# CORRIDOR STUDY 

FEBRUARY 2020

## ACKNOWLEDGMENTS

## STAKEHOLDERS

- Village of Medina
- Medina Central School District PTSA
- Town of Shelby
- New York State Department of Transportation, Region 4
- Genesee Community College
- Genesee Transportation Council
- Orleans County, Department of Planning and Development
- Maple Ridge Estates
- Orleans Economic Development
- Medina Business Association Agency
- Medina Central School District


## GENESEE TRANSPORTATION COUNCIL

Genesee Transportation Council (GTC) is the designated Metropolitan Planning Organization (MPO) responsible for transportation policy, planning, and investment decision making in the Genesee-Finger Lakes Region.

Financial assistance for the preparation of this report was provided in part by the Federal Highway Administration. The Village of Medina is solely responsible for its content and the views and opinions expressed herein do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

## MAPLE RIDGE ROAD CORRIDOR STUDY

The Maple Ridge Road Corridor Study is a result of collaboration and input from the stakeholders above as well as the general public. The purpose of this study was to evaluate means of improving safety and access for pedestrians and bicyclists through the Maple Ridge Road Corridor while simultaneously providing long-term access management for current and future land uses adjoining the same Corridor.

This Study was developed from November 2018 to November 2019 and was funded through the Unified Planning Work Program (UPWP).


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## SITE DESIGN TOOLS AND STANDARDS

There are a number of published resources available which have been nationally accepted as well as adopted by the New York State Department of Transportation. Future designs for transportation improvements along Maple Ridge Road, and throughout the Study Area, should follow the recommendations included in these guides:

FHWA

- Manual on Uniform Traffic Control Devices (2009)
- Small Town and Rural Multimodal Networks Guide (2016)
- Proven Safety Countermeasures (2012)
- Incorporating On-road Bicycle Networks into Resurfacing Projects (2015)
- Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts (2016)
- Bicycle Facilities and the MUTCD: Dashed Bicycle Lanes (2017)
- Interim Approval for Optional Use of Green Colored Pavement for Bike Lanes (IA-14) (2011)
- Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons (IA-11) (2008)
- Pedestrian Hybrid Beacon Guide: Recommendations and Case Study (2014)
- Public Rights-of-Way Accessibility Guidance (2011)


## NEW YORK STATE DEPARTMENT OF TRANSPORTATION (NYSDOT)

- Highway Design Manual
- Empire State Trail Design Manual (2018)
- State Supplement to the Manual on Uniform Traffic Control Devices (2009)
- Bridge Manual (2019)
- Pedestrian Safety Action Plan (2016)
- Project Development Manual (2004)
- Standards Sheet


## NATIONAL ASSOCIATION OF CITY TRANSPORTATION OFFICIALS (NACTO)

- Urban Bikeway Design Guide, 2nd Edition (2012)

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

- Guide for the Development of Bicycle Facilities, 4th Edition (2012)
- Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition (2004)
- A Policy on the Geometric Design of Highways and Streets (2011)
- Standard Specifications for Highway Bridges (2002)


## ASSOCIATION OF PEDESTRIAN AND BICYCLE PROFESSIONALS (APBP)

- Bicycle Parking Guide 2nd Edition (2010)


## US ACCESS BOARD

- ADA Accessibility Guidelines (2004)
- Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (2011)

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP)

- Report 672, Roundabouts: An Informational Guide, 2nd Edition (2010)


Maple Ridge Road Near Tim Hortons Facing West

## EXECUTIVE SUMMARY

Maple Ridge Road is a well-traveled corridor with numerous destinations of varying land uses. While the corridor currently caters to vehicles, people are observed walking along the 2.2-mile roadway, to access multiple destinations despite dedicated pedestrian accommodations being provided for only 900 feet. The Genesee Transportation Council (GTC) and stakeholders such as the Village of Medina, the Town of Shelby, Orleans County, New York State Department of Transportation (NYSDOT), and other local organizations are committed to improving safety, mobility, and access along Maple Ridge Road for all users, specifically pedestrians and bicyclists of all ages and abilities. Implementation of active transportation infrastructure and improved roadway configuration will transform Maple Ridge Road into a corridor that is welcoming and safe for all travel modes, ultimately encouraging more people to walk and bike to and from destinations along the roadway.

## STUDY AREA DESCRIPTION

The Maple Ridge Road Corridor study area is located in the Village of Medina, which shares boundaries with the Towns of Shelby and Ridgeway in Orleans County. The Village sits nearly halfway between the cities of Rochester and Buffalo; a 43.5 mile drive from Buffalo and a 43.1 mile drive from Rochester.

On a closer scale, the corridor runs along Maple Ridge Road (NYS Routes 31 and 31A) for 2.2 miles from Salt Works Road to Waterworks Road / Bates Road and it is under one (1) mile away from Medina's main downtown area. There are ten (10) intersections along the route, two (2) of which are controlled by traffic signals. Maple Ridge Road has a single lane in each direction and includes exclusive left turning lanes at the intersections of West Avenue and S Main Street (NY Route 63).


Sidewalk on the North Side of Maple Ridge Road just West of the Bridge Facing West

## INVENTORY OF EXISTING AND PLANNED CONDITIONS

## ROADWAY CHARACTERISTICS AND OPERATING CONDITIONS

A list of Maple Ridge Road's characteristics can be found in the table to the right. The route is owned and operated by the New York State Department of Transportation (NYSDOT). At the S Main Street / Gravel Road (NY Route 63) intersection, there is one pedestrian crosswalk located on the north side of Maple Ridge Road. The crossing includes ADA compliant curb ramps, detectable warning units, and pedestrian push buttons and countdown timers.

The Oak Orchard Creek bridge (BIN 1022050) carries Maple Ridge Road (NY Route 31A) over the Oak Orchard Creek. Built in 1946, this steel multi-girder structure with a concrete deck has a curb-to-curb width of approximately 31.5 feet (12-foot wide travel lanes and 4foot wide shoulders). The bridge was last inspected in September 2018 and has a NYSDOT condition rating of 5.068, considered to be in good condition.

Other roadway features include street signs, one run of w-beam guide rail, roadway street lighting (cobrahead style) primarily located at intersections along Maple Ridge Road, concrete curb with intermittent closed drainage in some locations, and open drainage that utilizes sheet flow and grass lined swales that are connected to larger drainage areas by cross culverts along a majority of the corridor. Non-roadway features present within the corridor include fire hydrants, right-of-way monuments and markers, as well as overhead and underground utilities.

Recent data published by the NYSDOT indicates that the pavement in the study area is in fair-togood condition (Rated 6-7) with distress clearly

Table i: Maple Ridge Road Summary

| ATTRIBUTE | MAPLE RIDGE ROAD |
| :--- | :---: |
| Length | 2.1 MI |
| Speed Limit | $40-55 \mathrm{MPH}$ |
| AADT (2013) | $5,078-6,153 \mathrm{vpd}$ |
| Pavement Width | 40 FT |
| Lane Width | 12 FT each |
| Shoulder Width | $5-8 \mathrm{FT}$ |
| Right-of-Way <br> Width | $60-89 \mathrm{FT}$ <br> $(70$ FT Average) |
| Functional <br> Classification | Urban Principal Arterial - <br> Other and Urban Minor <br> Arterial |
| Lane <br> Configuration | Two travel lanes; right and <br> left turning lanes where <br> appropriate |
| Bicycle Facilities | None |
| Sidewalks for 900 FT on <br> north side of road; minimal <br> crosswalks; pedestrian <br> signal at S Main Street |  |
| Facilities | None |
| On-Street <br> Parking | Retail, Commercial, and <br> Residential Use <br> Context |

visible or beginning to show. The NYSDOT's current 5 year capital program does not include any pavement work within the study limits.

The posted speed limit on Maple Ridge Road is 40-mph from mid-way between Charles Street in the west to the intersection of Brown Avenue in the east. Beyond these limits in both directions, the posted speed limit increases to 45 -mph to the west and $55-\mathrm{mph}$ to the east.


## PEDESTRIAN AND BICYCLE EXISTING CONDITIONS

## PEDESTRIAN FACILITIES

While Maple Ridge Road has just 900 feet of sidewalk constructed on the north side of the street from Gwinn Street to just east of S Main Street, the remainder of the Village of Medina is not lacking sidewalks. A majority of roads in the Village have sidewalks, often on both sides. Despite the numerous sidewalks throughout the Village, most tend to be narrow and in poor condition.

At the S Main Street intersection with Maple Ridge Road, there are ADA curb ramps, detectable warning units, and pedestrian push buttons and countdown timers. Other crosswalks of varying condition are concentrated at intersections along S Main Street, N Main Street, E Center Street, W Center Street, and Prospect Avenue. School properties also have a high amount of crosswalks.

## BICYCLE FACILITIES

The Erie Canalway Trail, running east-west through the northern portion of the Village, provides the only form of dedicated bicycle facilities in the Study Area. The Erie Canalway Trail is a shared use path running 350 miles from Albany to Buffalo and is approximately $80 \%$ complete at this time.

The Village of Medina's streets and Maple Ridge Road have very few, if any, on-road bicycle. NYS Bike Route 5 travels along Center Street (Routes 31 and 31 E ) through the Village. The route is largely unsigned, unmarked, and in poor condition for bicycling.

While the Village's streets do not provide dedicated space for bicyclists, local streets with low traffic volumes and low travel speeds, often referred to as "bicycle boulevards", can be safe and enjoyable streets for bicyclists of all ages and abilities.

## OPPORTUNITIES AND BARRIERS

## OPPORTUNITIES INCLUDE:

Wide Shoulders: The shoulders are 8 feet wide along a majority of the corridor, narrowing to 5 to 6 feet wide between the school and S Main Street, and narrowing further to approximately 4 feet wide on the Oak Orchard Creek bridge.

Right-of-Way along Maple Ridge Road: The public right-of-way along ranges from 60 to 89 feet wide, with a majority of the corridor right-ofway width ranging from 66 to 74 feet.

## Extensive Pedestrian Network within Village

While Maple Ridge Road has few sidewalks, the Village of Medina has an extensive sidewalk network. This provides a precedent to construct sidewalks on Maple Ridge Road to improve connectivity.

## School Support for Pedestrian and Bicycle

 Facilities: Approximately 300 students walk and/ or bike to and from school each day. School officials are in support of new and improved active transportation facilities as well as improved vehicle access.

8-foot Shoulders near Tops Plaza

## BARRIERS INCLUDE:

Available Funding: A lack of funding to implement proposed projects is a common barrier to any public realm project. The small size of jurisdictions such as the Village of Medina and Town of Shelby often have limited budgets for public improvements.

Existing Roadway Geometrics: The current corridor geometrics cannot be easily reconfigured. The road is straight for the entire 2.1 mile length and includes a crown. Lane reconfiguration would require extensive roadway reconstruction due to these existing geometrics.


Maple Ridge Road (NYS Route 31 and 31A) is Owned and Maintained by NYSDOT (Photo Facing West from the East Side of S Main Street)

## REVIEW RELEVANT PLANS, ZONING CODES, AND LAND USE POLICIES

Past plans reviewed as part of this Study include:

- New York State Pedestrian Safety Acton Plan (2016)
- Western Orleans Comprehensive Plan (2019)
- GTC Regional Walkability Improvement Program (2016)
- Maple Ridge Road Overlay District (§ 25433)

The high priority physical pedestrian- and bicycle-related recommendations according to the documents reviewed include:

- Maple Ridge Road: shared use path or sidewalks and crosswalks at Mustang Drive (school access) and South Main Street.
- Center Street: bicycle facilities on roadway to create a safer and more comfortable NYS Bike Route 5.
- Gwinn Street: traffic calming elements and a crosswalk to improve safety and accessibility at school properties.
- Main Street: traffic calming elements and bicycle facilities on roadway to create a safe and comfortable route between Maple Ridge Road and downtown as well as the Erie Canalway Trail.
- South Main Street: mid-block crossing at John E. Butts Memorial Park.
- West Oak Orchard Street: crosswalk at entrance to Oak Orchard Elementary School.


## PLANNED TRANSPORTATION IMPROVEMENTS

Identification of planned projects and their potential to include new or improved active transportation infrastructure in advance will be of great value during implementation of the recommendations included in this Study. Planned transportation improvements include:

- Pedestrian Bridge Funding Over Oak Orchard Creek: Funding has been made available to construct a pedestrian bridge over Oak Orchard Creek on the north side of the road to provide a safe and dedicated space for pedestrians. If additional funding is available, the Village intends to use funds to construct sidewalks extending east from the bridge.
- Planned Resurfacing Projects (NYSDOT): NYSDOT does not currently have any planned road resurfacing or construction projects in the study area. Ongoing collaboration with NYSDOT may reveal opportunities to implement the recommendations along with future roadwork on the corridor.
- Future Medina Business Park Development: The Medina Business Park (MBP), located on the eastern end of the corridor to the west of Bates Road, is a major employment hub in the area. MBP has grown steadily recent years and expects additional development in the near future.


## NEEDS ASSESSMENT

## ROADWAY AND VEHICULAR NEEDS

## ROADWAY CONDITION

East of the Oak Orchard Creek bridge, the pavement and shoulders are exhibiting signs of deterioration. The shoulders on Maple Ridge Road have deteriorated such that a bicyclist is more likely to ride in the travel lane than on the shoulder. Additionally, a reticuline style drainage grate would be safer for bicyclists that use the shoulder for travel than the current design.

## OPERATIONAL EFFICIENCIES

As documented in the traffic analysis, all of the study area intersections are operating at minimum acceptable Levels of Service (LOS) D or above. The intersection with West Avenue / West Avenue Ext. may require a future mitigation plan depending on growth and future roadway improvements. While the intersection of Mustang Drive is operating efficiently, public opinion has indicated a desire for a traffic signal, or other treatment, at this location.

## ACCESS MANAGEMENT

Through the years, the corridor has continued to develop resulting in many commercial businesses securing full access to Maple Ridge Road in this area. Increasing the frequency of access points presents a challenge to all users. As the demand increases with development growth, so will the amount of conflict points. Implementation of good access management practices is needed to ensure safety for all users.

## ACCIDENT COUNTERMEASURES

The numerous driveways present on the corridor likely contribute to the number of rear-end accidents. While most of the documented rearend accidents were due to driver inattention, a reduction in access points would limit the number of stopped vehicles along the corridor. Based on engagement efforts, road users felt that the introduction of turn-lanes would reduce vehicle conflicts due to the various turning maneuvers previously discussed.

## PEDESTRIAN AND BICYCLE SAFETY NEEDS

The following items have been identified as specific needs to improve safety for pedestrians and bicyclists:

- Speed Reduction: Slower speeds increase the likelihood of survival for all, especially pedestrian and bicyclists, in the event of a crash.
- School Connections: The schools are major destinations for many Medina residents.
- Oak Orchard Creek Bridge Crossing:

There are approximately 20-25 pedestrians that cross the bridge on a daily basis.

- Lighting: Roadway lighting is an integral part of both safety for all users.
- Medina Business Park Vehicular Access: Full build out of the Medina Business Park would likely require some mitigation based on the increase transportation demand.


## PUBLIC ENGAGEMENT ANALYSIS

To gather input from the public to help inform draft recommendations, the project team used the following public engagement methods:

- Stakeholder Interviews: Conduct confidential stakeholder interviews with group leaders
- Survey: Distribute an online survey, as well as a paper survey where necessary, to solicit feedback from community members


## ( 5 STAKEHOLDER INTERVIEWS

A public workshop was conducted during the recommendations phase of this project and will be discussed in Chapter 3.

## PUBLIC ENGAGEMENT SUMMARY

## THE FOLLOWING PRIORITIES AND TRENDS WERE DETERMINED BASED ON RESPONSES FROM THE SURVEY AND STAKEHOLDER INTERVIEWS:

- Traveling along Maple Ridge Road is a necessity for most people in the area
- People primarily travel by vehicle, but there is a desire for additional walking and bicycling opportunities
- Grocery stores and fast food locations are common destinations along the corridor and future recommendations should consider safe connections to these amenities
- Pedestrian facilities would likely be more popular among users than bicycle facilities
- The most common factors keeping people from walking or biking are:
- Lack of safe pedestrian and bicycle facilities
- High traffic speeds and/or volumes
- Poor/aggressive driver behavior
- Far travel distances
- The most common priorities for future improvements along the corridor are:
- Improved safety for all users
- New pedestrian facilities
- Improved vehicle traffic flow


## RECOMMENDATIONS

## PEDESTRIAN AND BICYCLE DESIGN TOOLKIT

A toolkit of active transportation infrastructure improvement measures form the building blocks of potential treatment options and alternatives. The infrastructure referenced is limited to facility types that may be appropriate improvements for Maple Ridge Road as it operates today. All have received approval by FHWA and appear in various manuals and guidelines. A list of these manuals and guidelines can be found at the beginning of this Study.

Linear pedestrian and bicycle facilities include:

- Sidepaths
- Sidewalks
- Paved Shoulders / Bike Spaces
- Bicycle Lanes
- Shared Lanes

Pedestrian- and bicycle-specific intersection improvements include:

- Crosswalks
- Curb Extensions
- Median Refuge Islands
- Curb Ramps
- Pedestrian Countdown Signals
- Rectangular Rapid Flashing Beacons
- Striping Bicycle Facilities at or through Intersections


Sidepath


Paved Shoulder / Bike Space


Bicycle Lane


Shared Lane

## ROADWAY CORRIDOR DESIGN TOOLKIT

## INTERSECTION TREATMENTS

With multiple intersecting roads along Maple Ridge Road, and considering a potential increase in traffic volumes with development growth, it is important to consider traffic control devices at intersections. Potential treatments may include:

- Traffic Signal
- Roundabout


## ACCESS MANAGEMENT TREATMENTS

There are various access management techniques and treatments which can be implemented along Maple Ridge Road to improve traffic flow and increase safety for all road users.

- Driveway Consolidation
- Center Median
- Right-In / Right-Out
- Left-In / Right-In / Right-Out
- Provide Access to Adjacent Corridors
- Align Access Points
- Service Roads


Right-In / Right-Out Access

## STREETSCAPE ENHANCEMENTS

Streetscape enhancements help make a roadway welcoming to all users, including pedestrians and bicyclists. They also result in a traffic calming effect along a busy corridor. Enhancements that are appropriate for Maple Ridge Road include:

- Landscaping
- Lighting
- Benches
- Bike Parking


Driveway Consolidation
Source: Google


Left-In / Right-In / Right-Out Access

## CORRIDOR ALTERNATIVES

Using the data obtained during the existing conditions and needs assessment phases of the project, three alternatives were developed for the Maple Ridge Road corridor. These alternatives are the result of public engagement, data collected for the corridor, coordination with the steering committee, and complete street best practices. These alternatives were presented to the public to solicit corridor user preferences for potential treatment options. Based on user comments, discussion, and additional consideration from NYSDOT Region 4 Traffic \& Safety Division, a variation of Alternative Concept A was developed (see NYSDOT Preferred Concept on page 110).

## ALTERNATIVE CONCEPT A:

- Twelve-foot (12') wide two-way left turn lane from the Tops Plaza to the intersection with S Main Street / S Gravel Road.*
- Eleven-foot $\left(11^{\prime}\right)$ travel lanes in either direction from Salt Works Road to Bates Road.
- Six-foot (6') wide shoulder/bike space** in both directions.
- Seven-foot ( $7^{\prime}$ ) sidewalk recommended on the north side of Maple Ridge Road.

Concept A with Two-Way Left Turn Lane


* Non-standard feature requiring NYSDOT approval
** Two-way left-turn lane will only be incorporated where necessary.
Concept A without Two-Way Left Turn Lane

* Non-standard feature requiring NYSDOT approval.
- A preferred section would include a five-foot (5') maintenance strip to accommodate snow storage and utilities and a five-foot ( $5^{\prime}$ ) sidewalk for pedestrians.
- The construction cost of Alternative Concept A is approximately $\$ 6.5 \mathrm{M}^{* * *}$.

[^0]
## ALTERNATIVE CONCEPT B:

- Twelve-foot (12') wide two-way left turn lane from the Tops Plaza to the intersection with S Main Street / S Gravel Road.*
- Eleven-foot ( $11^{\prime}$ ) travel lanes in either direction from Salt Works Road to Bates Road.
- Ten-foot ( $10^{\prime}$ ) wide shared use path (sidepath) recommended on the north side of Maple Ridge Road.
- The sidepath should be separated from the roadway by a recommended five-foot ( $5^{\prime}$ ) landscaped buffer.
- Five-foot ( $5^{\prime}$ ) wide shoulders are located on both sides of the street and can be utilized by bicyclists if they prefer.
- The construction cost of Alternative Concept B is approximately $\$ 4.5 \mathrm{M}{ }^{* * *}$.


## ALTERNATIVE CONCEPT C:

- Twelve-foot (12') wide two-way left turn lane from the Tops Plaza to the intersection with S Main Street / S Gravel Road.*
- Fifteen-foot ( $15^{\prime}$ ) shared travel lanes in either direction from Salt Works Road to Bates Road to provide a shared space for bicyclists and motorists.
- Ten-foot (10') wide shared use path (sidepath) recommended on the north side of Maple Ridge Road.
- The sidepath should be separated from the roadway by a recommended eight-foot ( $8^{\prime}$ ) landscaped buffer.
- The construction cost of Alternative Concept B is approximately $\$ 9.1 \mathrm{M}^{* * *}$.

* Non-standard feature requiring NYSDOT approval.
** Two-way left-turn lane will only be incorporated where necessary.

Concept B without Two-Way Left Turn Lane


Concept C with Two-Way Left Turn Lane


* Two-way left-turn lane will only be incorporated where necessary.

Concept C without Two-Way Left Turn Lane


## MEDINA BUSINESS PARK

The Medina Business Park currently has site plan approval for the development of a 58 -room hotel and the expansion of the industrial park to approximately 80,000 square feet. However, this does not allow for the full expansion of the business park. To accommodate the remaining land uses designated within the park, dedicated eastbound and westbound left turn lanes on Maple Ridge Road at the existing western most Medina Business Park entrance are recommended. A traffic analysis of the western Medina Business Park / GCC Campus intersection using the appropriate trip generation for the assumed land uses will also be required to determine the level of service implications on the intersection as a result of full build-out of the site. This analysis will help to determine whether a traffic signal is warranted at this location.

The installation of the left-turn lanes will have implications to the surrounding land uses that will likely result in the acquisition of property from the adjacent landowners as a result of widening the roadway. Existing utilities on the north side of Maple Ridge Road will require relocation and existing drainage patterns will need to be maintained. A smooth transition into and out of the turn lanes will be required east and west of the intersection improvement area. Further, it is recommended that any improvements made to the intersection include the bicycle and pedestrian accommodations.

## ACCESS MANAGEMENT PLAN

As part of this Study, the access to every business and residence was evaluated for improvement. The improvement strategies recommended include the following:

- Raised medians installed throughout the corridor at strategic locations where turn lanes are not recommended
- Consolidation of driveways
- Driveway Realignment with opposing driveways
- Driveway reconfiguration to restrict access
- Creation of service roads


Medina Business Park Entrance

## PUBLIC INPUT ON ALTERNATIVE CONCEPTS

To gather input from the public regarding the three alternative concepts, the project team used the following public engagement methods:

- Public Workshop: A public workshop was held at the Medina Central School on the evening of June 20th, 2019. A total of 13 people from the general public were in attendance.
- Alternatives Survey: A second survey was created to gather information and insights from the public regarding the 3 alternative concepts for Maple Ridge Road. The survey asked respondents to rank each of the alternatives in order from their favorite to least favorite option.


## KEY FINDINGS

- Survey respondents desire a buffer or other physical separation between pedestrian/ bicycle facilities and vehicle traffic.
- Survey respondents prefer a shared pedestrian and bicycle facility.
- Survey respondents are in favor of a twoway left turn lane from the intersection with S Main Street/S Gravel Road to the Tops Plaza.
- The preference for a separated pedestrian/ bicycle facility supports the findings from the initial survey, which indicated that, respectively, $37 \%$ and $46 \%$ of respondents feel that current pedestrian and bicycle conditions along the corridor feel unsafe.


PUBLIC WORKSHOP ATTENDEES


ALTERNATIVES SURVEYS*

Table vi: Alternatives Survey Voting Results

| $*$ | ALTERNATIVE <br> RANKING |  | ALTERNATIVE <br> CONCEPT B |  | ALTERNATIVE <br> CONCEPT C |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | \# OF <br> VOTES | \% OF <br> VOTES | \# OF <br> VOTES | \% OF <br> VOTES | \# OF <br> VOTES | \% OF <br> VOTES |
| 1st | 14 | $16 \%$ | 47 | $55 \%$ | 25 | $29 \%$ |
| 2nd | 21 | $24 \%$ | 33 | $38 \%$ | 32 | $37 \%$ |
| 3rd | 51 | $29 \%$ | 6 | $7 \%$ | 29 | $34 \%$ |

Table vii: Alternatives Survey Point Results

| RANKING | A | B | C |
| :---: | :---: | :---: | :---: |
| 1st Place <br> (3 points per vote) | 42 <br> points | 141 <br> points | 75 <br> points |
| 2nd Place <br> (2 points per vote) | 42 <br> points | 66 <br> points | 64 <br> points |
| 3rd Place | 51 <br> (1 point per vote) | 6 points | 29 <br> points |
| TOTAL POINTS | $\mathbf{1 3 5}$ <br> points | $\mathbf{2 1 3}$ <br> points | $\mathbf{1 6 8}$ <br> points |

*88 surveys were received, but 2 of these surveys were incomplete and omitted from the analysis.

## COORDINATION WITH NYSDOT

Officials within Region 4 of the New York State Department of Transportation (NYSDOT) proposed a variation to Alternative Concept A. This variation is different from the concept presented to the public, and was discussed following the draft recommendations phase of this Study. NYSDOT's preferred alternative includes 5 -foot sidewalks with a 5 - to 6 -foot grass maintenance strip adjacent to the curb between the sidewalk and edge of pavement on both sides of Maple Ridge Road. While not drastically different from the originally presented Alternative Concept $A$, the addition of the maintenance strip would require a transition from the NYSDOT preferred section to the existing section.


* Non-standard feature requiring NYSDOT approval.
** Two-way left-turn lane will only be incorporated where necessary.
NYSDOT Preferred Alternative without Two-Way Left Turn Lane

* Non-standard feature requiring NYSDOT approval.

NYSDOT's Preferred Alternative

In addition to the cross section changes above, the Department provided additional guidance and preference for other features of the roadway and overall corridor plan as follows:

- Sidewalks be implemented on both sides of Maple Ridge Road from Salt Works Road to Bates Road.
- A continuous two-way left turn lane from the Tops Plaza / Tractor Supply intersection to the S Main Street / S Gravel Road intersection.
- Raised medians shorter than 150-feet should not be considered on this corridor.
- 5-foot to 6-foot wide shoulders are recommended to double as a space to bicyclists. NYSDOT Region 4 does not currently recommend including standard bicycle markings in this "bike space" since there is no adjacent on-road parking nor is it marked for "No Parking". Use of these markings may be reviewed in more detail and considered during project implementation.
- Mustang Drive and Maple Ridge Road intersection be closed and Mustang Drive be realigned to connect to the north side of the Tops Plaza / Tractor Supply intersection where the existing traffic signal could be utilized for school traffic.

Further coordination with NYSDOT will be required to finalize the design of Maple Ridge Road to ensure the needs of all stakeholders, and the public, are met.

## RECOMMENDED CODE AND POLICY CHANGES

## COMPLETE STREETS POLICY

The Village of Medina, as well as the Town of Shelby should develop and adopt a Complete Streets Policy. This will encourage and support implementation of bicycle and pedestrian infrastructure along Maple Ridge Road as well as throughout the Village and Towns.

## ZONING RECOMMENDATIONS

Include Pedestrian and Bicycle Facilities and Amenities in New Development Site Designs:
New developments or redevelopments should be required to install pedestrian and bicycle facilities (e.g., sidewalks) and amenities within and directly adjacent to the new development site.

Access Management: Where possible, new developments or redevelopment of existing sites should be required to share driveway access with adjacent businesses and require that access points for parcels on located on both sides of the corridor be aligned to minimize potential conflict points.

## EXPAND UPON BICYCLING LAWS IN VILLAGE AND TOWN CODES

The bicycle section of the Village of Medina and Town of Shelby codes should be expanded to define and specify proper placement and use of bicycle facilities and amenities where desired and deemed appropriate by stakeholders.

A full list of all regulations related to bicycles included in the Village of Medina code can be found in Appendix D.

## VILLAGE SPEED LIMIT

The Village of Medina enforces a 30 MPH speed limit within village boundaries. It is recommended that a study be conducted to determine whether a speed reduction can/ should be implemented along Maple Ridge Road in this area to either match, or be closer to, the Village of Medina 30 MPH speed limit.

## MAINTENANCE POLICY

The Village and Towns should dedicate funds as well as the responsible parties for routine and asneeded maintenance of bicycle and pedestrian facilities along Maple Ridge Road.

Routine maintenance may include: activities such as trash collection, weeding, trimming of bushes and shrubs in any landscaped buffers, debris removal such as leaves in the fall, sweeping, graffiti removal, and snow removal. It may also include visiting the site periodically for other related activities such as visitor use counts and inspections.

As-needed maintenance may include: filling minor potholes, minor repairs of facility surfaces, repair of facility shoulders, replacing damaged signs, and minor repairs of amenities such as benches.

These recommended code and policy changes will help ease implementation of infrastructurerelated recommendations included in this Study.

## IMPLEMENTATION STRATEGY

## FUNDING MECHANISMS

An appropriate level of funding will be critical for implementation of the Maple Ridge Road Corridor Study. The local communities should work with the Genesee transportation Council (GTC) to apply for appropriate funding opportunities. Grant opportunities that may be appropriate for the recommendations in this study are listed below:

## Federal Funding Opportunities:

- Federal Transit Administration (FTA)
- Highway Safety Improvement Program (HSIP)
- National Highway Performance Program (NHPP)
- Surface Transportation Block Grant Program (STBG)
- Transportation Alternatives (TA) Set-Aside
- Recreational Trails Program (RTP)
- Safe Routes to School (SRTS)


## State Funding Opportunities:

- Consolidated Local Street and Highway Improvement Program (CHIPS)
- New York State Energy Research and Development Authority (NYSERDA)
- Consolidated Funding Application (CFA)


## Other Funding Opportunities:

- Mitigation Fees
- Public-Private Partnerships


## PHASED IMPLEMENTATION

Due to funding availability and potential design challenges, we recommend a phased approach to implementation. The project team considered two methods for a phased approach to implementation: Individual Elements Phased Approach and Location-Based Phased Approach. Due to the likelihood of re-work needed by the Individual Elements Phased Approach as well as different levels of demand along the corridor, this Study recommends a Location-Based Phase Approach for implementation of improvements on Maple Ridge Road.

LOCATION-BASED PHASED APPROACH
This assumes all recommended improvements within the segment endpoints be designed and constructed at once.

This Study proposes three phases for implementation of Maple Ridge Road improvements:

- Phase 1: Tops Plaza to $S$ Main Street (if the ped./bike bridge is not built) OR Tops Plaza to Ricky Place (if the ped./bike bridge is built)
- Phase 2: S Main Street to Bates Road (if the ped./bike bridge is not built) OR Ricky Place to Bates Road (if the ped./bike bridge is built)
- Phase 3: Salt Works Road to Tops Plaza



## ACCESS MANAGEMENT PLAN IMPLEMENTATION

The recommendations included in the access management plan should be progressed as soon as it is feasible to help the corridor realize traffic calming benefits without a complete redesign and reconstruction of the roadway. A key to improving vehicle access along Maple Ridge Road is the relocation of Mustang Drive.

The access management on developed parcels may be implemented in the following ways:

- Through coordination with the Village of Medina, Town of Shelby, and the current property owner
- Through coordination with the Village of Medina, Town of Shelby, and a new property owner when a parcel changes ownership
- Encouragement of zoning code changes


## INDIVIDUAL PROJECTS

Due to costs and other considerations, the Village and Town may benefit from implementing a few projects separately from the three phases previously discussed. These individual projects include:

- School Access to Maple Ridge Road:

Future improvement may include a traffic signal or other treatment at the intersection of Mustang Drive and Maple Ridge Road. Alternatively, the school may be able to reroute school traffic to the traffic light at the Tops Plaza. Further feasibility studies and traffic/intersection analyses are required to determine an appropriate and preferred alternative.

- Medina Business Park Access to Maple Ridge Road: The access needs in this area will evolve as more businesses are developed on the sites. Future access should consider projected traffic volumes and patterns and implement the recommendations for access management treatments included in this study.



Maple Ridge Road West of Gwinn Street

## CHAPTER 1 INVENTORY OF EXISTING AND PLANNED CONDITIONS

Maple Ridge Road runs through the Village of Medina which is home to over 5,800 residents. The corridor serves as a major connector between towns in this region of Western New York. An analysis of the existing conditions along the roadway in this area will help inform recommendations for improved vehicle access as well as safer pedestrian and bicycle travel.

This chapter focuses on documenting the existing conditions of Maple Ridge Road, including roadway characteristics, crash analysis, bicycle and pedestrian infrastructure, and key destinations. It also lays the groundwork for
identifying future opportunities to implement active transportation infrastructure and increase connectivity to major destinations throughout the corridor and Village.

## STUDY AREA DESCRIPTION

The Maple Ridge Road Corridor study area is located in the Village of Medina, which shares boundaries with the Towns of Shelby and Ridgeway in Orleans County. The Village sits nearly halfway between the cities of Rochester and Buffalo; a 43.5 mile drive from Buffalo and a 43.1 mile drive from Rochester.

On a closer scale, the corridor runs along Maple Ridge Road (NYS Routes 31 and 31A) for 2.2 miles from Salt Works Road to Waterworks Road / Bates Road and it is under one (1) mile away from Medina's main downtown area. There are ten (10) intersections along the route, two (2) of which are controlled by traffic signals. Maple Ridge Road has a single lane in each direction and includes exclusive left turning lanes at the intersections of West Avenue and S Main Street (NY Route 63).

Intersections along the corridor:

- Salt Works Road
- Charles Street
- Tops / Tractor Supply Entrance (traffic signal)
- Lakewood Village
- Mustang Road
- Gwinn Road
- West Avenue
- S Main Street / S. Gravel Road (NY Route 63) (traffic signal)
- Brown Avenue
- Bates Road / Waterworks Road

As of 2017, the population of Medina was recorded at 5,814 with 2.1 persons per household. ${ }^{1}$ The median household income was $\$ 39,741$ while the median household income of Orleans County was \$49,223, nearly $80 \%$ of the amount in New York State. ${ }^{2}$

There are multiple key areas in Medina that would benefit from improved bicycle and pedestrian infrastructure:

- Medina High School and Middle School located directly off of Maple Ridge Road.
- Maple Ridge Estates - low to mixed income housing units at the eastern end of Maple Ridge Road.
- Erie Canal Trail - two (2) entrances to the mixed-use trail approximately 1.2 miles from the corridor.
- Multiple retail stores along the corridor such as food chains, grocery stores, and other commercial locations.


Tim Hortons on Maple Ridge Road

## EXISTING ROADWAY CHARACTERISTICS AND OPERATING CONDITIONS

Maple Ridge Road ( NY Route 31/31A) extends in an east-west direction through the Village of Medina and the Town of Shelby. West of Main Street, Maple Ridge Road is classified as an "urban principal arterial - other" and east of S Main Street, it is classified as an "urban minor arterial." The route is owned and operated by the New York State Department of Transportation (NYSDOT). In general, Maple Ridge Road is a 40 -foot wide two-lane roadway consisting of 12 -foot wide travel lanes in each direction and shoulders that vary in width from a minimum of 5 feet to a maximum of 8 feet. The roadway widens near the intersections of the Tops / Tractor Supply entrance and the S

Main Street and Gwinn Street intersections to accommodate left-turning lanes. At the S Main Street / Gravel Road (NY Route 63) intersection, there is one pedestrian crosswalk located on the north side of Maple Ridge Road. The crossing includes ADA compliant curb ramps, detectable warning units, and pedestrian push buttons and countdown timers to aid pedestrians in safely crossing S Main Street (NY Route 63). While there is not an exclusive pedestrian crossing phase with the traffic signal, the pedestrian countdown timer does provide visual indication to users when to cross the roadway safely.


Maple Ridge Road Approach to S Main Street / Gravel Road Intersection (Facing East)

Between the intersections of Gwinn Street and before the Oak Orchard Creek Bridge on the north side of Maple Ridge Road, there are granite curbs with closed drainage adjacent to concrete sidewalks. West of the S Main Street intersection there are various locations of vertical-faced concrete curb with intermittent closed drainage. These locations are primarily located near the Tops /Tractor Supply intersection. The remainder of the corridor is comprised of open drainage that utilizes sheet flow and grass lined swales that are connected to larger drainage areas by cross culverts.

The Oak Orchard Creek bridge (BIN 1022050) carries Maple Ridge Road (NY Route 31A) over the Oak Orchard Creek. Built in 1946, this steel multi-girder structure with a concrete deck has a curb-to-curb width of approximately 31.5


Sidewalks on Maple Ridge Road East of S Main Street
feet. The travel lanes are 12 feet wide and the shoulders are approximately 4 feet wide and include two-rail steel bridge rail. The bridge was last inspected in September 2018 and has a NYSDOT condition rating of 5.068. In general, ratings of 5 or higher are considered to be in good condition.

Other roadway features include street signs, one run of w-beam guide rail located between the Tim Hortons and the House of Wheels businesses on the north side of Maple Ridge Road, and roadway street lighting primarily located at intersections along Maple Ridge Road. The roadway street lighting consists of cobrahead style lighting on existing wood utility poles. Non-roadway features present within the corridor include fire hydrants, right-of-way monuments and markers, as well as overhead


[^1]and underground utilities. While these features do not change the character of the roadway, they may have an impact on any alternatives considered later in this report.

Data published by the NYSDOT in the latest version of the Pavement Data Report indicates that the pavement on Maple Ridge Road in the study area is in fair-to-good condition (Rated 6-7) with distress clearly visible or beginning to show. The NYSDOT's current 5 year capital program does not include any pavement work on Route 31/31A within the study limits.

The posted speed limit on Maple Ridge Road is 40-mph from mid-way between Charles Street and the Tops / Tractor Supply entrance in the west to the intersection of Brown Avenue in the east. Beyond these limits in both directions, the posted speed limit increases to 45 -mph to the west and $55-\mathrm{mph}$ to the east.


Example of Cobrahead Style Lighting on
Maple Ridge Road

Table 1: Maple Ridge Road Summary

| ATTRIBUTE | MAPLE RIDGE ROAD |
| :---: | :---: |
| Length | 2.1 MI |
| Speed Limit | 40-55 MPH |
| AADT (2013) | 5,078-6,153 vpd |
| Pavement Width | 40 FT |
| Lane Width | 12 FT each |
| Shoulder Width | 5-8 FT |
| Right-of-Way Width | $\begin{gathered} 60-89 \mathrm{FT} \\ \text { (70 FT Average) } \end{gathered}$ |
| Functional Classification | Urban Principal Arterial Other and Urban Minor Arterial |
| Lane Configuration | Two travel lanes; right and left turning lanes where appropriate |
| Bicycle Facilities | None |
| Pedestrian Facilities | Sidewalks for 900 FT on north side of road; minimal crosswalks; pedestrian signal at S Main Street |
| On-Street Parking | None |
| Land Use Context | Retail, Commercial, and Residential |



W-Beam Guide Rail to the East of Tim Hortons Source: Google

Left Turn Lane to Turn from Maple Ridge Road onto West Avenue (Facing West)

## TRAFFIC ANALYSIS

The following section summarizes the results of a preliminary traffic analysis of the existing conditions within the study corridor. Level of Service (LOS) approach/intersection delay were the primary conditions evaluated to assess the operational impacts. While there are ten (10) intersections located along Maple Ridge Road, only seven (7) of these are considered study area intersections. The criteria which determined which intersections were to be considered study area intersections was based on the approach roadway functional classifications and the potential interaction with adjacent study area intersections. The intersections evaluated as part of the operational analysis from west to east along Maple Ridge Road (NY Routes 31/31A) include:

- Maple Ridge Road at Tops Plaza Access
- Maple Ridge Road at Mustang Drive
- Maple Ridge Road at Gwinn Street
- Maple Ridge Road at West Avenue
- Maple Ridge Road at Main Street
- Maple Ridge Road at GCC and Pride Pak Access
- Maple Ridge Road at Bates Road

Two of the seven intersections (Maple Ridge Road at Main Street and at Tops Plaza Access) are signal controlled, while the remaining five intersections are minor street stop controlled. Maple Ridge Road is the primary corridor, with no traffic controllers at each of the stop controlled intersections.

The existing traffic analysis used AM and PM peak turning movement count data collected at the study locations by the Genesee Transportation Council. The data was collected during weekdays in November and December of year 2018. Counts taken to identify the AM peak hours were taken between the hours of 6AM to 9AM. Counts taken to identify the PM peak hours were taken between 2 PM and 6 PM. The peak hours were selected to incorporate school arrival and departure times as well as typical peak commuting hours of 7-9AM and 4-6PM. The collected turning movement data can be found in Appendix A.

Capacity analyses were performed for the existing AM and PM peak hour periods using Synchro software (v.9) to determine the LOS and delay for each of the study intersections. LOS analysis determines the ability of an intersection to accommodate vehicular traffic volume demand. The analysis uses Highway Capacity


Tops Plaza Access at Traffic Signal
Manual (HCM) 2010 methodology, and accounts for roadway characteristics such as intersection geometry, traffic control devices, and traffic (vehicle and pedestrian) volumes.

LOS is defined by letter characters that range from A to F, with A representing the best traffic operating conditions that have little or no delay to vehicles utilizing the intersection and F characterizing poor conditions that have significant delay. LOS A through D are typically considered acceptable operations for corridors that are classified as urban arterials, such as Maple Ridge Road, while LOS E is representative of conditions where improvements could be needed if traffic volumes are expected to significantly increase in the future. LOS F is considered failing operations indicating the demand exceeds the capacity of the intersection as it is currently designed, and significant delays can be expected. Additionally, a change in a LOS from $A, B$, or $C$ to $D$ as a result of proposed changes or project conditions at signalized


Mustang Drive Intersection
intersections may be considered significant and can indicate impacts resulting from the proposed Project. Under these circumstances, improvements may be needed, in the form of traffic control modification, geometric changes, or a combination of both, for the purpose of reducing vehicle delay. The delay limits for each LOS category, based on the HCM, are shown in Table 2.

Table 2: Level of Service Delay Limits

| LEVEL OF <br> SERVICE <br> (LOS) | SIGNALIZED <br> INTERSECTION <br> DELAY PER <br> VEHICLE <br> (SEC/VEH) | UNSIGNALIZED <br> INTERSECTION |
| :---: | :---: | :---: |
| DELAY PER |  |  |
| VEHICLE |  |  |
| (SECNEH) |  |  |

The existing conditions Synchro model incorporated all available traffic data including turning movement counts for all road users, heavy vehicle percentages, signal timing, and lane configuration data. The resulting LOS for the study intersections are summarized in Table 3. A detailed LOS summary can be seen in Appendix B.

As indicated in Table 3, the existing conditions operational analysis indicated that all of the intersections currently operate acceptably (LOS D or better). The Maple Ridge Road at West Avenue intersection received the lowest LOS grade of the intersection analyzed, with a grade of $D$ and an intersection delay of 29.2 seconds in the PM Peak Hour.

For minor street stop controlled intersections, the delay and LOS reported are representative of the approach with the highest delay, rather than the average delay for all vehicles passing through the intersections (which is the case for signalized intersections). To further illustrate the
existing conditions of the Maple Ridge Road / West Avenue intersection, the LOS and Delay for each approach and movement have been broken down in Table 4.

As indicated in Table 4, the existing conditions operational analysis indicated that all of the intersection's approaches currently operate acceptably (LOS D or better) for the intersection of Maple Ridge Road and West Avenue.

Table 4: Peak Hour Intersection LOS Existing Conditions (2018), Maple Ridge Road at West Avenue

| ID |  | EXISTING CONDITIONS (2018) |  |  |
| :--- | :---: | :---: | :---: | :---: |
|  |  | AM PEAK |  | PM PEAK |  |
|  | DELAY | LOS | DELAY | LOS |
| Eastbound | 0.9 | A | 0.9 | A |
| Westbound | 0.0 | A | 0.1 | A |
| Northbound | 15.0 | C | 29.2 | D |
| Southbound | 10.7 | B | 18.8 | C |

Table 3: Peak Hour Intersection LOS - Existing Conditions (2018)

| ID | INTERSECTION | EXISTING CONDITIONS (2018) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | TRAFFIC CONTROL | AM PEAK |  | PM PEAK |  |
|  |  |  | DELAY | LOS | DELAY | LOS |
| 1 | Maple Ridge Road / Tops Plaza | Signal | 15.0 | B | 11.5 | B |
| 2 | Maple Ridge Road / Mustang Drive | Minor Street Stop | 19.8 | C | 16.0 | C |
| 3 | Maple Ridge Road / Gwinn Street | Minor Street Stop | 22.8 | C | 19.7 | C |
| 4 | Maple Ridge Road / West Avenue | Minor Street Stop | 15.0 | C | 29.2 | D |
| 5 | Maple Ridge Road / S Main Street (NY Route 63) | Signal | 14.6 | B | 13.7 | B |
| 6 | Maple Ridge Road / GCC / Pride Pak | Minor Street Yield | 0.0 | A | 12.6 | B |
| 7 | Maple Ridge Road / Bates Road | Minor Street Stop | 14.8 | B | 14.7 | B |

[^2]
## CRASH ANALYSIS

Crash data for crashes along the corridor was provided by GTC using the NYS ALIS LESOR/ QRA database for the four (4) year time period from January 1st 2013 to December 31st, 2017. Data is complete for the four (4) year time period. Data was also extracted for the period between December 31st, 2017 and August 31st 2018. Table 5 summarizes the locations of crashes reported at intersections during the timeframe evaluated.

The data shows that a total of 108 crashes occurred within the 2.2 mile corridor during the period evaluated. Of these, 10 of the crashes were located at the signalized intersection of $S$ Main Street / S Gravel Road (NY Route 63) while the remaining 98 crashes occurred along the roadway segments or at unsignalized driveways and intersections. None of the 108 crashes reported involved a pedestrian or bicyclist.


Intersection of Maple Ridge Road and S Main Street / S Gravel Road (NY Route 63) (Taken from Northwest Corner Facing East)

Table 5: Intersection Crash Analysis

| INTERSECTION | NUMBER OF |
| :--- | :---: |
| CRASHES |  |$|$

NONE OF THE 108 CRASHES REPORTED INVOLVED A PEDESTRIAN OR BICYCLIST

37 CRASHES WERE LOCATED AT INTERSECTIONS AND THE REMAINING 71 CRASHES WERE ON OTHER SEGMENTS ALONG THE CORRIDOR

> PREDOMINANT ACCIDENT TYPES ARE REAR ENDS, ANIMALS, AND RIGHT ANGLE ACCIDENTS

Further review of the crash data showed a number of characteristics summarized below:

- Of the 108 crashes, $30(28 \%)$ involved an injury. There were no reported fatalities in the corridor.
- The majority of crashes 86 / 108 ( $80 \%$ ) occurred during good weather (clear or cloudy), and with dry pavement 77 / 108 (71\%) when the roadway was dry indicating that weather is not a major contributing factor.
- The data shows that the largest portion of apparent contributing factors involved driver inattention 22 / 108 (20\%) followed by animal actions with 21 / 108 (19\%).
- The data shows that there were three categories comprising nearly $80 \%$ of crashes throughout the study area which include crashes with animals 34 / 108 (31\%), rear-end crashes $30 / 108$ (28\%), and rightangle crashes 20 / 108 (19\%).
- All other categories (Overtaking, Sideswipe, Fixed Objects, Right-turn, Head-On, and Other crash types) reported less than five occurrences.
- The relatively high number of crashes involving driver behavior indicate that education and enforcement should be considered when evaluating potential corrective measures. This would be in addition to any infrastructure improvements recommended as part of this Study.

In addition to the crash analysis conducted for this Study, it is noted that the NYSDOT monitors crashes annually through their Safety Information Management System (SIMS). According to the NYSDOT's 2015 to 2017 data, various locations within the study area along Maple Ridge Road were listed as having statistically significant higher than average accident rates for the category of "Collision with Animal" crashes.

In 2016, Maple Ridge Road had statistically significant higher than average accident rates for the category of "Head On" crashes. Throughout the time period reviewed, there were two head on crashes; one during September 2015 and one during May 2016. The 2015 crash was a result of a mechanical failure in one of the vehicles. The 2016 crash was during a turning maneuver from a single entrance and a result of driver inattention and outside car distraction. While the crashes are significant, they are not a direct result of the roadway configuration, but rather driver inattention and outside car distraction, neither of which can be mitigated or improved with infrastructure modifications. As the complete streets alternatives are identified and evaluated later in this Study, the corridor's crash experience will be considered.

Figure 1: Crash Severity


Figure 2: Crash Road Surface Condition


Figure 3: Crash Type
$19 \%$ RIGHT

LEFT TURN

## PEDESTRIAN AND BICYCLE EXISTING CONDITIONS

This section discusses the existing conditions of the current pedestrian and bicycle infrastructure along Maple Ridge Road and throughout the Village. Identifying gaps in the system as well as opportunities and barriers to future implementation will help inform and prioritize Plan recommendations.

## EXISTING ACTIVE TRANSPORTATION NETWORK

This section documents the presence and use of existing pedestrian and bicycle facilities within the Study Area.

## PEDESTRIAN FACILITIES

While Maple Ridge Road has just 900 feet of sidewalk constructed on the north side of the street from Gwinn Street to just east of S Main Street (NY Route 63), the remainder of the Village of Medina is not lacking sidewalks. A majority of roads in the Village have sidewalks, often on both sides, with some gaps located throughout the Village. Despite the numerous sidewalks throughout the Village, most tend to be lacking in quality. A majority of the sidewalks, particularly on residential streets, are narrow and in poor condition.

Crosswalks of varying condition are concentrated at intersections along S Main Street, N Main Street, E Center Street, W Center Street, and Prospect Avenue. School properties also have a high amount of crosswalks, particularly at the Oak Orchard Elementary School. At the S Main Street intersection with Maple Ridge Road, there are ADA curb ramps, detectable warning units,
and pedestrian push buttons and countdown timers to aid pedestrians in safely crossing $S$ Main St (NY Route 63). While there is not an exclusive pedestrian crossing phase with the traffic signal, the pedestrian countdown timer does provide visual indication to users when to cross the roadway safely.


Good sidewalk condition along north side of Maple Ridge Rd looking west from the bridge


Good crosswalk condition at intersection of W Center St and Prospect Ave


Poor sidewalk condition along south side of Park Ave looking east from Gwinn St


Poor crossing condition (no crosswalk and poor drainage) at intersection of Gwinn Street and school entrance

## BICYCLE FACILITIES

The Erie Canalway Trail, running east-west through the northern portion of the Village, provides the only form of dedicated bicycle facilities in the Study Area. The Erie Canalway Trail is a shared use path running 350 miles from Albany to Buffalo and is approximately $80 \%$ complete at this time. This cross-state trail is also included in the Empire State Trail initiative which will result in a $100 \%$ complete Erie Canalway Trail by the end of 2020.

The Village of Medina's streets and Maple Ridge Road have very few, if any, bicycle facilities outside of the Erie Canalway Trail. While NYS Bike Route 5 travels along Center Street (Routes 31 and 31E) through the Village, the route is largely unsigned, unmarked, and in poor condition for bicycling. Though in poor


Erie Canalway Trail in Medina
condition, the designation of NYS Bike Route 5 coupled with local, regional, and statewide efforts to improve bikeability and accessibility provide a precedent for improved bicycle facilities along Center Street to create a safer and more comfortable NYS Bike Route 5.

While the Village's streets do not provide dedicated space for bicyclists, that is not to say there are no streets in the Study Area suitable for bicycling. Local streets with low traffic volumes and low travel speeds can be safe and enjoyable streets for bicyclists of all ages and abilities. Identification of these types of streets, sometimes referred to as "bicycle boulevards," can help create a network of streets already appropriate for bicycle travel throughout the Village.


State Bike Route 5 in Medina

## MAPLE RIDGE ROAD CORRIDOR STUDY

VILLAGE BICYCLE \& PEDESTRIAN INFRASTRUCTURE

## EXISTING

- SHARED USE PATH

PROPOSED/STUDIED

- STATE BIKE ROUTE
- SIDEWALKS
= - PROPOSED TRAIL
-     - TRAIL STUDIED BUT NOT FEASIBLE

DESTINATIONS
© PARK
(1) SChOOL
© college
(1) LIBRARY
(H) HOSPITAL
(I) HISTORIC SITE
GTC
(2) BUSINES PARK
(:) PASSENGER RAIL STATION


## TIME-LAPSE CAMERA ANALYSIS

As part of the data collection period, GTC installed five time-lapse cameras at the following three locations:

- Bridge over Oak Orchard Creek (1): one camera was placed on the south side of Maple Ridge Road on the west side of the bridge facing east.
- Tim Hortons (2): one camera was placed on the south side of Maple Ridge Road on the east side of Tim Hortons facing west while the other camera was placed on the north side of Maple Ridge Road on the west side of Tim Hortons facing east.
- Salt Works Road Intersection (2): one camera was placed on the south side of Maple Ridge Road on the west side of the intersection facing east while the second camera was placed on the south side of Maple Ridge Road on the east side of Salt Works Road facing north.

These cameras continuously collected timelapse photo data at these locations from November 13th, 2018 to November 20th, 2018. Two 24-hour long videos, one weekday and one weekend day, were analyzed for each of the five camera locations to understand pedestrian and bicycle travel at these locations as well as identify any other notable events.


Pedestrians are present in all weather conditions

## PEDESTRIAN OBSERVATIONS

The time lapse data from the camera facing east at the bridge over Oak Orchard Creek was reviewed on Tuesday, 11/13 and Wednesday, $11 / 14$. On Tuesday there were 22 pedestrians observed walking in either direction and on Wednesday there were 20 pedestrians. Out of the 42 people recorded, 38 chose to walk on the north side of the road and four (4) preferred the south side of the road regardless of the direction they were heading. Once the sun set it became difficult to note pedestrians walking in the darkness but there were two (2) that could be seen as cars were driving past.

At the camera facing west near Tim Hortons, ten (10) pedestrians were recorded on Tuesday, 11/13 and there were 15 noted on Saturday, $11 / 17$. Of the 25 pedestrians, 15 preferred to walk on the south side of the road while the other ten (10) preferred the north side.

At the alternate camera facing east at Tim Hortons, there were seven (7) pedestrians recorded on Tuesday, 11/13 and 11 on Saturday, $11 / 17$. Overall, nine (9) out of the 13 recorded chose to walk on the north side of the street regardless of travel direction and the other four (4) preferred to walk on the south side.

There were no pedestrians recorded at either of the north or east facing cameras at the Salt Works Road intersection.


Pedestrians are observed on the bridge at night

## OTHER OBSERVATIONS

The camera facing east at the bridge over Oak Orchard Creek was reviewed on Tuesday, 11/13, and Wednesday, 11/14. A total of three (3) cyclists were recorded and each one was riding on the correct side of the road.

At the camera located near Tim Hortons facing west, there were zero (0) cyclists recorded on Tuesday, 11/13, however a box truck was noted to be parked on the north side of the road for approximately five (5) minutes around 10am. Approximately half an hour later, a tractor trailer parked in the same spot for about seven (7) minutes. On Saturday, 11/17, three (3) cyclists were noted and two (2) of them used the correct side of the road.


Families walk together on the shoulder


Pedestrians tend to walk on the north side regardless of their direction of travel

The alternate camera near Tim Hortons that was positioned to the east had similar recordings to the west-facing camera. There were no cyclists noted on this camera, however a tractor trailer parked on the north shoulder for about seven (7) minutes on Tuesday, 11/13. On Saturday, 11/17, a tractor trailer parked in the same location for about eight (8) minutes and shortly after that a pickup truck parked in the same space for six (6) minutes.

There were no cyclists or other observations recorded at either of the north or east facing cameras at the Salt Works Road intersection.


Truck parked on north side of road outside Tim Hortons


Bikes were observed riding on the shoulders

## STRAVA GLOBAL HEATMAP

The following descriptions of bicycling and walking trends throughout the Village are informed by Strava's Global Heatmap. Strava is a social fitness network used by individuals to track a wide range of athletic activities, including bicycling and walking. Users use the Strava application during workouts to track their activity type, distance, speed and other related factors. The application does have to be initiated before tracking movement. Therefore, it is a typically a better indicator of where people travel when exercising than where people are walking and bicycling to run errands. It does, however, provide information on where bicyclists, pedestrians, and joggers prefer to exercise which, in turn, helps inform about comfortable routes for these types of activities. The Strava Global Heatmap does not directly provide the number of people using the application or bicycling and walking in this area, but it does provide a density-based heatmap of popular bicycling, walking, and jogging routes throughout the Village according to local Strava users.


Strava Walking Heat Map
Source: Strava

## WALKING/JOGGING

As expected, the walking/jogging Strava Global Heat Map reveals some of the heaviest use on the Erie Canalway Trail. High density use of the Strava application for walking and jogging can be found, unsurprisingly, at the track behind the Medina High School as well as a loop around the Takeform parking lot located off of Maple Ridge Road. Another high-density loop can be found along Prospect Avenue, Gwinn Street, Maple Ridge Road (north side), Main Street (east side), and a walkway located on the south side of the Erie Canal. Lighter walking/jogging use can be found along East Center Street, west Center Street, and walkways within and between the school campuses. The trends depicted on this map, particularly the Village-wide loop, are likely the result of a few people in the Village walking or jogging along the same routes consistently. They do, however, indicate comfortable routes in the Village for walking and jogging. Additionally, the lack of pedestrians and joggers observed on the majority of Maple Ridge Road (according to Strava data) indicate it is not a comfortable roadway for this type of activity. Future recommendations regarding comfortable walking routes to connect Maple Ridge Road to destinations throughout the Village will consider these walking and jogging trends.

## BICYCLING

The bicycling Strava Global Heatmap reveals distinct roads and trails frequently traveled by Strava bicyclists. Unsurprisingly, the Erie Canalway Trail on the north end of the VIllage is one of the most popular bicycle routes in the area. Popular on-road bicycling routes are located on Center Street (NYS Bike Route 5), Prospect Avenue, Main Street (concentrated between Prospect Avenue and Park Avenue), and Gwinn Street. It is important to note that, according to this data, bicycle trips along Gwinn Street begin and/or end at the Medina Central Schools, rarely extending further south along Gwinn Street to the intersection of Maple Ridge Road. This shows a high percentage of bicycling trips along Gwinn Street are specifically meant to access school properties. This could
mean students and teachers are bicycling to school, or residents and students are bicycling to school to access other facilities, such as the track. This trend shows a clear desire to provide safe and comfortable bicycling access from the downtown to school properties. Additional roads experiencing bicycle use are Salt Works Road, Maple Ridge Road, Main Street (from Park Avenue to Maple Ridge Road), and Park Avenue. The data also reveals a small amount of bicycle use on West Avenue, Bates Road, and East Oak Orchard Street. Future recommendations to safely and comfortably connect bicyclists to destinations throughout the Village as well as Maple Ridge Road will consider the bicycling trends revealed in the Strava Global Heatmap.


[^3]Source: Strava

## EXISTING PUBLIC TRANSIT SERVICE

Bus service in the Village of Medina is operated by Regional Transit Service (RTS) Orleans. Route 202 bus service travels from between the Walmart in Albion to the Village of Medina by way of Route 31 during the week (Monday Friday) and Route 205 operates between Albion and Medina on Saturdays only.

## ROUTE 202

While the bus stops at specific locations such as the hospital, Tops, GCC, and Maple Ridge Estates, there are few other formal stops along the route. Alternatively, people are able to flag down a bus anywhere on the fixed route by waving at the driver to stop. Additionally, users can call RTS Orleans to inform the driver that someone intends to flag the bus for a pick-up along the route.

There are specific turn-by-turn directions on the fixed route as it travels through the Village. The RTS Orleans Public Transit Map depicts the route as well as travel directions. The turn-by-turn directions are also listed in this section. The one-directional loop route through the Village, generally moving in a counter-clockwise manner, before heading back to Albion, limits the ability for some riders, depending on where they board, to access all destinations without first traveling to Albion and back. For example, someone boarding the bus at Maple Ridge Estates wishing to go to the Tops to purchase groceries must remain on the bus all the way to the Walmart in Albion, where it turns around and heads back to Medina, before stopping at Tops.


Route 202 Bus on Maple Ridge Road

ROUTE 202 TURN-BY-TURN DIRECTIONS

- Begin at Walmart in Albion
- Turn Left: Route 31
- Turn Right: Bates Road
- Turn Left: North Street
- Turn Left: State Street
- Turn Right: E Center Street
- Turn Right: N Main Street
- Turn Left: Eagle Street
- Turn Right: Ohio Street
- Turn Left: Medina Memorial Hospital
- Turn Right: Ohio Street
- Turn Right: W Center Street
- Turn Left: Salt Works Road
- Turn Left: Park Avenue
- Turn Right: West Avenue
- Turn Right: Maple Ridge Road
- Turn Left: Tops Plaza
- Turn Right: Maple Ridge Road
- Turn Right: GCC
- Turn Left: Maple Ridge Road
- Turn Right: Ricky Place/Maple Ridge Estates
- Turn Right: Maple Ridge Road
- Turn Right: S Main Street
- Turn Right: E Center Street
- Turn Right: East Avenue
- Turn Left: E Oak Orchard Street
- Turn Left: Bates Road
- Turn Right: E Center Street (Route 31)
- End at Walmart in Albion


## MAPLE RIDGE ROAD CORRIDOR STUDY

RTS ORLEANS PUBLIC TRANSIT

- ROUTE 202 BUS SERVICE
$\rightarrow$ DIRECTION
- TURN CUES (IF NECESSARY)


## DESTINATIONS

© PARK
(c) SCHOOL
(H) HOSPITAL
© COLLEGE
(il) HISTORIC SITE
(b) LIBRARY
듕 BUSINES PARK
(:) PASSENGER RAIL STATION

## GTC alta <br> LANNING + DESIGN



## GAP ANALYSIS

The Gap Analysis identifies missing links in the active transportation network both along the corridor as well as the Village as a whole. Identification of these gaps, particularly between major destinations in the Study Area, will later inform recommendations for future pedestrian and bicycle infrastructure.

## PEDESTRIAN GAPS

Maple Ridge Road does not have any pedestrian infrastructure with the exception of 900 feet of sidewalk on the north side of the road from Gwinn Street to just east of S Main Street. The lack of sidewalks, however, is not deterring people from walking along the roadway either in the shoulder or adjacent to the pavement. The prevalence of walking along the corridor regardless of appropriate pedestrian facilities shows that Maple Ridge Road is a gap in the Village's pedestrian network. Constructing sidewalks along the corridor will provide a safe facility for all pedestrian and provide access to amenities and key destinations throughout both Maple Ridge Road and the Village.

While there is an extensive sidewalk network throughout the Village, the sidewalks are of varying quality and the network contains some gaps throughout the Village. Closure of significant gaps in the Village pedestrian network will improve mobility as well as access to key destinations throughout the Village.

SIGNIFICANT GAPS IN THE VILLAGE SIDEWALK NETWORK ARE FOUND ON:

- Gwinn Street: no sidewalks on west side from W Oak Orchard Street to Maple Ridge Road
- Orient Street: no sidewalks on either side from Starr Street to E Center Street and no sidewalks on east side of street for 650 feet moving north from S Main Street
- Commercial Street: no sidewalks on the north side from Glenwood Avenue to Prospect Avenue and no sidewalks on either side from Ann Street to Ohio Street
- Church Street: no sidewalks on the oneway portions of the roadway just south of E Center Street and no sidewalks on west side from S Main Street to E Oak Orchard Street
- E Oak Orchard Street: no sidewalks on north side from just east of Orient Street to Mahar Street and few sidewalks on either side from Waverly Avenue to Bates Road
- W Oak Orchard Street: no sidewalks on either side from Genesee Street to west end on road
- E Center Street: no sidewalks on south side for 0.3 miles west of Bates Road and no sidewalks on north side for 230 feet west of Bates Road
- Mustang Drive: no sidewalks for 800 feet of northern portion from Gwinn Street and no sidewalks for 800 feet of southern portion from Maple Ridge Road
- Ohio Street: no sidewalks on west side from W Center Street to Cook Alley and no sidewalks on either side from Cook Alley to Canal Street
- Lee Place: no sidewalks on south side from Catherine Street to just east of Prospect Avenue and no sidewalks on either side from just east of Prospect Avenue to west Avenue
- North Avenue: no sidewalks on north side from Genesee street to Gwinn Street and few sidewalks on north side from West Avenue to S Main Street
- East Avenue: no sidewalks on east side for 930 feet
- Genesee Street: no sidewalks on west side from South Avenue to W Oak Orchard Street
- Olive Street: no sidewalks on west side for 260 feet and no sidewalks on east side for 340 feet
- Florence Avenue: no sidewalks on west side for 450 feet and no sidewalks on east side for 550 feet
- Park Avenue: no sidewalks for 0.48 miles on north side (intermittent sidewalks) from Ohio Street to Salt Works Road and no sidewalks on south side for 0.35 miles on south side from end of Baxter Healthcare parking lot to Salt Works Road
- North Street: few sidewalks on north side from State Street to Bates Road and no sidewalks on south side from Starling Drive to Bates Road
- Chadwick Street: few sidewalks on north side from State Street to Starling Drive and no sidewalks for 910 feet west of Starling Drive
- Elizabeth Street: no sidewalks for 590 feet on south side
- Worthy Avenue: no sidewalks for 570 feet on north side and no sidewalks for 370 feet on south side
- Elwood Avenue: no sidewalks for 870 feet on north side and no sidewalks for 280 feet on south side
- Ensign Avenue: few sidewalks on south side
- Mead Avenue: no sidewalks on either side from Elwood Avenue to Elizabeth Street
- Other streets with no sidewalks on either side: Salt Works Road, Bates Road, James Street, Maple Street, Cook Alley, Canal Street, Brennon Place, Proctor Place, Bennett Place Demming Way, Pine Street, Bernzomatic Drive, Waverly Street, Mahar Street, Eastview Drive, Zacher Drive, Lakewood Village, Woodland Avenue, Kennedy Circle, Howell Parkway, Starling Drive



## "Desire Lines" on Maple Ridge Road

This "desire line" or "goat path" located west of Gwinn Street on the north side of Maple Ridge Road indicates the area is being used by pedestrians regardless of the lack of appropriate facilities. Construction of sidewalks here would provide a dedicated space for the pedestrians that frequent this corridor.


## Pedestrian Tracks on Maple Ridge Road

These tracks in the snow are located west of Gwinn Street on the south side of Maple Ridge Road and indicate pedestrians walk along the corridor regardless of the lack of appropriate facilities or conditions. Construction of sidewalks and appropriate winter maintenance would provide a safe, comfortable space for pedestrians.


## Pedestrian Tracks on Maple Ridge Road

These tracks in the snow are located west of the bridge over Oak Orchard Creek on the north side of Maple Ridge Road. They indicate pedestrian activity across the bridge and the desire to distance themselves from the motor vehicle traffic as quickly as possible. A pedestrian bridge separate from the road would provide users with a safe, comfortable space to walk.

## BICYCLE GAPS

While State Bike Route 5 is located on W Center Street (Route 31E) and E Center Street (Route 31) through the Village, there are no dedicated facilities for bicyclists in the Village or along Maple Ridge Road with the exception of the Erie Canalway Trail. As previously stated, low volume and low speed streets can be comfortably used by bicyclists to travel throughout a large portion of the Village. Maple Ridge Road, along with other major roadways connecting to key destinations in the Study Area, do not fall under this category. The higher speeds and traffic volumes of these types of streets warrant dedicated bicycle infrastructure to facilitate safe and comfortable bicycle travel to and from major destinations. The following roadways that should be considered as "gaps" in the Study Area's bicycle network:

- Maple Ridge Road
- S Main Street/Main Street/N Main Street/ Commercial Street
- W Center Street/E Center Street (State Bike Route 5)
- Park Avenue (from Ohio Street to Main Street)
- Salt Works Road
- Bates Road


State Bike Route 5 runs along W Center Street (State Route 31E)


Many low-volume residential streets in the Village, such as Catherine Street, can be considered bike boulevards

## OPPORTUNITIES AND BARRIERS

The prevalence of the existing sidewalk network throughout the Village shows a desire for walking and a need for adequate pedestrian facilities connecting to key destinations and residential areas.

## OPPORTUNITIES:

Wide Shoulders: The shoulders along Maple Ridge Road range from 3 feet 10 inches to 8 feet. The shoulders are 8 feet wide along a majority of the corridor, narrowing to 5 to 6 feet wide between the school and S Main Street, and narrowing further to 3 feet 10 inches to 4 feet wide along the bridge over Oak Orchard Creek. The wide shoulders can be used to implement on-road bicycle facilities, providing a dedicated and more comfortable space for bicyclists, or simply preserved and utilized as bike space with many of the same benefits. In areas with narrow shoulders, also called "pinch points," other treatments will need to be explored and designs will need to provide safe transitions if facility types change from one area to the next.


8-foot Shoulders near Tops Plaza

Right-of-Way along Maple Ridge Road: The public right-of-way along Maple Ridge Road ranges from 60 to 89 feet wide, with a majority of the corridor right-of-way width ranging from 66 to 74 feet. Given that the pavement width is typically 40 feet (though it widens in some areas), an ample amount public right-of-way is available for implementation of active transportation facilities. This right-of-way can be used to construct sidewalks for pedestrians or shared-use path or sidepath for both pedestrians and bicyclists. In areas where the pavement width does not allow for bicycle facilities, the wide right-of-way may enable NYSDOT to widen the roadway to provide space for bicyclists.


Shoulders Narrow to less than 4 Feet across the Bridge

## Extensive Pedestrian Network within Village:

While Maple Ridge Road has few sidewalks, the Village of Medina has an extensive sidewalk network. This provides a precedent to construct sidewalks on Maple Ridge Road for two reasons:

1. There is a clear desire for pedestrian facilities throughout the Village, and;
2. Sidewalk connections from Village amenities and destinations to Maple Ridge Road are already in place.

The Village can capitalize on the existing sidewalks to further expand the pedestrian network throughout the Village by implementing sidewalks along Maple Ridge Road.

School Support for Pedestrian and Bicycle
Facilities: Approximately 300 students walk and/or bike to and from school each day. School officials are in support of new and improved active transportation facilities as well as improved vehicle access along Maple Ridge Road to safely and efficiently facilitate travel to and from school grounds for all travel modes. If intersection improvements are warranted, the school may be able to contibute resources to improve the safety of the intersection of Mustang Drive and Maple Ridge Road.


Intersection of Mustang Drive and Maple Ridge Road at School Dismissal

## BARRIERS:

Available Funding: A lack of funding to implement proposed projects is a common barrier to any public realm project. The small size of jurisdictions such as the Village of Medina and Town of Shelby often have limited budgets for public improvements. Small budgets can be pulled in many directions and tend to be focused on high-priority and high-necessity projects, often leaving little to no funds for pedestrian and bicycle infrastructure. If local funds are not available for these types of projects, there are federal, state, and private grants for the Village and Town to apply for. This Study will discuss some of the funding opportunities available for the proposed recommendations.


Maple Ridge Road (NYS Route 31 and 31A) is Owned and Maintained by NYSDOT (Photo Facing West from the East Side of S Main Street)

Existing Roadway Geometrics: The current corridor geometrics cannot be easily reconfigured. The road is straight for the entire 2.1 mile length and includes a crown. A crown is typically in the middle of the road and signifies the highest point of the paved roadway area. The pavement slopes downward slightly, often unnoticeable to motorists, to manage water runoff. Lane reconfiguration would require extensive roadway reconstruction due to these existing geometrics of Maple Ridge Road.


Maple Ridge Road Geometrics (Photo Facing East from the Bates Road Intersection)

## REVIEW RELEVANT PLANS, ZONING CODES, AND LAND USE POLICIES

Understanding existing policies, programs, and plans for improving access and mobility in the area will help inform the recommendations and goals included in this Study.


New York State Pedestrian Safety Action Plan

## NEW YORK STATE PEDESTRIAN SAFETY ACTION PLAN ${ }^{3}$

The New York State Pedestrian Safety Action Plan (PSAP) was completed in June of 2016 with the cooperation of three major State agencies: the Department of Transportation (DOT), the Department of Health (DOH), and the Governor's Traffic Safety Committee (GTSC). The purpose of the PSAP is to "identify the current safety conditions and to recommend a distinct set of engineering, education, and enforcement countermeasures that can be accomplished over the next 5 years to improve pedestrian safety." The PSAP identifies two measurable goals:

- Reduce pedestrian fatalities by $20 \%$ from 3351 in 2013 to 268 in 2021.
- Reduce pedestrian injuries by $10 \%$ from 16,2782 in 2013 to 14,650 in 2021.

In response to the existing pedestrian conditions throughout the state and the goals to reduce pedestrian fatalities and injuries, the PSAP identifies multiple recommendations to achieve these goals under the overarching categories of Engineering, Education and Enforcement, and Data and Data Systems.

## Engineering Recommendations:

- Implement engineering countermeasures that improve pedestrian safety in urban areas.
- Emphasize locations with high numbers of pedestrian crashes in the New York State Department of Transportation's Annual Regional Work Program.


## Education and Enforcement Recommendations:

- Raise both driver and pedestrian awareness of the pedestrian safety issue and promote behavior change in order to reduce pedestrian injuries and fatalities statewide.
- Conduct a statewide Public Information and Education Campaign.
- Increase knowledge among law enforcement regarding pedestrian safety and increase enforcement through targeted "Operation SEE! BE SEEN!" pedestrian safety mobilization efforts.
- Conduct dedicated enforcement details to address pedestrian safety.


## Data and Data Systems Recommendations:

- Enhance the data and processes in New York State's information systems to include the following:
- enhanced intersection data
- available transit data
- a process to analyze all public roads in order to identify local locations with a high number of pedestrian crashes and corridors with a potential for crash reduction
- a linear referencing system that includes local roads; and
- additional traffic counts on local roads.
- Introduce a pilot pedestrian counting program to investigate best practices and determine pedestrian volumes and exposure.
- Develop a pedestrian safety web page available to the public that contains information pertinent to pedestrian safety, as well as dashboards showing pedestrian crash trends.

Future recommendations made in this Study will consider the goals of the PSAP, especially considering Maple Ridge Road's State Route designation.

## WESTERN ORLEANS COMPREHENSIVE PLAN ${ }^{4}$

The Western Orleans Comprehensive Plan (WOCP), adopted in 2019, provides a framework for future development in Western Orleans communities for the next 20 years. This includes guidance for future development and land use in the Towns of Shelby, Ridgeway, and Yates, as well as the Villages of Medina and Lyndonville. The WOCP discusses recent development along Maple Ridge Road, particularly east of Main Street (NY Route 63), and the lack of pedestrian facilities which decreases pedestrian accessibility in the area and creates a barrier between key destinations along the corridor and the Village Downtown. Respondents indicated that the lack of sidewalks was a major concern and inhibited pedestrian mobility, particularly along Maple Ridge Road. The plan also recommends trail connections from Maple Ridge Road to E Oak Orchard Street as well as S Main Street and Orient Street by way of John E. Butts Memorial Park.

## WOCP GOALS

MAINTAIN THE COMMERCIAL VITALITY OF THE VILLAGE OF MEDINA DOWNTOWN BUSINESS DISTRICT

- Action Item: Maintain and improve streets and sidewalks to enhance the pedestrian environment.

IMPROVE VEHICULAR AND PEDESTRIAN CIRCULATION

- Action Item: Encourage the installation of sidewalks on Village streets that lack sidewalks.

According to the survey conducted as part of the WOCP:

- 75.9\% of all respondents indicated recreational trail development or improvement as "very important" or "important." 72.4\% of Medina resident respondents indicated this topic is "very important" or "important."
- 74.8\% of all respondents indicated bicycle facility development or improvement as "very important" or "important." 72.7\% of Medina resident respondents indicated this topic is "very important" or "important."
- $\mathbf{8 4 . 0 \%}$ of all respondents indicated pedestrian facility development or improvement as "very important" or "important." 72.1\% of Medina resident respondents indicated this topic is "very important" or "important."
- $58.8 \%$ of respondents residing in Medina indicate the condition or lack of sidewalks is a "serious problem." A much higher percentage than respondents from any other community (Lyndonville: 4.0\%, Ridgeway: 15.8\%, Shelby: 16.4\%, and Yates: 24.7\%).

The recommendations made in this Study will consider the goals, survey responses, and outcomes of the WOCP.
"SIDEWALKS EXIST ALONG ONLY PORTIONS OF MAPLE RIDGE ROAD AND THE AREA IS NOT AS CONVENIENTLY ACCESSIBLE TO PEDESTRIANS AS IS THE DOWNTOWN BUSINESS DISTRICT."

- WESTERN ORLEANS COMPREHENSIVE PLAN


## "DUE TO THE LACK OF SIDEWALKS ON MAPLE RIDGE ROAD PEDESTRIAN TRAFFIC GENERATED BY THE MBP (I.E., EMPLOYEES) ARE LARGELY ISOLATED FROM THE CBD."



Pedestrian Observed along North Side of Maple Ridge Road West of Gwinn Street

## GTC REGIONAL WALKABILITY IMPROVEMENT PROGRAM ${ }^{5}$

The Genesee-Finger Lakes Regional Walkability Improvement Program, funded by the Federal Highway Administration (FHWA) and prepared for the Genesee Transportation Council (GTC), was finalized in 2016. The Program was conducted to examine existing pedestrian facilities of the cities, towns, and villages throughout the GeneseeFinger Lakes Region through Walkability Audits. The audits led to the development of Walkability Action Plans for each individual jurisdiction which include recommendations that, if implemented, will improve pedestrian safety, accessibility, convenience, and comfort on the pedestrian networks within the communities. The Village of Medina was included in this Program. The Medina


GTC Regional Walkability Improvement Program

Walkability Action Plan aims to identify physical improvements to the pedestrian network as well as educational and promotional programming and policies to encourage safe travel and behavior on the Medina pedestrian network. The Medina Walkability Audit included a windshield tour of the pedestrian network as well as a walking tour of the Village to identify opportunities for network improvements.

This audit resulted in the following list of opportunities and challenges:

- Lack of funding for sidewalk repairs.
- Poor sidewalk conditions force pedestrians into streets.
- Sidewalk maintenance is the homeowner's responsibility, but it is not enforced. Village program to assist in sidewalk repair by removing the old material is not well known.
- NYS Bike Route 5 is in poor bicycling condition (e.g. narrow, not signed, drainage grates which are unsuitable for bicyclists).
- Crosswalks are substandard or non-existent, particularly on Gwinn Street (school access) and Main Street (neighborhood and park access).
- Zoning code does not have sidewalk requirements for new developments.
- Lack of signage to encourage bicyclists or boaters along the Erie Canal to visit downtown.
- Poor road conditions.
- OTS bus service heavily utilized.


Students Walking and Biking following School Dismissal

Based on the walk audit, the Medina Walkability Action Plan developed the following recommendations to address the opportunities and challenges facing walkability in the Village:

- Develop a wayfinding program to direct pedestrians and bicyclists to landmarks, natural features, local businesses, and major destinations throughout the Village.
- Implement traffic calming measures to reduce vehicle speed and create a safer environment for pedestrians and bicyclists throughout the Village with additional attention given to streets that provide access to schools and parks (Gwinn Street and Main Street).
- Enhance the connection between the Village downtown and Maple Ridge Road by adding a shared use path or sidewalks to Maple Ridge Road or widening sidewalks to create shared use paths.
- Implement bicycle facilities on Center Street (NYS Bike Route 5) and Main
Street as well as bicycle boulevards along other Village streets to connect to key destinations to enhance bikeability in the area.
- Adopt and implement policies and programs such as a Complete Streets Policy, Sidewalk Improvement Program, Infill Development Incentives, and Development and Design Guidelines to direct future plans and designs for Village roads and buildings to support maintenance and construction of new pedestrian and bicycle infrastructure.
- Conduct educational and encouragement programs such as walking tours and development of bike and walking maps to promote walking and bicycling in the Village as well as local destinations.


## MAPLE RIDGE ROAD OVERLAY DISTRICT (§ 254-33)6

The Maple Ridge Road Overlay District was put in place to provide requirements for best design practices for new developments along Maple Ridge Road. In addition to standard zoning regulations, new developments need to adhere to the supplemental zoning regulations outlined in this Code. The main purpose of the Overlay District is to ensure future aesthetics of development along the corridor is consistent and aesthetically pleasing to the general public. The Overlay District code primarily provides
regulations on landscape, building, and parking requirements for new development along the corridor. Pedestrian circulation is mentioned in item F.1.a: Specifications - Minimum Setback Requirements: "All buildings shall be set back not less than 75 feet from the street right-ofway...Pedestrian circulation, utility facilities, and accessways shall be allowed in this area." Indicating that installation of pedestrian facilities is encouraged between the roadway and any new building constructed along the corridor.

## SUMMARY OF PAST PLAN PHYSICAL RECOMMENDATIONS

A SUMMARY OF THE HIGH PRIORITY PHYSICAL PEDESTRIAN- AND BICYCLE-RELATED RECOMMENDATIONS ACCORDING TO THE DOCUMENT REVIEW CONDUCTED IN THIS SECTION IS LISTED BELOW:

- Maple Ridge Road: shared use path or sidewalks and crosswalks at Mustang Drive (school access) and South Main Street (NY Route 63).
- Center Street: bicycle facilities on roadway to create a safer and more comfortable NYS Bike Route 5.
- Gwinn Street: traffic calming elements and a crosswalk to improve safety and accessibility at school properties.
- Main Street: traffic calming elements and bicycle facilities on roadway to create a safe and comfortable route between Maple Ridge Road and downtown as well as the Erie Canalway Trail.
- South Main Street (NY Route 63): midblock crossing at John E. Butts Memorial Park.
- West Oak Orchard Street: crosswalk at entrance to Oak Orchard Elementary School.

Note: The portion of the Village of Medina code which pertains to bicycles (Chapter 70) can be found in Appendix D

## PLANNED TRANSPORTATION IMPROVEMENTS

It is common to couple implementation of pedestrian and bicycle projects with planned improvements such as repaving of roadways or construction of new developments. Identifying planned improvements to roadways and other related developments may reveal opportunities to incorporate projects for new or improved vehicle access and pedestrian and bicycle infrastructure. Additionally, identifying relevant projects planned for adjacent towns and villages identifies opportunities for inter-municipal collaboration. Identifying these planned projects and their potential to include new or improved active transportation infrastructure in advance will be of great value during implementation of the recommendations included in this Study.

## PEDESTRIAN BRIDGE FUNDING OVER OAK ORCHARD CREEK

Funding has been made available by the Town of Shelby and the Village of Medina to construct a pedestrian bridge over Oak Orchard Creek. The existing bridge is frequently utilized by pedestrians and has shoulders ranging in 3 feet to 4 feet in width, putting pedestrians very close to motor vehicles traveling at 40 MPH . Construction of a pedestrian bridge, which is likely to be located on the north side of the roadway, will provide a safe, comfortable, and dedicated space for pedestrians traveling along Maple Ridge Road.

If additional funding is available after construction of the pedestrian bridge, the Village intends to use any leftover funds to construct sidewalks extending east from the
bridge along Maple Ridge Road. If constructed, these sidewalks would provide a valuable connection for the residents of Ricky Place to amenities along the corridor as well as downtown.

## PLANNED RESURFACING PROJECTS (NYSDOT)

The Study Area is located within Region 4 of the New York State Department of Transportation (NYSDOT). NYSDOT does not currently have any planned road resurfacing or construction projects on Maple Ridge Road or in the Village of Medina. Ongoing collaboration with NYSDOT may reveal opportunities to implement the recommendations included in this Study along with future roadwork on the corridor and within the Study Area.

## FUTURE MEDINA BUSINESS PARK DEVELOPMENT

The Medina Business Park (MBP), located on the eastern end of the corridor to the west of Bates Road, is a major employment hub in the area. MBP is currently home to PridePak, Takeform, and BMP America. MBP, which has grown steadily recent years, expects additional development in the near future. Site plans have been drafted for new commercial facilities, such as a $50+$ room hotel and medical facilities. Other land parcels in this area, located on both the north and south sides of the corridor, are zoned for industrial and light industrial development.

## CORRIDOR IMPROVEMENT CASE STUDIES

This section includes case studies of corridors which have undergone improvements to vehicular access, pedestrian, and bicycle facilities which illustrates the effect improved roadway designs can have on the user experience and safety of a corridor.

Case study corridors include:

- Main Street, Hamburg, New York
- Madison Avenue, Albany, New York
- University Avenue, Rochester, New York
- NY Route 31, Macedon, New York

Table 6 provides a summary of all corridors, including Maple Ridge Road.

## MAIN STREET, HAMBURG

Main Street (US Route 62) runs for approximately a half a mile from Lake Street to Buffalo Street in the Village of Hamburg, New York. Hamburg is located in Western NY in Erie County and is home to 9,603 residents according to 2017 ACS population data. Main Street, largely comprised of residential and retail land uses, has a speed limit of 30 MPH and services just under 10,700 vehicles per day. Sidewalks line both sides of the corridor and crosswalks are present at intersections and appropriate midblock crossings. Bicyclists can use painted bike lanes located between the travel lane and on-street parking lane. Additionally, there are sharrows indicating travel lanes should be shared with bicyclists. The sharrows may have been implemented to facilitate left turns by bicyclists from the travel lane. There are two traffic circles located at the Center Street and Buffalo Street intersections.


Main Street, Hamburg
Source: Google

## MADISON AVENUE, ALBANY

Madison Avenue (US Route 20) runs for approximately 1.6 miles from Lark Street to Western Avenue in Albany, New York. Madison Avenue underwent a road diet in 2018, transforming the four lane roadway with parking into a road comfortable for all users. It is now comprised of two travel lanes, a two-way left turn lane, bicycle facilities, and on-street parking. This corridor, which is located in the heart of Albany, serves as a major connection to residential areas, downtown, and recreation opportunities, such as Washington Park, for all modes of transportation. Madison Avenue, largely comprised of residential, retail, and recreation land uses, has a speed limit of 30 MPH and services just under 14,800 vehicles per day. The corridor has sidewalks on both sides and crosswalks at intersections. Bicyclists can use dedicated bike lanes located between the travel lane and on-street parking lane. The corridor design also includes intersection crossing markings for bicyclists, indicating to turning motorists that there may be bicyclists riding through the intersection in the bike lane area.


Madison Avenue, Albany
Source: Google

## UNIVERSITY AVENUE, ROCHESTER

University Avenue runs for approximately 1.1 miles from Blossom Road to Union Street in Rochester, New York. University Avenue is part of Rochester's ARTWalk system which is "a permanent urban art trail, connecting the arts centers and public spaces within the Neighborhood Of The Arts (NOTA)"." University Avenue, home to residential, retail, and commercial land uses, has a speed limit of 30 MPH and services just under 10,800 vehicles per day. The corridor has sidewalks on both sides, crosswalks at intersections, and mid-block crossings were necessary. Sharrows are used to highlight travel lanes as shared lanes between bicycles and vehicles. The corridor design also includes colored pavers on sidewalk treatments and landscaped medians where left turn lanes are not necessary.


University Avenue, Rochester
Source: Google

## ROUTE 31, MACEDON

Route 31 (Pittsford-Palmyra Road/W Main Street/W Market Street) runs for approximately 1.6 miles from Canandaigua Road to O'Neil Road in Macedon, New York. This portion of Route 31 has speed limits ranging from 30 MPH to 45 MPH and services just over 12,200 vehicles per day. The land uses along this corridor are very similar to that of Maple Ridge Road including large and small retail and commercial locations with some residential areas nearby.

The corridor has sidewalks on both sides for approximately 3000 feet ( 0.57 miles) west of the Route 31F intersection. Other sections of the corridor have sidewalks present on one side and crosswalks are present at most intersections. There are no dedicated bicycle facilities but there is a wide shoulder on each side of the road. Parking is intermittent on the shoulder along the corridor with dedicated on-street parking spaces in the "downtown."


Route 31, Macedon
Source: Google

Table 6: Case Study Corridors Summary

| ATTRIBUTE | MAPLE RIDGE ROAD | MAIN STREET HAMBURG | MADISON AVENUE | UNIVERSITY AVENUE | ROUTE 31 <br> MACEDON |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | MEDINA |  | ALBANY | ROCHESTER |  |
| Length | 2.1 Ml | 0.5 Ml | 1.6 MI | 1.6 Ml | 1.6 Ml |
| Speed Limit | 40-55 MPH | 30 MPH | 30 MPH | 30 MPH | 30-45 MPH |
| AADT | $\begin{gathered} 5,078-6,153 \mathrm{vpd} \\ (2013) \end{gathered}$ | $\begin{gathered} 10,628 \mathrm{vpd} \\ (2015) \end{gathered}$ | $\begin{gathered} 14,786 \mathrm{vpd} \\ (2013) \end{gathered}$ | $\begin{gathered} \text { 11,283-13,764 vpd } \\ (2009-2013) \end{gathered}$ | $\begin{gathered} 12,889-23,257 \text { vpd } \\ (2009-2013) \\ \hline \end{gathered}$ |
| Functional Classification | Urban Principal Arterial - Other and Urban Minor Arterial | Urban Principal Arterial - Other | Urban Principal Arterial - Other | Urban Minor <br> Arterial | Urban Principal Arterial - Other |
| Lane <br> Configuration | Two travel lanes; right and left turning lanes where appropriate | Two travel lanes; right and left turning lanes where appropriate | Two travel lanes; two way left turn lane; right and left turning lanes where appropriate | Two travel lanes; right and left turning lanes where appropriate | Two travel lanes; right and left turning lanes where appropriate |
| Bicycle Facilities | None | Striped bike lanes; sharrows | Striped bike lanes; greencolored conflict zone pavement markings | Sharrows to indicate shared roadway | None |
| Pedestrian Facilities | Sidewalks for 900 <br> FT on north side of road; minimal crosswalks; pedestrian signal | Sidewalks on both sides; crosswalks at intersections; mid-block crosswalks; curb ramps; pedestrian signals | Sidewalks on both sides; crosswalks; curb ramps; pedestrian signals | Sidewalks on both sides; curb bumpouts; crosswalks; mid-block crosswalks; curb ramps; pedestrian signals | Intermittent sidewalks (both sides, one side, and none); minimal crosswalks; curb ramps; pedestrian signals |
| On-Street Parking | None | Typically on both sides | Typically on both sides | Typically on both sides | Allowed on shoulder; dedicated spaces from Center Street to Route 31 F |
| Land Use Context | Residential, Retail, and Commercial | Residential, Retail, and Commercial | Residential, Retail, and Recreation | Residential, Retail, and Commercial | Residential, Retail, and Commercial |
| Other |  | Traffic circles at the Center Street and Buffalo Street intersections | Transit stops at nearly every block | Colored pavers for crosswalks; landscaped medians where leftturn lanes are not needed |  |

## IDENTIFY KEY DESTINATIONS

An Identification of key destinations will help inform areas and locations which warrant safe bicycle and pedestrian connections due to their popularity within the community. Common key destinations include parks and recreation opportunities, educational facilities, health facilities, employment hubs and other valuable community amenities. Safer active transportation opportunities between these locations and Maple Ridge Road will encourage bicycling and walking within the Village while promoting the valuable amenities offered throughout the community. Recommendations for future bicycle and pedestrian connections will consider the following key destinations in the study area:

## EDUCATIONAL INSTITUTIONS

- Medina High School
- Clifford H. Wise Middle School
- Oak Orchard Elementary School
- Warren P. Towne Elementary School
- Genesee Community College - Medina Campus


## PARKS AND RECREATION OPPORTUNITIES

- John E. Butts Memorial Park
- State Street Park
- Gulf Street Park
- Erie Canalway Trail
- State Bike Route 5
- Glenwood Lake


Medina Central School


Wayfinding Signage to Local and Regional Trails

## EMPLOYMENT HUBS

- Medina Business Park


## HISTORICAL SITES

- Main Street Historic District
- Medina Armory
- Home of First Lady Frances (Folsom) Cleveland
- St . John's Episcopal Church
- U.S. Post Office
- Payjack Chevrolet Building
- Medina Sandstone


## COMMUNITY AMENITIES

- Lee-Whedon Memorial Library
- Medina Memorial Hospital
- Medina Tourist Trains


Lee-Whedon Memorial Library


Wayfinding Signage to Medina Railroad Museum


St. John's Episcopal Church Historic Site

## MAPLE RIDGE ROAD CORRIDOR STUDY

## KEY DESTINATIONS

© PARK
( $\boldsymbol{H}$ HOSPITAL
(c) SCHOOL
(il HISTORIC SITE
© COLLEGE
(i) BUSINES PARK
(1) LIBRARY
(:) PASSENGER RAIL STATION

GULF STREET PARK


Westbound on Maple Ridge Road just east of S Main Street

## CHAPTER 2

## NEEDS ASSESSMENT

# During the existing conditions evaluation of the Maple Ridge Road corridor, several needs for the various modes of transportation using Maple Ridge Road became apparent. These needs have been divided into vehicular needs and pedestrian and bicycle needs. While some of the needs are shared between all users, the pedestrian and bicycle needs are specific to those user groups. The following discussion outlines the needs identified throughout this Study. 

It is the goal and objective of this needs assessment to identify any deficiencies along the Maple Ridge Road corridor that prevent the future success of converting Maple Ridge Road from a vehicle-centric roadway into a complete street. "A Complete Street is a roadway planned and designed to consider the safe, convenient access and mobility of all roadway users of all ages and abilities. This includes pedestrians, bicyclists, public transportation riders, and motorists; it includes children, the elderly, and persons with disabilities." ${ }^{8}$

The NYS Complete Streets Act of 2011 requires "state, county and local agencies to consider the convenience and mobility of all users when developing transportation projects that receive state and federal funding." ${ }^{9}$

## ROADWAY AND VEHICULAR NEEDS

## ROADWAY CONDITION

As noted in Chapter 1, the existing roadway is in fair to good condition throughout the corridor. East of the Oak Orchard Creek bridge, the pavement and shoulders are exhibiting signs of deterioration and are in fair condition. Pavement surface condition is known to affect user behavior, as the condition and pavement smoothness are important to all users, but especially bicyclists and pedestrians. Loose material, cracks, bumps, and potholes on a paved shoulder tend to deter bicyclists from
using these facilities and encourage bicyclists to enter into the travel lane to avoid potentially losing control of their bike or to have a more comfortable ride. This movement away from a shoulder and into the travel lane poses an increased risk for both motorists and bicyclists. The shoulders on Maple Ridge Road (Route 31A) have deteriorated such that a bicyclist is more likely to ride in the travel lane than on the shoulder.


Existing shoulder looking eastbound on Maple Ridge Road near Bates Road


Existing drainage grate located on the north side shoulder of Maple Ridge Road near Gwinn Street looking westbound

West of the S. Main Street intersection, Maple Ridge Road was rehabilitated in 2010 as part of the NYSDOT Rehabilitation project to include new closed drainage, granite curbing, and sidewalks. The drainage grates through this area are the rectangular with cross bars type, which still allows for a bicycle tire to become wedged between the webbing, in turn encouraging bicyclists to avoid the grate and enter into the travel lane.

A superior design to promote bicycle use on shoulders where drainage grates are located is the reticuline style. These have a slightly reduced hydraulic capacity, but are significantly safer for bicyclists that use the shoulder for travel.

## OPERATIONAL EFFICIENCIES OF THE CORRIDOR AND CRITICAL INTERSECTIONS

As documented in the traffic analysis of Chapter 1, all of the study area intersections are operating at minimum acceptable Levels of Service (LOS) D or above In accordance with the NYS Department of Transportation (NYSDOT) Highway Design Manual, the minimum level of service for urban locations is a LOS D while rural locations is a LOS C. The Maple Ridge Road / West Avenue / West Avenue Ext. is the only intersection that may require a future mitigation plan depending on growth and future roadway improvements. While the intersection is operating at the lower levels of effectiveness, the vehicle delay is mostly attributed to northbound vehicles turning left onto Maple Ridge Road from West Avenue. Vehicles are experiencing increased delay in trying to find vehicle gaps from both the eastbound and westbound Maple Ridge Road traffic. Opportunities for improvement are further discussed in Chapter 3.

While the intersection of Mustang Drive is operating efficiently with regards to vehicle delay, the results of the public engagement online survey and discussions with the Steering Committee members have resulted in an increased demand for a traffic signal at this location. This roadway is the main entrance to the Medina Central School district buildings and experiences typical increased demand during peak school hours. While the district does use the Mustang Drive intersection to transport students to and from school, it is currently diverting some of its bus traffic to the northern driveways to avoid buses having to make the
southbound left onto Maple Ridge Road. Observations noted during school dismissal show the buses queued along the Mustang Drive waiting for appropriate gaps in vehicle traffic to maneuver the busses safely. While an accident issue has not been documented at this location to date, parents and school staff have noted several near misses over time causing an increased sensitivity to the safety and functionality of the district entrance.

## ACCESS MANAGEMENT

Through the years, the Maple Ridge Road corridor has continued to develop resulting in several commercial businesses securing full access to Maple Ridge Road between the S. Main St. (Route 63) intersection and the westernmost project limit of Salt Works Road, there are seven parcels that have two full-access driveways and two other parcels that have undefined continuous access. East of S. Main St. (Route 63), driveway access is consolidated with most parcels having one full access driveway to Maple Ridge Road.

Increasing the frequency of access points presents a navigational challenge to all users. Stress on the surrounding transportation network is increased as the number of driveways increases, spacing between driveways decreases, and the overall volume of users increases. As the Village and Town continue to increase in size and the demand on Maple Ridge Road increases, so will the amount of conflict points between pedestrians, bicyclists, and motorists.


Looking westbound towards the Dollar General undefined continuous access driveway


Aerial view of the Citgo gas station which has two full access driveways onto Maple Ridge Road

## ACCIDENT COUNTERMEASURES

As documented in Chapter 1, the predominant accident type is collision with animals followed by the rear-end collision. The numerous driveways present on Maple Ridge Road provide an increased opportunity for vehicles turning to and from Maple Ridge Road likely contributing to the number of rear-end accidents. While most of the rear-end accidents that were documented within the years studied were due to driver inattention, a reduction in access points would limit the number of stopped vehicles along the corridor. Comment expressde during the public engagement process and discussions with the Steering Committee members resulted in a request for turning lanes throughout the Maple Ridge Road corridor. Users felt that the introduction of turn-lanes would reduce vehicle conflicts due to the various turning maneuvers previously discussed.

At the S Main Street intersection where a high number of rear-end accidents were documented, the need for a protected left-turn phase for the eastbound and westbound Maple Ridge Road traffic is apparent. The skew of the intersection
and the need to accommodate heavy vehicles has resulted in stop lines being placed well in advance of S Main Street / Gravel Road alignments. Due to restricted sight lines, driver behavior at this intersection results in drivers advancing beyond the stop bars in an effort to turn left regardless of whether the signal is in the yellow or green phase. This causes confusion for the subsequent drivers who are also trying to turn left before the traffic signal changes phase.

Just outside of the project limits, but directly affecting the intersection of Bates Road /
Waterworks Road is a series of crest and sag vertical curves. During field observations, it was noted that vehicles heading westbound on Maple Ridge Road will disappear in a valley only a few moments before reappearing near the intersection of Bates Road / Waterworks Road.

This reappearance of vehicles out of the valley happens just as the driver has already started turning at the intersection reducing the amount of reaction time available for the driver to react to an approaching vehicle.


Intersection skew at the intersection of Maple Ridge Road / S Main Street / S Gravel Street

## PEDESTRIAN AND BICYCLE SAFETY NEEDS

## SPEED REDUCTION

It is difficult to decrease the volume of traffic in rural areas due to the limited alternate routes available to drivers. With that being said, a substantial amount of focus should be shifted to vehicle speed considering it is one of the most useful indicators of rider stress levels. Typically, cyclists feel higher levels of comfort while riding near traffic traveling at 25 mph or slower.

Slower speeds increase the likelihood of survival and gives all involved (motorist, pedestrian, bicyclist or other road user) increased reaction time to avoid collision. Speed reduction measures, also referred to as traffic calming measures, are common tools used to increase the safety of roadways for all users. Traffic calming measures that can be used to reduce vehicle speeds include:

- Physical Measures: such as vertical deflections, horizontal shifts, and roadway narrowing enhance the streets for nonmotorists and naturally reduce speeds.
- Non-physical Measures: using signs and markings are intended to raise vehicle awareness and reduce speeds through visual indications.
- Diversion Treatments: reduce cutthrough traffic by obstructing or otherwise preventing traffic movements in one or more directions, such as implementing right-in/right-out intersections where appropriate.


Tefft, B. C. Impact speed and a pedestrian's risk of severe injury or death. Accident Analysis \& Prevention 50 (2013) 871-878.

## SCHOOL CONNECTIONS

Schools tend to be key destinations in communities of all sizes. This is especially true in smaller communities, such as Medina, where schools often play a prominent role in the community as centers of activity for people of all ages and capabilities. Current trends indicate that approximately 300 students walk or bike to school on a daily basis. Considering this as well as the fact that access to Medina Middle School and High School by way of Mustang Drive is directly off Maple Ridge Road and children will be present most days, it is essential to provide separation from motorized traffic and install controlled crossings in highly traveled locations to improve safety for vulnerable road users.


Medina Central School Dismissal

## OAK ORCHARD CREEK BRIDGE

There are approximately 20-25 pedestrians that cross the small bridge located on the east end of the corridor study near Maple Ridge Estates on a daily basis. The bridge creates a pinch point for vehicles with narrow lanes and shoulders, and for pedestrians, with no sidewalks available. Pedestrians are required to walk on the limited shoulder on either side of Maple Ridge Road. As identified during the data collection with the time-lapse cameras, pedestrians are using both sides of the structure.


Oak Orchard Creek at the Maple Ridge Road (Route 31A) Bridge

## LIGHTING

Roadway lighting is an integral part of both vehicular and pedestrian safety. As driving is fundamentally a visual task, it is critical for drivers to have clear line of sight to any pedestrians or bicyclists that may be traveling at night as well as being able to identify any roadside hazards that may be present in the roadway. When roadway lighting is inconsistent throughout a corridor, the driver's eye will continuously adjust to provide the best vision possible given the surrounding lighting levels. While roadway lighting is not required on all corridors, having only intersections lit presents an inconsistent lighting pattern. Drivers may experience difficulty differentiating between objects that are within the lighted range of view and unlit areas.

The need for lighting with respect to pedestrians, bicyclists and vehicles is critical to provide visibility to motorists. Focus should be placed on improving both vehicle and pedestrian level lighting to ensure all modes are accommodated efficiently. Vehicle lighting is typically placed at higher heights than pedestrian lighting will higher intensity wattage to ensure expansive visibility for drivers. Pedestrian lighting, on the other hand, is placed closer to the existing ground at increased intervals to ensure adequate coverage of the facility. Further, pedestrian level lighting is designed to increase the sense of security for cyclists and pedestrians. Specifically at crosswalks, proper lighting is a critical factor in determining the potential safety of a crosswalk and reduces the possibility of crashes with vehicles. In addition to safety for all users traversing throughout the corridor, adding pedestrian level lighting provides clear benefits in terms of personal security. In well-lit areas, pedestrians and bicyclists will be more willing to use their dedicated facilities at night. In contrast, any poorly lit areas may be
perceived as unsafe and users will shy away from a dedicated facility regardless of the safety of the surrounding area. For any future pedestrian or bicycle improvements considered, ensuring that lighting provides minimum acceptable levels of illuminance is critical to the success of any facility.


Vehicular Lighting at Gwinn Street


## Pedestrian-Scale Lighting in Downtown Medina

## MEDINA BUSINESS PARK VEHICULAR ACCESS

The Medina Business Park is expected to generate 133 new trips during the PM peak hour with the build out of Phase 1. Phase 1 includes the 50 room hotel and 80,000 square feet of industrial space. The traffic impact study concluded that no mitigation is needed to accommodate this increase in traffic, but that full build out would likely require some mitigation. It was determined that a left turn lane on Maple Ridge Road would likely be needed under this scenario and will be considered as part of this Study.


Medina Business Park Entrance


BMP in Medina Business Park

## PUBLIC ENGAGEMENT ANALYSIS

To gather input from the public to help inform draft recommendations, the project team used the following public engagement methods:

- Stakeholder Interviews: Conduct confidential stakeholder interviews with group leaders
- Survey: Distribute an online survey, as well as a paper survey where necessary, to solicit feedback from community members

A public workshop was conducted during the recommendations phase of this project and will be discussed in Chapter 3.

## 3 5 STAKEHOLDER INTERVIEWS

## PUBLIC ENGAGEMENT SUMMARY

THE FOLLOWING PRIORITIES AND TRENDS WERE DETERMINED BASED ON RESPONSES FROM THE SURVEY AND STAKEHOLDER INTERVIEWS:

- Traveling along Maple Ridge Road is a necessity for most people in the area
- People primarily travel by vehicle, but there is a desire for additional walking and bicycling opportunities
- Grocery stores and fast food locations are common destinations along the corridor and future recommendations should consider safe connections to these amenities
- Pedestrian facilities would likely be more popular among users than bicycle facilities
- The most common factors keeping people from walking or biking are:
- Lack of safe pedestrian and bicycle facilities
- High traffic speeds and/or volumes
- Poor/aggressive driver behavior
- Far travel distances
- The most common priorities for future improvements along the corridor are:
- Improved safety for all users
- New pedestrian facilities
- Improved vehicle traffic flow


Maple Ridge Road at Mustang Drive (Facing West)

Five key stakeholders were identified by the Village of Medina and were invited to do an in-depth interview to more fully share their local knowledge about the corridor and further illuminate the priorities and needs of stakeholders in the area. To encourage candor, these 15-30 minute conversations were conducted in confidence.

Those interviewed included interested group leaders from the following organizations:

- Medina Central School
- Medina Central School Parent Teacher Student Association
- Genesee Community College
- Medina Business Association
- Maple Ridge Estates

Plan recomendations will consider the needs and preferences of these stakeholder groups with the goal of improving the lives of the people who frequently travel along Maple Ridge Road.

## KEY FINDINGS

- Most stakeholders indicated a strong need for those in their group to travel along Maple Ridge Road to reach destinations.
- All stakeholders interviewed indicated that a vehicle is the current primary mode of transportation used by those in their groups to travel to or along Maple Ridge Road, but all indicated there is a desire for the opportunity to walk along the corridor if safe and comfortable facilities were implemented.
- All stakeholders interviewed indicted that improved pedestrian or bicycle facilities would be utilized by people from their stakeholder group, if implemented along Maple Ridge Road.
- Some stakeholders indicated that, if implemented, pedestrian facilities would likely see a higher use than bicycle facilities among their stakeholder group population.
- Some stakeholders indicated a need for a shorter connection for pedestrians between destinations on the east end of Maple Ridge Road and the Village Downtown.
- The most common destination types people within these stakeholder groups travel to are:
- Fast Food Locations
- Grocery Stores
- Educational Facilities
- Other Common Errand Locations (e.g., Pharmacies, Downtown Businesses, Gas Stations, etc.)
- The most common concerns or barriers keeping people from walking or biking along Maple Ridge Road are:
- A Lack of Pedestrian or Bicycle Facilities
- High Traffic Speeds and/or Volumes
- Poor Vehicle Behavior
- Far Travel Distances between Destinations
- The most common priorities for future improvements along Maple Ridge Road include:
- Improved Safety and Access to Destinations
- New Sidewalks
- A Two-Way Left Turn Lane

2 OUT OF 5 STAKEHODLERS INDICATED A CONCERN WITH POOR VEHICLE BEHAVIOR

ONE EXAMPLE DESCRIBES MOTORISTS DRIVING ON THE
SHOULDER TO PASS VEHICLES
STOPPED IN THE LANE WAITING TO TURN LEFT

MOST STAKEHOLDERS INDICATED THERE IS LIKELY A

PREFERENCE TO WALK RATHER THAN BIKE

AMONG THOSE IN THEIR STAKEHOLDER GROUPS

THE MOST COMMON PRIORITY FOR STAKEHOLDERS IS

IMPROVED SAFETY AND
ACCESS
TO DESTINATIONS ALONG MAPLE RIDGE ROAD

## SURVEY

A survey was created to gather information and insights from the public. Designed to take just 5 to 10 minutes on either a computer or mobile device, the survey asked respondents to indicate their current perceptions and priorities in relation to the corridor. In addition to the online survey, paper surveys were printed and distributed to those with limited internet access.

The Village of Medina along with other stakeholder groups distributed the link to contacts through email as well as social media outlets. In total, there were 560 survey responses. In sum, the survey generated a solid sample of interested individuals, with very consistent responses overall.

Plan recommendations will consider the needs and preferences of survey respondents in order to improve safety for those in the community.

## KEY FINDINGS

- Nearly $\mathbf{9 0 \%}$ of respondents travel along Maple Ridge Road in order to reach destinations in Medina.
- $\mathbf{9 2 \%}$ of respondents indicate they travel along Maple Ridge Road multiple times a week or daily.
- $95 \%$ of respondents currently use a vehicle to travel along Maple Ridge Road, while 6\% use other modes, such as walking, biking, or transit.
- If appropriate infrastructure were in place, $10 \%$ of respondents would prefer to walk, bike, or take transit, a 4\% increase from current trends.


## Walk and Bike Preferences among Respondents

Current Choice vs. Desired Choice


WALK
CURRENT MODE
2.5\%
$0.2 \%$

BIKE
DESIRED MODE

- According to respondents, grocery stores are the most popular destination (85\%) followed by fast food locations (40\%) and educational facilities (37\%). The remaining destinations are as follows: Dollar stores (31\%), Banks (21\%), Pharmacy/ Convenient stores (20\%), Homes/ residences (17\%), Retail Locations (12\%), Automotive Businesses (4\%), and Medina Business Park (4\%).
- Nearly 50\% of respondents said they would be more likely to walk if pedestrian facilities were improved on Maple Ridge Road.
- $40 \%$ of respondents would be more likely to bike to their destinations if bike facilities were constructed along Maple Ridge Road.

"...EVEN THOUGH I HAVE ACCESS TO A VEHICLE, THERE ARE MANY COMMUNITY MEMBERS WHO ARE NOT AS FORTUNATE AND I THINK IT IS IMPORTANT TO MAKE GETTING AROUND SAFER FOR THOSE PEOPLE..."
"...MEDINA IS A WONDERFUL COMMUNITY AND MORE PEDESTRIAN AND BICYCLE ACCESSIBILITY AND SAFETY WOULD MAKE IT EVEN MORE ATTRACTIVE FOR RESIDENTS AND VISITORS/TOURISTS..."
...A TRAFFIC LIGHT AT THE HIGH SCHOOL WOULD BE USEFUL..."

Quotes from Survey Respondents

# RESPONDENTS INDICATE THE FOLLOWING TOP FOUR PRIORITIES FOR FUTURE TRAVEL IMPROVEMENTS ALONG MAPLE RIDGE ROAD: 

## 79\% <br> IMPROVED <br> SAFETY FOR <br> ALL USERS

IMPROVED
TRAFFIC FLOW
FOR VEHICLES

43\%
IMPROVED
VEHICLE ACCESS
TO DESTINATIONS


IMPROVED
PEDESTRIAN
FACILITIES

Priorities for Maple Ridge Road Improvements
Respondents were encouraged to pick their top 3 priorities


When given a choice between four (4) images of the case study corridors noted in Chapter 1,51\% of respondents preferred a road treatment that incorporated:

- A two-way left turn lane in between two travel lanes
- Designated bike lanes
- Sidewalks on both sides of the road


The image above, which depicts Madison Avenue in Albany, NY, was the most popular road design among survey respondents

# RESPONDENTS INDICATE THE FOLLOWING TOP THREE OBSTACLES OR CONCERNS PREVENTING THEM FROM WALKING OR BIKING TO DESTINATIONS ALONG MAPLE RIDGE ROAD 

## CONCERNS ABOUT WALKING:

- $41 \%$ INDICATE THAT THEIR TRAVEL DISTANCE IS TOO FAR TO WALK
- $37 \%$ INDICATE THAT PEDESTRIAN FACILITIES DO NOT FEEL SAFE
- $31 \%$ FEEL AS IF STREET CROSSINGS ARE UNSAFE

CONCERNS ABOUT BIKING:

- $46 \%$ DO NOT FEEL SAFE BIKING ALONG THE CORRIDOR
- $31 \%$ ARE NOT INTERESTED IN BIKING
- $27 \%$ INDICATE THAT AGGRESSIVE DRIVERS ARE KEEPING THEM FROM BIKING


Walking Path Outside BMP America

## CHAPTER 3

## RECOMMENDATIONS

# By considering all user groups and the needs of community members, Maple Ridge Road can be transformed into a corridor which provides safe and comfortable facilities for all motorists, pedestrians, bicyclists, and low-mobility residents. 

Chapter 3 outlines the recommendations for Maple Ridge Road. This includes:

- Pedestrian, bicycle, and roadway design toolkits
- Three Alternative Concepts, each of which include roadway reconfigurations, pedestrian and bicycle accommodations, and order-of-magnitude cost estimates
- Discussion of traffic analyses regarding traffic signal warrants, level of service, turn lanes, and access management
- Public input regarding the Alternative Concepts
- Recommended code and policy changes

The recommendations included in this Study are intended to improve accessibility and mobility for all road users as well as ease implementation. These recommendations are conceptual in nature and are presented to characterize the types of improvement that are desired by the community and that may be implemented in the future. All transportation concepts will require further engineering evaluation, review, and approval by NYSDOT.

## PEDESTRIAN AND BICYCLE DESIGN TOOLKIT

Maple Ridge Road features a limited number of active transportation infrastructure elements. This Study aims to recommend appropriate facilities and improvements to increase access and safety for pedestrians, bicyclists, transit riders and those with disabilities. A toolkit of active transportation infrastructure improvement measures form the building blocks of the network alternatives presented. The infrastructure referenced in this section is limited to facility types that were considered for Maple Ridge Road as it operates today. All have received approval by FHWA and appear in various manuals and guidelines, including MUTCD, the AASHTO Guide for the Development of Bicycling Facilities and others. A full inventory of possible active transportation facilities can be seen within these manuals and guidelines. Certain components may or may not be appropriate for different sections of Maple Ridge Road however. For example, a sidepath may only be feasible where there are very few driveways. As with any proposed changes to Maple Ridge Road (NY 31/31A), NYSDOT consultation and approval will be required.


## Sidepath

## PEDESTRIAN AND BICYCLE FACILITIES

## SIDEPATH

Whereas shared use paths run within former rail corridors, along rivers, and through parks, sidepaths are located adjacent to and parallel with a roadway. Sidepaths can offer a highquality experience for users of all ages and abilities compared to on-road facilities in heavy traffic environments. Shared-use paths and sidepaths provide a shared space for both pedestrians and bicyclists as well as help promote bicycle tourism and economic development. Additional design considerations at driveways and side street crossings are also needed for sidepaths to address conflicts.


Sidepath

## SIDEWALK

Sidewalks are the most fundamental element of a pedestrian network, as they provide a dedicated space for pedestrian travel that is safe, comfortable, and accessible. Sidewalks are physically separated from the roadway by a curb and/or a landscaped buffer.

## PAVED SHOULDER / BIKE SPACE

Paved shoulders occur on the edge of roadways and, while not inherently considered a bicycle or pedestrian facility, they can be enhanced to serve as a functional space for bicyclists and pedestrians in the absence of other facilities. Paved shoulders utilize pavement striping to delineate the shoulder from motor vehicle travel lanes. Rumble strips can also be used to provide auditory separation , and designed with gaps to minimize impacts to bicyclists. These facilities often include signage and/or pavement markings that alert motorists to expect bicycle and pedestrian travel along the roadway.

## BICYCLE LANE

Bicycle lanes designate an exclusive space for bicycles through the use of roadway striping and signage. Bike lanes range from 5-7-feet in width. They are commonly added to roads with extra wide travel lanes or in replacement of a parking or a travel lane.

## WIDE CURB LANE

According to PedBikeSafe.org: "A wide curb lane (WCL) is the lane nearest the curb that is wider than a standard lane and provides extra space so that the lane may be shared by motor vehicles and bicycles. These facilities can also be placed on roads without curbs and are sometimes called wide outside lanes."


Sidewalk


Paved Shoulder / Bike Space


Bicycle Lane


Wide Curb Lane (Source: PedBikeSafe.org)

## INTERSECTION IMPROVEMENTS FOR PEDESTRIANS

## CROSSWALKS

Crosswalks accommodate pedestrian access and mobility, and if well-designed and appropriately placed, they can increase pedestrian safety and comfort. Crosswalks should be installed at grade and across all legs of a signalized intersection, unless pedestrians are prohibited. To increase accessibility, crosswalks should be paired with curb ramps, detectable warnings, and pedestrian countdown signals. Where crosswalks traverse multilane roads they should be paired with a median refuge island that separates motor vehicle travel directions and shortens the crossing distance for pedestrians.

## Curb Extensions



Curb extensions improve visibility and reduce pedestrian crossing distances. By reducing turning radius, bulb outs reduce vehicle speeds which increase the chance of survival for a pedestrian in the event of a collision.

Median Refuge Island


Median refuge islands are protected spaces placed in the center of the street to facilitate bicycle and pedestrian crossings. They are especially helpful when placed on wide roadways which may have long crossing times.


Curb Ramps


Curb ramps are needed to improve travel for all residents regardless of ability or age. Smooth transitions to the street with textured warning strips coupled with wide sidewalks provide direct, predictable, and accessible streetscapes.

## Pedestrian Countdown Signals



Pedestrian Countdown Signals, usually located at signalized intersections, indicate to pedestrians how much time remains for them to cross an intersection.

## Rectangular Rapid Flashing Beacon



Rectangular Rapid Flashing Beacons (RRFBs) are user-actuated warning beacons located at unsignalized intersections or mid-block crossings.

## INTERSECTION IMPROVEMENTS FOR BICYCLISTS


*Potential treatments shown here have received Interim Approval from FHWA but are not yet formally incorporated into the Manual of Uniform Traffic Control Devices (MUTCD)

Intersection Improvements*: Striping bicycle facilities at or through intersections can provide a more comfortable bicycling environment by providing bicyclists with guidance on where to wait for a signal to change or a well-marked route through the intersection to a continuation of the bikeway. By establishing a clear boundary, intersection lane markings effectively mark the paths of travel for through bicyclists and turning bicyclists, as well as through and turning motor vehicles. The use of green colored pavement raises awareness for all road users to potential conflict areas.

Table 7: Pedestrian \& Bicycle Facility Safety Data Table

| FACILITY | SAFETY IMPACT |  |
| :--- | :--- | :--- |
| Sidewalk | $65 \%-89 \%$ pedestrian crash reduction | https://safety.fhwa.dot.gov/ <br> provencountermeasures/ |
| Paved Shoulder | $71 \%$ reduction in crashes involving <br> pedestrians walking along roadways | https://safety.fhwa.dot.gov/ <br> provencountermeasures |
| Bicycle Lane | $36 \%$ bicycle crash reduction | https://safety.fhwa.dot.gov/ <br> provencountermeasures/ |
| Pedestrian <br> Countdown <br> Signal | Up to 52\% crash reduction in pedestrian <br> injuries in a large-scale study in San <br> Francisco | F. Markovitz, S. Sciortino, J. Fleck and <br> B. Yee, "Pedestrian Countdown Signals: <br> Experience with an Extensive Pilot <br> Installation," ITE Journal, 2006. |
| Median Refuge <br> Island | $56 \%$ reduction in pedestrian crashes | https://safety.fhwa.dot.gov/ <br> provencountermeasures/ |
| Colored Bicycle <br> Lanes in Conflict <br> Areas | $15 \%$ motorist yield rate increase and <br> $36 \%$ motorist turn signal rate increase | Federal Highway Administration. <br> Desktop Reference for Crash Reduction <br> Factors. http://safety.fhwa.dot.gov/ |

For additional information, data and links related to bicycle and pedestrian safety countermeasures that could be implemented along Maple Ridge Road or in the Village of Medina, see:
http://www.pedbikeinfo.org/cms/downloads/PedestrianLitReview_April2014.pdf\#page=27\&zoom=100,69,330

## ROADWAY CORRIDOR DESIGN TOOLKIT

## INTERSECTION TREATMENTS

With multiple intersecting roads along Maple Ridge Road, and considering a potential increase in traffic volumes with development growth, it is important to consider traffic control devices at intersections. This section briefly discusses traffic signals and roundabouts, which can be implemented at intersections which warrant additional treatment beyond other controls.

## TRAFFIC SIGNAL

If warranted, a traffic signal can be implemented to control traffic patterns at an intersection. A traffic signal uses three colors (red, yellow, and green) to direct vehicles as well as other road users. An engineering study which examines traffic conditions, pedestrian travel, and other characteristics at an intersection needs to be conducted in order to determine if a traffic signal is warranted. A detailed description of traffic signal warrants can be found in the Manual on Uniform Traffic Control Devices (MUTCD).


Traffic Signal
Source: Google

## ROUNDABOUT

A roundabout, also called a "traffic circle," is a circular intersection in which traffic flows counterclockwise around a center island. Roundabouts tend to keep traffic flowing and reduce the severity of crashes. Additional information about roundabouts can be found in the 2009 MUTCD as well as Report 672 (Roundabouts: An Informational Guide, 2nd Edition) which was developed by the National Cooperative Highway Research Program in 2010. In accordance with the NYS Highway Design Manual, if a signal is warranted, a traffic study is required to determine if a roundabout is a viable solution.


Roundabout
Source: Google

## ACCESS MANAGEMENT TREATMENTS

There are various access management techniques and treatments which can be implemented along Maple Ridge Road to improve traffic flow and increase safety for all road users. The techniques described below should be considered in future developments as well as in redevelopments of existing sites.

## DRIVEWAY CONSOLIDATION

Maple Ridge Road is lined with businesses and residences, a majority of which have individualized driveway access to the corridor. This unrestricted access to numerous locations on both the north and south sides of the corridor can impede traffic flow as well increase the number of potential conflict points between those traveling along the corridor and those entering and exiting driveways. Adjacent development sites should share driveway access to Maple Ridge Road to decrease conflict points and reduce the impact to traffic flow along the corridor. The shared driveway access between Tops, Burger King, Generations Bank, and other plaza businesses is a good example of existing driveway consolidation on Maple Ridge Road.


Driveway Consolidation
Source: Google

## CENTER MEDIAN

A center median can be implemented along a corridor to serve multiple functions such as access management, traffic calming, and pedestrian refuge. Medians can be applied in place of a two-way left-turn lane (TWLTL) where a left turn is unnecessary, or where it would be beneficial to restrict left turns. They provide a traffic calming effect to the roadway by narrowing the overall pavement width, which, in turn, tends to slow motorists. Additionally, a center median can include a refuge space for pedestrians crossing the road. Median refuge islands are located at the midpoint of a marked crossing and help improve safety by enabling pedestrians to cross one direction of traffic at a time. Similar to raised medians, traversable and/ or "flush" medians also provide visual cues for motorists to reduce speeds.


Center Median
Source: Google

## RIGHT-IN / RIGHT-OUT

A right-in/right-out access point allows only for right turns both into and out of a destination along the corridor. Similarly, this treatment has less of an impact on through-traffic while still providing access to destinations along the corridor for one travel direction. There are locations where it may be appropriate to have just one direction of travel provided, such as right-in only or right-out only.

## LEFT-IN / RIGHT-IN / RIGHT-OUT

This treatment allows for motorists traveling in either direction to access a destination (both- left and right-in turns permitted), but requires those exiting to make right turns only. Implementing this driveway treatment has the potential to decrease vehicle delays for those motorists exiting destinations as well as reduce conflict points with other motorists which can be experienced when making left turns.

## ACCESS TO ADJACENT CORRIDORS

Wherever possible, access should be provided to adjacent roadways that either intersect or run parallel to Maple Ridge Road rather than providing direct access to Maple Ridge Road. Employing this treatment will help alleviate multiple turning movements on the main corridor.

## ALIGN ACCESS POINTS

In cases where access is needed for businesses or residences on both the north and south side of Maple Ridge Road in the same general area, driveways should be designed so these access points are aligned. This simplicity and lack of offset driveways decreases the number of potential conflict points along the corridor.


Right-In / Right-Out Access


Left-In / Right-In / Right-Out Access


Right-In Only Access

## STREETSCAPE ENHANCEMENTS

Streetscape enhancements help make a roadway welcoming to all users, including pedestrians and bicyclists. They also result in a traffic calming effect along a busy corridor. Enhancements such as landscaping, lighting, and other active transportation amenities such as benches and bike racks make the corridor more functional for pedestrians and bicyclists and help promote alternative modes of transportation.


Landscaped Buffer

## LANDSCAPING

Landscaping can be a transformative treatment for a roadway. Trees and vegetation along a roadway have a natural traffic calming effect by visually narrowing the corridor width. Landscaping should be implemented within a buffer located between the roadway and pedestrian facilities, such as a path or sidewalk. Care should be taken to ensure plants are native to the area, ensuring they can thrive in the specific environment and climate. Trees should be located strategically to provide necessary shade for those traveling along the corridor. Additionally, landscaping can be applied in center medians to provide additional traffic calming effects. The addition of landscaping will likely increase maintenance costs that municipalities will need to plan for in annual budgets.


Landscaped Median

## LIGHTING

Lighting improves visibility and safety for all road users as previously discussed in Chapter 2. Installation of lighting along the corridor can make the space more inviting for alternative modes of transportation, such as pedestrians, bicyclists, and transit users. Depending on bulbintensity, pedestrian scale lighting is commonly placed every 30 to 50 feet. Roadway lighting requires a more detailed analysis to determine the type, placement, and style needs to achieve appropriate illuminance levels. Additional guidance on lighting can be found in the resources previously identified.

## BENCHES

Benches should be implemented along the length of the corridor to provide places for pedestrians and bicyclists to rest, if necessary. Benches can be designed to create identity in a place, along an active transportation corridor, or be strictly utilitarian. The placement of benches should provide interesting views, are close to a major destination, and offer shade for the user. All bench placement must consider accessibility, including grading surrounding the bench.

## BIKE PARKING

Bike parking opportunities (bike racks) should be provided along the corridor and at major destinations to promote bike use among Town and Village residents. The type and capacity of each rack should reflect anticipated usage depending on the location where the bike parking is proposed.


Lighting


Benches


Bike Parking

## CORRIDOR ALTERNATIVES

Using the data obtained during the existing conditions and needs assessment phases of the project, three alternatives were developed for the Maple Ridge Road corridor. These alternatives are the result of public engagement, data collected for the corridor and coordination with the steering committee. The alternatives were presented to the public to solicit corridor
user preferences for potential treatment options. Based on user comments, discussion, and additional consideration from NYSDOT Region 4 Traffic \& Safety Division, a variation of Alternative Concept A was developed (see NYSDOT Preferred Concept on page 110). The alternatives are described in detail below.


Pedestrians in shoulder outside Tim Hortons (Facing West)


Pedestrian in shoulder outside Tops Plaza (Facing West)

## ALTERNATIVE CONCEPT A

Alternative Concept $A$ is a continuation of the existing cross section that was installed by the NYSDOT on Maple Ridge Road between Gwinn Street and S. Main Street (NY Route 63). This alternative consists of a twelve-foot ( $12^{\prime}$ ) wide two-way left turn lane from the Tops Plaza to the intersection with S Main Street / S Gravel Road (NY Route 63). A hardscape center median may be implemented within the area where left turns are not necessary or purposefully restricted. It includes one eleven-foot (11') travel lane in either direction along the entire length of the corridor from Salt Works Road to Bates Road. Bicyclists will be able to utilize a six-foot (6') wide shoulder/bike space in both directions. NYSDOT does not currently recommend marking shoulders as bike lanes since shoulders often serve multiple purposes, such as parking. Pedestrians are accommodated by a sevenfoot (7') sidewalk recommended on the north side of Maple Ridge Road, which is directly adjacent to the pavement. While this alternative does provide space for both pedestrians and snow storage during the winter months, a preferred section would include a five-foot ( $5^{\prime}$ ) maintenance strip to accommodate snow storage and utilities and a five-foot ( $5^{\prime}$ ) sidewalk for pedestrians.

This alternative requires the installation of a granite curb to match existing conditions and the addition of a closed drainage system on the north side of Maple Ridge Road. Between the intersections of Gwinn Street and S Main Street/S Gravel Road (NY Route 63), there are no proposed improvements, as this alternative concept is the same as exisitng in this area. An
evaluation of the existing roadway pavement and cross slope would be required during detailed design to determine whether the existing pavement would require full-depth reconstruction or if a mill and overlay treatment in combination with a box-out widening on the north side could be used to address the striping and closed drainage changes between the Tops entrance and Gwinn Street.

The recommendations east of the S Main Street/S Gravel Road (NY Route 63) intersection and west of the Tops Plaza remain the same with the exception of the two-way left turn lane and center median. Due to the low land use density west of the Tops plaza, the sidewalk could be installed on the south side of Maple Ridge Road beginning at the Tops Plaza instead of continuing on the north side of Maple Ridge Road as currently proposed. This would provide accommodations to the residents in the Furness Parkway neighborhood located approximately 0.4 miles west of the Tops Plaza intersection. At the Medina Business Park and GCC Campus intersection east of the Oak Orchard Creek bridge, it is recommended that dedicated eastbound and westbound left-turn lanes be installed as discussed in the Medina Business Park discussion on page 96.

The construction cost of Alternative Concept A is approximately $\$ 6.5 \mathrm{M}$. This does not include design and engineering fees or construction inspection costs. It also assumes that no right-of-way acquisitions would be required. Refer to Table 8 on page 88 for a cost comparison of all the alternative concepts.

Concept A with Two-Way Left Turn Lane (From Tops/Tractor Supply to S Main Street)


Concept A without Two-Way Left Turn Lane (From Salt Works Road to Tops/Tractor Supply and from S Main Street to Bates Road)


Width= 41


[^4]
## ALTERNATIVE CONCEPT B

Alternative Concept B consists of a twelve-foot (12') wide two-way left turn lane from the Tops Plaza to the intersection with S Main Street / S Gravel Road (NY Route 63). A hardscape center median may be implemented within the area where left turns are not necessary or purposefully restricted. It includes one eleven-foot (11') travel lane in either direction along the entire length of the corridor from Salt Works Road to Bates Road. Both bicyclists and pedestrians are accommodated by a ten-foot (10') shared use path (sidepath) recommended on the north side of Maple Ridge Road. Appropriate signage and markings should be installed along the north side to alert motorists that pedestrians and bicyclists may be crossing access points to major destinations on the path. This path is separated from the roadway by a recommended fivefoot ( $5^{\prime}$ ) landscaped buffer. A five-foot ( $5^{\prime}$ ) wide shoulder is located on both sides of the street and can be utilized by bicyclists if they prefer to ride on the pavement rather than the path.

In contrast to Alternative Concept A, this alternative does not require the installation of curbing or a closed drainage system. Existing sheet-flow drainage patterns would be maintained allowing for the construction of only the shared use path west of Tops and east of the Medina Business park. The exisitng pavement in these areas could remain as-is, if desired. Similar to Alternative Concept A, an evaluation of the existing roadway pavement and cross slope would be required during detailed design to
determine whether the existing pavement would require full-depth reconstruction or if a mill and overlay treatment could be used to address the striping changes between the Tops entrance and the S Main Street/S Gravel Road (NY Route 63) intersection.

The recommendations east of the S Main Street/S Gravel Road (NY Route 63) and west of the Tops Plaza remain the same with the exception of the two-way left turn lane and center median. Due to the low land use density west of the Tops plaza, the shared use path (sidepath) could be installed on the south side of Maple Ridge Road beginning at the Tops Plaza instead of continuing on the north side of Maple Ridge Road as currently proposed. This would provide accommodations to the residents in the Furness Parkway neighborhood located approximately 0.4 miles west of the Tops Plaza intersection. At the Medina Business Park and GCC Campus intersection east of the Oak Orchard Creek bridge, it is recommended that dedicated eastbound and westbound left-turn lanes be installed as discussed in the Medina Business Park discussion on page 96.

The construction cost of Alternative Concept B is approximately $\$ 4.5 \mathrm{M}$. This does not include design and engineering fees or construction inspection costs. It also assumes that no right-of-way acquisitions would be required. Refer to Table 8 on page 88 for a cost comparison of all the alternative concepts.

Concept B with Two-Way Left Turn Lane (From Tops/Tractor Supply to S Main Street)


Concept B without Two-Way Left Turn Lane (From Salt Works Road to Tops/Tractor Supply and from S Main Street to Bates Road)


[^5]
## ALTERNATIVE CONCEPT C

Alternative Concept $C$ consists of a twelve-foot (12') wide two-way left turn lane from the Tops Plaza to the intersection of S Main Street and S Gravel Road (NY Route 63). A hardscape center median may be implemented within this area where left turns are not necessary or purposefully restricted. This concept includes one fifteenfoot ( $15^{\prime}$ ) shared travel lane in either direction along the entire length of the corridor from Salt Works Road to Bates Road. This type of shared travel lane is also called a "wide curb lane" and provides enough space for cars and bicyclists, who are often experienced and confident in their ability to ride with traffic, to share the travel lane. To accommodate all bicyclists and pedestrians, a ten-foot ( $10^{\prime}$ ) shared use path (sidepath) is recommended on the north side of Maple Ridge Road. Appropriate signage and markings should be installed along the north side to alert motorists that pedestrians and bicyclists may be crossing access points to major destinations on the path. It is recommended this path be separated from the roadway by an eight-foot ( $8^{\prime}$ ) landscaped buffer, complete with trees and other vegetation, to provide extra space between motorists and non-motorists on the path as well as increase the traffic calming effect of plantings.

This alternative requires the installation of granite curbing and closed drainage on both the south and north sides of Maple Ridge Road. Given the need for the installation of curbing and closed drainage, full-depth reconstruction of the existing roadway between the Tops entrance and the S Main Street/S Gravel Road (NY Route 63) intersection would likely be the most prudent and efficient installation method. West
of the Tops intersection, a box-out widening treatment to install the curbing could be utilized in combination with a mill and overlay to rehabilitate the existing pavement and address the striping changes. This same treatment should be used east of the Medina Business Park. A more detailed evaluation of the existing roadway pavement and cross slope would be beneficial to confirm the appropriate pavement reconstruction/rehabilitation treatment for all locations within the project limits.

The recommendations east of the S Main Street/S Gravel Road (NY Route 63) intersection and west of the Tops Plaza remain the same with the exception of the two-way left turn lane and center median. Due to the low land use density west of the Tops plaza, the shared use path (sidepath) could be installed on the south side of Maple Ridge Road beginning at the Tops Plaza instead of continuing on the north side of Maple Ridge Road as currently proposed. This would provide accommodations to the residents in the Furness Parkway neighborhood located approximately 0.4 miles west of the Tops Plaza intersection. At the Medina Business Park and GCC Campus intersection east of the Oak Orchard Creek bridge, it is recommended that dedicated eastbound and westbound left-turn lanes be installed as discussed in the Medina Business Park discussion on page 96.

The construction cost of Alternative Concept C is approximately $\$ 9.1 \mathrm{M}$. This does not include design and engineering fees or construction inspection costs. It also assumes that no right-of-way acquisitions would be required. Refer to Table 8 on page 88 for a cost comparison of all the alternative concepts.

Concept C with Two-Way Left Turn Lane (From Tops/Tractor Supply to S Main Street)


* Two-way left-turn lane will only be incorporated where necessary.

Concept C without Two-Way Left Turn Lane (From Salt Works Road to Tops/Tractor Supply and from S Main Street to Bates Road)



Bridge Over Oak Orchard Creek (Facing East)

## OPINION OF PROBABLE COST COMPARISON

The opinion of probable cost for each alternative concept is based on NYSDOT average weighted bid prices as of August 2019. Each estimate includes the cost of materials, installation, and labor. Percentages based on industry standards for work zone traffic control, survey and stakeout, mobilization, and contingency have also been included in each construction cost estimate. It should be noted that all three opinions of probable cost include the installation of a traffic signal at the Maple Ridge Road and Mustang

Drive intersection. If during the detailed design process it is determined that a roundabout is the more prudent and feasible alternative at this location, the costs would increase between $\$ 1.2 \mathrm{M}$ and $\$ 2.0 \mathrm{M}$ depending on the features selected for the roundabout. Further, none of the alternative concepts include streetscape amenities such as lighting, bike racks, benches, or trash receptacles. For a more detailed review of each individual cost estimate, refer to Appendix C.

Table 8: Cost Comparison

|  | ALTERNATIVE CONCEPT A | ALTERNATIVE CONCEPT B | ALTERNATIVE CONCEPT C |
| :---: | :---: | :---: | :---: |
| Construction Cost | \$6,458,000 | \$4,447,000 | \$9,123,000 |
| Design Engineering (12\%) | \$775,000 | \$533,700 | \$1,094,800 |
| Construction Inspection (20\%) | \$1,291,600 | \$889,400 | \$1,824,600 |
| TOTAL PROJECT COST | \$8,524,600 | \$5,870,100 | \$12,042,400 |

## SIGNAL WARRANT ANALYSIS AT MAPLE RIDGE ROAD (ROUTE 31) AND MUSTANG DRIVE:

The intersection of Maple Ridge Road (NY Route 31) and Mustang Drive is the only entrance to the Medina Central School complex from Maple Ridge Road. The intersection experiences an increase in vehicle delay during school peak hours. Currently, Mustang Drive is stop controlled and Maple Ridge Road is uncontrolled. Due to fewer gaps in traffic during school peak hours, vehicles and buses are diverting to other intersections further away from their destinations. As part of the study, a signal warrant analysis was conducted to analyze the need for a traffic signal at this intersection.

The signal warrant was analyzed using Synchro 10 Warrants and 15-minute volume counts at the intersection of Maple Ridge Road and Mustang Drive on November 14th and 15th, 2018. The results of the Federal 2009 Manual on Uniform Traffic Control Devices (MUTCD) warrant analysis report can be found in Appendix B. Per the "Warrant Summary Report", the intersection met two (2) of the nine (9) warrants set forth in the 2009 National MUTCD, as well as, the all-way stop-controlled warrant.

The two warrants that were met are Warrant 3, Peak Hour and Warrant 8, Roadway Network. Warrant 8 was met due to the total entering volume being greater than 1,000 vehicles per hour (vph) during peak hours while also meeting warrant 3, as described in Section 4C.09.02 of the MUTCD. Warrant 3 was met for condition B only, which states the plotted point has to fall above the plotted line for any given four (4) consecutive 15-minute periods (1-hour). Three
separate points plotted above the plotted line. Further evaluation of the warrant analysis report shows that 3 of the 4 hours were met for Warrant 2: Four-hour Vehicular Volumes and 3 of the 8 hours were met for Warrant 1: Eighthour Vehicular Volumes, but were not warranted. Warrants 4: Pedestrian Volume and Warrant 5: School Crossings were not met. While obtained video of traffic and pedestrian movements did not show pedestrians crossing at the intersection, field observations during various site visits noted that pedestrians are present at this intersection.

Since the intersection meets two (2) of the nine (9) signal warrants, the school is currently diverting some bus traffic away from the Maple Ridge Road / Mustang Drive intersection, and there has been significant public commentary requesting an improvement made to the intersection, it is recommended that an intersection treatment be implemented at this location. As per the New York State Highway Design Manual, Chapter 5, Section 9.7, the study of alternatively installing a roundabout is to be completed before any decision to install a new traffic signal is made. As part of the study, it is recommended to account for the additional vehicles and buses that will begin to use the reconfigured new intersection, the cost to benefit ratio of constructing a signal, and the effect of the signal on the rest of the signal corridor system, in particular the intersections of Maple Ridge Road with Gwinn Street and Maple Ridge Road at the Tops/Tractor Supply entrance.

## LEVEL OF SERVICE (LOS) ANALYSIS

Operational analyses were performed for the proposed project alternatives. The analysis methodologies, inputs, and the results are explained in the following section. They include the following changes modeled:

- Signal installation at Maple Ridge Road / Mustang Drive
- Installation of an eastbound left turn lane at the intersection of Maple Ridge Road / Mustang Drive
- Installation of eastbound and westbound left turn lanes at the intersection of Maple Ridge Road / Gwinn Street
- Trip redistributions at the intersections of Maple Ridge Road / West Avenue and Maple Ridge Road / S. Main Street from the proposed access management at the intersection of Maple Ridge Road / West Avenue / West Avenue Extension
- Installation of a two-way left-turn lane at select locations within the study area


## LEVEL OF SERVICE ANALYSIS HIGHLIGHTS

- This analysis studies average vehicle delay (or the time a vehicle is expected to have to wait at an intersection, on average), and uses those delay values to assign Level of Service (LOS) letter grades to compare existing conditions to recommended conditions.
- All intersections in the study area operate at acceptable levels of service based on existing conditions.
- If recommendations included in this Study are implemented, all intersections in the study area will continue to operate at acceptable levels of service.
- Level of service will either improve or maintain the existing average vehicle delay at all study intersections if recommendations included in this Study are implemented.
- The proposed signal at Mustang Drive would reduce average vehicle delay and give vehicles on Mustang Drive the time needed to turn onto Maple Ridge Road.
- The proposed access management plan would reduce overall vehicle delay, if implemented, and would reroute vehicles to more efficient travel routes.
- Installation of the proposed left turn lanes are expected to create a minor improvement to intersection congestion and average vehicle delay.
- Installation of the two-way left turn lane will have no impact on intersection level of service where implemented, but will reduce congestion at minor driveways along the corridor.

These conditions were modeled for all three alternatives, as the differences between the Alternative Concepts, from a traffic operations perspective, has a minimal measurable impact on level of service, delay, and operations. The purpose of this analysis is to compare the operational conditions of the existing corridor during the expected "build" year (2021) to the implementation of the proposed conditions. To account for annual growth in population, the 2018 existing traffic volumes were increased by $0.5 \%$ per year. This growth rate is based on the documented growth shown in the NYSDOT Traffic Data Reports from 2006 to 2017.

Operational analyses were performed for the proposed conditions' AM and PM peak hour periods using Synchro software (v.10) to determine the LOS and vehicular delay for each
of the study intersections with the proposed conditions. The analyses used the same methodology and inputs as those outlined in the Existing Traffic Analysis section (see page 6), with the exception of the inputs changed to meet the proposed conditions as previously described. The delay limits for each LOS category remains the same as the thresholds outlined in Table 2 (see page 7).

To model the installation of a traffic signal at the intersection with Mustang Drive as identified in the proposed conditions, this Study assumed 'Permissive Only Left-Turn Phasing' from Chapter 4.3.1 of the FHWA Traffic Signal Timing Manual, with actuated pedestrian phases. The phasing diagram shown below represents the modeled phasing for the new signal.

Proposed Phase Diagram
Maple Ridge Road \& Mustang Drive


To model the proposed access management in the Synchro model, the following trip redistributions were performed for the AM and PM peak hours:

- Northbound left turning traffic and through traffic at West Avenue Extension at its intersection with Maple Ridge Road was moved and added to the same corresponding movements at the intersection of S. Main Street.
- Southbound left turning movements and through traffic at Maple Ridge Road and West Avenue was moved and added to the same corresponding movements at the intersection of S. Main Street.
- Westbound left turning traffic at the intersection of Maple Ridge Road and West Avenue Extension was moved and added to the same corresponding movements at the intersection of S. Main Street.
- All other proposed access management, which is proposed for private lot and driveway access, was not modeled as a part of this analysis.

The resulting intersection LOS for the study intersections are summarized in Table 9. A detailed LOS summary can be seen in the attached reports, in Appendix B.

As shown in Table 9, the intersections of Maple Ridge Road / Mustang Drive and Maple Ridge Road / West Avenue both experience a positive impact on LOS from the implementation of the proposed project conditions.

The intersection of Maple Ridge Road and Mustang Drive operates at LOS A under the proposed conditions for the AM and PM peak hours, whereas the intersection operates at LOS C under the existing conditions in 2021 during both peak hours. This improvement in LOS can be largely attributed to the implementation of the proposed signal control at this intersection in the model.

The intersection of Maple Ridge Road and West Avenue experienced a change from in LOS from $C$ to LOS B in the AM peak hour, and from LOS D to LOS $B$ in the PM peak hour. This shift was a result of the access management performed at this intersection in the form of right-in, right-out restriction for the southern leg (northbound approach) and right-out only restriction for the northern leg (southbound approach). Eastbound left-turning movements from Maple Ridge Road to West Avenue are maintained in the proposed conditions, as a reasonable, alternative route for left-turning traffic was not available that would not result in excessive delay being displaced to another intersection.

The introduction of right-in and right-out restrictions reduces delay at minor street stop-controlled intersections, in particular, because of the following impacts:

- Right-in restrictions are effective at reducing delays because it eliminates the delay caused by queued left-turning vehicles on the major street approaches, who have to wait for a gap in opposing traffic to make their movement, and can also result in blocking through movements and right turning movements that may queue behind them. Instead, left-turning vehicles can continue to a more convenient location to perform the left turns, or reroute their trips to prevent the need of a left turn.
- Right out restrictions are effective at reducing delays because they eliminate the delay caused by queued left-turning and through movement vehicles on the minor street, which need to wait for a gap in both streams of traffic, rather than right turning vehicles, which only have a single stream of traffic that conflicts with their movements.

All other intersections studied had maintained the same LOS from the existing conditions to the proposed conditions.

All intersections in the proposed project alternatives conditions operate at an acceptable LOS (LOS D or better).

Table 9: Peak Hour Intersection LOS
Existing and Proposed (2021)

| ID | INTERSECTION | EXISTING CONDITIONS (2021) |  |  |  |  | PROPOSED (2021) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | TRAFFIC CONTROL | AM PEAK |  | PM PEAK |  | TRAFFIC CONTROL | AM PEAK |  | PM PEAK |  |
|  |  |  | DELAY | LOS | DELAY | LOS |  | DELAY | LOS | DELAY | LOS |
| 1 | Maple Ridge Road / Tops Plaza | Signal | 15.3 | B | 12.0 | B | Signal | 15.3 | B | 12.0 | B |
| 2 | Maple Ridge Road / Mustang Drive | Unsignalized | 17.7 | C | 16.7 | C | Signal | 6.3 | A | 6.4 | A |
| 3 | Maple Ridge Road / Gwinn Street | Unsignalized | 25.5 | D | 18.7 | C | Unsignalized | 25.3 | D | 18.5 | C |
| 4 | Maple Ridge Road / West Avenue | Unsignalized | 16.1 | C | 27.3 | D | Unsignalized | 10.2 | B | 11.2 | B |
| 5 | Maple Ridge Road / S Main Street (NY Route 63) | Signal | 15.0 | B | 13.5 | B | Signal | 13.3 | B | 14.3 | B |
| 6 | Maple Ridge Road / GCC / Pride Pak | Unsignalized | 15.2 | C | 14.4 | B | Unsignalized | 15.2 | C | 14.4 | B |
| 7 | Maple Ridge Road / <br> Bates Road | Unsignalized | 0.2 | A | 12.8 | B | Unsignalized | 0.2 | A | 12.8 | B |

Notes:

- HCM LOS 6th Edition Methodology was used.
- Delay is presented in seconds per vehicle; LOS = Level of Service
- Delay for signalized intersections is average vehicle delay.
- N/A for a signalized intersection is a reported delay greater than 80.
- Delay for one-way stop-controlled intersections is of the worst movement's delay.
- N/A for a stop-controlled intersection is a reported delay greater than 50.
- See the Signal Warrant Analysis for the justification of the change in control at Maple Ridge Road \& Mustang Drive.
- Bold Indicates a change in control type or LOS.


## TURN LANE RECOMMENDATIONS

The implementation strategy for new left turn lanes at study intersections was established based upon New York State Department of Transportation's Highway Design Manual (NYSDOT HDM), Section 5.9.8.2A This section states the following:
"The decision to construct left-turn lanes should consider: The volume of left-turning traffic and the volume of opposing traffic. In some cases, capacity analysis may clearly indicate a need for left-turn lanes. Chapter 9 of AASHTO's A Policy on Geometric Design of Highways and Streets, 2011, includes traffic volume criteria to be considered in determining the need for left turn lanes along two-lane highways."

Other factors such as crash history should be considered when determining when a leftturn lane is added. Following the guidance of the NYSDOT HDM, the AASHTO criteria was compared to the volumes that were collected for the traffic analysis. Exhibit 9-23 in AASHTO's A Policy on Geometric Design of Highways and Streets, 2011, was used for the comparison.

When the volumes were compared to the criteria, the following left turn lanes were identified to be justified within the project area:

- Maple Ridge Road at Tops Market, westbound left
- Maple Ridge Road at Mustang Drive, eastbound left
- Maple Ridge road at Gwinn Street, eastbound left
- Maple Ridge Road at West Avenue, eastbound left
- Maple Ridge Road at Main Street, eastbound left
- Maple Ridge Road at Bates Road, eastbound left

It shall be noted, that a left turn lane being justified at a location does not require the turn lane to be installed. If engineering judgment determines that the left turn lane would impose too heavy of a burden on the costs of the project, significantly decrease the safety of the intersection, or does not meet the goals of the project in question, then the installation of said left turn lane may be delayed until an appropriate alternative or necessary funding is acquired, or dismissed entirely, so long as the exclusion of the left turn lane does not cause an intersection to operate unacceptably or create safety concerns at the intersection.

The proposed project conditions included all of the justified left turn lanes, with the exception of the intersection of Maple Ridge Road and Bates Road. It was determined that installing a left turn lane at this intersection would not be in the best interest of the corridor given the lack of a crash history for rear-end collisions at this location compared to others in the corridor and the available stopping sight distance heading eastbound on Maple Ridge Road. These recommendations are based on the volume of left-turning traffic and a review of the crash history analyzed as part of the existing conditions and needs assessment.

In addition to the justified left turn lanes, the following left turn lanes are also present in the proposed conditions:

## - Maple Ridge Road at Tops Market,

 eastbound left: This left turn lane is existing and maintaining it will create symmetry within the intersection. Maintaining the left turn lane will also provide additional capacity for the intersection if the commercial plaza to the north is redeveloped or is filled with new tenants. Maintaining this turn lane will not hinder the cost of the project, operations of the intersection, or safety of the intersection.- Maple Ridge Road at Gwinn Street, westbound left: Installing this left turn lane will create symmetry within the intersection with the installation of the proposed eastbound left turn lane. It is a common best practice to create symmetry within a stop controlled intersection, so long as the installation does not create an unnecessary burden on traffic operations, create confusing operations, or create unsafe environments. Intersection symmetry reduces motor vehicle driver confusion, and can reduce 'dead space' (underutilized right-ofway).
- Maple Ridge Road at S. Main Street, westbound left: This left turn lane is existing and maintaining it will create symmetry within the intersection. Maintaining the left turn lane will also provide additional capacity for this signalized intersection of two major thoroughfares of the area, if the regional development continues to progress. Maintaining this turn lane will not hinder the cost of the project, operations of the intersection, or safety of the intersection.

Hardscaped medians in
combination with TWLTLs are
often effective in reducing
vehicle speeds, improving
safety for all users, and
improving traffic flow

The proposed left turn lanes (both new and existing) were included the project alternatives and the traffic analysis. Using a design speed of 45 mph , it was determined that the recommended left-turn lanes would require more length for the appropriate bay and approach tapers than is available between the various intersections using the criteria outlined in the NYSDOT Highway Design Manual Chapter 5.9.8.2E and the National Manual on Uniform Traffic Control Devices (MUTCD).

As a result of the lack of available space between left-turn lane locations, the recommendation of a two-way left-turn lane (TWLTL) was evaluated. As per the NYSDOT Highway Design Manual Section 5.9.8.2C, the installation of TWLTLs are most appropriate for locations "where there is a high demand for mid-block left turns, such as areas with (or expected to experience) moderate or intense strip development." The 1-mile corridor from the Tops/Tractor Supply Plaza to the S. Main Street intersection has such development and includes 49 individual driveways/entrances. This amount of driveway density can be mitigated through the use of strategically placed raised medians and/or other access management techniques. If no additional mitigation measures are taken, the installation of a TWLTL would likely reduce rear-end crashes and improve traffic flow along the Maple Ridge Road corridor, but also has the potential to increase vehicle speeds due to the increase in unimpeded pavement width. As a goal and objective of the project to reduce vehicle speeds, improve safety for all users, and improve traffic flow, it is recommended that hardscaped medians in combination with TWLTLs be installed between Tops/Tractor Supply plaza and the S. Main Street intersection. Specific placement location of medians will require further study.

## MEDINA BUSINESS PARK

As discussed in Chapter 2, the Medina Business Park currently has site plan approval for the development of a 58-room hotel and the expansion of the industrial park to approximately 80,000 square feet. However, this does not allow for the full expansion of the business park. To accommodate the remaining land uses designated within the park, dedicated eastbound and westbound left turn lanes on Maple Ridge Road at the existing western most Medina Business Park entrance are recommended. This entrance services the Pride Pak facility on the north side of Maple Ridge Road and the GCC campus on the south side of Maple Ridge Road. A traffic analysis of the western Medina Business Park / GCC Campus intersection using the appropriate trip generation for the assumed land uses will also be required to determine the level of service implications on the intersection as a result of full build-out of the site. This analysis will help to determine whether a traffic signal is warranted at this location.

The installation of the left-turn lanes will have implications to the surrounding land uses that will likely result in the acquisition of property from the adjacent landowners as a result of widening the roadway. Existing utilities on the north side of Maple Ridge Road will require relocation and existing drainage patterns will need to be maintained. Since this corridor study does not recommend the installation of a two-way left-turn lane beyond Oak Orchard Creek, a smooth transition into and out of the turn lanes will be required east and west of the intersection improvement area. Further, it is recommended that any improvements made to the intersection include the bicycle and pedestrian accommodations recommended earlier in this chapter.


BMP America at Medina Business Park

## ACCESS MANAGEMENT PLAN

As noted previously, the number of driveways/ entrances along the 1-mile corridor starting at the Tractor Supply/Tops intersection heading east is approximately 49. Most businesses have direct access to Maple Ridge Road with some having multiple access points that are not always aligned with opposing entrances on the other side of Maple Ridge Road. This type and placement of driveway density increases the number of conflict points for motorists using Maple Ridge Road, increasing the potential for crashes.

As part of this Study, the access to every business and residence was evaluated for improvement. The maps shown on the following pages illustrate the access management strategies that could be employed over time. The strategies illustrated on the figures include the following:

## - Consolidation of driveways

- The Farm (Map 1)
- Medina Lanes (Map 2)
- Aldi (Map 2)
- Dollar General (Map 2)
- Monroe / Auto Zone (Map 3)
- Auto Experts (Map 3)
- Medina Inn / Cusimano's Pizza (Map 3)
- Mariachi De Oro (Map 3)
- Driveway Realignment with opposing driveways
- The Farm entrance (north side) with the field entrance (south side) (Map 1)
- Doug's Pizza / Salon De Coiffeur (north side) with Tops Plaza (south side (Map 2)
- Medina Lanes (north side) with Aldi (south side) (Map 2)
- Driveway reconfiguration to restrict access
- McDonald's (Map 2)
- United Memorial Community Care (Map 2)
- Tim Hortons (Map 2)
- Citgo / Gardner's Car Wash (Map 3)
- Maple Ridge Road / West Avenue / West Avenue Extension Intersection (Map 3)
- Dunkin' Donuts (Map 3)
- Proposed Health Facility (Map 3)


## - Creation of service roads

- Medina Central School entrance to be realigned behind McDonald's to the Tops Plaza intersection by way of the access road to Lakewood Village. A barrier should be installed just north of McDonald's, directing all school and Lakewood Village traffic to the traffic light at the Tops Plaza / Tractor Supply intersection (Map 2)
- Tim Hortons rear entrance to connect to a future extension of Oakland Avenue (Map 2)

Given that most businesses were provided site plan approval and likely received NYSDOT highway work permits to construct their various driveways, the Town and Village in coordination with the NYSDOT will need to work together to implement the various improvements as sites turnover or get redeveloped. The implementation strategy for these various elements is discussed in Chapter 4.



## MAPLE RIDGE ROAD CORRIDOR STUDY

CORRIDOR ZOOM 1

## AM ACCESS MANAGEMENT LOCATION

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0200 F 200 FEET


Medina Central S

- Provide new roa light at Tops Pla to Medina Cent
- Close the entra on Maple Ridg
- Close access to road, directing traffic to the tra Tractor Supply


## chools / Mustang Drive

ad between traffic


- West Side: Close access
- East Side: Provide full access and align with access point to Medina Lanes


## United Memorial Community Care

- Convert access on Maple Ridge Road to full access in/right-out
- Provide new full access point to East Drive at northwest corner of parking lot alinged with proposed new access to McDonald's


## MAPLE RIDGE ROAD CORRIDOR STUDY CORRIDOR ZOOM 2





## MAPLE RIDGE ROAD CORRIDOR STUDY

 CORRIDOR ZOOM 3AM ACCESS MANAGEMENT LOCATION
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§ FULL IN / RIGHT-OUT ACCESS
J. RIGHT-IN / RIGHT-OUT ACCESS

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- ACCESS RESTRICTED




## MAPLE RIDGE ROAD CORRIDOR STUDY

CORRIDOR ZOOM 4
AM ACCESS MANAGEMENT LOCATION
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Public Workshop Presentation

## PUBLIC INPUT ON ALTERNATIVE CONCEPTS

## P PUBLIC WORKSHOP

A public workshop was held at the Medina Central School on the evening of June 20th, 2019. A total of 13 people from the general public were in attendance along with 4 people from the project Steering Committee. The public workshop started with a presentation introducing the project and describing the existing conditions analysis, the results of the initial public survey, design toolkits for pedestrian, bicycle, and corridor facilities and amenities, as well as the 3 alternative concepts for the corridor. Following the presentation, attendees were invited to stay for an interactive session to examine the alternative concept cross-section and plan view diagrams and voice their opinions on the needs of the corridor.

# (13) <br> PUBLIC WORKSHOP ATTENDEES 



Public Workshop Materials

## ALTERNATIVES SURVEY

A second survey was created to gather information and insights from the public regarding the 3 alternative concepts for Maple Ridge Road. Designed to take just a couple of minutes on either a computer or mobile device, the survey asked respondents to rank each of the alternatives in order from their favorite to least favorite option. People were also given the opportunity to provide written comments if desired. In addition to the online survey, paper surveys were printed and distributed to those with limited internet access.

As was done with the initial survey, steering committee members and stakeholders distributed the link to contacts through email as well as social media outlets. In total, there were 86* complete survey responses.

Table 10: Alternatives Survey Scoring Methodology

| RANKING | POINTS |
| :---: | :---: |
| 1st | 3 |
| 2nd | 2 |
| 3rd | 1 |

A scoring methodology was developed to give and overall score to each alternative concept based on the ranking of each alternative in order from most favorite (1st place) to least favorite (3rd place). An alternative received 3 points for each 1st place ranking, 2 points for each 2nd place ranking, and 1 point for each 3rd place ranking.

Table 11: Alternatives Survey Voting Results

| RANKING | ALTERNATIVE |  | ALTERNATIVE |  | ALTERNATIVE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | CONCEPT A | CONCEPT B |  | CONCEPT C |  |  |
|  | \# OF | \% OF | \# OF | \% OF | \# OF | \% OF |
|  | VOTES | VOTES | VOTES | VOTES | VOTES | VOTES |
| 1st Place | 14 | $16 \%$ | 47 | $55 \%$ | 25 | $29 \%$ |
| 2nd Place | 21 | $24 \%$ | 33 | $38 \%$ | 32 | $37 \%$ |
| 3rd Place | 51 | $29 \%$ | 6 | $7 \%$ | 29 | $34 \%$ |

## 86 <br> SURVEY <br> RESPONSES*

*88 surveys were received, but 2 of these surveys
were incomplete and omitted from the analysis.
MAPLE RIDGE ROAD CORRIDOR STUDY / 105

## RESULTS

Alternative Concept A: Scoring a total of 135 points, $16 \%$ of all survey respondents ranked Alternative Concept A 1st, while 24\% ranked it 2nd, and a majority (59\%) of surveys collected ranked this concept as their least favorite option for Maple Ridge Road.

Alternative Concept B: Alternative Concept B scored the highest of all three alternatives with a total of 213 points. $55 \%$ of all survey respondents ranked this as their favorite option while $38 \%$ of respondents ranked Alternative Concept B in 2 nd, and $7 \%$ ranked it as their 3rd choice.

Alternative Concept C: Alternative Concept C gained $29 \%$ of all 1 st place votes, $37 \%$ of 2 nd place votes, and $34 \%$ of 3 rd place votes, totaling up to 168 points.

Based on these survey results, Alternative Concept B is the most favorable to survey respondents, followed by Alternative Concept C, then Alternative Concept A.

## KEY FINDINGS

- Survey respondents desire a buffer or other physical separation between pedestrian/ bicycle facilities and vehicle traffic.
- Survey respondents prefer a shared pedestrian and bicycle facility (shared-use path proposed in Alternative Concepts B and C).
- Survey respondents are in favor of a twoway left turn lane from the intersection with S Main Street/S Gravel Road to the Tops Plaza.
- The preference for a separated pedestrian/ bicycle facility supports the findings from the initial survey, which indicated that, respectively, $37 \%$ and $46 \%$ of respondents feel that current pedestrian and bicycle conditions along the corridor feel unsafe.


## Table 12: Alternatives Survey Point Results

| RANKING | ALTERNATIVE <br> CONCEPT A | ALTERNATIVE <br> CONCEPT B | ALTERNATIVE <br> CONCEPT C |
| :---: | :---: | :---: | :---: |
| 1st Place <br> (3 points per vote) | 42 points | 141 points | 75 points |
| 2nd Place <br> (2 points per vote) | 42 points | 66 points | 64 points |
| 3rd Place <br> (1 point per vote) | 51 points | 6 points | 29 points |
| TOTAL POINTS | $\mathbf{1 3 5}$ points | $\mathbf{2 1 3}$ points | $\mathbf{1 6 8}$ points |

## Alternative Concept Point Totals

Based on Alternatives Survey Rankings


## "...INCORPORATING A

 TURN LANE AND BIKE AND PEDESTRIAN PATHS IN ANY CONFIGURATION WILL BE A VAST IMPROVEMENT AND WILL BE MUCH SAFER..."...THE SAFEST OPTIONS FOR BICYCLE/PEDESTRIANS IS TO SEPARATE THEM COMPLETELY FROM VEHICLE TRAFFIC..."


Quotes from Survey Respondents

## COORDINATION WITH NYSDOT

Officials within Region 4 of the New York State Department of Transportation (NYSDOT) proposed a variation to Alternative Concept A presented earlier in this chapter. This variation is different from the concept proposed to the public, and was discussed following the draft recommendations phase of this Study. NYSDOT's preferred alternative includes 5-foot sidewalks with a 5 - to 6 -foot grass maintenance strip adjacent to the curb between the sidewalk and edge of pavement on both sides of Maple Ridge Road. While not drastically different from the originally presented Alternative Concept A, the addition of the maintenance strip does not match the existing section between Gwinn Street and S Main Street and would require a transition from the NYSDOT preferred section to the existing section.


Existing Sidewalk on North Side of Maple Ridge Road

In addition to the cross section changes above, the Department provided additional guidance and preference for other features of the roadway and overall corridor plan as follows:

- Sidewalks be implemented on both sides of Maple Ridge Road from Salt Works Road to Bates Road.
- A continuous two-way left turn lane from the Tops Plaza / Tractor Supply intersection to the S Main Street / S Gravel Road intersection.
- Raised medians shorter than 150-feet should not be considered on this corridor.
- 5-foot to 6-foot wide shoulders are recommended to double as a space to bicyclists. NYSDOT Region 4 does not currently recommend including standard bicycle markings in this "bike space" since there is no adjacent on-road parking nor is it marked for "No Parking". Use of these markings may be reviewed in more detail and considered during project implementation.
- Mustang Drive and Maple Ridge Road intersection be closed and Mustang Drive be realigned to connect to the north side of the Tops Plaza / Tractor Supply intersection where the existing traffic signal could be utilized for school traffic.

Further coordination with NYSDOT will be required to finalize the design of Maple Ridge Road to ensure the needs of all stakeholders, and the public, are met.

## NYSDOT Preferred Alternative with Two-Way Left Turn Lane



Total Width $=66^{\prime}$


* Non-standard feature requiring NYSDOT approval.
** Two-way left-turn lane will only be incorporated where necessary.
NYSDOT Preferred Alternative without Two-Way Left Turn Lane


[^6]
## RECOMMENDED CODE AND POLICY CHANGES

## COMPLETE STREETS POLICY

The Village of Medina, as well as the Town of Shelby, should develop and adopt a Complete Streets Policy to help communities "develop and implement policies and practices that ensure streets are safe for people of all ages and abilities, balance the needs of different modes,
and support local land uses, economies, cultures, and natural environments. "11 This will encourage and support implementation of bicycle and pedestrian infrastructure along Maple Ridge Road as well as throughout the Village and Town.

## ACCORDING TO SMART GROWTH AMERICA, A ROBUST COMPLETE STREETS POLICY INCLUDES THE FOLLOWING ITEMS:12

- Vision and intent: Includes an equitable vision for how and why the community wants to complete its streets. Specifies need to create complete, connected, network and specifies at least four modes, two of which must be biking or walking.
- Diverse users: Benefits all users equitably, particularly vulnerable users and the most underinvested and underserved communities.
- Commitment in all projects and phases: Applies to new, retrofit/reconstruction, maintenance, and ongoing projects.
- Clear, accountable expectations: Makes any exceptions specific and sets a clear procedure that requires high-level approval and public notice prior to exceptions being granted.
- Jurisdiction: Requires interagency coordination between government departments and partner agencies on Complete Streets.
- Design: Directs the use of the latest and best design criteria and guidelines and sets a time frame for their implementation.
- Land use and context sensitivity: Considers the surrounding community's current and expected land use and transportation needs.
- Performance measures: Establishes performance standards that are specific, equitable, and available to the public.
- Project selection criteria: Provides specific criteria to encourage funding prioritization for Complete Streets implementation.
- Implementation steps: Includes specific next steps for implementation of the policy.


## ZONING RECOMMENDATIONS

## Include Pedestrian and Bicycle Facilities and Amenities in New Development Site Designs:

New developments or redevelopments should be required to install pedestrian and bicycle facilities and amenities within and directly adjacent to the new development site. This may include infrastructure such as sidewalks, shared use paths, bike parking, benches, and other amenities along Maple Ridge Road as well as within the site. This is a critical step in connecting the gaps over time and ensuring that all modes of transportation are considered as development increases.

Access Management: Where possible, new developments or redevelopment of existing sites should be required to share driveway access with adjacent businesses. Additionally, the zoning code should require that access points for parcels on located on both sides of the corridor be aligned, rather than offset, to minimize potential conflict points.

## EXPAND UPON BICYCLING LAWS IN VILLAGE AND TOWN CODES

The bicycle section of the Village of Medina, and Town of Shelby codes should be expanded to define and specify proper placement and use of bicycle facilities (e.g., shared use paths and bike lanes) and amenities (e.g., bicycle parking and fix-it stations).

A full list of all regulations related to bicycles included in the Village of Medina code can be found in Appendix D.

## VILLAGE SPEED LIMIT

The Village of Medina enforces a 30 MPH speed limit within village boundaries. For a majority of its length, the Village boundary runs along the center of Maple Ridge Road. It is recommended that a study be conducted to determine whether a speed reduction can be implemented along Maple Ridge Road in this area to either match, or be closer to, the Village of Medina 30 MPH speed limit. This would be most beneficial after some of the access management strategies such as the raised medians are installed.

## MAINTENANCE POLICY

The Village and Towns should dedicate funds as well as the responsible parties for routine and asneeded maintenance of bicycle and pedestrian facilities along Maple Ridge Road.

Routine maintenance may include: activities such as trash collection, weeding, trimming of bushes and shrubs in any landscaped buffers, debris removal such as leaves in the fall, sweeping, graffiti removal, and snow removal. It may also include visiting the site periodically for other related activities such as visitor use counts and inspections.

As-needed maintenance may include: filling minor potholes, minor repairs of facility surfaces, repair of facility shoulders, replacing damaged signs, and minor repairs of amenities such as benches.

These recommended code and policy changes will help ease implementation of infrastructurerelated recommendations included in this Study.


Maple Ridge Road Near Mustang Drive (Facing West)

## CHAPTER 4 IMPLEMENTATION STRATEGY

## A strong implementation strategy will help guide the Village and Town on how to effectively execute the recommendations included in this document.

Chapter 4 includes guidance on strategies that can be employed to facilitate implementation of the recommendations included in this Study. Additionally, this chapter identifies future work that is likely needed to move forward with
implementation, but was out of the scope of this Study. The final section of this chapter identifies various general information sections throughout the document that can be referenced for other plans or studies throughout the region.

## FUNDING MECHANISMS

An appropriate level of funding will be critical for implementation of the Maple Ridge Road Corridor Study. Communities that are consistently successful in implementing these types of projects leverage funds from a variety of sources and are consistent, year after year, with making investments in capital and maintenance projects. Genesee Transportation Council (GTC), the MPO responsible for transportation policy, planning, and investment decision making in the Genesee-Finger Lakes Region, distributes transportation funds from multiple funding programs throughout this region of

New York State. A project of this size, with a wide array of recommendations, may apply for multiple funding sources at both the state and federal level. Local matches typically range from 20 to $50 \%$. Additional funding for project implementation can be acquired through mitigation fees paid by local developments and public-private partnerships. The local communities should work with GTC to apply for appropriate funding opportunities. Grant opportunities that may be appropriate for the recommended Maple Ridge Road improvements are listed below.

## FEDERAL FUNDING OPPORTUNITIES*

- Federal Transit Administration (FTA)
- Highway Safety Improvement Program (HSIP)
- National Highway Performance Program (NHPP)
- Surface Transportation Block Grant Program (STBG)
- Transportation Alternatives (TA) Set-Aside
- Recreational Trails Program (RTP)
- Safe Routes to School (SRTS)


## STATE FUNDING OPPORTUNITIES

- Consolidated Local Street and Highway Improvement Program (CHIPS)
- New York State Energy Research and Development Authority (NYSERDA)
- Consolidated Funding Application (CFA)


## OTHER FUNDING OPPORTUNITIES

- Mitigation Fees
- Public-Private Partnerships

[^7]

## PHASED IMPLEMENTATION

Due to funding availability and potential design challenges, we recommend a phased approach to implementation. The project team considered two methods for a phased approach to implementation: Individual Elements Phased Approach and Location-Based Phased Approach.

## INDIVIDUAL ELEMENTS PHASED APPROACH

This method would take individual elements of the design and implement each separately along the entire length of the corridor. For example, if this methodology was followed, a sidepath may be implemented from Salt Works Road to Bates Road during Phase I, without implementing any other improvements (e.g., access management treatments, two-way left turn lane, etc.). Phase Il may follow with roadway redesign and construction, possibly resulting in the need for redesign and reconstruction of all or portions of the previously implemented sidepath. This approach also gives equal attention to the entire length of the corridor without considering the density of key destinations along the roadway. The area from the Tops Plaza to the S Main Street / S Gravel Road intersection will not be fully built out with all recommendations for an extended period of time since each elemental phase will take a number of years to implement along the corridor.

## LOCATION-BASED PHASED APPROACH

A location-based phased approach segments the corridor at certain locations based on demand and key destinations throughout the corridor. This assumes all recommended improvements within the segment endpoints be designed and constructed at once. For example, Phase I will include implementation of all recommendations (e.g., pedestrian and bicycle facilities, two-way left turn lane, access management treatments, etc.) within a segment at the same time. Design and construction will focus on each segment, reducing the need for future rework of recently constructed facilities as discussed in the individual elements phased approach description. Each of the location-based phases should have logical termini. Additionally, design of phase endpoints should ensure a seamless transition between the new construction configurations and current conditions.

Due to the likelihood of re-work needed by the Individual Elements Phased Approach as well as different levels of demand along the corridor, this Study recommends a Location-Based Phase Approach for implementation of improvements on Maple Ridge Road.

This Study proposes three phases for implementation of Maple Ridge Road improvements:

- Phase 1: Tops Plaza to $S$ Main Street (if the ped./ bike bridge is not built) OR Tops Plaza to Ricky Place (if the ped./bike bridge is built)
- Phase 2: S Main Street to Bates Road (if the ped./bike bridge is not built) OR Ricky Place to Bates Road (if the ped./bike bridge is built)
- Phase 3: Salt Works Road to Tops Plaza

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## ACCESS MANAGEMENT PLAN IMPLEMENTATION

The recommendations included in the access management plan should be progressed as soon as it is feasible, regardless of the status of other recommended projects included in this plan. Early implementation of the recommended access management treatments will help the corridor realize traffic calming benefits without a complete redesign and reconstruction of the roadway.

The access management on developed parcels may be implemented in the following ways:

- Through coordination with the Village of Medina, Town of Shelby, and the current property owner
- Through coordination with the Village of Medina, Town of Shelby, and a new property owner when a parcel changes ownership
- Encouragement of zoning code changes


Proposed Mustang Drive Reroute

## INDIVIDUAL PROJECTS

Due to costs and other considerations, the Village and Town may benefit from implementing a few projects separately from the three phases previously discussed. Implementing separately may enable the Village and Town to move forward with valuable improvements as funds become available, rather than waiting for enough funds to cover all the recommended projects at once. These individual projects include:

## - School Access to Maple Ridge Road:

Mustang Drive currently provides the school access to Maple Ridge Road. Based on the signal warrant analysis conducted in Chapter 3, it is recommended that an intersection treatment be implemented at this location. Depending on the results of further necessary studies, this improvement may include a traffic signal or roundabout at the intersection of Mustang Drive and Maple Ridge Road. Alternatively, the school may be able to reroute bus and other relevant school traffic west to the traffic light at the Tops Plaza, avoiding Mustang Drive. Further feasibility studies and traffic/intersection analyses are required to determine an appropriate and preferred alternative for the school access on Maple Ridge Road.

- Medina Business Park Access to Maple

Ridge Road: The access needs in this area will evolve as Medina Business Park expands and more businesses are developed on the sites. Access to Medina Business Park sites should consider projected traffic volumes and patterns based on both existing and planned developments during design phases. Design of these access points should consider and implement the recommendations for access management treatments included in Chapter 3 of this study.

Depending on timing and funding, it may be possible to design and implement these projects with their respective phases.

## PROPOSED SCHEDULE

Table 13: Proposed Schedule

| PHASE | YEAR 1 | YEAR 2 | YEAR 3 | YEAR 4 | YEAR 5 |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Phase 1 | Funding | Design/ <br> Permitting | Construction |  |  |
| Phase 2 |  | Funding | Design/ <br> Permitting | Construction |  |
| Phase 3 |  | Funding | Design/ <br> Permitting | Construction |  |
| Business Park* | Design/ <br> Permitting | Construction |  |  |  |
| School* | Construction |  |  |  |  |

*These projects could be completed at any time
depending on priorities and funding availability


## PROGRAMMING AND POLICY IMPLEMENTATION

- Adopt this Study: Adopting this Study will enable the Village of Medina to move forward with implementing the identified improvements, programs, and policies outlined in the document. Adoption will create consistency in project design, community priorities and will improve the project's competitiveness for grant programs.
- Update Zoning Policies: The Village and Town should revise their zoning codes to require new development to provide active transportation amenities such as pedestrian or bicycle facilities, bicycle parking, benches, lighting or other amenities.
- Complete Streets Law and Policy: Adopt a law requiring the development of complete streets. A Complete Streets Law will require new development to assess the impact that the development will have to all modes of travel and identify the need in the area for alternative modes of travel. Development and adoption of a Complete Streets Policy will help guide future projects to ensure safety for all road users.
- Walk/Bike to Work/School Days:

May is National Walk and Bike Month, with specific days of the month of May dedicated to Walk/Bike to School/Work Day. The community should partner with schools, employers, and advocacy groups to organize events throughout the month of May to help encourage biking and walking. Events may include organized rides or walking groups to work or school, bike rodeos to teach young or new bicyclists the basics of riding or maintaining a bike, or refueling/water stations hosted on a national walking or biking day for students or employees. More information and ideas can be found in the League of American Bicyclists' National Bike Month Guide ${ }^{14}$ and at the National Center for Safe Routes to School's 'Walk Bike to School' homepage. ${ }^{15}$

- Demonstration Projects: Demonstration projects, sometimes referred to as "tactical urbanism," are temporary facilities designed to simulate proposed infrastructure improvements. The temporary facility can help gain public support and awareness while illustrating installation feasibility.


## FUTURE WORK

While this Study aimed to provide a thorough summary of the existing and recommended infrastructure throughout the corridor, future studies are necessary to advance recommended projects from conceptual-level planning to construction. This future work will include:

- Identifying appropriate funding mechanisms for each phase and apply for funding.
- Design and construction approval process by appropriate agency which may vary based on funding sources. This could include SEQR, NEPA, design report, preliminary design, final design, engineering estimates.
- Refined Vehicle Level of Service Analysis for the individual projects through the design process.
- An analysis of West Ave Extension and S Gravel Road should be conducted for reconfiguration at the time that access management of Maple Ridge Road and West Avenue is implemented.


Future Work for Intersection of West Avenue Extension and S Gravel Road
Source: Google

## GENERAL INFORMATION FOR OTHER PLANS THROUGHOUT THE REGION


#### Abstract

Although the information included in this document is specific to Maple Ridge Road, this Study includes general information, strategies, and best practices that can pertain to other areas and projects within Orleans County and throughout the Genesee-Finger Lakes region. The list below provides a summary of the sections included in this Study which can be applied to other planning, design, and project implementation efforts.


- Level of Service Delay Limits (Table 2) - Chapter 1 - Page 7
- Pedestrian and Bicycle Safety Needs: Speed Reduction - Chapter 2 - Page 56
- Pedestrian and Bicycle Safety Needs: School Connections - Chapter 2 - Page 57
- Pedestrian and Bicycle Safety Needs: Lighting - Chapter 2 - Page 58
- Pedestrian and Bicycle Design Toolkit - Chapter 3 - Page 70-73
- Roadway Corridor Design Toolkit - Chapter 3 - Page 74-78
- Recommended Code and Policy Changes - Chapter 3 - Page 112-113
- Funding Mechanisms - Chapter 4 - Page 116


## ENDNOTES

1 Census Reporter. ACS 2012-2017 5-Year Estimates.
Obtained December 2018. <https://censusreporter.org/ profiles/16000US3646415-medina-ny/>
2 Census Reporter. ACS 2012-2017 5-Year Estimates. Obtained December 2018. <https://censusreporter.org/ profiles/16000US3646415-medina-ny/>
3 New York State Department of Transportation, Department of Health, and Governor's Traffic Safety Committee. 2016 New York State Pedestrian Safety Action Plan. Downloaded 12/10/2018. <https://www.ny.gov/sites/ny.gov/files/atoms/files/ pedestriansafetyactionplan.pdf>
4 Orleans County Department of Planning and Development. 2018. Western Orleans Comprehensive Plan. Downloaded 12/06/2018. <http://www.orleanscountyny.gov/Departments/ Resident-Services/Planning/Western-Orleans-ComprehensivePlan>
5 Genesee Transportation Council. 2016. Regional Walkability Improvement Program. Downloaded 12/06/2018. <https://www. gtcmpo.org/sites/default/files/pdf/2016/walkabilityactionplans_ wmapsexecsum.pdf>
6 § 254-33. MR Maple Ridge Road Overlay District. Downloaded 12/07/2018. [https://ecode360.com/13956577](https://ecode360.com/13956577)
7 ARTWalk. Obtained 1/31/2019. <http://www.rochesterartwalk. org/info.php>
8 NYSDOT Complete Streets. Downloaded 4/4/2019. <https:// www.dot.ny.gov/programs/completestreets>
9 NYSDOT Complete Streets. Downloaded 4/4/2019. <https:// www.dot.ny.gov/programs/completestreets>
10 NYSDOT Highway Design Manual Section 5.2.3.4.A: Measures of Effectiveness. 2017.
11 Smart Growth America. Elements of a Complete Streets Policy. Downloaded 5/29/2019. <https://smartgrowthamerica.org/ resources/elements-complete-streets-policy/>
12 Smart Growth America. Elements of a Complete Streets Policy. Downloaded 5/29/2019. <https://smartgrowthamerica.org/ resources/elements-complete-streets-policy/>
13 § 70. Bicycles. Downloaded 5/29/2019. <https://ecode360. com/13956577>
14 League of American Bicyclists. Plan a Bike Month Event. [https://www.bikeleague.org/BikeMonthGuide](https://www.bikeleague.org/BikeMonthGuide)
15 UNC Highway Safety Research Center. Walk \& Bike to School. [http://www.walkbiketoschool.org/](http://www.walkbiketoschool.org/)


Maple Ridge Road East of S Main Street Intersection Facing East

## APPENDIX A

## EXISTING CONDITIONS



# TURNING MOVEMENT COUNT DATA 

 PROVIDED BY GENESSEE TRANSPORTATION COUNCIL
## MRR @ Tops Market - TMC

Mon Nov 19, 2018
Full Leng th (6AM-9AM, 2PM-6PM)

Provided by: Genesee Transportation Council
50 West Main Street, Suite 8112,
Rochester, NY, 14614, US

All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 595325, Location: 43.206839, -78.399756

| Leg <br> Direction | West <br> Eastbound |  |  |  |  | East <br> Westbound |  |  |  |  | South <br> Northbound |  |  |  |  | North Southbound |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Time | L | T | R | U | App | L | T | R | U | App | L | T | R | U | U App | L | T | R |  | App | Int |
| $\begin{array}{\|r} \hline 2018-11-19 \\ 2: 00 \mathrm{PM} \end{array}$ | 0 | 68 | 18 | 0 | 86 | 48 | 47 | 6 | 0 | 101 | 18 | 0 | 33 | 0 | $0 \quad 51$ | 3 | 1 | 0 | 0 | 4 | 242 |
| 2:15PM | 0 | 89 | 19 | 0 | 108 | 44 | 59 | 8 | 0 | 111 | 10 | 0 | 51 | 0 | $0 \quad 61$ | 8 | 3 | 0 | 0 | 11 | 291 |
| 2:30PM | 1 | 64 | 15 | 0 | 80 | 48 | 56 | 3 | 0 | 107 | 18 | 0 | 45 | 0 | 063 | 1 | 0 | 1 | 0 | 2 | 252 |
| 2:45PM | 0 | 61 | 15 | 0 | 76 | 50 | 82 | 4 | 0 | 136 | 31 | 1 | 45 | 0 | 077 | 4 | 0 | 1 | 0 | 5 | 294 |
| Hourly Total | 1 | 282 | 67 | 0 | 350 | 190 | 244 | 21 | 0 | 455 | 77 | 1 | 174 | 0 | 0252 | 16 | 4 | 2 | 0 | 22 | 1079 |
| 3:00PM | 0 | 63 | 13 | 0 | 76 | 40 | 89 | 6 | 0 | 135 | 14 | 0 | 54 | 0 | 068 | 7 | 1 | 1 | 0 | 9 | 288 |
| 3:15PM | 0 | 63 | 12 | 0 | 75 | 43 | 94 | 6 | 0 | 143 | 16 | 0 | 40 | 0 | 056 | 1 | 1 | 0 | 0 | 2 | 276 |
| 3:30PM | 0 | 70 | 13 | 0 | 83 | 53 | 76 | 3 | 0 | 132 | 12 | 2 | 42 | 0 | 056 | 2 | 0 | 0 | 0 | 2 | 273 |
| 3:45PM | 0 | 55 | 18 | 0 | 73 | 33 | 65 | 6 | 0 | 104 | 15 | 1 | 48 | 0 | 064 | 2 | 0 | 2 | 0 | 4 | 245 |
| Hourly Total | 0 | 251 | 56 | 0 | 307 | 169 | 324 | 21 | 0 | 514 | 57 | 3 | 184 | 0 | $0 \quad 244$ | 12 | 2 | 3 | 0 | 17 | 1082 |
| 4:00PM | 0 | 62 | 17 | 0 | 79 | 43 | 70 | 5 | 0 | 118 | 15 | 0 | 38 | 0 | 053 | 3 | 0 | 1 | 0 | 4 | 254 |
| 4:15PM | 0 | 68 | 15 | 0 | 83 | 42 | 82 | 3 | 0 | 127 | 18 | 0 | 37 | 0 | 055 | 3 | 0 | 0 | 0 | 3 | 268 |
| 4:30PM | 0 | 62 | 21 | 0 | 83 | 39 | 71 | 3 | 0 | 113 | 15 | 0 | 46 | 0 | $0 \quad 61$ | 2 | 0 | 0 | 0 | 2 | 259 |
| 4:45PM | 0 | 67 | 19 | 0 | 86 | 28 | 73 | 1 | 0 | 102 | 19 | 0 | 49 | 0 | 068 | 3 | 0 | 0 | 0 | 3 | 259 |
| Hourly Total | 0 | 259 | 72 | 0 | 331 | 152 | 296 | 12 | 0 | 460 | 67 | 0 | 170 | 0 | $0 \quad 237$ | 11 | 0 | 1 | 0 | 12 | 1040 |
| 5:00PM | 0 | 73 | 14 | 0 | 87 | 35 | 66 | 4 | 0 | 105 | 11 | 1 | 36 | 0 | 048 | 2 | 1 | 0 | 0 | 3 | 243 |
| 5:15PM | 0 | 52 | 12 | 0 | 64 | 44 | 68 | 2 | 0 | 114 | 20 | 0 | 43 | 0 | 063 | 0 | 1 | 1 | 0 | 2 | 243 |
| 5:30PM | 0 | 53 | 13 | 0 | 66 | 37 | 65 | 3 | 0 | 105 | 8 | 0 | 48 | 0 | $0 \quad 56$ | 0 | 1 | 0 | 0 | 1 | 228 |
| 5:45PM | 0 | 58 | 13 | 0 | 71 | 34 | 42 | 1 | 0 | 77 | 15 | 1 | 23 | 0 | $0 \quad 39$ | 0 | 1 | 1 | 0 | 2 | 189 |
| Hourly Total | 0 | 236 | 52 | 0 | 288 | 150 | 241 | 10 | 0 | 401 | 54 | 2 | 150 | 0 | 0206 | 2 | 4 | 2 | 0 | 8 | 903 |
| 6:00PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hourly Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\begin{array}{\|r\|} \hline 2018-11-20 \\ 6: 00 \mathrm{AM} \\ \hline \end{array}$ | 0 | 47 | 2 | 0 | 49 | 3 | 22 | 0 | 0 | 25 | 0 | 0 | 3 | 0 | 03 | 0 | 0 | 0 | 0 | 0 | 77 |
| 6:15AM | 0 | 74 | 3 | 0 | 77 | 6 | 27 | 0 | 0 | 33 | 3 | 0 | 4 | 0 | 0 7 | 0 | 0 | 0 | 0 | 0 | 117 |
| 6:30AM | 0 | 45 | 4 | 0 | 49 | 9 | 40 | 0 | 0 | 49 | 1 | 0 | 8 | 0 | $0 \quad 9$ | 0 | 0 | 0 | 0 | 0 | 107 |
| 6:45AM | 1 | 57 | 3 | 0 | 61 | 10 | 52 | 2 | 0 | 64 | 1 | 0 | 8 | 0 | $0 \quad 9$ | 1 | 0 | 0 | 0 | 1 | 135 |
| Hourly Total | 1 | 223 | 12 | 0 | 236 | 28 | 141 | 2 | 0 | 171 | 5 | 0 | 23 | 0 | 028 | 1 | 0 | 0 | 0 | 1 | 436 |
| 7:00AM | 0 | 63 | 6 | 0 | 69 | 7 | 50 | 0 | 0 | 57 | 2 | 0 | 4 | 0 | $0 \quad 6$ | 0 | 0 | 0 | 0 | 0 | 132 |
| 7:15AM | 0 | 77 | 7 | 0 | 84 | 10 | 65 | 3 | 0 | 78 | 5 | 0 | 17 | 0 | 022 | 1 | 0 | 0 | 0 | 1 | 185 |
| 7:30AM | 0 | 92 | 9 | 0 | 101 | 14 | 85 | 2 | 0 | 101 | 4 | 0 | 12 | 0 | $0 \quad 16$ | 0 | 0 | 0 | 0 | 0 | 218 |
| 7:45AM | 0 | 77 | 11 | 0 | 88 | 24 | 68 | 1 | 0 | 93 | 3 | 0 | 17 | 0 | 020 | 0 | 0 | 1 | 0 | 1 | 202 |
| Hourly Total | 0 | 309 | 33 | 0 | 342 | 55 | 268 | 6 | 0 | 329 | 14 | 0 | 50 | 0 | $0 \quad 64$ | 1 | 0 | 1 | 0 | 2 | 737 |
| 8:00AM | 0 | 51 | 8 | 0 | 59 | 16 | 64 | 2 | 0 | 82 | 4 | 0 | 17 | 0 | $0 \quad 21$ | 0 | 0 | 0 | 0 | 0 | 162 |
| 8:15AM | 0 | 38 | 10 | 0 | 48 | 19 | 46 | 1 | 0 | 66 | 3 | 0 | 12 | 0 | $0 \quad 15$ | 0 | 0 | 0 | 0 | 0 | 129 |
| 8:30AM | 1 | 52 | 6 | 0 | 59 | 18 | 43 | 2 | 0 | 63 | 4 | 0 | 14 | 0 | $0 \quad 18$ | 0 | 0 | 0 | 0 | 0 | 140 |
| 8:45AM | 0 | 58 | 6 | 0 | 64 | 21 | 37 | 3 | 0 | 61 | 3 | 0 | 21 | 0 | 024 | 0 | 0 | 0 | 0 | 0 | 149 |
| Hourly Total | 1 | 199 | 30 | 0 | 230 | 74 | 190 | 8 | 0 | 272 | 14 | 0 | 64 | 0 | $0 \quad 78$ | 0 | 0 | 0 | 0 | 0 | 580 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Hourly Total | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | $0 \quad 0$ | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 3 | 1759 | 322 | 0 | 2084 | 818 | 1705 | 80 | 0 | 2603 | 288 | 6 | 815 | 0 | $0 \quad 1109$ | 43 | 10 | 9 | 0 | 62 | 5858 |
| $\begin{array}{r} \% \\ \text { Approach } \end{array}$ | 0.1\% | 84.4\% | 15.5\% | 0\% | - | 31.4\% | 65.5\% | 3.1\% | 0\% |  | 26.0\% | 0.5\% | 73.5\% 0 | 0\% |  | 69.4\% | 16.1\% | 14.5\% 0 |  | - | - |
| \% Total | 0.1\% | 30.0\% | 5.5\% | 0\% | 35.6\% | 14.0\% | 29.1\% | 1.4\% | 0\% | 44.4 \% | 4.9\% | 0.1\% | 13.9\% 0 | 0\% | \% 18.9\% | 0.7\% | 0.2\% | 0.2\% 0 |  | 1.1\% | - |
| Lights | 3 | 1621 | 313 | 0 | 1937 | 803 | 1603 | 72 | 0 | 2478 | 284 | 5 | 801 |  | 01090 | 43 | 10 | 7 | 0 | 60 | 5565 |



[^8]MRR @ Tops Market - TMC
Mon Nov 19, 2018
Full Leng th (6AM-9AM, 2PM-6PM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 595325, Location: 43.206839, -78.399756


Out: 1150 In: 1109
Total: 2259
[S] South

MRR @ Tops Market - TMC
Mon Nov 19, 2018
PM Peak (Nov 192018 2:45PM - 3:45PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 595325, Location: 43.206839, -78.399756

| Leg <br> Direction | West <br> Eastbound |  |  |  |  | East <br> Westbound |  |  |  |  | South <br> Northbound |  |  |  |  |  | North <br> Southbound |  |  |  |  |  | Int |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Time | L | T | R | U | App | L | T | R | R U | App | L | T | R |  | U | App | L | T | R | U | U | App |  |
| $\begin{array}{r} 2018-11-19 \\ 2: 45 \mathrm{PM} \end{array}$ | 0 | 61 | 15 | 0 | 76 | 50 | 82 | 4 | 0 | 136 | 31 | 1 | 45 |  | 0 | 77 | 4 | 0 | 1 |  | 0 | 5 | 294 |
| 3:00PM | 0 | 63 | 13 | 0 | 76 | 40 | 89 | 6 | 0 | 135 | 14 | 0 | 54 |  | 0 | 68 | 7 | 1 | 1 |  | 0 | 9 | 288 |
| 3:15PM | 0 | 63 | 12 | 0 | 75 | 43 | 94 | 6 | 0 | 143 | 16 | 0 | 40 |  | 0 | 56 | 1 | 1 | 0 |  | 0 | 2 | 276 |
| 3:30PM | 0 | 70 | 13 | 0 | 83 | 53 | 76 | 3 | 0 | 132 | 12 | 2 | 42 |  | 0 | 56 | 2 | 0 | 0 |  | 0 | 2 | 273 |
| Total | 0 | 257 | 53 | 0 | 310 | 186 | 341 | 19 | 0 | 546 | 73 | 3 | 181 |  | 0 | 257 | 14 | 2 | 2 |  | 0 | 18 | 1131 |
| \% Approach | 0\% | 82.9\% | 17.1\% |  |  | 34.1\% | 62.5\% | 3.5\% | 0\% |  | 28.4\% | 1.2\% | 70.4\% | 0\% | \% | - | 77.8\% | 11.1\% | 11.1\% | 0\% |  |  |  |
| \% Total |  | 22.7\% | 4.7\% | 0\% | 27.4 \% | 16.4\% | 30.2\% | 1.7\% | 0\% | 48.3 \% | 6.5\% | 0.3\% | 16.0\% | 0\% | \% | 22.7 \% | 1.2\% | 0.2\% | 0.2\% | 0\% | \% | 1.6 \% |  |
| PHF | - | 0.918 | 0.883 | - | 0.934 | 0.877 | 0.907 | 0.792 | - | 0.955 | 0.589 | 0.375 | 0.838 |  | - | 0.834 | 0.500 | 0.500 | 0.500 |  |  | 0.500 | 0.962 |
| Lights | 0 | 229 | 52 | 0 | 281 | 183 | 322 | 14 | 0 | 519 | 72 | 2 | 179 |  | 0 | 253 | 14 | 2 | 2 |  | 0 | 18 | 1071 |
| \% Lights | 0\% | 89.1\% | 98.1\% | 0\% | 90.6\% | 98.4\% | 94.4\% | 73.7\% | 0\% | 95.1\% | 98.6\% | 66.7\% | 98.9\% |  | \% | 98.4 \% | 100\% | 100\% | 100\% | 0\% | \% 1 | $100 \%$ | 94.7\% |
| Articulated Trucks and Single-Unit Trucks | 0 | 20 | 1 | 0 | 21 | 1 | 12 | 3 | 0 | 16 | 1 | 1 | 1 | , | 0 | 3 | 0 | 0 | 0 |  | 0 | 0 | 40 |
| Articulated Trucks and Single-Unit Trucks | 0\% | 7.8\% | 1.9\% | 0\% | 6.8\% | 0.5\% | 3.5\% | 15.8\% | 0\% | 2.9 \% | 1.4\% | 33.3\% | 0.6\% | 0\% |  | 1.2 \% | 0\% | 0\% | 0\% | 0\% |  | 0 \% | 3.5\% |
| Buses | 0 | 8 | 0 | 0 | 8 | 2 | 7 | 2 | 0 | 11 | 0 | 0 | 1 |  | 0 | 1 | 0 | 0 | 0 |  | 0 | 0 | 20 |
| \% Buses | 0\% | 3.1\% | 0\% | 0\% | $2.6 \%$ | 1.1\% | 2.1\% | 10.5\% | 0\% | 2.0\% | 0\% | 0\% | 0.6\% | 0\% | \% | 0.4 \% | 0\% | 0\% | 0\% | 0\% |  | 0 \% | 1.8\% |

[^9]MRR @ Tops Market - TMC
Mon Nov 19, 2018
PM Peak (Nov 192018 2:45PM - 3:45PM) - Overall Peak Hour All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 595325, Location: 43.206839, -78.399756
[N] North
Total: 40
In: 18 Out: 22


Out: 241 In: 257
Total: 498
[S] South

MRR @ Tops Market - TMC
Tue Nov 20, 2018
AM Peak (Nov 202018 7:15AM - 8:15AM)
Provided by: Genesee Transportation Council 50 West Main Street, Suite 8112,

Rochester, NY, 14614, US
All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 595325, Location: 43.206839, -78.399756


* L: Left, R: Right, T: Thru, U: U-Turn

MRR @ Tops Market - TMC
Tue Nov 20, 2018
AM Peak (Nov 202018 7:15AM - 8:15AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 595325, Location: 43.206839, -78.399756
[N] North
Total: 10
In: $2 \quad$ Out: 8


Out: $99 \quad \ln : 79$
Total: 178
[S] South


| 6 ＇ | 6.9 | － | $0 \cdot 0$ | L＇9 | $9 \cdot 1$ | $0 \cdot 1$ | － | 10 | L＇91 | $0 \cdot 1$ | $9 \%$ | － | $1 \cdot$ | 97 | g＇L | て＇६ | － | $0 \cdot 0$ | $0 \cdot 0$ | て＇zz | syonı \％ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 822 | 221 | 0 | 0 | L 41 | 9 | It | 0 | 2 | 1 | 8 | \＆6 | 0 | 6 | 84 | 9 | 2 | 0 | 0 | 0 | 2 | syonı1 |
| 1＇t | て＇ı | ． | $0 \cdot 0$ | て＇ı | て＇ı | $\stackrel{\circ}{0}$ | － | $\stackrel{\circ}{0}$ | 0.0 | L．0 | て＇ı | － | $\stackrel{0}{ }$ | t＇t | 92 | 0.0 | － | $0 \cdot 0$ | 0.0 | 0.0 | sosna \％ |
| 99 | 9z | 0 | 0 | 12 | t | 8 | 0 | 2 | 0 | 9 | 乙® | 0 | 9 | t2 | 2 | 0 | 0 | 0 | 0 | 0 | sesng |
| 0．96 | 626 | － | $0 \cdot 001$ | 2＇26 | で26 | ع＇86 | － | 9.86 | ع ¢8 | 8：86 | Z＇G6 | － | 2＇86 | $0 \cdot 76$ | $0 \cdot 06$ | $8 \cdot 96$ | － | $0 \cdot 001$ | $0 \cdot 001$ | 8＜L | s．466！\％ |
| ¢99s | L861 | 0 | $\varepsilon$ | 1291 |  | 0601 | 0 | ＋82 | 9 | 108 | 8Lセて | 0 | ع08 | 809 | ZL | 09 | 0 | \＆ | 01 | $\angle$ | s，4617 |
| － | $9 \cdot 98$ | $0 \cdot 0$ | to | 0.08 | ¢＇9 | 6.81 | $0 \cdot 0$ | $6{ }^{6}$ | 10 | 6 ¢ | t＇t | 0.0 | 0＇tr | $1 \cdot 62$ | t＇t | $1 \cdot$ | 0.0 | LO | 20 | 20 | \％ $\mathrm{Pt} \mathrm{l}^{\circ} \mathrm{O}$ |



| ¢＇¢ | $8 \cdot 9$ | － | － | $8{ }^{\circ}$ | 6.1 | て＇1 | － | カ＇ | ع＇६® | 90 | 6.2 | － | s＇0 | ¢ $¢$ | 8＇91 | $0 \cdot 0$ | － | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | s\％วワ＾\％ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 12 | 0 | 0 | 02 | 1 | $\varepsilon$ | 0 | 1 | 1 | 1 | 91 | 0 | ！ | 21 | $\varepsilon$ | 0 | 0 | 0 | 0 | 0 | syonı |
| $8 \cdot 1$ | $9 \cdot 2$ | － | － | $1 \cdot \varepsilon$ | $0 \cdot 0$ | †＇0 | － | 00 | $0 \cdot 0$ | 9.0 | $0 \cdot \mathrm{z}$ | － | $1 \cdot 1$ | $1 \cdot z$ | s．01 | $0{ }^{\circ}$ | － | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | səsng \％ |
| 02 | 8 | 0 | 0 | 8 | 0 | 1 | 0 | 0 | 0 | 1 | ＋ | 0 | 2 | $L$ | 2 | 0 | 0 | 0 | 0 | 0 | sesng |
| L＇t6 | 906 | － | － | $1 \cdot 68$ | ＋＇86 | †＇86 | － | $9 \cdot 86$ | L＇99 | 686 | $1 \cdot \mathrm{~S} 6$ | － | †＇86 | t＇t6 | L＇8L | $0 \cdot 001$ | － | 0.001 | 0.001 | 0.001 | stub！\％ |
| 1201 | 182 | 0 | 0 | 622 | 29 | ¢¢Z | 0 | ZL | 2 | $6 \angle 1$ | 619 | 0 | 881 | 乙乙६ | カ1 | 81 | 0 | カ1 | z | 2 | s 1466 |
| 2960 | †¢60 | $000^{\circ}$ | $000^{\circ}$ | 8160 | ع8800 | †¢8．0 | $000{ }^{\circ}$ | $689^{\circ} 0$ | GLE\％ | $888^{\circ} 0$ | S960 | $000{ }^{\circ}$ | $\angle \angle 8{ }^{\circ}$ | $\angle 060$ | 26200 | 00G 0 | $000^{\circ}$ | $00 \mathrm{~S}^{\circ}$ | 009＇0 | 009＇0 | ${ }^{\text {H }}$ d |
| － | ち－L | $0 \cdot 0$ | $0 \cdot 0$ | L＇zZ | L＇t | L＇z乙 | $0 \cdot 0$ | ¢ 9 | $\varepsilon \cdot 0$ | 0.91 | ع＇8t | $0 \cdot 0$ | †＇91 | て＇08 | L＇t | $9 \cdot 1$ | $0 \cdot 0$ | て＇1 | て＇0 | て＇0 | \％ $\mathrm{lel}_{1} \mathrm{O}$ |
| － | － | $0 \cdot 0$ | $0 \cdot 0$ | 6． 28 | 1－2t | － | $0 \cdot 0$ | †＇82 | で1 | †0 0 | － | $0 \cdot 0$ | 1＇tを | ¢＇29 | $9 \cdot \varepsilon$ | － | $0 \cdot 0$ | 8．LL | 1．1！ | 1．1 | \％पэeoudd $\forall$ |
| เ\＆ト1 | 018 | 0 | 0 | LSZ | \＆9 | LSZ | 0 | عL | $\varepsilon$ | 181 | 9 F S | 0 | 981 | เャ¢ | 61 | 81 | 0 | カr | 2 | 2 | ${ }_{\text {letol }}$ |
| $\varepsilon \angle Z$ | $\varepsilon 8$ | 0 | 0 | 02 | $\varepsilon \vdash$ | 99 | 0 | 21 | 2 | てt | 2\＆1 | 0 | \＆S | 92 | $\varepsilon$ | 2 | 0 | 2 | 0 | 0 | Wd 0¢：$\varepsilon$ |
| $9 \angle Z$ | SL | 0 | 0 | ع9 | 21 | 99 | 0 | 91 | 0 | 0t | \＆ャt | 0 | \＆ | ${ }^{+6}$ | 9 | 2 | 0 | 1 | 1 | 0 | Wd st： $\mathcal{E}$ |
| 882 | $9 /$ | 0 | 0 | ع9 | \＆1 | 89 | 0 | ＋1 | 0 | ts | SE1 | 0 | 0 | 68 | 9 | 6 | 0 | $L$ | 1 | ＋ | Wd $00: \varepsilon$ |
| t62 | 92 | 0 | 0 | 19 | St | LL | 0 | $1 \varepsilon$ | 1 | St | 981 | 0 | 09 | 28 | $\dagger$ | 9 | 0 | $\dagger$ | 0 | 1 | Wd St： |
|  | $1810 \pm$ ddy | $u_{1} \ln _{\perp}$ |  | nXIL | 146！！ | $1810 \pm$ dd $\forall$ | un_ı-n |  |  | 146!! <br> 1n | $\underbrace{1 / d d y}_{\text {1210 }}$ | unn $\perp$－n <br> łUӘひ |  | n. | 146！ | $1810 \pm$ ddy | $u_{1-n}$ | मәา punoquınos uddy punoqu | nı4． | 146！${ }^{\text {d }}$ | әш！$\downarrow$ นе！ |




| g＇9 | $0 \cdot 9$ | － | － | †＇9 | $6 \cdot 2$ |  | － | $\varepsilon \cdot 9$ | － | 6.1 | $8 \cdot 9$ | － | L＇t | L＇9 | 0＇sz | $0 \cdot 0$ | － | $0 \cdot 0$ | － | $0 \cdot 0$ | syonı 1 \％ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 09 | 02 | 0 | 0 | 61 | 1 | 9 | 0 | 1 | 0 | 9 | 七乙 | 0 | $\varepsilon$ | 61 | 乙 | 0 | 0 | 0 | 0 | 0 | syonı |
| でト | 6.0 | － | － | $0 \cdot 1$ | $0 \cdot 0$ | $0 \cdot 0$ | － | $0 \cdot 0$ | － | $0 \cdot 0$ | L＇t | － | $0 \cdot 0$ | $1 \cdot z$ | $0{ }^{\circ}$ | $0{ }^{\circ}$ | － | $0 \cdot 0$ |  | $0 \cdot 0$ | səsng \％ |
| 6 | $\varepsilon$ | 0 | 0 | $\varepsilon$ | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | sesng |
| ع＇ 26 | 1＇86 | － | － | $9 \cdot 26$ | 1．26 | †＇26 | － | 8＇86 | － | 1＇26 | S＇16 | － | ع＇s6 | $1 \cdot 16$ | 0＇GL | $0 \cdot 001$ | － | 0.001 | － | $0 \cdot 001$ | s．46！ 7 \％ |
| 802 | $60 \varepsilon$ | 0 | 0 | GLZ | $\downarrow \varepsilon$ | \＆ | 0 | St | 0 | 89 | ャ乙¢ | 0 | 19 | LSZ | 9 | z | 0 | 1 | 0 | 1 | S！46！ 7 |
| $088^{\circ}$ | 2280 | $000{ }^{\circ}$ | $000^{\circ}$ | 1080 | S6100 | 8680 | 0000 | 0080 | $000{ }^{\circ}$ | 9260 | $9 \angle 8{ }^{\circ}$ | 0000 | L990 | 6280 | L990 | $00{ }^{\circ} 0$ | 0000 | 0¢Z＇0 | $000^{\circ}$ | 0¢Z＇0 | JHd |
| － | \＆＇\＆t | $0{ }^{\circ}$ | $0 \cdot 0$ | L＇88 | 9 ＇t | ع\％ 0 | $0 \cdot 0$ | $1 \cdot 2$ | $0 \cdot 0$ | て＇8 | 2＇9t | $0 \cdot 0$ | ع＇8 | $8 \cdot 98$ | 0＇t | $\varepsilon 0$ | $0 \cdot 0$ | $1 \cdot 0$ | $0 \cdot 0$ | $1 \cdot 0$ | \％ $\mathrm{lel}_{1} \mathrm{O}$ |
| － | － | $0{ }^{\circ}$ | $0{ }^{\circ}$ | S＇68 | sol | － | $0 \cdot 0$ | ع＇02 | $0 \cdot 0$ | L＇64 | － | $0 \cdot 0$ | $1 \cdot 81$ | L＇6L | $\varepsilon \cdot$ | － | $0 \cdot 0$ | $0 \cdot 09$ | $0 \cdot 0$ | $0 \cdot 09$ |  |
| L92 | ટ®ะ | 0 | 0 | $\angle 62$ | ¢8 | 62 | 0 | 91 | 0 | $\varepsilon 9$ | เ¢ | 0 | †9 | 282 | 8 | 2 | 0 | 1 | 0 | 1 | ${ }_{\text {leto }}$ |
| 291 | 69 | 0 | 0 | 19 | 8 | 12 | 0 | $\checkmark$ | 0 | $\angle 1$ | 28 | 0 | 91 | ¢9 | 2 | 0 | 0 | 0 | 0 | 0 | W $600: 8$ |
| 202 | 88 | 0 | 0 | $\angle L$ | 11 | 02 | 0 | $\varepsilon$ | 0 | $\angle 1$ | $\varepsilon 6$ | 0 | $\dagger 2$ | 89 | 1 | 1 | 0 | 0 | 0 | 1 | W＊¢t：L |
| 812 | 101 | 0 | 0 | 26 | 6 | 91 | 0 | $\dagger$ | 0 | 21 | 101 | 0 | カ1 | 98 | 2 | 0 | 0 | 0 | 0 | 0 | W＊0¢： |
| 981 | †8 | 0 | 0 | LL | $L$ | 乙Z | 0 | 9 | 0 | $\angle 1$ | 82 | 0 | 01 | 99 | $\varepsilon$ | 1 | 0 | 1 | 0 | 0 | W＊Gl：L |
| ${ }^{12+101}+17$ | $12+10 \pm$ dd $\forall$ | $u_{1} n_{1-n}$ |  | $\qquad$ | 14б！！ | $18+10 \pm$ dd $\forall$ | $\text { uun } n_{1-\Omega}$ | मәา punoqupon dd $\forall$ punoqu NV GL： |  | $146!$ <br> dno | $\underbrace{1 / d d y}_{\text {1210 }}$ | $u u_{1-\cap}$ <br> чо | मəา punoqısə $M$ dd $\forall$ punoc ค人 | nı4। <br> UIUAN | 146！ | $12+10 \pm$ ddy | $u_{1} n_{1-\Omega}$ |  | nıuı | 146！！ | әu！ı Hets |

## MRR @ Mustang Drive - TMC

Wed Nov 14, 2018
Full Leng th (6AM-9AM, 2PM-6PM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 595321, Location: 43.206962, -78.396735

| Leg <br> Direction | West <br> Eastbound |  |  |  | East <br> Westbound |  |  |  | North <br> Southbound |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Time | L | T | U | App | T | R | U | App | L | R | U | App | Int |
| 2018-11-14 2:00PM | 1 | 113 | 0 | 114 | 99 | 3 | 0 | 102 | 3 | 1 | 0 | 4 | 220 |
| 2:15PM | 0 | 109 | 0 | 109 | 94 | 7 | 0 | 101 | 1 | 3 | 0 | 4 | 214 |
| 2:30PM | 11 | 87 | 0 | 98 | 112 | 11 | 0 | 123 | 3 | 8 | 0 | 11 | 232 |
| 2:45PM | 16 | 100 | 0 | 116 | 122 | 5 | 0 | 127 | 21 | 29 | 1 | 51 | 294 |
| Hourly Total | 28 | 409 | 0 | 437 | 427 | 26 | 0 | 453 | 28 | 41 | 1 | 70 | 960 |
| 3:00PM | 2 | 106 | 0 | 108 | 112 | 4 | 0 | 116 | 5 | 20 | 0 | 25 | 249 |
| 3:15PM | 3 | 102 | 0 | 105 | 128 | 5 | 0 | 133 | 9 | 7 | 0 | 16 | 254 |
| 3:30PM | 3 | 96 | 0 | 99 | 116 | 2 | 0 | 118 | 7 | 7 | 0 | 14 | 231 |
| 3:45PM | 2 | 110 | 0 | 112 | 128 | 4 | 0 | 132 | 8 | 12 | 0 | 20 | 264 |
| Hourly Total | 10 | 414 | 0 | 424 | 484 | 15 | 0 | 499 | 29 | 46 | 0 | 75 | 998 |
| 4:00PM | 2 | 127 | 0 | 129 | 139 | 6 | 0 | 145 | 8 | 8 | 0 | 16 | 290 |
| 4:15PM | 1 | 116 | 0 | 117 | 116 | 1 | 0 | 117 | 5 | 7 | 0 | 12 | 246 |
| 4:30PM | 0 | 124 | 0 | 124 | 116 | 1 | 0 | 117 | 0 | 3 | 0 | 3 | 244 |
| 4:45PM | 4 | 113 | 0 | 117 | 103 | 3 | 0 | 106 | 1 | 2 | 0 | 3 | 226 |
| Hourly Total | 7 | 480 | 0 | 487 | 474 | 11 | 0 | 485 | 14 | 20 | 0 | 34 | 1006 |
| 5:00PM | 2 | 113 | 0 | 115 | 118 | 3 | 0 | 121 | 2 | 7 | 0 | 9 | 245 |
| 5:15PM | 2 | 100 | 0 | 102 | 97 | 2 | 0 | 99 | 3 | 4 | 0 | 7 | 208 |
| 5:30PM | 2 | 107 | 0 | 109 | 93 | 1 | 0 | 94 | 0 | 3 | 0 | 3 | 206 |
| 5:45PM | 3 | 106 | 0 | 109 | 74 | 6 | 0 | 80 | 0 | 8 | 0 | 8 | 197 |
| Hourly Total | 9 | 426 | 0 | 435 | 382 | 12 | 0 | 394 | 5 | 22 | 0 | 27 | 856 |
| 6:00PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hourly Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2018-11-15 6:00 AM | 2 | 38 | 0 | 40 | 33 | 1 | 0 | 34 | 0 | 0 | 0 | 0 | 74 |
| 6:15AM | 2 | 65 | 0 | 67 | 34 | 2 | 0 | 36 | 0 | 1 | 0 | 1 | 104 |
| 6:30 AM | 3 | 67 | 0 | 70 | 42 | 2 | 0 | 44 | 1 | 0 | 0 | 1 | 115 |
| 6:45AM | 5 | 72 | 0 | 77 | 59 | 10 | 0 | 69 | 3 | 5 | 0 | 8 | 154 |
| Hourly Total | 12 | 242 | 0 | 254 | 168 | 15 | 0 | 183 | 4 | 6 | 0 | 10 | 447 |
| 7:00 AM | 15 | 70 | 0 | 85 | 63 | 8 | 0 | 71 | 2 | 3 | 0 | 5 | 161 |
| 7:15AM | 22 | 66 | 0 | 88 | 82 | 19 | 0 | 101 | 4 | 9 | 0 | 13 | 202 |
| 7:30AM | 28 | 79 | 0 | 107 | 99 | 33 | 0 | 132 | 21 | 17 | 0 | 38 | 277 |
| 7:45AM | 15 | 72 | 0 | 87 | 99 | 30 | 0 | 129 | 15 | 22 | 0 | 37 | 253 |
| Hourly Total | 80 | 287 | 0 | 367 | 343 | 90 | 0 | 433 | 42 | 51 | 0 | 93 | 893 |
| 8:00 AM | 2 | 71 | 0 | 73 | 71 | 7 | 0 | 78 | 3 | 8 | 0 | 11 | 162 |
| 8:15AM | 1 | 68 | 0 | 69 | 78 | 2 | 0 | 80 | 2 | 0 | 0 | 2 | 151 |
| 8:30AM | 3 | 82 | 0 | 85 | 62 | 2 | 0 | 64 | 0 | 1 | 0 | 1 | 150 |
| 8:45AM | 0 | 70 | 0 | 70 | 54 | 3 | 0 | 57 | 3 | 1 | 0 | 4 | 131 |
| Hourly Total | 6 | 291 | 0 | 297 | 265 | 14 | 0 | 279 | 8 | 10 | 0 | 18 | 594 |
| 9:00AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Hourly Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Total | 152 | 2549 | 0 | 2701 | 2543 | 183 | 0 | 2726 | 131 | 196 | 1 | 328 | 5755 |
| \% Approach | 5.6\% | 94.4\% | 0\% | - | 93.3\% | 6.7\% | 0\% | - | 39.9\% | 59.8\% | 0.3\% | - | - |
| \% Total | 2.6\% | 44.3\% | 0\% | 46.9 \% | 44.2\% | 3.2\% | 0\% | 47.4 \% | 2.3\% | 3.4\% | 0\% | 5.7\% | - |
| Lights | 146 | 2391 | 0 | 2537 | 2410 | 181 | 0 | 2591 | 124 | 188 | 1 | 313 | 5441 |
| \% Lights | 96.1\% | 93.8\% | 0\% | 93.9\% | 94.8\% | 98.9\% | 0\% | 95.0\% | 94.7\% | 95.9\% | 100\% | 95.4 \% | 94.5\% |
| Articulated Trucks and Single-Unit Trucks | 3 | 132 | 0 | 135 | 115 | 1 | 0 | 116 | 1 | 0 | 0 | 1 | 252 |
| \% Articulated Trucks and Single-Unit Trucks | 2.0\% | 5.2\% | 0\% | 5.0 \% | 4.5\% | 0.5\% | 0\% | 4.3 \% | 0.8\% | 0\% | 0\% | 0.3 \% | 4.4\% |
| Buses | 3 | 26 | 0 | 29 | 18 | 1 | 0 | 19 | 6 | 8 | 0 | 14 | 62 |
| \% Buses | 2.0\% | 1.0\% | 0\% | 1.1\% | 0.7\% | 0.5\% | 0\% | 0.7\% | 4.6\% | 4.1\% | 0\% | 4.3 \% | 1.1\% |

[^10]MRR @ Must ang Drive - TMC
Wed Nov 14, 2018
Full Leng th (6AM-9AM, 2PM-6PM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 595321, Location: 43.206962, -78.396735
[ N ] North
Total: 664
In: 328 Out: 336
®o


Out: 2680

MRR @ Mustang Drive - TMC
Wed Nov 14, 2018
PM Peak (Nov 142018 3:45PM - 4:45PM) - Overall Peak Hour
Provided by: Genesee Transportation Council 50 West Main Street, Suite 8112,

Rochester, NY, 14614, US
All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 595321, Location: 43.206962, -78.396735

| Leg <br> Direction | West <br> Eastbound |  |  |  | East <br> Westbound |  |  |  | North <br> Southbound |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Time | L | T | U | App | T | R | U | App | L | R | U | App | Int |
| 2018-11-14 3:45PM | 2 | 110 | 0 | 112 | 128 | 4 | 0 | 132 | 8 | 12 | 0 | 20 | 264 |
| 4:00PM | 2 | 127 | 0 | 129 | 139 | 6 | 0 | 145 | 8 | 8 | 0 | 16 | 290 |
| 4:15PM | 1 | 116 | 0 | 117 | 116 | 1 | 0 | 117 | 5 | 7 | 0 | 12 | 246 |
| 4:30PM | 0 | 124 | 0 | 124 | 116 | 1 | 0 | 117 | 0 | 3 | 0 | 3 | 244 |
| Total | 5 | 477 | 0 | 482 | 499 | 12 | 0 | 511 | 21 | 30 | 0 | 51 | 1044 |
| \% Approach | 1.0\% | 99.0\% | 0\% | - | 97.7\% | 2.3\% | 0\% | - | 41.2\% | 58.8\% | 0\% | - | - |
| \% Total | 0.5\% | 45.7\% | 0\% | 46.2 \% | 47.8\% | 1.1\% | 0\% | 48.9 \% | 2.0\% | 2.9\% | 0\% | 4.9\% | - |
| PHF | 0.625 | 0.939 | - | 0.934 | 0.897 | 0.500 | - | 0.881 | 0.656 | 0.625 | - | 0.638 | 0.900 |
| Lights | 5 | 455 | 0 | 460 | 478 | 12 | 0 | 490 | 21 | 30 | 0 | 51 | 1001 |
| \% Lights | 100\% | 95.4\% | 0\% | 95.4 \% | 95.8\% | 100\% | 0\% | 95.9\% | 100\% | 100\% | 0\% | 100\% | 95.9\% |
| Articulated Trucks and Single-Unit Trucks | 0 | 17 | 0 | 17 | 19 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 36 |
| \% Articulated Trucks and Single-Unit Trucks | 0\% | 3.6\% | 0\% | 3.5 \% | 3.8\% | 0\% | 0\% | 3.7\% | 0\% | 0\% | 0\% | 0 \% | 3.4\% |
| Buses | 0 | 5 | 0 | 5 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 7 |
| \% Buses | 0\% | 1.0\% | 0\% | 1.0\% | 0.4\% | 0\% | 0\% | 0.4 \% | 0\% | 0\% | 0\% | 0 \% | 0.7\% |

*L: Left, R: Right, T: Thru, U: U-Turn

MRR @ Must ang Drive - TMC
Wed Nov 14, 2018
PM Peak (Nov 142018 3:45PM - 4:45PM) - Overall Peak Hour All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 595321, Location: 43.206962, -78.396735
[N] North
Total: 68
In: $51 \quad$ Out: 17


Out: 498

MRR @ Mustang Drive - TMC
Thu Nov 15, 2018
AM Peak (Nov 152018 7:15AM - 8:15AM)
Provided by: Genesee Transportation Council 50 West Main Street, Suite 8112,

Rochester, NY, 14614, US
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 595321, Location: 43.206962, -78.396735

| Leg <br> Direction | West <br> Eastbound |  |  |  | East <br> Westbound |  |  |  | North Southbound |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Time | L | T | U | App | T | R | U | App | L | R | U | App | Int |
| 2018-11-15 7:15AM | 22 | 66 | 0 | 88 | 82 | 19 | 0 | 101 | 4 | 9 | 0 | 13 | 202 |
| 7:30AM | 28 | 79 | 0 | 107 | 99 | 33 | 0 | 132 | 21 | 17 | 0 | 38 | 277 |
| 7:45AM | 15 | 72 | 0 | 87 | 99 | 30 | 0 | 129 | 15 | 22 | 0 | 37 | 253 |
| 8:00 AM | 2 | 71 | 0 | 73 | 71 | 7 | 0 | 78 | 3 | 8 | 0 | 11 | 162 |
| Total | 67 | 288 | 0 | 355 | 351 | 89 | 0 | 440 | 43 | 56 | 0 | 99 | 894 |
| \% Approach | 18.9\% | 81.1\% | 0\% | - | 79.8\% | 20.2\% | 0\% | - | 43.4\% | 56.6\% | 0\% | - | - |
| \% Total | 7.5\% | 32.2\% | 0\% | 39.7\% | 39.3\% | 10.0\% | 0\% | 49.2 \% | 4.8\% | 6.3\% | 0\% | 11.1\% | - |
| PHF | 0.598 | 0.911 | - | 0.829 | 0.886 | 0.674 | - | 0.833 | 0.512 | 0.636 | - | 0.651 | 0.807 |
| Lights | 66 | 258 | 0 | 324 | 325 | 88 | 0 | 413 | 43 | 54 | 0 | 97 | 834 |
| \% Lights | 98.5\% | 89.6\% | 0\% | 91.3\% | 92.6\% | 98.9\% | 0\% | 93.9\% | 100\% | 96.4\% | 0\% | 98.0\% | 93.3\% |
| Articulated Trucks and Single-Unit Trucks | 1 | 26 | 0 | 27 | 22 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 49 |
| \% Articulated Trucks and Single-Unit Trucks | 1.5\% | 9.0\% | 0\% | 7.6 \% | 6.3\% | 0\% | 0\% | 5.0 \% | 0\% | 0\% | 0\% | 0 \% | 5.5\% |
| Buses | 0 | 4 | 0 | 4 | 4 | 1 | 0 | 5 | 0 | 2 | 0 | 2 | 11 |
| \% Buses | 0\% | 1.4\% | 0\% | 1.1\% | 1.1\% | 1.1\% | 0\% | 1.1\% | 0\% | 3.6\% | 0\% | 2.0 \% | 1.2\% |

*L: Left, R: Right, T: Thru, U: U-Turn

MRR @ Mustang Drive - TMC
Thu Nov 15, 2018
AM Peak (Nov 15 2018 7:15AM - 8:15AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 595321, Location: 43.206962, -78.396735


| － | － | $0 \cdot 0$ | 9 G | カ＇t6 | － | $0 \cdot 0$ | $\varepsilon$ \＆$¢ 6$ | L＇9 | － | $\varepsilon{ }^{\circ}$ | 6.68 | 8.69 | \％पэ宀о．dd |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| GS $¢ 9$ | 10＜Z | 0 | ZSt | 6 tSZ | 9Z८Z | 0 | \＆tg2 | ع81 |  | 1 | 1¢1 | 961 | retol puext |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | W 00：6 |
| t69 | $\angle 62$ | 0 | 9 | 162 | $6 \angle 2$ | 0 | ¢92 | カ1 | 81 | 0 | 8 | 0 |  |
| 1 ¢ 1 | 02 | 0 | 0 | 02 | L9 | 0 | †G | $\varepsilon$ |  | 0 | $\varepsilon$ | 1 | W Stt： |
| 0St | 98 | 0 | $\varepsilon$ | 28 | †9 | 0 | 29 | 2 | 1 | 0 | 0 | 1 | Wヤ 0¢：8 |
| 1St | 69 | 0 | 1 | 89 | 08 | 0 | 82 | 2 | 2 | 0 | 2 | 0 | W $\boldsymbol{\text { cl：}}$ ： |
| 291 | \＆ | 0 | 2 | 12 | 82 | 0 | IL | $L$ | $1+$ | 0 | $\varepsilon$ | 8 | W＊00：8 |
| $\varepsilon 68$ | L98 | 0 | 08 | $\angle 82$ | \＆$\downarrow$ | 0 | $\varepsilon \pm \varepsilon$ | 06 | $\varepsilon 6$ | 0 | てt | 19 | $1 \mathrm{P}+\mathrm{O} \mathrm{O} \mathrm{K} \mathrm{KHO} \mathrm{OH}$ |
| £¢Z | $\angle 8$ | 0 | St | ZL | 621 | 0 | 66 | $0 \varepsilon$ | $\angle \varepsilon$ | 0 | St | ZZ | WV St：L |
| $\angle L Z$ | LOL | 0 | 82 | 62 | 2\＆1 | 0 | 66 | $\varepsilon \varepsilon$ | $8 \varepsilon$ | 0 | 12 | $\angle 1$ | W $\quad 0 \varepsilon$ ：$L$ |
| 202 | 88 | 0 | 乙 | 99 | 101 | 0 | 28 | 61 | $\varepsilon \stackrel{1}{ }$ | 0 | † | 6 | W＊Sl：L |
| 191 | 98 | 0 | St | 02 | $1 / 2$ | 0 | 89 | 8 | 9 | 0 | 2 | $\varepsilon$ | W＊00：$\angle$ |
| Ltt | †¢Z | 0 | 21 | てぃて | ع8। | 0 | 891 | St | 01 | 0 | † | 9 | reqO O K KlnO H |
| tSt | $\angle L$ | 0 | 9 | ZL | 69 | 0 | 69 | 01 | 8 | 0 | $\varepsilon$ |  | W Stt？ |
| St1 | 02 | 0 | $\varepsilon$ | $\angle 9$ | ${ }^{\text {b }}$ | 0 | てt | 2 | 1 | 0 | 1 | 0 | W＊0¢：9 |
| tor | $\angle 9$ | 0 | 2 | 99 | $9 \varepsilon$ | 0 | †¢ | 2 | 1 | 0 | 0 | 1 | W＊Sl：9 |
| $\downarrow$ ¢ | 0 | 0 | 2 | $8 \varepsilon$ | $\downarrow \varepsilon$ | 0 | $\varepsilon \varepsilon$ | 1 | 0 | 0 | 0 | 0 | W $\forall 00: 9$ |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| － | － | － | － | － | － | － | － | － | － | － | － | － | ＊＊＊$\$ \＃ヨy ${ }_{\text {＊＊＊}}$ |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Wd 00：9 |
| 998 | $98 \downarrow$ | 0 | 6 | 92t | $\pm 68$ | 0 | 288 | 21 | $\angle 2$ | 0 | 9 | Z2 | ${ }_{\text {lelo }}$ ¢ KlunOH |
| $\angle 61$ | 601 | 0 | $\varepsilon$ | 901 | 08 | 0 | $\dagger$ ¢ | 9 | 8 | 0 | 0 | 8 | Wd St：S |
| 902 | 601 | 0 | 2 | LOL | ${ }^{\circ} 6$ | 0 | \＆6 | 1 | $\varepsilon$ | 0 | 0 | $\varepsilon$ | Wd 0e：${ }^{\text {c }}$ |
| 802 | 201 | 0 | 2 | 001 | 66 | 0 | $\angle 6$ | 2 | $L$ | 0 | $\varepsilon$ |  | Wd Gl：G |
| 9ャ2 | St1 | 0 | 2 | ع！ | 121 | 0 | 81＋ | $\varepsilon$ | 6 | 0 | 2 | $L$ | Wd 00：s |
| 9001 | L8t | 0 | $L$ | 08t | 98t | 0 | $\square \angle \square$ | 11 | $\downarrow \varepsilon$ | 0 | カ1 | 02 |  |
| 9 92 | $\angle 1+$ | 0 | $\checkmark$ | ع！ | 901 | 0 | ع01 | $\varepsilon$ | $\varepsilon$ | 0 | 1 | 2 | Wd St．t |
| ゅャて | ちてト | 0 | 0 | ちてト | $\angle 1+$ | 0 | 911 | 1 | $\varepsilon$ | 0 | 0 | $\varepsilon$ | Wd 0e：t |
| $9 \downarrow 2$ | LIt | 0 | 1 | 911 | $\angle 1+$ | 0 | $91+$ | 1 | 21 | 0 | 9 | $L$ | Wd Sl：t |
| 062 | 621 | 0 | 2 | LZ। | St1 | 0 | 681 | 9 | 91 | 0 | 8 | 8 | Wd 00： t |
| 866 | ちご | 0 | 01 | カレナ | 66t | 0 | t8t | St | GL | 0 | 62 | 97 |  |
| t92 |  | 0 | 2 | 0 Or | ट\＆ | 0 | 821 | † | 02 | 0 | 8 | 21 | Wd St： $\mathcal{L}$ |
| $1 \varepsilon 2$ | 66 | 0 | $\varepsilon$ | 96 | 811 | 0 | $91+$ | 2 | † | 0 | $L$ | $L$ | Wd 0¢：$\varepsilon$ |
| †¢Z | 901 | 0 | $\varepsilon$ | 201 | \＆\＆। | 0 | 8 L | ¢ | 91 | 0 | 6 | $L$ | Wdsl： |
| $6 \dagger 2$ | 801 | 0 | 2 | 901 | 911 | 0 | 2ト1 | $\dagger$ | 92 | 0 | 9 | 02 | Wd 00：$\varepsilon$ |
| 096 | L\＆t | 0 | 82 | 60t | \＆¢t | 0 | Lてヤ | 92 | $0 \angle$ | 1 | 82 | 15 | $\mathrm{reqO} \mathrm{O} \mathrm{K} \mu \mathrm{n} \mathrm{O} \mathrm{O}$ |
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| †เて | 601 | 0 | 0 | 601 | 101 | 0 | ${ }^{\text {6 }}$ | $L$ | † | 0 | 1 | $\varepsilon$ | Wd Sl： |
| 0 OZ | ャレ！ | 0 | 1 | ع $1+$ | 201 | 0 | 66 | $\varepsilon$ | $\dagger$ | 0 | $\varepsilon$ | ， | Wd 00：z |
| $1 \mathrm{P}+\mathrm{O}+7 \mathrm{~T}$ | $12+10 \pm$ dd ${ }^{\text {d }}$ | $\begin{aligned} & \text { un } \perp-\cap \\ & \text { чгео } \end{aligned}$ |  | n．41 | $\stackrel{12+1}{ }+$ ddy |  | n．4． <br> səm ӘへО | 146！！y <br> UND | $12+0 \pm$ ddy | $\begin{array}{r} \text { unn } \perp-\cap \\ p \\ \text { بгеофо } \end{array}$ | $\begin{aligned} & \text { Hə7 } \\ & \text { yınos } \end{aligned}$ | 146！！ | әШ！$\perp$ HetS |


| t＇t | 0＇s | － | $0 \cdot 2$ | て＇s | ع＇t | － | ＇t | so | ع 0 | $0 \cdot 0$ | 80 | 0.0 | งหวกı \％ |
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| 292 | ¢8 | 0 | $\varepsilon$ | z\＆1 | $91+$ | 0 | St | 1 | ＋ | 0 | 1 | 0 | sчัก11 |
| $1 \cdot$ | $1 \cdot$ | － | $0{ }^{\circ}$ | $0 \cdot 1$ | L＇0 | － | $\stackrel{0}{0}$ | go | $\varepsilon$＇t | $0 \cdot 0$ | 9 9 | 1＇t | sesng \％ |
| 29 | 62 | 0 | $\varepsilon$ | 92 | 61 | 0 | 81 | 1 | t | 0 | 9 | 8 | sesng |
| s＇t6 | 6 ¢ 6 | － | $1 \cdot 96$ | 8.86 | 0＇96 | － | 8.66 | 6．86 | t＇s6 | $0 \cdot 001$ | L＇66 | 6＇96 | s．466\％ |
| 1 trs |  | 0 | 9tr | 1682 | 1692 | 0 | 01ヶ2 | 181 | $\varepsilon 1 \varepsilon$ | 1 | tて1 | 881 | s，46！7 |
| － | 6.97 | 0.0 | 92 | $\varepsilon$＇tb | $\dagger$ t | 0.0 | でゅt | て＇¢ | L＇9 | 0.0 | $\varepsilon$ ¢ | $\stackrel{\text {＇}}{ }$ | \％ $\mathrm{lel}_{2} \mathrm{O}$ |



| $\dagger$＇$¢$ | ¢＇$¢$ | － | $0 \cdot 0$ | $9 \cdot \varepsilon$ | L＇\＆ | － | $8 \cdot \varepsilon$ | $0 \cdot 0$ | $0 \cdot 0$ | － | $0 \cdot 0$ | $0 \cdot 0$ | ऽฯワワュ \％ |
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| $9 \varepsilon$ | $\angle 1$ | 0 | 0 | $\angle 1$ | 61 | 0 | 61 | 0 | 0 | 0 | 0 | 0 | syonı |
| L＇0 | $0 \cdot 1$ | － | $0 \cdot 0$ | $0 \cdot 1$ | †＇0 | － | †＇0 | $0 \cdot 0$ | $0 \cdot 0$ | － | $0 \cdot 0$ | $0 \cdot 0$ | sesng \％ |
| $L$ | G | 0 | 0 | G | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | sasng |
| 6．56 | †＇G6 | － | $0 \cdot 001$ | †＇¢6 | 6．96 | － | 8．96 | 0．001 | 0.001 | － | $0 \cdot 001$ | $0 \cdot 001$ | sty6！\％ |
| 1001 | 09t | 0 | G | SSt | 06t | 0 | 8Lt | 21 | 19 | 0 | เट | $0 \varepsilon$ | s 446617 |
| 0060 | $\pm \boxed{6} 0$ | $000{ }^{\circ}$ | S29＇0 | 6860 | 1880 | $000^{\circ}$ | L680 | 009 0 | 8890 | 0000 | 9¢9 0 | 9290 | ${ }^{3} \mathrm{Hd}$ |
| － | て＇9t | $0 \cdot 0$ | so | L＇st | 68 t | $0 \cdot 0$ | 8． $2 t$ | $1 \cdot 1$ | 6 ＇t | $0 \cdot 0$ | $0 \cdot 2$ | $6 \cdot 2$ | \％ $18+10$ |
| － | － | $0 \cdot 0$ | $0 \cdot 1$ | $0 \cdot 66$ | － | $0 \cdot 0$ | L＇L6 | $\varepsilon \cdot z$ | － | $0 \cdot 0$ | でしt | 8．89 | \％цэeo．dd |
| ttor | $28 \%$ | 0 | 9 | LLt | $1+9$ | 0 | 66t | 21 | 19 | 0 | 12 | $0 \varepsilon$ | $\stackrel{\text { lelo }}{ }$ |
| ゅャて | †て！ | 0 | 0 | †てト | LIt | 0 | $9+1$ | 1 | $\varepsilon$ | 0 | 0 | $\varepsilon$ | Wd 0e：t |
| $9 \downarrow 2$ | LIt | 0 | 1 | 911 | LIt | 0 | $91+$ | 1 | 21 | 0 | ¢ | $L$ | Wd Sl：t |
| 062 | 621 | 0 | 2 | LZ1 | 9．t | 0 | 681 | 9 | 91 | 0 | 8 | 8 | Wd 00： t |
| t92 | 21t | 0 | $\checkmark$ | 0ㅏ | こと | 0 | 821 | $\dagger$ | 02 | 0 | 8 | 21 | Wd St：$\varepsilon$ |
| ${ }_{\text {｜elo }}+1$ | $12+10 \pm$ dd $\forall$ | $u_{1} n_{1-\Omega}$ |  | nı41 | $1 \mathrm{P}+\mathrm{O} \cdot \mathrm{dd} \forall$ <br> Wd St |  | $\begin{aligned} & \text { nıyı } \\ & \text { yeə } \\ & \text { yeom } \end{aligned}$ | 146！！y <br> 山əへ |  | $\text { unn } \perp-\cap$ | $\begin{aligned} & \text { मәт } \\ & \text { yınos } \end{aligned}$ | 146！ | әس！$\_$Hels |




| g＇s | $9^{\circ} \mathrm{L}$ | － | S＇t | $0 \% 6$ | 0＇s | － | $\varepsilon \cdot 9$ | $0 \cdot 0$ | $0 \cdot 0$ | － | 00 | 00 | sษวワ＾\％ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $6 \downarrow$ | $\angle 2$ | 0 | 1 | 92 | 乙乙 | 0 | 乙 | 0 | 0 | 0 | 0 | 0 | syonı1 |
| て＇1 | $1 \cdot 1$ | － | $0 \cdot 0$ | カ＇ | $1 \cdot 1$ | － | 1＇t | $1 \cdot 1$ | $0 \cdot \mathrm{z}$ | － | $0 \cdot 0$ | $9{ }^{\circ} \mathrm{E}$ | səsng \％ |
| $1+$ | † | 0 | 0 | † | 9 | 0 | † | 1 | 2 | 0 | 0 | 2 | sesng |
| ع＇$¢ 6$ | $\varepsilon!6$ | － | ¢＇86 | $9 \cdot 68$ | 6.86 | － | 9＇26 | 6.86 | $0 \cdot 86$ | － | 0.001 | †＇96 | s＋46！$\%$ |
| $\downarrow$ ¢ | †て¢ | 0 | 99 | 8 SZ | $\varepsilon$ \＆ | 0 | GZE | 88 | $\angle 6$ | 0 | \＆t | tG | s＋46！ 7 |
| 2080 | 6280 | $000{ }^{\circ}$ | $869^{\circ} 0$ | 1160 | \＆ $88^{\circ} 0$ | 0000 | 988.0 | † $\angle 99^{\circ}$ | 159\％ | 0000 | 219．0 | 9890 | ${ }^{\text {JHd }}$ |
| － | ＜＇68 | $0{ }^{\circ}$ | S＇L | て＇て६ | て＇6t | $0 \cdot 0$ | $\varepsilon 68$ | $0 \cdot 01$ | 1．1） | $0 \cdot 0$ | $8{ }^{\prime} \downarrow$ | $\varepsilon \cdot 9$ | \％ $\mathrm{CPl}_{1} \mathrm{O}$ |
| － | － | $0 \cdot 0$ | 6.81 | 1．18 | － | $0 \cdot 0$ | 8.62 | て＇02 | － | $0 \cdot 0$ | $\dagger$ ¢ $\downarrow$ | 9.99 |  |
| t68 | ¢¢¢ | 0 | $\angle 9$ | 882 | 0ヶt | 0 | 1.98 | 68 | 66 | 0 | \＆t | 99 | ${ }^{\text {Peto }}$ |
| 291 | $\varepsilon \angle$ | 0 | 2 | $1 / 2$ | 82 | 0 | 1／L | $L$ | $1+$ | 0 | $\varepsilon$ | 8 | WV00：8 |
| \＆¢ | $\angle 8$ | 0 | St | ZL | 621 | 0 | 66 | $0 \varepsilon$ | $\angle \varepsilon$ | 0 | St | Z2 | W＊St：L |
| LLZ | LO1 | 0 | 82 | 62 | ट\＆1 | 0 | 66 | $\varepsilon \varepsilon$ | $8 \varepsilon$ | 0 | 12 | $\angle 1$ | W＊0¢：$L$ |
| 202 | 88 | 0 | 乙乙 | 99 | 101 | 0 | 28 | 61 | $\varepsilon \stackrel{1}{ }$ | 0 | $\dagger$ | 6 | W＊Sl：L |
| $\mid 12+10 \perp 1$ | $12+10 \perp$ dd $\forall$ | $u_{1} n_{\perp-\cap}$ |  | nıप1 | ｜ełol $\cdot \mathrm{dd} \forall$ (W甘 G | $\text { unn } 1-n$ <br> чгео lea | $\begin{aligned} & \text { nıyı } \\ & \text { yeə } \\ & \text { yeom } \end{aligned}$ | 146！！ <br> 山Ә＾ |  | $u_{u} n^{\prime-n}$ цого | $\begin{aligned} & \text { मə7 } \\ & \text { yınos } \end{aligned}$ | 146！！ | әШ！$\perp$ HetS |




## MRR @ Gwinn Street - TMC

Thu Nov 15, 2018
Full Leng th (2PM-6PM, 6AM-9AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 595323, Location: 43.207121, -78.39086


| Leg <br> Direction | West <br> Eastbound |  |  |  | East <br> Westbound |  |  |  |  | South <br> Northbound |  |  |  |  | North <br> Southbound |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Time | L | T | R U | App | L | T | R |  | App | L | T | R |  | App | L | T | R | U | App | Int |
| Articulated Trucks and Single-Unit Trucks | 0.8\% | 4.0\% | 0\% 0\% | 3.6 \% | 0\% | 4.5\% | 1.4\% | 0\% | 4.3 \% | 0\% | 0\% | 0\% | 0\% | 0 \% | 3.6\% | 0\% | 1.3\% |  | 1.6 \% | 3.7\% |
| Buses | 7 | 18 | $0 \quad 0$ | 25 | 0 | 16 | 7 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 6 | 0 | 10 | 58 |
| \% Buses | 1.9\% | 0.7\% | 0\% 0\% | 0.8 \% | 0\% | 0.6\% | 5.1\% 0 | 0\% | 0.9\% | 0\% | 0\% | 0\% | 0\% | 0 \% | 4.8\% | 0\% | 1.3\% |  | 1.8 \% | 0.9\% |

${ }^{*}$ L: Left, R: Right, T:Thru, U: U-Turn

MRR @ Gwinn Street - TMC
Thu Nov 15, 2018
Full Leng th (2PM-6PM, 6AM-9AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 595323, Location: 43.207121, -78.39086
[N] North
Total: 1068
In: 556 Out: 512


Out: $22 \quad \ln : 21$
Total: 43
[S] South

MRR @ Gwinn Street - TMC
Thu Nov 15, 2018
PM Peak (Nov 152018 2:45PM - 3:45PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 595323, Location: 43.207121, -78.39086


* L: Left, R: Right, T: Thru, U: U-Turn

MRR @ Gwinn Street - TMC
Thu Nov 15, 2018
PM Peak (Nov 152018 2:45PM - 3:45PM) - Overall Peak Hour All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 595323, Location: 43.207121, -78.39086

## [ N ] North

Total: 184
In: $107 \quad$ Out: 77


MRR @ Gwinn Street - TMC
Fri Nov 16, 2018
AM Peak (Nov 162018 7AM - 8AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 595323, Location: 43.207121, -78.39086


* L: Left, R: Right, T: Thru, U: U-Turn

MRR @ Gwinn Street - TMC
Fri Nov 16, 2018
AM Peak (Nov 162018 7AM - 8AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 595323, Location: 43.207121, -78.39086
[N] North
Total: 207
In: $117 \quad$ Out: 90


Out: $5 \quad \ln : 3$
Total: 8
[S] South


| 0＇t | て＇t | ． | L＇0 | 6＇t | 6.1 | ！$\varepsilon$ | － | $\varepsilon ¢$ | $\varepsilon$ ¢ | $0 \cdot 0$ | て＇t | － | $0 \cdot 0$ | t＇t | $0 \cdot 0$ | $8{ }^{1}$ | － | 6.9 | 62 | $0 \cdot 1$ | syonı $\%$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 922 | \＆ $1+$ | 0 | 2 | 901 | 9 | L | 0 | 9 | 2 | 0 | 66 | 0 | 0 | 66 | 0 | L | 0 | 2 | 2 | $\varepsilon$ | syonı1 |
| 90 | L＇0 | － | t＇0 | 90 | $1 \cdot$ | 00 | － | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | to | － | $0 \cdot 0$ | to | $0 \cdot 0$ | 8＇ | － | $0 \cdot 0$ | $0 \cdot 0$ | ゅ＇2 | sesng\％ |
| ャ¢ | 81 | 0 | 1 | ＋1 | $\varepsilon$ | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | $L$ | 0 | 0 | 0 | $\angle$ | sesng |
| t＇S6 | て＇G6 | － | 686 | s＇t6 | $6 \cdot 96$ | $6 \cdot 96$ | － | L＇96 | L＇96 | $0 \cdot 001$ | t＇s6 | － | $0 \cdot 001$ | て＇96 | $0 \cdot 001$ | ＋＇96 | － | ＋ 86 | $1 \cdot 26$ | ¢．96 | s．46！7\％ |
| tてt⿳ | 9LS2 | 0 | 892 | ts02 | t¢Z | zz2 | 0 | 9tt | 89 | 81 | \＆¢zz | 0 | $0 \varepsilon$ | ¢sı | 89 | $\varepsilon \angle \varepsilon$ | 0 | $\angle 2$ | $\angle 9$ | 622 | s 1466 |
| － | $9 \angle t$ | $0 \cdot 0$ | $8{ }^{\prime \prime}$ | て＇88 | 9 ＇t | 0＇t | $0 \cdot 0$ | $L \cdot$ | $1 \cdot 1$ | \％ 0 | s＇Lt | 0.0 | ¢0 | $86 \varepsilon$ | て＇ı | 89 | 0.0 | ¢ 0 | Z＇1 | $1 \cdot 9$ | \％${ }^{\text {Plo }}$－ |



| s＇¢ | $9 \cdot \varepsilon$ | － | $0 \cdot 0$ | s＇t | $0 \cdot 0$ | $\varepsilon \cdot \varepsilon$ | － | 6.9 | $0 \cdot 0$ | $0 \cdot 0$ | L＇E | － | $0 \cdot 0$ | $6 \cdot \varepsilon$ | $0 \cdot 0$ | $\varepsilon \cdot \stackrel{ }{ }$ | － | L＇91 | $0 \cdot 0$ | $0 \cdot 0$ | syonı \％ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $8 \varepsilon$ | 81 | 0 | 0 | 81 | 0 | 1 | 0 | 1 | 0 | 0 | 81 | 0 | 0 | 81 | 0 | 1 | 0 | 1 | 0 | 0 | syonı |
| L＇0 | $\downarrow$＇0 | － | $0 \cdot 0$ | s＇0 | $0 \cdot 0$ | $0 \cdot 0$ | － | 00 | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 1$ | － | $0 \cdot 0$ | $1 \cdot 1$ | $0{ }^{\circ}$ | $\varepsilon \cdot$ | － | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot \mathrm{z}$ | sesng \％ |
| 8 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 9 | 0 | 1 | 0 | 0 | 0 | 1 | sesng |
| 8＇s6 | $0 \cdot 96$ | － | $0 \cdot 001$ | 0＇¢6 | $0 \cdot 001$ | L＇96 | － | 1＇t6 | 0.001 | 0.001 | ع＇96 | － | 0.001 | 1＇S6 | $0 \cdot 001$ | $\downarrow$－ 26 | － | ع＇६8 | 0.001 | 0＇86 | stlu6！ 7 \％ |
| 1ャ01 | $\downarrow \angle \square$ | 0 | ZS | LLE | St | 62 | 0 | 91 | 6 | $\checkmark$ | t9t | 0 | $\angle$ | 比 | $\varepsilon \vdash$ | †L | 0 | ¢ | 61 | 09 | s＋46！ 7 |
| $\dagger \angle 60$ | 8880 | $000^{\circ}$ | ZZL＇0 | 2060 | 2990 | 0SL＇0 | 0000 | 80＜ 0 | OSt＇0 | 000＇t | $626{ }^{\circ}$ | $000{ }^{\circ}$ | 8\＆t＇0 | $\downarrow 6^{\circ} 0$ | 0¢9＊0 | 26L＇0 | $000^{\circ}$ | 0gL ${ }^{\circ}$ | 26100 | OSL＇0 | JHd |
| － | ち＇St | $0 \cdot 0$ | 8 ＇t | ¢＇98 | 1＇t | 8.2 | $0 \cdot 0$ | $9 \cdot 1$ | 8.0 | †＇0 | 8＇tt | $0 \cdot 0$ | 90 | 0＇\＆t | て＇ト | 0＇L | $0 \cdot 0$ | $9{ }^{\circ} 0$ | L＇t | L＇t | \％ $18+10$ |
| － | － | $0 \cdot 0$ | 9.01 | †＇08 | $1 \cdot 6$ | － | $0 \cdot 0$ | L＇99 | 0．08 | ع＇$¢$ | － | $0 \cdot 0$ | $t \cdot$ | 6．96 | L＇z | － | $0 \cdot 0$ | 6. | 0＇sz | ＋＇29 |  |
| 2801 | $\stackrel{\square}{\text { b }}$ | 0 | 29 | L68 | St | $0 \varepsilon$ | 0 | $\angle 1$ | 6 | $\dagger$ | 28t | 0 | $L$ | L9t | $\varepsilon \vdash$ | 92 | 0 | 9 | 61 | 19 | ${ }_{\text {letol }}$ |
| 892 | 221 | 0 | St | $\angle 6$ | 01 | 8 | 0 | 9 | 1 | 1 | 1＋1 | 0 | $\checkmark$ | tor | $\varepsilon$ | $\angle 1$ | 0 | 2 | 9 | 6 | Wd St： |
| $\dagger \angle Z$ | カト1 | 0 | 81 | $\varepsilon 6$ | $\varepsilon$ | 9 | 0 | $\varepsilon$ | 1 | 1 | 181 | 0 | 1 | SZ1 | ¢ | $\dagger 2$ | 0 | 1 | 9 | $\angle 1$ | Wd $0 ¢: \varepsilon$ |
| 6LZ | 681 | 0 | 21 | 015 | $\angle 1$ | $L$ | 0 | † | 2 | 1 | 22। | 0 | 1 | LIt | $\dagger$ | 11 | 0 | 1 | 1 | 6 | Wd ¢ l ： E |
| 9LZ | $61+$ | 0 | $L$ | $L 6$ | St | 01 | 0 | $\dagger$ | 9 | 1 | とટ1 | 0 | 1 | L21 | 1 | †て | 0 | 2 | 9 | 91 | Wd 00： |
|  | $1810 \pm$ dd $\forall$ | $\text { un } n_{\perp-\cap}$ | Нəา | n.4ı | $146!$ | $1810 \pm$ dd $\forall$ | $u n_{\perp}-n$ <br> чэ |  | n+ul <br> ع） | ＋4б！！ <br> dno | $\underbrace{1 / d d y}_{\text {1210 }}$ | unn $\perp$－n <br> чэモ <br> 廿UӘU | Нәา punoqısə $M$ udd $\forall$ punoq ○＾OW | nı41 <br> әM <br> Uludn | 14б！！ | $18+10 \pm$ dd $\forall$ | $u_{\perp}-n$ | サəา punoquınos add $\forall$ punoqu | n．4． | 146！ | әш！$\downarrow$ นetS |



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| L＇9 | ¢＇9 | － | $0 \cdot 0$ | て＇8 | 0 ＇\＆ | $1 \cdot 9$ | － | s＇t | 0.01 | $0 \cdot 0$ | L＇L | － | － | $6{ }^{\circ}$ | $0 \cdot 0$ | $\downarrow$＇z | － | － | L＇91 | $0 \cdot 0$ | syonı \％ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | $\angle 1$ | 0 | 0 | 91 | 1 | 2 | 0 | 1 | 1 | 0 | 02 | 0 | 0 | 02 | 0 | 1 | 0 | 0 | 1 | 0 | syonı |
| s＇0 | †＇0 | － | $0{ }^{\circ}$ | s＇0 | $0 \cdot 0$ | $0 \cdot 0$ | － | 00 | $0 \cdot 0$ | $0{ }^{\circ}$ | $0{ }^{\circ}$ | － | － | $0 \cdot 0$ | $0{ }^{\circ}$ | $6{ }^{\circ}$ | － | － | $0{ }^{\circ}$ | L＇9 | sesng \％ |
| $\varepsilon$ | 1 | 0 | 0 | ！ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | sasng |
| 8＇26 | 1－86 | － | 0.001 | ع＇16 | $0 \cdot \angle 6$ | 6.86 | － | ¢＇96 | $0 \cdot 06$ | $0 \cdot 001$ | ع＇ 26 | － | － | ＋＇26 | 0.001 | L＇ 26 | － | － | ع＇\＆8 | $\varepsilon$＇t6 | s＋46！\％ |
| LSS | てぃて | 0 | $1 \varepsilon$ | $6 \angle 1$ | 乙\＆ | $1 \varepsilon$ | 0 | 12 | 6 | 1 | 0ヶて | 0 | 0 | เ¢乙 | 9 | $8 \varepsilon$ | 0 | 0 | s | $\varepsilon \varepsilon$ | St46！ 7 |
| 8980 | ع¢8．0 | $000{ }^{\circ}$ | G $\angle 1 L^{\circ} 0$ | $\angle 180$ | OG $\iota^{\circ} 0$ | ¢ 690 | 0000 | $19^{\circ}$ | 9290 | 0¢Z＇0 | 8280 | 000 | $000{ }^{\circ}$ | $0 \angle 8{ }^{\circ}$ | 09L＇0 | 88L＇0 | $000{ }^{\circ}$ | $000{ }^{\circ}$ | $008^{\circ}$ | 9 $\angle 8{ }^{\circ} 0$ | ${ }^{\text {H／}}$ |
| － | 8¢ | $0{ }^{\circ}$ | て＇G | $0 \cdot \varepsilon \varepsilon$ | $9 \cdot 9$ | $9 \cdot 9$ | $0 \cdot 0$ | L＇E | L＇． | て＇0 | 8．8 | $0 \cdot 0$ | $0{ }^{\circ}$ | 8で | $0 \cdot 1$ | 6.9 | $0{ }^{\circ}$ | $0{ }^{\circ}$ | $0 \cdot 1$ | 6.5 | \％ $\mathrm{Peta}^{\text {¢ }}$ |
| － | － | $0 \cdot 0$ | 6.1 | $\downarrow$ ¢ $\mathcal{L}$ | くて1 | － | $0{ }^{\circ}$ | L＇99 | ع＇08 | $0{ }^{\circ} \mathrm{\varepsilon}$ | － | $0 \cdot 0$ | $0 \cdot 0$ | L．L6 | $\varepsilon$ \％ | － | $0 \cdot 0$ | $0 \cdot 0$ | 9 9\％ | †＇98 | \％पэeoudd ${ }^{\text {d }}$ |
| t69 | 092 | 0 | $1 \varepsilon$ | 961 | $\varepsilon \varepsilon$ | $\varepsilon \varepsilon$ | 0 | 乙Z | 01 | 1 | 092 | 0 | 0 | ャG2 | 9 | Lt | 0 | 0 | 9 | ${ }^{5}$ | ${ }^{\text {eto }}$ |
| 6 St | 99 | 0 | 01 | $6{ }^{6}$ | L | 9 | 0 | G | 1 | 0 | $\dagger$ ¢ | 0 | 0 | \＆ | 1 | \＆ | 0 | 0 | 9 | 8 | WV St：8 |
| ZLL | 82 | 0 | 01 | 09 | 8 | $\varepsilon \stackrel{1}{ }$ | 0 | 6 | $\varepsilon$ | 1 | HL | 0 | 0 | 02 | 1 | 01 | 0 | 0 | 0 | 01 | W $\quad 0 \mathrm{E}: 8$ |
| เ\＆1 | 99 | 0 | 9 | \＆t | $L$ | 01 | 0 | 9 | $\dagger$ | 0 | G9 | 0 | 0 | \＆ 9 | 2 | 01 | 0 | 0 | 1 | 6 |  |
| ट\＆1 | 09 | 0 | 9 | $\square$ | $1+$ | $\checkmark$ | 0 | 2 | 2 | 0 | 09 | 0 | 0 | 89 | 2 | 8 | 0 | 0 | 0 | 8 | W $\forall 00: 8$ |
| ｜ $1+10 \pm 1$ ？ 7 | $1810 \pm$ ddy | $u u_{\perp}-\cap$ |  | nuyl | 14 14！y | $1810 \pm$ dd $\forall$ | $\text { unin } \perp-\cap$ | मәา unoqu dd $\forall$ pun NV |  | 146！！ <br> dno | $\underbrace{}_{\text {1210 }}$ ddy | u．nı－n <br> чг <br> łUӘU | मәา punoqısə $M$ idd $\forall$ puno Ө＾ОW | n． 41 <br> M <br> ulud | 146！！ | $1 \mathrm{EtO} \mathrm{O} \cdot \mathrm{ddy}$ | $u_{1} n_{\perp-n}$ |  | n.lyl | 146！y | әس！ 1 HetS |



| 9129 | ＋812 | 0 | 0 | 9ヶL | 6081 | 621 | 286 | 0 | 0 | $\angle 92$ | 1L9 | tot | $08 \angle 1$ | 0 | 0 | 121 | ¢61 | ＋98 | 6181 | 0 | 0 | 898 | 769 | $\angle 98$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 0 | 0 | 0 | 0 | O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | W 00 ： 6 |
| $9<2$ | 0ヶ2 | 0 | 0 | 08 | t＋1 | 61 | Lt | 0 | 0 | $\varepsilon \varepsilon$ | 99 | 6 | 881 | 0 | 0 | 21 | 081 | $9{ }^{\text {9 }}$ | 182 |  | 0 | $\angle \varepsilon$ | 62 | St |  |
| เटz | $\varepsilon \iota$ | 0 | 0 | 82 | $\stackrel{+}{\square}$ |  | $8 \varepsilon$ | 0 | 0 | 21 | 22 |  | zs | 0 | 0 | $\varepsilon$ | $8 \varepsilon$ | $\stackrel{ }{1}$ | 19 | 0 | 0 | 21 | 61 | $0 \varepsilon$ | WV St：8 |
| 8L1 | $9+$ | 0 | 0 | 21 | 乙® | 2 | 62 | 0 | 0 | 6 | t＋ | 9 | てt | 0 | 0 | $t$ | 92 | \＆ | 19 | 0 | 0 | ＋ | 91 | $\downarrow \varepsilon$ | W $W$ 0e： 8 |
| 621 | 9 S | 0 | 0 | $\angle 1$ | $0 \varepsilon$ | 6 | $\angle 2$ | 0 | 0 | t | $9+$ | $\llcorner$ | \＆ | 0 | 0 | $\varepsilon$ | $9 \varepsilon$ | tr | \＆t | 0 | 0 | t | 61 | 02 | W＊St：8 |
| S6t | 99 | 0 | 0 | $\varepsilon z$ | $8 \varepsilon$ | $\dagger$ | $\varepsilon 2$ | 0 | 0 | 8 | $\varepsilon \vdash$ | 2 | เナ | 0 | 0 | 2 | $1 \varepsilon$ | 8 | 99 | 0 | 0 | 0 | 92 | $1 \varepsilon$ | W $000: 8$ |
| 986 | $\varepsilon \angle Z$ | 0 | 0 | 99 | 061 | 81 | 681 | 0 | 0 | $9{ }^{9}$ | 69 | ャ2 | 892 | 0 | 0 | $\varepsilon 2$ | 161 | †9 | 992 | 0 | 0 | 29 | t6 | 0 OL |  |
| LLZ | 28 | 0 | 0 | 12 | G9 | 9 | $6{ }^{6}$ | 0 | 0 | 91 | 22 | ！ | 89 | 0 | 0 | t | st | 61 | 82 | 0 | 0 | $\angle$ | $0 \varepsilon$ | $1 \varepsilon$ | WV St：L |
| ¢82 | LL | 0 | 0 | $\angle 1$ | 99 | 5 | $\angle 2$ | － |  | 6 | $\angle 1$ | 1 | 89 | 0 | 0 | s | ¢9 | 0 | ع9 | 0 | 0 | 91 | St | 乙¢ | W $\dagger$ OE：L |
| $18 \Sigma$ | 19 | 0 | 0 | 21 | 98 | $\varepsilon$ | $\varepsilon \varepsilon$ | 0 | 0 | 2t | tr | $L$ | ャ8 | 0 | 0 | 0 | 99 | $8+$ | ¢9 | 0 | 0 | $\varepsilon \vdash$ | ゅ2 | 92 | W＊Sl：L |
| 861 | $\varepsilon 9$ | 0 | 0 | St | $\stackrel{+}{\square}$ | ， | 08 | 0 | 0 | 6 | $9+$ | 9 | ${ }^{8+}$ | 0 | 0 | $\dagger$ | $\angle \varepsilon$ | $L$ | 29 | 0 | 0 | 9 | gz | 12 | W＊00：L |
| GLS | 912 | 0 | 0 | $1 \varepsilon$ | $1<1$ | tr | 49 | 0 | 0 | 21 | ャ | 12 | 9¢। | 0 | 0 | 21 | 801 | 12 | 991 | 0 | 0 | 0 | ¢9 | \＆я |  |
| $6 \angle 1$ | 69 | 0 | 0 | $\varepsilon \stackrel{1}{ }$ | 68 | $L$ | ャ2 | 0 | 0 | $\dagger$ | tr | 9 | ${ }^{+}$ | 0 | 0 | 2 | ＜ | 0 | 29 | 0 | 0 | 2t | 12 | 61 | W Cs t：9 |
| 981 | st | 0 | 0 | $\varepsilon$ | $6 \varepsilon$ | ¢ | 02 | 0 | 0 | $\dagger$ | 0 | 9 | ャ | 0 | 0 | 9 | ャて | † | $\angle \varepsilon$ | 0 | 0 | ＋ | 21 | H | W 0 © 9 |
| 091 | 19 | 0 |  | 6 | ${ }^{6+}$ | $\varepsilon$ | $2 \stackrel{ }{2}$ | 0 | 0 | 0 | 2 | 9 | $6 \varepsilon$ | 0 | 0 | 1 | ャ | † | 88 | 0 | 0 | 6 | $\angle$ | 21 | W＊cl：9 |
| 0 OL | 19 | 0 | 0 | 9 | $\stackrel{+}{\square}$ | 1 | $\stackrel{ }{1}$ | 0 | 0 | $\dagger$ | $\varepsilon$ | $\dagger$ | 61 | 0 | 0 | $\varepsilon$ | $\varepsilon \vdash$ | $\varepsilon$ | 62 | 0 | 0 | 9 | \＆ | ！ | W＊00：9 |
| $\varepsilon$ | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 |  |
| － | － | － | － | － | － | － | － | － | － | － | － | － | － | － | － | － | － | － | － | － | － | － | － | － |  |
| $\varepsilon$ | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | Wd 00：9 |
| 9801 | ${ }^{198}$ |  | 0 | 991 | z＜1 | $\varepsilon z$ | 281 | 0 | 0 | $\angle$ | LIt | 81 | £ $¢$ | 0 | 0 | †2 | 19 | 89 | 092 | 0 | 0 | 19 | 18 | 821 |  |
| 2ı2 | 06 | 0 | 0 | 19 | $\varepsilon \varepsilon$ | 9 | เ | 0 | 0 | ！ | z2 | 8 | $8 \varepsilon$ | 0 | 0 | 2 | 82 | 8 | \＆t | 0 | 0 | 9 | 0 | $\angle 2$ | Wd St：s |
| LS2 | 88 | 0 | 0 | $8 \varepsilon$ | L | 6 | ${ }^{6+}$ | 0 | 0 | $\varepsilon \vdash$ | $1 \varepsilon$ | 9 | $\angle 9$ | 0 | 0 | 8 | $\varepsilon{ }^{\text {¢ }}$ | 91 | ¢9 | 0 | 0 | 21 | St | 92 | Wd $08: ¢$ |
| 882 | 26 | 0 | 0 | $2 t$ | $\angle\rangle$ | $\varepsilon$ | ${ }^{8+}$ | 0 | 0 | tr | $0 \varepsilon$ | t | 19 | 0 | 0 | 0 | 乙 | 61 | 28 | 0 | 0 | St | $\angle 2$ | ${ }^{0+}$ | Wdsl：s |
| ¢82 | 16 | 0 | 0 | ¢ | 19 | 9 | $\stackrel{+}{\square}$ | 0 | 0 | 6 | ャ |  | $\angle 9$ | 0 | 0 | $\dagger$ | ${ }^{8+}$ | St | 28 | 0 | 0 | 8 ＋ | 62 | $9 \varepsilon$ | Wd 00：s |
| $261+$ | 668 | 0 | 0 | 881 | \＆って | 8 | SLL | 0 | 0 | ${ }^{8+}$ | 601 | 8 | 862 | 0 | 0 | 82 | 902 | 09 | ¢ ¢ | 0 | 0 | t／ | S6 | 991 |  |
| 682 | 201 | 0 | 0 | 62 | 69 | $\dagger$ | 0 | 0 | 0 | $\varepsilon \stackrel{1}{ }$ | z2 | 9 | LL | 0 | 0 | 9 | ${ }^{6+}$ | $\angle$ | 92 | 0 | 0 | 8 r | tz | $\downarrow \varepsilon$ | Wd st：${ }^{\text {d }}$ |
| เ上¢ | L0， | 0 | 0 | $0 \varepsilon$ | 99 | 9 | $2 t$ | 0 | 0 | 01 | 82 | t | 08 | 0 | 0 | 6 | 19 | 0 | 88 | 0 | 0 | 92 | 62 | $\pm \varepsilon$ | Wd 0 e：${ }^{\text {d }}$ |
| 082 | $\angle 6$ | 0 | 0 | $6 \varepsilon$ | 99 | 2 | ＋ | 0 | 0 | ！ | 82 | 9 | L／ | 0 | 0 | $L$ | $9+$ | 8 | 89 | 0 | 0 | St | 9 ¢ | $\angle \varepsilon$ | Wdsl：t |
| टı¢ | 66 | 0 | 0 | $0+$ | 29 | $L$ | $6{ }^{6}$ | 0 | 0 | ＋ | 18 |  | K | 0 | 0 | $L$ | ${ }^{6+}$ | St | 86 | 0 | 0 | 91 | 92 | 19 | Wd 00：t |
| 901 | $9 \boxed{ }$ | 0 | 0 | 621 | 281 | St | 091 | 0 | 0 | to | 001 | 61 | て¢¢ | 0 | 0 | $\pm \varepsilon$ | $2 \varepsilon 2$ | $9 /$ | $8 L 2$ | 0 | 0 | $6{ }^{6}$ | 68 | 0tr |  |
| म⿺𠃊 | 06 | 0 | 0 | $8 \varepsilon$ | 19 |  | $9{ }^{9}$ | 0 | 0 | 21 | $0 \varepsilon$ | $\stackrel{\square}{\square}$ | 101 | 0 | 0 | 6 | ＋9 | 82 | tL | 0 | 0 | $\varepsilon \vdash$ | 02 | เt | Wd st：$\varepsilon$ |
| 992 | 99 | 0 | 0 | 82 | 58 | $\varepsilon$ | $6 \varepsilon$ | 0 | 0 | St | 02 | $\dagger$ | 18 | 0 | 0 | $\angle$ | 99 | 61 | 62 | 0 | 0 | 91 | $\angle Z$ | 98 | Wd $0 ¢ \%$ |
| ¢ヶて | $\varepsilon 8$ | 0 | 0 | $\varepsilon \varepsilon$ | st | 9 | z¢ | 0 | 0 | 9 | 02 | 9 | ¢8 | 0 | 0 | 6 | $\angle 9$ | $\angle$ | $\angle$ | 0 | 0 | 9 | 02 | 12 | Wast： |
| 988 | $\angle 8$ | 0 | 0 | $0 \varepsilon$ | 19 | 9 | $\varepsilon{ }^{\text {¢ }}$ | 0 | 0 | 8 | $0 \varepsilon$ | 9 | L | 0 | 0 | 6 | 99 | 2t | 82 | 0 | 0 | tr | 22 | てt | Wd 00：\％ |
| 1601 | 698 | 0 | 0 | L\＆ | 012 | 22 | しゃ！ | 0 | 0 | 68 | L | 92 | $0 \angle 2$ | 0 | 0 | $8 \varepsilon$ | \＆81 | 6t | $1+\varepsilon$ | 0 | 0 | 99 | 26 | tgt |  |
| 008 | 96 | 0 |  | ＋ | $\angle$ | 8 | ${ }^{8+}$ | 0 | 0 | $\varepsilon$ | 62 | 9 | 89 | 0 | 0 | ＋ | เ | $9+$ | 88 | 0 | 0 | 12 | 62 | $8 \varepsilon$ | Wd st：z |
| 882 | 16 | 0 | 0 | $6 \varepsilon$ | $\angle$ | s | 乙 | 0 | 0 | 0 | $\angle$ | 9 | 96 | 0 | 0 | ！ | LL | ＋1 | 69 | 0 | 0 | 0 | sz | ャ¢ | Wd 0¢： |
| 692 | 26 | 0 | 0 | $9 \varepsilon$ | 29 | $\checkmark$ | \＆$\varepsilon$ | 0 | 0 | 01 | 8 r | 9 | 29 | 0 | 0 | $L$ | ャ | ！ | 28 | 0 | 0 | 91 | 12 | st | Wd Sl：Z |
| 比て | 06 | 0 | 0 | 12 | ＋9 |  | 82 | 0 | 0 | 9 | $\varepsilon$ | 6 | $\pm$ ¢ | 0 | 0 | 0 | $\angle \varepsilon$ |  | ZL | 0 | 0 | 81 | $\angle 1$ | $\angle \varepsilon$ | Wd 00：z |
| $1810 \pm 741$ | $\begin{aligned} & \text { [exol } \\ & d d V \end{aligned}$ |  |  | нәา גSeョ |  |  | $\begin{aligned} & {\left[\begin{array}{l} \text { edol } 1 \\ d d y \end{array}\right)} \end{aligned}$ | ${ }^{\text {spad }}$ |  |  |  | 14ठ！！ <br> ұuə | $\begin{aligned} & \text { ed olo } \\ & !d d y \end{aligned}$ $\downarrow ə \wedge 0$ | ${ }^{\text {spad }}$ <br> Bu | unı－n <br> puno чэeordd $\forall$ un﹎ | нәา <br> M noqısəM | $n, 4 \perp$ | 146！： | $\begin{aligned} & \text { Ielool } \\ & \text { ddy } \end{aligned}$ |  | $\begin{array}{r} \text { unı } \perp \text {-n } \\ \text { punoq } \\ \text { цэoo.ıddy } p \end{array}$ | нәา <br> nos noquınos |  |  | әس！$\perp$ मexs |


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| 0.0 | 0.0 |  | － | 0.0 | 0.0 | 0.0 | 0.0 |  | － | 0.0 | 0.0 | 0.0 | 0.0 |  | － | 0.0 | 0.0 | 0.0 | 0.0 |  | － | 0.0 | 0.0 | 0.0 | $\begin{gathered} \text { peoy } \\ \text { us sәјरо! } \% \end{gathered}$ |
| 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | proy uo se｜र吅 |
| 62 | 12 |  | － | ＋0 | 92 | 98 | て＇9 |  | － | 9 9 | ＜$¢$ | † $\llcorner\stackrel{ }{ }$ | く $\varepsilon$ |  | － | $9+1$ | $\stackrel{\circ}{ }$ | 6.1 | $9 \cdot$ |  | － | でて | $6{ }^{6}$ | z＇0 |  |
| 861 | 9 t | － | 0 | 1 | $\downarrow \varepsilon$ | H | 19 | － | 0 | St | 12 | S2 | $\stackrel{+9}{ }$ |  | 0 | S2 | २६ | $L$ | $\angle 2$ |  | 0 | 8 | 4 | 2 |  |
| $\dagger$ ¢ | ¢ 2 |  | － | s＇t | 82 | t＇s | ${ }^{\circ} \mathrm{\varepsilon}$ |  |  | 0 － | $\varepsilon$ \＆ | 9 ＇s | ¢ ${ }^{\text {c }}$ |  |  | \＆＇ | $1: 2$ | $\angle 2$ | 6 ＇t |  |  | 0 ＇$\varepsilon$ | でて | て＇ı |  |
| เ91 | $\downarrow 9$ | － | 0 | ！ | 98 | $L$ | 62 | － | 0 | 8 | $\varepsilon \stackrel{1}{ }$ | 8 | to | － | 0 | 6 | 92 | 0 | ャ | － | 0 | H | $\varepsilon$ | 01 |  |
| て＇！ | 1＇t | － | ． | $\varepsilon{ }^{\circ}$ | L＇t | 80 | $8 \cdot$ | － | － | 92 | †＇t | 12 | 1＇t | － | － | て＇， | 60 | $9 \cdot$ | 60 | － | － | 2＇z | 80 | so | sesng \％ |
| 62 | G2 | － | 0 | 2 | ¿z | 1 | 8 | － | 0 | $L$ | 8 | $\varepsilon$ | 61 | － | 0 | 2 | 1 | 9 | $\angle 1$ | － | 0 | 8 | 9 | $\dagger$ | sesng |
| $\downarrow$ ¢ $¢ 6$ | $\varepsilon{ }^{\prime \prime} 6$ | － | － | 1．86 | 0 － 6 | ع＇98 | $0 \cdot 68$ | － | － | 888 | 926 | 0．9L | L．26 | － | － | 682 | \＆＇t6 | － 86 | $9 \cdot 96$ | － | － | L＇z6 | ${ }^{\text {8 }}$ ¢ 6 | ＋＇86 | $\begin{array}{\|c\|c\|l} \hline \text { spoose } \\ \hline \end{array}$ |
| sLZ9 | 6902 | － | 0 | $28 /$ | LıL | 01t | t＜8 | － | 0 | L®z | 629 | 801 | 8091 | － | 0 | ¢\＆t | LZı | เャ¢ | $68 \angle 1$ | － | 0 | $1+\varepsilon$ | L99 | 1＋8 | spoov 146678 s．eo |
| $0 \cdot 0$ | $0{ }^{\circ}$ | － | － | 0.0 | $0 \cdot 0$ | 0.0 | 0.0 | － | － | 0.0 | $0{ }^{\circ}$ | 0.0 | 0.0 | － | － | $0 \cdot 0$ | 00 | 00 | 10 | － | － | 00 | ع＇0 | $0 \cdot 0$ | sp｜0イ0．010 \％\％ |
| 2 | 0 | － | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 2 |  | 0 | 0 | 2 | 0 | Sol｜గ1010 ${ }^{\text {a }}$ |
| － | ¢ $2 \ell$ | － | $0 \cdot 0$ | $1 \cdot 1+$ | 961 | 6.1 | 971 | － | 0.0 | $0 \times$ | 98 | 12 | 8＇92 | － | 0.0 | g＇z | 8.2 | カ＇s | $1 \cdot L 2$ | － | 0.0 | s＇s | 88 | 8 \％ | \％［1e｜O |
| － | － | － | $0 \cdot 0$ | て＇t¢ | 6.69 | 6.9 | － | － | 0.0 | て＇Lz | 1．89 | L＇ザ | － | － | 0.0 | 66 | $1 \cdot 69$ | 0＇12 | － | － | 0.0 | 2：02 | ＜＇z¢ | $1: \angle t$ |  |



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| － | － | 0 | － | － | － | － | － | 0 | － | － | － | － | － | 0 | － | － | － | － | － | 0 | － | － | － | － | sue！！nsepad |
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| － | － | 0 | － | － | － | － | － | 0 | － | － | － | － | － | 0 | － | － | － | － | － | 0 | － | － | － | － | y｜emssoio uo sәəર๐！я |
| $0 \cdot 0$ | $0 \cdot 0$ | － | － | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | $00^{\circ}$ | － | － | $0 \cdot 0$ | $0{ }^{\circ}$ | 00 | $0 \cdot 0$ | － | － | $0 \cdot 0$ | $00^{\circ}$ | 00 | 00 | － | － | 00 | $00^{\circ}$ | 00 | $\begin{gathered} \text { peoyg } \\ \text { uo sepरo!g \% } \end{gathered}$ |
| 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 |  |
|  | 80 | － | － | $0 \cdot 0$ | $\varepsilon \cdot$ | $0 \cdot 0$ | 6 ¢ | － | － | ¢＇8 | L＇． | $6 \cdot 9$ | $1 \cdot \varepsilon$ | － | － | $\dagger^{\prime} 6$ | ع＇乙 | $8{ }^{\prime}$ | 6. | － | － | 6 ＇z | カ＇t | 00 |  |
| 92 | $\varepsilon$ | － | 0 | 0 | $\varepsilon$ | 0 | $L$ | － | 0 | $\checkmark$ | 2 | 1 | 01 | － | 0 | $\varepsilon$ | 9 | 2 | 9 | － | 0 | 2 | $\dagger$ | 0 |  |
| 8 ＇ | 9 ＇ | － | － | L＇0 | 60 | 0．02 | $\stackrel{1}{ }$ | － | － | $0{ }^{\circ}$ | L＇． | 00 | $\downarrow$＇$\varepsilon$ | － | － | ع＇9 | L＇乙 | でも | 60 | － | － | $0{ }^{\circ}$ | $\varepsilon$ ¢ $\varepsilon$ | $0 \cdot 0$ | $\begin{gathered} \text { syonג! } \\ \text { t!un-ə\|ธu!S } \% \end{gathered}$ |
| 22 | 9 | － | 0 | 1 | 2 | $\varepsilon$ | 2 | － | 0 | 0 | 2 | 0 | H | － | 0 | Z | 9 | $\varepsilon$ | $\varepsilon$ | － | 0 | 0 | $\varepsilon$ | 0 | syonı $\downarrow$ ！un－ə｜6u！ |
| 80 | 8.0 | － | － | $0 \cdot 0$ | $\varepsilon \cdot \stackrel{ }{ }$ | $0 \cdot 0$ | て＇Z | － | － | $0 \cdot 0$ | $9 \times$ | $6^{\circ} \mathrm{G}$ | $0 \cdot 0$ | － | － | $0 \cdot 0$ | $00^{\circ}$ | $00^{\circ}$ | 60 | － | － | 6.2 | $0{ }^{\circ}$ | $9{ }^{\circ}$ | sesng \％ |
| 01 | $\varepsilon$ | － | 0 | 0 | $\varepsilon$ | 0 | † | － | 0 | 0 | $\varepsilon$ | 1 | 0 | － | 0 | 0 | 0 | 0 | $\varepsilon$ | － | 0 | z | 0 | 1 | səsng |
| て＇G6 | 6.96 | － | － | ع＇66 | †＇96 | $0 \cdot 08$ | 8 826 | － | － | S＇16 | 0 ＇t6 | て＇88 | ¢＇\＆6 | － | － | カ＇ャ8 | 0 ¢ $¢$ | 0 ＇\＆6 | ع＇96 | － | － | て＇ャ6 | ع＇乙6 | $\dagger^{\prime} 66$ | $\begin{gathered} \text { spoov } \\ \text { +46! } 8 \text { sıe \% \% } \end{gathered}$ |
| 9S15 | S $\angle \varepsilon$ | － | 0 | 9 t | $\angle 12$ | 21 | 891 | － | 0 | \＆t | $01+$ | St | $20 \varepsilon$ | － | 0 | $\angle 2$ | 602 | 99 | 1 1¢ | － | 0 | 99 | †8 | 291 | spoos 146678 s．eo |
| $0 \cdot 0$ | $0 \cdot 0$ | － | － | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | － | － | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | － | － | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | － | － | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | selukjoion \％ |
| 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | sepरJuotow |
| $\varepsilon \angle 6{ }^{\circ}$ | $8 \mathrm{S6} 0^{\circ}$ | － | 000＇0 | 6160 | 2980 | 989＇0 | \＆ 260 | － | $000{ }^{\circ}$ | $688^{\circ} 0$ | $\pm \pm 6{ }^{\circ}$ | $08^{\circ} 0$ | $008{ }^{\circ}$ | － | $000^{\circ}$ | $688^{\circ}$ | 6980 | เ\＆9＊0 | 8980 | － | $000{ }^{\circ}$ | 06900 | †8L＇0 | 662＇0 | ${ }^{3} \mathrm{Hd}$ |
| － | 6.18 | － | $0{ }^{\circ}$ | $1 \cdot \mathrm{Cl}$ | 9＇81 | て＇1 | 6 tr | － | $0{ }^{\circ}$ | $6 \cdot 8$ | $9 \%$ | t＇t | 9.92 | － | $0{ }^{\circ}$ | 92 | 1．81 | $8{ }^{\circ}$ | 9．92 | － | $0{ }^{\circ}$ | L＇s | G＇L | †＇\＆ا | \％｜letol |
| － | － | － | $0 \cdot 0$ | $0 \cdot 8 \varepsilon$ | 1.89 | $6 \cdot 8$ | － | － | $0 \cdot 0$ | 0.92 | 9 ＇t9 | t＇6 | － | － | $0 \cdot 0$ | 6.6 | 1＇89 | 0＇z2 | － | － | $0 \cdot 0$ | $\downarrow$－ | て＇82 | s．09 | \％पгео．Id ${ }^{\text {d }}$ |
| カ121 | $\angle 8 \varepsilon$ | 0 | 0 |  | SZZ | St | 181 | 0 | 0 | $\angle t$ | LIt | $\angle 1$ | £ ¢ | 0 | 0 | 乙¢ | 0 Oz | LL | દટદ | 0 | 0 | 69 | 16 | ع91 | ${ }_{\text {Pelo }}$ |
| 1 1¢ | 101 | 0 | 0 | $0 \varepsilon$ | 99 | 9 | 2t | 0 | 0 | 01 | 82 | $\checkmark$ | 08 | 0 | 0 | 6 | 19 | 01 | 88 | 0 | 0 | S2 | 62 | $\pm \varepsilon$ | Wd 0¢：\％ |
| 082 | $\angle 6$ | 0 | 0 | $6 \varepsilon$ | 99 | $\tau$ | t | 0 | 0 | H | 82 | s | LL | 0 | 0 | $L$ | 97 | 81 | 89 | 0 | 0 | St | 91 | $\angle \varepsilon$ | Wd st： t |
| 218 | 66 | 0 | 0 | 0t | 29 | $L$ | 6 t | 0 | 0 | ＋1 | $1 \varepsilon$ | t | LL | 0 | 0 | $L$ | 67 | St | $\varepsilon 6$ | 0 | 0 | 91 | 92 | 19 | Wd 00：${ }^{\text {t }}$ |
| 1 ¢ | 06 | 0 | 0 | $8 \varepsilon$ | 19 | 1 | 97 | O | 0 | 21 | $0 \varepsilon$ | $\checkmark$ | 101 | 0 | 0 | 6 | t9 | 82 | tL | 0 | 0 | \＆ | 02 | It | Wd St：$\varepsilon$ |
| $12+10 \perp 7$ | $\begin{aligned} & \text { Ielol } \\ & \text { ddd }-1 \end{aligned}$ | spod | unn $\perp$－n <br> pun чэ๐o．dd $\forall$ | $\begin{aligned} & \text { मəา } \\ & \text { 1se⿶ } \\ & \text { unoqıseョ } \end{aligned}$ | nıчı |  | $\begin{aligned} & \text { Iefol } \\ & \text { dd } \forall \end{aligned}$ | ${ }^{\text {spod }}$ | un $\perp$－$\cap$ <br> punoq чreouddy <br> （Wd | $S \downarrow: \varepsilon$ | n.чı | 개！！ <br> dno | $\begin{aligned} & \text { etol } \\ & d d y-2 \end{aligned}$ <br> уеә | spad <br> ఛUӘ | unn $\perp$－n <br> puno чэeordd $\forall$ ШӘへО | нәา <br> qisem punoqısəM N Du！ | $\begin{aligned} & \text { nıчı } \\ & \text { nגп } \perp 1 \end{aligned}$ | Ічб！！ | $\begin{aligned} & \mathrm{lelol} \mathrm{I} \\ & \mathrm{dd} \forall \end{aligned}$ |  | un $\perp$－n <br> puno <br> чæ宀оıdd | みәา ınos unoquınos | nuч1 | 146！！ | әس！$\perp$ Hels |



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| $00^{\circ}$ | 00 | － | － | $00^{\circ}$ | $00^{\circ}$ | 0.0 | $0 \cdot 0$ | － | － | $00^{\circ}$ | $00^{\circ}$ | $00^{\circ}$ | 00 | － | － | $00^{\circ}$ | $00^{\circ}$ | $00^{\circ}$ | $00^{\circ}$ | － | － | 00 | $00^{\circ}$ | 00 | peoy uo se｜रイO！ \％ |
| 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | proy uo səjર0！g |
| $\dagger$ ¢ | $\mathrm{S} \cdot \stackrel{ }{ }$ | － | － | 00 | $9 \cdot$ | 9 G | 9.01 | － | － | でて | $9 \cdot \angle$ | ＋＇8¢ | て＇t | － | － | どャレ | $8 \cdot \varepsilon$ | $8 \cdot$ | $\stackrel{1}{ }$ | － | － | $0 \cdot 0$ | $1 \cdot 1$ | L＇． | $\begin{gathered} \text { syınıı } \\ \text { pıte\|noliv } \end{gathered}$ |
| 乙\＆ | $\dagger$ | － | 0 | 0 | $\varepsilon$ | 1 | ＋1 | － | 0 | 1 | 9 | 8 | 11 | － | 0 | $\varepsilon$ | $L$ | 1 | $\varepsilon$ | － | 0 | 0 | 1 | 2 |  |
| $9{ }^{\text {9 }}$ | $1 \cdot 9$ | － | － | 89 | $6{ }^{\prime}$ | 00 | s ＇ | － | － | でて | $0 \cdot 0$ | $8{ }^{\prime} \downarrow$ | 8.0 | － | － | 00 | $1 \cdot 1$ | 000 | でて | － | － | $9{ }^{\circ} \varepsilon$ | $\tau \bullet \varepsilon$ | 80 |  |
| †て | ャレ | － | 0 | 9 | 6 | 0 | 2 | － | 0 | 1 | 0 | 1 | 2 | － | 0 | 0 | 2 | 0 | 9 | － | 0 | 2 | $\varepsilon$ | 1 | รyonı ！！un－ə｜бu！ |
| L＇t | L＇0 | － | － | ガレ | S＇0 | $0 \cdot 0$ | 9＇1 | － | － | でて | 9＇1 | $0 \cdot 0$ | L＇ | － | － | $0 \cdot 0$ | て＇て | g＇s | 6. | － | － | $t \cdot 9$ | $1 \cdot 1$ | 8.0 | sesng \％ |
| 91 | 2 | － | 0 | 1 | 1 | 0 | 2 | － | 0 | 1 | 1 | 0 | $L$ | － | 0 | 0 | $\checkmark$ | $\varepsilon$ | 9 | － | 0 | $\varepsilon$ | 1 | 1 | səsng |
| ع＇26 | L＇26 | － | － | 8.16 | $6 \cdot 26$ | カ＇t6 | ${ }^{\text {¢ }} 98$ | － | － | $\varepsilon \cdot 86$ | 6.06 | 1－Ls | ع ¿6 | － | － | L＇98 | $0 \cdot 86$ | L＇26 | $8 \cdot 6$ | － | － | $1 \cdot 16$ | L＇t6 | く．96 | $\begin{gathered} \text { spoog } \\ 146!78 \text { sıe } \% \end{gathered}$ |
| 998 | ¢SZ | － | 0 | $\angle 9$ | $12+$ | $\angle 1$ | カト1 | － | 0 | てt | 09 | 21 | เャて | － | 0 | 81 | 2L1 | 19 | 9¢8 | － | 0 | 19 | 68 | 915 | Spoos 146！7 8 s．e0 |
| $0 \cdot 0$ | $0 \cdot 0$ | － | － | $0 \cdot 0$ | $0 \cdot 0$ | 0.0 | $0 \cdot 0$ | － | － | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | － | － | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | － | － | $0 \cdot 0$ | $0 \cdot 0$ | $0 \cdot 0$ | seprojolow \％ |
| 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | 0 | － | 0 | 0 | 0 | 0 | sepरıjolow |
| Lt8 ${ }^{\circ}$ | 8880 | － | 0000 | ع61＇0 | 988.0 | OSL＇0 | ع 290 | － | 0000 | ع02＇0 | 0S $L^{\circ} 0$ | LLt＇0 | LLL＇0 | － | $000 \cdot 0$ | G29＇0 | $988{ }^{\circ}$ | †てL＇0 | 9980 | － | 0000 | †ट8．0 | 88200 | 8860 | ${ }^{3} \mathrm{Hd}$ |
| － | ع＇62 | － | $0{ }^{\circ} 0$ | 8. | 961 | 6. | 1＇tr | － | $0{ }^{\circ}$ | 8 ＇t | $0 \cdot 1$ | でて | 8 $\angle 2$ | － | $0{ }^{\circ}$ | て＇て | L＇61 | 6.5 | 8．82 | － | $0{ }^{\circ}$ | $0 \cdot 9$ | $0 \cdot 01$ | 8 Zl | \％ 1 ［10 10 |
| － | － | － | $0{ }^{\circ}$ | ¢．92 | 6.99 | ¢＇9 | － | － | $0 \cdot 0$ | $1 \cdot \downarrow \varepsilon$ | 0.09 | 6 Gr | － | － | $0 \cdot 0$ | $0 \cdot 8$ | 6.02 | 1．t2 | － | － | $0 \cdot 0$ | L＇02 | $8{ }^{\circ} \downarrow$ | ガ㠶 | \％цॅeordd |
| 886 | SLZ | 0 | 0 | \＆ | ＋81 | 81 | 2\＆1 | 0 | 0 | St | 99 | 12 | 192 | 0 | 0 | 12 | 981 | G9 | $0 \angle Z$ | 0 | 0 | 99 | ${ }^{+6}$ | 0Z1 | ${ }_{\text {랑ㅇ }}$ |
| 961 | S9 | 0 | 0 | $\varepsilon 2$ | $8 \varepsilon$ | $\checkmark$ | $\varepsilon 2$ | 0 | 0 | 8 | $\varepsilon \stackrel{1}{ }$ | 2 | H | 0 | 0 | 2 | $1 \varepsilon$ | 8 | 99 | 0 | 0 | 01 | 92 | $1 \varepsilon$ | W $00: 8$ |
| LLZ | 28 | 0 | 0 | 12 | Gs | 9 | 6 t | 0 | 0 | 91 | 乙 | H | 89 | 0 | 0 | $\dagger$ | St | 61 | 82 | 0 | 0 | $\angle 1$ | $0 \varepsilon$ | $1 \varepsilon$ | W $\boldsymbol{\text { St }}$ ：$L$ |
| ¢\＆z | LL | 0 | 0 | $\angle 1$ | S¢ | 9 | $\angle 2$ | 0 | 0 | 6 | $\angle 1$ | ＋ | 89 | 0 | 0 | s | 89 | 01 | ¢9 | 0 | 0 | 91 | St | $2 \varepsilon$ | W 0 OE： |
| เદ乙 | 19 | 0 | 0 | 21 | $9 \varepsilon$ | $\varepsilon$ | $\varepsilon \varepsilon$ | 0 | 0 | 21 | tr | $L$ | ャ8 | 0 | 0 | 01 | 99 | 81 | ع9 | 0 | 0 | \＆ | †て | 92 | W＊St：L |
|  |  |  | $\begin{array}{r} \text { un } \perp-\cap \\ \text { punc } \\ \text { цэャo.dd } \forall \end{array}$ | Нәา <br> 1seق unoqlse ヨ | n．4． |  | $\begin{aligned} & \mathrm{IefO} \perp \perp \\ & \cdot \mathrm{dd} \theta \end{aligned}$ |  | u．n $\perp$－$n$ <br> puno чoeouddy （WV | Нəา <br> Yนon ипоqчมо Gl：L | nuч <br> еұе | 146ு！！ <br> inor | $\stackrel{\mathrm{EP}, \mathrm{O}}{ } \mathrm{I}$ $\cdot d d \forall$ <br> yеә | spod <br> łuə | unn－ก <br> puno чэeodd $\forall$ ひӘへО | нәา <br> isom punoqısəM N Du！u |  | 14б！！ | $\begin{aligned} & \mathrm{IPlO} \mathrm{\perp} \\ & \text { dd } \end{aligned}$ | sped | uni－n <br> puno чэюо．ddy | みәา <br> ！nos unoquınos | n．4． | Ічб！̣ | әس！$\perp$ Hels |



MRR @ Main Street - TMC
Tue Nov 13, 2018
Full Length (6AM-9AM, 2PM-6PM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 595320, Location: 43.207195, -78.387926


MRR @ GCC/Pride Pak - TMC
Tue Nov 27, 2018
Full Leng th (2PM-6PM, 6AM-9AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 595329, Location: 43.207325, -78.380733


*L: Left, R: Right, T: Thru, U: U-Turn

## MRR @ GCC/Pride Pak - TMC

Tue Nov 27, 2018
Full Leng th (2PM-6PM, 6AM-9AM)
Provided by: Genesee Transportation Council
50 West Main Street, Suite 8112,
Rochester, NY, 14614, US
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 595329, Location: 43.207325, -78.380733

## [N] North

Total: 68
In: $29 \quad$ Out: 39


Out: $33 \quad \ln : 38$
Total: 71
[S] South

MRR @ GCC/Pride Pak - TMC
Tue Nov 27, 2018
AM Peak (7AM - 8AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 595329, Location: 43.207325, -78.380733


* L: Left, R: Right, T: Thru, U: U-Turn

MRR @ GCC/Pride Pak - TMC
Tue Nov 27, 2018
AM Peak (7AM - 8AM)
Provided by: Genesee Transportation Council
50 West Main Street, Suite 8112,
Rochester, NY, 14614, US
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 595329, Location: 43.207325, -78.380733

## [N] North

Total: 8
In: $0 \quad$ Out: 8


MRR @ GCC/Pride Pak - TMC
Tue Nov 27, 2018
PM Peak (3:15PM - 4:15PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 595329, Location: 43.207325, -78.380733


* L: Left, R: Right, T: Thru, U: U-Turn

MRR @ GCC/Pride Pak - TMC
Tue Nov 27, 2018
PM Peak (3:15PM - 4:15PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 595329, Location: 43.207325, -78.380733

## [N] North

Total: 19
In: 14 Out: 5


Out: 16 In: 13
Total: 29
[S] South

MRR @ Bates Road - TMC
Wed Dec 5, 2018
Full Leng th (6AM-9AM, 2PM-6PM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 596447, Location: 43.207524, -78.370027



| Leg <br> Direction | West <br> Eastbound |  |  |  |  | East <br> Westbound |  |  |  |  | South <br> Northbound |  |  |  |  | North <br> Southbound |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Time | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | Int |
| $\begin{array}{r} \text { Articulated } \\ \text { Trucks } \\ \text { and } \\ \text { Single-Unit } \\ \text { Trucks } \end{array}$ | 35 | 54 | 2 | 0 | 91 | 0 | 38 | 15 | 0 | 53 | 1 | 4 | 0 | 0 | 5 | 20 | 1 | 47 | 0 | 68 | 217 |
| $\%$ <br> Articulate d <br> Trucks <br> and <br> Single-Unit <br> Trucks | 7.7\% | 5.0\% | 4.0\% 0 | 0\% | 5.7\% | 0\% | 3.8\% | 11.9\% | 0\% | 4.7\% | 2.1\% | 4.7\% | 0\% 0 |  | 3.7\% | 13.4\% | 0.9\% | 8.8\% | 0\% | 8.6 \% | 5.9\% |
| Buses | 2 | 15 | 2 | 0 | 19 | 0 | 16 | 4 | 0 | 20 | 0 | 2 | 0 | 0 | 2 | 1 | 1 | 1 | 0 | 3 | 44 |
| \% Buses | 0.4\% | 1.4\% | 4.0\% 0 | 0\% | 1.2\% | 0\% | 1.6\% | 3.2\% 0 | 0\% | 1.8 \% | 0\% | 2.4\% | 0\% 0 |  | 1.5\% | 0.7\% | 0.9\% | 0.2\% | 0\% | 0.4 \% | 1.2\% |

*L: Left, R: Right, T: Thru, U: U-Turn

MRR @ Bates Road - TMC
Wed Dec 5, 2018
Full Leng th (6AM-9AM, 2PM-6PM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 596447, Location: 43.207524, -78.370027
[ N ] North
Total: 1459
In: 793 Out: 666
べ $\stackrel{\text { No }}{\text { ® }}$


Out: $160 \quad \ln : 134$
Total: 294
[S] South

MRR @ Bates Road - TMC
Wed Dec 5, 2018
AM Peak (7AM - 8AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 596447, Location: 43.207524, -78.370027

| Leg <br> Direction | West <br> Eastbound |  |  |  |  | East <br> Westbound |  |  |  |  |  | South <br> Northbound |  |  |  |  | North <br> Southbound |  |  |  |  | Int |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Time | L | T | R | U | App |  | L | T |  | U | U App | L | T | R | R U | App | L | T | R | U | App |  |
| $\begin{array}{r} \hline 2018-12-05 \\ 7: 00 \mathrm{AM} \end{array}$ | 17 | 41 | 2 | 0 | 60 |  | 0 | 40 | 5 | 0 | 45 | 3 | 2 | 0 | 0 | 5 | 2 | 2 | 11 | 0 | 15 | 125 |
| 7:15AM | 8 | 35 | 2 | 0 | 45 |  | 0 | 43 | 9 | 0 | 52 | 2 | 2 | 0 | 0 | 4 | 6 | 8 | 21 | 0 | 35 | 136 |
| 7:30AM | 20 | 42 | 2 | 0 | 64 |  | 0 | 48 | 3 | 0 | 51 | 5 | 1 | 0 | 0 | 6 | 3 | 4 | 18 | 0 | 25 | 146 |
| 7:45AM | 30 | 32 | 1 | 0 | 63 |  | 0 | 49 | 9 | 0 | 58 | 0 | 5 | 0 | 0 | 5 | 4 | 1 | 19 | 0 | 24 | 150 |
| Total | 75 | 150 | 7 | 0 | 232 |  | 0 | 180 | 26 | 0 | 206 | 10 | 10 | 0 | 0 | 20 | 15 | 15 | 69 | 0 | 99 | 557 |
| \% Approach | 32.3\% | 64.7\% | 3.0\% | 0\% | - |  | \% 8 | 87.4\% | 12.6\% | 0\% | - | 50.0\% | 50.0\% | 0\% | 0\% |  | 15.2\% | 15.2\% | 69.7\% |  |  |  |
| \% Total | 13.5\% | 26.9\% | 1.3\% | 0\% | 41.7 \% |  | \% 3 | 32.3\% | 4.7\% | 0\% | 37.0\% | 1.8\% | 1.8\% | 0\% | 0\% | 3.6\% | 2.7\% | 2.7\% | 12.4\% | 0\% | 17.8\% |  |
| PHF | 0.625 | 0.893 | 0.875 | - | 0.906 |  | - | 0.918 | 0.722 |  | 0.888 | 0.500 | 0.500 |  | - - | -0.833 | 0.625 | 0.469 | 0.821 |  | 0.707 | 0.928 |
| Lights | 68 | 138 | 7 | 0 | 213 |  | 0 | 166 | 21 | 0 | 187 | 10 | 10 | 0 | 0 | 20 | 12 | 15 | 65 | 0 | 92 | 512 |
| \% Lights | 90.7\% | 92.0\% | 100\% | 0\% | 91.8\% |  | \% 9 | 92.2\% | 80.8\% | 0\% | 90.8\% | 100\% | 100\% | 0\% | 0\% | $100 \%$ | 80.0\% | 100\% | 94.2\% |  | 92.9\% | 91.9\% |
| Articulated Trucks and Single-Unit Trucks | 7 | 9 | 0 | 0 | 16 |  | 0 | 6 | 4 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 4 | 0 | 7 | 33 |
| \% Articulated Trucks and Single-Unit Trucks | 9.3\% | 6.0\% | 0\% | 0\% | 6.9 \% | 0\% |  | 3.3\% | 15.4\% | 0\% | $4.9 \%$ | 0\% | 0\% | 0\% | 0\% | 0 \% | 20.0\% | 0\% | 5.8\% | 0\% | 7.1\% | 5.9\% |
| Buses | 0 | 3 | 0 | 0 | 3 |  | 0 | 8 | 1 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| \% Buses | 0\% | 2.0\% | 0\% | 0\% | 1.3\% | 0\% | \% | 4.4\% | 3.8\% | 0\% | 4.4 \% | 0\% | 0\% | 0\% | 0\% | 0 \% | 0\% | 0\% | 0\% | 0\% | 0 \% | 2.2\% |

* L: Left, R: Right, T: Thru, U: U-Turn

MRR @ Bates Road - TMC
Wed Dec 5, 2018
AM Peak (7AM - 8AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 596447, Location: 43.207524, -78.370027
[ N ] North
Total: 210
In: $99 \quad$ Out: 111
8 ำ ำ


Out: $22 \quad \ln : 20$
Total: 42
[S] South

MRR @ Bates Road - TMC
Wed Dec 5, 2018
PM Peak (3PM - 4PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks and Single-Unit Trucks,
Buses)
All Movements
ID: 596447, Location: 43.207524, -78.370027

| Leg <br> Direction | West <br> Eastbound |  |  |  |  | East <br> Westbound |  |  |  |  | South <br> Northbound |  |  |  |  | North <br> Southbound |  |  |  |  | Int |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Time | L | T | R | U | App | L | T |  | U | App | L | T | R | R U | App | L | T |  | U | App |  |
| $\begin{array}{r} \text { 2018-12-05 } \\ 3: 00 \mathrm{PM} \end{array}$ | 16 | 42 | 3 | 0 | 61 | 0 | 45 | 3 | 0 | 48 | 1 | 3 | 0 | 0 | 4 | 5 | 2 | 40 | 0 | 47 | 160 |
| 3:15PM | 15 | 35 | 2 | 0 | 52 | 1 | 58 | 2 | 0 | 61 | 0 | 3 | 0 | 0 | 3 | 5 | 6 | 34 | 0 | 45 | 161 |
| 3:30PM | 19 | 47 | 3 | 0 | 69 | 1 | 45 | 5 | 0 | 51 | 0 | 2 | 0 | 0 | 2 | 9 | 1 | 23 | 0 | 33 | 155 |
| 3:45PM | 24 | 47 | 4 | 0 | 75 | 0 | 41 | 5 | 0 | 46 | 0 | 3 | 0 | 0 | 3 | 4 | 5 | 23 | 0 | 32 | 156 |
| Total | 74 | 171 | 12 | 0 | 257 | 2 | 189 | 15 | 0 | 206 | 1 | 11 | 0 | 0 | 12 | 23 | 14 | 120 | 0 | 157 | 632 |
| \% Approach | 28.8\% | 66.5\% | 4.7\% |  | - | 1.0\% | 91.7\% | 7.3\% | 0\% | - | 8.3\% | 91.7\% | 0\% | 0\% | - | 14.6\% | 8.9\% | 76.4\% |  |  | - |
| \% Total | 11.7\% | 27.1\% | 1.9\% | 0\% | $40.7 \%$ | 0.3\% | 29.9\% | 2.4\% | 0\% | 32.6\% | 0.2\% | 1.7\% | 0\% | 0\% | 1.9 \% | 3.6\% | 2.2\% | 19.0\% | 0\% | 24.8 \% |  |
| PHF | 0.771 | 0.910 | 0.750 | - | 0.857 | 0.500 | 0.815 | 0.750 |  | - 0.844 | 0.250 | 0.917 |  |  | 0.750 | 0.639 | 0.583 | 0.750 |  | 0.835 | 0.981 |
| Lights | 65 | 161 | 10 | 0 | 236 | 2 | 178 | 12 | 0 | 192 | 1 | 9 | 0 | 0 | 10 | 19 | 14 | 107 | 0 | 140 | 578 |
| \% Lights | 87.8\% | 94.2\% | 83.3\% | 0\% | 91.8\% | 100\% | 94.2\% | 80.0\% | 0\% | 93.2\% | 100\% | 81.8\% | 0\% | 0\% | 83.3\% | 82.6\% | 100\% | 89.2\% | 0\% | 89.2\% | 91.5\% |
| Articulated Trucks and Single-Unit Trucks | 8 | 6 | 1 | 0 | 15 | 0 | 7 | 2 | 0 | 9 | 0 | 1 | 0 | 0 | 1 | 3 | 0 | 12 | 0 | 15 | 40 |
| \% Articulated Trucks and Single-Unit Trucks | 10.8\% | 3.5\% | 8.3\% | 0\% | 5.8 \% | 0\% | 3.7\% | 13.3\% | 0\% | 4.4 \% | 0\% | 9.1\% | 0\% | 0\% | 8.3 \% | 13.0\% | 0\% | 10.0\% | 0\% | 9.6 \% | 6.3\% |
| Buses | 1 | 4 | 1 | 0 | 6 | 0 | 4 | 1 | 0 | 5 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 2 | 14 |
| \% Buses | 1.4\% | 2.3\% | 8.3\% | 0\% | 2.3\% | 0\% | 2.1\% | 6.7\% | 0\% | 2.4 \% | 0\% | 9.1\% | 0\% | 0\% | 8.3\% | 4.3\% | 0\% | 0.8\% | 0\% | 1.3\% | 2.2\% |

*L: Left, R: Right, T: Thru, U: U-Turn

MRR @ Bates Road - TMC
Wed Dec 5, 2018
PM Peak (3PM - 4PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)
All Movements
ID: 596447, Location: 43.207524, -78.370027
[ N ] North
Total: 257
In: 157 Out: 100


Out: 28 In: 12
Total: 40
[S] South

## STATE ROUTE TRAFFIC DATA

PROVIDED BY NEW YORK STATE DEPARTMENT OF TRANSPORTATION



WNONNNGNNNNNN

FROM：Niag／Orieans Co Line
PLACEMENT： $845 f t$ E of Hoffman Rd
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## APPENDIX B

## ENGINEERING ANALYSES

|  | $\rangle$ | $\rightarrow$ |  | $\dagger$ | - |  | 4 | 4 | $p$ |  | $\downarrow$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | \% | $\uparrow$ |  | ${ }^{7}$ | $\uparrow$ |  | ${ }^{7}$ | $\uparrow$ | F |  | \$ |  |
| Traffic Volume (veh/h) | 0 | 297 | 35 | 64 | 282 | 8 | 15 | 0 | 58 | 1 | 0 | 1 |
| Future Volume (veh/h) | 0 | 297 | 35 | 64 | 282 | 8 | 15 | 0 | 58 | 1 | 0 | 1 |
| Initial $Q(Q b)$, veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach |  | No |  |  | No |  |  | No |  |  | No |  |
| Adj Sat Flow, veh/h/n | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1900 | 1885 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 0 | 338 | 40 | 73 | 320 | 9 | 17 | 0 | 66 | 1 | 0 | 1 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, \% | 1 | 1 | 1 |  | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| Cap, veh/h | 145 | 451 | 53 | 115 | 779 | 22 | 705 | 745 | 728 | 368 | 35 | 294 |
| Arrive On Green | 0.00 | 0.27 | 0.27 | 0.06 | 0.43 | 0.43 | 0.39 | 0.00 | 0.39 | 0.39 | 0.00 | 0.39 |
| Sat Flow, veh/h | 1059 | 1654 | 196 | 1795 | 1825 | 51 | 1427 | 1900 | 1598 | 661 | 89 | 750 |
| Grp Volume(v), veh/h | 0 | 0 | 378 | 73 | 0 | 329 | 17 | 0 | 66 | 2 | 0 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1059 | 0 | 1850 | 1795 | 0 | 1876 | 1427 | 1900 | 1598 | 1500 | 0 | 0 |
| Q Serve(g_s), s | 0.0 | 0.0 | 9.3 | 2.0 | 0.0 | 6.1 | 0.3 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 |
| Cycle Q Clear (g_c), s | 0.0 | 0.0 | 9.3 | 2.0 | 0.0 | 6.1 | 0.4 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 |
| Prop In Lane | 1.00 |  | 0.11 | 1.00 |  | 0.03 | 1.00 |  | 1.00 | 0.50 |  | 0.50 |
| Lane Grp Cap (c), veh/h | 145 | 0 | 505 | 115 | 0 | 801 | 705 | 745 | 728 | 697 | 0 | 0 |
| V/C Ratio(X) | 0.00 | 0.00 | 0.75 | 0.64 | 0.00 | 0.41 | 0.02 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 761 | 0 | 1581 | 523 | 0 | 2319 | 705 | 745 | 728 | 697 | 0 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 16.5 | 22.7 | 0.0 | 9.9 | 9.3 | 0.0 | 7.7 | 9.2 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 2.3 | 5.7 | 0.0 | 0.3 | 0.1 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| \%ile BackOfQ(50\%),veh/ln | 0.0 | 0.0 | 3.5 | 0.9 | 0.0 | 1.9 | 0.1 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh |  |  |  |  |  |  |  |  |  |  |  |  |
| LnGrp Delay(d),s/veh | 0.0 | 0.0 | 18.8 | 28.5 | 0.0 | 10.2 | 9.4 | 0.0 | 7.9 | 9.2 | 0.0 | 0.0 |
| LnGrp LOS | A | A | B | C | A | B | A | A | A | A | A | A |
| Approach Vol, veh/h |  | 378 |  |  | 402 |  |  | 83 |  |  | 2 |  |
| Approach Delay, s/veh |  | 18.8 |  |  | 13.5 |  |  | 8.2 |  |  | 9.2 |  |
| Approach LOS |  | B |  |  | B |  |  | A |  |  | A |  |
| Timer - Assigned Phs | 1 | 2 |  | 4 |  | 6 |  | 8 |  |  |  |  |
| Phs Duration ( $\mathrm{G}+\mathrm{Y}+\mathrm{Rc}$ ), s | 7.7 | 18.1 |  | 24.0 |  | 25.7 |  | 24.0 |  |  |  |  |
| Change Period ( $\mathrm{Y}+\mathrm{Rc}$ ), s | 4.5 | 4.5 |  | 4.5 |  | 4.5 |  | 4.5 |  |  |  |  |
| Max Green Setting (Gmax), s | 14.5 | 42.5 |  | 19.5 |  | 61.5 |  | 19.5 |  |  |  |  |
| Max Q Clear Time (g_c+1), s | 4.0 | 11.3 |  | 2.0 |  | 8.1 |  | 3.2 |  |  |  |  |
| Green Ext Time (p_c), s | 0.1 | 2.3 |  | 0.0 |  | 2.0 |  | 0.2 |  |  |  |  |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| HCM 6th Ctrl DelayHCM 6th LOS |  |  | 15.3 |  |  |  |  |  |  |  |  |  |
|  |  |  | B |  |  |  |  |  |  |  |  |  |


|  |  | Intersection |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 2.6 |  |  |  |  |  |
| Movement E | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations |  | $\uparrow$ | $\uparrow$ |  | ${ }^{7}$ | 「 |
| Traffic Vol, veh/h | 67 | 288 | 351 | 89 | 43 | 56 |
| Future Vol, veh/h | 67 | 288 | 351 | 89 | 43 | 56 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control F | Free | Free | Free | Free | Stop | Stop |
| RT Channelized |  | None | - | None | - | None |
| Storage Length |  | - | - | - | 0 | 0 |
| Veh in Median Storage, \# | \# | 0 | 0 | - | 0 | - |
| Grade, \% |  | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 81 | 81 | 81 | 81 | 81 | 81 |
| Heavy Vehicles, \% | 2 | 5 | 5 | 1 | 1 | 1 |
| Mvmt Flow | 83 | 356 | 433 | 110 | 53 | 69 |


| Major/Minor | Major1 | Major2 |  | Minor2 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Conflicting Flow All | 543 | 0 |  | 0 | 1010 | 488 |
| Stage 1 |  |  |  | - | 488 |  |
| Stage 2 | - | - | - | - | 522 |  |
| Critical Hdwy | 4.12 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 |  |
| Critical Hdwy Stg 2 | - | - |  | - | 5.41 |  |
| Follow-up Hdwy | 2.218 | - |  |  | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1026 | - | - | - | 267 | 582 |
| Stage 1 | - | - | - | - | 619 |  |
| Stage 2 | - | - | - | - | 597 |  |
| Platoon blocked, \% |  | - | - | - |  |  |
| Mov Cap-1 Maneuver | 1026 | - | - | - | 240 | 582 |
| Mov Cap-2 Maneuver |  | - | - |  | 240 |  |
| Stage 1 |  | - | - |  | 556 |  |
| Stage 2 | - | - | - |  | 597 |  |


| Approach | EB | WB | SB |
| :--- | ---: | ---: | ---: |
| HCM Control Delay, s | 1.7 | 0 | 17.3 |
| HCM LOS |  |  | C |


| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR SBLn1 SBLn2 |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: |
| Capacity (veh/h) | 1026 | - | - | - | 240 | 582 |
| HCM Lane V/C Ratio | 0.081 | - | - | -0.221 | 0.119 |  |
| HCM Control Delay (s) | 8.8 | 0 | - | - | 24.2 | 12 |
| HCM Lane LOS | A | A | - | - | C | B |
| HCM 95th \%tile Q(veh) | 0.3 | - | - | - | 0.8 | 0.4 |


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| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{array}{ll} \text { Intersection } & \\ \text { Int Delay, s/veh } & 2.7 \end{array}$ |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | ${ }_{\text {¢ }}$ |  |  | $\uparrow$ |  |  | ¢ |  |  | ¢ |  |
| Traffic Vol, veh/h | 53 | 299 | 2 | 3 | 393 | 36 | 2 | 1 | 0 | 17 | 0 | 100 |
| Future Vol, veh/h | 53 | 299 | 2 | 3 | 393 | 36 | 2 | 1 | 0 | 17 | 0 | 100 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control F | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Heavy Vehicles, \% | 1 | 4 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 4 | 0 | 6 |
| Mumt Flow | 61 | 344 | 2 | 3 | 452 | 41 | 2 | 1 | 0 | 20 | 0 | 115 |



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|  | $\prime$ |  |  | 7 | - |  | 4 | $\dagger$ | $p$ |  | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | $\uparrow$ |  | \% | $\uparrow$ |  | \% | $\uparrow$ |  | \% | $\uparrow$ |  |
| Traffic Volume (veh/h) | 73 | 184 | 18 | 21 | 185 | 55 | 45 | 66 | 21 | 56 | 94 | 120 |
| Future Volume (veh/h) | 73 | 184 | 18 | 21 | 185 | 55 | 45 | 66 | 21 | 56 | 94 | 120 |
| Initial $\mathrm{Q}(\mathrm{Qb})$, veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach |  | No |  |  | No |  |  | No |  |  | No |  |
| Adj Sat Flow, veh/h/n | 1885 | 1870 | 1870 | 1678 | 1856 | 1856 | 1811 | 1841 | 1841 | 1900 | 1856 | 1856 |
| Adj Flow Rate, veh/h | 75 | 190 | 19 | 22 | 191 | 57 | 46 | 68 | 22 | 58 | 97 | 124 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, \% | 1 | 2 | 2 | 15 | 3 | 3 | 6 | 4 | 4 | 0 | 3 | 3 |
| Cap, veh/h | 252 | 403 | 40 | 269 | 330 | 99 | 740 | 816 | 264 | 903 | 453 | 579 |
| Arrive On Green | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 |
| Sat Flow, veh/h | 1141 | 1673 | 167 | 1052 | 1372 | 410 | 1123 | 1332 | 431 | 1327 | 740 | 946 |
| Grp Volume(v), veh/h | 75 | 0 | 209 | 22 | 0 | 248 | 46 | 0 | 90 | 58 | 0 | 221 |
| Grp Sat Flow(s),veh/h/ln | 1141 | 0 | 1840 | 1052 | 0 | 1782 | 1123 | 0 | 1763 | 1327 | 0 | 1685 |
| Q Serve(g_s), s | 3.8 | 0.0 | 6.0 | 1.1 | 0.0 | 7.5 | 1.2 | 0.0 | 1.3 | 1.1 | 0.0 | 3.6 |
| Cycle Q Clear(g_c), s | 11.3 | 0.0 | 6.0 | 7.1 | 0.0 | 7.5 | 4.8 | 0.0 | 1.3 | 2.4 | 0.0 | 3.6 |
| Prop In Lane | 1.00 |  | 0.09 | 1.00 |  | 0.23 | 1.00 |  | 0.24 | 1.00 |  | 0.56 |
| Lane Grp Cap(c), veh/h | 252 | 0 | 443 | 269 | 0 | 429 | 740 | 0 | 1080 | 903 | 0 | 1032 |
| V/C Ratio(X) | 0.30 | 0.00 | 0.47 | 0.08 | 0.00 | 0.58 | 0.06 | 0.00 | 0.08 | 0.06 | 0.00 | 0.21 |
| Avail Cap(c_a), veh/h | 788 | 0 | 1307 | 762 | 0 | 1266 | 740 | 0 | 1080 | 903 | 0 | 1032 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 25.5 | 0.0 | 19.9 | 22.9 | 0.0 | 20.5 | 6.4 | 0.0 | 4.9 | 5.3 | 0.0 | 5.3 |
| Incr Delay (d2), s/veh | 0.7 | 0.0 | 0.8 | 0.1 | 0.0 | 1.2 | 0.2 | 0.0 | 0.2 | 0.1 | 0.0 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| \%ile BackOfQ( $50 \%$ ),veh/ln | 1.0 | 0.0 | 2.3 | 0.3 | 0.0 | 2.9 | 0.3 | 0.0 | 0.4 | 0.3 | 0.0 | 1.1 |
| Unsig. Movement Delay, s/veh |  |  |  |  |  |  |  |  |  |  |  |  |
| LnGrp Delay(d),s/veh | 26.1 | 0.0 | 20.7 | 23.1 | 0.0 | 21.7 | 6.5 | 0.0 | 5.0 | 5.5 | 0.0 | 5.8 |
| LnGrp LOS | C | A | C | C | A | C | A | A | A | A | A | A |
| Approach Vol, veh/h |  | 284 |  |  | 270 |  |  | 136 |  |  | 279 |  |
| Approach Delay, s/veh |  | 22.1 |  |  | 21.8 |  |  | 5.5 |  |  | 5.7 |  |
| Approach LOS |  | C |  |  | C |  |  | A |  |  | A |  |
| Timer - Assigned Phs |  | 2 |  | 4 |  | 6 |  | 8 |  |  |  |  |
| Phs Duration ( $\mathrm{G}+\mathrm{Y}+\mathrm{Rc}$ ), $s$ |  | 42.0 |  | 19.2 |  | 42.0 |  | 19.2 |  |  |  |  |
| Change Period ( $Y+R \mathrm{Rc}$ ), $s$ |  | 4.5 |  | 4.5 |  | 4.5 |  | 4.5 |  |  |  |  |
| Max Green Setting (Gmax), s |  | 37.5 |  | 43.5 |  | 37.5 |  | 43.5 |  |  |  |  |
| Max Q Clear Time (g_c+11), s |  | 6.8 |  | 13.3 |  | 5.6 |  | 9.5 |  |  |  |  |
| Green Ext Time (p_c), s |  | 0.7 |  | 1.4 |  | 1.6 |  | 1.5 |  |  |  |  |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| HCM 6th Ctrl Delay |  |  | 15.0 |  |  |  |  |  |  |  |  |  |
| HCM 6th LOS |  |  | B |  |  |  |  |  |  |  |  |  |


| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 0.1 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | * |  |  | $\uparrow$ |  | ${ }^{*}$ | $\uparrow$ |  |  | \& |  |
| Traffic Vol, veh/h | 6 | 252 | 0 | 0 | 251 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Vol, veh/h | 6 | 252 | 0 | 0 | 251 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 130 | - | - | - | - | - |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Heavy Vehicles, \% | 13 | 6 | 0 | 0 | 6 | 50 | 4 | 0 | 0 | 13 | 6 | 0 |
| Mvmt Flow | 7 | 290 | 0 | 0 | 289 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |



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| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 3.6 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | \$ |  |  | $\ddagger$ |  |  | $\ddagger$ |  |  | $\uparrow$ | 「 |
| Traffic Vol, veh/h | 75 | 150 | 7 | 0 | 180 | 26 | 10 | 10 | 0 | 15 | 15 | 69 |
| Future Vol, veh/h | 75 | 150 | 7 | 0 | 180 | 26 | 10 | 10 | 0 | 15 | 15 | 69 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | 150 |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, \% | 8 | 5 | 4 | 0 | 4 | 12 | 2 | 5 | 0 | 13 | 1 | 9 |
| Mvmt Flow | 81 | 161 | 8 | 0 | 194 | 28 | 11 | 11 | 0 | 16 | 16 | 74 |



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|  | $\rangle$ | $\rightarrow$ | \% | 7 | - | 4 | 4 | 4 | $p$ |  | $\downarrow$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | $\hat{\square}$ |  | ${ }^{7}$ | $\hat{\dagger}$ |  | ${ }_{7}$ | $\uparrow$ | 「 |  | \$ |  |
| Traffic Volume (veh/h) | 0 | 257 | 53 | 186 | 341 | 19 | 73 | 0 | 181 | 14 | 2 | 2 |
| Future Volume (veh/h) | 0 | 257 | 53 | 186 | 341 | 19 | 73 | 0 | 181 | 14 | 2 | 2 |
| Initial $Q(Q b)$, veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach |  | No |  |  | No |  |  | No |  |  | No |  |
| Adj Sat Flow, veh/h/ln | 1900 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1900 | 1885 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 0 | 268 | 55 | 194 | 355 | 20 | 76 | 0 | 189 | 15 | 2 | 2 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, \% | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| Cap, veh/h | 150 | 337 | 69 | 677 | 1224 | 69 | 324 | 228 | 794 | 246 | 33 | 17 |
| Arrive On Green | 0.00 | 0.22 | 0.22 | 0.38 | 0.69 | 0.69 | 0.12 | 0.00 | 0.12 | 0.12 | 0.12 | 0.12 |
| Sat Flow, veh/h | 1024 | 1518 | 311 | 1795 | 1768 | 100 | 1424 | 1900 | 1598 | 930 | 277 | 142 |
| Grp Volume(v), veh/h | 0 | 0 | 323 | 194 | 0 | 375 | 76 | 0 | 189 | 19 | 0 | 0 |
| Grp Sat Flow(s),veh/h/n | 1024 | 0 | 1829 | 1795 | 0 | 1867 | 1424 | 1900 | 1598 | 1348 | 0 | 0 |
| Q Serve(g_s), s | 0.0 | 0.0 | 8.0 | 3.6 | 0.0 | 3.7 | 1.8 | 0.0 | 3.2 | 0.0 | 0.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 8.0 | 3.6 | 0.0 | 3.7 | 2.3 | 0.0 | 3.2 | 0.4 | 0.0 | 0.0 |
| Prop In Lane | 1.00 |  | 0.17 | 1.00 |  | 0.05 | 1.00 |  | 1.00 | 0.79 |  | 0.11 |
| Lane Grp Cap (c), veh/h | 150 | 0 | 406 | 677 | 0 | 1293 | 324 | 228 | 794 | 296 | 0 | 0 |
| V/C Ratio(X) | 0.00 | 0.00 | 0.80 | 0.29 | 0.00 | 0.29 | 0.23 | 0.00 | 0.24 | 0.06 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 249 | 0 | 583 | 677 | 0 | 1473 | 687 | 712 | 1201 | 629 | 0 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 17.7 | 10.5 | 0.0 | 2.8 | 19.6 | 0.0 | 6.9 | 18.8 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 4.9 | 1.1 | 0.0 | 0.1 | 0.4 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| \%ile BackOfQ(50\%),veh/ln | 0.0 | 0.0 | 3.3 | 1.3 | 0.0 | 0.4 | 0.7 | 0.0 | 0.8 | 0.2 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh |  |  |  |  |  |  |  |  |  |  |  |  |
| LnGrp Delay(d),s/veh | 0.0 | 0.0 | 22.6 | 11.5 | 0.0 | 3.0 | 19.9 | 0.0 | 7.0 | 18.9 | 0.0 | 0.0 |
| LnGrp LOS | A | A | C | B | A | A | B | A | A | B | A | A |
| Approach Vol, veh/h |  | 323 |  |  | 569 |  |  | 265 |  |  | 19 |  |
| Approach Delay, s/veh |  | 22.6 |  |  | 5.9 |  |  | 10.7 |  |  | 18.9 |  |
| Approach LOS |  | C |  |  | A |  |  | B |  |  | B |  |
| Timer - Assigned Phs | 1 | 2 |  | 4 |  | 6 |  | 8 |  |  |  |  |
| Phs Duration ( $\mathrm{G}+\mathrm{Y}+\mathrm{Rc}$ ), s | 22.6 | 15.2 |  | 10.3 |  | 37.8 |  | 10.3 |  |  |  |  |
| Change Period ( $\mathrm{Y}+\mathrm{Rc}$ ), s | 4.5 | 4.5 |  | 4.5 |  | 4.5 |  | 4.5 |  |  |  |  |
| Max Green Setting (Gmax), s | 18.1 | 15.3 |  | 18.1 |  | 37.9 |  | 18.0 |  |  |  |  |
| Max Q Clear Time (g_c+11), s | 5.6 | 10.0 |  | 2.4 |  | 5.7 |  | 5.2 |  |  |  |  |
| Green Ext Time (p_c), s | 0.4 | 0.8 |  | 0.0 |  | 2.2 |  | 0.7 |  |  |  |  |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| HCM 6th Ctrr Delay |  |  | 11.8 |  |  |  |  |  |  |  |  |  |
| HCM 6th LOS |  |  | B |  |  |  |  |  |  |  |  |  |


| Intersection |  |  |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: |


| Major/Minor | Major1 | Major2 |  | Minor2 |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Conflicting Flow All | 567 | 0 | - | 0 | 1103 | 561 |  |
| Stage 1 | - | - | - | - | 561 | - |  |
| Stage 2 | - | - | - | - | 542 | - |  |
| Critical Hdwy | 4.12 | - | - | - | 6.41 | 6.2 |  |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |  |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |  |
| Follow-up Hdwy | 2.218 | - | - | - | 3.509 | 3.3 |  |
| Pot Cap-1 Maneuver | 1005 | - | - | - | 235 | 531 |  |
| Stage 1 | - | - | - | - | 573 | - |  |
| Stage 2 | - | - | - | - | 585 | - |  |
| Platoon blocked, \% |  | - | - | - |  |  |  |
| Mov Cap-1 Maneuver | 1005 | - | - | - | 233 | 531 |  |
| Mov Cap-2 Maneuver | - | - | - | - | 233 | - |  |
| Stage 1 | - | - | - | - | 568 | - |  |
| Stage 2 | - | - | - | - | 585 | - |  |
|  |  |  |  |  |  |  |  |
| Approach | EB |  | WB |  | SB |  |  |
| HCM Control Delay, s | 0.1 |  | 0 |  | 16.3 |  |  |
| HCM LOS |  |  |  |  | C |  |  |
|  |  |  |  |  |  |  |  |
| Minor Lane/Major Mvm |  | EBL | EBT | WBT | WBR | BLn1 | BLn2 |
| Capacity (veh/h) |  | 1005 | - | - | - | 233 | 531 |
| HCM Lane V/C Ratio |  | 0.006 | - | - | - | 0.1 | 0.063 |
| HCM Control Delay (s) |  | 8.6 | 0 | - | - | 22.2 | 12.2 |
| HCM Lane LOS |  | A | A | - | - | C | B |
| HCM 95th \%tile Q(veh) |  | 0 | - | - | - | 0.3 | 0.2 |


| PM Existing | Synchro 10 Report |
| :--- | ---: |
| Alta Planning + Design | Page EC- 9 |


| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 2.1 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | $\uparrow$ |  |  | $\uparrow$ |  |  | \$ |  |  | \$ |  |
| Traffic Vol, veh/h | 57 | 484 | 1 | 1 | 495 | 20 | 1 | 0 | 4 | 19 | 1 | 87 |
| Future Vol, veh/h | 57 | 484 | 1 | 1 | 495 | 20 | 1 | 0 | 4 | 19 | 1 | 87 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control F | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - |  | 0 | - |
| Peak Hour Factor | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 |
| Heavy Vehicles, \% | 1 | 4 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 4 | 0 | 1 |
| Mvmt Flow | 59 | 499 | 1 | 1 | 510 | 21 | 1 | 0 | 4 | 20 | 1 | 90 |



| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 2.4 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | $\uparrow$ |  |  | \& |  |  | ¢ |  |  | \& |  |
| Traffic Vol, veh/h | 52 | 377 | 45 | 7 | 467 | 13 | 17 | 9 | 4 | 6 | 19 | 51 |
| Future Vol, veh/h | 52 | 377 | 45 | 7 | 467 | 13 | 17 | 9 | 4 | 6 | 19 | 51 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 25 | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 |
| Heavy Vehicles, \% | 1 | 5 | 1 | 2 | 2 | 3 | 0 | 3 | 3 | 7 | 3 | 1 |
| Mvmt Flow | 54 | 389 | 46 | 7 | 481 | 13 | 18 | 9 | 4 | 6 | 20 | 53 |



|  | 4 |  |  | 7 | - |  | 4 | $\dagger$ | $p$ |  | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | \% | $\uparrow$ |  | \% | $\hat{}$ |  | \% | $\uparrow$ |  | ${ }^{7}$ | $\uparrow$ |  |
| Traffic Volume (veh/h) | 147 | 225 | 15 | 32 | 220 | 71 | 47 | 117 | 17 | 163 | 91 | 69 |
| Future Volume (veh/h) | 147 | 225 | 15 | 32 | 220 | 71 | 47 | 117 | 17 | 163 | 91 | 69 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach |  | No |  |  | No |  |  | No |  |  | No |  |
| Adj Sat Flow, veh/h/n | 1885 | 1856 | 1856 | 1678 | 1856 | 1856 | 1648 | 1841 | 1841 | 1870 | 1856 | 1856 |
| Adj Flow Rate, veh/h | 152 | 232 | 15 | 33 | 227 | 73 | 48 | 121 | 18 | 168 | 94 | 71 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, \% | 1 | 3 | 3 | 15 | 3 | 3 | 17 | 4 | 4 | 2 | 3 | 3 |
| Cap, veh/h | 342 | 573 | 37 | 360 | 447 | 144 | 618 | 795 | 118 | 711 | 498 | 376 |
| Arrive On Green | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 |
| Sat Flow, veh/h | 1088 | 1724 | 111 | 1016 | 1345 | 433 | 1076 | 1566 | 233 | 1250 | 981 | 741 |
| Grp Volume(v), veh/h | 152 | 0 | 247 | 33 | 0 | 300 | 48 | 0 | 139 | 168 | 0 | 165 |
| Grp Sat Flow(s),veh/h/ln | 1088 | 0 | 1835 | 1016 | 0 | 1778 | 1076 | 0 | 1799 | 1250 | 0 | 1722 |
| Q Serve(g_s), s | 7.3 | 0.0 | 5.8 | 1.5 | 0.0 | 7.6 | 1.4 | 0.0 | 2.3 | 4.7 | 0.0 | 2.9 |
| Cycle Q Clear(g_c), s | 14.9 | 0.0 | 5.8 | 7.3 | 0.0 | 7.6 | 4.4 | 0.0 | 2.3 | 7.0 | 0.0 | 2.9 |
| Prop In Lane | 1.00 |  | 0.06 | 1.00 |  | 0.24 | 1.00 |  | 0.13 | 1.00 |  | 0.43 |
| Lane Grp Cap(c), veh/h | 342 | 0 | 610 | 360 | 0 | 591 | 618 | 0 | 913 | 711 | 0 | 874 |
| V/C Ratio(X) | 0.44 | 0.00 | 0.40 | 0.09 | 0.00 | 0.51 | 0.08 | 0.00 | 0.15 | 0.24 | 0.00 | 0.19 |
| Avail Cap(c_a), veh/h | 610 | 0 | 1062 | 611 | 0 | 1029 | 618 | 0 | 913 | 711 | 0 | 874 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 21.1 | 0.0 | 14.5 | 17.3 | 0.0 | 15.1 | 8.7 | 0.0 | 7.4 | 9.2 | 0.0 | 7.5 |
| Incr Delay (d2), s/veh | 0.9 | 0.0 | 0.4 | 0.1 | 0.0 | 0.7 | 0.2 | 0.0 | 0.4 | 0.8 | 0.0 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| \%ile BackOfQ( $50 \%$ ),veh/ln | 1.7 | 0.0 | 2.1 | 0.3 | 0.0 | 2.7 | 0.3 | 0.0 | 0.8 | 1.2 | 0.0 | 1.0 |
| Unsig. Movement Delay, s/veh |  |  |  |  |  |  |  |  |  |  |  |  |
| LnGrp Delay(d),s/veh | 22.0 | 0.0 | 14.9 | 17.4 | 0.0 | 15.7 | 9.0 | 0.0 | 7.7 | 10.0 | 0.0 | 8.0 |
| LnGrp LOS | C | A | B | B | A | B | A | A | A | B | A | A |
| Approach Vol, veh/h |  | 399 |  |  | 333 |  |  | 187 |  |  | 333 |  |
| Approach Delay, s/veh |  | 17.6 |  |  | 15.9 |  |  | 8.1 |  |  | 9.0 |  |
| Approach LOS |  | B |  |  | B |  |  | A |  |  | A |  |
| Timer - Assigned Phs |  | 2 |  | 4 |  | 6 |  | 8 |  |  |  |  |
| Phs Duration ( $\mathrm{G}+\mathrm{Y}+\mathrm{Rc}$ ), $s$ |  | 33.0 |  | 23.2 |  | 33.0 |  | 23.2 |  |  |  |  |
| Change Period ( $Y+R \mathrm{Rc}$ ), $s$ |  | 4.5 |  | 4.5 |  | 4.5 |  | 4.5 |  |  |  |  |
| Max Green Setting (Gmax), s |  | 28.5 |  | 32.5 |  | 28.5 |  | 32.5 |  |  |  |  |
| Max Q Clear Time (g_c+11), s |  | 6.4 |  | 16.9 |  | 9.0 |  | 9.6 |  |  |  |  |
| Green Ext Time (p_c), s |  | 0.9 |  | 1.7 |  | 1.5 |  | 1.8 |  |  |  |  |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| HCM 6th Ctrl Delay |  |  | 13.4 |  |  |  |  |  |  |  |  |  |
| HCM 6th LOS |  |  | B |  |  |  |  |  |  |  |  |  |




| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 4 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | \& |  |  | $\uparrow$ |  |  | \& |  |  | 4 | 7 |
| Traffic Vol, veh/h | 74 | 171 | 12 | 2 | 189 | 15 | 1 | 11 | 0 | 23 | 14 | 120 |
| Future Vol, veh/h | 74 | 171 | 12 | 2 | 189 | 15 | 1 | 11 | 0 | 23 | 14 | 120 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | 0 |
| Veh in Median Storage, \# | \# - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 |
| Heavy Vehicles, \% | 8 | 5 | 4 | 0 | 4 | 12 | 2 | 5 | 0 | 13 | 1 | 9 |
| Mvmt Flow | 76 | 174 | 12 | 2 | 193 | 15 | 1 | 11 | 0 | 23 | 14 | 122 |



|  | $\rangle$ | $\rightarrow$ |  | $\dagger$ |  | 4 | 4 | 4 | $p$ |  | $\downarrow$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | \% | $\uparrow$ |  | ${ }^{7}$ | $\hat{1}$ |  | \% | $\uparrow$ | F |  | \$ |  |
| Traffic Volume (veh/h) | 0 | 297 | 35 | 64 | 282 | 8 | 15 | 0 | 58 | 1 | - | 1 |
| Future Volume (veh/h) | 0 | 297 | 35 | 64 | 282 | 8 | 15 | 0 | 58 | 1 | 0 | 1 |
| Initial $Q(Q b)$, veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach |  | No |  |  | No |  |  | No |  |  | No |  |
| Adj Sat Flow, veh/h/ln | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1900 | 1885 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 0 | 344 | 41 | 74 | 327 | 9 | 17 | 0 | 67 | , | 0 | 1 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, \% | 1 | 1 | 1 | 1 | , | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| Cap, veh/h | 144 | 457 | 54 | 115 | 786 | 22 | 700 | 740 | 725 | 365 | 35 | 292 |
| Arrive On Green | 0.00 | 0.28 | 0.28 | 0.06 | 0.43 | 0.43 | 0.39 | 0.00 | 0.39 | 0.39 | 0.00 | 0.39 |
| Sat Flow, veh/h | 1053 | 1653 | 197 | 1795 | 1826 | 50 | 1427 | 1900 | 1598 | 660 | 89 | 750 |
| Grp Volume(v), veh/h | 0 | 0 | 385 | 74 | 0 | 336 | 17 | 0 | 67 | 2 | 0 | 0 |
| Grp Sat Flow(s), veh/h/n | 1053 | 0 | 1850 | 1795 | 0 | 1876 | 1427 | 1900 | 1598 | 1500 | 0 | 0 |
| Q Serve(g_s), s | 0.0 | 0.0 | 9.5 | 2.0 | 0.0 | 6.2 | 0.3 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 9.5 | 2.0 | 0.0 | 6.2 | 0.4 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 |
| Prop In Lane | 1.00 |  | 0.11 | 1.00 |  | 0.03 | 1.00 |  | 1.00 | 0.50 |  | 0.50 |
| Lane Grp Cap (c), veh/h | 144 | 0 | 512 | 115 | 0 | 808 | 700 | 740 | 725 | 692 | 0 | 0 |
| V/C Ratio(X) | 0.00 | 0.00 | 0.75 | 0.64 | 0.00 | 0.42 | 0.02 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 746 | 0 | 1571 | 520 | 0 | 2305 | 700 | 740 | 725 | 692 | 0 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(1) | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 16.5 | 22.9 | 0.0 | 9.9 | 9.4 | 0.0 | 7.8 | 9.3 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 2.3 | 5.8 | 0.0 | 0.3 | 0.1 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| \%ile BackOfQ(50\%),veh/ln | 0.0 | 0.0 | 3.6 | 0.9 | 0.0 | 1.9 | 0.1 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh |  |  |  |  |  |  |  |  |  |  |  |  |
| LnGrp Delay(d),s/veh | 0.0 | 0.0 | 18.8 | 28.7 | 0.0 | 10.2 | 9.5 | 0.0 | 8.0 | 9.3 | 0.0 | 0.0 |
| LnGrp LOS | A | A | B | C | A | B | A | A | A | A | A | A |
| Approach Vol, veh/h |  | 385 |  |  | 410 |  |  | 84 |  |  | 2 |  |
| Approach Delay, s/veh |  | 18.8 |  |  | 13.6 |  |  | 8.3 |  |  | 9.3 |  |
| Approach LOS |  | B |  |  | B |  |  | A |  |  | A |  |
| Timer - Assigned Phs | 1 | 2 |  | 4 |  | 6 |  | 8 |  |  |  |  |
| Phs Duration ( $\mathrm{G}+\mathrm{Y}+\mathrm{Rc}$ ), s | 7.7 | 18.3 |  | 24.0 |  | 26.1 |  | 24.0 |  |  |  |  |
| Change Period ( $Y+R \mathrm{c}$ ), s | 4.5 | 4.5 |  | 4.5 |  | 4.5 |  | 4.5 |  |  |  |  |
| Max Green Setting (Gmax), s | 14.5 | 42.5 |  | 19.5 |  | 61.5 |  | 19.5 |  |  |  |  |
| Max Q Clear Time (g_c+11), s | 4.0 | 11.5 |  | 2.0 |  | 8.2 |  | 3.2 |  |  |  |  |
| Green Ext Time (p_c), s | 0.1 | 2.3 |  | 0.0 |  | 2.0 |  | 0.2 |  |  |  |  |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| HCM 6th Ctrl DelayHCM 6th LOS |  |  | 15.3 |  |  |  |  |  |  |  |  |  |
|  |  |  | B |  |  |  |  |  |  |  |  |  |


| Intersection |  |  |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: |


| Major/Minor | Major1 | Major2 |  | Minor2 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Conflicting Flow All | 554 | 0 |  | 0 | 1029 | 498 |
| Stage 1 |  |  |  |  | 498 |  |
| Stage 2 | - | - | - | - | 531 |  |
| Critical Hdwy | 4.12 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 |  | - | - | - | 5.41 |  |
| Critical Hdwy Stg 2 | - |  |  | - | 5.41 |  |
| Follow-up Hdwy | 2.218 | - |  |  | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1016 | - | - | - | 260 | 574 |
| Stage 1 | - | - | - | - | 613 |  |
| Stage 2 | - | - | - | - | 592 |  |
| Platoon blocked, \% |  | - |  | - |  |  |
| Mov Cap-1 Maneuver | 1016 | - | - | - | 233 | 574 |
| Mov Cap-2 Maneuver |  | - |  |  | 233 |  |
| Stage 1 |  | - | - |  | 549 |  |
| Stage 2 | - | - | - | - | 592 |  |


| Approach | EB | WB | SB |
| :--- | ---: | ---: | ---: |
| HCM Control Delay, s | 1.7 | 0 | 17.7 |
| HCM LOS |  |  | C |


| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR SBLn1 SBLn2 |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: |
| Capacity (veh/h) | 1016 | - | - | - | 233 | 574 |
| HCM Lane V/C Ratio | 0.083 | - | - | -0.232 | 0.123 |  |
| HCM Control Delay (s) | 8.9 | 0 | - | - | 25.1 | 12.1 |
| HCM Lane LOS | A | A | - | - | D | B |
| HCM 95th \%tile Q(veh) | 0.3 | - | - | - | 0.9 | 0.4 |


| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{array}{ll} \text { Intersection } & \\ \text { Int Delay, s/veh } & 2.7 \end{array}$ |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | $\uparrow$ |  |  | $\uparrow$ |  |  | ¢ |  |  | $\dagger$ |  |
| Traffic Vol, veh/h | 53 | 299 | 2 | 3 | 393 | 36 | 2 | 1 | 0 | 17 | 0 | 100 |
| Future Vol, veh/h | 53 | 299 | 2 | 3 | 393 | 36 | 2 | 1 | 0 | 17 | 0 | 100 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control F | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Heavy Vehicles, \% | 1 | 4 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 4 | 0 | 6 |
| Mumt Flow | 62 | 351 | 2 | 4 | 461 | 42 | 2 | 1 | 0 | 20 | 0 | 117 |



| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 2.1 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{*}$ | 个 |  |  | $\uparrow$ |  |  | $\uparrow$ |  |  | \& |  |
| Traffic Vol, veh/h | 31 | 196 | 33 | 0 | 254 | 6 | 22 | 10 | 1 | 0 | 6 | 35 |
| Future Vol, veh/h | 31 | 196 | 33 | 0 | 254 | 6 | 22 | 10 | 1 | 0 | 6 | 35 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control F | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 25 | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 |
| Heavy Vehicles, \% | 1 | 5 | 2 | 0 | 4 | 0 | 3 | 3 | 0 | 7 | 3 | 3 |
| Mvmt Flow | 37 | 232 | 39 | 0 | 301 | 7 | 26 | 12 | 1 | 0 | 7 | 42 |



|  | $\dagger$ |  |  | 7 | - |  | 4 | $\dagger$ | $p$ |  | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | $\uparrow$ |  | \% | $\uparrow$ |  | \% | $\uparrow$ |  | \% | $\uparrow$ |  |
| Traffic Volume (veh/h) | 73 | 184 | 18 | 21 | 185 | 55 | 45 | 66 | 21 | 56 | 94 | 120 |
| Future Volume (veh/h) | 73 | 184 | 18 | 21 | 185 | 55 | 45 | 66 | 21 | 56 | 94 | 120 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach |  | No |  |  | No |  |  | No |  |  | No |  |
| Adj Sat Flow, veh/h/n | 1885 | 1870 | 1870 | 1678 | 1856 | 1856 | 1811 | 1841 | 1841 | 1900 | 1856 | 1856 |
| Adj Flow Rate, veh/h | 77 | 193 | 19 | 22 | 195 | 58 | 47 | 69 | 22 | 59 | 99 | 126 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, \% | 1 | 2 | 2 | 15 | 3 | 3 | 6 | 4 | 4 | 0 | 3 | 3 |
| Cap, veh/h | 253 | 411 | 40 | 271 | 337 | 100 | 731 | 814 | 260 | 896 | 452 | 575 |
| Arrive On Green | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 |
| Sat Flow, veh/h | 1136 | 1676 | 165 | 1049 | 1373 | 409 | 1119 | 1338 | 426 | 1326 | 742 | 944 |
| Grp Volume(v), veh/h | 77 | 0 | 212 | 22 | 0 | 253 | 47 | 0 | 91 | 59 | 0 | 225 |
| Grp Sat Flow(s),veh/h/ln | 1136 | 0 | 1841 | 1049 | 0 | 1782 | 1119 | 0 | 1764 | 1326 | 0 | 1686 |
| Q Serve(g_s), s | 3.9 | 0.0 | 6.1 | 1.1 | 0.0 | 7.7 | 1.2 | 0.0 | 1.3 | 1.2 | 0.0 | 3.7 |
| Cycle Q Clear(g_c), s | 11.6 | 0.0 | 6.1 | 7.2 | 0.0 | 7.7 | 4.9 | 0.0 | 1.3 | 2.5 | 0.0 | 3.7 |
| Prop In Lane | 1.00 |  | 0.09 | 1.00 |  | 0.23 | 1.00 |  | 0.24 | 1.00 |  | 0.56 |
| Lane Grp Cap(c), veh/h | 253 | 0 | 451 | 271 | 0 | 437 | 731 | 0 | 1074 | 896 | 0 | 1026 |
| V/C Ratio(X) | 0.30 | 0.00 | 0.47 | 0.08 | 0.00 | 0.58 | 0.06 | 0.00 | 0.08 | 0.07 | 0.00 | 0.22 |
| Avail Cap(c_a), veh/h | 777 | 0 | 1300 | 755 | 0 | 1259 | 731 | 0 | 1074 | 896 | 0 | 1026 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 25.6 | 0.0 | 19.8 | 22.9 | 0.0 | 20.5 | 6.5 | 0.0 | 5.0 | 5.5 | 0.0 | 5.4 |
| Incr Delay (d2), s/veh | 0.7 | 0.0 | 0.8 | 0.1 | 0.0 | 1.2 | 0.2 | 0.0 | 0.2 | 0.1 | 0.0 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| \%ile BackOfQ( $50 \%$ ),veh/ln | 1.0 | 0.0 | 2.4 | 0.3 | 0.0 | 3.0 | 0.3 | 0.0 | 0.4 | 0.3 | 0.0 | 1.1 |
| Unsig. Movement Delay, s/veh |  |  |  |  |  |  |  |  |  |  |  |  |
| LnGrp Delay(d),s/veh | 26.2 | 0.0 | 20.6 | 23.0 | 0.0 | 21.7 | 6.7 | 0.0 | 5.1 | 5.6 | 0.0 | 5.9 |
| LnGrp LOS | C | A | C | C | A | C | A | A | A | A | A | A |
| Approach Vol, veh/h |  | 289 |  |  | 275 |  |  | 138 |  |  | 284 |  |
| Approach Delay, s/veh |  | 22.1 |  |  | 21.8 |  |  | 5.7 |  |  | 5.9 |  |
| Approach LOS |  | C |  |  | C |  |  | A |  |  | A |  |
| Timer - Assigned Phs |  | 2 |  | 4 |  | 6 |  | 8 |  |  |  |  |
| Phs Duration ( $\mathrm{G}+\mathrm{Y}+\mathrm{Rc}$ ), $s$ |  | 42.0 |  | 19.6 |  | 42.0 |  | 19.6 |  |  |  |  |
| Change Period ( $Y+R \mathrm{Rc}$ ), $s$ |  | 4.5 |  | 4.5 |  | 4.5 |  | 4.5 |  |  |  |  |
| Max Green Setting (Gmax), s |  | 37.5 |  | 43.5 |  | 37.5 |  | 43.5 |  |  |  |  |
| Max Q Clear Time (g_c+11), s |  | 6.9 |  | 13.6 |  | 5.7 |  | 9.7 |  |  |  |  |
| Green Ext Time (p_c), s |  | 0.7 |  | 1.5 |  | 1.6 |  | 1.6 |  |  |  |  |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| HCM 6th Ctrl Delay |  |  | 15.0 |  |  |  |  |  |  |  |  |  |
| HCM 6th LOS |  |  | B |  |  |  |  |  |  |  |  |  |


| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 0.1 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | * |  |  | $\uparrow$ |  | ${ }^{*}$ | $\uparrow$ |  |  | \& |  |
| Traffic Vol, veh/h | 6 | 252 | 0 | 0 | 251 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Vol, veh/h | 6 | 252 | 0 | 0 | 251 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 130 | - | - | - | - | - |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Heavy Vehicles, \% | 13 | 6 | 0 | 0 | 6 | 50 | 4 | 0 | 0 | 13 | 6 | 0 |
| Mvmt Flow | 7 | 295 | 0 | 0 | 294 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |



| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 3.6 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | \$ |  |  | \$ |  |  | \& |  |  | $\uparrow$ | 「 |
| Traffic Vol, veh/h | 75 | 150 | 7 | 0 | 180 | 26 | 10 | 10 | 0 | 15 | 15 | 69 |
| Future Vol, veh/h | 75 | 150 | 7 | 0 | 180 | 26 | 10 | 10 | 0 | 15 | 15 | 69 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | 150 |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, \% | 8 | 5 | 4 | 0 | 4 | 12 | 2 | 5 | 0 | 13 | 1 | 9 |
| Mvmt Flow | 82 | 165 | 8 | 0 | 197 | 29 | 11 | 11 | 0 | 16 | 16 | 76 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Configurations | ${ }^{7}$ | $\uparrow$ |  | \% | $\hat{6}$ |  | \% | $\uparrow$ | 「 |  | ¢ |  |
| Traffic Volume (veh/h) | 0 | 257 | 53 | 186 | 341 | 19 | 73 | 0 | 181 | 14 | 2 | 2 |
| Future Volume (veh/h) | 0 | 257 | 53 | 186 | 341 | 19 | 73 | 0 | 181 | 14 | 2 | 2 |
| Initial $Q(Q b)$, veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach |  | No |  |  | No |  |  | No |  |  | No |  |
| Adj Sat Flow, veh/h/ln | 1900 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1900 | 1885 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 0 | 273 | 56 | 198 | 362 | 20 | 78 | 0 | 192 | 15 | 2 | 2 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, \% | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| Cap, veh/h | 149 | 341 | 70 | 672 | 1225 | 68 | 325 | 231 | 792 | 246 | 33 | 17 |
| Arrive On Green | 0.00 | 0.22 | 0.22 | 0.37 | 0.69 | 0.69 | 0.12 | 0.00 | 0.12 | 0.12 | 0.12 | 0.12 |
| Sat Flow, veh/h | 1017 | 1518 | 311 | 1795 | 1770 | 98 | 1424 | 1900 | 1598 | 929 | 274 | 142 |
| Grp Volume(v), veh/h | 0 | 0 | 329 | 198 | 0 | 382 | 78 | 0 | 192 | 19 | 0 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1017 | 0 | 1829 | 1795 | 0 | 1868 | 1424 | 1900 | 1598 | 1345 | 0 | 0 |
| Q Serve(g_s), s | 0.0 | 0.0 | 8.2 | 3.8 | 0.0 | 3.8 | 1.9 | 0.0 | 3.3 | 0.0 | 0.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 8.2 | 3.8 | 0.0 | 3.8 | 2.3 | 0.0 | 3.3 | 0.4 | 0.0 | 0.0 |
| Prop In Lane | 1.00 |  | 0.17 | 1.00 |  | 0.05 | 1.00 |  | 1.00 | 0.79 |  | 0.11 |
| Lane Grp Cap(c), veh/h | 149 | 0 | 411 | 672 | 0 | 1293 | 325 | 231 | 792 | 297 | 0 | 0 |
| V/C Ratio(X) | 0.00 | 0.00 | 0.80 | 0.29 | 0.00 | 0.30 | 0.24 | 0.00 | 0.24 | 0.06 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 242 | 0 | 579 | 672 | 0 | 1464 | 682 | 707 | 1193 | 624 | 0 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 17.7 | 10.6 | 0.0 | 2.9 | 19.6 | 0.0 | 7.0 | 18.8 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 5.3 | 1.1 | 0.0 | 0.1 | 0.4 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| \%ile BackOfQ(50\%),veh/ln | 0.0 | 0.0 | 3.4 | 1.3 | 0.0 | 0.4 | 0.8 | 0.0 | 0.9 | 0.2 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh |  |  |  |  |  |  |  |  |  |  |  |  |
| LnGrp Delay(d),s/veh | 0.0 | 0.0 | 23.0 | 11.8 | 0.0 | 3.0 | 20.0 | 0.0 | 7.1 | 18.9 | 0.0 | 0.0 |
| LnGrp LOS | A | A | C | B | A | A | C | A | A | B | A | A |
| Approach Vol, veh/h |  | 329 |  |  | 580 |  |  | 270 |  |  | 19 |  |
| Approach Delay, s/veh |  | 23.0 |  |  | 6.0 |  |  | 10.9 |  |  | 18.9 |  |
| Approach LOS |  | C |  |  | A |  |  | B |  |  | B |  |


| Timer - Assigned Phs | 1 | 2 | 4 | 6 | 8 |
| :--- | ---: | ---: | ---: | ---: | ---: |
| Phs Duration (G+Y+Rc), s | 22.6 | 15.4 | 10.4 | 38.0 | 10.4 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.1 | 15.3 | 18.1 | 37.9 | 18.0 |
| Max Q Clear Time (g_c+11), s | 5.8 | 10.2 | 2.4 | 5.8 | 5.3 |
| Green Ext Time (p_c), s | 0.4 | 0.8 | 0.0 | 2.3 | 0.7 |

## Intersection Summary

HCM 6th Ctrl Delay 12.0

HCM 6th LOS B

| Intersection |  |  |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: |


| Major/Minor | Major1 |  | Major2 |  | Minor2 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Conflicting Flow All | 580 | 0 | - | 0 | 1126 | 573 |  |
| Stage 1 | - | - | - |  | 573 | - |  |
| Stage 2 | - | - | - | - | 553 | - |  |
| Critical Hdwy | 4.12 | - | - | - | 6.41 | 6.2 |  |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |  |
| Critical Hdwy Stg 2 | - | - | - |  | 5.41 | - |  |
| Follow-up Hdwy | 2.218 | - | - |  | 3.509 | 3.3 |  |
| Pot Cap-1 Maneuver | 994 | - | - | - | 228 | 523 |  |
| Stage 1 | - | - | - |  | 566 | - |  |
| Stage 2 | - | - | - |  | 578 | - |  |
| Platoon blocked, \% |  | - | - | - |  |  |  |
| Mov Cap-1 Maneuver | 994 | - | - | - | 226 | 523 |  |
| Mov Cap-2 Maneuver | - | - | - | - | 226 | - |  |
| Stage 1 | - | - | - |  | 561 | - |  |
| Stage 2 | - | - | - | - | 578 | - |  |
|  |  |  |  |  |  |  |  |
| Approach | EB |  | WB |  | SB |  |  |
| HCM Control Delay, s | 0.1 |  | 0 |  | 16.7 |  |  |
| HCM LOS |  |  |  |  | C |  |  |
|  |  |  |  |  |  |  |  |
| Minor Lane/Major Mvmt |  | EBL | EBT | WBT | WBR | BLn1 | BLn2 |
| Capacity (veh/h) |  | 994 | - | - | - | 226 | 523 |
| HCM Lane V/C Ratio |  | 0.006 | - | - | - | 0.105 | 0.065 |
| HCM Control Delay (s) |  | 8.6 | 0 | - | - | 22.8 | 12.4 |
| HCM Lane LOS |  | A | A | - | - | C | B |
| HCM 95th \%tile Q(veh) |  | 0 | - | - | - | 0.3 | 0.2 |


| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 2.2 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | $\uparrow$ |  |  | $\uparrow$ |  |  | * |  |  | * |  |
| Traffic Vol, veh/h | 57 | 484 | 1 | 1 | 495 | 20 | 1 | 0 | 4 | 19 | 1 | 87 |
| Future Vol, veh/h | 57 | 484 | 1 | 1 | 495 | 20 | 1 | 0 | 4 | 19 | 1 | 87 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control F | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 |
| Heavy Vehicles, \% | 1 | 4 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 4 | 0 | 1 |
| Mvmt Flow | 60 | 509 | 1 | 1 | 521 | 21 | 1 | 0 | 4 | 20 | 1 | 91 |





|  | 4 | $\rightarrow$ |  | 7 |  |  | 4 | 4 | $p$ |  | $\downarrow$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | \% | $\hat{\dagger}$ |  | ${ }^{7}$ | $\uparrow$ |  | ${ }^{7}$ | $\uparrow$ |  | ${ }^{7}$ | $\uparrow$ |  |
| Traffic Volume (veh/h) | 147 | 225 | 15 | 32 | 220 | 71 | 47 | 117 | 17 | 163 | 91 | 69 |
| Future Volume (veh/h) | 147 | 225 | 15 | 32 | 220 | 71 | 47 | 117 | 17 | 163 | 91 | 69 |
| Initial $Q(Q b)$, veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach |  | No |  |  | No |  |  | No |  |  | No |  |
| Adj Sat Flow, veh/h/ln | 1885 | 1856 | 1856 | 1678 | 1856 | 1856 | 1648 | 1841 | 1841 | 1870 | 1856 | 1856 |
| Adj Flow Rate, veh/h | 155 | 237 | 16 | 34 | 231 | 75 | 49 | 123 | 18 | 171 | 96 | 73 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, \% | 1 | 3 | 3 | 15 | , | 3 | 17 | 4 | , | 2 | 3 | 3 |
| Cap, veh/h | 344 | 581 | 39 | 361 | 453 | 147 | 609 | 790 | 116 | 702 | 492 | 374 |
| Arrive On Green | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| Sat Flow, veh/h | 1082 | 1719 | 116 | 1011 | 1342 | 436 | 1072 | 1570 | 230 | 1248 | 978 | 744 |
| Grp Volume(v), veh/h | 155 | 0 | 253 | 34 | 0 | 306 | 49 | 0 | 141 | 171 | 0 | 169 |
| Grp Sat Flow(s),veh/h/n | 1082 | 0 | 1835 | 1011 | 0 | 1777 | 1072 | 0 | 1799 | 1248 | 0 | 1722 |
| Q Serve(g_s), s | 7.6 | 0.0 | 6.0 | 1.5 | 0.0 | 7.8 | 1.5 | 0.0 | 2.4 | 4.8 | 0.0 | 3.1 |
| Cycle Q Clear(g_c), s | 15.4 | 0.0 | 6.0 | 7.5 | 0.0 | 7.8 | 4.6 | 0.0 | 2.4 | 7.2 | 0.0 | 3.1 |
| Prop In Lane | 1.00 |  | 0.06 | 1.00 |  | 0.25 | 1.00 |  | 0.13 | 1.00 |  | 0.43 |
| Lane Grp Cap(c), veh/h | 344 | 0 | 620 | 361 | 0 | 600 | 609 | 0 | 906 | 702 | 0 | 866 |
| V/C Ratio(X) | 0.45 | 0.00 | 0.41 | 0.09 | 0.00 | 0.51 | 0.08 | 0.00 | 0.16 | 0.24 | 0.00 | 0.20 |
| Avail Cap(c_a), veh/h | 599 | 0 | 1053 | 600 | 0 | 1020 | 609 | 0 | 906 | 702 | 0 | 866 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 21.1 | 0.0 | 14.4 | 17.3 | 0.0 | 15.0 | 9.0 | 0.0 | 7.6 | 9.5 | 0.0 | 7.7 |
| Incr Delay (d2), s/veh | 0.9 | 0.0 | 0.4 | 0.1 | 0.0 | 0.7 | 0.3 | 0.0 | 0.4 | 0.8 | 0.0 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| \%ile BackOfQ(50\%),veh/ln | 1.8 | 0.0 | 2.1 | 0.3 | 0.0 | 2.7 | 0.3 | 0.0 | 0.8 | 1.3 | 0.0 | 1.0 |
| Unsig. Movement Delay, s/veh |  |  |  |  |  |  |  |  |  |  |  |  |
| LnGrp Delay (d),s/veh | 22.1 | 0.0 | 14.8 | 17.4 | 0.0 | 15.7 | 9.3 | 0.0 | 7.9 | 10.4 | 0.0 | 8.3 |
| LnGrp LOS | C | A | B | B | A | B | A | A | A | B | A | A |
| Approach Vol, veh/h |  | 408 |  |  | 340 |  |  | 190 |  |  | 340 |  |
| Approach Delay, s/veh |  | 17.6 |  |  | 15.8 |  |  | 8.3 |  |  | 9.3 |  |
| Approach LOS |  | B |  |  | B |  |  | A |  |  | A |  |
| Timer - Assigned Phs |  | 2 |  | 4 |  | 6 |  | 8 |  |  |  |  |
| Phs Duration ( $G+Y+R \mathrm{c}$ ), $s$ |  | 33.0 |  | 23.6 |  | 33.0 |  | 23.6 |  |  |  |  |
| Change Period ( $Y+\mathrm{Rc}$ ), s |  | 4.5 |  | 4.5 |  | 4.5 |  | 4.5 |  |  |  |  |
| Max Green Setting (Gmax), s |  | 28.5 |  | 32.5 |  | 28.5 |  | 32.5 |  |  |  |  |
| Max Q Clear Time (g_c+11), s |  | 6.6 |  | 17.4 |  | 9.2 |  | 9.8 |  |  |  |  |
| Green Ext Time (p_c), s |  | 0.9 |  | 1.8 |  | 1.5 |  | 1.9 |  |  |  |  |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| HCM 6th Ctrr Delay |  |  | 13.5 |  |  |  |  |  |  |  |  |  |
| HCM 6th LOS |  |  | B |  |  |  |  |  |  |  |  |  |


| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 0.6 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | \& |  |  | \& |  | ${ }^{7}$ | $\hat{\sigma}$ |  |  | \& |  |
| Traffic Vol, veh/h | 2 | 220 | 11 | 5 | 300 | 3 | 8 | 0 | 4 | 1 | 0 | 13 |
| Future Vol, veh/h | 2 | 220 | 11 | 5 | 300 | 3 | 8 | 0 | 4 | 1 | 0 | 13 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 130 | - | - | - | - | - |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, \% | 5 | 13 | 0 | 0 | 6 | 56 | 4 | 0 | 0 | 4 | 0 | 40 |
| Mvmt Flow | 2 | 244 | 12 | 6 | 333 | 3 | 9 | 0 | 4 | 1 | 0 | 14 |



| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 4 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | $\ddagger$ |  |  | \& |  |  | * |  |  | $\uparrow$ | 「 |
| Traffic Vol, veh/h | 74 | 171 | 12 | 2 | 189 | 15 | 1 | 11 | 0 | 23 | 14 | 120 |
| Future Vol, veh/h | 74 | 171 | 12 | 2 | 189 | 15 | 1 | 11 | 0 | 23 | 14 | 120 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | 0 |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 |
| Heavy Vehicles, \% | 8 | 5 | 4 | 0 | 4 | 12 | 2 | 5 | 0 | 13 | 1 | 9 |
| Mvmt Flow | 77 | 178 | 12 | 2 | 197 | 16 | 1 | 11 | 0 | 24 | 15 | 125 |



|  | $\rangle$ | $\rightarrow$ |  | 7 |  | 4 | 4 | 4 | $p$ |  | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | \% | $\uparrow$ |  | \% | $\uparrow$ |  | ${ }^{7}$ | 4 | F |  | \$ |  |
| Traffic Volume (veh/h) | 0 | 297 | 35 | 64 | 282 | 8 | 15 | 0 | 58 | 1 | 0 | 1 |
| Future Volume (veh/h) | 0 | 297 | 35 | 64 | 282 | 8 | 15 | 0 | 58 | 1 | 0 | 1 |
| Initial $\mathrm{Q}(\mathrm{Qb})$, veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach |  | No |  |  | No |  |  | No |  |  | No |  |
| Adj Sat Flow, veh/h/ln | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1900 | 1885 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 0 | 344 | 41 | 74 | 327 | 9 | 17 | 0 | 67 | 1 | 0 | 1 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, \% | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| Cap, veh/h | 144 | 457 | 54 | 115 | 786 | 22 | 700 | 740 | 725 | 365 | 35 | 292 |
| Arrive On Green | 0.00 | 0.28 | 0.28 | 0.06 | 0.43 | 0.43 | 0.39 | 0.00 | 0.39 | 0.39 | 0.00 | 0.39 |
| Sat Flow, veh/h | 1053 | 1653 | 197 | 1795 | 1826 | 50 | 1427 | 1900 | 1598 | 660 | 89 | 750 |
| Grp Volume(v), veh/h | 0 | 0 | 385 | 74 | 0 | 336 | 17 | 0 | 67 | 2 | 0 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1053 | 0 | 1850 | 1795 | 0 | 1876 | 1427 | 1900 | 1598 | 1500 | 0 | 0 |
| Q Serve(g_s), s | 0.0 | 0.0 | 9.5 | 2.0 | 0.0 | 6.2 | 0.3 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 9.5 | 2.0 | 0.0 | 6.2 | 0.4 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 |
| Prop In Lane | 1.00 |  | 0.11 | 1.00 |  | 0.03 | 1.00 |  | 1.00 | 0.50 |  | 0.50 |
| Lane Grp Cap(c), veh/h | 144 | 0 | 512 | 115 | 0 | 808 | 700 | 740 | 725 | 692 | 0 | 0 |
| V/C Ratio(X) | 0.00 | 0.00 | 0.75 | 0.64 | 0.00 | 0.42 | 0.02 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 746 | 0 | 1571 | 520 | 0 | 2305 | 700 | 740 | 725 | 692 | 0 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 16.5 | 22.9 | 0.0 | 9.9 | 9.4 | 0.0 | 7.8 | 9.3 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 2.3 | 5.8 | 0.0 | 0.3 | 0.1 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| \%ile BackOfQ(50\%),veh/ln | 0.0 | 0.0 | 3.6 | 0.9 | 0.0 | 1.9 | 0.1 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh  |  |  |  |  |  |  |  |  |  |  |  |  |
| LnGrp Delay(d),s/veh | 0.0 | 0.0 | 18.8 | 28.7 | 0.0 | 10.2 | 9.5 | 0.0 | 8.0 | 9.3 | 0.0 | 0.0 |
| LnGrp LOS | A | A | B | C | A | B | A | A | A | A | A | A |
| Approach Vol, veh/h |  | 385 |  |  | 410 |  |  | 84 |  |  | 2 |  |
| Approach Delay, s/veh |  | 18.8 |  |  | 13.6 |  |  | 8.3 |  |  | 9.3 |  |
| Approach LOS |  | B |  |  | B |  |  | A |  |  | A |  |
| Timer - Assigned Phs | 1 | 2 |  | 4 |  | 6 |  | 8 |  |  |  |  |
| Phs Duration ( $\mathrm{G}+\mathrm{Y}+\mathrm{Rc}$ ), s | 7.7 | 18.3 |  | 24.0 |  | 26.1 |  | 24.0 |  |  |  |  |
| Change Period ( $Y+R \mathrm{Rc}$ ), s | 4.5 | 4.5 |  | 4.5 |  | 4.5 |  | 4.5 |  |  |  |  |
| Max Green Setting (Gmax), s | 14.5 | 42.5 |  | 19.5 |  | 61.5 |  | 19.5 |  |  |  |  |
| Max Q Clear Time (g_c+1), s | 4.0 | 11.5 |  | 2.0 |  | 8.2 |  | 3.2 |  |  |  |  |
| Green Ext Time (p_c), s | 0.1 | 2.3 |  | 0.0 |  | 2.0 |  | 0.2 |  |  |  |  |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| HCM 6th Ctrl DelayHCM 6th LOS |  |  | 15.3 |  |  |  |  |  |  |  |  |  |
|  |  |  | B |  |  |  |  |  |  |  |  |  |



| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh 2.7 |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | 个 |  | ${ }^{7}$ | $\uparrow$ |  |  | \& |  |  | \& |  |
| Traffic Vol, veh/h | 53 | 299 | 2 | 3 | 393 | 36 | 2 | 1 | 0 | 17 | 0 | 100 |
| Future Vol, veh/h | 53 | 299 | 2 | 3 | 393 | 36 | 2 | 1 | 0 | 17 | 0 | 100 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 75 | - | - | 75 | - | - | - | - | - | - | - | - |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Heavy Vehicles, \% | 1 | 4 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 4 | 0 | 6 |
| Mvmt Flow | 62 | 351 | 2 | 4 | 461 | 42 | 2 | 1 | 0 | 20 | 0 | 117 |





|  | $\dagger$ |  |  | 7 | - |  | 4 | $\dagger$ | $p$ |  | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | $\uparrow$ |  | \% | $\uparrow$ |  | \% | $\uparrow$ |  | \% | $\uparrow$ |  |
| Traffic Volume (veh/h) | 73 | 184 | 18 | 21 | 185 | 55 | 67 | 76 | 21 | 56 | 100 | 120 |
| Future Volume (veh/h) | 73 | 184 | 18 | 21 | 185 | 55 | 67 | 76 | 21 | 56 | 100 | 120 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach |  | No |  |  | No |  |  | No |  |  | No |  |
| Adj Sat Flow, veh/h/n | 1885 | 1870 | 1870 | 1678 | 1856 | 1856 | 1811 | 1841 | 1841 | 1900 | 1856 | 1856 |
| Adj Flow Rate, veh/h | 77 | 193 | 19 | 22 | 195 | 58 | 70 | 80 | 22 | 59 | 105 | 126 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, \% | 1 | 2 | 2 | 15 | 3 | 3 | 6 | 4 | 4 | 0 | 3 | 3 |
| Cap, veh/h | 365 | 405 | 40 | 358 | 273 | 81 | 533 | 586 | 161 | 673 | 324 | 389 |
| Arrive On Green | 0.07 | 0.24 | 0.24 | 0.03 | 0.20 | 0.20 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 |
| Sat Flow, veh/h | 1795 | 1676 | 165 | 1598 | 1373 | 409 | 1113 | 1390 | 382 | 1313 | 768 | 922 |
| Grp Volume(v), veh/h | 77 | 0 | 212 | 22 | 0 | 253 | 70 | 0 | 102 | 59 | 0 | 231 |
| Grp Sat Flow(s),veh/h/ln | 1795 | 0 | 1841 | 1598 | 0 | 1782 | 1113 | 0 | 1772 | 1313 | 0 | 1690 |
| Q Serve(g_s), s | 1.4 | 0.0 | 4.3 | 0.5 | 0.0 | 5.8 | 2.0 | 0.0 | 1.5 | 1.3 | 0.0 | 4.0 |
| Cycle Q Clear(g_c), s | 1.4 | 0.0 | 4.3 | 0.5 | 0.0 | 5.8 | 6.0 | 0.0 | 1.5 | 2.8 | 0.0 | 4.0 |
| Prop In Lane | 1.00 |  | 0.09 | 1.00 |  | 0.23 | 1.00 |  | 0.22 | 1.00 |  | 0.55 |
| Lane Grp Cap(c), veh/h | 365 | 0 | 445 | 358 | 0 | 355 | 533 | 0 | 748 | 673 | 0 | 713 |
| V/C Ratio(X) | 0.21 | 0.00 | 0.48 | 0.06 | 0.00 | 0.71 | 0.13 | 0.00 | 0.14 | 0.09 | 0.00 | 0.32 |
| Avail Cap(c_a), veh/h | 451 | 0 | 764 | 498 | 0 | 735 | 533 | 0 | 748 | 673 | 0 | 713 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 12.6 | 0.0 | 14.2 | 13.3 | 0.0 | 16.3 | 10.4 | 0.0 | 7.7 | 8.6 | 0.0 | 8.4 |
| Incr Delay (d2), s/veh | 0.3 | 0.0 | 0.8 | 0.1 | 0.0 | 2.7 | 0.5 | 0.0 | 0.4 | 0.3 | 0.0 | 1.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| \%ile BackOfQ( $50 \%$ ),veh/ln | 0.5 | 0.0 | 1.5 | 0.1 | 0.0 | 2.1 | 0.5 | 0.0 | 0.5 | 0.3 | 0.0 | 1.3 |
| Unsig. Movement Delay, s/veh |  |  |  |  |  |  |  |  |  |  |  |  |
| LnGrp Delay(d),s/veh | 12.9 | 0.0 | 15.0 | 13.4 | 0.0 | 19.0 | 10.9 | 0.0 | 8.1 | 8.8 | 0.0 | 9.6 |
| LnGrp LOS | B | A | B | B | A | B | B | A | A | A | A | A |
| Approach Vol, veh/h |  | 289 |  |  | 275 |  |  | 172 |  |  | 290 |  |
| Approach Delay, s/veh |  | 14.4 |  |  | 18.5 |  |  | 9.3 |  |  | 9.5 |  |
| Approach LOS |  | B |  |  | B |  |  | A |  |  | A |  |
| Timer - Assigned Phs |  | 2 | 3 | 4 |  | 6 | 7 | 8 |  |  |  |  |
| Phs Duration ( $\mathrm{G}+\mathrm{Y}+\mathrm{Rc}$ ), $s$ |  | 22.9 | 5.7 | 15.0 |  | 22.9 | 7.5 | 13.2 |  |  |  |  |
| Change Period ( $Y+R \mathrm{Cc}$ ), $s$ |  | 4.5 | 4.5 | 4.5 |  | 4.5 | 4.5 | 4.5 |  |  |  |  |
| Max Green Setting (Gmax), s |  | 18.4 | 5.0 | 18.1 |  | 18.4 | 5.1 | 18.0 |  |  |  |  |
| Max Q Clear Time (g_c+11), s |  | 8.0 | 2.5 | 6.3 |  | 6.0 | 3.4 | 7.8 |  |  |  |  |
| Green Ext Time (p_c), s |  | 0.5 | 0.0 | 0.8 |  | 1.2 | 0.0 | 0.9 |  |  |  |  |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| HCM 6th Ctrr DelayHCM 6th LOS |  |  | 13.3 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |


| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 0.1 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | * |  |  | $\uparrow$ |  | ${ }^{*}$ | $\uparrow$ |  |  | \& |  |
| Traffic Vol, veh/h | 6 | 252 | 0 | 0 | 251 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Vol, veh/h | 6 | 252 | 0 | 0 | 251 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 130 | - | - | - | - | - |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Heavy Vehicles, \% | 13 | 6 | 0 | 0 | 6 | 50 | 4 | 0 | 0 | 13 | 6 | 0 |
| Mvmt Flow | 7 | 295 | 0 | 0 | 294 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |



| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 3.6 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | \$ |  |  | \$ |  |  | \& |  |  | $\uparrow$ | 「 |
| Traffic Vol, veh/h | 75 | 150 | 7 | 0 | 180 | 26 | 10 | 10 | 0 | 15 | 15 | 69 |
| Future Vol, veh/h | 75 | 150 | 7 | 0 | 180 | 26 | 10 | 10 | 0 | 15 | 15 | 69 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | 150 |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, \% | 8 | 5 | 4 | 0 | 4 | 12 | 2 | 5 | 0 | 13 | 1 | 9 |
| Mvmt Flow | 82 | 165 | 8 | 0 | 197 | 29 | 11 | 11 | 0 | 16 | 16 | 76 |



|  | $\rangle$ | $\rightarrow$ | \% | 7 | - | 4 | 4 | 4 | $p$ |  | $\downarrow$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | $\hat{\square}$ |  | ${ }^{7}$ | $\hat{\dagger}$ |  | ${ }_{7}$ | $\uparrow$ | 「 |  | \$ |  |
| Traffic Volume (veh/h) | 0 | 257 | 53 | 186 | 341 | 19 | 73 | 0 | 181 | 14 | 2 | 2 |
| Future Volume (veh/h) | 0 | 257 | 53 | 186 | 341 | 19 | 73 | 0 | 181 | 14 | 2 | 2 |
| Initial $Q(Q b)$, veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach |  | No |  |  | No |  |  | No |  |  | No |  |
| Adj Sat Flow, veh/h/ln | 1900 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1900 | 1885 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 0 | 273 | 56 | 198 | 362 | 20 | 78 | 0 | 192 | 15 | 2 | 2 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, \% | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| Cap, veh/h | 149 | 341 | 70 | 672 | 1225 | 68 | 325 | 231 | 792 | 246 | 33 | 17 |
| Arrive On Green | 0.00 | 0.22 | 0.22 | 0.37 | 0.69 | 0.69 | 0.12 | 0.00 | 0.12 | 0.12 | 0.12 | 0.12 |
| Sat Flow, veh/h | 1017 | 1518 | 311 | 1795 | 1770 | 98 | 1424 | 1900 | 1598 | 929 | 274 | 142 |
| Grp Volume(v), veh/h | 0 | 0 | 329 | 198 | 0 | 382 | 78 | 0 | 192 | 19 | 0 | 0 |
| Grp Sat Flow(s),veh/h/n | 1017 | 0 | 1829 | 1795 | 0 | 1868 | 1424 | 1900 | 1598 | 1345 | 0 | 0 |
| Q Serve(g_s), s | 0.0 | 0.0 | 8.2 | 3.8 | 0.0 | 3.8 | 1.9 | 0.0 | 3.3 | 0.0 | 0.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 8.2 | 3.8 | 0.0 | 3.8 | 2.3 | 0.0 | 3.3 | 0.4 | 0.0 | 0.0 |
| Prop In Lane | 1.00 |  | 0.17 | 1.00 |  | 0.05 | 1.00 |  | 1.00 | 0.79 |  | 0.11 |
| Lane Grp Cap (c), veh/h | 149 | 0 | 411 | 672 | 0 | 1293 | 325 | 231 | 792 | 297 | 0 | 0 |
| V/C Ratio(X) | 0.00 | 0.00 | 0.80 | 0.29 | 0.00 | 0.30 | 0.24 | 0.00 | 0.24 | 0.06 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 242 | 0 | 579 | 672 | 0 | 1464 | 682 | 707 | 1193 | 624 | 0 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 17.7 | 10.6 | 0.0 | 2.9 | 19.6 | 0.0 | 7.0 | 18.8 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 5.3 | 1.1 | 0.0 | 0.1 | 0.4 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| \%ile BackOfQ(50\%),veh/ln | 0.0 | 0.0 | 3.4 | 1.3 | 0.0 | 0.4 | 0.8 | 0.0 | 0.9 | 0.2 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh |  |  |  |  |  |  |  |  |  |  |  |  |
| LnGrp Delay(d),s/veh | 0.0 | 0.0 | 23.0 | 11.8 | 0.0 | 3.0 | 20.0 | 0.0 | 7.1 | 18.9 | 0.0 | 0.0 |
| LnGrp LOS | A | A | C | B | A | A | C | A | A | B | A | A |
| Approach Vol, veh/h |  | 329 |  |  | 580 |  |  | 270 |  |  | 19 |  |
| Approach Delay, s/veh |  | 23.0 |  |  | 6.0 |  |  | 10.9 |  |  | 18.9 |  |
| Approach LOS |  | C |  |  | A |  |  | B |  |  | B |  |
| Timer - Assigned Phs | , | 2 |  | 4 |  | 6 |  | 8 |  |  |  |  |
| Phs Duration ( $\mathrm{G}+\mathrm{Y}+\mathrm{Rc}$ ), s | 22.6 | 15.4 |  | 10.4 |  | 38.0 |  | 10.4 |  |  |  |  |
| Change Period ( $\mathrm{Y}+\mathrm{Rc}$ ), s | 4.5 | 4.5 |  | 4.5 |  | 4.5 |  | 4.5 |  |  |  |  |
| Max Green Setting (Gmax), s | 18.1 | 15.3 |  | 18.1 |  | 37.9 |  | 18.0 |  |  |  |  |
| Max Q Clear Time (g_c+11), s | 5.8 | 10.2 |  | 2.4 |  | 5.8 |  | 5.3 |  |  |  |  |
| Green Ext Time (p_c), s | 0.4 | 0.8 |  | 0.0 |  | 2.3 |  | 0.7 |  |  |  |  |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| HCM 6th Ctrr Delay |  |  | 12.0 |  |  |  |  |  |  |  |  |  |
| HCM 6th LOS |  |  | B |  |  |  |  |  |  |  |  |  |







|  | $\prime$ |  |  | 7 | - |  | 4 | 4 | $p$ |  | $\dagger$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | \% | $\uparrow$ |  | \% | $\hat{}$ |  | ${ }^{7}$ | $\uparrow$ |  | ${ }^{7}$ | $\uparrow$ |  |
| Traffic Volume (veh/h) | 147 | 225 | 15 | 39 | 220 | 71 | 64 | 126 | 17 | 169 | 110 | 69 |
| Future Volume (veh/h) | 147 | 225 | 15 | 39 | 220 | 71 | 64 | 126 | 17 | 169 | 110 | 69 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 | 1.00 |  | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach |  | No |  |  | No |  |  | No |  |  | No |  |
| Adj Sat Flow, veh/h/n | 1885 | 1856 | 1856 | 1678 | 1856 | 1856 | 1648 | 1841 | 1841 | 1870 | 1856 | 1856 |
| Adj Flow Rate, veh/h | 155 | 237 | 16 | 41 | 231 | 75 | 67 | 132 | 18 | 178 | 116 | 73 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, \% | 1 | 3 | 3 | 15 | 3 | 3 | 17 | 4 | 4 | 2 | 3 | 3 |
| Cap, veh/h | 394 | 474 | 32 | 388 | 304 | 99 | 486 | 616 | 84 | 568 | 414 | 260 |
| Arrive On Green | 0.09 | 0.28 | 0.28 | 0.04 | 0.23 | 0.23 | 0.39 | 0.39 | 0.39 | 0.39 | 0.39 | 0.39 |
| Sat Flow, veh/h | 1795 | 1719 | 116 | 1598 | 1342 | 436 | 1052 | 1586 | 216 | 1237 | 1065 | 670 |
| Grp Volume(v), veh/h | 155 | 0 | 253 | 41 | 0 | 306 | 67 | 0 | 150 | 178 | 0 | 189 |
| Grp Sat Flow(s),veh/h/ln | 1795 | 0 | 1835 | 1598 | 0 | 1777 | 1052 | 0 | 1802 | 1237 | 0 | 1735 |
| Q Serve(g_s), s | 3.0 | 0.0 | 5.4 | 0.9 | 0.0 | 7.5 | 2.2 | 0.0 | 2.6 | 5.2 | 0.0 | 3.5 |
| Cycle Q Clear(g_c), s | 3.0 | 0.0 | 5.4 | 0.9 | 0.0 | 7.5 | 5.6 | 0.0 | 2.6 | 7.8 | 0.0 | 3.5 |
| Prop In Lane | 1.00 |  | 0.06 | 1.00 |  | 0.25 | 1.00 |  | 0.12 | 1.00 |  | 0.39 |
| Lane Grp Cap(c), veh/h | 394 | 0 | 506 | 388 | 0 | 403 | 486 | 0 | 700 | 568 | 0 | 674 |
| V/C Ratio(X) | 0.39 | 0.00 | 0.50 | 0.11 | 0.00 | 0.76 | 0.14 | 0.00 | 0.21 | 0.31 | 0.00 | 0.28 |
| Avail Cap(c_a), veh/h | 440 | 0 | 733 | 489 | 0 | 691 | 486 | 0 | 700 | 568 | 0 | 674 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 12.4 | 0.0 | 14.1 | 12.7 | 0.0 | 16.7 | 11.6 | 0.0 | 9.4 | 12.0 | 0.0 | 9.7 |
| Incr Delay (d2), s/veh | 0.6 | 0.0 | 0.8 | 0.1 | 0.0 | 3.0 | 0.6 | 0.0 | 0.7 | 1.4 | 0.0 | 1.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| \%ile BackOfQ( $50 \%$ ),veh/ln | 1.0 | 0.0 | 1.9 | 0.3 | 0.0 | 2.8 | 0.5 | 0.0 | 1.0 | 1.4 | 0.0 | 1.3 |
| Unsig. Movement Delay, s/veh |  |  |  |  |  |  |  |  |  |  |  |  |
| LnGrp Delay(d),s/veh | 13.1 | 0.0 | 14.9 | 12.9 | 0.0 | 19.7 | 12.2 | 0.0 | 10.1 | 13.5 | 0.0 | 10.8 |
| LnGrp LOS | B | A | B | B | A | B | B | A | B | B | A | B |
| Approach Vol, veh/h |  | 408 |  |  | 347 |  |  | 217 |  |  | 367 |  |
| Approach Delay, s/veh |  | 14.2 |  |  | 18.9 |  |  | 10.8 |  |  | 12.1 |  |
| Approach LOS |  | B |  |  | B |  |  | B |  |  | B |  |
| Timer - Assigned Phs |  | 2 | 3 | 4 |  | 6 | 7 | 8 |  |  |  |  |
| Phs Duration ( $\mathrm{G}+\mathrm{Y}+\mathrm{Rc}$ ), $s$ |  | 22.5 | 6.5 | 17.3 |  | 22.5 | 8.8 | 15.0 |  |  |  |  |
| Change Period ( $Y+R \mathrm{Cc}$ ), $s$ |  | 4.5 | 4.5 | 4.5 |  | 4.5 | 4.5 | 4.5 |  |  |  |  |
| Max Green Setting (Gmax), s |  | 18.0 | 5.0 | 18.5 |  | 18.0 | 5.5 | 18.0 |  |  |  |  |
| Max Q Clear Time (g_c+11), s |  | 7.6 | 2.9 | 7.4 |  | 9.8 | 5.0 | 9.5 |  |  |  |  |
| Green Ext Time (p_c), s |  | 0.8 | 0.0 | 1.0 |  | 1.1 | 0.0 | 1.1 |  |  |  |  |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| HCM 6th Ctrr DelayHCM 6th LOS |  |  | 14.3 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |


| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 0.6 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | \& |  |  | \& |  | ${ }^{7}$ | $\hat{\sigma}$ |  |  | \& |  |
| Traffic Vol, veh/h | 2 | 220 | 11 | 5 | 300 | 3 | 8 | 0 | 4 | 1 | 0 | 13 |
| Future Vol, veh/h | 2 | 220 | 11 | 5 | 300 | 3 | 8 | 0 | 4 | 1 | 0 | 13 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 130 | - | - | - | - | - |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, \% | 5 | 13 | 0 | 0 | 6 | 56 | 4 | 0 | 0 | 4 | 0 | 40 |
| Mvmt Flow | 2 | 244 | 12 | 6 | 333 | 3 | 9 | 0 | 4 | 1 | 0 | 14 |



| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 4 |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | $\uparrow$ |  |  | $\uparrow$ |  |  | $\uparrow$ |  |  | $\uparrow$ | 「 |
| Traffic Vol, veh/h | 74 | 171 | 12 | 2 | 189 | 15 | 1 | 11 | 0 | 23 | 14 | 120 |
| Future Vol, veh/h | 74 | 171 | 12 | 2 | 189 | 15 | 1 | 11 | 0 | 23 | 14 | 120 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control F | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | 0 |
| Veh in Median Storage, \# | \# | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, \% | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 |
| Heavy Vehicles, \% | 8 | 5 | 4 | 0 | 4 | 12 | 2 | 5 | 0 | 13 | 1 | 9 |
| Mvmt Flow | 77 | 178 | 12 | 2 | 197 | 16 | 1 | 11 | 0 | 24 | 15 | 125 |



## Warrants Summary Report

1: Maple Ridge at Mustang Road

Intersection Information

|  | Major Street | Minor Street |
| :--- | :--- | :--- |
| Street Name | Maple Ridge Road | Mustang Drive |
| Direction | EB/WB | SB |
| Number of Lanes | 1 | 1 |
| Approch Speed | 40 | 25 |


| Warrant | Met? | Notes |
| :--- | :---: | :--- |
| Warrant 1, Eight-Hour Vehicular Volume |  |  |
|  | No |  |
| Condition A or B Met? | No | 3 Hours met (8 required) |
| Condition A and B Met? | No | 2 Hours met (8 required) |

Warrant 2, Four-Hour Vehicular Volume

Warrant 3, Peak Hour

|  | Yes |  |
| :--- | :---: | :--- |
|  |  |  |
| Condition A Met? | No | 0 Hours met (1 required) |
| Condition B Met? | Yes | 1 Hours met (1 required) |

Warrant 4, Pedestrian Volume

|  | No |  |
| :--- | :--- | :--- |
| Condition A Met? | No | 0 Hours met (4 required) |
| Condition B Met? | No | 0 Hours met (1 required) |

Warrant 5, School Crossing

## No

Warrant 6, Coordinated Signal System
No

Warrant 7, Crash Experience


Warrant 8, Roadway Network
Yes

Warrant 9, Intersection Near a Grade Crossing
No

AWSC Warrant, Multiway Stop Application

|  | Yes |
| :--- | :--- |
| Condition A Met? | Yes |
| Condition B Met? | No |
| Condition C Met? | No |

Warrant 1: Eight-hour Vehicular Volume
1: Maple Ridge at Mustang Road

## Intersection Information

| Major Street Name: | Maple Ridge Road |
| :--- | :--- |
| Major Street Direction: | EB/WB |
| Minor Street Direction: | SB |

WARRANT 1 MET? No

## Details:

| Condition A Met? |  | 3 Hours met (8 required) <br> 2 Hours met (8 required) |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Condition B Met? |  |  |  |  |  |  |  |  |
| Hour | Major Street Vehicles (Total of Both Approaches) |  | High Volume Minor Approach Vehicles |  | 70\% Standard Met? <br> Cond. A OR Cond. B |  | 56\% Standard Met? <br> Cond. A AND Cond. B |  |
|  |  |  |  |  | Condition A <br> 70\% Column | Condition B <br> 70\% <br> Column | Condition A <br> 56\% <br> Column | Condition B 56\% Column |
| 06:00 to 07:00 | 437 |  | 10 |  | No | No | No | No |
| Condition A | $\begin{aligned} & \text { Volume >= } 70 \% \\ & \text { column (350)? } \end{aligned}$ | Yes | Volume >= 70\% column (525)? | No |  |  |  |  |
|  | Volume >= 56\% column (280)? | Yes | Volume >= 56\% column (420)? | No |  |  |  |  |
| Condition B | Volume >=70\% column (525)? | No | $\begin{aligned} & \text { Volume >= } 70 \% \\ & \text { column (53)? } \end{aligned}$ | No |  |  |  |  |
|  | Volume >= 56\% column (420)? | Yes | $\begin{aligned} & \text { Volume >=56\% } \\ & \text { column (42)? } \end{aligned}$ | No |  |  |  |  |


| 06:15 to 07:15 <br> Condition A | 519 |  | 15 |  | No | No | No | No |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Volume >= 70\% column (350)? | Yes | Volume >= 70\% column (525)? | No |  |  |  |  |
| Condition B | Volume >= 56\% column (280)? | Yes | Volume >= 56\% column (420)? | No |  |  |  |  |
|  | Volume >= 70\% column (525)? | No | Volume >= $\mathbf{7 0 \%}$ column (53)? | No |  |  |  |  |
|  | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (420)? } \end{aligned}$ | Yes | Volume >=56\% column (42)? | No |  |  |  |  |


| 06:30 to 07:30 <br> Condition A | 605 |  | 27 |  | No | No | No | No |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Volume >= 70\% column (350)? | Yes | Volume >= 70\% column (525)? | No |  |  |  |  |
| Condition B | Volume >= 56\% column (280)? | Yes | Volume >= 56\% column (420)? | No |  |  |  |  |
|  | Volume >= $\mathbf{7 0 \%}$ column (525)? | Yes | Volume >= $\mathbf{7 0 \%}$ column (53)? | No |  |  |  |  |
|  | Volume >=56\% column (420)? | Yes | Volume >=56\% column (42)? | No |  |  |  |  |


| 06:45 to 07:45 | 730 |  | 64 |  | No | Yes* | No | Yes |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Condition A | Volume >= $70 \%$ column (350)? | Yes | Volume >= $70 \%$ column (525)? | No |  |  |  |  |
|  | Volume >= $56 \%$ column (280)? | Yes | Volume >= 56\% column (420)? | No |  |  |  |  |
| Condition B | Volume >= 70\% column (525)? | Yes | Volume >= $\mathbf{7 0 \%}$ column (53)? | Yes |  |  |  |  |
|  | Volume >= $56 \%$ column (420)? | Yes | Volume >= $56 \%$ column (42)? | Yes |  |  |  |  |


| 07:00 to 08:00 | 800 |  | 93 |  | No | Yes | Yes* | Yes* |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Condition A | Volume >= 70\% column (350)? | Yes | Volume >= $70 \%$ column (525)? | No |  |  |  |  |
|  | Volume >= 56\% column (280)? | Yes | Volume >= 56\% column (420)? | Yes |  |  |  |  |
| Condition B | Volume >= 70\% column (525)? | Yes | Volume >= $\mathbf{7 0 \%}$ column (53)? | Yes |  |  |  |  |
|  | Volume >=56\% column (420)? | Yes | $\begin{aligned} & \text { Volume }>=56 \% \\ & \text { column (42)? } \end{aligned}$ | Yes |  |  |  |  |


| 07:15 to 08:15 <br> Condition A | 795 |  | 99 |  | No | Yes | Yes | Yes |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{aligned} & \text { Volume >= } 70 \% \\ & \text { column (350)? } \end{aligned}$ | Yes | Volume >= $70 \%$ column (525)? | No |  |  |  |  |
| Condition B | Volume >= $56 \%$ column (280)? | Yes | Volume $>=56 \%$ column (420)? | Yes |  |  |  |  |
|  | Volume $>=\mathbf{7 0 \%}$ column (525)? | Yes | Volume >= 70\% column (53)? | Yes |  |  |  |  |
|  | Volume >=56\% column (420)? | Yes | $\begin{aligned} & \text { Volume >=56\% } \\ & \text { column (42)? } \end{aligned}$ | Yes |  |  |  |  |


| 07:30 to 08:30 <br> Condition A | 755 |  | 88 |  | No | Yes | Yes | Yes |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{aligned} & \text { Volume >= } 70 \% \\ & \text { column (350)? } \end{aligned}$ | Yes | $\begin{aligned} & \text { Volume >= } 70 \% \\ & \text { column (525)? } \end{aligned}$ | No |  |  |  |  |
|  | Volume >= $56 \%$ column (280)? | Yes | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column ( } 420 \text { )? } \end{aligned}$ | Yes |  |  |  |  |
| Condition B | Volume >= $\mathbf{7 0 \%}$ column (525)? | Yes | Volume >= $\mathbf{7 0 \%}$ column (53)? | Yes |  |  |  |  |
|  | Volume >= $56 \%$ column (420)? | Yes | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (42)? } \end{aligned}$ | Yes |  |  |  |  |


| 07:45 to 08:45 <br> Condition A | 665 |  | 51 |  | No | No | No | Yes |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Volume >= $70 \%$ column (350)? | Yes | Volume >= 70\% column (525)? | No |  |  |  |  |
| Condition B | Volume >=56\% column (280)? | Yes | Volume >= 56\% column (420)? | No |  |  |  |  |
|  | Volume >= $\mathbf{7 0 \%}$ column (525)? | Yes | Volume $>=70 \%$ column (53)? | No |  |  |  |  |
|  | Volume >= $56 \%$ column (420)? | Yes | $\begin{aligned} & \text { Volume >=56\% } \\ & \text { column (42)? } \end{aligned}$ | Yes |  |  |  |  |


| 08:00 to 09:00 <br> Condition A | 576 |  | 18 |  | No | No | No | No |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{aligned} & \text { Volume >= } 70 \% \\ & \text { column (350)? } \end{aligned}$ | Yes | Volume >= $70 \%$ column (525)? | No |  |  |  |  |
| Condition B | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (280)? } \end{aligned}$ | Yes | Volume >= 56\% column (420)? | No |  |  |  |  |
|  | Volume >= $70 \%$ column (525)? | Yes | Volume >= 70\% column (53)? | No |  |  |  |  |
|  | Volume >= 56\% column (420)? | Yes | Volume >= $56 \%$ column (42)? | No |  |  |  |  |


| 08:15 to 09:15 <br> Condition A | 425 |  | 8 |  | No | No | No | No |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Volume >= $70 \%$ column (350)? | Yes | Volume >= 70\% column (525)? | No |  |  |  |  |
| Condition B | Volume >=56\% column (280)? | Yes | Volume >= 56\% column (420)? | No |  |  |  |  |
|  | Volume >= $\mathbf{7 0 \%}$ column (525)? | No | Volume $>=70 \%$ column (53)? | No |  |  |  |  |
|  | Volume $>=56 \%$ column (420)? | Yes | $\begin{aligned} & \text { Volume >=56\% } \\ & \text { column (42)? } \end{aligned}$ | No |  |  |  |  |




| 09:00 to 10:00 | 0 |  | 1 |  | No | No | No | No |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Condition A | $\begin{aligned} & \text { Volume >= } 70 \% \\ & \text { column (350)? } \end{aligned}$ | No | Volume >= $70 \%$ column (525)? | No |  |  |  |  |
|  | Volume >= $56 \%$ column (280)? | No | Volume >= 56\% column (420)? | No |  |  |  |  |
| Condition B | Volume >= 70\% column (525)? | No | Volume >= $70 \%$ column (53)? | No |  |  |  |  |
|  | Volume >= 56\% column (420)? | No | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (42)? } \end{aligned}$ | No |  |  |  |  |


| $\text { 14:00 to } 15: 00$ <br> Condition A | 890 |  | 69 |  | No | Yes* | No | Yes |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Volume >= $70 \%$ column (350)? | Yes | Volume >= 70\% column (525)? | No |  |  |  |  |
| Condition B | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (280)? } \end{aligned}$ | Yes | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (420)? } \end{aligned}$ | No |  |  |  |  |
|  | Volume >= $\mathbf{7 0 \%}$ column (525)? | Yes | Volume >= $70 \%$ column (53)? | Yes |  |  |  |  |
|  | Volume >= $56 \%$ column (420)? | Yes | Volume >= $56 \%$ column (42)? | Yes |  |  |  |  |


| 14:15 to 15:15 | 898 |  | 90 |  | No | Yes | Yes* | Yes* |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Condition A | $\begin{aligned} & \text { Volume >= } 70 \% \\ & \text { column (350)? } \end{aligned}$ | Yes | $\begin{aligned} & \text { Volume >= } 70 \% \\ & \text { column (525)? } \end{aligned}$ | No |  |  |  |  |
|  | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (280)? } \end{aligned}$ | Yes | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column ( } 420 \text { )? } \end{aligned}$ | Yes |  |  |  |  |
| Condition B | Volume $>=70 \%$ column (525)? | Yes | Volume >= 70\% column (53)? | Yes |  |  |  |  |
|  | Volume >= $56 \%$ | Yes | Volume >=56\% column (42)? | Yes |  |  |  |  |


| 14:30 to 15:30 <br> Condition A | 926 |  | 102 |  | No | Yes | Yes | Yes |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Volume >= $70 \%$ column (350)? | Yes | Volume >= 70\% column (525)? | No |  |  |  |  |
| Condition B | Volume >=56\% column (280)? | Yes | Volume >= 56\% column (420)? | Yes |  |  |  |  |
|  | Volume >= $\mathbf{7 0 \%}$ column (525)? | Yes | Volume $>=70 \%$ column (53)? | Yes |  |  |  |  |
|  | Volume $>=56 \%$ column (420)? | Yes | $\begin{aligned} & \text { Volume >=56\% } \\ & \text { column (42)? } \end{aligned}$ | Yes |  |  |  |  |


| 14:45 to 15:45 | 922 |  | 105 |  | Yes* | Yes | Yes | Yes |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Condition A | Volume >= $70 \%$ column (350)? | Yes | Volume >= $70 \%$ column (525)? | Yes |  |  |  |  |
|  | Volume >= $56 \%$ column (280)? | Yes | Volume >= $56 \%$ column (420)? | Yes |  |  |  |  |
| Condition B | Volume >= 70\% column (525)? | Yes | Volume >= $\mathbf{7 0 \%}$ column (53)? | Yes |  |  |  |  |
|  | Volume >= 56\% column (420)? | Yes | Volume >= 56\% column (42)? | Yes |  |  |  |  |


| 15:00 to 16:00 <br> Condition A | 923 |  | 75 |  | No | Yes* | No | Yes |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{aligned} & \text { Volume >= } 70 \% \\ & \text { column (350)? } \end{aligned}$ | Yes | Volume >= $70 \%$ column (525)? | No |  |  |  |  |
| Condition B | Volume >= $56 \%$ column (280)? | Yes | Volume >= 56\% column (420)? | No |  |  |  |  |
|  | Volume $>=\mathbf{7 0 \%}$ column (525)? | Yes | Volume $>=70 \%$ column (53)? | Yes |  |  |  |  |
|  | Volume >=56\% column (420)? | Yes | Volume >= $56 \%$ column (42)? | Yes |  |  |  |  |


| 15:15 to 16:15 | 973 |  | 66 |  | No | Yes | No | Yes |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Condition A | Volume $>=70 \%$ column (350)? | Yes | Volume >= 70\% column (525)? | No |  |  |  |  |
|  | Volume >= $56 \%$ column (280)? | Yes | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column ( } 420 \text { )? } \end{aligned}$ | No |  |  |  |  |
| Condition B | Volume >= 70\% column (525)? | Yes | Volume >= $70 \%$ column (53)? | Yes |  |  |  |  |
|  | Volume >= 56\% column (420)? | Yes | Volume $>=56 \%$ column (42)? | Yes |  |  |  |  |


| $\text { 15:30 to } 16: 30$ <br> Condition A | 969 |  | 62 |  | No | Yes | No | Yes |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Volume >= $70 \%$ column (350)? | Yes | $\begin{aligned} & \text { Volume }>=70 \% \\ & \text { column (525)? } \end{aligned}$ | No |  |  |  |  |
| Condition B | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (280)? } \end{aligned}$ | Yes | $\begin{aligned} & \text { Volume }>=56 \% \\ & \text { column (420)? } \end{aligned}$ | No |  |  |  |  |
|  | Volume >= $\mathbf{7 0 \%}$ column (525)? | Yes | Volume >= 70\% column (53)? | Yes |  |  |  |  |
|  | Volume >= 56\% column (420)? | Yes | Volume >= $56 \%$ column (42)? | Yes |  |  |  |  |


| 15:45 to 16:45 <br> Condition A | 993 |  | 51 |  | No | No | No | Yes |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{aligned} & \text { Volume >= } 70 \% \\ & \text { column (350)? } \end{aligned}$ | Yes | $\begin{aligned} & \text { Volume >= } 70 \% \\ & \text { column (525)? } \end{aligned}$ | No |  |  |  |  |
| Condition B | Volume >= $56 \%$ column (280)? | Yes | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (420)? } \end{aligned}$ | No |  |  |  |  |
|  | Volume >= $\mathbf{7 0 \%}$ column (525)? | Yes | Volume >= 70\% column (53)? | No |  |  |  |  |
|  | Volume >= 56\% column (420)? | Yes | Volume >= $56 \%$ column (42)? | Yes |  |  |  |  |


| 16:00 to 17:00 <br> Condition A | 972 |  | 34 |  | No | No | No | No |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Volume >= $70 \%$ column (350)? | Yes | Volume >= $70 \%$ column (525)? | No |  |  |  |  |
| Condition B | Volume >= 56\% column (280)? | Yes | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (420)? } \end{aligned}$ | No |  |  |  |  |
|  | Volume >= $\mathbf{7 0 \%}$ column (525)? | Yes | Volume >= $\mathbf{7 0 \%}$ column (53)? | No |  |  |  |  |
|  | Volume >= $56 \%$ | Yes | Volume >= $56 \%$ column (42)? | No |  |  |  |  |


| 16:15 to 17:15 | 934 |  | 27 |  | No | No | No | No |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Condition A | Volume >= $70 \%$ column (350)? | Yes | Volume >= 70\% column (525)? | No |  |  |  |  |
|  | Volume >= $56 \%$ column (280)? | Yes | Volume >= 56\% column (420)? | No |  |  |  |  |
| Condition B | Volume >= 70\% column (525)? | Yes | Volume >= $\mathbf{7 0 \%}$ column (53)? | No |  |  |  |  |
|  | Volume >= 56\% column (420)? | Yes | Volume >= $56 \%$ column (42)? | No |  |  |  |  |



| 16:45 to 17:45 <br> Condition A | 863 |  | 22 |  | No | No | No | No |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Volume $>=70 \%$ column (350)? | Yes | Volume >= 70\% column (525)? | No |  |  |  |  |
|  | Volume >= 56\% column (280)? | Yes | Volume >= 56\% column (420)? | No |  |  |  |  |
| Condition B | Volume >= 70\% column (525)? | Yes | Volume >= 70\% column (53)? | No |  |  |  |  |
|  | Volume >= $56 \%$ column (420)? | Yes | Volume >= $56 \%$ column (42)? | No |  |  |  |  |


| 17:00 to 18:00 <br> Condition A | 829 |  | 27 |  | No | No | No | No |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Volume >= $70 \%$ column (350)? | Yes | Volume >= 70\% column (525)? | No |  |  |  |  |
| Condition B | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (280)? } \end{aligned}$ | Yes | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (420)? } \end{aligned}$ | No |  |  |  |  |
|  | Volume >= $\mathbf{7 0 \%}$ column (525)? | Yes | Volume >= $70 \%$ column (53)? | No |  |  |  |  |
|  | Volume >= $56 \%$ column (420)? | Yes | Volume >= $56 \%$ column (42)? | No |  |  |  |  |


| 17:15 to 18:15 <br> Condition A | 593 |  | 18 |  | No | No | No | No |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{aligned} & \text { Volume >= } 70 \% \\ & \text { column (350)? } \end{aligned}$ | Yes | Volume >= $70 \%$ column (525)? | No |  |  |  |  |
| Condition B | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (280)? } \end{aligned}$ | Yes | $\begin{aligned} & \text { Volume >= } 56 \% \\ & \text { column (420)? } \end{aligned}$ | No |  |  |  |  |
|  | Volume >= $70 \%$ column (525)? | Yes | Volume >= 70\% column (53)? | No |  |  |  |  |
|  | Volume >= 56\% column (420)? | Yes | Volume >= $56 \%$ column (42)? | No |  |  |  |  |


| 17:30 to 18:30 <br> Condition A | 392 |  | 11 |  | No | No | No | No |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Volume >= $70 \%$ column (350)? | Yes | $\begin{aligned} & \text { Volume }>=70 \% \\ & \text { column (525)? } \end{aligned}$ | No |  |  |  |  |
| Condition B | Volume >=56\% column (280)? | Yes | Volume $>=56 \%$ column (420)? | No |  |  |  |  |
|  | Volume >= $\mathbf{7 0 \%}$ column (525)? | No | Volume >= 70\% column (53)? | No |  |  |  |  |
|  | Volume $>=56 \%$ column (420)? | No | $\begin{aligned} & \text { Volume >=56\% } \\ & \text { column (42)? } \end{aligned}$ | No |  |  |  |  |


| 17:45 to 18:45 | 189 |  | 8 |  | No | No | No | No |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Condition A | Volume >= $70 \%$ column (350)? | No | Volume >= $70 \%$ column (525)? | No |  |  |  |  |
|  | Volume >= $56 \%$ column (280)? | No | Volume >= 56\% column (420)? | No |  |  |  |  |
| Condition B | Volume >=70\% column (525)? | No | Volume >= $\mathbf{7 0 \%}$ column (53)? | No |  |  |  |  |
|  | Volume >=56\% column (420)? | No | Volume >= 56\% column (42)? | No |  |  |  |  |

Warrant 2: Four-hour Vehicular Volume
1: Maple Ridge at Mustang Road
Intersection Information

|  | Major Street | Minor Street |
| :--- | :--- | :--- |
| Street Name | Maple Ridge Road | Mustang Drive |
| Direction | EB/WB | SB |
| Number of Lanes | 1 | 1 |
| Approch Speed | 40 | 25 |

Details:

| Notes | 3 Hours met (4 required) |
| :--- | :---: |
| Low population | Yes |

Four-Hour Vehicular Volume
Community Population Less Than 10,000 or Major Street Approach Speed Above 40 mph


Hourly Volumes

| Hour | Major Street Total All Approaches (vph) | Minor Street <br> Highest Volume Approach (vph) |
| :---: | :---: | :---: |
| 00:00:00-01:00:00 | 0.00 | 0.00 |
| 01:00:00-02:00:00 | 0.00 | 0.00 |
| 02:00:00-03:00:00 | 0.00 | 0.00 |
| 03:00:00-04:00:00 | 0.00 | 0.00 |
| 04:00:00-05:00:00 | 0.00 | 0.00 |
| 05:00:00-06:00:00 | 0.00 | 0.00 |
| 06:00:00-07:00:00 | 437.00 | 10.00 |
| 07:00:00-08:00:00 | 800.00 | 93.00 |
| 08:00:00-09:00:00 | 576.00 | 18.00 |
| 09:00:00-10:00:00 | 0.00 | 1.00 |
| 10:00:00-11:00:00 | 0.00 | 0.00 |
| 11:00:00-12:00:00 | 0.00 | 0.00 |
| 12:00:00-13:00:00 | 0.00 | 0.00 |
| 13:00:00-14:00:00 | 0.00 | 0.00 |
| 14:00:00-15:00:00 | 890.00 | 69.00 |
| 15:00:00-16:00:00 | 923.00 | 75.00 |
| 16:00:00-17:00:00 | 972.00 | 34.00 |
| 17:00:00-18:00:00 | 829.00 | 27.00 |
| 18:00:00-19:00:00 | 0.00 | 0.00 |
| 19:00:00-20:00:00 | 0.00 | 0.00 |
| 20:00:00-21:00:00 | 0.00 | 0.00 |
| 21:00:00-22:00:00 | 0.00 | 0.00 |
| 22:00:00-23:00:00 | 0.00 | 0.00 |
| 23:00:00-00:00:00 | 0.00 | 0.00 |

Warranted Volumes

| Hour | Major Street <br> Total All <br> Approaches (vph) | Minor Street <br> Highest Volume <br> Approach (vph) |
| :---: | :---: | :---: |
| $07: 00: 00-08: 00: 00$ | 800.00 | 93.00 |
| $14: 00: 00-15: 00: 00$ | 890.00 | 69.00 |
| $15: 00: 00-16: 00: 00$ | 923.00 | 75.00 |

## Warrant 3: Peak Hour

1: Maple Ridge at Mustang Road

Intersection Information

|  | Major Street | Minor Street |
| :--- | :--- | :--- |
| Street Name | Maple Ridge Road | Mustang Drive |
| Direction | $\mathrm{EB} / \mathrm{WB}$ | SB |
| Number of Lanes | 1 | 1 |
| Approch Speed | 40 | 25 |

## Warrant 3 Met?

Details

| Low Population? | Yes |  |  |
| :--- | :---: | :--- | :--- |
| Condition A Met? | No | Condition B Met? | Yes |
| Notes | 0 Hours met (1 required) | Notes | 1 Hours met (1 required) |
| Minor Approach Time Delay Condition Met? | Not Met |  |  |
| Minor Approach Volume Condition Met? | Met |  |  |
| Total Entering Intersection Volume Condition Met? | Not Met |  |  |

## Peak Hour Vehicular Volume

Community Population Greater Than 10,000 and Major Street Approach Speed Below 40 mph


| Hour | Major Street <br> Total All <br> Approaches (vph) | Minor Street <br> Highest Volume <br> Approach (vph) |
| :---: | :---: | :---: |
| $6: 00$ | 437 | 10 |
| $7: 00$ | 800 | 93 |
| $8: 00$ | 576 | 18 |
| $14: 00$ | 890 | 69 |
| $14: 30$ | 926 | 102 |
| $16: 30$ | 969 | 62 |
| $17: 30$ | 901 | 22 |

## Warrant 4: Pedestrian Volume

1: Maple Ridge at Mustang Road
Intersection Information

|  | Major Street | Minor Street |
| :--- | :--- | :--- |
| Street Name | Maple Ridge Road | Mustang Drive |
| Direction | EB/WB | SB |
| Number of Lanes | 1 | 1 |
| Approch Speed | 40 | 25 |

## Details

| Pedestrian Four Hour Volume Warrant Met? | No |  |
| :--- | :---: | :---: |
| Pedestrian Peak Hour Warrant Met? | No | Notes |
| Speed Limit or 85 th Percentile Speed on Major Street $>35 \mathrm{mph}$, or |  |  |
| Intersection lies within an Isolated Community with Population $<10,000 ?$ | Yes |  |




## Warrant 5: School Crossing

1: Maple Ridge at Mustang Roa

## Intersection Information

Major Street Name Maple Ridge Road
Major Street Direction EB/WB

## Details:

| Time Period Interval for Students Crossing (min) | 0 |
| :--- | :---: |
| Number of Students Crossing in Time Period | 0 |
| Number of Adequate Gaps in Time Period | 0 |
| Other Remedial Measures Attempted? | No |
| Adjacent Signal on EB approach? | No |
| Distance to signal on EB Approach (ft) | - |
| Adjacent Signal on WB approach? | No |
| Distance to signal on WB Approach (ft) | - |
| Will New Signal Restrict Progressive Traffic? | No |

## Warrant 6: Coordinated Signal System

1: Maple Ridge at Mustang Road
Intersection Information
Major Street Name Maple Ridge Road

Major Street Direction EB/WB

## Details:

| Approach Direction \& Name | Acceptable <br> Platooning? | Adjacent <br> Coordinating <br> Signal? | Adjacent <br> Intersection <br> Distance |
| :--- | :--- | :--- | :--- |
| SB Approach (Mustang Drive) | Yes | No | N/A |
| WB Approach (Maple Ridge Road) | Yes | No | N/A |
| EB Approach (Maple Ridge Road) |  |  |  |

Unacceptable Platooning?
(At least one approach)

Distance to Closest Signal
(Must be N/A or > 1000)
N/A

Warrant 7: Crash Experience
1: Maple Ridge at Mustang Road
Intersection Information

| Major Street Name | Maple Ridge Road |
| :--- | :--- |
| Major Street Direction | EB/WB |
| Minor Street Direction | SB |

WARRANT 7 MET? No

Details:

| Low Population? | Yes | Traffic Volume Condition Met? | No |
| :--- | :---: | :---: | :---: |
| Major Street Speed Limit | 40 |  | Ped Volume Condition Met? |


| Hour | Traffic Volumes |  |  |  | Pedestrian Volumes |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Major <br> Street Vehicles | Minor <br> Street Vehicles | 80\% Standard Met? <br> A or B |  | Southbound Ped Volumes |  |  | > 80 ? |
|  |  |  | Condition A | Condition B | Peds | > 80? | Peds |  |
| 06:00 to 07:00 | 437 | 0 | No | No | 0 | No | 0 | No |
| 06:15 to 07:15 | 519 | 0 | No | No | 0 | No | 0 | No |
| 06:30 to 07:30 | 605 | 0 | No | No | 0 | No | 0 | No |
| 06:45 to 07:45 | 730 | 0 | No | No | 0 | No | 0 | No |
| 07:00 to 08:00 | 800 | 0 | No | No | 0 | No | 0 | No |
| 07:15 to 08:15 | 795 | 0 | No | No | 0 | No | 0 | No |
| 07:30 to 08:30 | 755 | 0 | No | No | 0 | No | 0 | No |
| 07:45 to 08:45 | 665 | 0 | No | No | 0 | No | 0 | No |


| 08:00 to 09:00 | 576 | 0 | No | No | 0 | No | 0 | No |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 08:15 to 09:15 | 425 | 0 | No | No | 0 | No | 0 | No |
| 08:30 to 09:30 | 276 | 0 | No | No | 0 | No | 0 | No |
| 08:45 to 09:45 | 127 | 0 | No | No | 0 | No | 0 | No |
| 09:00 to 10:00 | 0 | 0 | No | No | 0 | No | 0 | No |
| 14:00 to 15:00 | 890 | 0 | No | No | 0 | No | 0 | No |
| 14:15 to 15:15 | 898 | 0 | No | No | 0 | No | 0 | No |
| 14:30 to 15:30 | 926 | 0 | No | No | 0 | No | 0 | No |
| 14:45 to 15:45 | 922 | 0 | No | No | 0 | No | 0 | No |
| 15:00 to 16:00 | 923 | 0 | No | No | 0 | No | 0 | No |
| 15:15 to 16:15 | 973 | 0 | No | No | 0 | No | 0 | No |
| 15:30 to 16:30 | 969 | 0 | No | No | 0 | No | 0 | No |
| 15:45 to 16:45 | 993 | 0 | No | No | 0 | No | 0 | No |
| 16:00 to 17:00 | 972 | 0 | No | No | 0 | No | 0 | No |
| 16:15 to 17:15 | 934 | 0 | No | No | 0 | No | 0 | No |
| 16:30 to 17:30 | 901 | 0 | No | No | 0 | No | 0 | No |
| 16:45 to 17:45 | 863 | 0 | No | No | 0 | No | 0 | No |
| 17:00 to 18:00 | 829 | 0 | No | No | 0 | No | 0 | No |


| $17: 15$ to $18: 15$ | 593 | 0 | No | No | 0 | No | 0 | No |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $17: 30$ to $18: 30$ | 392 | 0 | No | No | 0 | No | 0 | No |
| $17: 45$ to $18: 45$ | 189 | 0 | No | No | 0 | No | 0 | No |

Warrant 8: Roadway Network
1: Maple Ridge at Mustang Road

## Intersection Information

| Major Street Name | Maple Ridge Road |
| :--- | :--- |
| Major Street Direction | EB/WB |
| Minor Street Direction | SB |

## WARRANT 8 MET? ( A or B)

Details:

|  |  | Growth Rates \% (per year) <br>  <br>  <br>  <br>  <br> SB |  | EB | WB |
| :--- | :--- | :--- | :---: | :---: | :---: |
| $\mathbf{L}$ | 0.00 | 0.00 |  |  |  |
| $\mathbf{T}$ | 0.00 | 0.00 |  |  |  |
| $\mathbf{R}$ | 0.00 | 0.00 |  |  |  |


| Condition A, Total Entering Volume |  | Condition B, Non-normal Business Day |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | Existing | Future |
| Existing Peak Hour | 1,044 | Highest Hour | 0 | 0 |
| Years | 0.00 | Second Highest Hour | 0 | 0 |
| Future Peak Hour | 1,044 | Third Highest Hour | 0 | 0 |
| Warrant 1 in 5 Years? | No | Fourth Highest Hour | 0 | 0 |
| Warrant 2 in 5 Years? | No | Fifth Highest Hour | 0 | 0 |
| Warrant 3 in 5 Years? | Yes | Yearly Growth Rate (\%) | 0.00 |  |
|  |  | Years | 0.00 |  |


| Condition A Met? | Yes | Condition B Met? |
| :--- | :--- | :--- |

Warrant 9: Intersection Near a Grade Crossing
1: Maple Ridge at Mustang Road

## Intersection Information

|  | Major Street | Minor Street |
| :--- | :--- | :--- |
| Street Name | Maple Ridge Road | Mustang Drive |
| Direction | EB/WB | SB |
| Number of Lanes | 1 | 1 |
| Approch Speed | 40 | 25 |

WARRANT 9 MET ? No

## Details

Note No approach with a railroad grade crossing

| Minor street approach having a grade crossing |  |  |
| :---: | :---: | :---: |
| Distance from the center of the track to the stop or yield line | Interpolated |  |
| Number of occurences of rail traffic per day |  | Adjustment Factor |
| Percentage of high-occupancy buses crossing the track (\%) |  | Adjustment Factor |
| Percentage of tractor-trailer trucks crossing the track (\%) |  | Adjustment Factor |
| The rail traffic arrival times are uknown, the highest traffic volume hour of the day is used |  |  |



| Hour | Major Street <br> Total of Both Approaches (vph) | Minor Street <br> Adjusted Volume Crossing Tracks (vph) |
| :---: | :---: | :---: |
|  |  |  |

All-Way Stop Control Warrant: Multiway Stop Applications

## 1: Maple Ridge at Mustang Road

## Intersection Information

| Major Street Name: | Maple Ridge Road |
| :--- | :--- |
| Major Street Direction: | EB/WB |
| Minor Street Direction: | SB |

AWSC WARRANT MET?
Yes

## Details:

| Condition A Met? | Yes | Qualifying Crashes | 0 |
| :--- | :--- | :--- | :--- |
| Condition B Met? | No | Major Street 85th \%-tile Speed | 0.00 |
| Condition C Met? | No | Major Street Speed Limit | 40 |
| Notes: | 0 Hours Met (8 Required) |  |  |


| Hour | Traffic Volumes |  | Bicycle Volumes |  | Ped Volumes |  | Condition C |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Major Street | Minor Street | East Bound Bicycle Volumes | South Bound Bicycle Volumes |  | South Bound Ped Volumes | Major Street <br> Veh Volume > 300 | $\begin{array}{r} \text { Minor } \\ \text { Avg }(\text { Veh }+ \text { Ped } \\ + \text { Bicycle })> \\ 200 \end{array}$ | reet <br> Delay <br> > 30 |

APPENDIX C

## COST ESTIMATES



## Maple Ridge Road Corridor Study

August 5, 2019

## Description of Major Improvements for Alternative A:

Full-depth pavement reconstruction from Tops to Gwinn St and for Medina Business Park intersection
Mill and Overlay from Gwinn St. to Oak Orchard Creek Bridge
Shoulder box-out widening for all other areas
Granite curb with 7' concrete sidewalk
Closed drainage on north side of the roadway
Traffic Signal at Mustang Drive
Raised medians between Tops Entrance and Gwinn Street

| ITEM DESCRIPTION | UNITS | PRICE | QUANTITY | TOTAL |
| :---: | :---: | :---: | :---: | :---: |
| UNCLASSIFIED EXCAVATION AND DISPOSAL | CY | \$20.00 | 22700 | \$454,000 |
| EMBANKMENT IN PLACE | CY | \$20.00 | 12000 | \$240,000 |
| FULL DEPTH PAVEMENT AND SUBBASE | SF | \$7.50 | 210000 | \$1,575,000 |
| MILL AND FILL PAVEMENT | SF | \$1.60 | 46000 | \$73,600 |
| SIDEWALKS | SF | \$10.00 | 83000 | \$830,000 |
| CONCRETE CURB | LF | \$35.00 | 1300 | \$45,500 |
| GRANITE CURB (BOX-OUT WIDENING) | LF | \$50.00 | 7000 | \$350,000 |
| GRANITE CURB (NEW ASPHALT) | LF | \$35.00 | 4800 | \$168,000 |
| CLEARING AND GRUBBING | LS | \$5,000.00 | 1 | \$5,000 |
| LANDSCAPING (INCLUDING TOPSOIL AND SEED) | LS | \$40,000.00 | 1 | \$40,000 |
| SIGNING AND STRIPING | LS | \$60,000.00 | 1 | \$60,000 |
| DRAINAGE BASINS | EA | \$5,000.00 | 35 | \$175,000 |
| DRAINAGE PIPE | LF | \$60.00 | 7200 | \$432,000 |
| TRAFFIC SIGNALS | LS | \$175,000.00 | 1 | \$175,000 |
| STORMWATER MANAGEMENT (\$50,000 /acre) | AC | \$50,000.00 | 1 | \$50,000 |
| EROSION CONTROL | LS | \$40,000.00 | 1 | \$40,000 |
| WORK ZONE TRAFFIC CONTROL | LS | 8\% | 1 | \$377,100 |
| SURVEY AND STAKEOUT | LS | 5\% | 1 | \$235,700 |
| MOBILIZATION | LS | 4\% | 1 | \$188,600 |
| CONTINGENCY | LS | 20\% | 1 | \$942,700 |
|  | CONSTRUCTION SUBTOTAL: |  |  | 6,458,000 |
|  |  | DESIGN ENG | EERING (12\%) | 775,000 |
|  | CONSTRUCTION INSPECTION (20\%) |  |  | 1,291,600 |
|  | PROJECT TOTAL: |  |  | 8,524,600 |

ANNNB + DEBSM

## Maple Ridge Road Corridor Study

## August 5, 2019

## Description of Major Improvements for Alternative B:

Full-depth pavement reconstruction from Tops to Oak Orchard Creek Bridge and for Medina Business Park intersection
10' wide Shared Use Asphalt Path
Closed drainage on north side of the roadway
Traffic Signal at Mustang Drive
Raised medians between Tops Entrance and Gwinn Street


## Maple Ridge Road Corridor Study

## August 5, 2019

## Description of Major Improvements for Alternative C:

Full-depth pavement reconstruction from Tops to Oak Orchard Creek Bridge and for Medina Business Park intersection
Mill and Overlay and 3 ' box-out widening for all other areas
Granite curb with 10' shared use asphalt path
Closed drainage on both sides of the roadway
Traffic Signal at Mustang Drive
Raised medians between Tops Entrance and Gwinn Street

| ITEM DESCRIPTION | UNITS | PRICE | QUANTITY | TOTAL |
| :---: | :---: | :---: | :---: | :---: |
| UNCLASSIFIED EXCAVATION AND DISPOSAL | CY | \$20.00 | 23600 | \$472,000 |
| EMBANKMENT IN PLACE | CY | \$20.00 | 13000 | \$260,000 |
| FULL DEPTH PAVEMENT AND SUBBASE | SF | \$7.50 | 202000 | \$1,515,000 |
| MILL AND FILL PAVEMENT | SF | \$1.60 | 294000 | \$470,400 |
| SHARED USE PATH | SF | \$4.00 | 118000 | \$472,000 |
| CONCRETE CURB | LF | \$35.00 | 1300 | \$45,500 |
| GRANITE CURB (BOX-OUT WIDENING) | LF | \$50.00 | 14000 | \$700,000 |
| GRANITE CURB (NEW ASPHALT) | LF | \$35.00 | 9600 | \$336,000 |
| CLEARING AND GRUBBING | LS | \$5,000.00 | 1 | \$5,000 |
| LANDSCAPING (INCLUDING TOPSOIL AND SEED) | LS | \$40,000.00 | 1 | \$40,000 |
| SIGNING AND STRIPING | LS | \$60,000.00 | 1 | \$60,000 |
| DRAINAGE BASINS | EA | \$5,000.00 | 118 | \$590,000 |
| DRAINAGE PIPE | LF | \$60.00 | 23800 | \$1,428,000 |
| TRAFFIC SIGNALS | LS | \$175,000.00 | 1 | \$175,000 |
| STORMWATER MANAGEMENT (\$50,000 /acre) | AC | \$50,000.00 | 1 | \$50,000 |
| EROSION CONTROL | LS | \$40,000.00 | 1 | \$40,000 |
| WORK ZONE TRAFFIC CONTROL | LS | 8\% | 1 | \$532,800 |
| SURVEY AND STAKEOUT | LS | 5\% | 1 | \$333,000 |
| MOBILIZATION | LS | 4\% | 1 | \$266,400 |
| CONTINGENCY | LS | 20\% | 1 | \$1,331,800 |
|  | CONSTRUCTION SUBTOTAL: |  |  | 9,123,000 |
|  | DESIGN ENGINEERING (12\%)CONSTRUCTION INSPECTION (20\%) |  |  | 1,094,800 |
|  |  |  |  | 1,824,600 |
|  | PROJECT TOTAL: |  |  | 12,042,400 |

## APPENDIX D

## EXISTING ZONING

## EXISTING VILLAGE OF MEDINA CODE

## CHAPTER 70: BICYCLES

## § 70-1 Purpose*

- The purpose of this chapter is to protect the public health, safety and welfare because of the hazards to the public and the users of bicycles and annoyance to the public in the places that are public or open to the public. The Board of Trustees finds that the regulations hereafter enacted are such that are reasonably necessary to accomplish these objectives.
*Editor's Note: Amended at time of adoption of Code (see Ch. 1, General Provisions, Art. I).


## § 70-2 Parking.

- No person shall park a bicycle upon a street, other than upon the roadway against the curb or upon the sidewalk on a rack to support the bicycle or against a building or at the curb, in such manner as to afford the least obstruction to pedestrian traffic.
§ 70-3 Riding on sidewalks.
- No person shall ride a bicycle on a sidewalk within the business districts on Main Street between Eagle Street and Starr Street, and on Center Street between West Avenue and State Street.
- No person 15 or more years of age, other than newspaper carrier on delivery routes, shall ride a bicycle upon any other sidewalk in the Village.
§ 70-4 Yielding to and passing pedestrians.
- Whenever any person is riding a bicycle upon any sidewalk or roadway, such person shall yield the right-of-way to all pedestrians and shall give an audible signal before overtaking and passing such pedestrian.
§ 70-5 Parental responsibility.
- No parent, guardian or any other person having legal care, custody or control of any child under the age of 16 shall allow or permit said child to use or ride any bicycle in violation of $\S \S 70-2,70-3$, and $70-4$, and such parent, guardian or person having legal care, custody or control shall be subject to the penalties described in § 70-6 of this chapter.
§ 70-6 Penalties for offenses.
- Where a first violation of this chapter is observed by a police officer, in the first instance, said police officer shall issue a written warning to the violator, and, if said violator is under 16 years of age, said warning shall be issued to his or her parents, guardians or person having legal care, custody or control of said violator. A record of said warning shall be kept at the Police Department and a second or more violations will result in a penalty as set forth in Subsections B through D.
- Upon a second violation, the bicycle shall be confiscated for a minimum period of one week, after which the bicycle will be returned to the parents, guardians or person having legal care, custody or control of a minor or to any person over the age of 16 years.
- Upon a third violation, possession of the bicycle shall be taken for a minimum of two weeks and an appearance ticket issued, which would subject the offender or the offender's parents or guardian, if said offender is under the age of 16 years of age, to a fine of $\$ 25$, and upon payment of the fine and expiration of the two-week period, the return of the bicycle would be made to the parent or guardian of the minor, or, if over the age of 16 , to the offender.
- Upon a fourth violation, or subsequent violations thereafter, issuance of an appearance ticket to the violator, a fine not to exceed $\$ 50$, or in lieu of a fine, the presiding justice of the court may impose community service for a period of time upon the violator. If a fine is imposed, the parent or guardian shall be so responsible.


[^0]:    * A hardscape center median may be implemented where left turns are not necessary or purposefully restricted.
    ** NYSDOT does not currently recommend marking shoulders as bike lanes since shoulders often serve multiple purposes, such as parking.
    *** Cost estimate does not include design and engineering fees or construction inspection costs. It also assumes that no right-of-way acquisitions would be required.

[^1]:    Bridge Over Oak Orchard Creek (Facing West)

[^2]:    Notes:

    - Delay is presented in seconds per vehicle; $L O S=$ Level of Service
    - Delay for signalized intersections is average vehicle delay.
    - Delay for one-way stop-controlled intersections is of the worst movement's delay.
    - The 0.0 delay for intersection 7 was caused by 0 traffic volume on the stop controlled legs of the intersection.

[^3]:    Strava Bicycling Heat Map

[^4]:    * Non-standard feature requiring NYSDOT approval.

[^5]:    * Non-standard feature requiring NYSDOT approval.

[^6]:    * Non-standard feature requiring NYSDOT approval.

[^7]:    *Additional information about all federal funding opportunities can be found here:
    https://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.cfm

[^8]:    ${ }^{*}$ L: Left, R: Right, T:Thru, U: U-Turn

[^9]:    * L: Left, R: Right, T: Thru, U: U-Turn

[^10]:    *L: Left, R: Right, T: Thru, U: U-Turn

