556	1799	0	0	1801	1561
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			135		135							135
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		757			596			3063			1095	
Travel Time (s)		17.2			13.5			52.2			18.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	2%	0%
Adj. Flow (vph)	168	3	112	5	0	1	96	528	4	0	457	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	171	112	0	6	0	96	532	0	0	457	118
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			10			10	
Link Offset(ft)		0			-30			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.09	1.09	1.00	1.00	1.00	1.09	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA			NA	Perm

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 No-Build Condition

Weekday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Detector Phase	8	8	8	4	4		1	6		2	2	2
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		8.0	5.0		5.0	5.0	5.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		13.0	11.0		11.0	11.0	11.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0		13.0	54.0		41.0	41.0	41.0
Total Split (%)	27.6%	27.6%	27.6%	27.6%	27.6%		12.4%	51.4%		39.0%	39.0%	39.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0		8.0	48.0		35.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.0		4.0	4.0	4.0
Recall Mode	None	None	None	None	None		Min	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		16.1	16.1		12.3		49.3	48.3			35.2	35.2
Actuated g/C Ratio		0.21	0.21		0.16		0.64	0.63			0.46	0.46
v/c Ratio		0.59	0.26		0.01		0.20	0.46			0.55	0.14
Control Delay (s/veh)		35.6	4.6		0.1		7.7	10.3			19.5	2.9
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)		35.6	4.6		0.1		7.7	10.3			19.5	2.9
LOS		D	A		A		A	B			B	A
Approach Delay (s/veh)		23.4			0.2			9.9			16.1	
Approach LOS		C			A			A			B	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 76.5

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.60

Intersection Signal Delay (s/veh): 14.8

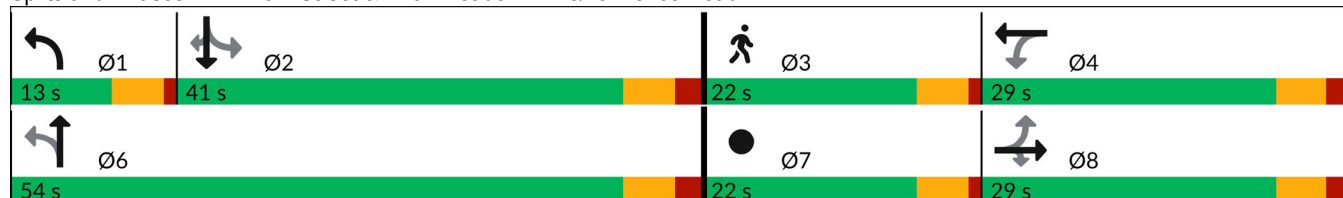
Intersection LOS: B

Intersection Capacity Utilization 72.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Main Street & Birch Meadow Drive/Lawrence Road



Lanes, Volumes, Timings
1: Main Street & Birch Meadow Drive/Lawrence Road

2032 No-Build Condition
Weekday Midday Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	22.0	22.0
Total Split (s)	22.0	22.0
Total Split (%)	21%	21%
Maximum Green (s)	17.0	17.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	7.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	9	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues

2032 No-Build Condition

1: Main Street & Birch Meadow Drive/Lawrence Road

Weekday Midday Peak Hour

	→	↘	←	↙	↑	↓	↗
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	171	112	6	96	532	457	118
v/c Ratio	0.59	0.26	0.01	0.20	0.46	0.55	0.14
Control Delay (s/veh)	35.6	4.6	0.1	7.7	10.3	19.5	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	35.6	4.6	0.1	7.7	10.3	19.5	2.9
Queue Length 50th (ft)	73	0	0	14	110	145	0
Queue Length 95th (ft)	131	26	0	46	269	304	25
Internal Link Dist (ft)	677		516		2983	1015	
Turn Bay Length (ft)		50		410			410
Base Capacity (vph)	428	566	521	474	1136	829	792
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.20	0.01	0.20	0.47	0.55	0.15
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 No-Build Condition
Weekday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	3	103	5	0	1	88	486	4	0	420	109
Future Volume (vph)	155	3	103	5	0	1	88	486	4	0	420	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	10	12	12	12	10	11	11	11	11	11
Total Lost time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.97		1.00	0.99			1.00	0.85
Flt Protected		0.95	1.00		0.96		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1690	1507		1783		1652	1799			1801	1561
Flt Permitted		0.76	1.00		0.76		0.32	1.00			1.00	1.00
Satd. Flow (perm)		1365	1507		1413		556	1799			1801	1561
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	3	112	5	0	1	96	528	4	0	457	118
RTOR Reduction (vph)	0	0	84	0	5	0	0	0	0	0	0	66
Lane Group Flow (vph)	0	171	28	0	1	0	96	532	0	0	457	52
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA			NA	Perm
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Actuated Green, G (s)		20.3	20.3		12.3		48.3	48.3			35.2	35.2
Effective Green, g (s)		20.3	20.3		12.3		48.3	48.3			35.2	35.2
Actuated g/C Ratio		0.25	0.25		0.15		0.60	0.60			0.44	0.44
Clearance Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	4.0			4.0	4.0
Lane Grp Cap (vph)		343	379		215		443	1078			786	681
v/s Ratio Prot							0.02	c0.30			c0.25	
v/s Ratio Perm		c0.13	0.02		0.00		0.11					0.03
v/c Ratio		0.49	0.07		0.00		0.21	0.49			0.58	0.07
Uniform Delay, d1		25.7	22.9		28.9		8.3	9.1			17.1	13.2
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		1.1	0.0		0.0		0.2	1.6			3.1	0.2
Delay (s)		26.9	23.0		28.9		8.5	10.8			20.2	13.4
Level of Service		C	C		C		A	B			C	B
Approach Delay (s/veh)		25.4			28.9			10.4			18.8	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		16.6										
HCM 2000 Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		80.6										
Intersection Capacity Utilization		72.6%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
2: Main Street & Salem Street

2032 No-Build Condition
Weekday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	492	68	20	302	72	103	536	14	143	429	49
Future Volume (vph)	59	492	68	20	302	72	103	536	14	143	429	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	11	10	10	11	11	11	11	11	11	12
Storage Length (ft)	190		0	0		85	0		0	0		0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (ft)	85			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		0.982				0.850		0.997			0.988	
Flt Protected	0.950				0.997			0.992			0.989	
Satd. Flow (prot)	1620	1757	0	0	1735	1473	0	3402	0	0	3376	0
Flt Permitted	0.360				0.944			0.627			0.572	
Satd. Flow (perm)	614	1757	0	0	1643	1473	0	2150	0	0	1952	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				119		2			8	
Link Speed (mph)		20			20			40			40	
Link Distance (ft)		462			1004			529			859	
Travel Time (s)		15.8			34.2			9.0			14.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	0%	0%	2%	6%	4%	1%	0%	0%	1%	4%
Adj. Flow (vph)	64	535	74	22	328	78	112	583	15	155	466	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	609	0	0	350	78	0	710	0	0	674	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.04	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	

Lanes, Volumes, Timings

2: Main Street & Salem Street

2032 No-Build Condition
Weekday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Detector Phase	9	14		10	10	10	5	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	7.0		7.0	7.0	7.0	6.0	7.0		7.0	7.0	
Minimum Split (s)	10.0	11.0		11.0	11.0	11.0	10.0	11.0		11.0	11.0	
Total Split (s)	11.0	41.0		30.0	30.0	30.0	11.0	59.0		48.0	48.0	
Total Split (%)	9.2%	34.5%		25.2%	25.2%	25.2%	9.2%	49.6%		40.3%	40.3%	
Maximum Green (s)	7.0	37.0		26.0	26.0	26.0	7.0	55.0		44.0	44.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	C-Min		C-Min	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	55.0	55.0		46.5	46.5	46.5	48.4			48.4		
Actuated g/C Ratio	0.46	0.46		0.39	0.39	0.39	0.41			0.41		
v/c Ratio	0.18	0.74		0.54	0.12	0.12	0.81			0.84		
Control Delay (s/veh)	24.9	36.4		37.2	2.3	2.3	38.8			41.7		
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0			0.0		
Total Delay (s/veh)	24.9	36.4		37.2	2.3	2.3	38.8			41.7		
LOS	C	D		D	A	A	D			D		
Approach Delay (s/veh)		35.4			30.9		38.9				41.8	
Approach LOS		D			C		D				D	

Intersection Summary

Area Type: Other

Cycle Length: 119

Actuated Cycle Length: 119

Offset: 44 (37%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay (s/veh): 37.3

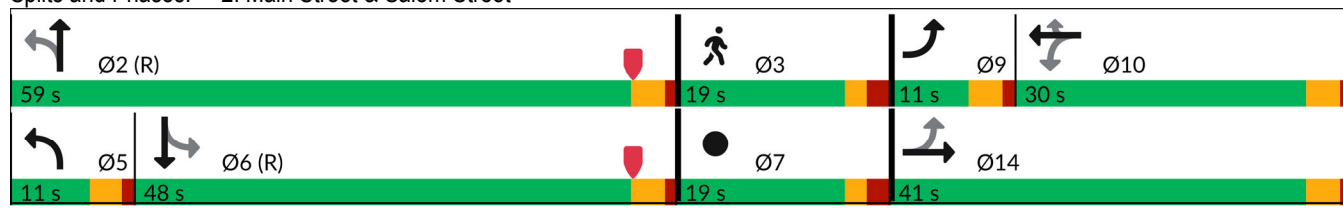
Intersection LOS: D

Intersection Capacity Utilization 94.9%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 2: Main Street & Salem Street



Lanes, Volumes, Timings
2: Main Street & Salem Street

2032 No-Build Condition
Weekday Midday Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	19.0	19.0
Total Split (s)	19.0	19.0
Total Split (%)	16%	16%
Maximum Green (s)	15.0	15.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	4.0	
Flash Dont Walk (s)	11.0	
Pedestrian Calls (#/hr)	11	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues

2: Main Street & Salem Street

2032 No-Build Condition

Weekday Midday Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	64	609	350	78	710	674
v/c Ratio	0.18	0.74	0.54	0.12	0.81	0.84
Control Delay (s/veh)	24.9	36.4	37.2	2.3	38.8	41.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	24.9	36.4	37.2	2.3	38.8	41.7
Queue Length 50th (ft)	23	323	189	0	250	240
Queue Length 95th (ft)	70	#759	#459	14	301	295
Internal Link Dist (ft)		382	924		449	779
Turn Bay Length (ft)	190			85		
Base Capacity (vph)	342	815	642	648	994	810
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.75	0.55	0.12	0.71	0.83

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: Main Street & Salem Street

2032 No-Build Condition

Weekday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	492	68	20	302	72	103	536	14	143	429	49
Future Volume (vph)	59	492	68	20	302	72	103	536	14	143	429	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	10	11	11	11	11	11	11	12
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		0.95			0.95	
Frt	1.00	0.98			1.00	0.85		0.99			0.98	
Flt Protected	0.95	1.00			0.99	1.00		0.99			0.98	
Satd. Flow (prot)	1620	1757			1735	1473		3402			3375	
Flt Permitted	0.36	1.00			0.94	1.00		0.62			0.57	
Satd. Flow (perm)	614	1757			1643	1473		2151			1953	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	535	74	22	328	78	112	583	15	155	466	53
RTOR Reduction (vph)	0	3	0	0	0	48	0	1	0	0	5	0
Lane Group Flow (vph)	64	606	0	0	350	30	0	709	0	0	669	0
Heavy Vehicles (%)	4%	3%	0%	0%	2%	6%	4%	1%	0%	0%	1%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Actuated Green, G (s)	55.7	55.7			46.5	46.5		45.3			45.3	
Effective Green, g (s)	55.7	55.7			46.5	46.5		45.3			45.3	
Actuated g/C Ratio	0.47	0.47			0.39	0.39		0.38			0.38	
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Vehicle Extension (s)	2.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	331	822			642	575		818			743	
v/s Ratio Prot	0.01	c0.34										
v/s Ratio Perm	0.08				0.21	0.02		0.33			c0.34	
v/c Ratio	0.19	0.73			0.54	0.05		0.86			0.90	
Uniform Delay, d1	18.9	25.7			28.0	22.5		34.0			34.7	
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	3.4			0.9	0.0		9.2			16.1	
Delay (s)	19.0	29.1			29.0	22.5		43.3			50.8	
Level of Service	B	C			C	C		D			D	
Approach Delay (s/veh)		28.2			27.8			43.3			50.8	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		38.6			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		119.0			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		94.9%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 No-Build Condition

Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	1	83	5	1	2	87	399	1	0	435	96
Future Volume (vph)	87	1	83	5	1	2	87	399	1	0	435	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	10	12	12	12	10	11	11	11	11	11
Storage Length (ft)	0		50	0		0	410		0	0		410
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.966							0.850
Flt Protected		0.953			0.970		0.950					
Satd. Flow (prot)	0	1690	1507	0	1583	0	1685	1837	0	0	1837	1546
Flt Permitted		0.686			0.794		0.340					
Satd. Flow (perm)	0	1217	1507	0	1295	0	603	1837	0	0	1837	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			135		2							135
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		757			594			3060			1095	
Travel Time (s)		17.2			13.5			52.2			18.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	95	1	90	5	1	2	95	434	1	0	473	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	96	90	0	8	0	95	435	0	0	473	104
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			10			10	
Link Offset(ft)		0			-30			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.09	1.09	1.00	1.00	1.00	1.09	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA			NA	Perm

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 No-Build Condition

Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Detector Phase	8	8	8	4	4		1	6		2	2	2
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		8.0	5.0		5.0	5.0	5.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		13.0	11.0		11.0	11.0	11.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0		13.0	59.0		46.0	46.0	46.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	22.9%		12.4%	56.2%		43.8%	43.8%	43.8%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		8.0	53.0		40.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.0		4.0	4.0	4.0
Recall Mode	None	None	None	None	None		Min	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		13.1	13.1		9.4		54.5	53.5			40.4	40.4
Actuated g/C Ratio		0.17	0.17		0.12		0.69	0.68			0.51	0.51
v/c Ratio		0.47	0.24		0.05		0.17	0.34			0.50	0.12
Control Delay (s/veh)		36.4	3.1		32.0		6.4	7.6			16.5	1.9
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)		36.4	3.1		32.0		6.4	7.6			16.5	1.9
LOS		D	A		C		A	A			B	A
Approach Delay (s/veh)		20.4			32.0			7.4			13.9	
Approach LOS		C			C			A			B	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 78.7

Natural Cycle: 75

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.50

Intersection Signal Delay (s/veh): 12.3

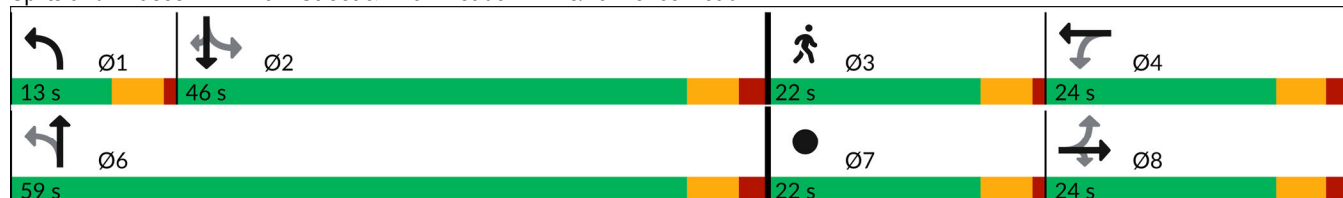
Intersection LOS: B

Intersection Capacity Utilization 66.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Main Street & Birch Meadow Drive/Lawrence Road



Lanes, Volumes, Timings
1: Main Street & Birch Meadow Drive/Lawrence Road

2032 No-Build Condition
Weekday Evening Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	22.0	22.0
Total Split (s)	22.0	22.0
Total Split (%)	21%	21%
Maximum Green (s)	17.0	17.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	7.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	1	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues

2032 No-Build Condition

1: Main Street & Birch Meadow Drive/Lawrence Road

Weekday Evening Peak Hour

	→	↘	←	↙	↑	↓	↗
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	96	90	8	95	435	473	104
v/c Ratio	0.47	0.24	0.05	0.17	0.34	0.50	0.12
Control Delay (s/veh)	36.4	3.1	32.0	6.4	7.6	16.5	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	36.4	3.1	32.0	6.4	7.6	16.5	1.9
Queue Length 50th (ft)	43	0	3	11	67	132	0
Queue Length 95th (ft)	84	13	18	46	209	318	18
Internal Link Dist (ft)	677		514		2980	1015	
Turn Bay Length (ft)		50		410			410
Base Capacity (vph)	309	484	300	528	1248	942	858
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.19	0.03	0.18	0.35	0.50	0.12
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 No-Build Condition
Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	1	83	5	1	2	87	399	1	0	435	96
Future Volume (vph)	87	1	83	5	1	2	87	399	1	0	435	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	10	12	12	12	10	11	11	11	11	11
Total Lost time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.96		1.00	0.99			1.00	0.85
Flt Protected		0.95	1.00		0.96		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1690	1507		1582		1685	1836			1837	1546
Flt Permitted		0.68	1.00		0.79		0.33	1.00			1.00	1.00
Satd. Flow (perm)		1217	1507		1296		602	1836			1837	1546
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	1	90	5	1	2	95	434	1	0	473	104
RTOR Reduction (vph)	0	0	71	0	2	0	0	0	0	0	0	53
Lane Group Flow (vph)	0	96	19	0	6	0	95	435	0	0	473	51
Heavy Vehicles (%)	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	1%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA			NA	Perm
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Actuated Green, G (s)		17.2	17.2		9.4		53.5	53.5			40.4	40.4
Effective Green, g (s)		17.2	17.2		9.4		53.5	53.5			40.4	40.4
Actuated g/C Ratio		0.21	0.21		0.11		0.65	0.65			0.49	0.49
Clearance Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	4.0			4.0	4.0
Lane Grp Cap (vph)		253	313		147		495	1187			897	755
v/s Ratio Prot							0.02	c0.24			c0.26	
v/s Ratio Perm		c0.08	0.01		0.00		0.11					0.03
v/c Ratio		0.37	0.05		0.04		0.19	0.36			0.52	0.06
Uniform Delay, d1		28.1	26.2		32.6		6.8	6.7			14.5	11.1
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		0.9	0.0		0.1		0.1	0.8			2.2	0.1
Delay (s)		29.1	26.3		32.7		6.9	7.6			16.7	11.3
Level of Service		C	C		C		A	A			B	B
Approach Delay (s/veh)		27.7			32.7			7.5			15.8	
Approach LOS		C			C			A			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			14.2				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			82.7				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			66.0%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2: Main Street & Salem Street

2032 No-Build Condition
Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	420	65	20	297	36	153	467	16	147	384	51
Future Volume (vph)	79	420	65	20	297	36	153	467	16	147	384	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	11	10	10	11	11	11	11	11	11	12
Storage Length (ft)	190		0	0		85	0		0	0		0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (ft)	85			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		0.980				0.850		0.996			0.987	
Flt Protected	0.950				0.997			0.988			0.988	
Satd. Flow (prot)	1668	1780	0	0	1720	1516	0	3412	0	0	3394	0
Flt Permitted	0.371				0.953			0.591			0.566	
Satd. Flow (perm)	651	1780	0	0	1644	1516	0	2041	0	0	1945	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				119		3			9	
Link Speed (mph)		20			20			40			40	
Link Distance (ft)		462			1004			529			864	
Travel Time (s)		15.8			34.2			9.0			14.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	0%	3%	3%	2%	0%	7%	1%	0%	0%
Adj. Flow (vph)	86	457	71	22	323	39	166	508	17	160	417	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	528	0	0	345	39	0	691	0	0	632	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.04	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	

Lanes, Volumes, Timings

2: Main Street & Salem Street

2032 No-Build Condition
Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Detector Phase	9	14		10	10	10	5	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	7.0		7.0	7.0	7.0	6.0	7.0		7.0	7.0	
Minimum Split (s)	10.0	11.0		11.0	11.0	11.0	10.0	11.0		11.0	11.0	
Total Split (s)	11.0	41.0		30.0	30.0	30.0	11.0	59.0		48.0	48.0	
Total Split (%)	9.2%	34.5%		25.2%	25.2%	25.2%	9.2%	49.6%		40.3%	40.3%	
Maximum Green (s)	7.0	37.0		26.0	26.0	26.0	7.0	55.0		44.0	44.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	C-Min		C-Min	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	56.8	56.8		47.4	47.4	47.4	46.6			46.6		
Actuated g/C Ratio	0.48	0.48		0.40	0.40	0.40	0.39			0.39		
v/c Ratio	0.23	0.61		0.52	0.05	0.05	0.86			0.86dl		
Control Delay (s/veh)	24.0	30.8		36.5	0.1	0.1	44.5			41.3		
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0			0.0		
Total Delay (s/veh)	24.0	30.8		36.5	0.1	0.1	44.5			41.3		
LOS	C	C		D	A	A	D			D		
Approach Delay (s/veh)		29.9			32.9		44.5				41.4	
Approach LOS		C			C		D				D	

Intersection Summary

Area Type: Other

Cycle Length: 119

Actuated Cycle Length: 119

Offset: 11 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay (s/veh): 37.9

Intersection LOS: D

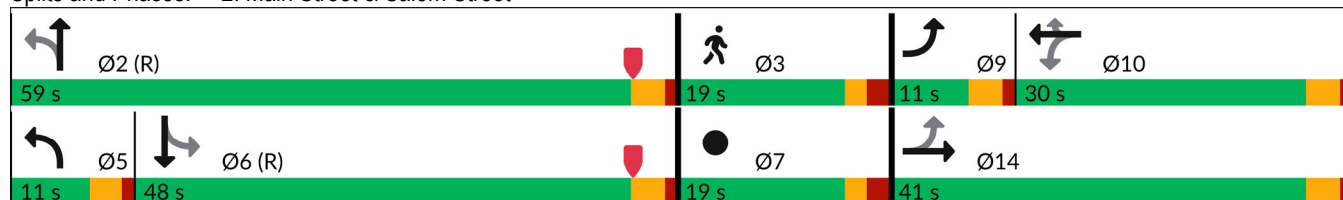
Intersection Capacity Utilization 90.5%

ICU Level of Service E

Analysis Period (min) 15

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 2: Main Street & Salem Street



Stonefield Engineering & Design
NB-PM

Synchro 12 Report
06/30/2025

Lanes, Volumes, Timings
2: Main Street & Salem Street

2032 No-Build Condition
Weekday Evening Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	19.0	19.0
Total Split (s)	19.0	19.0
Total Split (%)	16%	16%
Maximum Green (s)	15.0	15.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	4.0	
Flash Dont Walk (s)	11.0	
Pedestrian Calls (#/hr)	14	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues

2: Main Street & Salem Street

2032 No-Build Condition

Weekday Evening Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	86	528	345	39	691	632
v/c Ratio	0.23	0.61	0.52	0.05	0.86	0.86dl
Control Delay (s/veh)	24.0	30.8	36.5	0.1	44.5	41.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	24.0	30.8	36.5	0.1	44.5	41.3
Queue Length 50th (ft)	31	249	181	0	253	224
Queue Length 95th (ft)	89	#611	#451	0	298	268
Internal Link Dist (ft)		382	924		449	784
Turn Bay Length (ft)	190			85		
Base Capacity (vph)	376	853	655	675	944	788
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.62	0.53	0.06	0.73	0.80
Intersection Summary						
# 95th percentile volume exceeds capacity, queue may be longer.						
Queue shown is maximum after two cycles.						
dl Defacto Left Lane. Recode with 1 though lane as a left lane.						

HCM Signalized Intersection Capacity Analysis

2: Main Street & Salem Street

2032 No-Build Condition

Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	420	65	20	297	36	153	467	16	147	384	51
Future Volume (vph)	79	420	65	20	297	36	153	467	16	147	384	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	10	11	11	11	11	11	11	12
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		0.95			0.95	
Frt	1.00	0.97			1.00	0.85		0.99			0.98	
Flt Protected	0.95	1.00			0.99	1.00		0.98			0.98	
Satd. Flow (prot)	1668	1779			1719	1516		3413			3392	
Flt Permitted	0.37	1.00			0.95	1.00		0.59			0.56	
Satd. Flow (perm)	651	1779			1644	1516		2042			1944	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	86	457	71	22	323	39	166	508	17	160	417	55
RTOR Reduction (vph)	0	4	0	0	0	23	0	2	0	0	6	0
Lane Group Flow (vph)	86	524	0	0	345	16	0	689	0	0	626	0
Heavy Vehicles (%)	1%	1%	2%	0%	3%	3%	2%	0%	7%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Actuated Green, G (s)	57.6	57.6			47.4	47.4		43.4			43.4	
Effective Green, g (s)	57.6	57.6			47.4	47.4		43.4			43.4	
Actuated g/C Ratio	0.48	0.48			0.40	0.40		0.36			0.36	
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Vehicle Extension (s)	2.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	368	861			654	603		744			708	
v/s Ratio Prot	0.01	c0.29										
v/s Ratio Perm	0.10				0.21	0.01		c0.34			0.32	
v/c Ratio	0.23	0.60			0.52	0.02		0.92			0.86dl	
Uniform Delay, d1	18.0	22.4			27.2	21.7		36.2			35.4	
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	1.2			0.7	0.0		17.1			15.0	
Delay (s)	18.1	23.6			28.0	21.7		53.4			50.5	
Level of Service	B	C			C	C		D			D	
Approach Delay (s/veh)		22.9			27.4			53.4			50.5	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		40.3			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.76										
Actuated Cycle Length (s)		119.0			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		90.5%			ICU Level of Service			E				
Analysis Period (min)		15										
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

Lanes, Volumes, Timings
1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition
Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	1	118	8	3	0	147	256	2	1	549	253
Future Volume (vph)	159	1	118	8	3	0	147	256	2	1	549	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	10	12	12	12	10	11	11	11	11	11
Storage Length (ft)	0		50	0		0	410		0	0		410
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.999				0.850
Flt Protected		0.953			0.964		0.950					
Satd. Flow (prot)	0	1690	1507	0	1832	0	1668	1759	0	0	1783	1561
Flt Permitted		0.732			0.768		0.221					
Satd. Flow (perm)	0	1298	1507	0	1459	0	388	1759	0	0	1783	1561
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			135									275
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		757			596			1316			1095	
Travel Time (s)		17.2			13.5			22.4			18.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	4%	50%	0%	3%	0%
Adj. Flow (vph)	173	1	128	9	3	0	160	278	2	1	597	275
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	174	128	0	12	0	160	280	0	0	598	275
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			10			10	
Link Offset(ft)		0			-30			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.09	1.09	1.00	1.00	1.00	1.09	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm

Lanes, Volumes, Timings
1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition
Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Detector Phase	8	8	8	4	4		1	6		2	2	2
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		8.0	5.0		5.0	5.0	5.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		13.0	11.0		11.0	11.0	11.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0		13.0	59.0		46.0	46.0	46.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	22.9%		12.4%	56.2%		43.8%	43.8%	43.8%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		8.0	53.0		40.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.0		4.0	4.0	4.0
Recall Mode	None	None	None	None	None		Min	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		18.0	18.0		14.1		54.3	53.3			40.2	40.2
Actuated g/C Ratio		0.22	0.22		0.17		0.65	0.64			0.48	0.48
v/c Ratio		0.62	0.29		0.04		0.42	0.24			0.69	0.30
Control Delay (s/veh)		39.3	6.1		34.0		10.4	8.2			23.6	3.0
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)		39.3	6.1		34.0		10.4	8.2			23.6	3.0
LOS		D	A		C		B	A			C	A
Approach Delay (s/veh)		25.3			34.1			9.0			17.2	
Approach LOS		C			C			A			B	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 83.3

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.70

Intersection Signal Delay (s/veh): 16.6

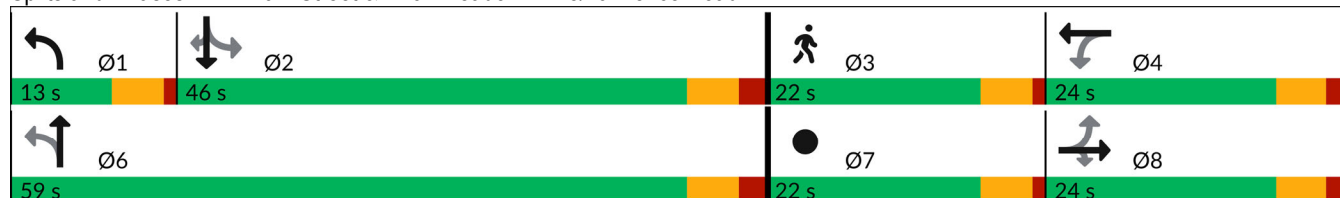
Intersection LOS: B

Intersection Capacity Utilization 68.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Main Street & Birch Meadow Drive/Lawrence Road



Lanes, Volumes, Timings
1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition
Weekday Morning Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	22.0	22.0
Total Split (s)	22.0	22.0
Total Split (%)	21%	21%
Maximum Green (s)	17.0	17.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	7.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	5	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition

Weekday Morning Peak Hour

	→	↘	←	↙	↑	↓	↗
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	174	128	12	160	280	598	275
v/c Ratio	0.62	0.29	0.04	0.42	0.24	0.69	0.30
Control Delay (s/veh)	39.3	6.1	34.0	10.4	8.2	23.6	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	39.3	6.1	34.0	10.4	8.2	23.6	3.0
Queue Length 50th (ft)	82	0	5	28	55	230	0
Queue Length 95th (ft)	144	37	24	74	131	#459	46
Internal Link Dist (ft)	677		516		1236	1015	
Turn Bay Length (ft)		50		410			410
Base Capacity (vph)	314	467	316	376	1124	860	895
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.27	0.04	0.43	0.25	0.70	0.31

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition
Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	1	118	8	3	0	147	256	2	1	549	253
Future Volume (vph)	159	1	118	8	3	0	147	256	2	1	549	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	10	12	12	12	10	11	11	11	11	11
Total Lost time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00		1.00	0.99			1.00	0.85
Flt Protected		0.95	1.00		0.96		0.95	1.00			0.99	1.00
Satd. Flow (prot)		1689	1507		1831		1668	1759			1783	1561
Flt Permitted		0.73	1.00		0.76		0.22	1.00			0.99	1.00
Satd. Flow (perm)		1298	1507		1458		389	1759			1783	1561
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	173	1	128	9	3	0	160	278	2	1	597	275
RTOR Reduction (vph)	0	0	96	0	0	0	0	0	0	0	0	148
Lane Group Flow (vph)	0	174	32	0	12	0	160	280	0	0	598	127
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	4%	50%	0%	3%	0%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Actuated Green, G (s)		22.1	22.1		14.1		53.3	53.3			40.3	40.3
Effective Green, g (s)		22.1	22.1		14.1		53.3	53.3			40.3	40.3
Actuated g/C Ratio		0.25	0.25		0.16		0.61	0.61			0.46	0.46
Clearance Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	4.0			4.0	4.0
Lane Grp Cap (vph)		328	381		235		354	1072			822	719
v/s Ratio Prot							c0.04	0.16				
v/s Ratio Perm		c0.13	0.02		0.01		0.23				0.34	0.08
v/c Ratio		0.53	0.08		0.05		0.45	0.26			0.72	0.17
Uniform Delay, d1		28.1	24.9		30.9		10.9	7.9			19.0	13.8
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		1.6	0.0		0.0		0.9	0.5			5.5	0.5
Delay (s)		29.8	25.0		31.0		11.9	8.5			24.6	14.3
Level of Service		C	C		C		B	A			C	B
Approach Delay (s/veh)		27.7			31.0			9.7			21.4	
Approach LOS		C			C			A			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			19.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			87.4				Sum of lost time (s)				22.0	
Intersection Capacity Utilization			68.7%				ICU Level of Service				C	
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings

2: Main Street & Salem Street

2032 Build Condition
Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	453	72	32	394	37	88	443	8	157	573	45
Future Volume (vph)	61	453	72	32	394	37	88	443	8	157	573	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	11	10	10	11	11	11	11	11	11	12
Storage Length (ft)	190		0	0		85	0		0	0		0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (ft)	85			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		0.979				0.850		0.998			0.991	
Flt Protected	0.950				0.996			0.992			0.990	
Satd. Flow (prot)	1685	1710	0	0	1710	1301	0	3366	0	0	3348	0
Flt Permitted	0.230				0.861			0.605			0.641	
Satd. Flow (perm)	408	1710	0	0	1478	1301	0	2053	0	0	2168	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				119		2			6	
Link Speed (mph)		20			20			40			40	
Link Distance (ft)		462			1004			529			868	
Travel Time (s)		15.8			34.2			9.0			14.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	6%	7%	3%	20%	1%	3%	0%	3%	2%	3%
Adj. Flow (vph)	66	492	78	35	428	40	96	482	9	171	623	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	570	0	0	463	40	0	587	0	0	843	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.04	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	

Lanes, Volumes, Timings

2: Main Street & Salem Street

2032 Build Condition
Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Detector Phase	9	14		10	10	10	5	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	7.0		7.0	7.0	7.0	6.0	7.0		7.0	7.0	
Minimum Split (s)	10.0	11.0		11.0	11.0	11.0	10.0	11.0		11.0	11.0	
Total Split (s)	11.0	36.0		25.0	25.0	25.0	11.0	64.0		53.0	53.0	
Total Split (%)	9.2%	30.3%		21.0%	21.0%	21.0%	9.2%	53.8%		44.5%	44.5%	
Maximum Green (s)	7.0	32.0		21.0	21.0	21.0	7.0	60.0		49.0	49.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	C-Min		C-Min	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	53.0	53.0		44.2	44.2	44.2	54.2			54.2	54.2	
Actuated g/C Ratio	0.45	0.45		0.37	0.37	0.37	0.46			0.46	0.46	
v/c Ratio	0.25	0.74		0.84	0.07	0.07	0.62			0.85	0.85	
Control Delay (s/veh)	26.3	36.5		52.1	0.2	0.2	27.4			37.6	37.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0			0.0	0.0	
Total Delay (s/veh)	26.3	36.5		52.1	0.2	0.2	27.4			37.6	37.6	
LOS	C	D		D	A	A	C			D	D	
Approach Delay (s/veh)		35.5			48.0	48.0		27.4			37.6	
Approach LOS		D			D	D		C			D	

Intersection Summary

Area Type: Other

Cycle Length: 119

Actuated Cycle Length: 119

Offset: 11 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay (s/veh): 36.8

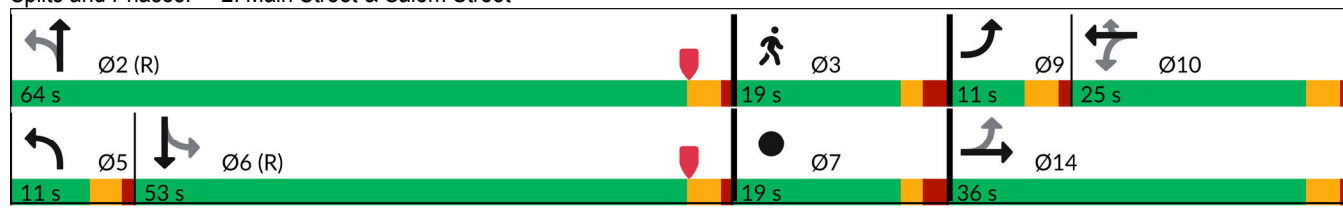
Intersection LOS: D

Intersection Capacity Utilization 97.6%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 2: Main Street & Salem Street



Lanes, Volumes, Timings
2: Main Street & Salem Street

2032 Build Condition
Weekday Morning Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	19.0	19.0
Total Split (s)	19.0	19.0
Total Split (%)	16%	16%
Maximum Green (s)	15.0	15.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	4.0	
Flash Dont Walk (s)	11.0	
Pedestrian Calls (#/hr)	2	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues
2: Main Street & Salem Street

2032 Build Condition
Weekday Morning Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	66	570	463	40	587	843
v/c Ratio	0.25	0.74	0.84	0.07	0.62	0.85
Control Delay (s/veh)	26.3	36.5	52.1	0.2	27.4	37.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.3	36.5	52.1	0.2	27.4	37.6
Queue Length 50th (ft)	27	326	312	0	177	297
Queue Length 95th (ft)	77	#761	#738	0	216	354
Internal Link Dist (ft)		382	924		449	788
Turn Bay Length (ft)	190			85		
Base Capacity (vph)	259	765	548	557	1036	999
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.75	0.84	0.07	0.57	0.84

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: Main Street & Salem Street

2032 Build Condition

Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	453	72	32	394	37	88	443	8	157	573	45
Future Volume (vph)	61	453	72	32	394	37	88	443	8	157	573	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	10	11	11	11	11	11	11	12
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		0.95			0.95	
Frt	1.00	0.97			1.00	0.85		0.99			0.99	
Flt Protected	0.95	1.00			0.99	1.00		0.99			0.98	
Satd. Flow (prot)	1685	1711			1710	1301		3365			3349	
Flt Permitted	0.22	1.00			0.86	1.00		0.60			0.64	
Satd. Flow (perm)	408	1711			1478	1301		2052			2169	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	66	492	78	35	428	40	96	482	9	171	623	49
RTOR Reduction (vph)	0	4	0	0	0	25	0	1	0	0	3	0
Lane Group Flow (vph)	66	566	0	0	463	15	0	586	0	0	840	0
Heavy Vehicles (%)	0%	5%	6%	7%	3%	20%	1%	3%	0%	3%	2%	3%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Actuated Green, G (s)	53.8	53.8			44.2	44.2		50.2			50.2	
Effective Green, g (s)	53.8	53.8			44.2	44.2		50.2			50.2	
Actuated g/C Ratio	0.45	0.45			0.37	0.37		0.42			0.42	
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Vehicle Extension (s)	2.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	244	773			548	483		865			914	
v/s Ratio Prot	0.01	c0.33										
v/s Ratio Perm	0.11				c0.31	0.01		0.29			c0.39	
v/c Ratio	0.27	0.73			0.84	0.03		0.67			0.91	
Uniform Delay, d1	21.6	26.7			34.2	23.7		27.8			32.4	
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.2	3.6			11.4	0.0		1.6			15.5	
Delay (s)	21.8	30.3			45.6	23.8		29.5			48.0	
Level of Service	C	C			D	C		C			D	
Approach Delay (s/veh)		29.4			43.9			29.5			48.0	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		38.4			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.89										
Actuated Cycle Length (s)		119.0			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		97.6%			ICU Level of Service			F				
Analysis Period (min)		15										

c Critical Lane Group

HCM 7th TWSC
3: Main Street & Site Driveway

2032 Build Condition
Weekday Morning Peak Hour

Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	47	26	379	44	38	637
Future Vol, veh/h	47	26	379	44	38	637
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	92	92	92	92	92	92
Heavy Vehicles, %	0	0	4	0	0	3
Mvmt Flow	51	28	412	48	41	692

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1211	436	0	0	460
Stage 1	436	-	-	-	-
Stage 2	775	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	203	625	-	-	1112
Stage 1	656	-	-	-	-
Stage 2	458	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	191	625	-	-	1112
Mov Cap-2 Maneuver	319	-	-	-	-
Stage 1	656	-	-	-	-
Stage 2	430	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	16.73	0	0.47
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	386	101
HCM Lane V/C Ratio	-	-	0.206	0.037
HCM Control Delay (s/veh)	-	-	16.7	8.4
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.8	0.1

Lanes, Volumes, Timings
1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition
Weekday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	3	103	5	0	1	88	492	4	0	427	109
Future Volume (vph)	155	3	103	5	0	1	88	492	4	0	427	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	10	12	12	12	10	11	11	11	11	11
Storage Length (ft)	0		50	0		0	410		0	0		410
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.977			0.999				0.850
Flt Protected		0.953			0.960		0.950					
Satd. Flow (prot)	0	1690	1507	0	1782	0	1652	1799	0	0	1801	1561
Flt Permitted		0.770			0.761		0.314					
Satd. Flow (perm)	0	1365	1507	0	1413	0	546	1799	0	0	1801	1561
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			135		135							135
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		757			595			1316			1095	
Travel Time (s)		17.2			13.5			22.4			18.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	2%	0%
Adj. Flow (vph)	168	3	112	5	0	1	96	535	4	0	464	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	171	112	0	6	0	96	539	0	0	464	118
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			10			10	
Link Offset(ft)		0			-30			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.09	1.09	1.00	1.00	1.00	1.09	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA			NA	Perm

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition
Weekday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Detector Phase	8	8	8	4	4		1	6		2	2	2
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		8.0	5.0		5.0	5.0	5.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		13.0	11.0		11.0	11.0	11.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0		13.0	54.0		41.0	41.0	41.0
Total Split (%)	27.6%	27.6%	27.6%	27.6%	27.6%		12.4%	51.4%		39.0%	39.0%	39.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0		8.0	48.0		35.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.0		4.0	4.0	4.0
Recall Mode	None	None	None	None	None		Min	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		16.1	16.1		12.3		49.3	48.3			35.2	35.2
Actuated g/C Ratio		0.21	0.21		0.16		0.64	0.63			0.46	0.46
v/c Ratio		0.59	0.26		0.01		0.20	0.47			0.55	0.14
Control Delay (s/veh)		35.6	4.6		0.1		7.7	10.4			19.6	2.9
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)		35.6	4.6		0.1		7.7	10.4			19.6	2.9
LOS		D	A		A		A	B			B	A
Approach Delay (s/veh)		23.4			0.2			10.0			16.3	
Approach LOS		C			A			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 76.5

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.60

Intersection Signal Delay (s/veh): 14.9

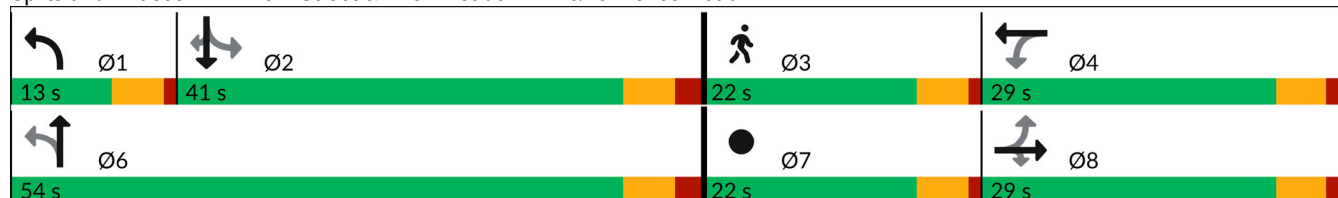
Intersection LOS: B

Intersection Capacity Utilization 73.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Main Street & Birch Meadow Drive/Lawrence Road



Lanes, Volumes, Timings
1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition
Weekday Midday Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	22.0	22.0
Total Split (s)	22.0	22.0
Total Split (%)	21%	21%
Maximum Green (s)	17.0	17.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	7.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	9	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition

Weekday Midday Peak Hour

	→	↘	←	↙	↑	↓	↗
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	171	112	6	96	539	464	118
v/c Ratio	0.59	0.26	0.01	0.20	0.47	0.55	0.14
Control Delay (s/veh)	35.6	4.6	0.1	7.7	10.4	19.6	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	35.6	4.6	0.1	7.7	10.4	19.6	2.9
Queue Length 50th (ft)	73	0	0	14	113	148	0
Queue Length 95th (ft)	131	26	0	46	274	310	25
Internal Link Dist (ft)	677		515		1236	1015	
Turn Bay Length (ft)		50		410			410
Base Capacity (vph)	428	566	521	468	1136	829	792
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.20	0.01	0.21	0.47	0.56	0.15
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition
Weekday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	3	103	5	0	1	88	492	4	0	427	109
Future Volume (vph)	155	3	103	5	0	1	88	492	4	0	427	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	10	12	12	12	10	11	11	11	11	11
Total Lost time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.97		1.00	0.99			1.00	0.85
Flt Protected		0.95	1.00		0.96		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1690	1507		1783		1652	1799			1801	1561
Flt Permitted		0.76	1.00		0.76		0.31	1.00			1.00	1.00
Satd. Flow (perm)		1365	1507		1413		546	1799			1801	1561
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	3	112	5	0	1	96	535	4	0	464	118
RTOR Reduction (vph)	0	0	84	0	5	0	0	0	0	0	0	66
Lane Group Flow (vph)	0	171	28	0	1	0	96	539	0	0	464	52
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA			NA	Perm
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Actuated Green, G (s)		20.3	20.3		12.3		48.3	48.3			35.2	35.2
Effective Green, g (s)		20.3	20.3		12.3		48.3	48.3			35.2	35.2
Actuated g/C Ratio		0.25	0.25		0.15		0.60	0.60			0.44	0.44
Clearance Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	4.0			4.0	4.0
Lane Grp Cap (vph)		343	379		215		438	1078			786	681
v/s Ratio Prot							0.02	c0.30			c0.26	
v/s Ratio Perm		c0.13	0.02		0.00		0.11					0.03
v/c Ratio		0.49	0.07		0.00		0.21	0.50			0.59	0.07
Uniform Delay, d1		25.7	22.9		28.9		8.3	9.2			17.2	13.2
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		1.1	0.0		0.0		0.2	1.6			3.2	0.2
Delay (s)		26.9	23.0		28.9		8.6	10.8			20.4	13.4
Level of Service		C	C		C		A	B			C	B
Approach Delay (s/veh)		25.4			28.9			10.5			19.0	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		16.7										
HCM 2000 Volume to Capacity ratio		0.62										
Actuated Cycle Length (s)		80.6										
Intersection Capacity Utilization		73.3%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
2: Main Street & Salem Street

2032 Build Condition
Weekday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	492	68	20	302	74	103	542	14	145	435	52
Future Volume (vph)	63	492	68	20	302	74	103	542	14	145	435	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	11	10	10	11	11	11	11	11	11	12
Storage Length (ft)	190		0	0		85	0		0	0		0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (ft)	85			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		0.982				0.850		0.997			0.988	
Flt Protected	0.950				0.997			0.992			0.989	
Satd. Flow (prot)	1620	1757	0	0	1735	1473	0	3402	0	0	3375	0
Flt Permitted	0.355				0.931			0.626			0.572	
Satd. Flow (perm)	605	1757	0	0	1621	1473	0	2147	0	0	1952	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				119		2			9	
Link Speed (mph)		20			20			40			40	
Link Distance (ft)		462			1004			529			865	
Travel Time (s)		15.8			34.2			9.0			14.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	0%	0%	2%	6%	4%	1%	0%	0%	1%	4%
Adj. Flow (vph)	68	535	74	22	328	80	112	589	15	158	473	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	609	0	0	350	80	0	716	0	0	688	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.04	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	

Lanes, Volumes, Timings

2: Main Street & Salem Street

2032 Build Condition
Weekday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Detector Phase	9	14		10	10	10	5	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	7.0		7.0	7.0	7.0	6.0	7.0		7.0	7.0	
Minimum Split (s)	10.0	11.0		11.0	11.0	11.0	10.0	11.0		11.0	11.0	
Total Split (s)	11.0	41.0		30.0	30.0	30.0	11.0	59.0		48.0	48.0	
Total Split (%)	9.2%	34.5%		25.2%	25.2%	25.2%	9.2%	49.6%		40.3%	40.3%	
Maximum Green (s)	7.0	37.0		26.0	26.0	26.0	7.0	55.0		44.0	44.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	C-Min		C-Min	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	54.2	54.2			45.7	45.7		49.2			49.2	
Actuated g/C Ratio	0.46	0.46			0.38	0.38		0.41			0.41	
v/c Ratio	0.20	0.75			0.56	0.12		0.80			0.84	
Control Delay (s/veh)	25.5	37.4			38.3	2.6		38.0			41.4	
Queue Delay	0.0	0.0			0.0	0.0		0.0			0.0	
Total Delay (s/veh)	25.5	37.4			38.3	2.6		38.0			41.4	
LOS	C	D			D	A		D			D	
Approach Delay (s/veh)		36.3			31.7			38.0			41.4	
Approach LOS		D			C			D			D	

Intersection Summary

Area Type: Other

Cycle Length: 119

Actuated Cycle Length: 119

Offset: 44 (37%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay (s/veh): 37.4

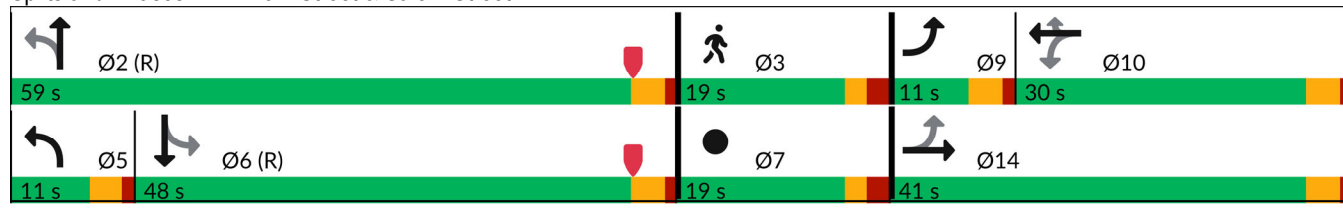
Intersection LOS: D

Intersection Capacity Utilization 96.7%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 2: Main Street & Salem Street



Lanes, Volumes, Timings
2: Main Street & Salem Street

2032 Build Condition
Weekday Midday Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	19.0	19.0
Total Split (s)	19.0	19.0
Total Split (%)	16%	16%
Maximum Green (s)	15.0	15.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	4.0	
Flash Dont Walk (s)	11.0	
Pedestrian Calls (#/hr)	11	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues
2: Main Street & Salem Street

2032 Build Condition
Weekday Midday Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	68	609	350	80	716	688
v/c Ratio	0.20	0.75	0.56	0.12	0.80	0.84
Control Delay (s/veh)	25.5	37.4	38.3	2.6	38.0	41.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.5	37.4	38.3	2.6	38.0	41.4
Queue Length 50th (ft)	25	327	193	0	250	244
Queue Length 95th (ft)	74	#759	#463	16	304	304
Internal Link Dist (ft)		382	924		449	785
Turn Bay Length (ft)	190			85		
Base Capacity (vph)	335	803	622	638	993	822
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.76	0.56	0.13	0.72	0.84

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: Main Street & Salem Street

2032 Build Condition

Weekday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	492	68	20	302	74	103	542	14	145	435	52
Future Volume (vph)	63	492	68	20	302	74	103	542	14	145	435	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	10	11	11	11	11	11	11	12
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		0.95			0.95	
Frt	1.00	0.98			1.00	0.85		0.99			0.98	
Flt Protected	0.95	1.00			0.99	1.00		0.99			0.98	
Satd. Flow (prot)	1620	1757			1735	1473		3402			3373	
Flt Permitted	0.35	1.00			0.93	1.00		0.62			0.57	
Satd. Flow (perm)	605	1757			1620	1473		2146			1951	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	535	74	22	328	80	112	589	15	158	473	57
RTOR Reduction (vph)	0	3	0	0	0	49	0	1	0	0	6	0
Lane Group Flow (vph)	68	606	0	0	350	31	0	715	0	0	682	0
Heavy Vehicles (%)	4%	3%	0%	0%	2%	6%	4%	1%	0%	0%	1%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Actuated Green, G (s)	55.0	55.0			45.7	45.7		46.0			46.0	
Effective Green, g (s)	55.0	55.0			45.7	45.7		46.0			46.0	
Actuated g/C Ratio	0.46	0.46			0.38	0.38		0.39			0.39	
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Vehicle Extension (s)	2.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	324	812			622	565		829			754	
v/s Ratio Prot	0.01	c0.34										
v/s Ratio Perm	0.09				0.22	0.02		0.33			c0.35	
v/c Ratio	0.20	0.74			0.56	0.05		0.86			0.90	
Uniform Delay, d1	19.3	26.2			28.7	23.0		33.5			34.4	
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	3.7			1.1	0.0		8.8			16.4	
Delay (s)	19.5	30.0			29.9	23.0		42.4			50.8	
Level of Service	B	C			C	C		D			D	
Approach Delay (s/veh)		28.9			28.6			42.4			50.8	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		38.8			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		119.0			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		96.7%			ICU Level of Service			F				
Analysis Period (min)		15										

c Critical Lane Group

HCM 7th TWSC
3: Main Street & Site Driveway

2032 No-Build Condition
Weekday Midday Peak Hour

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	13	571	19	13	522
Future Vol, veh/h	17	13	571	19	13	522
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	92	92	92	92	92	92
Heavy Vehicles, %	0	0	3	0	0	2
Mvmt Flow	18	14	621	21	14	567
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1227	631	0	0	641	0
Stage 1	631	-	-	-	-	-
Stage 2	596	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	199	485	-	-	953	-
Stage 1	534	-	-	-	-	-
Stage 2	554	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	195	485	-	-	953	-
Mov Cap-2 Maneuver	334	-	-	-	-	-
Stage 1	534	-	-	-	-	-
Stage 2	542	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v15.18		0		0.21		
HCM LOS	C					
Minor Lane/Major Mvmt		NBT	NBRWBLn1	SBL	SBT	
Capacity (veh/h)		-	-	386	44	-
HCM Lane V/C Ratio		-	-	0.084	0.015	-
HCM Control Delay (s/veh)		-	-	15.2	8.8	0
HCM Lane LOS		-	-	C	A	A
HCM 95th %tile Q(veh)		-	-	0.3	0	-

Lanes, Volumes, Timings
1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition
Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	1	83	5	1	2	87	417	1	0	449	96
Future Volume (vph)	87	1	83	5	1	2	87	417	1	0	449	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	10	12	12	12	10	11	11	11	11	11
Storage Length (ft)	0		50	0		0	410		0	0		410
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.966							0.850
Flt Protected		0.953			0.970		0.950					
Satd. Flow (prot)	0	1690	1507	0	1583	0	1685	1837	0	0	1837	1546
Flt Permitted		0.686			0.794		0.328					
Satd. Flow (perm)	0	1217	1507	0	1295	0	582	1837	0	0	1837	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			135		2							135
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		757			599			1316			1095	
Travel Time (s)		17.2			13.6			22.4			18.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	95	1	90	5	1	2	95	453	1	0	488	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	96	90	0	8	0	95	454	0	0	488	104
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			10			10	
Link Offset(ft)		0			-30			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.09	1.09	1.00	1.00	1.00	1.09	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA			NA	Perm

Lanes, Volumes, Timings

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition
Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Detector Phase	8	8	8	4	4		1	6		2	2	2
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		8.0	5.0		5.0	5.0	5.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		13.0	11.0		11.0	11.0	11.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0		13.0	59.0		46.0	46.0	46.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	22.9%		12.4%	56.2%		43.8%	43.8%	43.8%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		8.0	53.0		40.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.0		4.0	4.0	4.0
Recall Mode	None	None	None	None	None		Min	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		13.1	13.1		9.4		54.5	53.5			40.4	40.4
Actuated g/C Ratio		0.17	0.17		0.12		0.69	0.68			0.51	0.51
v/c Ratio		0.47	0.24		0.05		0.18	0.36			0.51	0.12
Control Delay (s/veh)		36.4	3.1		32.0		6.5	7.8			16.8	1.9
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)		36.4	3.1		32.0		6.5	7.8			16.8	1.9
LOS		D	A		C		A	A			B	A
Approach Delay (s/veh)		20.4			32.0			7.6			14.3	
Approach LOS		C			C			A			B	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 78.7

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.52

Intersection Signal Delay (s/veh): 12.5

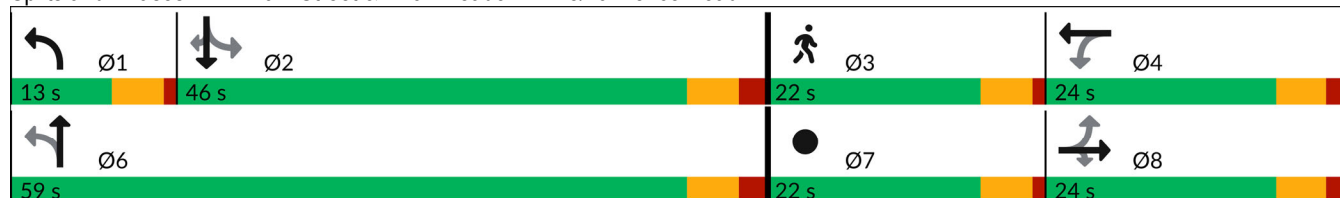
Intersection LOS: B

Intersection Capacity Utilization 67.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Main Street & Birch Meadow Drive/Lawrence Road



Lanes, Volumes, Timings
1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition
Weekday Evening Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	22.0	22.0
Total Split (s)	22.0	22.0
Total Split (%)	21%	21%
Maximum Green (s)	17.0	17.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	7.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	1	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition

Weekday Evening Peak Hour

	→	↘	←	↙	↑	↓	↗
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	96	90	8	95	454	488	104
v/c Ratio	0.47	0.24	0.05	0.18	0.36	0.51	0.12
Control Delay (s/veh)	36.4	3.1	32.0	6.5	7.8	16.8	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	36.4	3.1	32.0	6.5	7.8	16.8	1.9
Queue Length 50th (ft)	43	0	3	11	71	138	0
Queue Length 95th (ft)	84	13	18	46	220	331	18
Internal Link Dist (ft)	677		519		1236	1015	
Turn Bay Length (ft)		50		410			410
Base Capacity (vph)	309	484	300	516	1248	942	858
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.19	0.03	0.18	0.36	0.52	0.12
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

1: Main Street & Birch Meadow Drive/Lawrence Road

2032 Build Condition
Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	1	83	5	1	2	87	417	1	0	449	96
Future Volume (vph)	87	1	83	5	1	2	87	417	1	0	449	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	10	12	12	12	10	11	11	11	11	11
Total Lost time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.96		1.00	0.99			1.00	0.85
Flt Protected		0.95	1.00		0.96		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1690	1507		1582		1685	1836			1837	1546
Flt Permitted		0.68	1.00		0.79		0.32	1.00			1.00	1.00
Satd. Flow (perm)		1217	1507		1296		582	1836			1837	1546
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	1	90	5	1	2	95	453	1	0	488	104
RTOR Reduction (vph)	0	0	71	0	2	0	0	0	0	0	0	53
Lane Group Flow (vph)	0	96	19	0	6	0	95	454	0	0	488	51
Heavy Vehicles (%)	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	1%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA			NA	Perm
Protected Phases		8			4		1	6			2	
Permitted Phases	8		8	4			6			2		2
Actuated Green, G (s)		17.2	17.2		9.4		53.5	53.5			40.4	40.4
Effective Green, g (s)		17.2	17.2		9.4		53.5	53.5			40.4	40.4
Actuated g/C Ratio		0.21	0.21		0.11		0.65	0.65			0.49	0.49
Clearance Time (s)		6.0	6.0		6.0		5.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	4.0			4.0	4.0
Lane Grp Cap (vph)		253	313		147		484	1187			897	755
v/s Ratio Prot							0.02	c0.25			c0.27	
v/s Ratio Perm		c0.08	0.01		0.00		0.11					0.03
v/c Ratio		0.37	0.05		0.04		0.19	0.38			0.54	0.06
Uniform Delay, d1		28.1	26.2		32.6		6.9	6.8			14.7	11.1
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		0.9	0.0		0.1		0.1	0.9			2.3	0.1
Delay (s)		29.1	26.3		32.7		7.1	7.7			17.1	11.3
Level of Service		C	C		C		A	A			B	B
Approach Delay (s/veh)		27.7			32.7			7.6			16.0	
Approach LOS		C			C			A			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			14.4				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			82.7				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			67.6%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2: Main Street & Salem Street

2032 Build Condition
Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	420	65	20	297	41	153	481	16	154	401	61
Future Volume (vph)	87	420	65	20	297	41	153	481	16	154	401	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	11	10	10	11	11	11	11	11	11	12
Storage Length (ft)	190		0	0		85	0		0	0		0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (ft)	85			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		0.980				0.850		0.996			0.985	
Flt Protected	0.950				0.997			0.988			0.988	
Satd. Flow (prot)	1668	1780	0	0	1720	1516	0	3412	0	0	3388	0
Flt Permitted	0.346				0.952			0.586			0.569	
Satd. Flow (perm)	607	1780	0	0	1642	1516	0	2024	0	0	1951	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				119		3			11	
Link Speed (mph)		20			20			40			40	
Link Distance (ft)		462			1004			529			863	
Travel Time (s)		15.8			34.2			9.0			14.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	0%	3%	3%	2%	0%	7%	1%	0%	0%
Adj. Flow (vph)	95	457	71	22	323	45	166	523	17	167	436	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	528	0	0	345	45	0	706	0	0	669	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.04	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	

Lanes, Volumes, Timings

2: Main Street & Salem Street

2032 Build Condition
Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Detector Phase	9	14		10	10	10	5	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	7.0		7.0	7.0	7.0	6.0	7.0		7.0	7.0	
Minimum Split (s)	10.0	11.0		11.0	11.0	11.0	10.0	11.0		11.0	11.0	
Total Split (s)	11.0	41.0		30.0	30.0	30.0	11.0	59.0		48.0	48.0	
Total Split (%)	9.2%	34.5%		25.2%	25.2%	25.2%	9.2%	49.6%		40.3%	40.3%	
Maximum Green (s)	7.0	37.0		26.0	26.0	26.0	7.0	55.0		44.0	44.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	C-Min		C-Min	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	55.1	55.1		43.7	43.7	43.7	48.3			48.3		
Actuated g/C Ratio	0.46	0.46		0.37	0.37	0.37	0.41			0.41		
v/c Ratio	0.27	0.63		0.57	0.07	0.07	0.85			0.83		
Control Delay (s/veh)	25.4	32.3		39.2	0.2	0.2	42.9			41.1		
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0			0.0		
Total Delay (s/veh)	25.4	32.3		39.2	0.2	0.2	42.9			41.1		
LOS	C	C		D	A	A	D			D		
Approach Delay (s/veh)		31.3			34.8		43.0			41.2		
Approach LOS		C			C		D			D		

Intersection Summary

Area Type: Other

Cycle Length: 119

Actuated Cycle Length: 119

Offset: 11 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay (s/veh): 38.1

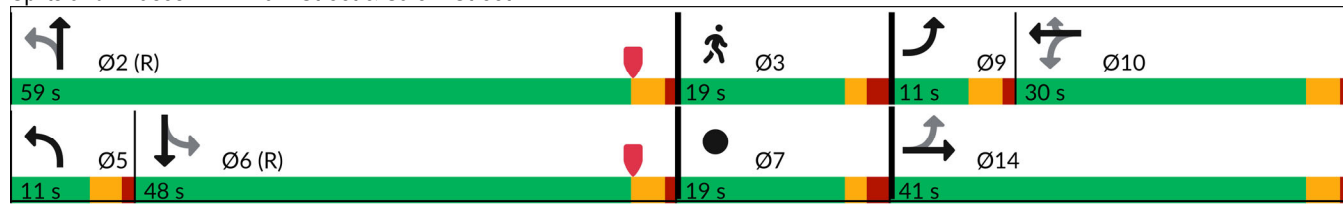
Intersection LOS: D

Intersection Capacity Utilization 91.9%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 2: Main Street & Salem Street



Lanes, Volumes, Timings
2: Main Street & Salem Street

2032 Build Condition
Weekday Evening Peak Hour

Lane Group	Ø3	Ø7
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	19.0	19.0
Total Split (s)	19.0	19.0
Total Split (%)	16%	16%
Maximum Green (s)	15.0	15.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	4.0	
Flash Dont Walk (s)	11.0	
Pedestrian Calls (#/hr)	14	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay (s/veh)		
Queue Delay		
Total Delay (s/veh)		
LOS		
Approach Delay (s/veh)		
Approach LOS		
Intersection Summary		

Queues
2: Main Street & Salem Street

2032 Build Condition
Weekday Evening Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	95	528	345	45	706	669
v/c Ratio	0.27	0.63	0.57	0.07	0.85	0.83
Control Delay (s/veh)	25.4	32.3	39.2	0.2	42.9	41.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.4	32.3	39.2	0.2	42.9	41.1
Queue Length 50th (ft)	35	259	189	0	255	236
Queue Length 95th (ft)	97	#611	#452	0	310	291
Internal Link Dist (ft)		382	924		449	783
Turn Bay Length (ft)	190			85		
Base Capacity (vph)	349	827	602	632	937	811
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.64	0.57	0.07	0.75	0.82

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: Main Street & Salem Street

2032 Build Condition

Weekday Evening Peak Hour

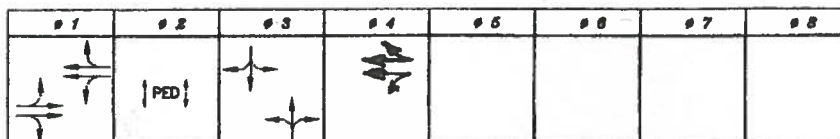
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	420	65	20	297	41	153	481	16	154	401	61
Future Volume (vph)	87	420	65	20	297	41	153	481	16	154	401	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	10	11	11	11	11	11	11	12
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		0.95			0.95	
Frt	1.00	0.97			1.00	0.85		0.99			0.98	
Flt Protected	0.95	1.00			0.99	1.00		0.98			0.98	
Satd. Flow (prot)	1668	1779			1719	1516		3415			3387	
Flt Permitted	0.34	1.00			0.95	1.00		0.58			0.56	
Satd. Flow (perm)	608	1779			1643	1516		2025			1950	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	457	71	22	323	45	166	523	17	167	436	66
RTOR Reduction (vph)	0	4	0	0	0	28	0	2	0	0	7	0
Lane Group Flow (vph)	95	524	0	0	345	17	0	704	0	0	662	0
Heavy Vehicles (%)	1%	1%	2%	0%	3%	3%	2%	0%	7%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	9	14			10		5	2			6	
Permitted Phases	14			10		10	2			6		
Actuated Green, G (s)	55.1	55.1			43.7	43.7		45.9			45.9	
Effective Green, g (s)	55.1	55.1			43.7	43.7		45.9			45.9	
Actuated g/C Ratio	0.46	0.46			0.37	0.37		0.39			0.39	
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Vehicle Extension (s)	2.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	347	823			603	556		781			752	
v/s Ratio Prot	0.02	c0.29										
v/s Ratio Perm	0.11				0.21	0.01		c0.35			0.34	
v/c Ratio	0.27	0.63			0.57	0.02		0.90			0.88	
Uniform Delay, d1	19.6	24.3			30.1	24.0		34.4			34.0	
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	1.6			1.3	0.0		13.3			14.0	
Delay (s)	19.8	25.9			31.4	24.1		47.7			48.0	
Level of Service	B	C			C	C		D			D	
Approach Delay (s/veh)		25.0			30.6			47.7			48.0	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			39.1				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			119.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			91.9%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th TWSC
3: Main Street & Site Driveway

2032 Build Condition
Weekday Evening Peak Hour

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	33	472	42	31	506
Future Vol, veh/h	50	33	472	42	31	506
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	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	54	36	513	46	34	550
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1153	536	0	0	559	0
Stage 1	536	-	-	-	-	-
Stage 2	617	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	220	549	-	-	1022	-
Stage 1	591	-	-	-	-	-
Stage 2	542	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	210	549	-	-	1022	-
Mov Cap-2 Maneuver	346	-	-	-	-	-
Stage 1	591	-	-	-	-	-
Stage 2	516	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v16.38		0		0.5		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	406	104	-	
HCM Lane V/C Ratio	-	-	0.222	0.033	-	
HCM Control Delay (s/veh)	-	-	16.4	8.6	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-	

TRAFFIC SIGNAL TIMING DIRECTIVE

[illegible]

TIMING IN SECONDS									
MINIMUM GREEN (INITIAL)	5				6				
PASSAGE TIME (VEHICLE)	4				3				
MAXIMUM 1	40				18				
MAXIMUM 2 (M-F 2 PM TO 4 PM)	35				23				
YELLOW CLEARANCE		4				4			5
RED CLEARANCE			2				2		1
WALK (W)				7					
PEDESTRIAN CLEARANCE				15					
RECALL		MAX		NONE		NONE		MIN	
MEMORY				LOCK		ANALOG			

EMERGENCY ONLY

A diagram showing a 2x4 grid of nodes. The top row contains nodes labeled #1, #2, #3, and #4 from left to right. The bottom row contains nodes labeled #5, #6, #7, and #8 from left to right. Solid lines connect nodes horizontally and vertically. Dashed lines connect nodes diagonally.

[illegible]

STATE	SIGNAL ID NO.	SECTION NO.	SHEET NO.	TOTAL SHEETS
MASS	0575	01	3	

SEQUENCE AND TIMING NOTES:

1. PHASES ASSOCIATED BY A SOLID LINE SHALL NOT OPERATE CONCURRENTLY.

2. PHASES ASSOCIATED BY A DASHED LINE MAY
OPERATE CONCURRENTLY.

3. THROUGH MOVEMENTS MAY INCLUDE RIGHT TURNS.

4. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT SHALL NOT CHANGE DURING THE CHANGE INTERVAL(S) UNLESS OTHERWISE NOTED.

1. SEE: LOOP DETECTOR DETAIL SHEET FROM DESIGN DOCUMENT FOR SPURCE PATTERN AND OTHER INFORMATION.
2. DELAY AND EXTENSION TIMES ARE IN SECONDS.
3. DELAY TIME SHALL BE EFFECTIVE ONLY DURING THE RED PORTION OF THE PHASE THAT IS CALLED BY THE DETECTOR.
4. LOOP DETECTOR (2) WAS NOT CONNECTED AT THE TIME OF SIGNAL INVENTORY.

[illegible]

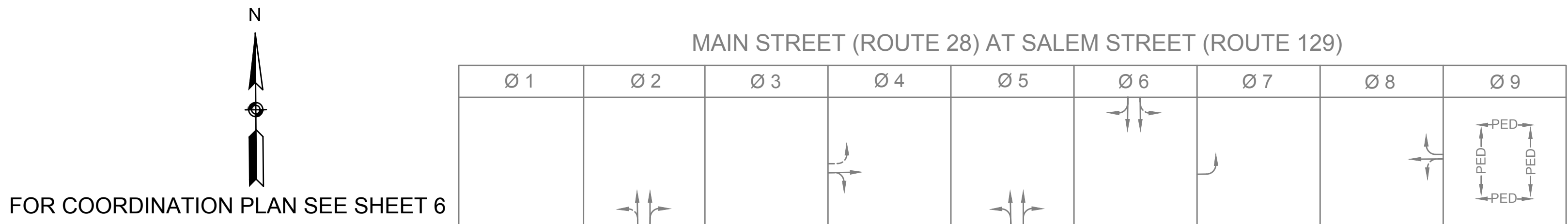
CONTROLLER MAKE & MODEL:	EPAC 300
UTILITY POLE No.	4W8+4W16
METER No.	78 575 828
EMERGENCY PRE-EMPTION (TYPE):	NONE

APPROVED BY:

STATE TRAFFIC RECORDING

Date _____

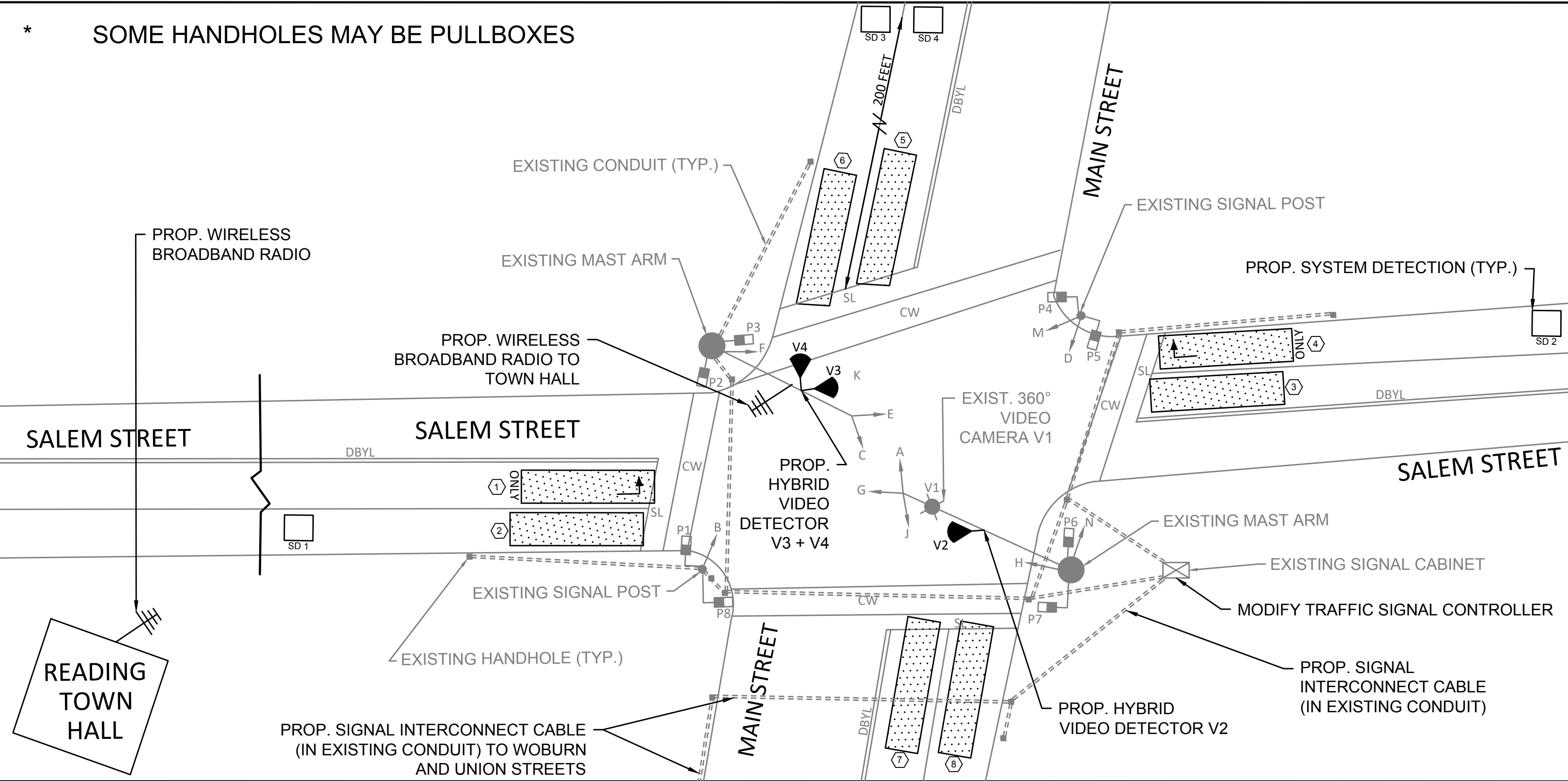
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FOR COORDINATION PLAN SEE SHEET 6

EXISTING SEQUENCE AND TIMING FOR ACTUATED CONTROL (COORDINATED)																														
STREET	DIRECTION	HOUSINGS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	FLASHING OPERATION
MAIN STREET (ROUTE 28)	SB	A,B,K				R	R	R				R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FY
MAIN STREET (ROUTE 28)	NB	D,J				G	Y	R				R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
MAIN STREET (ROUTE 28)	NB	C				G	Y	R				R	R	R	G/GLA	Y/YLA	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
SALEM STREET (ROUTE 129)	WB	E,F,N				R	R	R				R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
SALEM STREET (ROUTE 129)	EB	H,M				R	R	R				G	Y	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	FR
SALEM STREET (ROUTE 129)	EB	G				R	R	R				R	R	R	R	R	R	R	R	R	G/GLA	Y/YLA	R	R	R	R	R	R	R	FR
PEDESTRIANS	ALL	P1 - P8				DW	DW	DW				DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT
TIMING IN SECONDS																														
MINIMUM GREEN (INITIAL)						7						7			6			7			6			7						
PASSAGE TIME (VEHICLE)						3						3			2			3			2			3						
MAXIMUM 1						34						36			10			34			10			36						
MAXIMUM 2						34						43			6			34			6			43						
YELLOW CLEARANCE							3						3			3			3			3			3					
RED CLEARANCE								1						1			1			1			1			1				
WALK (W)																											4			
PEDESTRIAN CLEARANCE																												13	2	
RECALL								SOFT							NONE		NONE		SOFT			NONE			NONE					
MEMORY								NON-LOCKING							NON-LOCKING		NON-LOCKING		NON-LOCKING			NON-LOCKING			NON-LOCKING					

- NOTES:
- IF THE ASSIGNED RIGHT-OF-WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
 - IF THE ASSIGNED RIGHT-OF-WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT TRAFFIC MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.
 - FLASHING OPERATION IS FOR EMERGENCY ONLY. THE SIGNAL SHALL PROVIDE STOP AND GO OPERATION 24 HOURS DAILY.
 - THE CONTROLLER SHALL OPERATE IN THE STANDARD NEMA DUAL RING CONFIGURATION.
 - ALL DETECTOR SETTINGS TO BE IMPLEMENTED AT THE CONTROLLER ONLY.
 - EACH DETECTOR GROUP SHALL BE CONNECTED TO A SEPARATE AMPLIFIER CHANNEL.



PROPOSED VIDEO DETECTION DATA

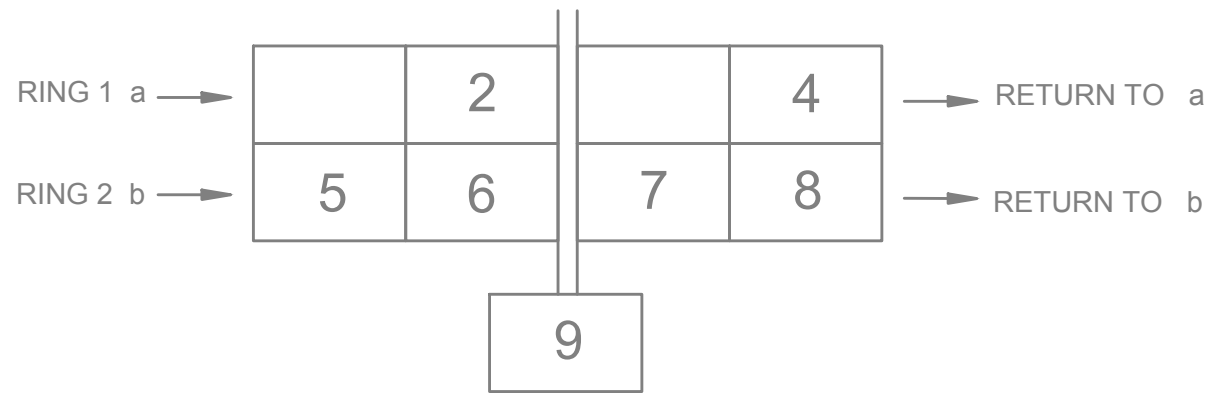
DELAY TIME EFFECTIVE ONLY DURING CALLED Ø RED. TIME IN SEC.

DETECTION ZONE	APPROACH / LANE	VIDEO SENSOR	DELAY / EXIT	CALL PHASE	DETECTOR TYPE
①	SALEM ST. EB LEFT	V1	0	Ø 7	360°
②	SALEM ST. EB THRU/RIGHT	V1	0	Ø 4	360°
③	SALEM ST. WB THRU/LEFT	V1	0	Ø 8	360°
④	SALEM ST. WB RIGHT	V1	0	Ø 8	360°
⑤	MAIN ST. SB THRU/LEFT	V1	0	Ø 6	360°
⑥	MAIN ST. SB THRU/RIGHT	V1	0	Ø 6	360°
⑦	MAIN ST. NB THRU/LEFT	V1	0	Ø 5	360°
⑧	MAIN ST. NB THRU/RIGHT	V1	0	Ø 2	360°
SD 1	SALEM ST. EB	V2	0	-	HYBRID VIDEO
SD 2	SALEM ST. WB	V3	0	-	HYBRID VIDEO
SD 3	MAIN ST. SB	V4	0	-	HYBRID VIDEO
SD 4	MAIN ST. SB	V4	0	-	HYBRID VIDEO

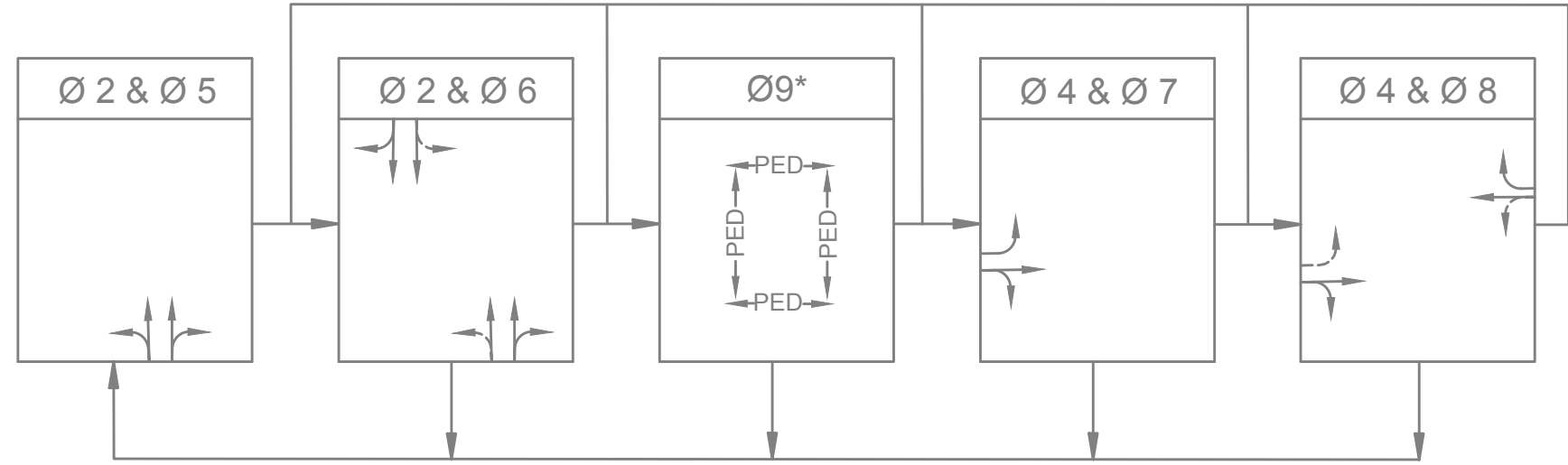
MAJOR ITEMS REQUIRED

QUANTITY	ITEM
1	REPROGRAM CONTROLLER W / NEW TIMING AND TRAFFIC RESPONSIVE SETTINGS
3	COMPLETE SYSTEM DETECTION SYSTEM W / 3 SYSTEM DETECTION HYBRID DETECTORS, VEHICLE SENSORS, PROCESSOR + CABLE
1	8 - PORT ETHERNET SWITCH
2	WIRELESS BROADBAND RADIO
1	MODIFY CABINET + ASSEMBLY TO ACCOMMODATE PROPOSED CHANGES AS SHOWN

EXISTING RING STRUCTURE



EXISTING PREFERENTIAL PHASING SEQUENCE

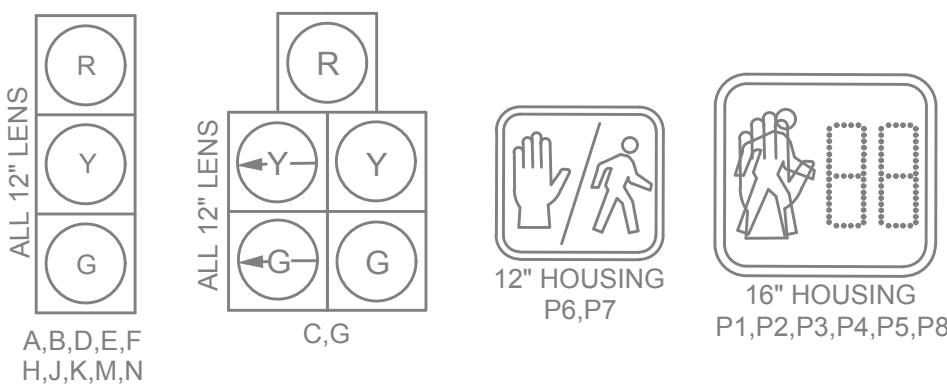


* DETECTOR CONTROLLING PHASE

EXISTING EMERGENCY VEHICLE PREEMPTION

NB PREEMPT #1	SB PREEMPT #2	EB PREEMPT #3	WB PREEMPT #4
REC #1	REC #2	REC #3	REC #4

EXISTING SIGNAL IDENTIFICATION



CLIENT:

MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION

PROJECT:

LOCAL BOTTLENECK REDUCTION
PROGRAM
CONTRACT NO: 118711 - ASSIGNMENT #1

READING, MASSACHUSETTS

PREPARED BY:

Tighe&Bond

300 TRADECENTER, SUITE 5580
WOBURN, MA 01801
T: 781-933-4800
F: 781-933-4801

NO.

DATE

REVISION

SCALE:

N.T.S

DRAWING TITLE:

TRAFFIC SIGNAL
PLANS AND DATA
MAIN STREET AT
SALEM STREET

SHEET NO.

1 OF 6

Filename: J:_Woburn\MassDOT\22-032.02 MassDOT - Contract 118711 - Bottleneck_Reading\Design\((MASSDOT# CAD_XStage)\Project Drawing Data\Plan Sheet Files\Plan Sheet DWG\22-032.02(Traffic Signal Plans).dwg

COORDINATION DATA PLAN 1

LOCATION	CYCLE LENGTH	OFFSET	COORD. PHASE	* W / Ø 9						
				SPLITS						
				Ø 2 / *	Ø 4	Ø 5	Ø 6 / *	Ø 7	Ø 8	Ø 9
MAIN STREET AT SALEM STREET	90	0	Ø 2 + Ø 6	47 / 28	32	11	58 / 39	11	21	19
MAIN STREET AT WOBURN STREET	90	0	Ø 2 + Ø 6	50 / 31	24	-	50 / 31	-	16	19
MAIN STREET AT PLEASANT STREET	90	7	Ø 2 + Ø 6	55 / 33	35	-	55 / 33	-	35	22
MAIN STREET AT HAVEN STREET	90	84	Ø 2 + Ø 6	60 / 39	19	11	71 / 50	-	19	21

COORDINATION DATA PLAN 2

LOCATION	CYCLE LENGTH	OFFSET	COORD. PHASE	* W / Ø 9						
				SPLITS						
				Ø 2 / *	Ø 4	Ø 5	Ø 6 / *	Ø 7	Ø 8	Ø 9
MAIN STREET AT SALEM STREET	100	11	Ø 2 + Ø 6	53 / 34	36	11	64 / 45	11	25	19
MAIN STREET AT WOBURN STREET	100	0	Ø 2 + Ø 6	65 / 36	18	-	65 / 36	-	17	19
MAIN STREET AT PLEASANT STREET	100	0	Ø 2 + Ø 6	73 / 51	27	-	73 / 51	-	27	22
MAIN STREET AT HAVEN STREET	100	60	Ø 2 + Ø 6	66 / 45	19	15	81 / 60	-	19	21

COORDINATION DATA PLAN 3

LOCATION	CYCLE LENGTH	OFFSET	COORD. PHASE	* W / Ø 9						
				SPLITS						
				Ø 2 / *	Ø 4	Ø 5	Ø 6 / *	Ø 7	Ø 8	Ø 9
MAIN STREET AT SALEM STREET	100	11	Ø 2 + Ø 6	48 / 29	41	11	59 / 49	11	30	19
MAIN STREET AT WOBURN STREET	100	0	Ø 2 + Ø 6	64 / 45	21	-	64 / 45	-	15	19
MAIN STREET AT PLEASANT STREET	100	80	Ø 2 + Ø 6	75 / 53	25	-	75 / 53	-	25	22
MAIN STREET AT HAVEN STREET	100	55	Ø 2 + Ø 6	66 / 45	19	15	81 / 60	-	19	21

COORDINATION DATA PLAN 4

LOCATION	CYCLE LENGTH	OFFSET	COORD. PHASE	* W / Ø 9						
				SPLITS						
				Ø 2 / *	Ø 4	Ø 5	Ø 6 / *	Ø 7	Ø 8	Ø 9
MAIN STREET AT SALEM STREET	110	17	Ø 2 + Ø 6	58 / 39	40	12	70 / 51	11	29	19
MAIN STREET AT WOBURN STREET	110	0	Ø 2 + Ø 6	74 / 55	21	-	74 / 55	-	15	19
MAIN STREET AT PLEASANT STREET	110	0	Ø 2 + Ø 6	80 / 58	30	-	80 / 58	-	30	22
MAIN STREET AT HAVEN STREET	110	55	Ø 2 + Ø 6	76 / 55	19	15	91 / 70	-	19	21

COORDINATION NOTES

1. LOCATIONS 1 THROUGH 4 SHALL BE COORDINATED VIA EXISTING COPPER INTERCONNECT.
2. OFFSETS REFERENCED TO BEGINNING OF Ø2 & Ø6 YELLOW.
3. ALL COORDINATION SPLIT TIMES INCLUDE YELLOW CHANGE AND RED CLEARANCE TIME.
4. COORDINATION MODE SHALL BE YIELD. FIXED FORCE OFFS SHALL BE IN EFFECT DURING COORDINATION.
5. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.
6. OFFSET SEEKING SHALL BE THE SHORTWAY METHOD.
7. THE MASTER SCHEDULE SHALL ONLY BE USED IN THE EVENT OF FAILURE OF THE TRAFFIC RESPONSIVE SYSTEM.

SYSTEM DETECTOR LOCATIONS

SYSTEM DETECTOR	INTERSECTION	ROADWAY/ DIRECTION	WEIGHING FACTOR
SD1	MAIN STREET AT SALEM STREET	SALEM STREET EASTBOUND	100
SD2	MAIN STREET AT SALEM STREET	SALEM STREET WESTBOUND	100
SD3	MAIN STREET AT SALEM STREET	MAIN STREET SOUTHBOUND	100
SD4	MAIN STREET AT SALEM STREET	MAIN STREET NORTHBOUND	100
SD5	MAIN STREET AT HAVEN STREET / ASH STREET	MAIN STREET NORTHBOUND	100
SD6	MAIN STREET AT HAVEN STREET / ASH STREET	MAIN STREET NORTHBOUND	100

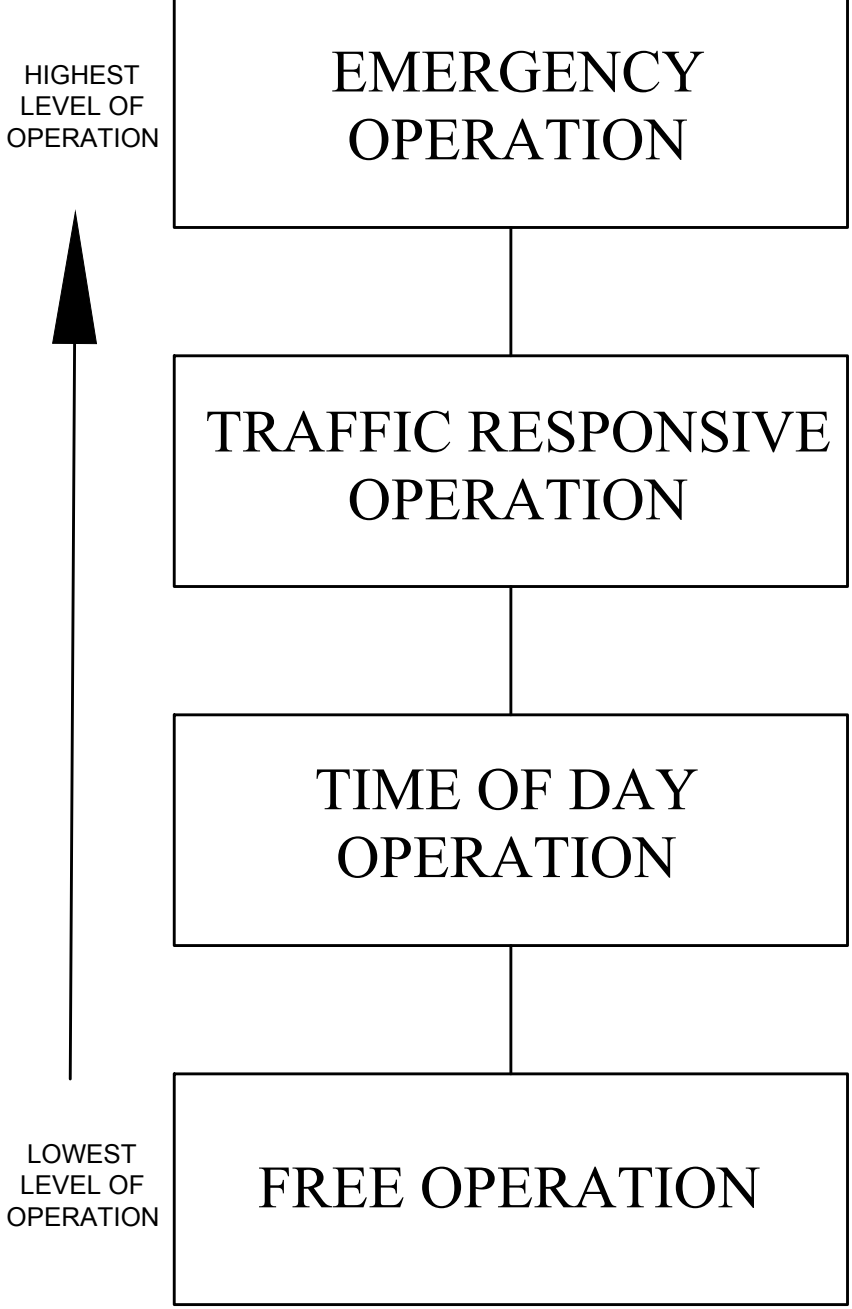
- NOTES:
1. WEIGHTING FACTORS LISTED ABOVE SHALL BE MODIFIED BY THE CONTRACTOR, IN CONSULTATION WITH THE ENGINEER, DURING THE TRAFFIC RESPONSIVE FINE TUNING AND ADJUSTMENT PERIOD.

MASTER SCHEDULE

	PLAN 2	PLAN 3	FREE
MONDAY - FRIDAY	0600 - 1100	1100 - 1900	0000 - 0600 1900 - 0000
SATURDAY	-	-	ALL DAY
SUNDAY	-	-	ALL DAY

- NOTES:
1. TIME OF DAY COORDINATION PROGRAMS SHALL ONLY BE UTILIZED IN THE CASE OF A FAILURE OF THE TRAFFIC RESPONSIVE MODE.

SIGNAL OPERATION HIERARCHY



- NOTES:
1. THE TRAFFIC SIGNAL SYSTEM SHALL OPERATE AT THE HIGHEST LEVEL OF OPERATION APPROPRIATE AND FEASIBLE AT ALL TIMES.
2. IF A FAILURE PREVENTS THE SYSTEM FROM OPERATING AT A PARTICULAR LEVEL OF OPERATION, THEN THE SYSTEM SHALL AUTOMATICALLY REVERT TO THE NEXT HIGHEST LEVEL OF OPERATION FEASIBLE WITHOUT THE NEED FOR OPERATOR INTERVENTION.

TRAFFIC RESPONSIVE PLAN SELECTION PARAMETERS

SYSTEM LEVEL	ENTER (INCREASING VOLUME)	LEAVE (DECREASING VOLUME)	PLAN
FREE			FREE
LEVEL 1	20%	15%	PLAN 1 - 90 SECOND CYCLE
LEVEL 2	40%	30%	PLAN 2 - 100 SECOND CYCLE
LEVEL 3	60%	50%	PLAN 3 - 100 SECOND CYCLE
LEVEL 4	80%	70%	PLAN 4 - 110 SECOND CYCLE

- NOTES:
1. TRAFFIC RESPONSIVE OPERATION SHALL BE IN EFFECT FROM 06:00 TO 19:00. THE SYSTEM SHALL OPERATE IN FREE MODE AT ALL OTHER TIMES.
2. A 5 MINUTE MOVING AVERAGE SHALL BE USED IN CALCULATING THRESHOLD VALUES.
3. A CYCLE LENGTH SHALL BE MAINTAINED FOR A MINIMUM OF 5 MINUTES.
4. ASCENDING AND DESCENDING THRESHOLDS LISTED ABOVE SHALL BE MODIFIED BY THE CONTRACTOR, IN CONSULTATION WITH THE ENGINEER, DURING THE TRAFFIC RESPONSIVE FINE TUNING AND ADJUSTMENT PERIOD.

CLIENT: MASSACHUSETTS DEPARTMENT OF TRANSPORTATION	PROJECT: LOCAL BOTTLENECK REDUCTION PROGRAM CONTRACT NO: 118711 - ASSIGNMENT #1 READING, MASSACHUSETTS	PREPARED BY: Tighe&Bond 300 TRADECENTER, SUITE 5580 WOBURN, MA 01801 T: 781-933-4800 F: 781-933-4801		NO.	DATE	REVISION	SCALE:	N.T.S	DRAWING TITLE: TRAFFIC SIGNAL COORDINATION DATA	SHEET NO. 6 OF 6
							DATE:	JUNE 2023		
							WTE PROJ. NO:	22-032.02		
							DESIGNED BY:	DB		
							CHECKED BY:	RE		