

Ref: 8102

October 2, 2024

Mr. Takashi Tada
Land Use Director/Town Planner
Town of Groton Planning Board
173 Main Street
Groton, MA 01450

Re: Response to Traffic Engineering Review
Gratuity Brook Farm Estates – 63 Gratuity Road
Groton, Massachusetts

Dear Takashi:

Vanasse & Associates, Inc. (VAI) is providing responses to the comments that were raised in the September 10, 2024 *Traffic Engineering Review* letter prepared by Nitsch Engineering (Nitsch) concerning their review of the April 23, 2024 *Transportation Impact Assessment* (the “April 2024 TIA”) that was prepared by VAI in support of the proposed Gratuity Brook Farm Estates residential development to be located at 63 Gratuity Road in Groton, Massachusetts (hereafter referred to as the “Project”). Listed below are the comments that were identified by Nitsch in the subject letter followed by our response on behalf of the Project proponent.

Comment 1: *The memorandum references that the Project will be accessed off both Gratuity Road and Jenkins Road, and references the access points as “Project Site Roadway” for each. The plans reference the Project Site Roadway for Gratuity Road as “Gerard Way,” and the Project Site Roadway for Jenkins Road as “Therese Lane.” We recommend VAI clarify the intended nomenclature for the Project Site Roadways and reference the intended names in future correspondence.*

Response: **Within this letter and in all future correspondence, the Project site roadways that will intersect Gratuity Road and Jenkins Road will be referred to as “Gerard Way” and “Therese Lane”, respectively.**

Comment 2: *The memorandum states that off-street parking will be provided in individual garages and driveways that will accommodate a minimum of two (2) vehicles per dwelling. We recommend VAI clarify parking requirements from the Town of Groton, and present information from the Institute of Transportation Engineers’ (ITE’s) Parking Generation to establish if the Project would provide sufficient parking.*

Response: **Section 218-8.1, *Off-street parking and loading*, of the Zoning Bylaw of the Town of Groton requires a minimum of 2.0 parking spaces per unit be provided for single or two-family dwellings containing more than one (1) bedroom.**

Parking demand data published by the Institute of Transportation Engineers (ITE)¹ for Land Use Code (LUC) 215, *Single-Family Attached Housing*, indicates that the observed peak parking demand ranges between 0.90 and 2.55 parking spaces per dwelling unit, with an average observed peak parking demand of 1.41 parking spaces per unit and an 85th percentile observed peak parking demand² of 2.27 parking spaces per unit. Parking demands for an age-restricted residential community are generally less than those for a conventional (non-age restricted) community.

The proposed parking supply (a minimum of 2.0 parking spaces per unit) meets the parking requirements of the Zoning Bylaw of the Town of Groton and is consistent with the parking ratios observed by the ITE for a single-family (non-age qualified) residential community.

Comment 3: *Based on our site visit, the Gratuity Road pavement quality is poor in some areas between the future Site driveway and Mill Street with cracking and potholes. We recommend VAI confirm the pavement condition and clarify if pavement resurfacing is proposed as part of the Project.*

Response: **VAI agrees that the pavement along Gratuity Road is in fair to poor condition. The resurfacing of Gratuity Road is not currently proposed as a part of the Project outside of the areas where the construction of the Project site roadways and the installation or upgrade of utilities may be required to accommodate the Project.**

Comment 4: *The memorandum indicated that no lighting was present on Gratuity Road near Mill Street. Based on our site visit, we note street lighting is present. We recommend VAI clarify if lighting was recently installed on Gratuity Road, and if there are plans independent of the Project to install additional lighting within the study area.*

Response: **The Groton Electric Light Department (GELD) confirmed that the installation of two (2) pole mounted lights in the vicinity of private driveways requested by residents of Gratuity Road have occurred within the past year. GELD also confirmed that there are not lighting projects planned within the study area at this time.**

Comment 5: *Based on our site visit proximate to the intersection of Main Street at Mill Street, there is an existing sign that indicates a heavy vehicle restriction on Mill Street. We recommend VAI confirm that the truck restriction is present, clarify whether there are additional heavy vehicle restrictions within the study area, and how the restrictions may impact safety and operations within the study area as a result of the Project.*

¹*Trip Generation*, 6th Edition; Institute of Transportation Engineers; Washington, DC; 2023.

²The 85th percentile peak parking demand is defined as the parking demand at which 85 percent of the observed peak parking demands fall below and 15 percent are above.



Response: VAI has confirmed that per Section 266-23, *Vehicle weight restrictions*, of the Zoning Bylaw of the Town of Groton, the use and operation of heavy commercial vehicles having a carrying capacity of more than 2.5 tons is restricted along Mill Street. No other heavy vehicle restrictions are present within the study area.

Contractors working on the Project will be informed of the weight restriction on Mill Street. Post-construction truck traffic associated with the Project is expected to be consistent with the truck traffic (and likely the same vendors serving the area) that serves the existing residential homes in the area and primarily vehicles that are less than 2.5 tons (i.e., UPS, FedEx, Amazon, etc.).

Comment 6: Based on our site visit, we observed the following at the intersection of Main Street at Mill Street:

- a. *There are no Americans with Disabilities Act (ADA) and Massachusetts Architectural Access Board (MAAB)-compliant pedestrian ramps or crosswalks present across Mill Street, despite a sidewalk on the west side of Main Street.*
- b. *The stop line for the Mill Street eastbound approach is placed beyond the projection of the pedestrian desire line for the sidewalk on the west side of Main Street.*
- c. *The available sight distance looking left (southbound) and looking right (northbound) from the Mill Street eastbound approach is impeded by a berm to the south and vegetation to the north. As a result, we observed vehicles inching from the stop line closer to Main Street and into the pedestrian desire line to obtain better observation of approaching vehicles along Main Street.*
- d. *The curb radii on both corners of Mill Street are significant given that heavy vehicles are restricted along Mill Street, which can promote high turning speeds for the free southbound right turn and lengthen the crossing distance for pedestrians traveling on the west side of Main Street.*

We recommend VAI consider working with the Town to facilitate a proposed improvement plan that may provide better accessibility for vehicles and pedestrians at the intersection of Main Street at Mill Street.

Response: The Project proponent will relocate the stop-line on the Mill Street approach and trim/remove vegetation located within the public-right-of-way on the corners of the intersection in order to improve sight lines. In addition, the Project proponent will coordinate with the Town to advance additional improvements at the intersection that are commensurate with the impact of the Project.

Comment 7: Table 1 indicates that the two intersections along Main Street have bicycle accommodations via a combined shoulder and travel lane width equal to or exceeding 14 feet. Though note “b” is not shown for the intersection of



Main Street at Arlington Street, we consider that note “b” is applicable for this location in addition to Main Street at Mill Street. Based on our field observations, the travel lanes are not designated as shared lanes by signage or Sharrow pavement markings. We recommend VAI clarify the presence of bicycle accommodations though no signage or Sharrow pavement markings are present and note any recommendations to provide additional bicycle accommodations within the study area.

Response: VAI agrees that a shared-traveled-way is provided along Main Street in the vicinity of Arlington Street. Independent of an unrelated to the Project, “Share the Road” signs (graphic symbol) could be installed along Main Street (Route 119) to the extent so desired by the Town and as approved by MassDOT.

Comment 8: The discussion of seasonal factors on page 5 and presented in the Appendix reviews the factors for Urban Groups 4-7. However, Main Street is classified as an urban principal arterial, which falls under Urban Group 3. We recommend VAI clarify the functional classification of all the roadways included within the study area and establish if seasonal factors should be applied to additional traffic volumes within the study area.

Response: With the exception of Main Street, all of the study area roadways are classified as local roadways under Town jurisdiction. Main Street within the study area is classified as an urban principal arterial under MassDOT jurisdiction. A review of MassDOT weekday seasonal factors for Urban Group 3 (other principal arterials) and Urban Group 4-7 (minor arterials, major and minor collectors and local roads and street)³ indicates that traffic volumes during the month of March are approximately 2.0 and 5.3 percent above average-month conditions, respectively. As such, and consistent with the methodology presented in the April 2024 TIA, a seasonal adjustment was not applied to the March 2024 traffic counts as they are representative of above average-month conditions.

Comment 9: The ATR data sheets in the Appendix for the Gratuity Road location indicate the counts were collected east of Mill Street, not west of Mill Street. We recommend VAI clarify the correct ATR collection.

Response: The ATR counts were conducted on Gratuity Road west of Mill Street.

Comment 10: The memorandum notes that the peak-hour volumes presented in Table 2 for Gratuity Road and Jenkins Road are obtained from information provided in Figures 2 and 3. We note the following:

- a. The peak periods and ATR information between Table 2 and Figures 2 and 3 are inconsistent with the information provided in the Appendix.

³MassDOT statewide Traffic Data Collection; 2019 Weekday Seasonal Factors, Groups U3 and U4-7.



b. *The K-factors presented in Table 2 may be unreasonably high given the roadway classifications within study area. The method for how the K-factors were calculated is also unclear.*

VAI should clarify the information from Table 2, Figures 2 and 3, and provide revised information, if needed.

Response: **The average weekday traffic volumes presented in Table 2 are consistent with the “week average” traffic volume in the right-most column of the ATR count sheet that averages traffic per direction.**

The peak-hour traffic volumes presented in Table 2 are consistent with the 2024 Existing traffic volumes depicted on Figures 2 and 3, which are consistent with the turning movement count data that is presented in the Appendix.

The K-factors in Table 2 represent the percent of the average weekday traffic that occurs during the respective peak hour (i.e., the Gratuity Road weekday morning peak-hour K-factor is calculated as follows: 25 vehicles per hour ÷ 165 daily vehicles = 15.2 percent). VAI agrees that the calculated K-factors are generally higher than the standard K-factors observed for many local roadways (typically in the range of 9 to 10 percent) and is a function of the relatively low traffic volumes along the study area roadways.

Comment 11: *The ATR counts for Gratuity Road, west of Mill Street, and Jenkins Road, east of Hickory Drive presented within the Appendix do not include vehicle classifications. Particularly, the heavy-vehicle percentages on the two roadways with ATR counts are of importance so we can understand the potential impact of heavy vehicles within the study area. We recommend VAI clarify if heavy vehicle data is available, and if not, consider collecting an additional ATR counts so we may understand the impact of heavy vehicles within the study area.*

Response: **Heavy vehicle data was collected at the study area intersections in conjunction with the TMC data and, with the exception of Main Street, was found to be two (2) heavy vehicles or less per movement during the peak periods. Due to the existing heavy vehicle restriction along Mill Street, heavy vehicle activity within the study area outside of Main Street is generally limited. Outside of the construction period, the Project will not result in a material increase in truck traffic.**

Comment 12: *In Table 2, the Average Weekday Traffic (AWT) presented for Gratuity Road and Jenkins Road may be different than the calculated average between the two sets of 24-hour counts. We recommend VAI clarify the calculation methodology, confirm if the numbers presented in Table 2 are correct, and if not, present the correct information.*

Response: **See response to Comment #10.**

Comment 13: *The Pedestrian Facilities discussion on page 9 notes pedestrians were observed crossing at the Main Street/Mill Street and Mill Street/Gratuity Road/Arlington Street intersections during the peak hours, and that pedestrian activity*



along the study area roadways was found to be generally low. With implementation of the Project, there is potential for additional pedestrian activity within the study area. We recommend VAI clarify when the pedestrian observations were collected, including time of year and time of day, to understand if there is potential for additional pedestrian activity during other times not observed.

Response: **Pedestrian activity at the study area intersections was observed in conjunction with the TMC data collected in March 2024 during the weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak periods, which is consistent with time periods that are evaluated for a residential development in a similar setting.**

Comment 14: *In the crash rate worksheets presented in the Appendix, we present the following:*

- a. It is unclear whether the AM or PM peak-hour volumes were used to calculate crash rates;*
- b. A K-factor of 0.097 is used at all intersections, which is consistent with the count data from the previous TIA, but is not consistent with the K-factors presented in Table 2;*
- c. The worksheet for the Main Street/Arlington Street intersection indicates one (1) crash occurred; however, Table 4 indicates no crashes at this location.*

We recommend VAI present updated crash rate worksheets, and update Table 4, if needed.

Response: **The MassDOT crash rate worksheets that were provided in the Appendix of the April 2024 TIA were inadvertently obtained from a prior assessment that was performed for the Project. As correctly presented in Table 4 of the April 2024 TIA, a review of motor vehicle crash data for the 2017 through 2021 review period indicates that no (0) motor vehicle crashes were reported to have occurred at the Main Street/Arlington Street intersection.**

Updated intersection crash rate worksheets are attached which: i) denote the peak hourly volumes (either AM or PM) to the left of numerical peak hour volumes; and ii) use the MassDOT standard K-factor of 0.09, as the calculated K-factors in Table 2 are not representative of traffic volumes along Main Street or along the Mill Street approaches to Gratuity Road or Jenkins Road, as they depict traffic volumes along local side streets that serve mainly local resident traffic. These revisions did not result in a material change from the information that is presented in Table 4 of the April 2024 TIA.

Comment 15: *We coordinated with the Town to confirm the Specific Development by Others presented on page 10. Based on coordination with the Town, construction is underway for the Proposed Residential Development, Hayes Woods Road; however, the Town does not anticipate any occupancy permits being issued in 2024. The Proposed Age-Restricted Multifamily Residential Development at*



797 Boston Road was permitted by the Planning Board in June 2024. Based on the memorandum, the traffic volumes associated with this development within the study area are expected to be relatively minor and would be included in the general background traffic growth rate. We obtained the Special Permit Application for the 797 Boston Road project, and the application states that this project is anticipated to generate 78 vehicle trips per day, five (5) vehicle trips during the weekday morning peak hour, and six (6) vehicle trips during the weekday evening peak hour. We recommend VAI clarify if the specific traffic information provided in the Special Permit Application for 797 Boston Road would significantly impact the results presented in the memorandum.

Response: **The minor traffic volumes associated with the 797 Boston Road development project (between five (5) and six (6) vehicle trips during the peak hours) would not result in material increase in peak-hour traffic to the extent that there would be an increase in average motorist delay at the study area intersections that would change the analysis results or the findings that are presented in the April 2024. We note that the 797 Boston Road property is located approximately 4.1 miles from the closest study area intersection (Mill Street at Jenkins Road) and that the majority of the associated trips will likely be on Main Street.**

Comment 16: *In Figure 5 – 2031 No Build Weekday Evening Peak Hour Traffic Volumes, the Mill Street southbound volume at the intersection of Mill Street at Arlington Street and Gratuity Road should be consistent with the 2024 Existing Weekday Evening Peak Hour Traffic Volumes, presented in Figure 3, grown by the background growth rate, and presented in the Synchro analysis in the Appendix. Based on our understanding, the volume should be 57 vehicles instead of 87 vehicles. We recommend VAI clarify if the 57 vehicles should be the correct number of vehicles presented in Figure 5.*

Response: **Figure 5R is attached and has been revised to show 57 through vehicles on the Mill Street southbound approach to the Mill Street/Arlington Street/Gratuity Road intersection. The 2031 No-Build and Build condition traffic operations analysis results that are presented in the April 2024 TIA correctly incorporate 57 vehicles for this movement.**

Comment 17: *In Table 5, Column B, based on the information from the Appendix, the number of entering vehicles should be four (4) and the number of exiting vehicles should be three (3). We note that the seven (7) total vehicles presented is consistent with information from the Appendix. We recommend that VAI clarify the numbers presented in Table 5.*

Response: **Table 5R has been revised to reflect the correct distribution of entering and exiting trips for ITE LUC 252, *Senior Adult Housing*, during the weekday evening peak-hour of the adjacent roadway: four (4) entering vehicles and three (3) exiting vehicles. This revision does not impact the analyses or findings that are presented in the April 2024 TIA which was based on the use of the higher traffic volumes that are derived using ITE LUC 215, *Single-Family Attached Housing*.**



**Table 5R
 TRIP-GENERATION SUMMARY**

| Time Period/Direction | (A) Single-Family Attached Housing ^a | (B) Multifamily Senior Adult Housing ^b |
|---------------------------------------|---|---|
| <i>Average Weekday Daily:</i> | | |
| Entering | 82 | 46 |
| <u>Exiting</u> | <u>82</u> | <u>46</u> |
| Total | 164 | 92 |
| <i>Weekday Morning Peak Hour:</i> | | |
| Entering | 2 | 2 |
| <u>Exiting</u> | <u>7</u> | <u>4</u> |
| Total | 9 | 6 |
| <i>Weekday Evening Peak Hour:</i> | | |
| Entering | 8 | 4 |
| <u>Exiting</u> | <u>5</u> | <u>3</u> |
| Total | 13 | 7 |

^aBased on ITE LUC 215, *Single-Family Attached Housing* (28 units).

^bBased on ITE LUC 252, *Senior Adult Housing – Multifamily* (28 units).

Comment 18:

Based on information from ITE’s Trip Generation, 11th edition, the TIS used Land Use Code (LUC) 215–Single Family Attached Housing and LUC 252 – Senior Adult Housing for the Trip Generation Summary presented in Table 5. Based on information available from Trip Generation, the Project may fit the description of LUC 251, Single-Family Senior Adult Housing, better than either LUC 215 or LUC 252. According to the ITE description, LUC 251 includes both detached and attached dwelling units, including “traditional single-family detached homes, patio homes, duplexes, and townhouses. Single-family attached housing includes any single-family housing unit that shares a wall with an adjoining dwelling unit, whether the walls are for living space, a vehicle garage, or storage space.” LUC 252 is used for multifamily units that “share both floors and walls with other units in the residential building.” We recommend VAI evaluate the potential to apply LUC 251 and establish how this may impact the 2031 Build Volumes and Analysis results, Summary, and Recommendations.

Response:

Table 5A summarizes the trip characteristics of the Project using ITE LUC 251, Single-Family Senior Adult Housing applied to 28 units.



**Table 5A
 TRIP GENERATION SUMMARY**

| Time Period | Vehicle Trips ^a | | |
|-----------------------------------|----------------------------|---------|-------|
| | Entering | Exiting | Total |
| <i>Average Weekday:</i> | 61 | 61 | 122 |
| <i>Weekday Morning Peak-Hour:</i> | 2 | 5 | 7 |
| <i>Weekday Evening Peak-Hour:</i> | 5 | 3 | 8 |

^aBased on ITE LUC 251, *Single-Family Senior Housing* (28 unit).

As can be seen in Table 5A, using ITE LUC 251, *Single-Family Senior Housing*, the Project is expected to generate approximately 122 vehicle trips on an average weekday (two-way, 24-hour volume) with 7 vehicle trips expected during the weekday morning peak-hour and 8 vehicle trips expected during the weekday evening peak-hour.

Based on a review of Tables 5R and 5A, the traffic volume projections for the Project obtained using ITE LUC 215, *Single-Family Attached Housing*, as presented in the April 2024 TIA continues to provide conservative (high) traffic volumes from which to assess the potential impact of the Project on the transportation infrastructure.

Comment 19:

Gratuity Road is described as 18 feet wide and contains two (2) full traffic lanes. Using the Trip Generation Summary presented in Table 5, the Project estimates 164 added trips per day and approximately 59 trips would use Gratuity Road. The 59 trips would represent an approximately 35% increase in daily trips on Gratuity Road. We recommend VAI recommend additional improvements as part of the Project, including but not limited to: widening Gratuity Road, adding centerline pavement markings, investigate installing speed limit signs, repairing pavement sections that are in poor condition, and/or implement heavy vehicle restrictions.

Response:

The average daily traffic volume along Gratuity Road does not meet the standards or guidance that are provided in the Manual on Uniform Traffic Control Devices (MUTCD)⁴ for the installation of centerline pavement markings and the installation of speed limit signs cannot be installed without the approval of a Special Speed Regulation by MassDOT. In addition, heavy vehicle restrictions also require approval by MassDOT after the completion of an engineering study to justify the restriction and the identification of an alternate truck route that is located entirely within the requesting community. The Project proponent will undertake the resurfacing of Gratuity Road in areas where the construction of the Project site roadways and the installation or upgrade of utilities may be required to accommodate the Project.

⁴Manual on Uniform Traffic Control Devices (MUTCD); Federal Highway Administration; Washington, D.C.; 2009.



Comment 20: *The Traffic Operations Analysis presented on page 13 states that the peak-hour factors (PHFs) and heavy vehicle percentages (%HV) were obtained from the 2024 TMCs for each approach. However, the Synchro output sheets indicate that the heavy vehicle percentages were applied by movement. We recommend VAI clarify which method was intended to ensure consistency between the Synchro inputs and the narrative.*

Response: **The traffic operations analysis presented in the April 2024 TIA used the average peak-hour factor by approach and the heavy vehicle percentage by movement at each study area intersection.**

Comment 21: *For the Synchro model associated with the Traffic Operations Analysis, we note the following:*

- a. Inputs are inconsistent between the traffic volume figures and the traffic counts included in the Appendix for the following movements:*
 - *Build Weekday Morning volume for the northbound right-turn movement at Mill Street & Gratuity Road/Arlington Street;*
 - *Weekday Morning heavy vehicle percentage for NBT at Mill Street & Jenkins Road; and*
 - *Weekday Morning heavy vehicle percentage for NBR at Jenkins Road & Hickory Drive;*
- b. No conflicting pedestrians or approach grades are provided in the inputs, which could impact the overall results. The memorandum indicates that pedestrians are present during the peak hours; therefore, we anticipate the number of conflicting pedestrians to be greater than zero. Based on our site visit, we anticipate several intersection approach grades to be greater than zero; and*
- c. Delay for the Weekday Evening Build condition on the eastbound lane at the Main Street at Arlington Street intersection shown in Table 6 is inconsistent with the Synchro analysis.*

We recommend VAI confirm the inputs and results shown above and provide an updated analysis to understand the Project impact.

Response: **The traffic operations analysis for 2024 Existing, 2031 No-Build and 2031 Build conditions have been revised to incorporate corrected volumes and heavy vehicle percentages for the above noted movements as well as the inclusion of conflicting pedestrian volumes at the Main Street/Mill Street, Main Street/Arlington Street and Mill Street/Arlington Street/Gratuity Road intersections, the locations where pedestrian activity was observed. Specific approach grade information is not currently available for the study area intersections. Per Exhibit 20-5 of the Highway Capacity Manual 6th Edition,⁵ a default value of zero (0) percent should be used such cases where**

⁵Highway Capacity Manual 6th Edition, Transportation Research Board; Washington, DC; 2016; Page 20-10.



intersection-specific information is not available. That being said, the approach grades to the study area intersections are gradual and would not impact the capacity of the intersections.⁶ The updated capacity analysis for each condition is summarized in Table 6A.

As can be seen in Table 6A and consistent with the results of the April 2024 TIA, the impact of the Project on the study area is generally defined as a predicted increase in average motorist delay of less than 1.0 seconds that resulted in a corresponding increase in vehicle queuing of up to three (3) feet.

Comment 22: Table 6 indicates that the Mill Street eastbound approach to the intersection of Main Street at Mill Street during the weekday evening peak hour operates at Level of Service (LOS) F with a 95th percentile queue of 138 feet, and a volume to capacity (v/c) ratio of 0.78. Based on our site visit, we confirmed the operations are consistent with the information presented in the memorandum. We note that during the 2031 No-Build and 2031 Build Conditions, the 95th percentile queue is anticipated to increase to 233 feet, and the v/c ratio is anticipated to increase to 1.09. We recommend VAI outline if there are any plans to implement mitigation at this intersection due to the operations at the Mill Street eastbound approach.

Response: The impact of the Project at the Main Street/Mill Street intersection has been defined as an increase in average motorist delay of less than 1.0 seconds that resulted in a corresponding increase in vehicle queuing along the Mill Street approach of up to three (3) feet (less than one (1) vehicle). This level of impact does not warrant or require improvements to the intersection to accommodate the relatively minor increase in traffic that the Project represents (predicted to be an increase of one (1) vehicle during the peak hours).

Comment 23: In Table 7, several of the measured sight distances are listed as “500+” feet. Based on our site visit, the intersection sight distance looking east from the Project Site Roadway along Gratuity Road is close to 500 feet and constrained by an existing horizontal curve. We recommend VAI provide a more specific measured sight distance to fully understand the available sight distance.

Response: The measured sight distances presented in Table 7 of the April 2024 TIA (500+ feet) far exceed both the recommended minimum stopping sight distance (200 feet) and the desirable intersection sight distance (335 feet for left-turn movements) for Project site roadway intersections to function in a safe and efficient manner. Providing a more exacting measurement of a value in excess of 500 feet would not change this conclusion.

Comment 24: Based on our site visit, the sight distances at the intersection of Main Street at Arlington Street are limited due to the crest vertical curve to the south on Main Street and the bridge abutment directly to the south of Arlington Street. Also, there is no marked crosswalk across Arlington Street despite the presence

⁶An extended approach grade of +5 percent or more can impact vehicle performance, which is not present at the study area intersections (*A Policy on Geometric Design of Highway and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018).



of pedestrian ramps on both sides of Arlington Street on the west side of Main Street. We recommend VAI consider working with the Town to improve intersection sight distance and potential installation of a crosswalk at the Arlington Street eastbound approach to the intersection of Main Street.

Response: **An intersection ahead warning sign is provided on the Main Street northbound approach to Arlington Street to address the identified sight line limitation. To the extent so desired by the Town and subject to review and approval by MassDOT, the Project proponent will install a marked crosswalk across Arlington Street at Main Street.**

Comment 25: *Based on our site visit at the intersection of Mill Street at Arlington Street and Gratuity Road, we note there are no yield signs, stop signs, or pavement markings to indicate proper traffic control for the northbound channelized right turn lane from Mill Street onto Arlington Street. We recommend VAI consider working with the Town to recommend proper signing and striping for the northbound channelized right turn lane from Mill Street onto Arlington Street.*

Response: **To the extent so desired by the Town and subject to receipt of all necessary rights, permits and approvals, the Project proponent will design and construct sign and pavement marking improvements for the channelized right-turn lane from Mill Street northbound to Arlington Street eastbound.**

Comment 26: *Based on our site visit at the intersection of Mill Street and Jenkins Road, sight distance is limited due to the crest vertical curve to the south on Mill Street, and the Jenkins Road eastbound approach contains a splitter island to separate turns to/from the north and the south. Jenkins Road contains no centerline markings or signage and creates a potential conflict point where two streams of traffic merge at the west end of the island. Based on Figure 6 from the memorandum, Jenkins Road between Project Site Roadway (Therese Lane) and Mill Street is anticipated to service approximately 64% of Project-related traffic. We recommend VAI address how to better serve Project-related traffic along Jenkins Road, including investigating how to limit conflict points at the intersection of Mill Street and Jenkins Road, and how to improve sight distance south on Mill Street.*

Response: **Discontinuing the southernmost channelized portion of Jenkins Road to create a T-intersection would serve to: i) reduce conflict points; and ii) improve sight lines by positioning the intersection further from the crest vertical curve along Mill Street to the south of Jenkins Road.**

Comment 27: *The fourth item under Recommendations in the Project Access section on page 19 discusses conformance of the work with the Manual on Uniform Traffic Control Devices (MUTCD), and it references by footnote the 2009 edition of the MUTCD. By the time the Project is approved, the MUTCD 11th Edition may be adopted by MassDOT. Accordingly, we recommend VAI clarify that a reference to “the latest edition” of the MUTCD may be appropriate.*

Response: **Any approvals that may be granted for the Project should indicate that the signs and pavement markings that are to be installed as a part of the Project**



shall comply with the latest edition of the MUTCD that has been approved by MassDOT.

Comment 28: The plans indicate a proposed sidewalk on the east side of Project Site Roadway (Gerard Way) to connect to the south side of Gratuity Road, and the east side of Project Site Roadway (Therese Lane) to connect to the north side of Jenkins Road. We note the proposed sidewalks do not connect to existing or proposed sidewalks along either Gratuity Road or Jenkins Road. We recommend VAI consider working with the Town to facilitate how the proposed sidewalks may tie into plans for future pedestrian accommodations within the study area.

Response: The Project proponent will coordinate with the Town to ensure that the proposed sidewalks along Gerard Way and Therese Lane are designed and constructed in a manner that will allow for connections to potential future sidewalks along Gratuity Road and Jenkins Road.

Comment 29: The Project access along Jenkins Road is adjacent to the Fairgrounds and Hazel Grove Park. Given the potential for seasonal events at Fairground and/or Hazel Grove Park that could potentially result in additional vehicle trips and/or parking for these events along Jenkins Road, VAI should investigate how the Project would impact traffic operations and safety associated with potential events at Fairgrounds and Hazel Grove Park.

Response: The Project will not result in a material impact on traffic operations or safety during events at the Fairgrounds or at Hazel Grove Park. As detailed in the April 2024 TIA and affirmed as a part of this response, the Project is expected to generate less than 13 vehicles during the weekday peak hours using conservative (high) traffic volume projections. With or without an event, the predicted traffic volume increase will not be readily apparent outside of the immediate proximity of the Project site.

Comment 30: In our review of the June 5, 2023 TIA, we commented that if Transportation Demand Management (TDM) measures are required for the Project, the memorandum should include a section covering the proposed measures. VAI responded, in part, in their July 11, 2023, response letter that accompanied their updated TIA, "To the extent that there is a homeowners association, the association will make information available to new residents regarding available public transportation options in the area." Page 6 of the memorandum indicates "regularly scheduled public transportation services are not currently provided to or within the Town of Groton or in the immediate vicinity of the Project site." We recommend VAI include a discussion on TDM and additional measures beyond referencing public transportation that may not be immediately available.

Response: In addition to providing public transportation schedules, the TDM program will include providing contact information for the Groton Council On Aging (COA) so that residents are informed of services that are offered by the COA, as well as information on bicycle facilities in the area, including the Nashua River Rail Trail which is located to the east of the Project site and can be accessed from Whistle Post Lane to the south (off of Pleasant Street). The intent of the TDM program is to inform residents of alternatives to the



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use of single-occupancy vehicles (SOVs) that are available in the area even though these services are not currently available at the Project site.

We trust that this information is responsive to the comments that were identified in the September 10, 2024 letter prepared by Nitsch concerning their review of the Project. If you should have any questions or would like to discuss our responses in more detail, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.



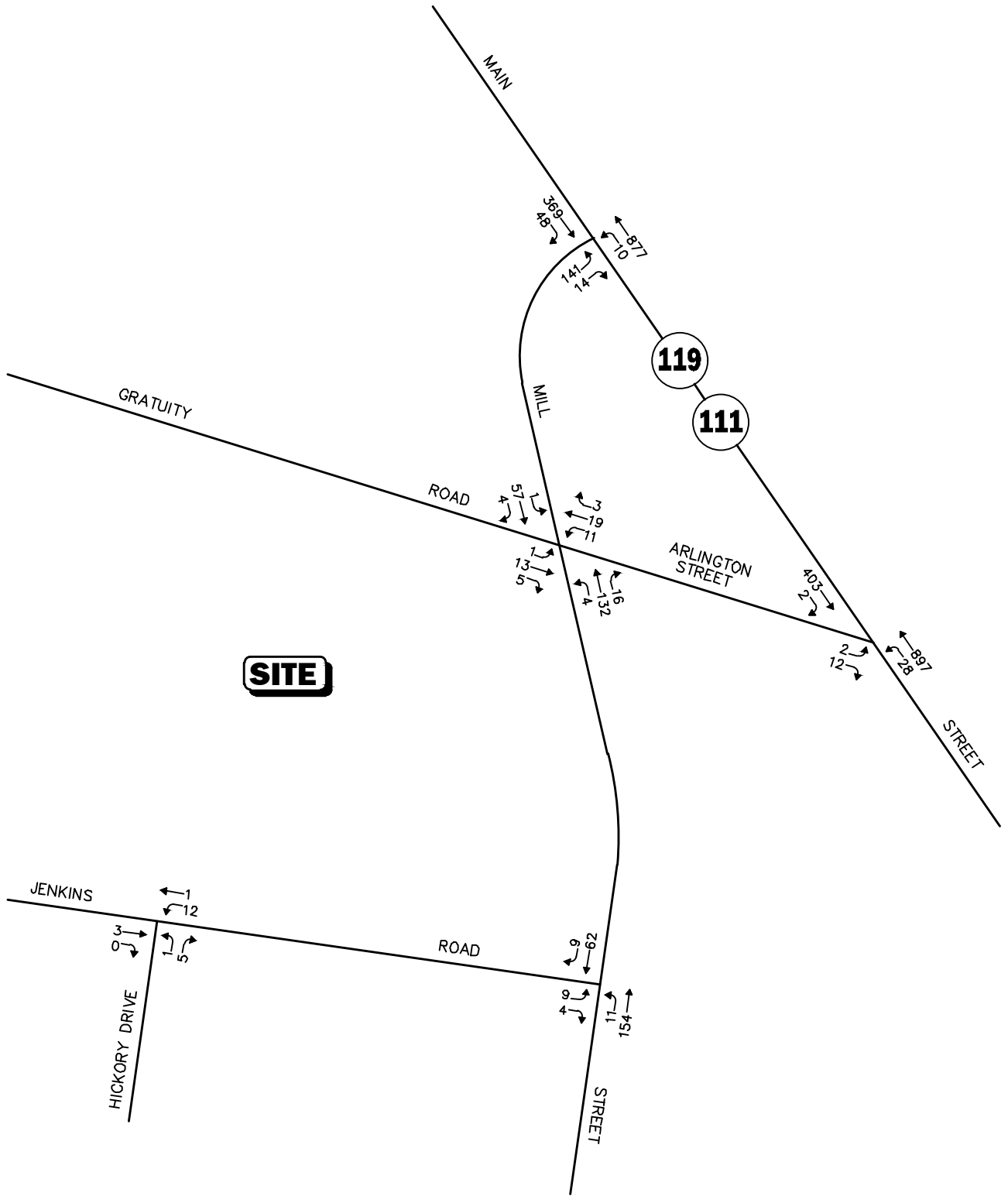
Jeffrey S. Dirk, P.E., PTOE, FITE
Managing Partner

Professional Engineer in CT, MA, ME, NH, RI, and VA

JSD/jsd

Attachments





Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.
 Not To Scale

Figure 5R



2031 No-Build
 Weekday Evening
 Peak-Hour Traffic Volumes

Table 6A
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

| Unsignalized Intersection/Peak-Hour/Movement | 2024 Existing | | | | 2031 No-Build | | | | 2031 Build | | | |
|--|------------------|--------------------|------------------|--|---------------|-------|-----|---------------------------|------------|-------|-----|---------------------------|
| | V/C ^a | Delay ^b | LOS ^c | Queue ^d 95 th | V/C | Delay | LOS | Queue 95 th | V/C | Delay | LOS | Queue 95 th |
| Main Street at Mill Street | | | | | | | | | | | | |
| <i>Weekday Morning:</i> | | | | | | | | | | | | |
| Mill St. EB LT/RT | 0.22 | 27.6 | D | 20 | 0.31 | 37.3 | E | 30 | 0.32 | 37.6 | E | 33 |
| Main St. NB LT | 0.00 | 0.0 | A | 0 | 0.00 | 0.0 | A | 0 | 0.00 | 0.0 | A | 0 |
| <i>Weekday Evening:</i> | | | | | | | | | | | | |
| Mill St. EB LT/RT | 0.78 | 65.3 | F | 138 | 1.10 | 154.7 | F | 235 | 1.10 | 154.7 | F | 235 |
| Main St. NB LT/TH | 0.01 | 8.1 | A | 0 | 0.01 | 8.3 | A | 0 | 0.01 | 8.3 | A | 0 |
| Main Street at Arlington Street | | | | | | | | | | | | |
| <i>Weekday Morning:</i> | | | | | | | | | | | | |
| Arlington St. EB LT/RT | 0.18 | 20.3 | C | 15 | 0.23 | 24.5 | C | 23 | 0.27 | 25.4 | D | 25 |
| Main St. NB LT | 0.02 | 10.2 | B | 3 | 0.02 | 10.9 | B | 3 | 0.03 | 10.9 | B | 3 |
| <i>Weekday Evening:</i> | | | | | | | | | | | | |
| Arlington St. EB LT/RT | 0.05 | 13.5 | B | 3 | 0.06 | 14.8 | B | 5 | 0.06 | 14.3 | B | 5 |
| Main St. NB LT | 0.03 | 8.1 | A | 3 | 0.03 | 8.3 | A | 3 | 0.03 | 8.3 | A | 3 |
| Mill Street at Arlington Street and Gratuity Road | | | | | | | | | | | | |
| <i>Weekday Morning:</i> | | | | | | | | | | | | |
| Gratuity Rd. EB LT/TH/RT | 0.04 | 8.2 | A | 3 | 0.05 | 8.3 | A | 5 | 0.06 | 8.3 | A | 5 |
| Arlington St. WB LT/TH/RT | 0.07 | 8.2 | A | 5 | 0.07 | 8.3 | A | 5 | 0.08 | 8.4 | A | 5 |
| Mill St. NB LT/TH/RT | 0.12 | 8.4 | A | 10 | 0.13 | 8.5 | A | 10 | 0.13 | 8.6 | A | 13 |
| Mill St. SB LT/TH/RT | 0.20 | 8.2 | A | 18 | 0.22 | 8.5 | A | 20 | 0.22 | 8.5 | A | 20 |
| <i>Weekday Evening:</i> | | | | | | | | | | | | |
| Gratuity Rd. EB LT/TH/RT | 0.05 | 7.6 | A | 5 | 0.05 | 7.8 | A | 5 | 0.06 | 7.8 | A | 5 |
| Arlington St. WB LT/TH/RT | 0.09 | 8.0 | A | 8 | 0.10 | 8.1 | A | 8 | 0.11 | 8.3 | A | 10 |
| Mill St. NB LT/TH/RT | 0.22 | 8.3 | A | 20 | 0.25 | 8.6 | A | 25 | 0.26 | 8.7 | A | 25 |
| Mill St. SB LT/TH/RT | 0.08 | 7.7 | A | 5 | 0.09 | 7.8 | A | 8 | 0.09 | 7.9 | A | 8 |
| Mill Street at Jenkins Road | | | | | | | | | | | | |
| <i>Weekday Morning:</i> | | | | | | | | | | | | |
| Jenkins Rd. EB LT/RT | 0.04 | 9.9 | A | 3 | 0.04 | 10.0 | B | 3 | 0.05 | 10.1 | B | 5 |
| Mill St. NB LT | 0.00 | 7.6 | A | 0 | 0.00 | 7.6 | A | 0 | 0.00 | 7.6 | A | 0 |
| <i>Weekday Evening:</i> | | | | | | | | | | | | |
| Jenkins Rd. EB LT/RT | 0.02 | 9.5 | A | 3 | 0.02 | 9.6 | A | 3 | 0.03 | 9.7 | A | 3 |
| Mill St. NB LT | 0.01 | 7.4 | A | 0 | 0.01 | 7.4 | A | 0 | 0.01 | 7.4 | A | 0 |

See notes at end of Table.

Table 6A (Continued)
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

| Unsignalized Intersection/Peak-Hour/Movement | 2024 Existing | | | | 2031 No-Build | | | | 2031 Build | | | |
|--|------------------|--------------------|------------------|--|---------------|-------|-----|---------------------------|------------|-------|-----|---------------------------|
| | V/C ^a | Delay ^b | LOS ^c | Queue ^d 95 th | V/C | Delay | LOS | Queue 95 th | V/C | Delay | LOS | Queue 95 th |
| Jenkins Road at Hickory Drive | | | | | | | | | | | | |
| <i>Weekday Morning:</i> | | | | | | | | | | | | |
| Jenkins Rd. WB LT | 0.01 | 7.2 | A | 0 | 0.01 | 7.2 | A | 0 | 0.01 | 7.2 | A | 0 |
| Hickory Dr. NB LT/RT | 0.03 | 8.5 | A | 3 | 0.03 | 8.5 | A | 3 | 0.03 | 8.5 | A | 3 |
| <i>Weekday Evening:</i> | | | | | | | | | | | | |
| Jenkins Rd. WB LT | 0.01 | 7.2 | A | 0 | 0.01 | 7.2 | A | 0 | 0.01 | 7.2 | A | 0 |
| Hickory Dr. NB LT/RT | 0.01 | 8.4 | A | 0 | 0.01 | 8.4 | A | 0 | 0.01 | 8.4 | A | 0 |
| Gratuity Road at the Project Site Roadway | | | | | | | | | | | | |
| <i>Weekday Morning:</i> | | | | | | | | | | | | |
| Gratuity Rd. WB LT | -- | -- | -- | -- | -- | -- | -- | -- | 0.00 | 7.3 | A | 0 |
| Project Site Roadway NB LT/RT | -- | -- | -- | -- | -- | -- | -- | -- | 0.00 | 8.4 | A | 0 |
| <i>Weekday Evening:</i> | | | | | | | | | | | | |
| Gratuity Rd. WB LT | -- | -- | -- | -- | -- | -- | -- | -- | 0.00 | 7.3 | A | 0 |
| Project Site Roadway NB LT/RT | -- | -- | -- | -- | -- | -- | -- | -- | 0.00 | 8.4 | A | 0 |
| Jenkins Road at the Project Site Roadway | | | | | | | | | | | | |
| <i>Weekday Morning:</i> | | | | | | | | | | | | |
| Jenkins Rd. EB LT | -- | -- | -- | -- | -- | -- | -- | -- | 0.00 | 8.7 | A | 0 |
| Project Site Roadway SB LT/RT | -- | -- | -- | -- | -- | -- | -- | -- | 0.00 | 0.0 | A | 0 |
| <i>Weekday Evening:</i> | | | | | | | | | | | | |
| Jenkins Rd. EB LT | -- | -- | -- | -- | -- | -- | -- | -- | 0.00 | 8.7 | A | 0 |
| Project Site Roadway SB LT/RT | -- | -- | -- | -- | -- | -- | -- | -- | 0.00 | 0.0 | A | 0 |

^aVolume to Capacity ratio.

^bAverage control delay per vehicle (in seconds).

^cLevel of service.

^dQueue length in feet.

NB = northbound, EB = eastbound; SB = southbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

ATTACHMENTS

ITE PARKING GENERATION DATA
SEASONAL ADJUSTMENT DATA
AUTOMATIC TRAFFIC RECORDER DATA
MASSDOT CRASH DATA WORKSHEETS
ITE TRIP GENERATION DATA
CAPACITY ANALYSIS WORKSHEETS

ITE PARKING GENERATION DATA

Graph Look Up



Query Filter

DATA SOURCE:
 Parking Generation Manual, 6th Ed

SEARCH BY LAND USE CODE:
 215

LAND USE GROUP:
 (200-299) Residential

LAND USE:
 215 - Single-Family Attached Housing

LAND USE SUBCATEGORY:
 Not Close to Rail Transit

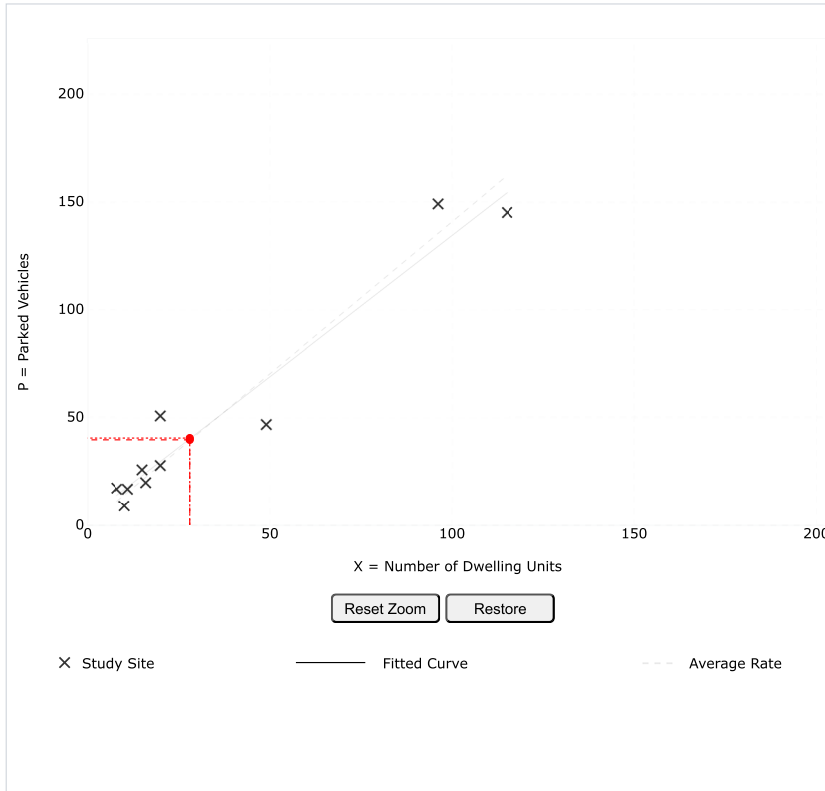
SETTING/LOCATION:
 General Urban/Suburban

INDEPENDENT VARIABLE (IV):
 Dwelling Units

TIME PERIOD:
 Weekday (Monday - Friday)

ENTER IV VALUE TO CALCULATE PARKING DEMAND:
 28 Calculate

Data Plot and Equation



DATA STATISTICS

| | |
|-------------------------------------|---|
| Land Use: | Single-Family Attached Housing - Not Close to Rail Transit (215) Click for Description and Data Plots |
| Independent Variable: | Dwelling Units |
| Time Period: | Weekday (Monday - Friday) |
| Setting/Location: | General Urban/Suburban |
| Number of Studies: | 10 |
| Avg. Num. of Dwelling Units: | 36 |
| Average Rate: | 1.41 |
| Range of Rates: | 0.90 - 2.55 |
| 33rd / 85th Percentile: | 1.26 / 2.27 |
| 95% Confidence Interval: | *** |
| Standard Deviation: | 0.39 |
| Coefficient of Variation: | 28% |
| Fitted Curve Equation: | $P = 1.31(X) + 3.62$ |
| R²: | 0.94 |
| Calculated Parking Demand: | Weighted Average: 39 Fitted Curve: 40 85 th Percentile: 64 |

SEASONAL ADJUSTMENT DATA

Massachusetts Highway Department
 Statewide Traffic Data Collection
 2019 Weekday Seasonal Factors

| Factor Group | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Axle Factor |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|-------------|
| R1 | 1.22 | 1.14 | 1.12 | 1.06 | 1.00 | 0.96 | 0.87 | 0.85 | 0.96 | 0.99 | 1.04 | 1.12 | 0.85 |
| R2 | 0.95 | 0.96 | 0.98 | 0.97 | 0.97 | 0.93 | 0.97 | 0.94 | 0.96 | 0.90 | 0.92 | 0.93 | 0.96 |
| R3 | 1.15 | 1.06 | 1.07 | 1.00 | 0.89 | 0.88 | 0.89 | 0.89 | 0.95 | 0.92 | 1.02 | 1.01 | 0.97 |
| R4-R7 | 1.09 | 1.09 | 1.11 | 1.02 | 0.96 | 0.92 | 0.89 | 0.89 | 0.99 | 0.98 | 1.09 | 1.13 | 0.98 |
| U1-Boston | 1.03 | 1.01 | 0.98 | 0.94 | 0.94 | 0.92 | 0.95 | 0.93 | 0.94 | 0.94 | 0.97 | 1.04 | 0.96 |
| U1-Essex | 1.09 | 1.06 | 1.03 | 0.99 | 0.94 | 0.90 | 0.88 | 0.86 | 0.93 | 0.94 | 0.99 | 1.06 | 0.93 |
| U1-Southeast | 1.06 | 1.05 | 1.01 | 0.97 | 0.95 | 0.93 | 0.93 | 0.90 | 0.94 | 0.94 | 0.98 | 1.04 | 0.98 |
| U1-West | 1.19 | 1.14 | 1.09 | 0.95 | 0.92 | 0.89 | 0.89 | 0.86 | 0.91 | 0.95 | 0.97 | 1.07 | 0.84 |
| U1-Worcester | 1.02 | 1.04 | 0.97 | 0.94 | 0.93 | 0.91 | 0.95 | 0.91 | 0.93 | 0.92 | 0.95 | 1.10 | 0.88 |
| U2 | 1.01 | 1.00 | 0.94 | 0.93 | 0.91 | 0.89 | 0.93 | 0.90 | 0.90 | 0.91 | 0.94 | 1.02 | 0.99 |
| U3 | 1.06 | 1.03 | 0.98 | 0.94 | 0.93 | 0.91 | 0.95 | 0.91 | 0.92 | 0.93 | 0.97 | 1.00 | 0.98 |
| U4-U7 | 1.01 | 1.00 | 0.95 | 0.92 | 0.88 | 0.86 | 0.92 | 0.91 | 0.92 | 0.94 | 0.99 | 1.04 | 0.99 |
| Rec - East | 1.04 | 1.16 | 1.12 | 0.98 | 0.92 | 0.88 | 0.77 | 0.81 | 0.94 | 1.02 | 1.08 | 1.12 | 0.99 |
| Rec - West | 1.30 | 1.23 | 1.32 | 1.18 | 0.95 | 0.82 | 0.70 | 0.69 | 0.97 | 0.96 | 1.16 | 1.15 | 0.98 |

Round off:

0-999 = 10

>1000 = 100

U = Urban

R = Rural

1 - Interstate

2 - Freeway and Expressway

3 - Other Principal Arterial

4 - Minor Arterial

5 - Major Collector

6 - Minor Collector

7 - Local Road and Street

Recreational - East Group - Cape Cod (all towns) including the town of Plymouth south of Route 3A (stations 7014,7079,7080,7090,7091,7092,7093,7094,7095,7096,7097,7108 and 7178), Martha's Vineyard and Nantucket.

Recreational - West Group - Continuous Stations 2 and 189 including stations 1066,1067,1083,1084,1085,1086,1087,1088,1089,1090,1091,1092,1093,1094,1095,1096,1097,1098,1099,1100,1101,1102,1103,1104,1105,1106,1107,1108,1113,1114, 1116,2196,2197 and 2198.

AUTOMATIC TRAFFIC RECORDER DATA

Accurate Counts
978-664-2565

Location : Gratuity Road
Location : East of Mill Street
City/State: Groton, MA

Site Code: 81020001

| 3/6/2024 Time | EB, | | Hour Totals | | WB, | | Hour Totals | | Combined Totals | |
|------------------|---------|-----------|-------------|-----------|---------|-----------|-------------|-----------|-----------------|-----------|
| | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon |
| 12:00 | 0 | 0 | | | 0 | 0 | | | | |
| 12:15 | 0 | 0 | | | 0 | 1 | | | | |
| 12:30 | 0 | 1 | | | 0 | 0 | | | | |
| 12:45 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 | 0 | 4 |
| 1:00 | 0 | 1 | | | 0 | 1 | | | | |
| 1:15 | 0 | 0 | | | 0 | 0 | | | | |
| 1:30 | 0 | 3 | | | 0 | 5 | | | | |
| 1:45 | 0 | 1 | 0 | 5 | 0 | 1 | 0 | 7 | 0 | 12 |
| 2:00 | 0 | 0 | | | 0 | 1 | | | | |
| 2:15 | 0 | 4 | | | 0 | 2 | | | | |
| 2:30 | 0 | 0 | | | 0 | 3 | | | | |
| 2:45 | 0 | 0 | 0 | 4 | 0 | 1 | 0 | 7 | 0 | 11 |
| 3:00 | 1 | 2 | | | 1 | 1 | | | | |
| 3:15 | 0 | 0 | | | 0 | 2 | | | | |
| 3:30 | 1 | 3 | | | 1 | 1 | | | | |
| 3:45 | 0 | 3 | 2 | 8 | 0 | 4 | 2 | 8 | 4 | 16 |
| 4:00 | 0 | 1 | | | 0 | 5 | | | | |
| 4:15 | 0 | 1 | | | 0 | 1 | | | | |
| 4:30 | 1 | 2 | | | 0 | 2 | | | | |
| 4:45 | 0 | 1 | 1 | 5 | 0 | 2 | 0 | 10 | 1 | 15 |
| 5:00 | 0 | 2 | | | 0 | 2 | | | | |
| 5:15 | 0 | 1 | | | 0 | 2 | | | | |
| 5:30 | 0 | 0 | | | 0 | 1 | | | | |
| 5:45 | 0 | 1 | 0 | 4 | 0 | 1 | 0 | 6 | 0 | 10 |
| 6:00 | 1 | 1 | | | 0 | 2 | | | | |
| 6:15 | 1 | 1 | | | 2 | 1 | | | | |
| 6:30 | 2 | 0 | | | 0 | 2 | | | | |
| 6:45 | 3 | 3 | 7 | 5 | 1 | 0 | 3 | 5 | 10 | 10 |
| 7:00 | 3 | 0 | | | 2 | 2 | | | | |
| 7:15 | 1 | 2 | | | 0 | 1 | | | | |
| 7:30 | 3 | 0 | | | 0 | 1 | | | | |
| 7:45 | 0 | 3 | 7 | 5 | 2 | 1 | 4 | 5 | 11 | 10 |
| 8:00 | 2 | 0 | | | 0 | 0 | | | | |
| 8:15 | 6 | 0 | | | 2 | 1 | | | | |
| 8:30 | 0 | 0 | | | 0 | 0 | | | | |
| 8:45 | 1 | 0 | 9 | 0 | 2 | 1 | 4 | 2 | 13 | 2 |
| 9:00 | 3 | 0 | | | 1 | 1 | | | | |
| 9:15 | 1 | 2 | | | 1 | 2 | | | | |
| 9:30 | 2 | 0 | | | 0 | 0 | | | | |
| 9:45 | 2 | 1 | 8 | 3 | 1 | 0 | 3 | 3 | 11 | 6 |
| 10:00 | 0 | 0 | | | 1 | 0 | | | | |
| 10:15 | 1 | 0 | | | 1 | 0 | | | | |
| 10:30 | 3 | 0 | | | 4 | 0 | | | | |
| 10:45 | 1 | 0 | 5 | 0 | 0 | 0 | 6 | 0 | 11 | 0 |
| 11:00 | 2 | 1 | | | 1 | 0 | | | | |
| 11:15 | 1 | 0 | | | 1 | 0 | | | | |
| 11:30 | 1 | 0 | | | 1 | 0 | | | | |
| 11:45 | 0 | 0 | 4 | 1 | 2 | 1 | 5 | 1 | 9 | 2 |
| Total | 43 | 42 | | | 27 | 56 | | | 70 | 98 |
| Percent | 50.6% | 49.4% | | | 32.5% | 67.5% | | | 41.7% | 58.3% |

Accurate Counts
978-664-2565

Location : Gratuity Road
Location : East of Mill Street
City/State: Groton, MA

Site Code: 81020001

| 3/7/2024 Time | EB, | | Hour Totals | | WB, | | Hour Totals | | Combined Totals | |
|------------------|---------|-----------|-------------|-----------|---------|-----------|-------------|-----------|-----------------|-----------|
| | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon |
| 12:00 | 0 | 0 | | | 0 | 1 | | | | |
| 12:15 | 1 | 1 | | | 0 | 1 | | | | |
| 12:30 | 0 | 1 | | | 0 | 1 | | | | |
| 12:45 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 3 | 1 | 5 |
| 1:00 | 0 | 3 | | | 0 | 0 | | | | |
| 1:15 | 0 | 0 | | | 0 | 1 | | | | |
| 1:30 | 0 | 1 | | | 0 | 3 | | | | |
| 1:45 | 0 | 2 | 0 | 6 | 0 | 3 | 0 | 7 | 0 | 13 |
| 2:00 | 0 | 2 | | | 0 | 2 | | | | |
| 2:15 | 0 | 1 | | | 0 | 2 | | | | |
| 2:30 | 0 | 0 | | | 0 | 2 | | | | |
| 2:45 | 0 | 1 | 0 | 4 | 1 | 1 | 1 | 7 | 1 | 11 |
| 3:00 | 1 | 2 | | | 0 | 2 | | | | |
| 3:15 | 0 | 2 | | | 0 | 2 | | | | |
| 3:30 | 0 | 2 | | | 0 | 5 | | | | |
| 3:45 | 0 | 1 | 1 | 7 | 0 | 1 | 0 | 10 | 1 | 17 |
| 4:00 | 0 | 1 | | | 0 | 3 | | | | |
| 4:15 | 0 | 0 | | | 0 | 3 | | | | |
| 4:30 | 0 | 0 | | | 0 | 2 | | | | |
| 4:45 | 0 | 1 | 0 | 2 | 0 | 3 | 0 | 11 | 0 | 13 |
| 5:00 | 0 | 2 | | | 0 | 4 | | | | |
| 5:15 | 0 | 3 | | | 0 | 1 | | | | |
| 5:30 | 1 | 1 | | | 0 | 5 | | | | |
| 5:45 | 1 | 0 | 2 | 6 | 0 | 3 | 0 | 13 | 2 | 19 |
| 6:00 | 2 | 3 | | | 1 | 1 | | | | |
| 6:15 | 0 | 2 | | | 1 | 2 | | | | |
| 6:30 | 2 | 0 | | | 0 | 2 | | | | |
| 6:45 | 1 | 2 | 5 | 7 | 1 | 1 | 3 | 6 | 8 | 13 |
| 7:00 | 1 | 1 | | | 0 | 1 | | | | |
| 7:15 | 1 | 1 | | | 2 | 0 | | | | |
| 7:30 | 2 | 1 | | | 0 | 2 | | | | |
| 7:45 | 2 | 2 | 6 | 5 | 2 | 2 | 4 | 5 | 10 | 10 |
| 8:00 | 2 | 0 | | | 0 | 1 | | | | |
| 8:15 | 5 | 2 | | | 1 | 1 | | | | |
| 8:30 | 3 | 1 | | | 1 | 0 | | | | |
| 8:45 | 1 | 0 | 11 | 3 | 1 | 2 | 3 | 4 | 14 | 7 |
| 9:00 | 0 | 1 | | | 0 | 0 | | | | |
| 9:15 | 0 | 0 | | | 2 | 0 | | | | |
| 9:30 | 0 | 0 | | | 1 | 0 | | | | |
| 9:45 | 0 | 1 | 0 | 2 | 0 | 0 | 3 | 0 | 3 | 2 |
| 10:00 | 0 | 0 | | | 0 | 0 | | | | |
| 10:15 | 2 | 0 | | | 0 | 0 | | | | |
| 10:30 | 1 | 0 | | | 0 | 0 | | | | |
| 10:45 | 0 | 0 | 3 | 0 | 3 | 1 | 3 | 1 | 6 | 1 |
| 11:00 | 1 | 0 | | | 0 | 0 | | | | |
| 11:15 | 1 | 0 | | | 0 | 0 | | | | |
| 11:30 | 1 | 0 | | | 1 | 0 | | | | |
| 11:45 | 1 | 0 | 4 | 0 | 3 | 0 | 4 | 0 | 8 | 0 |
| Total | 33 | 44 | | | 21 | 67 | | | 54 | 111 |
| Percent | 42.9% | 57.1% | | | 23.9% | 76.1% | | | 32.7% | 67.3% |
| Grand Total | 76 | 86 | | | 48 | 123 | | | 124 | 209 |
| Percent | 46.9% | 53.1% | | | 28.1% | 71.9% | | | 37.2% | 62.8% |

ADT

ADT: 166

AADT: 166

Accurate Counts
978-664-2565

Site Code: 81020001

Location : Gratuity Road
Location : East of Mill Street
City/State: Groton, MA

| Time | Monday | | Tuesday | | Wednesday | | Thursday | | Friday | | Saturday | | Sunday | | Week Average | |
|------------|--------|-----|---------|-----|-----------|-------|----------|-------|--------|-----|----------|-----|--------|-----|--------------|-------|
| | EB, | WB, | EB, | WB, | EB, | WB, | EB, | WB, | EB, | WB, | EB, | WB, | EB, | WB, | EB, | WB, |
| 0:00 | * | * | * | * | 0 | 0 | 1 | 0 | * | * | * | * | * | * | 0 | 0 |
| 1:00 | * | * | * | * | 0 | 0 | 0 | 0 | * | * | * | * | * | * | 0 | 0 |
| 2:00 | * | * | * | * | 0 | 0 | 0 | 1 | * | * | * | * | * | * | 0 | 0 |
| 3:00 | * | * | * | * | 2 | 2 | 1 | 0 | * | * | * | * | * | * | 2 | 1 |
| 4:00 | * | * | * | * | 1 | 0 | 0 | 0 | * | * | * | * | * | * | 0 | 0 |
| 5:00 | * | * | * | * | 0 | 0 | 2 | 0 | * | * | * | * | * | * | 1 | 0 |
| 6:00 | * | * | * | * | 7 | 3 | 5 | 3 | * | * | * | * | * | * | 6 | 3 |
| 7:00 | * | * | * | * | 7 | 4 | 6 | 4 | * | * | * | * | * | * | 6 | 4 |
| 8:00 | * | * | * | * | 9 | 4 | 11 | 3 | * | * | * | * | * | * | 10 | 4 |
| 9:00 | * | * | * | * | 8 | 3 | 0 | 3 | * | * | * | * | * | * | 4 | 3 |
| 10:00 | * | * | * | * | 5 | 6 | 3 | 3 | * | * | * | * | * | * | 4 | 4 |
| 11:00 | * | * | * | * | 4 | 5 | 4 | 4 | * | * | * | * | * | * | 4 | 4 |
| 12:00 | * | * | * | * | 2 | 2 | 2 | 3 | * | * | * | * | * | * | 2 | 2 |
| 13:00 | * | * | * | * | 5 | 7 | 6 | 7 | * | * | * | * | * | * | 6 | 7 |
| 14:00 | * | * | * | * | 4 | 7 | 4 | 7 | * | * | * | * | * | * | 4 | 7 |
| 15:00 | * | * | * | * | 8 | 8 | 7 | 10 | * | * | * | * | * | * | 8 | 9 |
| 16:00 | * | * | * | * | 5 | 10 | 2 | 11 | * | * | * | * | * | * | 4 | 10 |
| 17:00 | * | * | * | * | 4 | 6 | 6 | 13 | * | * | * | * | * | * | 5 | 10 |
| 18:00 | * | * | * | * | 5 | 5 | 7 | 6 | * | * | * | * | * | * | 6 | 6 |
| 19:00 | * | * | * | * | 5 | 5 | 5 | 5 | * | * | * | * | * | * | 5 | 5 |
| 20:00 | * | * | * | * | 0 | 2 | 3 | 4 | * | * | * | * | * | * | 2 | 3 |
| 21:00 | * | * | * | * | 3 | 3 | 2 | 0 | * | * | * | * | * | * | 2 | 2 |
| 22:00 | * | * | * | * | 0 | 0 | 0 | 1 | * | * | * | * | * | * | 0 | 0 |
| 23:00 | * | * | * | * | 1 | 1 | 0 | 0 | * | * | * | * | * | * | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 85 | 83 | 77 | 88 | 0 | 0 | 0 | 0 | 0 | 0 | 81 | 84 |
| Day | 0 | | 0 | | 168 | | 165 | | 0 | | 0 | | 0 | | 165 | |
| AM Peak | | | | | 8:00 | 10:00 | 8:00 | 7:00 | | | | | | | 8:00 | 7:00 |
| Volume | | | | | 9 | 6 | 11 | 4 | | | | | | | 10 | 4 |
| PM Peak | | | | | 15:00 | 16:00 | 15:00 | 17:00 | | | | | | | 15:00 | 16:00 |
| Volume | | | | | 8 | 10 | 7 | 13 | | | | | | | 8 | 10 |
| Comb Total | 0 | | 0 | | 168 | | 165 | | 0 | | 0 | | 0 | | 165 | |

Accurate Counts
978-664-2565

Location : Jenkins Road
Location : at # 80
City/State: Groton, MA

Site Code: 81020002

| 3/6/2024 Time | EB, | | Hour Totals | | WB, | | Hour Totals | | Combined Totals | |
|------------------|---------|-----------|-------------|-----------|---------|-----------|-------------|-----------|-----------------|-----------|
| | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon |
| 12:00 | 0 | 0 | | | 1 | 0 | | | | |
| 12:15 | 0 | 0 | | | 0 | 1 | | | | |
| 12:30 | 0 | 2 | | | 0 | 3 | | | | |
| 12:45 | 0 | 0 | 0 | 2 | 0 | 2 | 1 | 6 | 1 | 8 |
| 1:00 | 0 | 2 | | | 0 | 2 | | | | |
| 1:15 | 0 | 1 | | | 0 | 3 | | | | |
| 1:30 | 0 | 0 | | | 0 | 1 | | | | |
| 1:45 | 0 | 0 | 0 | 3 | 0 | 5 | 0 | 11 | 0 | 14 |
| 2:00 | 0 | 2 | | | 0 | 4 | | | | |
| 2:15 | 0 | 0 | | | 0 | 3 | | | | |
| 2:30 | 0 | 2 | | | 0 | 3 | | | | |
| 2:45 | 0 | 0 | 0 | 4 | 0 | 3 | 0 | 13 | 0 | 17 |
| 3:00 | 0 | 4 | | | 0 | 1 | | | | |
| 3:15 | 0 | 2 | | | 0 | 3 | | | | |
| 3:30 | 0 | 2 | | | 0 | 5 | | | | |
| 3:45 | 0 | 3 | 0 | 11 | 0 | 2 | 0 | 11 | 0 | 22 |
| 4:00 | 0 | 2 | | | 0 | 5 | | | | |
| 4:15 | 0 | 0 | | | 0 | 3 | | | | |
| 4:30 | 0 | 1 | | | 0 | 5 | | | | |
| 4:45 | 0 | 1 | 0 | 4 | 0 | 1 | 0 | 14 | 0 | 18 |
| 5:00 | 0 | 0 | | | 0 | 2 | | | | |
| 5:15 | 0 | 2 | | | 0 | 4 | | | | |
| 5:30 | 0 | 1 | | | 0 | 3 | | | | |
| 5:45 | 1 | 1 | 1 | 4 | 0 | 4 | 0 | 13 | 1 | 17 |
| 6:00 | 1 | 1 | | | 0 | 1 | | | | |
| 6:15 | 0 | 1 | | | 0 | 3 | | | | |
| 6:30 | 2 | 1 | | | 1 | 0 | | | | |
| 6:45 | 1 | 0 | 4 | 3 | 2 | 0 | 3 | 4 | 7 | 7 |
| 7:00 | 1 | 1 | | | 0 | 2 | | | | |
| 7:15 | 0 | 0 | | | 2 | 4 | | | | |
| 7:30 | 1 | 1 | | | 0 | 2 | | | | |
| 7:45 | 2 | 0 | 4 | 2 | 0 | 0 | 2 | 8 | 6 | 10 |
| 8:00 | 0 | 1 | | | 2 | 3 | | | | |
| 8:15 | 3 | 0 | | | 4 | 2 | | | | |
| 8:30 | 6 | 0 | | | 2 | 3 | | | | |
| 8:45 | 0 | 1 | 9 | 2 | 7 | 1 | 15 | 9 | 24 | 11 |
| 9:00 | 3 | 0 | | | 3 | 2 | | | | |
| 9:15 | 1 | 0 | | | 1 | 0 | | | | |
| 9:30 | 0 | 0 | | | 1 | 0 | | | | |
| 9:45 | 0 | 0 | 4 | 0 | 1 | 0 | 6 | 2 | 10 | 2 |
| 10:00 | 2 | 0 | | | 1 | 0 | | | | |
| 10:15 | 1 | 0 | | | 1 | 0 | | | | |
| 10:30 | 0 | 0 | | | 0 | 0 | | | | |
| 10:45 | 0 | 0 | 3 | 0 | 4 | 0 | 6 | 0 | 9 | 0 |
| 11:00 | 0 | 0 | | | 1 | 0 | | | | |
| 11:15 | 1 | 0 | | | 3 | 1 | | | | |
| 11:30 | 2 | 0 | | | 0 | 1 | | | | |
| 11:45 | 0 | 0 | 3 | 0 | 2 | 0 | 6 | 2 | 9 | 2 |
| Total | 28 | 35 | | | 39 | 93 | | | 67 | 128 |
| Percent | 44.4% | 55.6% | | | 29.5% | 70.5% | | | 34.4% | 65.6% |

Accurate Counts
978-664-2565

Location : Jenkins Road
Location : at # 80
City/State: Groton, MA

Site Code: 81020002

| 3/7/2024 Time | EB, | | Hour Totals | | WB, | | Hour Totals | | Combined Totals | |
|------------------|---------|-----------|-------------|-----------|---------|-----------|-------------|-----------|-----------------|-----------|
| | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon |
| 12:00 | 0 | 0 | | | 0 | 0 | | | | |
| 12:15 | 0 | 2 | | | 0 | 2 | | | | |
| 12:30 | 0 | 0 | | | 0 | 1 | | | | |
| 12:45 | 0 | 3 | 0 | 5 | 0 | 1 | 0 | 4 | 0 | 9 |
| 1:00 | 0 | 1 | | | 0 | 5 | | | | |
| 1:15 | 0 | 3 | | | 0 | 4 | | | | |
| 1:30 | 0 | 0 | | | 0 | 1 | | | | |
| 1:45 | 0 | 0 | 0 | 4 | 0 | 2 | 0 | 12 | 0 | 16 |
| 2:00 | 0 | 1 | | | 0 | 4 | | | | |
| 2:15 | 0 | 0 | | | 0 | 2 | | | | |
| 2:30 | 0 | 1 | | | 0 | 2 | | | | |
| 2:45 | 0 | 2 | 0 | 4 | 0 | 0 | 0 | 8 | 0 | 12 |
| 3:00 | 0 | 1 | | | 0 | 2 | | | | |
| 3:15 | 0 | 1 | | | 0 | 3 | | | | |
| 3:30 | 0 | 0 | | | 0 | 5 | | | | |
| 3:45 | 1 | 0 | 1 | 2 | 0 | 5 | 0 | 15 | 1 | 17 |
| 4:00 | 0 | 2 | | | 0 | 4 | | | | |
| 4:15 | 0 | 0 | | | 0 | 5 | | | | |
| 4:30 | 0 | 2 | | | 0 | 1 | | | | |
| 4:45 | 0 | 2 | 0 | 6 | 0 | 5 | 0 | 15 | 0 | 21 |
| 5:00 | 0 | 0 | | | 0 | 2 | | | | |
| 5:15 | 0 | 1 | | | 0 | 2 | | | | |
| 5:30 | 1 | 2 | | | 0 | 2 | | | | |
| 5:45 | 0 | 2 | 1 | 5 | 0 | 2 | 0 | 8 | 1 | 13 |
| 6:00 | 1 | 0 | | | 0 | 2 | | | | |
| 6:15 | 1 | 3 | | | 0 | 1 | | | | |
| 6:30 | 1 | 2 | | | 2 | 3 | | | | |
| 6:45 | 1 | 2 | 4 | 7 | 0 | 4 | 2 | 10 | 6 | 17 |
| 7:00 | 0 | 0 | | | 2 | 2 | | | | |
| 7:15 | 0 | 0 | | | 0 | 0 | | | | |
| 7:30 | 1 | 0 | | | 0 | 2 | | | | |
| 7:45 | 2 | 0 | 3 | 0 | 3 | 1 | 5 | 5 | 8 | 5 |
| 8:00 | 3 | 0 | | | 3 | 1 | | | | |
| 8:15 | 0 | 0 | | | 2 | 3 | | | | |
| 8:30 | 3 | 1 | | | 0 | 1 | | | | |
| 8:45 | 0 | 0 | 6 | 1 | 4 | 2 | 9 | 7 | 15 | 8 |
| 9:00 | 0 | 0 | | | 1 | 1 | | | | |
| 9:15 | 1 | 0 | | | 2 | 3 | | | | |
| 9:30 | 2 | 0 | | | 1 | 1 | | | | |
| 9:45 | 1 | 0 | 4 | 0 | 2 | 0 | 6 | 5 | 10 | 5 |
| 10:00 | 0 | 1 | | | 0 | 0 | | | | |
| 10:15 | 1 | 0 | | | 0 | 1 | | | | |
| 10:30 | 3 | 0 | | | 1 | 0 | | | | |
| 10:45 | 3 | 0 | 7 | 1 | 1 | 0 | 2 | 1 | 9 | 2 |
| 11:00 | 1 | 0 | | | 0 | 1 | | | | |
| 11:15 | 1 | 0 | | | 1 | 2 | | | | |
| 11:30 | 2 | 0 | | | 1 | 0 | | | | |
| 11:45 | 1 | 0 | 5 | 0 | 0 | 0 | 2 | 3 | 7 | 3 |
| Total | 31 | 35 | | | 26 | 93 | | | 57 | 128 |
| Percent | 47.0% | 53.0% | | | 21.8% | 78.2% | | | 30.8% | 69.2% |
| Grand Total | 59 | 70 | | | 65 | 186 | | | 124 | 256 |
| Percent | 45.7% | 54.3% | | | 25.9% | 74.1% | | | 32.6% | 67.4% |

ADT

ADT: 190

AADT: 190

Accurate Counts
978-664-2565

Location : Jenkins Road
Location : at # 80
City/State: Groton, MA

Site Code: 81020002

| Time | Monday | | Tuesday | | Wednesday | | Thursday | | Friday | | Saturday | | Sunday | | Week Average | |
|------------|--------|-----|---------|-----|-----------|-------|----------|-------|--------|-----|----------|-----|--------|-----|--------------|-------|
| | EB, | WB, | EB, | WB, | EB, | WB, | EB, | WB, | EB, | WB, | EB, | WB, | EB, | WB, | EB, | WB, |
| 0:00 | * | * | * | * | 0 | 1 | 0 | 0 | * | * | * | * | * | * | 0 | 0 |
| 1:00 | * | * | * | * | 0 | 0 | 0 | 0 | * | * | * | * | * | * | 0 | 0 |
| 2:00 | * | * | * | * | 0 | 0 | 0 | 0 | * | * | * | * | * | * | 0 | 0 |
| 3:00 | * | * | * | * | 0 | 0 | 1 | 0 | * | * | * | * | * | * | 0 | 0 |
| 4:00 | * | * | * | * | 0 | 0 | 0 | 0 | * | * | * | * | * | * | 0 | 0 |
| 5:00 | * | * | * | * | 1 | 0 | 1 | 0 | * | * | * | * | * | * | 1 | 0 |
| 6:00 | * | * | * | * | 4 | 3 | 4 | 2 | * | * | * | * | * | * | 4 | 2 |
| 7:00 | * | * | * | * | 4 | 2 | 3 | 5 | * | * | * | * | * | * | 4 | 4 |
| 8:00 | * | * | * | * | 9 | 15 | 6 | 9 | * | * | * | * | * | * | 8 | 12 |
| 9:00 | * | * | * | * | 4 | 6 | 4 | 6 | * | * | * | * | * | * | 4 | 6 |
| 10:00 | * | * | * | * | 3 | 6 | 7 | 2 | * | * | * | * | * | * | 5 | 4 |
| 11:00 | * | * | * | * | 3 | 6 | 5 | 2 | * | * | * | * | * | * | 4 | 4 |
| 12:00 | * | * | * | * | 2 | 6 | 5 | 4 | * | * | * | * | * | * | 4 | 5 |
| 13:00 | * | * | * | * | 3 | 11 | 4 | 12 | * | * | * | * | * | * | 4 | 12 |
| 14:00 | * | * | * | * | 4 | 13 | 4 | 8 | * | * | * | * | * | * | 4 | 10 |
| 15:00 | * | * | * | * | 11 | 11 | 2 | 15 | * | * | * | * | * | * | 6 | 13 |
| 16:00 | * | * | * | * | 4 | 14 | 6 | 15 | * | * | * | * | * | * | 5 | 14 |
| 17:00 | * | * | * | * | 4 | 13 | 5 | 8 | * | * | * | * | * | * | 4 | 10 |
| 18:00 | * | * | * | * | 3 | 4 | 7 | 10 | * | * | * | * | * | * | 5 | 7 |
| 19:00 | * | * | * | * | 2 | 8 | 0 | 5 | * | * | * | * | * | * | 1 | 6 |
| 20:00 | * | * | * | * | 2 | 9 | 1 | 7 | * | * | * | * | * | * | 2 | 8 |
| 21:00 | * | * | * | * | 0 | 2 | 0 | 5 | * | * | * | * | * | * | 0 | 4 |
| 22:00 | * | * | * | * | 0 | 0 | 1 | 1 | * | * | * | * | * | * | 0 | 0 |
| 23:00 | * | * | * | * | 0 | 2 | 0 | 3 | * | * | * | * | * | * | 0 | 2 |
| Total | 0 | 0 | 0 | 0 | 63 | 132 | 66 | 119 | 0 | 0 | 0 | 0 | 0 | 0 | 65 | 123 |
| Day | 0 | | 0 | | 195 | | 185 | | 0 | | 0 | | 0 | | 188 | |
| AM Peak | | | | | 8:00 | 8:00 | 10:00 | 8:00 | | | | | | | 8:00 | 8:00 |
| Volume | | | | | 9 | 15 | 7 | 9 | | | | | | | 8 | 12 |
| PM Peak | | | | | 15:00 | 16:00 | 18:00 | 15:00 | | | | | | | 15:00 | 16:00 |
| Volume | | | | | 11 | 14 | 7 | 15 | | | | | | | 6 | 14 |
| Comb Total | 0 | | 0 | | 195 | | 185 | | 0 | | 0 | | 0 | | 188 | |

MASSDOT CRASH DATA WORKSHEETS

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Groton COUNT DATE : 5/13/2019

DISTRICT : 3 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Main Street

MINOR STREET(S) : Mill Street

**INTERSECTION
 DIAGRAM
 (Label Approaches)**



PEAK HOUR VOLUMES

| APPROACH : | 1 | 2 | 3 | 4 | 5 | Total Peak Hourly Approach Volume |
|-----------------------------------|-----|-----|-----|----|---|-----------------------------------|
| DIRECTION : | NB | SB | EB | WB | | |
| PEAK HOURLY VOLUMES (PM) : | 787 | 360 | 140 | | | 1,287 |

" K " FACTOR : INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

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

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

Comments : Below MassDOT Statewide and District Average Crash Rates

Project Title & Date: 8102 - Proposed Residential Development

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Groton COUNT DATE : 5/13/2019

DISTRICT : 3 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Mill Street

MINOR STREET(S) : Arlington Street

Gratuity Road

**INTERSECTION
 DIAGRAM
 (Label Approaches)**



PEAK HOUR VOLUMES

| APPROACH : | 1 | 2 | 3 | 4 | 5 | Total Peak Hourly Approach Volume |
|-----------------------------------|-----|----|----|----|---|-----------------------------------|
| DIRECTION : | NB | SB | EB | WB | | |
| PEAK HOURLY VOLUMES (PM) : | 137 | 54 | 18 | 31 | | 240 |

"K" FACTOR : **0.090** INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME : **2,667**

| | | | | | |
|----------------------|---|--------------|---|---------------------------------------|-------------|
| TOTAL # OF CRASHES : | 1 | # OF YEARS : | 5 | AVERAGE # OF CRASHES PER YEAR (A) : | 0.20 |
|----------------------|---|--------------|---|---------------------------------------|-------------|

CRASH RATE CALCULATION : **0.21** RATE = $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : Below MassDOT Statewide and District Average Crash Rates

Project Title & Date : 8102 - Proposed Residential Development

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Groton COUNTY DATE : 5/13/2019

DISTRICT : 3 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Jenkins Road

MINOR STREET(S) : Hickory Drive

**INTERSECTION
DIAGRAM
(Label Approaches)**



PEAK HOUR VOLUMES

| APPROACH : | 1 | 2 | 3 | 4 | 5 | Total Peak Hourly Approach Volume |
|---------------------------------------|----|----|----|----|---|--|
| DIRECTION : | NB | SB | EB | WB | | |
| PEAK HOURLY VOLUMES (AM) : | 22 | | 2 | 10 | | 34 |

"K" FACTOR : INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

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

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

Comments : Above MassDOT Statewide and District Average Crash Rates

Project Title & Date : 8102 - Proposed Residential Development

ITE TRIP GENERATION DATA

Graph Look Up



ITETripGen Web-based App

Graph Look Up

How to Use ITETripGen

TGM Desk Reference

TGM Appendices

Support Documents

Add Users

Comments

Add-ons to do more

Try OTISS Pro

Query Filter

DATA SOURCE:

Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:

251

LAND USE GROUP:

(200-299) Residential

LAND USE :

251 - Senior Adult Housing - Single-Family

LAND USE SUBCATEGORY:

All Sites

SETTING/LOCATION:

General Urban/Suburban

INDEPENDENT VARIABLE (IV):

Dwelling Units

TIME PERIOD:

Weekday

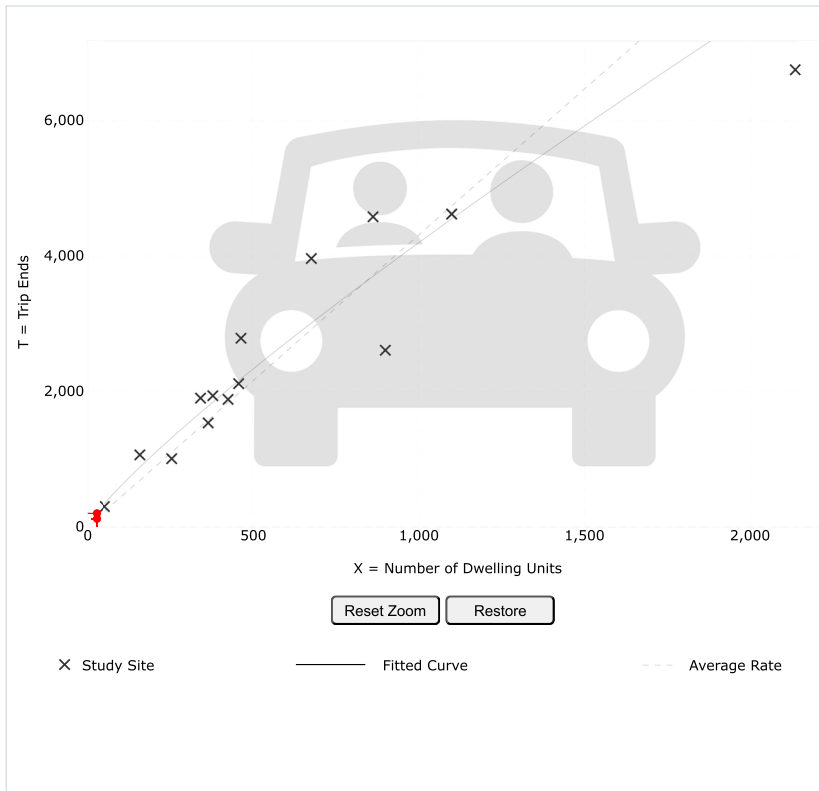
TRIP TYPE:

Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

28 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In. Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

| | |
|-------------------------------------|--|
| Land Use: | Senior Adult Housing - Single-Family (251) Click for Description and Data Plots |
| Independent Variable: | Dwelling Units |
| Time Period: | Weekday |
| Setting/Location: | General Urban/Suburban |
| Trip Type: | Vehicle |
| Number of Studies: | 15 |
| Avg. Num. of Dwelling Units: | 646 |
| Average Rate: | 4.31 |
| Range of Rates: | 2.90 - 6.66 |
| Standard Deviation: | 1.07 |
| Fitted Curve Equation: | $\ln(T) = 0.85 \ln(X) + 2.47$ |
| R²: | 0.94 |
| Directional Distribution: | 50% entering, 50% exiting |
| Calculated Trip Ends: | Average Rate: 121 (Total), 60 (Entry), 61 (Exit) Fitted Curve: 201 (Total), 100 (Entry), 101 (Exit) |

Graph Look Up



ITETripGen Web-based App

Graph Look Up

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Query Filter

DATA SOURCE:

Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:

251

LAND USE GROUP:

(200-299) Residential

LAND USE :

251 - Senior Adult Housing - Single-Family

LAND USE SUBCATEGORY:

All Sites

SETTING/LOCATION:

General Urban/Suburban

INDEPENDENT VARIABLE (IV):

Dwelling Units

TIME PERIOD:

Weekday, Peak Hour of Adjacent Street Traffic

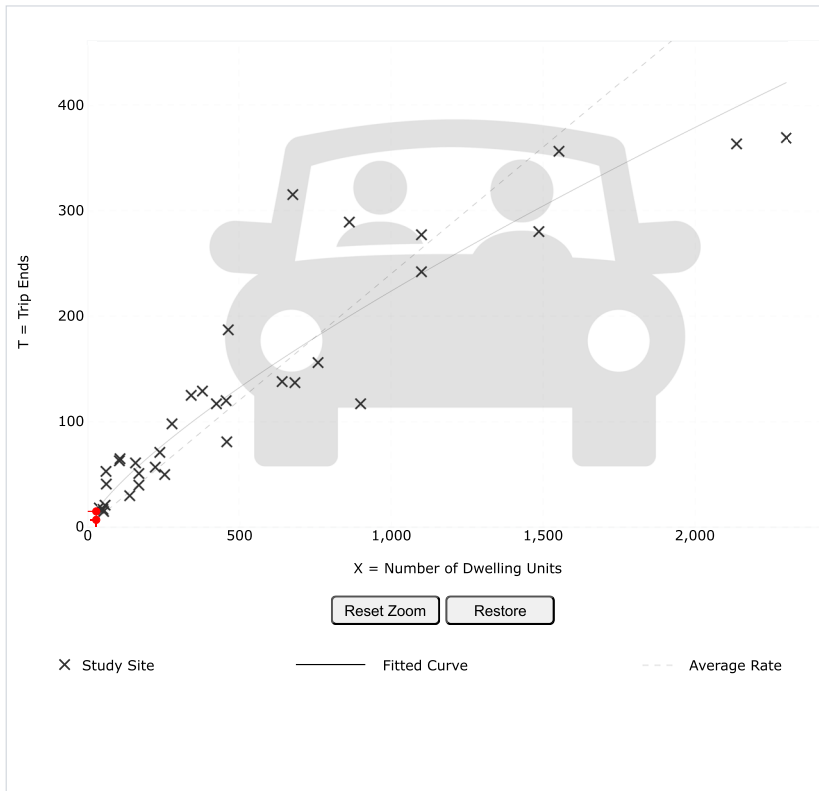
TRIP TYPE:

Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

28 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
 Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

| | |
|-------------------------------------|---|
| Land Use: | Senior Adult Housing - Single-Family (251) Click for Description and Data Plots |
| Independent Variable: | Dwelling Units |
| Time Period: | Weekday Peak Hour of Adjacent Street Traffic One Hour Between 7 and 9 a.m. |
| Setting/Location: | General Urban/Suburban |
| Trip Type: | Vehicle |
| Number of Studies: | 34 |
| Avg. Num. of Dwelling Units: | 557 |
| Average Rate: | 0.24 |
| Range of Rates: | 0.13 - 0.84 |
| Standard Deviation: | 0.10 |
| Fitted Curve Equation: | $\ln(T) = 0.76 \ln(X) + 0.16$ |
| R²: | 0.88 |
| Directional Distribution: | 33% entering, 67% exiting |
| Calculated Trip Ends: | Average Rate: 7 (Total), 2 (Entry), 5 (Exit) Fitted Curve: 15 (Total), 5 (Entry), 10 (Exit) |

Graph Look Up



ITETripGen Web-based App

Graph Look Up

How to Use ITETripGen

TGM Desk Reference

TGM Appendices

Support Documents

Add Users

Comments

Add-ons to do more

Try OTISS Pro

Query Filter

DATA SOURCE:

Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:

251

LAND USE GROUP:

(200-299) Residential

LAND USE :

251 - Senior Adult Housing - Single-Family

LAND USE SUBCATEGORY:

All Sites

SETTING/LOCATION:

General Urban/Suburban

INDEPENDENT VARIABLE (IV):

Dwelling Units

TIME PERIOD:

Weekday, Peak Hour of Adjacent Street Traffic

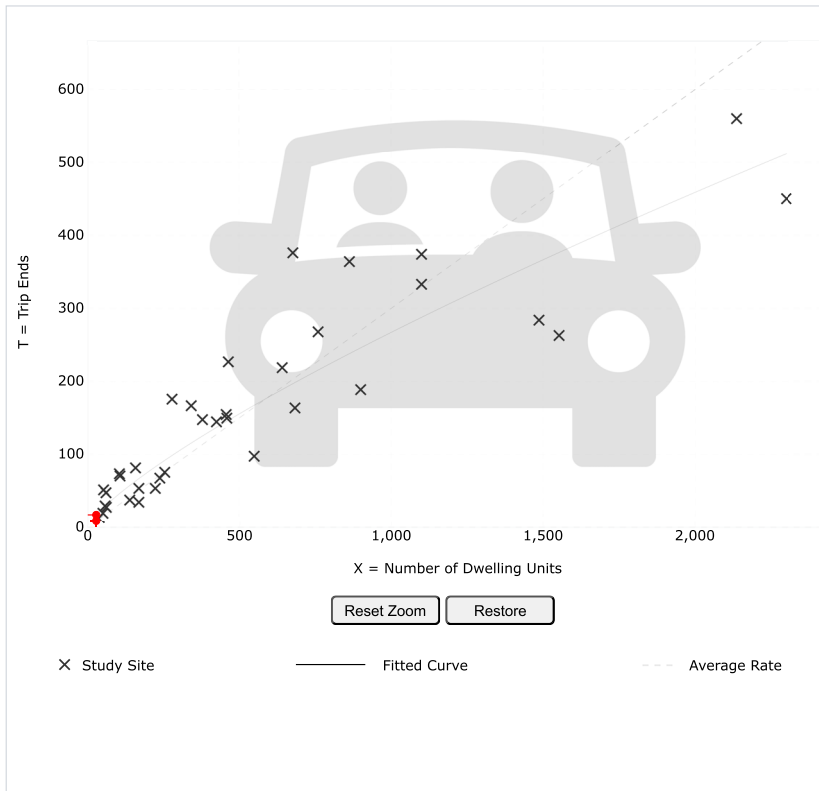
TRIP TYPE:

Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

28 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

| | |
|-------------------------------------|---|
| Land Use: | Senior Adult Housing - Single-Family (251) Click for Description and Data Plots |
| Independent Variable: | Dwelling Units |
| Time Period: | Weekday Peak Hour of Adjacent Street Traffic One Hour Between 4 and 6 p.m. |
| Setting/Location: | General Urban/Suburban |
| Trip Type: | Vehicle |
| Number of Studies: | 35 |
| Avg. Num. of Dwelling Units: | 556 |
| Average Rate: | 0.30 |
| Range of Rates: | 0.17 - 0.95 |
| Standard Deviation: | 0.12 |
| Fitted Curve Equation: | $\ln(T) = 0.78 \ln(X) + 0.20$ |
| R²: | 0.86 |
| Directional Distribution: | 61% entering, 39% exiting |
| Calculated Trip Ends: | Average Rate: 8 (Total), 5 (Entry), 3 (Exit) Fitted Curve: 16 (Total), 10 (Entry), 6 (Exit) |

CAPACITY ANALYSIS WORKSHEETS

2024 Existing Weekday Morning
1: Main Street & Mill Street

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 0.9 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | T | | | T | | |
| Traffic Vol, veh/h | 36 | 5 | 0 | 173 | 805 | 116 |
| Future Vol, veh/h | 36 | 5 | 0 | 173 | 805 | 116 |
| Conflicting Peds, #/hr | 4 | 4 | 4 | 0 | 0 | 4 |
| 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 | 93 | 93 | 82 | 82 | 85 | 85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 5 | 1 | 0 |
| Mvmt Flow | 39 | 5 | 0 | 211 | 947 | 136 |

| Major/Minor | Minor2 | Major1 | Major2 | | | |
|----------------------|--------|--------|--------|---|---|---|
| Conflicting Flow All | 1234 | 1023 | 1087 | 0 | - | 0 |
| Stage 1 | 1019 | - | - | - | - | - |
| Stage 2 | 215 | - | - | - | - | - |
| 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 | 197 | 289 | 649 | - | - | - |
| Stage 1 | 351 | - | - | - | - | - |
| Stage 2 | 826 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 195 | 286 | 646 | - | - | - |
| Mov Cap-2 Maneuver | 195 | - | - | - | - | - |
| Stage 1 | 349 | - | - | - | - | - |
| Stage 2 | 822 | - | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|------|----|----|
| HCM Control Delay, s/v | 27.6 | 0 | 0 |
| HCM LOS | D | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-----|-----|-------|-----|-----|
| Capacity (veh/h) | 646 | - | 203 | - | - |
| HCM Lane V/C Ratio | - | - | 0.217 | - | - |
| HCM Control Delay (s/veh) | 0 | - | 27.6 | - | - |
| HCM Lane LOS | A | - | D | - | - |
| HCM 95th %tile Q (veh) | 0 | - | 0.8 | - | - |

2024 Existing Weekday Morning
2: Main Street & Arlington Street

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 0.9 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | T | | | T | | T |
| Traffic Vol, veh/h | 0 | 26 | 11 | 194 | 798 | 2 |
| Future Vol, veh/h | 0 | 26 | 11 | 194 | 798 | 2 |
| 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 | 50 | 50 | 81 | 81 | 80 | 80 |
| Heavy Vehicles, % | 0 | 8 | 0 | 4 | 2 | 0 |
| Mvmt Flow | 0 | 52 | 14 | 240 | 998 | 3 |

| Major/Minor | Minor2 | Major1 | Major2 | | | |
|----------------------|--------|--------|--------|---|---|---|
| Conflicting Flow All | 1268 | 1000 | 1001 | 0 | - | 0 |
| Stage 1 | 1000 | - | - | - | - | - |
| Stage 2 | 268 | - | - | - | - | - |
| Critical Hdwy | 6.4 | 6.28 | 4.1 | - | - | - |
| Critical Hdwy Stg 1 | 5.4 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - |
| Follow-up Hdwy | 3.5 | 3.372 | 2.2 | - | - | - |
| Pot Cap-1 Maneuver | 188 | 287 | 700 | - | - | - |
| Stage 1 | 359 | - | - | - | - | - |
| Stage 2 | 782 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 184 | 287 | 700 | - | - | - |
| Mov Cap-2 Maneuver | 184 | - | - | - | - | - |
| Stage 1 | 351 | - | - | - | - | - |
| Stage 2 | 782 | - | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|------|-----|----|
| HCM Control Delay, s/v | 20.3 | 0.5 | 0 |
| HCM LOS | C | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h) | 700 | - | 287 | - | - |
| HCM Lane V/C Ratio | 0.019 | - | 0.181 | - | - |
| HCM Control Delay (s/veh) | 10.2 | 0 | 20.3 | - | - |
| HCM Lane LOS | B | A | C | - | - |
| HCM 95th %tile Q (veh) | 0.1 | - | 0.6 | - | - |

2024 Existing Weekday Morning
3: Mill Street & Gratuity Road/Arlington Street

10/01/2024

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 8.3 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | |
| Traffic Vol, veh/h | 3 | 9 | 7 | 17 | 1 | 2 | 3 | 65 | 11 | 3 | 119 | 2 |
| Future Vol, veh/h | 3 | 9 | 7 | 17 | 1 | 2 | 3 | 65 | 11 | 3 | 119 | 2 |
| Peak Hour Factor | 0.59 | 0.59 | 0.59 | 0.39 | 0.39 | 0.39 | 0.90 | 0.90 | 0.90 | 0.74 | 0.74 | 0.74 |
| Heavy Vehicles, % | 33 | 0 | 0 | 12 | 0 | 0 | 33 | 0 | 18 | 0 | 0 | 0 |
| Mvmt Flow | 5 | 15 | 12 | 44 | 3 | 5 | 3 | 72 | 12 | 4 | 161 | 3 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|----------------------------|-----|-----|-----|-----|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay, s/veh | 8.2 | 8.2 | 8.4 | 8.2 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|--------------------------|-------|-------|-------|-------|
| Vol Left, % | 4% | 16% | 85% | 2% |
| Vol Thru, % | 82% | 47% | 5% | 96% |
| Vol Right, % | 14% | 37% | 10% | 2% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 79 | 19 | 20 | 124 |
| LT Vol | 3 | 3 | 17 | 3 |
| Through Vol | 65 | 9 | 1 | 119 |
| RT Vol | 11 | 7 | 2 | 2 |
| Lane Flow Rate | 88 | 32 | 51 | 168 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.116 | 0.044 | 0.069 | 0.196 |
| Departure Headway (Hd) | 4.769 | 4.923 | 4.841 | 4.217 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 755 | 729 | 742 | 856 |
| Service Time | 2.78 | 2.938 | 2.855 | 2.217 |
| HCM Lane V/C Ratio | 0.117 | 0.044 | 0.069 | 0.196 |
| HCM Control Delay, s/veh | 8.4 | 8.2 | 8.2 | 8.2 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.1 | 0.2 | 0.7 |

2024 Existing Weekday Morning
4: Mill Street & Jenkins Road

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 1 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | T | | | T | | T |
| Traffic Vol, veh/h | 13 | 9 | 2 | 63 | 140 | 7 |
| Future Vol, veh/h | 13 | 9 | 2 | 63 | 140 | 7 |
| 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 | 79 | 79 | 86 | 86 | 82 | 82 |
| Heavy Vehicles, % | 15 | 0 | 0 | 2 | 1 | 0 |
| Mvmt Flow | 16 | 11 | 2 | 73 | 171 | 9 |

| Major/Minor | Minor2 | Major1 | | Major2 | |
|----------------------|--------|--------|------|--------|---|
| Conflicting Flow All | 253 | 176 | 180 | 0 | 0 |
| Stage 1 | 176 | - | - | - | - |
| Stage 2 | 77 | - | - | - | - |
| Critical Hdwy | 6.55 | 6.2 | 4.1 | - | - |
| Critical Hdwy Stg 1 | 5.55 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.55 | - | - | - | - |
| Follow-up Hdwy | 3.635 | 3.3 | 2.2 | - | - |
| Pot Cap-1 Maneuver | 708 | 872 | 1408 | - | - |
| Stage 1 | 824 | - | - | - | - |
| Stage 2 | 914 | - | - | - | - |
| Platoon blocked, % | | | | - | - |
| Mov Cap-1 Maneuver | 707 | 872 | 1408 | - | - |
| Mov Cap-2 Maneuver | 707 | - | - | - | - |
| Stage 1 | 823 | - | - | - | - |
| Stage 2 | 914 | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|-----|-----|----|
| HCM Control Delay, s/v | 9.9 | 0.2 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h) | 1408 | - | 766 | - | - |
| HCM Lane V/C Ratio | 0.002 | - | 0.036 | - | - |
| HCM Control Delay (s/veh) | 7.6 | 0 | 9.9 | - | - |
| HCM Lane LOS | A | A | A | - | - |
| HCM 95th %tile Q (veh) | 0 | - | 0.1 | - | - |

2024 Existing Weekday Morning
5: Hickory Drive & Jenkins Road

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 6.9 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 2 | 0 | 8 | 2 | 0 | 22 |
| Future Vol, veh/h | 2 | 0 | 8 | 2 | 0 | 22 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 50 | 50 | 50 | 50 | 69 | 69 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 9 |
| Mvmt Flow | 4 | 0 | 16 | 4 | 0 | 32 |

| Major/Minor | Major1 | Major2 | Minor1 | Minor2 | Minor3 |
|----------------------|--------|--------|--------|--------|--------|
| Conflicting Flow All | 0 | 0 | 4 | 0 | 40 |
| Stage 1 | - | - | - | - | 4 |
| Stage 2 | - | - | - | - | 36 |
| Critical Hdwy | - | - | 4.1 | - | 6.4 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 |
| Pot Cap-1 Maneuver | - | - | 1631 | - | 977 |
| Stage 1 | - | - | - | - | 1024 |
| Stage 2 | - | - | - | - | 992 |
| Platoon blocked, % | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1631 | - | 967 |
| Mov Cap-2 Maneuver | - | - | - | - | 967 |
| Stage 1 | - | - | - | - | 1024 |
| Stage 2 | - | - | - | - | 982 |

| Approach | EB | WB | NB |
|------------------------|----|-----|-----|
| HCM Control Delay, s/v | 0 | 5.8 | 8.5 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---------------------------|-------|-----|-----|------|-----|
| Capacity (veh/h) | 1059 | - | - | 1631 | - |
| HCM Lane V/C Ratio | 0.03 | - | - | 0.01 | - |
| HCM Control Delay (s/veh) | 8.5 | - | - | 7.2 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q (veh) | 0.1 | - | - | 0 | - |

2024 Existing Weekday Evening
1: Main Street & Mill Street

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 7.8 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | T | | | T | | |
| Traffic Vol, veh/h | 127 | 13 | 9 | 778 | 319 | 41 |
| Future Vol, veh/h | 127 | 13 | 9 | 778 | 319 | 41 |
| Conflicting Peds, #/hr | 1 | 1 | 1 | 0 | 0 | 1 |
| 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 | 85 | 85 | 94 | 94 | 91 | 91 |
| Heavy Vehicles, % | 0 | 0 | 0 | 1 | 2 | 0 |
| Mvmt Flow | 149 | 15 | 10 | 828 | 351 | 45 |

| Major/Minor | Minor2 | Major1 | | Major2 | |
|----------------------|--------|--------|------|--------|---|
| Conflicting Flow All | 1224 | 376 | 397 | 0 | 0 |
| Stage 1 | 375 | - | - | - | - |
| Stage 2 | 849 | - | - | - | - |
| 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 | 200 | 675 | 1173 | - | - |
| Stage 1 | 699 | - | - | - | - |
| Stage 2 | 423 | - | - | - | - |
| Platoon blocked, % | | | | - | - |
| Mov Cap-1 Maneuver | 196 | 674 | 1172 | - | - |
| Mov Cap-2 Maneuver | 196 | - | - | - | - |
| Stage 1 | 687 | - | - | - | - |
| Stage 2 | 423 | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|------|-----|----|
| HCM Control Delay, s/v | 65.3 | 0.1 | 0 |
| HCM LOS | F | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h) | 1172 | - | 210 | - | - |
| HCM Lane V/C Ratio | 0.008 | - | 0.784 | - | - |
| HCM Control Delay (s/veh) | 8.1 | 0 | 65.3 | - | - |
| HCM Lane LOS | A | A | F | - | - |
| HCM 95th %tile Q (veh) | 0 | - | 5.5 | - | - |

2024 Existing Weekday Evening
2: Main Street & Arlington Street

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 0.4 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | T | | T | | T | |
| Traffic Vol, veh/h | 2 | 11 | 26 | 797 | 351 | 2 |
| Future Vol, veh/h | 2 | 11 | 26 | 797 | 351 | 2 |
| Conflicting Peds, #/hr | 3 | 3 | 3 | 0 | 0 | 3 |
| 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 | 65 | 65 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 0 | 0 | 0 | 1 | 2 | 0 |
| Mvmt Flow | 3 | 17 | 29 | 886 | 390 | 2 |

| Major/Minor | Minor2 | Major1 | | Major2 | |
|----------------------|--------|--------|------|--------|---|
| Conflicting Flow All | 1341 | 397 | 395 | 0 | 0 |
| Stage 1 | 394 | - | - | - | - |
| Stage 2 | 947 | - | - | - | - |
| 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 | 170 | 657 | 1175 | - | - |
| Stage 1 | 686 | - | - | - | - |
| Stage 2 | 380 | - | - | - | - |
| Platoon blocked, % | | | | - | - |
| Mov Cap-1 Maneuver | 161 | 654 | 1172 | - | - |
| Mov Cap-2 Maneuver | 161 | - | - | - | - |
| Stage 1 | 651 | - | - | - | - |
| Stage 2 | 379 | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|------|-----|----|
| HCM Control Delay, s/v | 13.5 | 0.3 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h) | 1172 | - | 445 | - | - |
| HCM Lane V/C Ratio | 0.025 | - | 0.045 | - | - |
| HCM Control Delay (s/veh) | 8.1 | 0 | 13.5 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q (veh) | 0.1 | - | 0.1 | - | - |

2024 Existing Weekday Evening
3: Mill Street & Gratuity Road/Arlington Street

10/01/2024

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 8.1 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | |
| Traffic Vol, veh/h | 1 | 12 | 5 | 10 | 18 | 3 | 4 | 118 | 15 | 1 | 49 | 4 |
| Future Vol, veh/h | 1 | 12 | 5 | 10 | 18 | 3 | 4 | 118 | 15 | 1 | 49 | 4 |
| Peak Hour Factor | 0.45 | 0.45 | 0.45 | 0.43 | 0.43 | 0.43 | 0.71 | 0.71 | 0.71 | 0.84 | 0.84 | 0.84 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 2 | 27 | 11 | 23 | 42 | 7 | 6 | 166 | 21 | 1 | 58 | 5 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|----------------------------|-----|----|-----|-----|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay, s/veh | 7.6 | 8 | 8.3 | 7.7 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|--------------------------|-------|-------|-------|-------|
| Vol Left, % | 3% | 6% | 32% | 2% |
| Vol Thru, % | 86% | 67% | 58% | 91% |
| Vol Right, % | 11% | 28% | 10% | 7% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 137 | 18 | 31 | 54 |
| LT Vol | 4 | 1 | 10 | 1 |
| Through Vol | 118 | 12 | 18 | 49 |
| RT Vol | 15 | 5 | 3 | 4 |
| Lane Flow Rate | 193 | 40 | 72 | 64 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.219 | 0.049 | 0.09 | 0.077 |
| Departure Headway (Hd) | 4.084 | 4.394 | 4.517 | 4.317 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 864 | 819 | 797 | 833 |
| Service Time | 2.178 | 2.4 | 2.523 | 2.325 |
| HCM Lane V/C Ratio | 0.223 | 0.049 | 0.09 | 0.077 |
| HCM Control Delay, s/veh | 8.3 | 7.6 | 8 | 7.7 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 0.8 | 0.2 | 0.3 | 0.2 |

2024 Existing Weekday Evening
4: Mill Street & Jenkins Road

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 0.9 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | T | | | T | | T |
| Traffic Vol, veh/h | 8 | 4 | 10 | 139 | 54 | 8 |
| Future Vol, veh/h | 8 | 4 | 10 | 139 | 54 | 8 |
| 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 | 75 | 75 | 96 | 96 | 86 | 86 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 11 | 5 | 10 | 145 | 63 | 9 |

| Major/Minor | Minor2 | Major1 | | Major2 | |
|----------------------|--------|--------|------|--------|---|
| Conflicting Flow All | 233 | 68 | 72 | 0 | 0 |
| Stage 1 | 68 | - | - | - | - |
| Stage 2 | 165 | - | - | - | - |
| 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 | 760 | 1001 | 1541 | - | - |
| Stage 1 | 960 | - | - | - | - |
| Stage 2 | 869 | - | - | - | - |
| Platoon blocked, % | | | | - | - |
| Mov Cap-1 Maneuver | 755 | 1001 | 1541 | - | - |
| Mov Cap-2 Maneuver | 755 | - | - | - | - |
| Stage 1 | 953 | - | - | - | - |
| Stage 2 | 869 | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|-----|-----|----|
| HCM Control Delay, s/v | 9.5 | 0.5 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h) | 1541 | - | 822 | - | - |
| HCM Lane V/C Ratio | 0.007 | - | 0.019 | - | - |
| HCM Control Delay (s/veh) | 7.4 | 0 | 9.5 | - | - |
| HCM Lane LOS | A | A | A | - | - |
| HCM 95th %tile Q (veh) | 0 | - | 0.1 | - | - |

2024 Existing Weekday Evening
5: Hickory Drive & Jenkins Road

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 5.5 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 3 | 0 | 11 | 1 | 1 | 5 |
| Future Vol, veh/h | 3 | 0 | 11 | 1 | 1 | 5 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 38 | 38 | 60 | 60 | 75 | 75 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 8 | 0 | 18 | 2 | 1 | 7 |

| Major/Minor | Major1 | Major2 | Minor1 | Minor2 | Minor3 |
|----------------------|--------|--------|--------|--------|--------|
| Conflicting Flow All | 0 | 0 | 8 | 0 | 46 |
| Stage 1 | - | - | - | - | 8 |
| Stage 2 | - | - | - | - | 38 |
| Critical Hdwy | - | - | 4.1 | - | 6.4 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 |
| Pot Cap-1 Maneuver | - | - | 1625 | - | 969 |
| Stage 1 | - | - | - | - | 1020 |
| Stage 2 | - | - | - | - | 990 |
| Platoon blocked, % | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1625 | - | 958 |
| Mov Cap-2 Maneuver | - | - | - | - | 958 |
| Stage 1 | - | - | - | - | 1020 |
| Stage 2 | - | - | - | - | 979 |

| Approach | EB | WB | NB |
|------------------------|----|-----|-----|
| HCM Control Delay, s/v | 0 | 6.6 | 8.4 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---------------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 1058 | - | - | 1625 | - |
| HCM Lane V/C Ratio | 0.008 | - | - | 0.011 | - |
| HCM Control Delay (s/veh) | 8.4 | - | - | 7.2 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q (veh) | 0 | - | - | 0 | - |

2031 No-Build Weekday Morning
1: Main Street & Mill Street

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 1.2 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 41 | 5 | 0 | 200 | 912 | 130 |
| Future Vol, veh/h | 41 | 5 | 0 | 200 | 912 | 130 |
| Conflicting Peds, #/hr | 4 | 4 | 4 | 0 | 0 | 4 |
| 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 | 93 | 93 | 82 | 82 | 85 | 85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 5 | 1 | 0 |
| Mvmt Flow | 44 | 5 | 0 | 244 | 1073 | 153 |

| Major/Minor | Minor2 | Major1 | Major2 | | | |
|----------------------|--------|--------|--------|---|---|---|
| Conflicting Flow All | 1402 | 1158 | 1230 | 0 | - | 0 |
| Stage 1 | 1154 | - | - | - | - | - |
| Stage 2 | 248 | - | - | - | - | - |
| 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 | 156 | 241 | 574 | - | - | - |
| Stage 1 | 303 | - | - | - | - | - |
| Stage 2 | 798 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 154 | 239 | 571 | - | - | - |
| Mov Cap-2 Maneuver | 154 | - | - | - | - | - |
| Stage 1 | 301 | - | - | - | - | - |
| Stage 2 | 794 | - | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|------|----|----|
| HCM Control Delay, s/v | 37.3 | 0 | 0 |
| HCM LOS | E | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-----|-----|-------|-----|-----|
| Capacity (veh/h) | 571 | - | 160 | - | - |
| HCM Lane V/C Ratio | - | - | 0.309 | - | - |
| HCM Control Delay (s/veh) | 0 | - | 37.3 | - | - |
| HCM Lane LOS | A | - | E | - | - |
| HCM 95th %tile Q (veh) | 0 | - | 1.2 | - | - |

2031 No-Build Weekday Morning
2: Main Street & Arlington Street

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 1 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | T | | | T | | T |
| Traffic Vol, veh/h | 0 | 28 | 12 | 223 | 905 | 2 |
| Future Vol, veh/h | 0 | 28 | 12 | 223 | 905 | 2 |
| 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 | 50 | 50 | 81 | 81 | 80 | 80 |
| Heavy Vehicles, % | 0 | 8 | 0 | 4 | 2 | 0 |
| Mvmt Flow | 0 | 56 | 15 | 275 | 1131 | 3 |

| Major/Minor | Minor2 | Major1 | Major2 | | | |
|----------------------|--------|--------|--------|---|---|---|
| Conflicting Flow All | 1438 | 1133 | 1134 | 0 | - | 0 |
| Stage 1 | 1133 | - | - | - | - | - |
| Stage 2 | 305 | - | - | - | - | - |
| Critical Hdwy | 6.4 | 6.28 | 4.1 | - | - | - |
| Critical Hdwy Stg 1 | 5.4 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - |
| Follow-up Hdwy | 3.5 | 3.372 | 2.2 | - | - | - |
| Pot Cap-1 Maneuver | 148 | 240 | 623 | - | - | - |
| Stage 1 | 310 | - | - | - | - | - |
| Stage 2 | 752 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 144 | 240 | 623 | - | - | - |
| Mov Cap-2 Maneuver | 144 | - | - | - | - | - |
| Stage 1 | 301 | - | - | - | - | - |
| Stage 2 | 752 | - | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|------|-----|----|
| HCM Control Delay, s/v | 24.5 | 0.6 | 0 |
| HCM LOS | C | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h) | 623 | - | 240 | - | - |
| HCM Lane V/C Ratio | 0.024 | - | 0.233 | - | - |
| HCM Control Delay (s/veh) | 10.9 | 0 | 24.5 | - | - |
| HCM Lane LOS | B | A | C | - | - |
| HCM 95th %tile Q (veh) | 0.1 | - | 0.9 | - | - |

2031 No-Build Weekday Morning
 3: Mill Street & Gratuity Road/Arlington Street

10/01/2024

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 8.5 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | |
| Traffic Vol, veh/h | 3 | 10 | 8 | 18 | 1 | 2 | 3 | 72 | 12 | 3 | 134 | 2 |
| Future Vol, veh/h | 3 | 10 | 8 | 18 | 1 | 2 | 3 | 72 | 12 | 3 | 134 | 2 |
| Peak Hour Factor | 0.59 | 0.59 | 0.59 | 0.39 | 0.39 | 0.39 | 0.90 | 0.90 | 0.90 | 0.74 | 0.74 | 0.74 |
| Heavy Vehicles, % | 33 | 0 | 0 | 12 | 0 | 0 | 33 | 0 | 18 | 0 | 0 | 0 |
| Mvmt Flow | 5 | 17 | 14 | 46 | 3 | 5 | 3 | 80 | 13 | 4 | 181 | 3 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|----------------------------|-----|-----|-----|-----|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay, s/veh | 8.3 | 8.3 | 8.5 | 8.5 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|--------------------------|-------|-------|-------|-------|
| Vol Left, % | 3% | 14% | 86% | 2% |
| Vol Thru, % | 83% | 48% | 5% | 96% |
| Vol Right, % | 14% | 38% | 10% | 1% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 87 | 21 | 21 | 139 |
| LT Vol | 3 | 3 | 18 | 3 |
| Through Vol | 72 | 10 | 1 | 134 |
| RT Vol | 12 | 8 | 2 | 2 |
| Lane Flow Rate | 97 | 36 | 54 | 188 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.129 | 0.049 | 0.074 | 0.221 |
| Departure Headway (Hd) | 4.807 | 4.985 | 4.917 | 4.236 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 748 | 720 | 730 | 851 |
| Service Time | 2.822 | 3.005 | 2.936 | 2.249 |
| HCM Lane V/C Ratio | 0.13 | 0.05 | 0.074 | 0.221 |
| HCM Control Delay, s/veh | 8.5 | 8.3 | 8.3 | 8.5 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.2 | 0.2 | 0.8 |

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 1 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 14 | 10 | 2 | 70 | 156 | 8 |
| Future Vol, veh/h | 14 | 10 | 2 | 70 | 156 | 8 |
| 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 | 79 | 79 | 86 | 86 | 82 | 82 |
| Heavy Vehicles, % | 15 | 0 | 0 | 2 | 1 | 0 |
| Mvmt Flow | 18 | 13 | 2 | 81 | 190 | 10 |

| Major/Minor | Minor2 | Major1 | | Major2 | |
|----------------------|--------|--------|------|--------|---|
| Conflicting Flow All | 280 | 195 | 200 | 0 | 0 |
| Stage 1 | 195 | - | - | - | - |
| Stage 2 | 85 | - | - | - | - |
| Critical Hdwy | 6.55 | 6.2 | 4.1 | - | - |
| Critical Hdwy Stg 1 | 5.55 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.55 | - | - | - | - |
| Follow-up Hdwy | 3.635 | 3.3 | 2.2 | - | - |
| Pot Cap-1 Maneuver | 683 | 851 | 1384 | - | - |
| Stage 1 | 808 | - | - | - | - |
| Stage 2 | 907 | - | - | - | - |
| Platoon blocked, % | | | | - | - |
| Mov Cap-1 Maneuver | 682 | 851 | 1384 | - | - |
| Mov Cap-2 Maneuver | 682 | - | - | - | - |
| Stage 1 | 806 | - | - | - | - |
| Stage 2 | 907 | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|----|-----|----|
| HCM Control Delay, s/v | 10 | 0.2 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h) | 1384 | - | 744 | - | - |
| HCM Lane V/C Ratio | 0.002 | - | 0.041 | - | - |
| HCM Control Delay (s/veh) | 7.6 | 0 | 10 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q (veh) | 0 | - | 0.1 | - | - |

2031 No-Build Weekday Morning
5: Hickory Drive & Jenkins Road

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 7 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 2 | 0 | 9 | 2 | 0 | 24 |
| Future Vol, veh/h | 2 | 0 | 9 | 2 | 0 | 24 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 50 | 50 | 50 | 50 | 69 | 69 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 9 |
| Mvmt Flow | 4 | 0 | 18 | 4 | 0 | 35 |

| Major/Minor | Major1 | Major2 | Minor1 | | |
|----------------------|--------|--------|--------|---|-----------|
| Conflicting Flow All | 0 | 0 | 4 | 0 | 44 4 |
| Stage 1 | - | - | - | - | 4 - |
| Stage 2 | - | - | - | - | 40 - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 6.29 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 3.381 |
| Pot Cap-1 Maneuver | - | - | 1631 | - | 972 1059 |
| Stage 1 | - | - | - | - | 1024 - |
| Stage 2 | - | - | - | - | 988 - |
| Platoon blocked, % | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1631 | - | 961 1059 |
| Mov Cap-2 Maneuver | - | - | - | - | 961 - |
| Stage 1 | - | - | - | - | 1024 - |
| Stage 2 | - | - | - | - | 977 - |

| Approach | EB | WB | NB |
|------------------------|----|-----|-----|
| HCM Control Delay, s/v | 0 | 5.9 | 8.5 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---------------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 1059 | - | - | 1631 | - |
| HCM Lane V/C Ratio | 0.033 | - | - | 0.011 | - |
| HCM Control Delay (s/veh) | 8.5 | - | - | 7.2 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q (veh) | 0.1 | - | - | 0 | - |

2031 No-Build Weekday Evening
1: Main Street & Mill Street

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 17.9 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 141 | 14 | 10 | 877 | 369 | 48 |
| Future Vol, veh/h | 141 | 14 | 10 | 877 | 369 | 48 |
| Conflicting Peds, #/hr | 1 | 1 | 1 | 0 | 0 | 1 |
| 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 | 85 | 85 | 94 | 94 | 91 | 91 |
| Heavy Vehicles, % | 0 | 0 | 0 | 1 | 2 | 0 |
| Mvmt Flow | 166 | 16 | 11 | 933 | 405 | 53 |

| Major/Minor | Minor2 | Major1 | | Major2 | |
|----------------------|--------|--------|------|--------|---|
| Conflicting Flow All | 1389 | 434 | 459 | 0 | 0 |
| Stage 1 | 433 | - | - | - | - |
| Stage 2 | 956 | - | - | - | - |
| 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 | ~ 159 | 626 | 1113 | - | - |
| Stage 1 | 658 | - | - | - | - |
| Stage 2 | 376 | - | - | - | - |
| Platoon blocked, % | | | | - | - |
| Mov Cap-1 Maneuver | ~ 155 | 625 | 1112 | - | - |
| Mov Cap-2 Maneuver | ~ 155 | - | - | - | - |
| Stage 1 | 644 | - | - | - | - |
| Stage 2 | 376 | - | - | - | - |

| Approach | EB | NB | SB |
|-----------------------------|----|-----|----|
| HCM Control Delay, s/v154.7 | | 0.1 | 0 |
| HCM LOS | F | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|------|-----|-------|-----|-----|
| Capacity (veh/h) | 1112 | - | 166 | - | - |
| HCM Lane V/C Ratio | 0.01 | - | 1.099 | - | - |
| HCM Control Delay (s/veh) | 8.3 | 0 | 154.7 | - | - |
| HCM Lane LOS | A | A | F | - | - |
| HCM 95th %tile Q (veh) | 0 | - | 9.4 | - | - |

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

2031 No-Build Weekday Evening
2: Main Street & Arlington Street

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 0.4 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | T | | T | | T | |
| Traffic Vol, veh/h | 2 | 12 | 28 | 897 | 403 | 2 |
| Future Vol, veh/h | 2 | 12 | 28 | 897 | 403 | 2 |
| Conflicting Peds, #/hr | 3 | 3 | 3 | 0 | 0 | 3 |
| 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 | 65 | 65 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 0 | 0 | 0 | 1 | 2 | 0 |
| Mvmt Flow | 3 | 18 | 31 | 997 | 448 | 2 |

| Major/Minor | Minor2 | Major1 | | Major2 | |
|----------------------|--------|--------|------|--------|---|
| Conflicting Flow All | 1514 | 455 | 453 | 0 | 0 |
| Stage 1 | 452 | - | - | - | - |
| Stage 2 | 1062 | - | - | - | - |
| 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 | 133 | 609 | 1118 | - | - |
| Stage 1 | 645 | - | - | - | - |
| Stage 2 | 335 | - | - | - | - |
| Platoon blocked, % | | | | - | - |
| Mov Cap-1 Maneuver | 124 | 606 | 1115 | - | - |
| Mov Cap-2 Maneuver | 124 | - | - | - | - |
| Stage 1 | 604 | - | - | - | - |
| Stage 2 | 334 | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|------|-----|----|
| HCM Control Delay, s/v | 14.8 | 0.3 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h) | 1115 | - | 390 | - | - |
| HCM Lane V/C Ratio | 0.028 | - | 0.055 | - | - |
| HCM Control Delay (s/veh) | 8.3 | 0 | 14.8 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q (veh) | 0.1 | - | 0.2 | - | - |

2031 No-Build Weekday Evening
 3: Mill Street & Gratuity Road/Arlington Street

10/01/2024

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 8.3 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | |
| Traffic Vol, veh/h | 1 | 13 | 5 | 11 | 19 | 3 | 4 | 132 | 16 | 1 | 57 | 4 |
| Future Vol, veh/h | 1 | 13 | 5 | 11 | 19 | 3 | 4 | 132 | 16 | 1 | 57 | 4 |
| Peak Hour Factor | 0.45 | 0.45 | 0.45 | 0.43 | 0.43 | 0.43 | 0.71 | 0.71 | 0.71 | 0.84 | 0.84 | 0.84 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 2 | 29 | 11 | 26 | 44 | 7 | 6 | 186 | 23 | 1 | 68 | 5 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|----------------------------|-----|-----|-----|-----|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay, s/veh | 7.8 | 8.1 | 8.6 | 7.8 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|--------------------------|-------|-------|-------|-------|
| Vol Left, % | 3% | 5% | 33% | 2% |
| Vol Thru, % | 87% | 68% | 58% | 92% |
| Vol Right, % | 11% | 26% | 9% | 6% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 152 | 19 | 33 | 62 |
| LT Vol | 4 | 1 | 11 | 1 |
| Through Vol | 132 | 13 | 19 | 57 |
| RT Vol | 16 | 5 | 3 | 4 |
| Lane Flow Rate | 214 | 42 | 77 | 74 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.251 | 0.053 | 0.098 | 0.09 |
| Departure Headway (Hd) | 4.216 | 4.48 | 4.597 | 4.367 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 856 | 800 | 780 | 822 |
| Service Time | 2.216 | 2.503 | 2.618 | 2.383 |
| HCM Lane V/C Ratio | 0.25 | 0.053 | 0.099 | 0.09 |
| HCM Control Delay, s/veh | 8.6 | 7.8 | 8.1 | 7.8 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 1 | 0.2 | 0.3 | 0.3 |

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 0.9 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | T | | | T | | T |
| Traffic Vol, veh/h | 9 | 4 | 11 | 154 | 62 | 9 |
| Future Vol, veh/h | 9 | 4 | 11 | 154 | 62 | 9 |
| 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 | 75 | 75 | 96 | 96 | 86 | 86 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 12 | 5 | 11 | 160 | 72 | 10 |

| Major/Minor | Minor2 | Major1 | | Major2 | |
|----------------------|--------|--------|------|--------|---|
| Conflicting Flow All | 259 | 77 | 82 | 0 | 0 |
| Stage 1 | 77 | - | - | - | - |
| Stage 2 | 182 | - | - | - | - |
| 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 | 734 | 990 | 1528 | - | - |
| Stage 1 | 951 | - | - | - | - |
| Stage 2 | 854 | - | - | - | - |
| Platoon blocked, % | | | | - | - |
| Mov Cap-1 Maneuver | 728 | 990 | 1528 | - | - |
| Mov Cap-2 Maneuver | 728 | - | - | - | - |
| Stage 1 | 943 | - | - | - | - |
| Stage 2 | 854 | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|-----|-----|----|
| HCM Control Delay, s/v | 9.6 | 0.5 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h) | 1528 | - | 793 | - | - |
| HCM Lane V/C Ratio | 0.007 | - | 0.022 | - | - |
| HCM Control Delay (s/veh) | 7.4 | 0 | 9.6 | - | - |
| HCM Lane LOS | A | A | A | - | - |
| HCM 95th %tile Q (veh) | 0 | - | 0.1 | - | - |

2031 No-Build Weekday Evening
5: Hickory Drive & Jenkins Road

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 5.7 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 3 | 0 | 12 | 1 | 1 | 5 |
| Future Vol, veh/h | 3 | 0 | 12 | 1 | 1 | 5 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 38 | 38 | 60 | 60 | 75 | 75 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 8 | 0 | 20 | 2 | 1 | 7 |

| Major/Minor | Major1 | Major2 | Minor1 | Minor2 | Minor3 |
|----------------------|--------|--------|--------|--------|--------|
| Conflicting Flow All | 0 | 0 | 8 | 0 | 50 |
| Stage 1 | - | - | - | - | 8 |
| Stage 2 | - | - | - | - | 42 |
| Critical Hdwy | - | - | 4.1 | - | 6.4 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 |
| Pot Cap-1 Maneuver | - | - | 1625 | - | 964 |
| Stage 1 | - | - | - | - | 1020 |
| Stage 2 | - | - | - | - | 986 |
| Platoon blocked, % | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1625 | - | 952 |
| Mov Cap-2 Maneuver | - | - | - | - | 952 |
| Stage 1 | - | - | - | - | 1020 |
| Stage 2 | - | - | - | - | 974 |

| Approach | EB | WB | NB |
|------------------------|----|-----|-----|
| HCM Control Delay, s/v | 0 | 6.7 | 8.4 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---------------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 1056 | - | - | 1625 | - |
| HCM Lane V/C Ratio | 0.008 | - | - | 0.012 | - |
| HCM Control Delay (s/veh) | 8.4 | - | - | 7.2 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q (veh) | 0 | - | - | 0 | - |

2031 Build Weekday Morning
1: Main Street & Mill Street

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 1.2 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | T | | | T | | T |
| Traffic Vol, veh/h | 42 | 5 | 0 | 200 | 912 | 130 |
| Future Vol, veh/h | 42 | 5 | 0 | 200 | 912 | 130 |
| Conflicting Peds, #/hr | 4 | 4 | 4 | 0 | 0 | 4 |
| 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 | 93 | 93 | 82 | 82 | 85 | 85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 5 | 1 | 0 |
| Mvmt Flow | 45 | 5 | 0 | 244 | 1073 | 153 |

| Major/Minor | Minor2 | Major1 | Major2 | | | |
|----------------------|--------|--------|--------|---|---|---|
| Conflicting Flow All | 1402 | 1158 | 1230 | 0 | - | 0 |
| Stage 1 | 1154 | - | - | - | - | - |
| Stage 2 | 248 | - | - | - | - | - |
| 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 | 156 | 241 | 574 | - | - | - |
| Stage 1 | 303 | - | - | - | - | - |
| Stage 2 | 798 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 154 | 239 | 571 | - | - | - |
| Mov Cap-2 Maneuver | 154 | - | - | - | - | - |
| Stage 1 | 301 | - | - | - | - | - |
| Stage 2 | 794 | - | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|------|----|----|
| HCM Control Delay, s/v | 37.6 | 0 | 0 |
| HCM LOS | E | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-----|-----|-------|-----|-----|
| Capacity (veh/h) | 571 | - | 160 | - | - |
| HCM Lane V/C Ratio | - | - | 0.316 | - | - |
| HCM Control Delay (s/veh) | 0 | - | 37.6 | - | - |
| HCM Lane LOS | A | - | E | - | - |
| HCM 95th %tile Q (veh) | 0 | - | 1.3 | - | - |

2031 Build Weekday Morning
2: Main Street & Arlington Street

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 1.2 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | T | | | T | | T |
| Traffic Vol, veh/h | 0 | 32 | 13 | 223 | 905 | 2 |
| Future Vol, veh/h | 0 | 32 | 13 | 223 | 905 | 2 |
| 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 | 50 | 50 | 81 | 81 | 80 | 80 |
| Heavy Vehicles, % | 0 | 8 | 0 | 4 | 2 | 0 |
| Mvmt Flow | 0 | 64 | 16 | 275 | 1131 | 3 |

| Major/Minor | Minor2 | Major1 | Major2 | | | |
|----------------------|--------|--------|--------|---|---|---|
| Conflicting Flow All | 1440 | 1133 | 1134 | 0 | - | 0 |
| Stage 1 | 1133 | - | - | - | - | - |
| Stage 2 | 307 | - | - | - | - | - |
| Critical Hdwy | 6.4 | 6.28 | 4.1 | - | - | - |
| Critical Hdwy Stg 1 | 5.4 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - |
| Follow-up Hdwy | 3.5 | 3.372 | 2.2 | - | - | - |
| Pot Cap-1 Maneuver | 148 | 240 | 623 | - | - | - |
| Stage 1 | 310 | - | - | - | - | - |
| Stage 2 | 751 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 144 | 240 | 623 | - | - | - |
| Mov Cap-2 Maneuver | 144 | - | - | - | - | - |
| Stage 1 | 301 | - | - | - | - | - |
| Stage 2 | 751 | - | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|------|-----|----|
| HCM Control Delay, s/v | 25.4 | 0.6 | 0 |
| HCM LOS | D | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h) | 623 | - | 240 | - | - |
| HCM Lane V/C Ratio | 0.026 | - | 0.267 | - | - |
| HCM Control Delay (s/veh) | 10.9 | 0 | 25.4 | - | - |
| HCM Lane LOS | B | A | D | - | - |
| HCM 95th %tile Q (veh) | 0.1 | - | 1 | - | - |

2031 Build Weekday Morning
 3: Mill Street & Gratuity Road/Arlington Street

10/01/2024

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 8.5 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | |
| Traffic Vol, veh/h | 4 | 11 | 9 | 18 | 2 | 2 | 3 | 72 | 15 | 3 | 134 | 2 |
| Future Vol, veh/h | 4 | 11 | 9 | 18 | 2 | 2 | 3 | 72 | 15 | 3 | 134 | 2 |
| Peak Hour Factor | 0.59 | 0.59 | 0.59 | 0.39 | 0.39 | 0.39 | 0.90 | 0.90 | 0.90 | 0.74 | 0.74 | 0.74 |
| Heavy Vehicles, % | 33 | 0 | 0 | 12 | 0 | 0 | 33 | 0 | 18 | 0 | 0 | 0 |
| Mvmt Flow | 7 | 19 | 15 | 46 | 5 | 5 | 3 | 80 | 17 | 4 | 181 | 3 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|----------------------------|-----|-----|-----|-----|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay, s/veh | 8.3 | 8.4 | 8.6 | 8.5 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|--------------------------|-------|-------|-------|-------|
| Vol Left, % | 3% | 17% | 82% | 2% |
| Vol Thru, % | 80% | 46% | 9% | 96% |
| Vol Right, % | 17% | 38% | 9% | 1% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 90 | 24 | 22 | 139 |
| LT Vol | 3 | 4 | 18 | 3 |
| Through Vol | 72 | 11 | 2 | 134 |
| RT Vol | 15 | 9 | 2 | 2 |
| Lane Flow Rate | 100 | 41 | 56 | 188 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.134 | 0.057 | 0.077 | 0.222 |
| Departure Headway (Hd) | 4.81 | 5.005 | 4.928 | 4.26 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 747 | 717 | 728 | 845 |
| Service Time | 2.828 | 3.027 | 2.95 | 2.275 |
| HCM Lane V/C Ratio | 0.134 | 0.057 | 0.077 | 0.222 |
| HCM Control Delay, s/veh | 8.6 | 8.3 | 8.4 | 8.5 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.2 | 0.2 | 0.8 |

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 1.2 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 17 | 11 | 3 | 70 | 157 | 8 |
| Future Vol, veh/h | 17 | 11 | 3 | 70 | 157 | 8 |
| 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 | 79 | 79 | 86 | 86 | 82 | 82 |
| Heavy Vehicles, % | 15 | 0 | 0 | 2 | 1 | 0 |
| Mvmt Flow | 22 | 14 | 3 | 81 | 191 | 10 |

| Major/Minor | Minor2 | Major1 | | Major2 | |
|----------------------|--------|--------|------|--------|---|
| Conflicting Flow All | 283 | 196 | 201 | 0 | 0 |
| Stage 1 | 196 | - | - | - | - |
| Stage 2 | 87 | - | - | - | - |
| Critical Hdwy | 6.55 | 6.2 | 4.1 | - | - |
| Critical Hdwy Stg 1 | 5.55 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.55 | - | - | - | - |
| Follow-up Hdwy | 3.635 | 3.3 | 2.2 | - | - |
| Pot Cap-1 Maneuver | 680 | 850 | 1383 | - | - |
| Stage 1 | 807 | - | - | - | - |
| Stage 2 | 905 | - | - | - | - |
| Platoon blocked, % | | | | - | - |
| Mov Cap-1 Maneuver | 679 | 850 | 1383 | - | - |
| Mov Cap-2 Maneuver | 679 | - | - | - | - |
| Stage 1 | 805 | - | - | - | - |
| Stage 2 | 905 | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|------|-----|----|
| HCM Control Delay, s/v | 10.1 | 0.3 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h) | 1383 | - | 737 | - | - |
| HCM Lane V/C Ratio | 0.003 | - | 0.048 | - | - |
| HCM Control Delay (s/veh) | 7.6 | 0 | 10.1 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q (veh) | 0 | - | 0.2 | - | - |

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 7 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 2 | 0 | 9 | 2 | 0 | 24 |
| Future Vol, veh/h | 2 | 0 | 9 | 2 | 0 | 24 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 50 | 50 | 50 | 50 | 69 | 69 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 9 |
| Mvmt Flow | 4 | 0 | 18 | 4 | 0 | 35 |

| Major/Minor | Major1 | Major2 | Minor1 | | |
|----------------------|--------|--------|--------|---|------|
| Conflicting Flow All | 0 | 0 | 4 | 0 | 44 |
| Stage 1 | - | - | - | - | 4 |
| Stage 2 | - | - | - | - | 40 |
| Critical Hdwy | - | - | 4.1 | - | 6.4 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 |
| Pot Cap-1 Maneuver | - | - | 1631 | - | 972 |
| Stage 1 | - | - | - | - | 1024 |
| Stage 2 | - | - | - | - | 988 |
| Platoon blocked, % | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1631 | - | 961 |
| Mov Cap-2 Maneuver | - | - | - | - | 961 |
| Stage 1 | - | - | - | - | 1024 |
| Stage 2 | - | - | - | - | 977 |

| Approach | EB | WB | NB |
|------------------------|----|-----|-----|
| HCM Control Delay, s/v | 0 | 5.9 | 8.5 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---------------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 1059 | - | - | 1631 | - |
| HCM Lane V/C Ratio | 0.033 | - | - | 0.011 | - |
| HCM Control Delay (s/veh) | 8.5 | - | - | 7.2 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q (veh) | 0.1 | - | - | 0 | - |

2031 Build Weekday Morning
 6: Project Site Driveway & Gratuity Road

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 1 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↑ | | | ↑ | ↑ | |
| Traffic Vol, veh/h | 21 | 0 | 1 | 6 | 0 | 3 |
| Future Vol, veh/h | 21 | 0 | 1 | 6 | 0 | 3 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| 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, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 23 | 0 | 1 | 7 | 0 | 3 |

| Major/Minor | Major1 | Major2 | Minor1 | Minor2 | Minor3 |
|----------------------|--------|--------|--------|--------|--------|
| Conflicting Flow All | 0 | 0 | 23 | 0 | 32 |
| Stage 1 | - | - | - | - | 23 |
| Stage 2 | - | - | - | - | 9 |
| Critical Hdwy | - | - | 4.12 | - | 6.42 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 |
| Pot Cap-1 Maneuver | - | - | 1592 | - | 982 |
| Stage 1 | - | - | - | - | 1000 |
| Stage 2 | - | - | - | - | 1014 |
| Platoon blocked, % | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1592 | - | 981 |
| Mov Cap-2 Maneuver | - | - | - | - | 981 |
| Stage 1 | - | - | - | - | 1000 |
| Stage 2 | - | - | - | - | 1013 |

| Approach | EB | WB | NB |
|------------------------|----|----|-----|
| HCM Control Delay, s/v | 0 | 1 | 8.4 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---------------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 1054 | - | - | 1592 | - |
| HCM Lane V/C Ratio | 0.003 | - | - | 0.001 | - |
| HCM Control Delay (s/veh) | 8.4 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q (veh) | 0 | - | - | 0 | - |

2031 Build Weekday Morning
7: Jenkins Road & Project Site Driveway

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 0.9 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↶ | ↷ | | ↶ | |
| Traffic Vol, veh/h | 0 | 24 | 10 | 1 | 4 | 0 |
| Future Vol, veh/h | 0 | 24 | 10 | 1 | 4 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| 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, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 26 | 11 | 1 | 4 | 0 |

| Major/Minor | Major1 | Major2 | Minor2 | | |
|----------------------|--------|--------|--------|---|-------|
| Conflicting Flow All | 12 | 0 | - | 0 | 38 |
| Stage 1 | - | - | - | - | 12 |
| Stage 2 | - | - | - | - | 26 |
| Critical Hdwy | 4.12 | - | - | - | 6.42 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 |
| Pot Cap-1 Maneuver | 1607 | - | - | - | 974 |
| Stage 1 | - | - | - | - | 1011 |
| Stage 2 | - | - | - | - | 997 |
| Platoon blocked, % | | - | - | - | |
| Mov Cap-1 Maneuver | 1607 | - | - | - | 974 |
| Mov Cap-2 Maneuver | - | - | - | - | 974 |
| Stage 1 | - | - | - | - | 1011 |
| Stage 2 | - | - | - | - | 997 |

| Approach | EB | WB | SB |
|------------------------|----|----|-----|
| HCM Control Delay, s/v | 0 | 0 | 8.7 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---------------------------|------|-----|-----|-----|-------|
| Capacity (veh/h) | 1607 | - | - | - | 974 |
| HCM Lane V/C Ratio | - | - | - | - | 0.004 |
| HCM Control Delay (s/veh) | 0 | - | - | - | 8.7 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q (veh) | 0 | - | - | - | 0 |

2031 Build Weekday Evening
1: Main Street & Mill Street

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 17.9 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | T | | T | | T | |
| Traffic Vol, veh/h | 141 | 14 | 10 | 877 | 369 | 49 |
| Future Vol, veh/h | 141 | 14 | 10 | 877 | 369 | 49 |
| Conflicting Peds, #/hr | 1 | 1 | 1 | 0 | 0 | 1 |
| 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 | 85 | 85 | 94 | 94 | 91 | 91 |
| Heavy Vehicles, % | 0 | 0 | 0 | 1 | 2 | 0 |
| Mvmt Flow | 166 | 16 | 11 | 933 | 405 | 54 |

| Major/Minor | Minor2 | Major1 | | Major2 | |
|----------------------|--------|--------|------|--------|---|
| Conflicting Flow All | 1389 | 434 | 460 | 0 | 0 |
| Stage 1 | 433 | - | - | - | - |
| Stage 2 | 956 | - | - | - | - |
| 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 | ~ 159 | 626 | 1112 | - | - |
| Stage 1 | 658 | - | - | - | - |
| Stage 2 | 376 | - | - | - | - |
| Platoon blocked, % | | | | - | - |
| Mov Cap-1 Maneuver | ~ 155 | 625 | 1111 | - | - |
| Mov Cap-2 Maneuver | ~ 155 | - | - | - | - |
| Stage 1 | 644 | - | - | - | - |
| Stage 2 | 376 | - | - | - | - |

| Approach | EB | NB | SB |
|-----------------------------|----|-----|----|
| HCM Control Delay, s/v154.7 | | 0.1 | 0 |
| HCM LOS | F | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|------|-----|-------|-----|-----|
| Capacity (veh/h) | 1111 | - | 166 | - | - |
| HCM Lane V/C Ratio | 0.01 | - | 1.099 | - | - |
| HCM Control Delay (s/veh) | 8.3 | 0 | 154.7 | - | - |
| HCM Lane LOS | A | A | F | - | - |
| HCM 95th %tile Q (veh) | 0 | - | 9.4 | - | - |

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

2031 Build Weekday Evening
2: Main Street & Arlington Street

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 0.5 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | T | | | T | | T |
| Traffic Vol, veh/h | 2 | 15 | 33 | 897 | 403 | 2 |
| Future Vol, veh/h | 2 | 15 | 33 | 897 | 403 | 2 |
| Conflicting Peds, #/hr | 3 | 3 | 3 | 0 | 0 | 3 |
| 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 | 65 | 65 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 0 | 0 | 0 | 1 | 2 | 0 |
| Mvmt Flow | 3 | 23 | 37 | 997 | 448 | 2 |

| Major/Minor | Minor2 | Major1 | | Major2 | |
|----------------------|--------|--------|------|--------|---|
| Conflicting Flow All | 1526 | 455 | 453 | 0 | 0 |
| Stage 1 | 452 | - | - | - | - |
| Stage 2 | 1074 | - | - | - | - |
| 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 | 131 | 609 | 1118 | - | - |
| Stage 1 | 645 | - | - | - | - |
| Stage 2 | 331 | - | - | - | - |
| Platoon blocked, % | | | | - | - |
| Mov Cap-1 Maneuver | 121 | 606 | 1115 | - | - |
| Mov Cap-2 Maneuver | 121 | - | - | - | - |
| Stage 1 | 596 | - | - | - | - |
| Stage 2 | 330 | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|------|-----|----|
| HCM Control Delay, s/v | 14.3 | 0.3 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h) | 1115 | - | 412 | - | - |
| HCM Lane V/C Ratio | 0.033 | - | 0.063 | - | - |
| HCM Control Delay (s/veh) | 8.3 | 0 | 14.3 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q (veh) | 0.1 | - | 0.2 | - | - |

2031 Build Weekday Evening
 3: Mill Street & Gratuity Road/Arlington Street

10/01/2024

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 8.4 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | |
| Traffic Vol, veh/h | 1 | 14 | 6 | 14 | 21 | 3 | 5 | 132 | 18 | 1 | 58 | 4 |
| Future Vol, veh/h | 1 | 14 | 6 | 14 | 21 | 3 | 5 | 132 | 18 | 1 | 58 | 4 |
| Peak Hour Factor | 0.45 | 0.45 | 0.45 | 0.43 | 0.43 | 0.43 | 0.71 | 0.71 | 0.71 | 0.84 | 0.84 | 0.84 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 2 | 31 | 13 | 33 | 49 | 7 | 7 | 186 | 25 | 1 | 69 | 5 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|----------------------------|-----|-----|-----|-----|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay, s/veh | 7.8 | 8.3 | 8.7 | 7.9 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|--------------------------|-------|-------|-------|-------|
| Vol Left, % | 3% | 5% | 37% | 2% |
| Vol Thru, % | 85% | 67% | 55% | 92% |
| Vol Right, % | 12% | 29% | 8% | 6% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 155 | 21 | 38 | 63 |
| LT Vol | 5 | 1 | 14 | 1 |
| Through Vol | 132 | 14 | 21 | 58 |
| RT Vol | 18 | 6 | 3 | 4 |
| Lane Flow Rate | 218 | 47 | 88 | 75 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.257 | 0.058 | 0.114 | 0.092 |
| Departure Headway (Hd) | 4.239 | 4.496 | 4.632 | 4.414 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 849 | 798 | 775 | 814 |
| Service Time | 2.253 | 2.519 | 2.653 | 2.432 |
| HCM Lane V/C Ratio | 0.257 | 0.059 | 0.114 | 0.092 |
| HCM Control Delay, s/veh | 8.7 | 7.8 | 8.3 | 7.9 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 1 | 0.2 | 0.4 | 0.3 |

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 1 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 11 | 5 | 12 | 155 | 63 | 13 |
| Future Vol, veh/h | 11 | 5 | 12 | 155 | 63 | 13 |
| 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 | 75 | 75 | 96 | 96 | 86 | 86 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 15 | 7 | 13 | 161 | 73 | 15 |

| Major/Minor | Minor2 | Major1 | | Major2 | |
|----------------------|--------|--------|------|--------|---|
| Conflicting Flow All | 268 | 81 | 88 | 0 | 0 |
| Stage 1 | 81 | - | - | - | - |
| Stage 2 | 187 | - | - | - | - |
| 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 | 726 | 985 | 1520 | - | - |
| Stage 1 | 947 | - | - | - | - |
| Stage 2 | 850 | - | - | - | - |
| Platoon blocked, % | | | | - | - |
| Mov Cap-1 Maneuver | 719 | 985 | 1520 | - | - |
| Mov Cap-2 Maneuver | 719 | - | - | - | - |
| Stage 1 | 938 | - | - | - | - |
| Stage 2 | 850 | - | - | - | - |

| Approach | EB | NB | SB |
|------------------------|-----|-----|----|
| HCM Control Delay, s/v | 9.7 | 0.5 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---------------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h) | 1520 | - | 785 | - | - |
| HCM Lane V/C Ratio | 0.008 | - | 0.027 | - | - |
| HCM Control Delay (s/veh) | 7.4 | 0 | 9.7 | - | - |
| HCM Lane LOS | A | A | A | - | - |
| HCM 95th %tile Q (veh) | 0 | - | 0.1 | - | - |

2031 Build Weekday Evening
5: Hickory Drive & Jenkins Road

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 5.7 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 3 | 0 | 12 | 1 | 1 | 5 |
| Future Vol, veh/h | 3 | 0 | 12 | 1 | 1 | 5 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 38 | 38 | 60 | 60 | 75 | 75 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 8 | 0 | 20 | 2 | 1 | 7 |

| Major/Minor | Major1 | Major2 | Minor1 | Minor2 | Minor3 |
|----------------------|--------|--------|--------|--------|--------|
| Conflicting Flow All | 0 | 0 | 8 | 0 | 50 |
| Stage 1 | - | - | - | - | 8 |
| Stage 2 | - | - | - | - | 42 |
| Critical Hdwy | - | - | 4.1 | - | 6.4 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 |
| Pot Cap-1 Maneuver | - | - | 1625 | - | 964 |
| Stage 1 | - | - | - | - | 1020 |
| Stage 2 | - | - | - | - | 986 |
| Platoon blocked, % | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1625 | - | 952 |
| Mov Cap-2 Maneuver | - | - | - | - | 952 |
| Stage 1 | - | - | - | - | 1020 |
| Stage 2 | - | - | - | - | 974 |

| Approach | EB | WB | NB |
|------------------------|----|-----|-----|
| HCM Control Delay, s/v | 0 | 6.7 | 8.4 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---------------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 1056 | - | - | 1625 | - |
| HCM Lane V/C Ratio | 0.008 | - | - | 0.012 | - |
| HCM Control Delay (s/veh) | 8.4 | - | - | 7.2 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q (veh) | 0 | - | - | 0 | - |

2031 Build Weekday Evening
 6: Project Site Driveway & Gratuity Road

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 0.7 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 19 | 0 | 3 | 27 | 0 | 2 |
| Future Vol, veh/h | 19 | 0 | 3 | 27 | 0 | 2 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| 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, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 21 | 0 | 3 | 29 | 0 | 2 |

| Major/Minor | Major1 | Major2 | Minor1 | | | |
|----------------------|--------|--------|--------|---|-------|-------|
| Conflicting Flow All | 0 | 0 | 21 | 0 | 56 | 21 |
| Stage 1 | - | - | - | - | 21 | - |
| Stage 2 | - | - | - | - | 35 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1595 | - | 952 | 1056 |
| Stage 1 | - | - | - | - | 1002 | - |
| Stage 2 | - | - | - | - | 987 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1595 | - | 950 | 1056 |
| Mov Cap-2 Maneuver | - | - | - | - | 950 | - |
| Stage 1 | - | - | - | - | 1002 | - |
| Stage 2 | - | - | - | - | 985 | - |

| Approach | EB | WB | NB |
|------------------------|----|-----|-----|
| HCM Control Delay, s/v | 0 | 0.7 | 8.4 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---------------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 1056 | - | - | 1595 | - |
| HCM Lane V/C Ratio | 0.002 | - | - | 0.002 | - |
| HCM Control Delay (s/veh) | 8.4 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q (veh) | 0 | - | - | 0 | - |

2031 Build Weekday Evening
7: Jenkins Road & Project Site Driveway

10/01/2024

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 0.6 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 0 | 13 | 20 | 5 | 3 | 0 |
| Future Vol, veh/h | 0 | 13 | 20 | 5 | 3 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| 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, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 14 | 22 | 5 | 3 | 0 |

| Major/Minor | Major1 | Major2 | Minor2 | | |
|----------------------|--------|--------|--------|---|-------|
| Conflicting Flow All | 27 | 0 | - | 0 | 39 |
| Stage 1 | - | - | - | - | 25 |
| Stage 2 | - | - | - | - | 14 |
| Critical Hdwy | 4.12 | - | - | - | 6.42 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 |
| Pot Cap-1 Maneuver | 1587 | - | - | - | 973 |
| Stage 1 | - | - | - | - | 998 |
| Stage 2 | - | - | - | - | 1009 |
| Platoon blocked, % | | - | - | - | |
| Mov Cap-1 Maneuver | 1587 | - | - | - | 973 |
| Mov Cap-2 Maneuver | - | - | - | - | 973 |
| Stage 1 | - | - | - | - | 998 |
| Stage 2 | - | - | - | - | 1009 |

| Approach | EB | WB | SB |
|------------------------|----|----|-----|
| HCM Control Delay, s/v | 0 | 0 | 8.7 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---------------------------|------|-----|-----|-----|-------|
| Capacity (veh/h) | 1587 | - | - | - | 973 |
| HCM Lane V/C Ratio | - | - | - | - | 0.003 |
| HCM Control Delay (s/veh) | 0 | - | - | - | 8.7 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q (veh) | 0 | - | - | - | 0 |