SAFE STREETS AND ROADS FOR ALL

Downtown District Safety Action Plan

PREPARED FOR THE
CITY OF MOUNT CLEMENS

SEPTEMBER 15, 2025

THE CITY OF MOUNT CLEMENS · MICHIGAN ·

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS

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Executive Summary

As part of a comprehensive Safety Action Plan for the City of Mount Clemens and its Downtown District, AEW has studied the city's roads, traffic infrastructure, and related data in order to suggest feasible plans to curb safety risks such as traffic-related deaths and injuries to pedestrians, drivers, and cyclists.

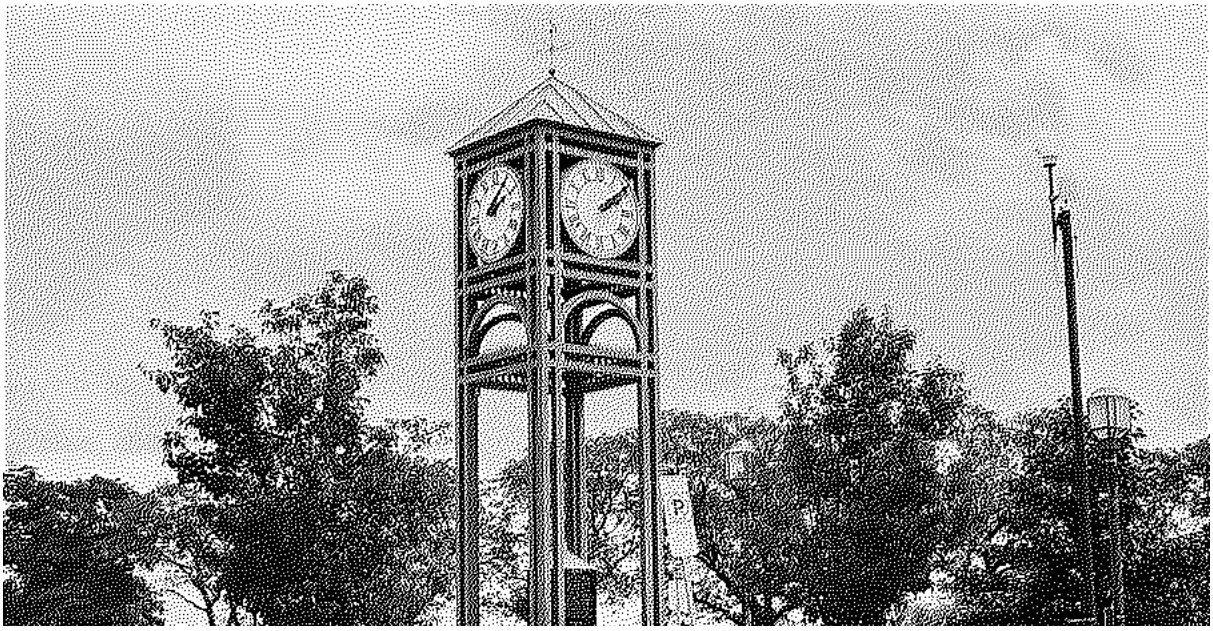
During the study process, AEW reached out to residents, businesses, and other stakeholders via a survey to better discern where they feel traffic is unsafe when walking, cycling, or driving. For instance, when it came to walking in the downtown area, 64% of respondents either felt very or somewhat safe, though top safety concerns included vehicles running red lights or stop signs; limited visibility at intersections; and conflicts among vehicles, pedestrians, and bicycles.

In addition, the study analyzed five years of crash data at intersections in the City of Mount Clemens and its Downtown District to determine the intersections with the most crashes and where fatal crashes occurred. Crashes were also analyzed by type, severity, time of occurrence, weather conditions, and more. Crash data was specifically studied along N. Main Street and S. Main Street.

The study also examined and made recommendations for lane configuration and signal timing at Cass Avenue between Main Street and Gratiot Avenue. Dedicated full-length left-turn lanes were recommended for eastbound and westbound traffic, and pretimed, coordinated signalized intersections were also recommended.

Among other study recommendations, the study urged N. Main Street to turn angled parking into parallel parking, add a raised median that serves as a pedestrian refuge island, and add a dedicated bike lane to protect cyclists and other road users. The study also urged S. Main Street to have a dedicated bike lane in addition to a road diet that turns the street's existing four lanes into a three-lane setup that includes a dedicated center left-turn lane.

Other study recommendations praise the effectiveness of traffic signal backplates and signal box span layouts to enhance signal visibility. Pedestrian protection barriers such as planter boxes were also suggested to create separation between motorists and people traveling on foot.



1.0 INTRODUCTION

The City of Mount Clemens is committed to enhancing the safety and well-being of its residents, and as part of this effort, Anderson, Eckstein & Westrick, Inc., (AEW) is working collaboratively with the city to develop a comprehensive Safety Action Plan. This plan is being prepared in response to the Safe Streets and Roads for All (SS4A) grant initiative, a federal program designed to help communities address traffic-related safety concerns and create safer environments for all road users.

Through a comprehensive evaluation of the city's transportation infrastructure, traffic patterns, and public safety data, the Safety Action Plan aims to reduce fatalities and serious injuries, promote equitable access to safe mobility, and foster a community that prioritizes safety for pedestrians, cyclists, and motorists alike. The plan will include a series of strategic recommendations, backed by data-driven insights, that focus on identifying and mitigating risks, improving infrastructure, and engaging the local community in the process. The study area is presented in **Figure 1.1** on the next page.

FIGURE 1.1 – STUDY AREA

1.1 STUDY GOAL

The goal of this study is to evaluate intersections and roadway segments throughout the City of Mount Clemens and develop recommendations to improve the overall traffic safety of the city. The recommendations will be developed based on traffic operation and crash data, ensuring that solutions are targeted and effective in addressing high-risk areas.

By leveraging this grant, Mount Clemens is taking a proactive step toward creating a safer and more sustainable transportation network that will ultimately contribute to the health, safety, and quality of life for all its residents.

1.2 OBJECTIVE OF THE STUDY

The objectives of the Safety Streets and Roads for All study are as follows:

1. **Evaluate Intersections and Roadway Segments:** Assess the safety, functionality, and operation efficiency of key intersections and roadway segments within the City of Mount Clemens.
2. **Analyze Traffic Operation and Crash Data:** Review and analyze traffic flow, operation, and crash data to identify high-risk locations and contributing factors to safety concerns.
3. **Identify High-Risk Areas:** Pinpoint intersections and roadway links that have a history of crashes, high traffic volumes, and other factors that contribute to unsafe conditions.
4. **Develop Targeted Safety Recommendations:** Propose data-driven, evidence-based recommendations for safety improvements, including infrastructure enhancements and operational changes.
5. **Promote Equitable Safety Solutions:** Ensure that recommendations provide equitable safety benefits for all users, including pedestrians, cyclists, and motorists, with a focus on vulnerable populations.
6. **Engage Stakeholders and the Community:** Involve local residents, business owners, and community stakeholders in identifying safety concerns and ensuring that the proposed solutions align with community needs and priorities.

1.3 SAFE SYSTEM APPROACH

The Federal Highway Administration emphasizes that "Zero is our goal. A Safe System is how we get there." The vision of zero deaths recognizes that even a single loss of life on our transportation network is unacceptable. This approach prioritizes safe, reliable mobility for every road user. Achieving this vision requires the adoption and implementation of a comprehensive Safe System Approach.

The Safe System Approach has been adopted by U.S. Department of Transportation and is a comprehensive strategy designed to reduce the inherent risks within the transportation network. It operates by implementing and strengthening multiple layers of safety measures aimed at both preventing crashes and minimizing the severity of injuries when crashes do occur.

The City of Mt. Clemens recognizes the vital role its transportation system plays in connecting people, business, and services throughout the community. Above all, safety must be the foundation of this system protecting drivers, passengers, pedestrians, and bicyclists, regardless of their mode of travel.

Our vision is clear, a transportation network free from fatalities and serious injuries, where everyone reaches their destination safely. To achieve this vision, the Comprehensive Transportation Safety Action Plan (CTSAP) establishes a coordinated strategy with measurable goals, setting Mt. Clemens on a path to achieve zero fatalities and serious injuries by 2035.

Vision

A transportation network free from fatalities and serious injuries, where everyone reaches their destination safely.

Goal

Eliminate all fatalities and serious injures by 2035.

1.4 MEASURING PROGRESS

To remain on track toward the City's vision of zero fatalities and serious injuries by the year 2035, consistent tracking of progress is essential. Recognizing this, the City has established a safety tracker that will monitor key performance measures and evaluate progress toward the long-term goal. This tracking process will serve as a tool to ensure accountability, transparency, and continued focus on safety improvements.

Regular evaluation of these measures will allow the City to adapt its approach to traffic safety as conditions change, including shifting travel behaviors, evolving roadway needs, and new safety challenges. By reassessing strategies and reprioritizing projects, the City can ensure that resources are directed toward the most pressing issues and the most effective countermeasures.

The safety goals and performance targets will undergo a comprehensive review every three to five years. These periodic updates will provide an opportunity to incorporate new data, adjust performance measures, and align with emerging best practices at the state and federal level. **Table 1.1** below provides the Downtown District of Mt. Clemens safety goal from now to 2035.

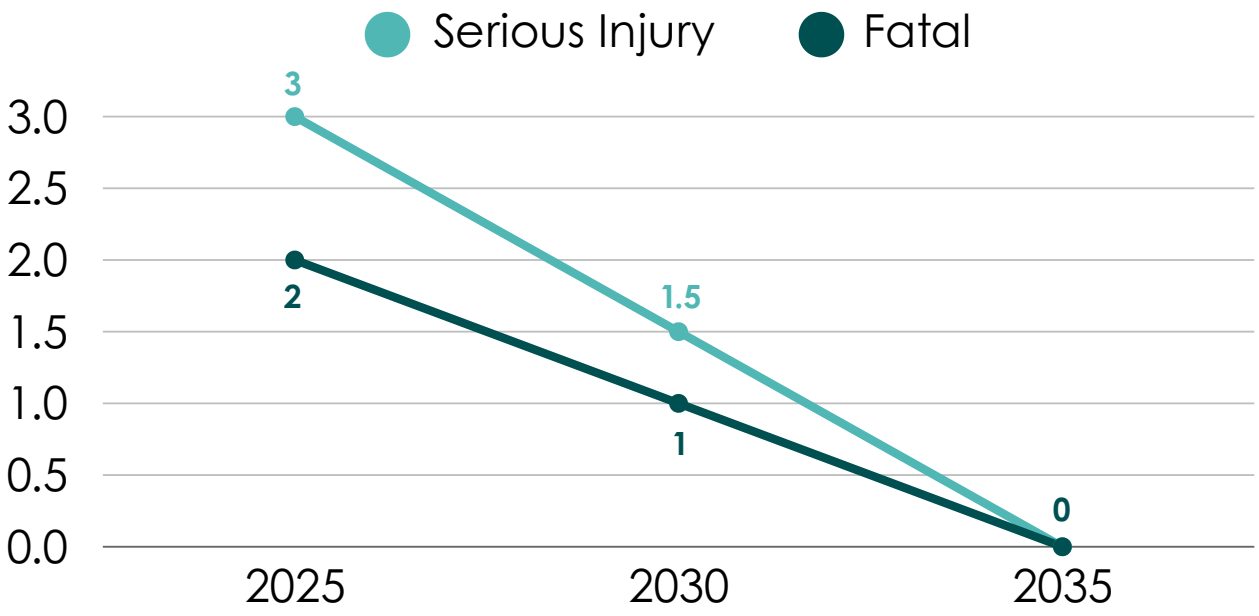


TABLE 1.1 –DOWNTOWN DISTRICT SAFTY GOALS, (2025-2035)

SAFETY SYSTEM APPROACH

SAFER PEOPLE
Encourage safe, responsible driving and behavior by people who use our roads and create conditions that prioritize their ability to reach their destination unharmed.[1]

SAFER VEHICLES
Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users.[2]

SAFER SPEEDS
Expand the availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.[3]

SAFER ROADS
Promote safer speeds in all roadway environments through a combination of thoughtful, equitable, context-appropriate roadway design, appropriate speed-limit setting, targeted education, outreach campaigns, and enforcement.[4]

POST-CRASH CARE
Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.[5]

[1-5] U.S. Department of Transportation. (2025, January 14). What is a Safe System Approach? https://www.transportation.gov/safe-system-approach

2.0 Community Engagement

A community survey was conducted to gather input on locations within the city where residents feel unsafe while driving, biking, and walking. The survey was made widely accessible, posted on the city's social media platforms and displayed as a physical exhibit at City Hall from January 16 through February 17. This approach ensured that both digitally engaged residents and those who frequent municipal offices had an opportunity to participate. The results helped highlight key locations of concern, which are illustrated in **Figure 2.1** on the following page. Comments from the community survey are provided in **Appendix A**.

To complement the survey, a public meeting was held on Wednesday, January 15, to provide community members with a direct forum to share their thoughts and concerns about safety in the downtown district.

The vast majority of respondents rely on personal vehicles for their daily transportation, with walking accounting for about 14% and bicycling representing only 2%. When asked about the purpose of their visits to the Downtown District, the most common reasons were for entertainment, followed closely by retail and personal services. Other notable reasons included commuting for work, visits to county buildings and courts, and attending religious services. Activities like cycling, attending festivals, or visiting parks and the riverfront were less frequent among respondents.

2.1 WALKING SAFETY

Through the community survey, to get a better understanding of pedestrian safety, the following questions were asked:

- In general, how safe do you feel when walking in the Downtown District?
- What safety issues are most important to you when walking in the Downtown District?

The results of these questions can be found in **Table 2.1** and **Table 2.2** on page 8.

FIGURE 2.1 – LOCATIONS OF CONCERN

TABLE 2.1 – PERCEIVED SAFETY WHEN WALKING

In general, how safe do you feel when walking in the Downtown District?

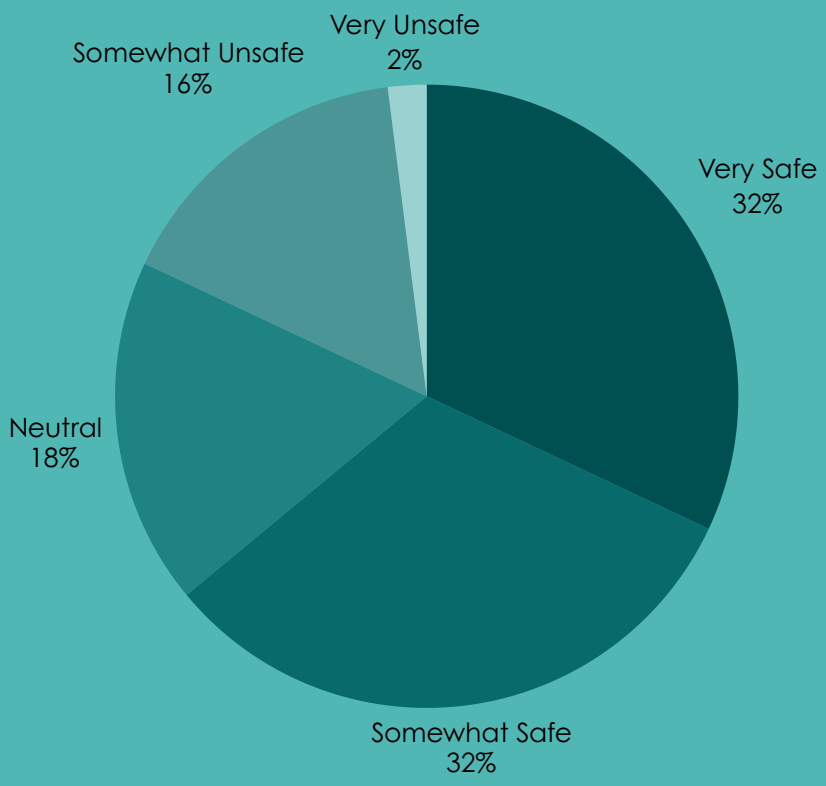
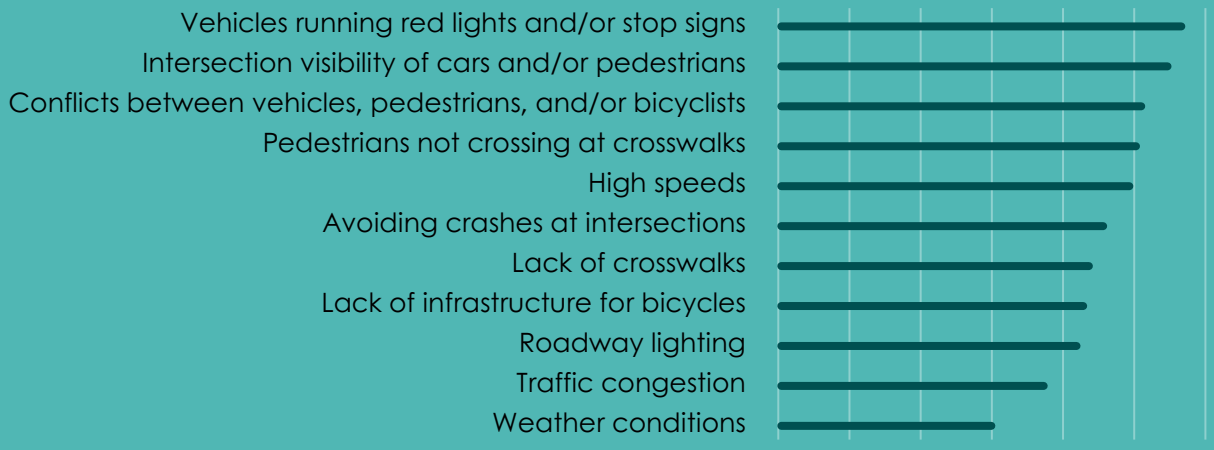


TABLE 2.2 – TOP SAFETY CONCERNS WHEN WALKING

What safety issues are most important to you when walking in the Downtown District?



Overall, the public's perception of walking in the Downtown District is feeling very safe or feeling somewhat safe. When identifying the top safety issues, the responses highlighted several key issues. The most frequently mentioned concerns were vehicles running red lights or stop signs; limited visibility at intersections, and conflicts between vehicles, pedestrians, and bicycles. Additional concerns included pedestrians crossing outside of designated crosswalks, high vehicle speeds, and a lack of crosswalks and bicycle infrastructure. Other factors such as poor roadway lighting, traffic congestion, and weather conditions were also cited as contributing to pedestrian safety concerns in the Downtown District.

2.2 BIKING SAFETY

Through the community survey, to get a better understanding of bicyclists' safety, the following questions were asked:

- In general, how safe do you feel when biking in the Downtown District?
- What safety issues are most important to you when biking in the Downtown District?

The results of these questions can be found in **Table 2.3** and **Table 2.4** on the next page.

TABLE 2.3 – PERCEIVED SAFETY WHEN BIKING

In general, how safe do you feel when biking in the Downtown District?

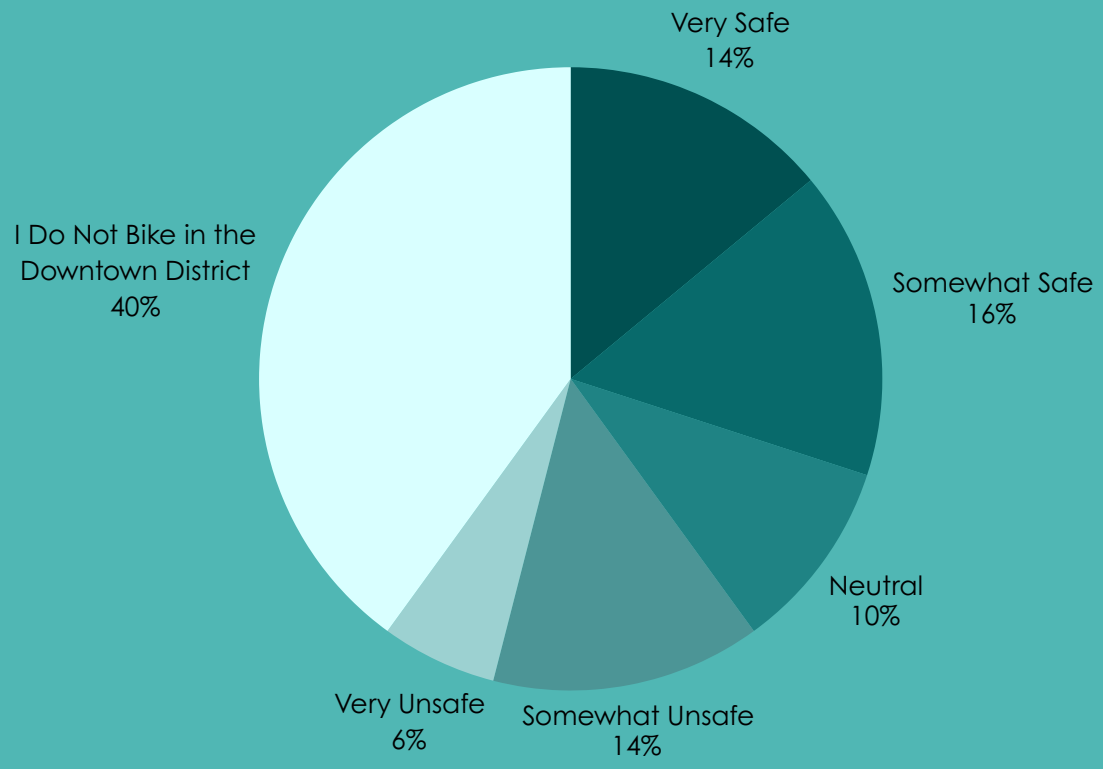
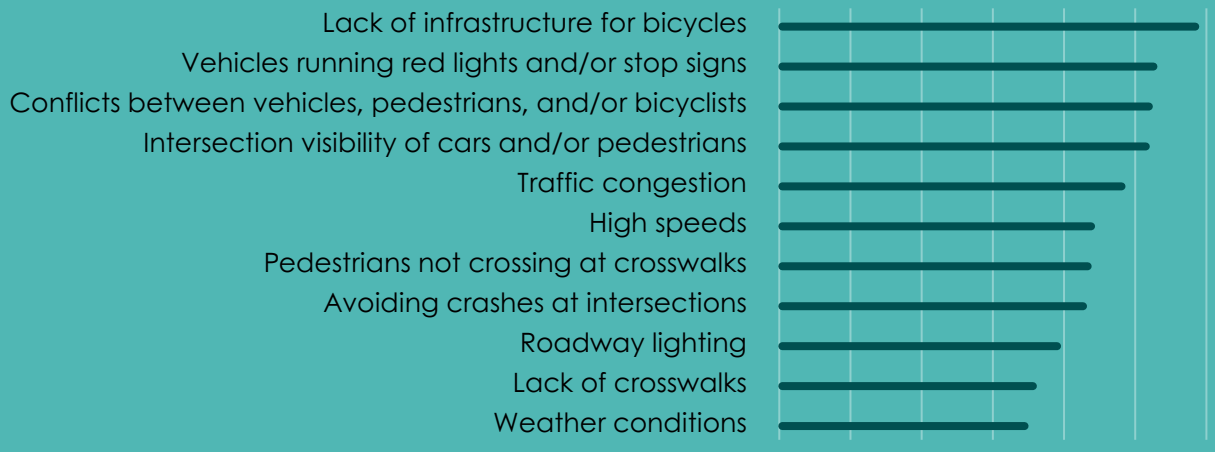


TABLE 2.4 – TOP SAFETY CONCERNS WHEN BIKING

What safety issues are most important to you when biking in the Downtown District?



Overall, 40% of people that participated in the survey do not bike in the Downtown District. Among the remaining 60%, there is a range from feeling very safe to feeling very unsafe biking in the Downtown District. When identifying the top safety issues, the responses highlighted several key issues. The most frequently mentioned concerns were a lack of infrastructure for bicycles; vehicles running red lights and stop signs; and conflicts between vehicles, pedestrians and bicyclists. Additional concerns included a lack of intersection visibility of cars and pedestrians, traffic congestion, and high speeds.

2.3 DRIVING SAFETY

Through the community survey, to get a better understanding of driving safety, the following questions were asked:

- In general, how safe do you feel when driving in the Downtown District?
- What safety issues are most important to you when driving in the Downtown District?

The results of these questions can be found in **Table 2.5** and **Table 2.6** on the next page.

TABLE 2.5 – PERCEIVED SAFETY WHEN DRIVING

In general, how safe do you feel when driving in the Downtown District?

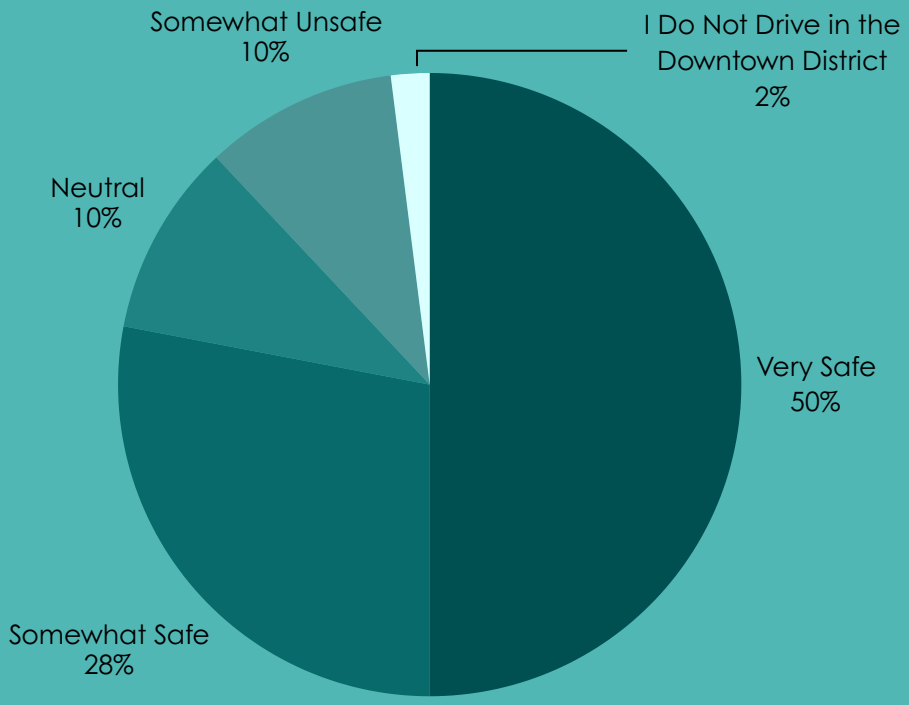
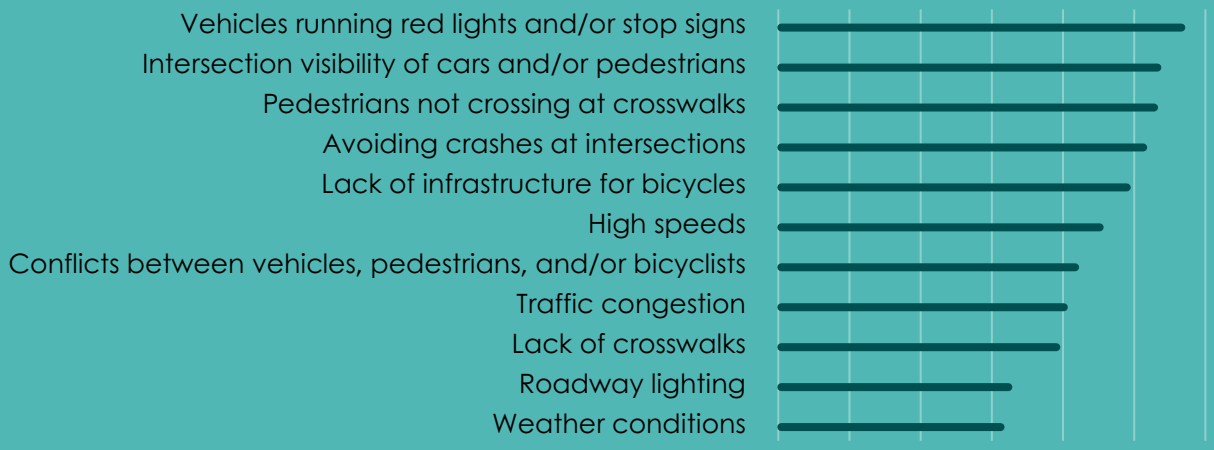


TABLE 2.6 – TOP SAFETY CONCERNS WHEN DRIVING

What safety issues are most important to you when driving in the Downtown District?



Overall, the public's perception of driving in the Downtown District is either feeling very safe or feeling somewhat safe. When identifying the top safety issues, the responses highlighted several key issues. The most frequently mentioned concerns were vehicles running red lights or stop signs; limited visibility at intersections; and conflicts between vehicles and pedestrians. Additional concerns included pedestrians crossing outside of designated crosswalks, avoiding crashes at intersections, and high vehicle speeds. Other factors such as conflicts between vehicles, pedestrians and bicyclists; traffic congestion; and a lack of crosswalks were also cited as contributing to pedestrian safety concerns in the Downtown District.

3.0 CITYWIDE SAFETY ANALYSIS

A crash analysis was conducted at all the intersections in the city of Mount Clemens. Crash data for this safety analysis was based on the data from Transportation Improvement Association (TIA).

Five years of crash data were collected and reviewed (2020-2024). Traffic crash reports and summaries were obtained from the Transportation Improvement Association's Traffic Crash Analysis Tool (TCAT) website. A summary of crashes by type is provided in **Appendix A.** The intersections with the most crashes are provided in **Table 3.1**. An overall crash map of the city of Mt. Clemens is presented in **Figure 3.1**.

Intersection	Crashes
Groesbeck Highway & Cass Avenue	72
Gratiot Avenue & Cass Avenue	57
Gratiot Avenue & Market Street	55
Groesbeck Highway & Elizabeth Road	36
Gratiot Avenue & Main Street	28
Gratiot Avenue & Harrington Street	25
Gratiot Avenue & Church Street	23
Groesbeck Highway & Church Street	21

TABLE 3.1 – INTERSECTIONS WITH FREQUENT CRASHES

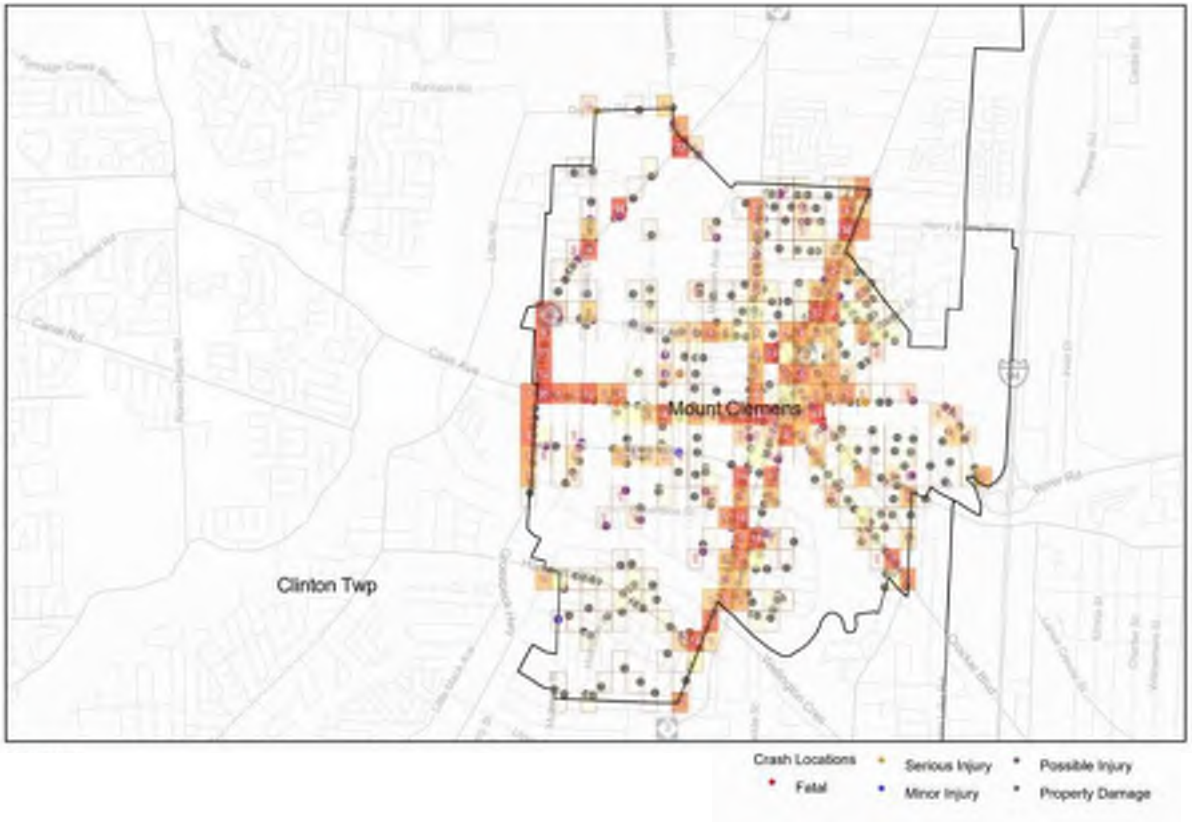


FIGURE 3.1 – CRASH MAP

3.1 FATAL CRASHES

There were eight fatalities in the city of Mount Clemens over the past five years. A summary of these crashes can be found below in **Table 3.2**. Signal crashes accounted for 75% of crashes. The year 2021 had 50% of fatal crashes reported over the five-year analysis.

Intersection	Year	Crash Type	Alcohol Involved?	Drugs Involved?	Pedestrians Involved?
Gratiot Avenue & Robertson Street	2020	Signal	Yes	No	Yes
Gratiot Avenue & Cass Avenue	2021	Signal	Yes	No	No
Cass Avenue & N Rose Street	2021	Angle	No	No	No
Gratiot Avenue & Cass Avenue	2021	Signal	Yes	No	No
Gratiot Avenue & N. Main Street	2021	Signal	Yes	No	No
Dickinson Street & 1st Street	2022	Signal	Yes	Yes	Yes
Cass Avenue & Floral Avenue	2023	Rear End	Yes	No	Yes
Elizabeth Road & Canadian National Railroad	2024	Signal	No	No	No

TABLE 3.2 – FATAL CRASHES

3.2 CRASHES BY SEVERITY

The crashes by severity were evaluated in the City of Mount Clemens; it was reported that approximately 67% resulted in property damage only. The data is presented below in **Table 3.3**.

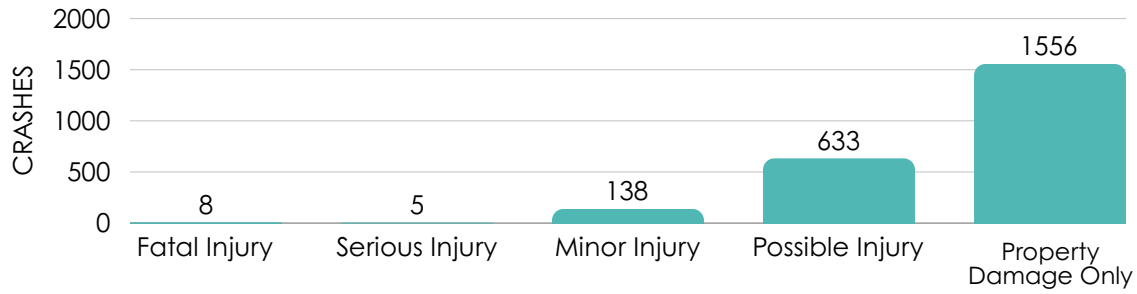


TABLE 3.3 – CRASHES BY SEVERITY

3.3 CRASH TYPE BY YEAR

Crashes by type and year were evaluated and presented in **Table 3.4**. Rear-end crashes are the most common type of crash with 564 crashes in the past five years. This is closely followed by sideswipe (same direction) with 504 crashes.

Crash Type	2020	2021	2022	2023	2024	Total
Single	50	49	45	51	39	**234**
Head-On	8	15	3	6	7	**39**
Head-On (LT)	15	11	17	8	13	**64**
Angle	92	89	103	111	88	**483**
Rear-End	103	129	143	97	92	**564**
Rear-End (LT)	7	2	6	2	9	**26**
Rear-End (RT)	3	6	4	3	1	**17**
Sideswipe (Same)	77	94	134	107	92	**504**
Sideswipe (Opposite)	4	10	20	15	9	**58**
Back	23	20	25	25	20	**113**
Others include Bike, Ped, Motorcycle	20	17	40	57	62	**196**
Unknown	6	5	10	9	12	**42**
Total	**408**	**447**	**550**	**491**	**444**	**2340**

TABLE 3.4 – CRASH TYPE BY YEAR

3.4 ENVIRONMENTAL CONDITIONS

An evaluation of 2,340 reported crashes was conducted to assess the influence of roadway surface conditions, weather, and lighting at the time of each incident. These environmental factors can significantly affect crash risk and severity; however, the data indicate that a substantial proportion of crashes occurred under generally favorable conditions:

Roadway Surface Conditions
Approximately 79% of crashes occurred on dry pavement. This suggests that slick or hazardous surface conditions — such as snow, ice, or wet pavement — were not primary contributing factors in the majority of incidents. The prevalence of crashes under dry conditions indicates that other influences, including driver behavior or traffic operations, may play a more significant role.

Weather Conditions
Clear weather was reported in approximately 71% of crashes, indicating that adverse weather conditions such as rain, snow, fog, or sleet were not predominant contributors in most cases.

Lighting Conditions
About 73% of crashes occurred during daylight hours. This finding implies that reduced visibility due to nighttime or low-light environments was not a primary factor in the majority of crashes.

Table 3.5 provides a detailed breakdown of crashes categorized by these environmental conditions. The analysis underscores that crashes frequently occur even when roadway, weather, and lighting conditions are favorable. These findings highlight the importance of focusing on behavioral, geometric, and systemic factors within the roadway network to improve overall traffic safety.

Roadway Condition	2020	2021	2022	2023	2024	Total
Dry	316	49	45	51	39	1,852
Ice	11	15	3	6	7	39
Slush	1	11	17	8	13	9
Snow	13	89	103	111	88	62
Unknown	9	129	143	97	92	44
Wet	58	2	6	2	9	334
Weather Condition	**2020**	**2021**	**2022**	**2023**	**2024**	**Total**
Blowing Snow	1	0	2	0	2	5
Clear	292	325	412	319	323	1,671
Cloudy	51	69	71	79	62	332
Fog	2	0	4	0	2	8
Rain	26	39	26	65	32	188
Sleet/Hail	0	0	0	0	1	1
Smoke	0	0	1	0	0	1
Snow	28	9	23	15	12	87
Unkown	8	5	11	13	10	47
Lighting Condition	**2020**	**2021**	**2022**	**2023**	**2024**	**Total**
Dark - Lighted	78	72	66	65	47	328
Dark - Unlighted	22	36	37	38	49	182
Dawn	8	4	8	12	9	41
Daylight	285	327	422	357	319	1,710
Dusk	7	7	11	10	11	46
Unknown	8	1	6	9	9	33

TABLE 3.5 – CRASHES BY ENVIRONMENTAL CONDITIONS

3.5 PEDESTRIANS AND BICYCLE CRASHES

A pedestrian and bicycle crash analysis was conducted and presented below in **Table 3.6**. It was found that crashes involving pedestrians and bicycles accounted for a total of 61.6% of fatal and serious injuries over the past five years.

Crash Type	All Crashes		Fatal and Serious Injury Crashes	
Pedestrian	28	1.20%	6	46.20%
Bicycle	26	1.10%	2	15.40%

TABLE 3.6 – PEDESTRIAN AND BICYCLE CRASHES

3.6 CRASHES BY DAY & MONTH

The days of the week for crashes were evaluated and presented in **Table 3.7** below. The most crashes occur on Fridays with 413 crashes. Approximately 39% of crashes occur on Friday, Saturday, or Sunday.

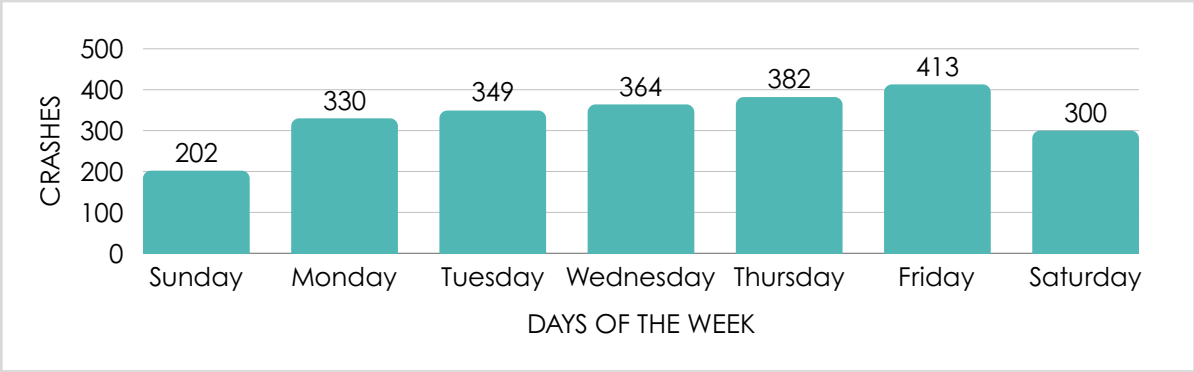


TABLE 3.7 – CRASHES BY DAY OF THE WEEK

Crashes by month were evaluated and presented in **Table 3.8** below. The month of September has the most crashes, accounting for 244 crashes, which is approximately 10% of total crashes.

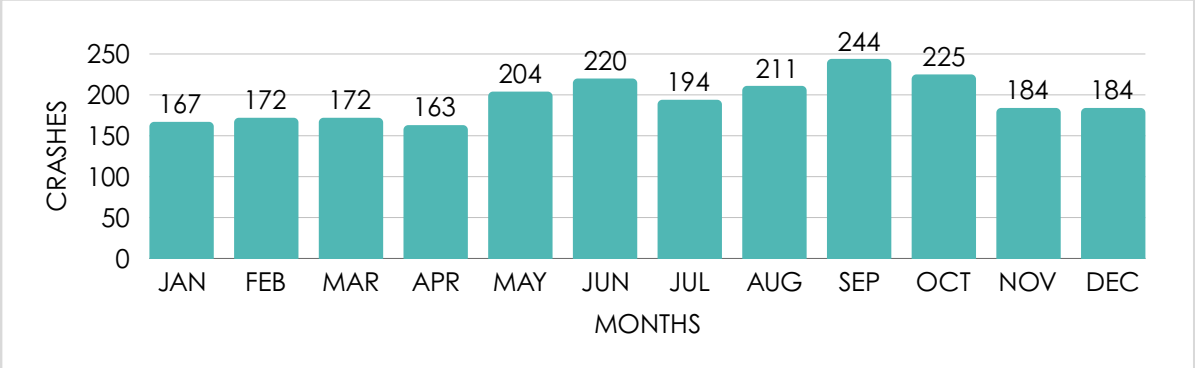
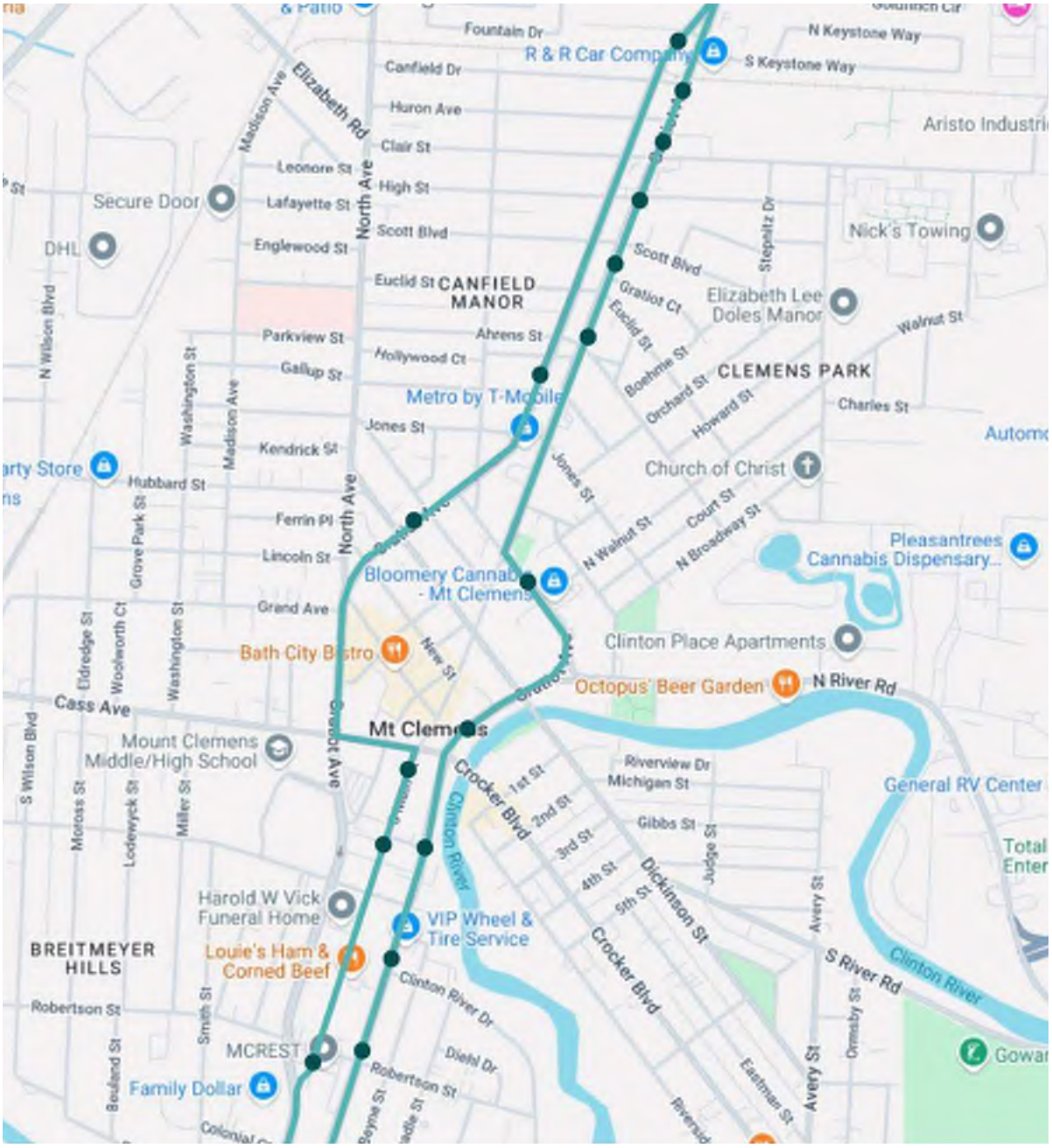


TABLE 3.8 – CRASHES BY MONTH

3.7 PUBLIC TRANSIT

There is currently one bus route that turns through downtown Mount Clemens on northbound and southbound Gratiot Avenue. **Figure 3.9** shows the route and stops through the downtown area.

FIGURE 3.9 – BUS STOPS IN DOWNTOWN AREA



4.0 DOWNTOWN DISTRICT SAFETY ANALYSIS

A crash analysis was conducted at all the intersections in the city of Mount Clemens Downtown District. Five years of crash data were collected and reviewed (2020-2024). Traffic crash reports and summaries were obtained from the Transportation Improvement Association's Traffic Crash Analysis Tool website. A summary of crashes by type is provided in **Appendix B**. Overall the intersections with the most crashes in the downtown district are provided in **Table 4.1.**

Intersection	Crashes
Cass Avenue & N. Main Street	19
Cass Avenue & N. Walnut Street	4

TABLE 4.1 – INTERSECTIONS WITH FREQUENT CRASHES – BUSINESS DISTRICT

4.1 FATAL CRASHES

Over the past five years, two fatal crashes were recorded within the downtown district of Mount Clemens. Notably, both incidents occurred in 2021. A detailed summary of these crashes is presented in **Table 4.2**.

Intersection	Year	Crash Type	Alcohol Involved?	Drugs Involved?	Pedestrians Involved?
Gratiot Avenue & Cass Avenue	2021	Signal	Yes	No	No
Gratiot Avenue & Cass Avenue	2021	Signal	Yes	No	No

TABLE 4.2 – FATAL CRASHES

4.2 CRASHES BY DAY & MONTH

The distribution of crashes by day of the week was evaluated and is summarized in **Table 4.3**. The highest number of crashes occurred on Thursdays, with 58 crashes, accounting for approximately 18.5% of the total.

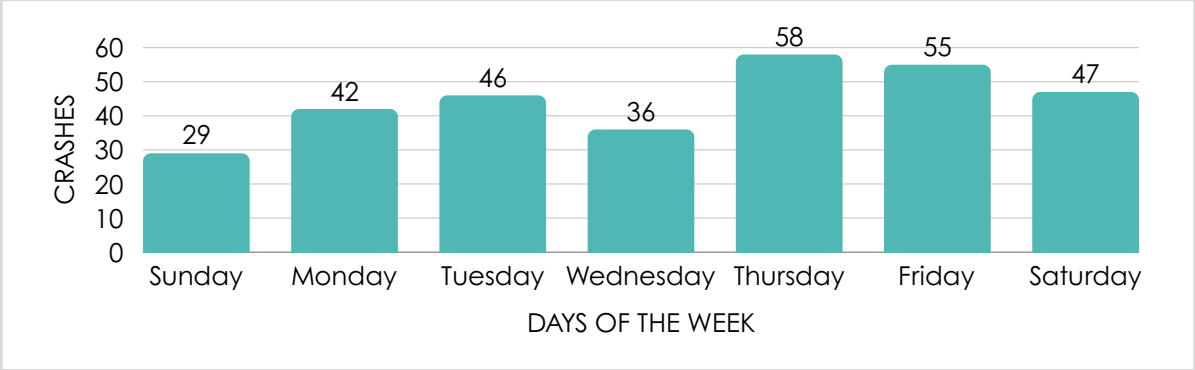


TABLE 4.3– CRASHES BY DAY OF THE WEEK IN DOWNTOWN DISTRICT

Crashes by month were evaluated and are summarized in **Table 4.4**. September recorded the highest number of crashes, with 37, representing approximately 12% of the total. This concentration suggests that seasonal factors or local travel patterns during September may contribute to the increased frequency of crashes.

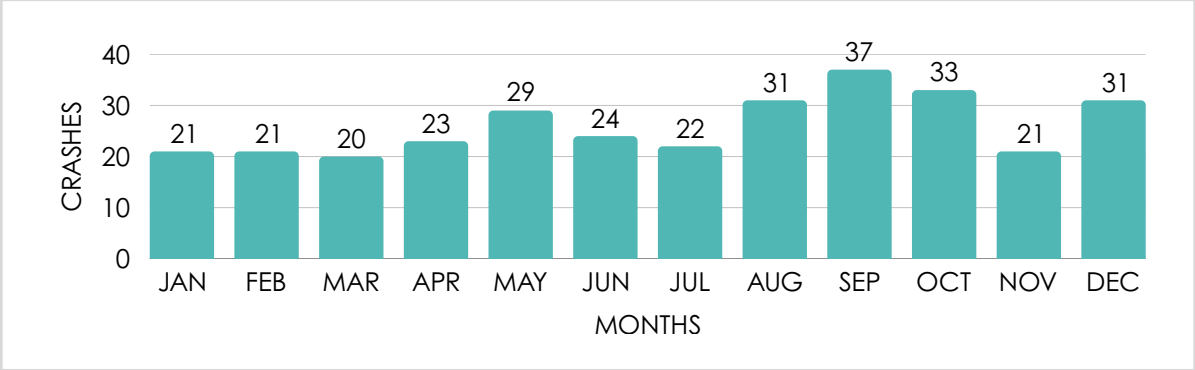


TABLE 4.4 CRASHES BY MONTH IN DOWNTOWN DISTRICT

4.3 CRASH TYPE BY YEAR

Crashes by type and year were evaluated and presented in **Table 4.5**. sideswipe same-side crashes are the most common type of crashes with 88 crashes in the past five years. This is closely followed by rear-end crashes with 71.

4.4 PEDESTRIANS AND BICYCLE CRASHES

A pedestrian and bicycle crash analysis was conducted in the downtown district and presented below in **Table 4.6**. There were eight crashes involving pedestrian and five involving bicycle.

Crash Type	2020	2021	2022	2023	2024	Total
SIngle	10	12	6	7	5	**40**
Head-On	0	1	0	0	1	**2**
Head-On (LT)	3	2	1	2	0	**8**
Angle	13	8	5	9	15	**50**
Rear-End	14	16	17	9	15	**71**
Rear-End (LT)	2	1	0	1	1	**5**
Rear-End (RT)	0	0	0	1	1	**2**
Sideswipe (Same)	11	14	28	19	16	**88**
Sideswipe (Opposite)	0	1	4	1	1	**7**
Back	2	4	4	2	3	**15**
Others include Bike, Pedestrian, Motorcycle	0	1	7	5	8	**21**
Unknown	1	0	2	1	0	**4**
Total	**56**	**60**	**74**	**57**	**66**	**313**

TABLE 4.5 – CRASH TYPE BY YEAR

Crash Type	All Crashes		Fatal and Serious Injury Crashes	
Pedestrian	8	2.60%	1	0.30%
Bicycle	5	1.60%	1	0.30%

TABLE 4.6 – PEDESTRIAN AND BICYCLE CRASHES

4.5 CRASH BY SEVERITY

The crashes by severity were evaluated in the Downtown District, it was reported that approximately 75% resulted in property damage only. In **Table 4.7** below, the data is presented.

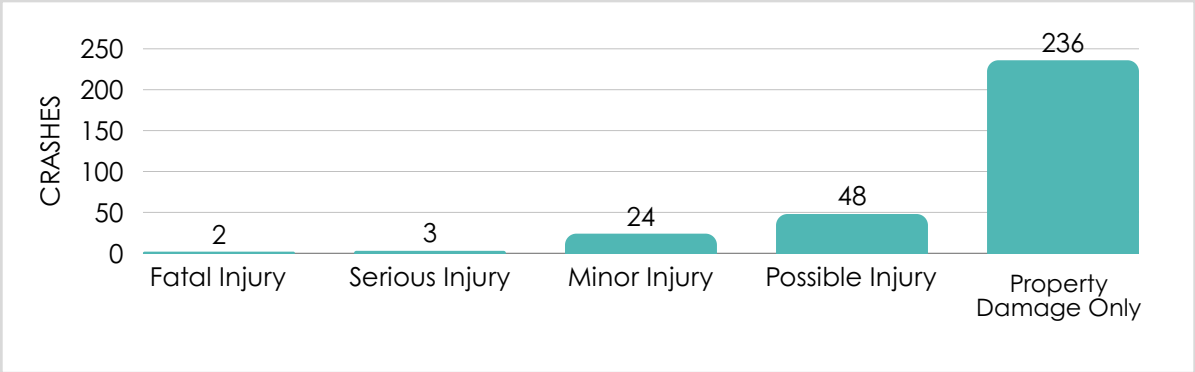


TABLE 4.7 – CRASHES BY SEVERITY

4.6 CRASH BY TIME OF THE DAY

A time-of-day crash analysis was conducted in the Downtown District and presented below in **Table 4.8**. It was found that 28% of crashes occur from 4 p.m. to 8 p.m.

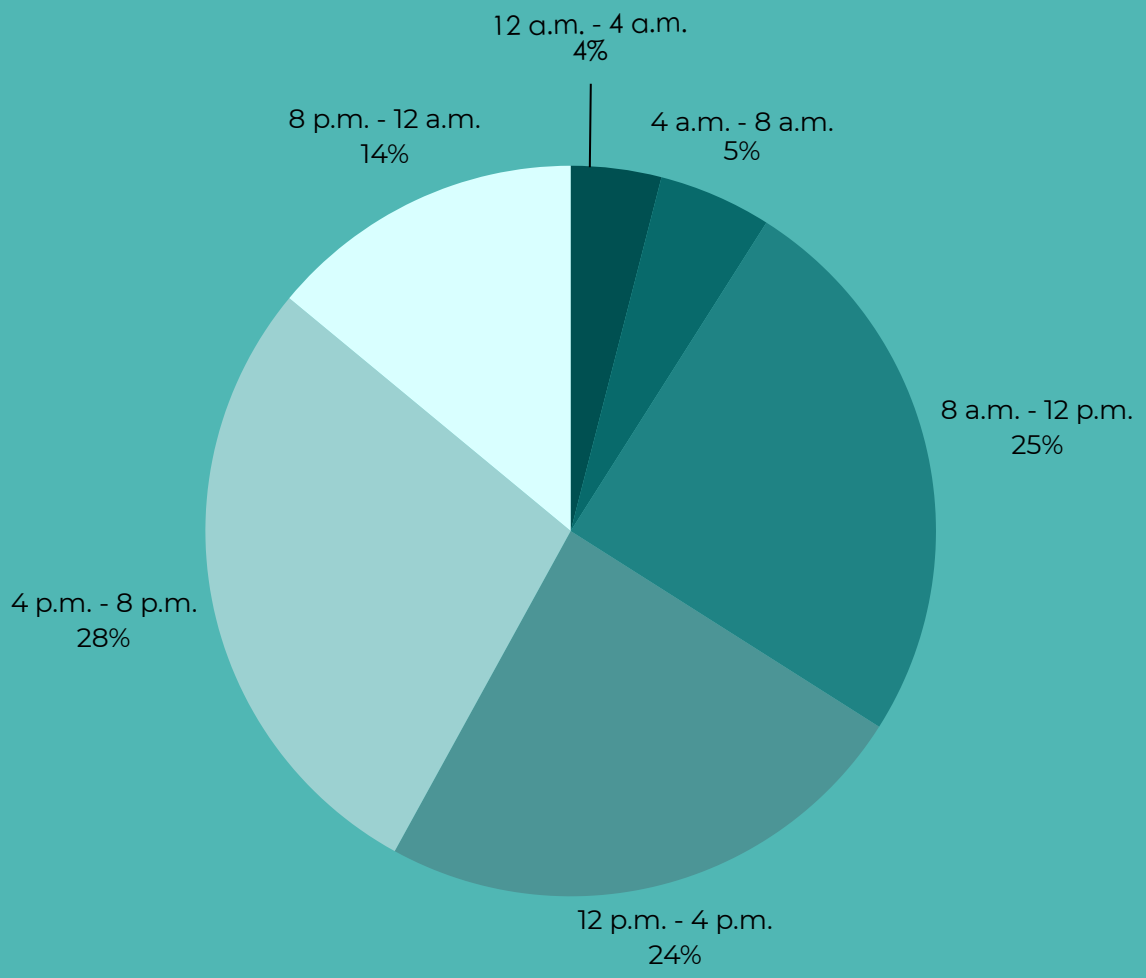


TABLE 4.8 – CRASHES BY TIME OF DAY

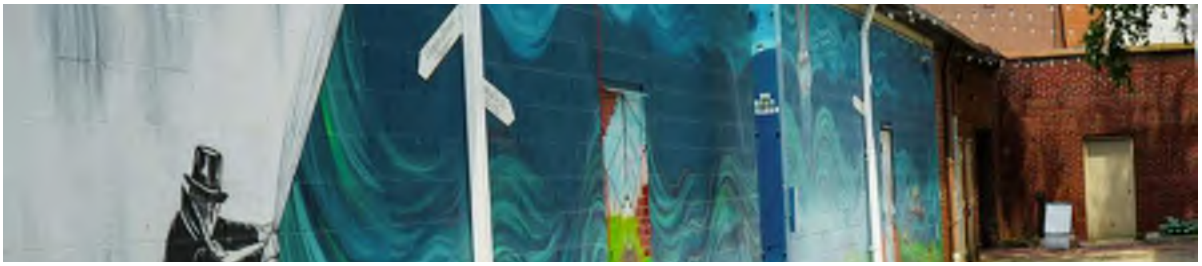
5.0 N. MAIN STREET EVALUATION

5.1 N. MAIN STREET CRASHES

A crash analysis was also conducted along the link of N. Main Street from Cass Avenue to Market Street. Five years of crash data were collected and reviewed (2020-2024). This data does not include the crashes at the intersections studied. Traffic crash reports and summaries were obtained from the Transportation Improvement Association's Traffic Crash Analysis Tool website. A summary of crashes by type is provided in **Table 5.1**.

Location	Crash Type	Crashes	% of Total	KAB Crashes	% KAB
N. Main Street (Cass Avenue – Market Street)	SIngle	1	6%	0	0%
	Head-On	0	0%	0	0%
	Head-On (LT)	0	0%	0	0%
	Angle	0	0%	0	0%
	Rear-End	4	22%	0	0%
	Rear-End (LT)	0	0%	0	0%
	Rear-End (RT)	0	0%	0	0%
	Sideswipe (Same)	0	0%	0	0%
	Sideswipe (Opposite)	1	6%	0	0%
	Back	7	39%	0	0%
	Others include Bike, Pedestrian, Motorcycle	4	22%	0	0%
	Unknown	1	6%	0	0%
	Total	**18**	**100%**	**1**	**0%**

TABLE 5.1 – LINK CRASH TYPE SUMMARY



The table above provides a summary of the crash data types along N. Main Street from Cass Avenue to Market Street. In total, within the past five years there have been 18 crashes. The most frequent crash type includes back (39%) that accounted for seven of the crashes. All these crashes were due to people backing out of parking spaces on N. Main Street.

The Southeast Michigan Council of Governments (SEMCOG) Crash Analysis Process Regional Critical Intersection Crash Rates, Frequencies and Casualty Ratios: By Presence or Absence of Signalization was used to compare the actual crash rates and frequencies to the regional rates for similar intersection operations. The study area included in this analysis is located within the Southeast Michigan Council of Governments region. Therefore, the data provided by Southeast Michigan Council of Governments provides an applicable comparison to the crash rates experienced within the study area. The results of the analysis are summarized in **Table 5.2**.

Intersection	Average (ADT)	Total (5 Years) Crashes	Crash Frequency (Crash/Year)			Crash Rate (Crashes Per MV)		
			Intersection Annual Crash Frequency	SEMCOG Average Annual Crash Frequency	Difference	Intersection Crash Rate	SEMCOG Average Crash Rate	Difference
Cass Avenue & N. Main Street	15,725	23	4.6	4.69	-0.09	0.8	0.87	-0.07
N. Main Street & Market Street	8,747	9	1.8	2.57	-0.77	0.56	1.55	-0.99

TABLE 5.2 – CRASH TYPE SUMMARY

The results of the analysis are summarized in **Table 5.2** and showed that the majority of the study intersections currently have crash frequencies (crashes per year) and crash rates (crashes per million entering vehicles) lower than the Southeast Michigan Council of Governments average for intersections with similar characteristics.

5.2 HIGHWAY SAFETY MANUAL ANALYSIS

The Federal Highway Administration (FHWA) has identified crosswalk visibility as a proven safety countermeasure and promotes them as a safety-focused design alternative to a traditional crosswalk. Adding advance yield or stop markings and signs can reduce pedestrian crashes up to 42%. In order to determine the predictive impact on safety, an analysis was performed according to the Highway Safety Manual (HSM) crash predictive methodology. The analysis included the evaluation of the existing operations of the N. Main Street corridor and a safety review of the operations with recommended improvement of corridor by removing the center left-turn lane and adding in high visibility pedestrian crossing. The latest HSM predictive methods' analysis spreadsheet, provided by the MDOT Safety Programs Unit, was used to determine the expected and predicted crashes associated with the existing and recommended improvements. This analysis used the crash prediction values provided by MDOT in the HSM spreadsheet and urban/suburban segments model was used for this analysis. The results of the analysis are summarized in **Table 5.3** below, and the detailed HSM summary sheets are attached.

Arterial N. Main Street	Property Damage Only (PDO)		Fatal & Injury Crashes		Total			
	Predicted Crashes Per Year	Crash Rate (Crashes/Mile/Year)	Predicted Crashes Per Year	Crash Rate (Crashes/Mile/Year)	Predicted Crashes Per Year	% Reduction	Crash Rate (Crashes/Mile/Year)	% Reduction
Cass Avenue to Market Street	0.83	4.14	0.13	0.64	0.96	_	4.78	_
With Raised Median	0.32	1.62	0.06	0.28	0.38	60%	1.9	60%

TABLE 5.3 – HIGHWAY SAFETY ANALYSIS

The result of this analysis shows that adding high-visibility crosswalks would reduce the predicted crashes by approximately 4% per year on the studied road segment of Main Street.

5.3 LEVEL OF SERVICE

Traffic data was collected on May 26, 2025, on N. Main Street from Cass Avenue to Market Street. The peak hour volume for each intersection was utilized for the study, and volumes were balanced upward through the study network. At locations where access is provided between study intersections, "dummy" intersections were used to account for sink and source volumes, and through volumes were carried along the main roadways. The collected peak hour intersection volumes, approach peak hour factors (PHF), truck percentages, and lane utilization factors were used for the Existing Condition analysis. The LOS analysis by intersection and arterial for the existing conditions are shown in **Table 5.4 Appendix C** presents all LOS reports for N. Main Street.

Intersection & Control	Approach	Lane Group	2025 Existing (LOS)		2045 Future Conditions (LOS)	
			AM-Peak LOS/Delay	PM-Peak LOS/Delay	AM-Peak LOS/Delay	PM-Peak LOS/Delay
N. Main Street & Market Street Signalized	Northbound	Left	B/18.3	C/22.1	B/19.5	B/17.8
		Thru/Right	B/19.0	C/26.5	C/20.1	D/40.5
	Southbound	Left	B/17.1	C/28.9	B/17.7	C/21.0
		Thru	C/20.5	C/27.6	C/21.2	C/22.3
		Right	B/14.3	B/17.2	B/14.5	B/16.0
	Eastbound	Left	B/17.8	C/22.0	B/18.5	C/31.5
		Thru/Right	B/18.8	D/44.1	B/19.4	F/124.7
	Westbound	Left	C/21.1	C/28.8	C/22.1	D/37.1
		Thru	B/19.3	C/26.7	B/19.8	C/37.2
	Intersection Overall		**B/19.2**	**C/32.4**	**B/19.9**	**E/64.7**
N. Main Street & Cass Avenue Signalized	Eastbound	Left	A/9.7	B/10.7	A/9.9	B/11.4
		Thru	B/11.5	B/17.9	B/11.8	C/20.1
		Right	A/9.2	A/8.7	A/9.2	A/8.7
	Westbound	Left	A/5.2	A/6.5	A/5.4	A/7.5
		Thru	A/6.1	A/7.1	A/6.2	A/7.5
		Right	A/5.1	A/5.0	A/5.1	A/5.1
	Northbound	Left	A/9.0	B/16.7	A/9.1	B/17.3
		Thru	A/9.4	B/18.5	A/9.5	B/19.5
		Right	B/13.4	B/11.8	B/13.4	B/12.0
	Southbound	Left	B/13.6	B/15.8	B/13.7	B/16.8
		Thru/Right	B/16.6	B/15.4	B/17.2	B/15.8
	Intersection Overall		**A/9.9**	**B/13.9**	**B/10.2**	**B/14.9**

TABLE 5.4 – 2025 EXISTING CONDITION LOS INTERSECTION ANALYSIS

N. Main Street & Macomb Place Unsignalized	Northbound	Left	A/7.8	A/7.7	A/7.9	A/7.8
		Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Eastbound	Left/Right	B/10.3	A/10.2	B/10.7	B/13.6
	Intersection Overall		**A/1.0**	**A/1.6**	**A/1.0**	**A/1.8**
S. Main Street & New Street Unsignalized	Northbound	Left	A/7.7	A/7.7	A/7.8	A/7.7
		Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Eastbound	Left/Right	A/10.0	B/10.2	B/10.4	B/10.9
	Intersection Overall		**A/0.6**	**A/0.6**	**A/0.6**	**A/0.6**

***(CONTINUED)* TABLE 5.4 – 2025 EXISTING CONDITION LOS INTERSECTION ANALYSIS**

The potential road reconfiguration spans from Cass Avenue to Market Street and involves reconfiguration of the existing three-lane cross section into a boulevard design, consisting of one northbound lane, one southbound lane, and a raised median with left-turn openings at intersections. In addition, a separate Bike Route Study has recommended the implementation of a protected on-street bike lane along North Main Street to enhance bicyclist safety and accessibility.

5.4 MITIGATION

To improve traffic operations and enhance the Level of Service (LOS) or reduce delay, the two signals were optimized to improve the level of service. The mitigation strategy was evaluated under the existing conditions, and the LOS can be found in **Table 5.5**.

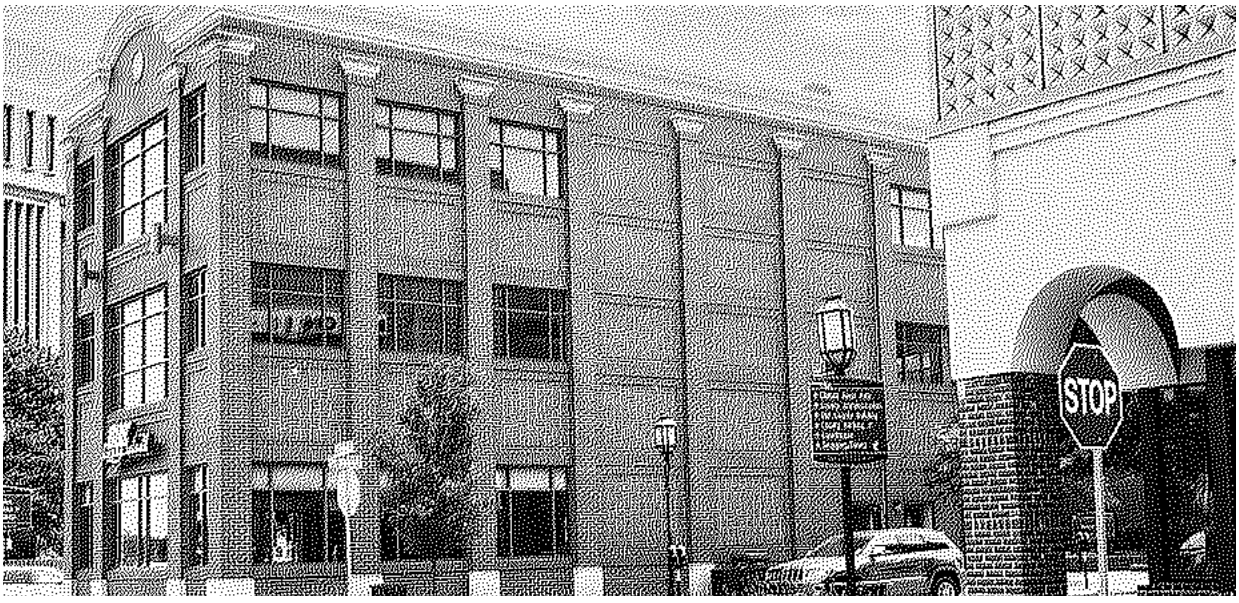
Intersection & Control	Approach	Lane Group	2045 Future Conditions (LOS)		2045 Mitigation (LOS)	
			AM-Peak LOS/Delay	PM-Peak LOS/Delay	AM-Peak LOS/Delay	PM-Peak LOS/Delay
N. Main Street & Market Street Signalized	Northbound	Left	B/19.5	C/22.0	B/19.6	C/23.5
		Thru/Right	C/20.1	C/28.4	C/20.2	C/31.7
	Southbound	Left	B/17.7	C/29.6	B/17.7	C/31.7
		Thru	C/21.2	C/28.6	C/21.3	C/30.6
		Right	B/14.5	B/18.3	B/14.6	B/18.2
	Eastbound	Left	B/18.5	C/32.2	B/18.5	C/23.2
		Thru/Right	B/19.4	F/69.7	B/19.2	D/46.2
	Westbound	Left	C/22.1	C/29.5	C/22.1	C/31.4
		Thru	B/19.8	C/28.6	B/19.8	C/28.5
	Intersection Overall		**B/19.9**	**D/42.2**	**B/19.8**	**D/35.0**
N. Main Street & Cass Avenue Signalized	Eastbound	Left	A/9.9	B/11.4	A/8.6	B/10.5
		Thru	B/11.8	B/20.1	B/10.3	B/18.3
		Right	A/9.2	A/8.7	A/8.1	A/8.1
	Westbound	Left	A/5.4	A/7.5	A/4.5	A/6.6
		Thru	A/6.2	A/7.5	A/5.3	A/6.9
		Right	A/5.1	A/5.1	A/4.1	A/4.6
	Northbound	Left	A/9.1	B/17.3	A/9.8	B/18.4
		Thru	A/9.5	B/19.5	B/10.2	C/21.0
		Right	B/13.4	B/12.0	B/14.8	B/12.5
	Southbound	Left	B/13.7	B/16.8	B/15.1	B/18.0
		Thru/Right	B/17.2	B/15.8	B/19.0	B/16.7
	Intersection Overall		**B/10.2**	**B/14.9**	**A/9.7**	**B/14.6**

TABLE 5.5 – 2025 MITIGATION CONDITION LOS INTERSECTION ANALYSIS

N. Main Street & Macomb Place Unsignalized	Northbound	Left	A/7.8	A/7.7	A/7.8	A/7.7
		Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Eastbound	Left/Right	B/10.4	B/10.9	B/10.4	B/10.9
	Intersection Overall		**A/0.6**	**A/0.6**	**A/0.6**	**B/0.6**
N. Main Street & New Street Unsignalized	Northbound	Left	A/7.9	A/7.8	A/7.9	A/7.8
		Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Eastbound	Left/Right	B/10.7	B/13.6	B/10.7	B/13.6
	Intersection Overall		**A/1.0**	**A/1.8**	**A/1.0**	**B/1.8**

(CONTINUED) TABLE 5.5 – 2025 MITIGATION CONDITION LOS INTERSECTION ANALYSIS

The mitigation condition analysis results indicate a minimal decrease in intersection Level of Service (LOS) compared to existing conditions. This slight degradation may be attributed to increased demand or limited improvement capacity at the intersection, despite the implemented mitigation measures.



5.5 SAFETY IMPROVEMENTS

Based on **Section 9.3** (Recommended Improvements), the following safety enhancements are identified as the most effective for implementation along N. Main Street.

1. **Pedestrian Refuge Islands** – Provide a safe waiting area for pedestrians crossing multiple lanes, reducing exposure to vehicle traffic.
2. **Pedestrian Protective Barriers** – Serve as a physical buffer between pedestrians and vehicles, particularly in high-speed or high-volume areas.
3. **Dedicated Bike Lanes** – Improve cyclist safety by separating bicycles from vehicular traffic, encouraging multimodal transportation.
4. **Parallel Parking** – Reduces the likelihood of angle-related crashes and improves sight distance at driveways and intersections.
5. **Signal Improvements** – Upgrading signal hardware and timing improves intersection safety, particularly for pedestrians and left-turning vehicles.
6. **Crosswalk Visibility Enhancements** – Including high-visibility markings, signage, and lighting, these upgrades make crosswalks and users more noticeable to drivers.

These improvements collectively support a safer, more accessible corridor for all users including pedestrians, cyclists, transit riders, and drivers alike.

6.0 S. MAIN STREET EVALUATION

6.1 S. MAIN STREET CRASHES

A crash analysis was also conducted along the link of S. Main Street from Cass Avenue to Market Street. Five years of crash data were collected and reviewed (2020-2024). This data does not include the crashes at the intersections studied. Traffic crash reports and summaries were obtained from the Transportation Improvement Association's Traffic Crash Analysis Tool website. A summary of crashes by type is provided in **Table 6.1.**

Location	Crash Type	Crashes	% of Total	KAB Crashes	% KAB
S. Main Street (Cass Avenue - S. Gratiot Avenue)	Single	0	0%	0	100%
	Head-On	1	10%	0	0%
	Head-On (LT)	0	0%	0	0%
	Angle	6	60%	1	100%
	Rear-End	2	20%	0	0%
	Rear-End (LT)	1	10%	0	0%
	Rear-End (RT)	0	0%	0	0%
	Sideswipe (Same)	0	0%	0	0%
	Sideswipe (Opposite)	0	0%	0	0%
	Back	0	0%	0	0%
	Others include Bike, Pedestrian, Motorcycle	0	0%	0	0%
	Total	**10**	**100%**	**1**	**100%**

TABLE 6.1 - LINK CRASH TYPE SUMMARY

The table above provides a summary of the crash data types along S. Main Street from Cass Avenue to S. Gratiot. In total, within the past five years there have been 10 crashes. The most frequent crash type includes an angle (60%) that accounted for six of the crashes.

6.2 HIGHWAY SAFETY MANUAL ANALYSIS

The FHWA has identified Road Diets as a proven safety countermeasure and promotes them as a safety-focused design alternative to a traditional four-lane road. In order to determine the predictive impact on safety an analysis was performed according to the Highway Safety Manual crash predictive methodology. The analysis included an evaluation of the existing operations of the S. Main Street corridor and a safety review of the operations with recommended improvement of three-lane construction. The latest HSM predictive methods' analysis spreadsheet, provided by the MDOT Safety Programs Unit, was used to determine the expected and predicted crashes associated with the existing and recommended improvements. This analysis used the crash prediction values provided by MDOT in the HSM spreadsheet and urban/suburban segments model was used for this analysis. The results of the analysis are summarized in **Table 6.2** below, and the detailed HSM summary sheets are attached.

Arterial S. Main Street	Property Damage Only (PDO)		Crash Frequency		Total			
	Predicted Crashes Per Year	Crash Rate (Crashes/Mile/Year)	Predicted Crashes Per Year	Crash Rate (Crashes/Mile/Year) Crashes Per Year	Predicted Crashes Per Year	% Reduction	Crash Rate (Crashes/Mile/Year)	% Difference
Cass Avenue to S. Gratiot Avenue	0.90	1.57	0.24	0.42	1.40	_	1.99	_
With Center Left-Turn Lane	0.81	1.35	0.13	0.21	0.94	12%	1.56	28%

TABLE 6.2 – HIGHWAY SAFETY ANALYSIS

The result of this analysis shows that there is a 12% reduction in predicted crashes per year and a 28% percent difference in the crash rate per year.

6.3 EXISTING LEVEL OF SERVICE

Traffic data was collected on S. Main Street from Church Street to S. Gratiot on July 8, 2025. The collected peak hour intersection volumes, approach peak hour factors (PHF), truck percentages, and lane utilization factors were used for the Existing Condition analysis. The LOS analysis by intersection for the existing conditions is shown in **Table 6.3**. The LOS reports for the existing and road diet are presented in **Appendix D**.

Intersection & Control	Approach	Lane Group	2025 Existing (LOS)	
			AM-Peak LOS/Delay	PM-Peak LOS/Delay
S. Main Street & Church Street Signalized	Eastbound	Left/Thru/Right	B/16.8	B/15.6
	Westbound	Left/Thru/Right	B/13.8	B/14.5
	Northbound	Left/Thru & Thru/Right	A/8.4	A/8.6
	Southbound	Left/Thru & Thru/Right	B/11.0	B/10.8
	Intersection Overall		**B/13.3**	**B/12.1**
S. Main Street & Robertson Street Unsignalized	Eastbound	Left/Thru/Right	B/10.3	B/14.6
	Westbound	Left/Thru/Right	A/9.7	B/11.9
	Northbound	Left/Thru/Right	A/7.4	Free Flow
	Southbound	Left/Thru	A/7.3	A/7.3
		Right	Free Flow	Free Flow
	Intersection Overall		**A/5.4**	**A/5.5**

TABLE 6.3 – EXISTING CONDITION LOS INTERSECTION ANALYSIS

Intersection & Control	Approach	Lane Group	2025 Existing (LOS)	
			AM-Peak LOS/Delay	PM-Peak LOS/Delay
S. Main Street & S. Gratiot Avenue Unsignalized	Southbound	3-Thru	Free Flow	Free Flow
	Westbound	Left	B/12.5	C/21.7
	Intersection Overall		**A/1.1**	**A/4.4**
S. Main Street & Cass Avenue Signalized	Eastbound	Left	A/9.8	B/11.0
		Thru	B/11.8	B/19.6
		Right	A/9.2	A/8.7
	Westbound	Left	A/5.2	A/6.5
		Thru	A/6.1	A/7.3
		Right	A/5.0	A/4.8
	Northbound	Left	A/9.1	B/17.0
		Thru	A/9.4	B/19.2
		Right	B/13.4	B/11.8
	Southbound	Left	B/13.6	B/16.1
		Thru/Right	B/16.9	B/15.6
	Intersection Overall		**B/10.1**	**B/14.6**

(CONTINUED) TABLE 6.3 – EXISTING CONDITION LOS INTERSECTION ANALYSIS

The results of the existing condition analysis indicate that most of the study intersections overall and intersection movement levels of service currently operate at a LOS D or better.

6.4 ROAD DIET CONDITIONS

The potential proposed road diet spans from Cass Avenue to Robertson Street on S. Main Street and involves reconstructing the existing four-lane cross section into a three-lane cross section configuration. The new layout will consist of comprising one northbound lane, one southbound lane and a center two-way left-turn lane. **Table 6.4** presents the road diet conditions intersection. The table also presents the existing condition LOS to allow for direct comparison. To determine the growth rate of the study area historical data and population forecasts were referenced. This resulted in a 0.65% annual growth rate. Due to the horizon year of 2045, a growth factor of 1.14 was applied to the existing traffic volumes.

Intersection & Control	Approach	Lane Group	2025 Existing (LOS)		2045 Road Diet (LOS)	
			AM-Peak LOS/Delay	PM-Peak LOS/Delay	AM-Peak LOS/Delay	PM-Peak LOS/Delay
S. Main Street & S. Gratiot Avenue	Southbound	3-Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Westbound	Left	B/12.5	C/21.7	B/13.4	D/31.5
	Intersection Overall		**A/1.1**	**A/4.4**	**A/1.1**	**A/6.4**
S. Main Street & Cass Avenue Unsignalized	Eastbound	Left	A/9.8	B/11.0	B/10.2	B/12.4
		Thru	B/11.8	B/19.6	B/12.5	C/25.6
		Right	A/9.2	A/8.7	A/9.3	A/8.7
	Westbound	Left	A/5.2	A/6.5	A/5.4	B/16.3
		Thru	A/6.1	A/7.3	A/6.5	B/15.7
		Right	A/5.0	A/4.8	A/4.8	B/13.5
	Northbound	Left	A/9.1	B/17.0	A/8.7	B/19.4
		Thru	A/9.4	B/19.2	N/A	N/A
		Right	B/13.4	B/11.8	N/A	N/A
		Thru/Right	N/A	N/A	A/8.5	C/33.0
	Southbound	Left	B/13.6	B/16.1	B/13.7	C/23.7
		Thru/Right	B/16.9	B/15.6	B/17.7	B/16.1
	Intersection Overall		**B/10.1**	**B/14.6**	**B/10.4**	**C/22.4**

TABLE 6.4 – ROAD DIET CONDITIONS

Intersection & Control	Approach	Lane Group	2025 Existing (LOS)		2025 Road Diet (LOS)	
			AM-Peak LOS/Delay	PM-Peak LOS/Delay	AM-Peak LOS/Delay	PM-Peak LOS/Delay
S. Main Street & Church Street Signalized	Eastbound	Left/Thru/ Right	B/16.8	B/16.1	B/17.8	B/16.8
	Westbound	Left/Thru/ Right	B/13.8	B/14.9	B/14.0	B/15.3
	Northbound	Left/Thru & Thru/Right	A/8.4	A/8.6	N/A	N/A
		Left	N/A	N/A	A/8.4	A/8.8
		Thru/Right	N/A	N/A	A/8.6	A/8.9
	Southbound	Left/Thru & Thru/Right	B/11.0	B/12.3	N/A	N/A
		Left	N/A	N/A	A/9.6	B/11.2
		Thru/Right	N/A	N/A	B/12.1	B/15.9
	Intersection Overall		**B/13.3**	**B/13.0**	**B/14.1**	**B/15.0**
S. Main Street & Robertson Street Unsignalized	Eastbound	Left/Thru/ Right	B/10.3	B/14.6	B/10.6	C/16.9
	Westbound	Left/Thru/ Right	A/9.7	B/11.9	A/9.9	B/12.8
	Northbound	Left/Thru/ Right	A/7.4	Free Flow	A/7.5	Free Flow
	Southbound	Left/Thru	A/7.3	A/7.3	N/A	N/A
		Right	Free Flow	Free Flow	N/A	N/A
		Left	N/A	N/A	A/7.3	A/7.3
		Thru/Right	N/A	N/A	Free Flow	Free Flow
	Intersection Overall		**A/5.4**	**A/5.5**	**A/5.5**	**A/6.1**

(CONTINUED) TABLE 6.4 – ROAD DIET CONDITIONS

The results of the road diet condition analysis indicate that there is minimal change in the intersection LOS when compared to the existing conditions.

6.5 SAFETY IMPROVEMENTS

Based on **Section 9.3** (Recommended Improvements), the following safety enhancements are identified as the most effective for implementation along S. Main Street:

Dedicated Bike Lane – Enhances cyclist safety by providing a designated space separate from vehicular traffic, promoting active transportation and reducing conflicts between users.

Signal Improvements – Upgrading traffic signal equipment and optimizing signal timing can improve intersection safety, reduce delays, and enhance pedestrian and vehicle operations.

Road Diet – Converting the existing four-lane roadway into a three-lane configuration (two through lanes with a center two-way left-turn lane) improves safety by reducing rear-end and left-turn crashes, calming traffic, and creating space for other modes of transportation such as bike lanes or wider sidewalks.

These measures work together to create a safer, more balanced corridor for all roadway users. To see the concept for the proposed road diet with a bike lane see **Appendix F**.

7.0 CASS AVENUE BETWEEN MAIN STREET AND GRATIOT AVENUE

7.1 LANE CONFIGURATION

Currently, the existing left-turn lanes on Cass Avenue between Main Street and Gratiot Avenue provide approximately 80 feet of storage, which accommodates only two to three passenger vehicles or a single heavy vehicle. To enhance corridor operations and reduce delay, the proposed geometric configuration provides two westbound lanes consisting of a shared through/right lane and a left turn lane. The eastbound approach will consist of one shared through/right lane and one left turn lane, optimizing capacity allocation while maintaining operational efficiency at the intersections. A concept plan illustrating the recommended improvements is provided in **Figure 7.1.**

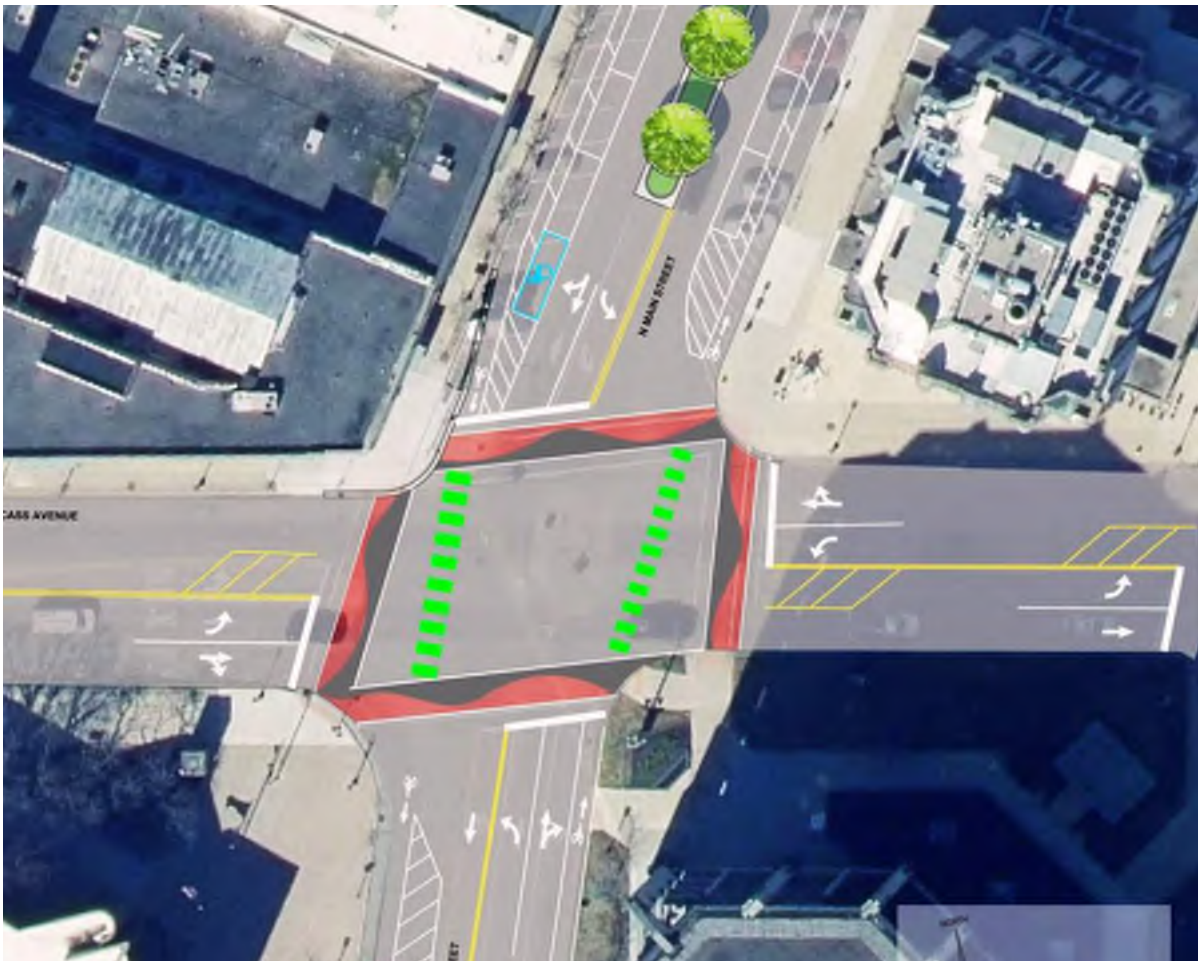


FIGURE 7.1 – CONCEPT PLAN CASS AVENUE

7.2 SAFETY IMPROVEMENTS

Based on **Section 9.3** (Recommended Improvements), the following safety enhancements are identified as the most effective for implementation along Cass Avenue between Main Street and Gratiot Avenue:

Signal Backplates – Improve signal visibility by providing a contrasting background, particularly beneficial in low-light or visually complex environments. Backplates with retroreflective borders further enhance visibility during nighttime and adverse weather conditions, reducing the likelihood of signal-related crashes.

Signal Improvements – Upgrading traffic signal hardware, improving signal placement (e.g., box span or mast arm configurations), and optimizing timing can enhance intersection efficiency and safety. These improvements help reduce crashes, support better driver compliance, and improve conditions for pedestrians and turning vehicles.

Together, these enhancements will improve the visibility, clarity, and overall safety of signalized intersections along this corridor.

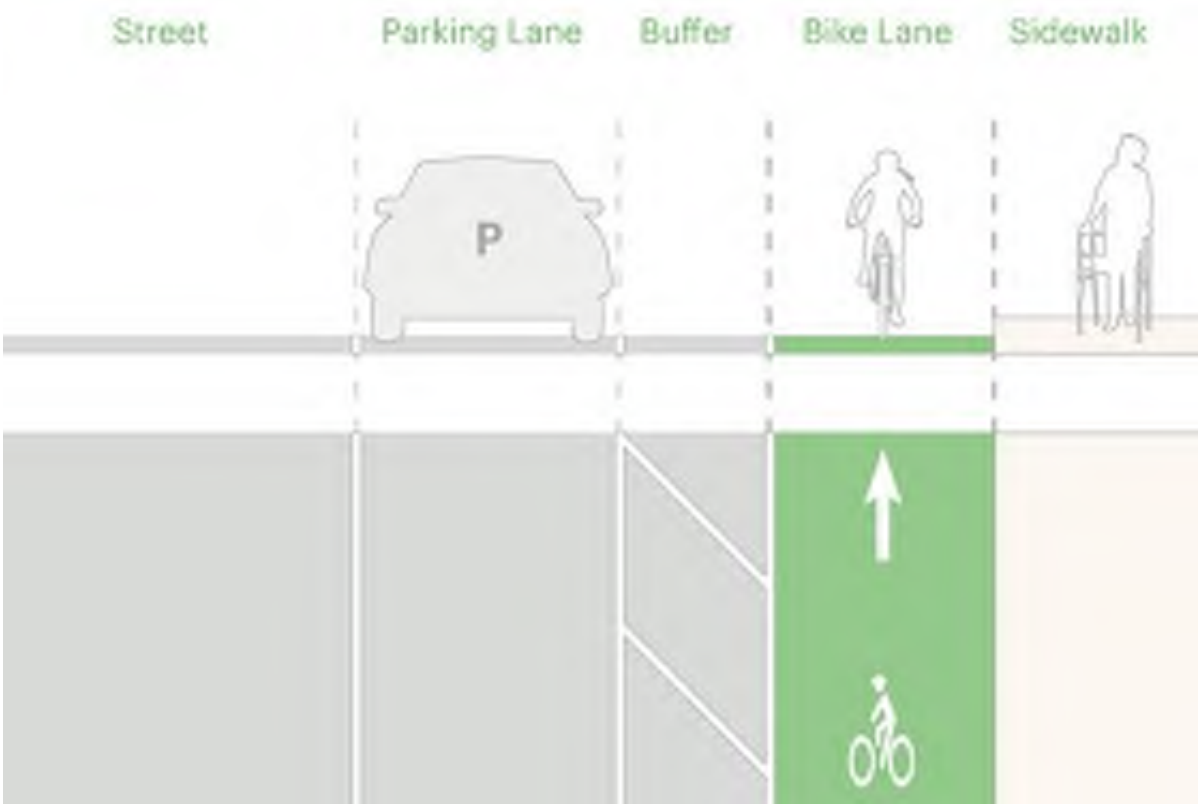
8.0 BIKE LANE

The addition of a dedicated bike lane in the downtown area will enhance overall mobility by providing a safe and accessible route for cyclists of all ages and abilities. By encouraging active transportation, bike lanes not only support healthier lifestyles but also help alleviate traffic congestion, contributing to a more efficient and sustainable transportation network.

8.1 PROTECTED BIKE LANES

On-street parking can serve as an effective buffer between a bike lane and the travel lane, enhancing cyclist safety. A minimum buffer width of 3 feet is recommended to accommodate the full swing of a car door and reduce the risk of dooring-related injuries. In **Figure 8.1** presents a cross-section of street-level protected bike lane.

FIGURE 8.1 – STREET-LEVEL PROTECTED BIKE LANE

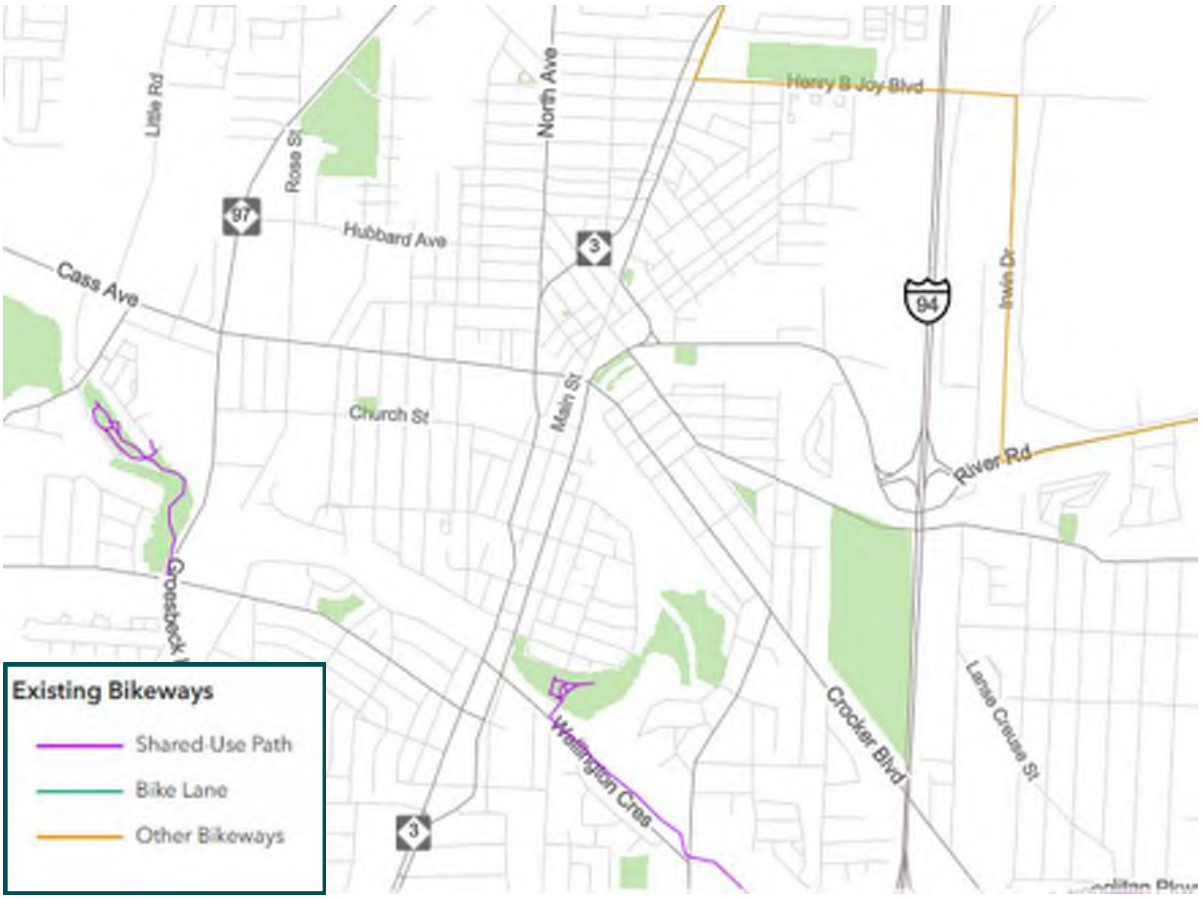


National Association of City Transportation Officials. (2025). Separating protected bike lanes. In Urban Bikeway Design Guide: Designing Bikeways for All Ages and Abilities — Protected Bike Lanes. Island Press. Retrieved July 28, 2025, from Source: nacto

8.2 BIKE LANE INFRASTRUCTURE

Figure 8.2 below illustrates the existing bicycle mobility network in the downtown district as provided by the Southeast Michigan Council of Governments. A closer examination of this network within the downtown district reveals a noticeable absence of dedicated bike lanes and shared-use paths. This lack of infrastructure highlights significant gaps in the area's non-motorized connectivity. The limited availability of safe and accessible routes for bicyclists and pedestrians may discourage active transportation, reduce overall mobility options, and hinder efforts to promote sustainable and inclusive urban travel. Addressing these deficiencies would not only improve connectivity within the downtown core but also enhance public safety, encourage healthier lifestyles, and support broader environmental and transportation goals.

FIGURE 8.2 – EXISTING BICYCEL MOBILITY NETWORK



Southeast Michigan Council of Governments. (n.d.). Existing bikeway network [Interactive map]. SEMCOG. Retrieved July 28, 2025, from Source: SEMCOG

9.0 RECOMMENDED PROJECTS AND STRATEGIES

9.1 N. MAIN STREET

To enhance overall safety and improve traffic operations along N. Main Street, it is recommended to convert the existing angled parking to parallel parking. This modification is anticipated to reduce crash rates by improving driver sight distance and minimizing conflicts between vehicles and cyclists. In addition, the implementation of a raised median will function as a traffic calming measure, helping to lower vehicle speeds and providing a pedestrian refuge island to improve crossing safety. A dedicated bike lane, physically separated from both vehicular travel lanes and sidewalks, is also proposed to promote multimodal access to the downtown district and enhance safety for all road users.

Regarding signage, R1-6 signs are currently proposed to be located at the intersections of N. Main Street with New Street and Macomb Place. It is important to note that Michigan does not have a statewide law requiring motorists to yield or stop for pedestrians at unsignalized crosswalks. Each municipality must adopt either the Uniform Traffic Code (UTC) or establish its own ordinance defining the right-of-way and expected behaviors for both drivers and pedestrians. The City of Mount Clemens has adopted the UTC, thereby establishing the applicable rules within its jurisdiction. Additionally, W11-2 pedestrian warning signs have been proposed to be installed at the mid-block crossing to alert road users to the presence of pedestrians. A concept plan illustrating the recommended improvements is provided in **Figure 9.1** and can be found in **Appendix E**.

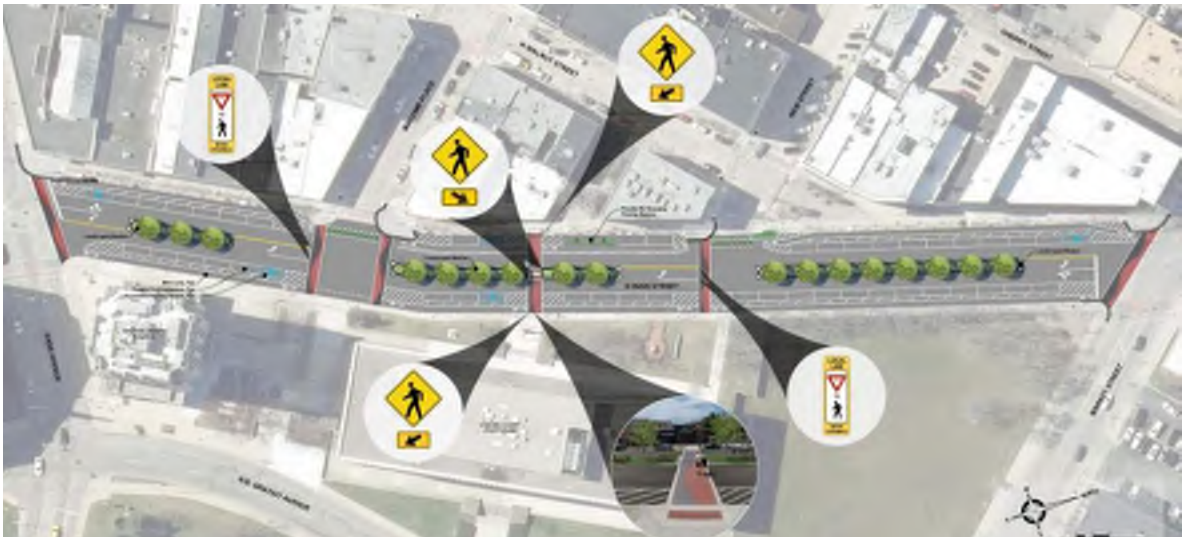


FIGURE 9.1 – CONCEPT PLAN

9.2 S. MAIN STREET

To enhance overall safety along S. Main Street, a road diet concept was proposed, converting the existing four-lane roadway into a three-lane configuration with a dedicated center left-turn lane. This reconfiguration improves traffic flow and reduces potential conflict points. The design includes a dedicated bike lane to provide safe and convenient access to the downtown district for cyclists. **Figure 9.2** below and **Appendix F** presents a concept plan outlining the recommended improvements for S. Main Street. This plan was developed to illustrate the proposed roadway reconfiguration and associated safety enhancements.

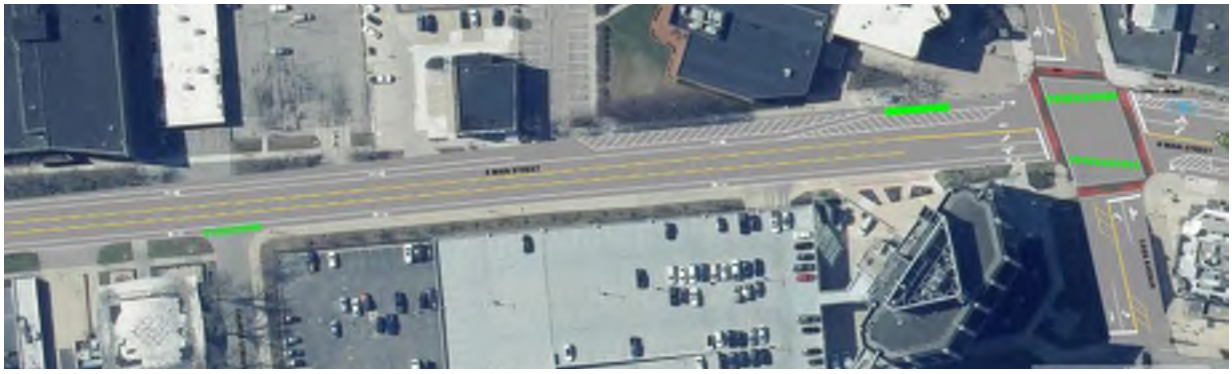


FIGURE 9.2 – SOUTH MAIN STREET CONCEPT

9.3 BIKE LANE

To enhance accessibility and improve safety in the downtown district, a bike lane concept has been proposed, extending from Shadyside Park to N. Main Street and N. Gratiot Avenue. This proposed facility would provide a dedicated space for bicyclists to access the downtown area without conflicting with motor vehicles or pedestrian traffic. **Figure 9.3** illustrates the proposed bike lane concept, while **Appendix G** outlines alternative options that were evaluated, along with their respective advantages and disadvantages.

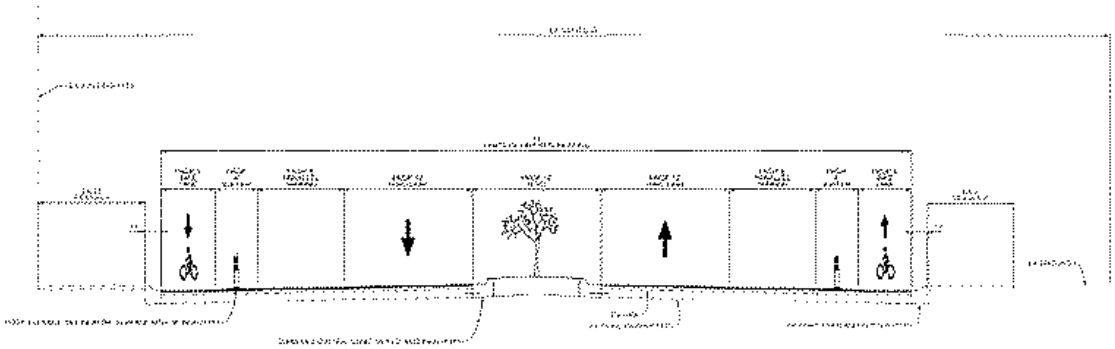


FIGURE 9.3 – PROPOSED BIKE LANE CONCEPT

Pedestrian Refuge Islands

ACCORDING TO THE FHWA, IMPLEMENTING PEDESTRIAN REFUGE ISLANDS CAN REDUCE CRASHES BY UP TO

56%

(CMF ID: 175) Desktop Reference for Crash Reduction Factors, FHWA-SA-08-011, September 2008, Table 11.

Pedestrian refuge islands are raised, curbed areas placed in the center of a roadway to provide a safe space for pedestrians to pause while crossing. According to the Federal Highway Administration (FHWA), their implementation can reduce pedestrian crashes by up to 56%. These islands improve pedestrian safety by allowing individuals to cross one direction of traffic at a time. They are typically installed at midblock crossings or in locations with a high rate of pedestrian-related crashes.

ADVANTAGES

- Increases pedestrian safety
- Reduces pedestrian crashes
- Allows pedestrians to focus on one direction of traffic at a time
- Effective at midblock crossings

DISADVANTAGES

- May require roadway widening
- Can be costly to install depending on location
- May affect traffic flow if not properly designed

Rectangular Rapid Flashing Beacons (RRFB)

Rectangular Rapid Flashing Beacons (RRFBs) are pedestrian-activated warning devices installed at crosswalks to alert motorists to pedestrian presence. According to the Federal Highway Administration (FHWA), RRFBs can reduce pedestrian crashes by 47% and increase motorist yield rates up to 98%. They are typically used at multilane crossings with speed limits of 40 mph or less. RRFBs are mounted on both sides of a crosswalk, below the pedestrian crossing sign and above the downward diagonal arrow plaque. The flashing lights are activated by a push button and remain off when not in use. RRFBs are most effective at midblock crossings or at locations with known pedestrian safety concerns.

ADVANTAGES

- Significantly increases driver awareness of pedestrians
- Reduces pedestrian crashes
- High motorist yield rate
- Only activated when needed

DISADVANTAGES

- Requires pedestrian activation
- May be ignored by some drivers
- Installation and maintenance can be costly

[1]ACCORDING TO THE FHWA, RRFBS CAN REDUCE PEDESTRIAN CRASHES BY

47%

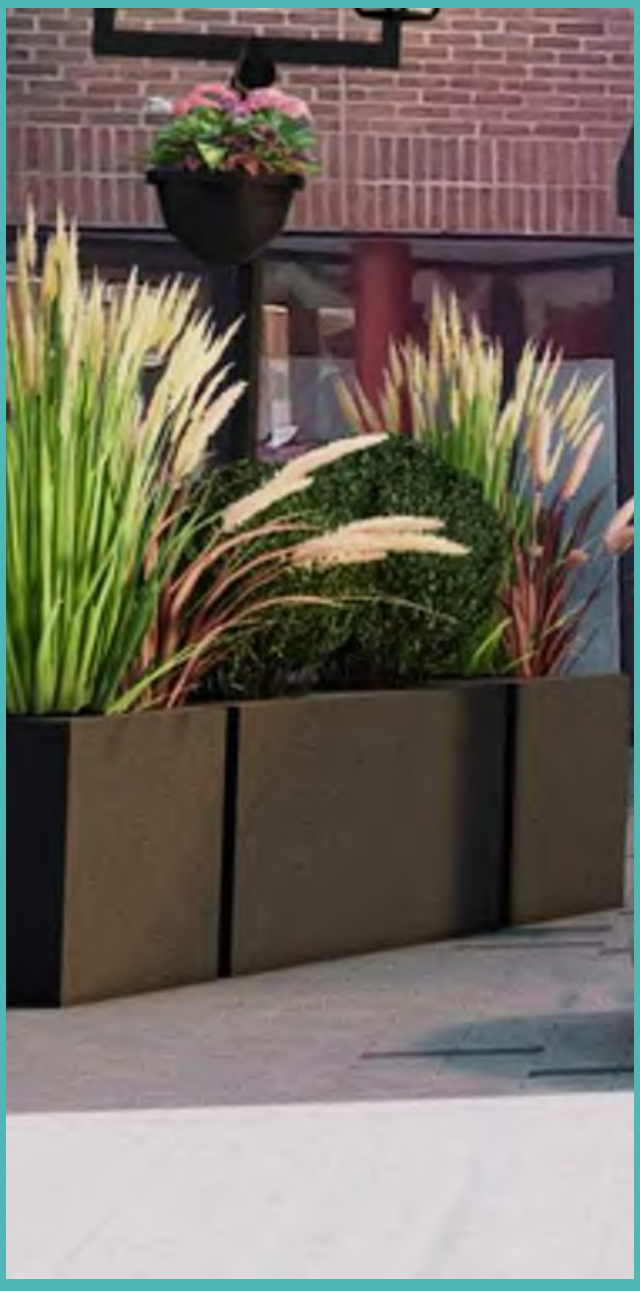
[2]AND INCREASE MOTORIST YIELD RATES UP TO

98%

1. (CMF ID: 9024) NCHRP Research Report 841 Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments, (2017).
2. Fitzpatrick et al. "Will You Stop for Me? Roadway Design and Traffic Control Device Influences on Drivers Yielding to Pedestrians in a Crosswalk with a Rectangular Rapid-Flashing Beacon." Report No. TTI-CTS-0010. Texas A&M Transportation Institute, (2016).

THESE BARRIERS CREATE THE VISUAL EFFECT OF A NARROWER ROADWAY, WHICH NATURALLY ENCOURAGES DRIVERS TO

REDUCE THEIR SPEED.



Pedestrian Protection Barrier

Pedestrian protection barriers, such as planter boxes, serve as physical separations between the roadway and sidewalk, enhancing pedestrian safety. These barriers create the visual effect of a narrower roadway, which naturally encourages drivers to reduce their speed. In addition to slowing traffic, the barriers help prevent vehicle encroachment into pedestrian pathways. They also guide foot traffic, discourage jaywalking, and provide a protective buffer in high-volume or high-speed traffic areas. These barriers will be installed in locations where pedestrian safety is at greater risk.

ADVANTAGES

- Provides a physical barrier between vehicles and pedestrians
- Visually narrows roadway to reduce vehicle speeds
- Enhances pedestrian safety and comfort
- Helps guide pedestrian movement and reduce jaywalking

DISADVANTAGES

- May require regular maintenance (e.g., landscaping)
- Can reduce sidewalk space if not properly placed
- Installation may be limited by right-of-way constraints

Dedicated Bike Lanes

Bike lanes are designated sections of the roadway reserved for bicyclists, helping to create a safer and more organized flow of traffic. According to the Federal Highway Administration, the addition of a dedicated bike lane can reduce crashes by up to 49%. Separated bike lanes enhance overall roadway safety by minimizing conflicts between bicyclists, motorists, and pedestrians. Bike lanes will be installed in areas currently lacking dedicated bicycle infrastructure to improve safety, accessibility, and connectivity for cyclists.

ADVANTAGES

- Reduces crashes involving bicyclists
- Separates cyclists from vehicle and pedestrian traffic
- Improves accessibility and mobility for bicyclists
- Encourages alternative transportation methods

DISADVANTAGES

- May reduce roadway space for vehicles or parking
- Requires clear signage and pavement markings
- Potential conflicts at driveways and intersections

THE ADDITION OF A DEDICATED BIKE LANE CAN REDUCE CRASHES BY UP TO

49%

(CMF ID: 10738, 10742) Development of Crash Modification Factors for Bicycle Lane Additions While Reducing Lane and Shoulder Widths. FHWA-HRT-21-012, (2021).

PARALLEL PARKING

IMPROVES

DRIVERS' VISIBILITY OF ONCOMING VEHICLES AND CYCLISTS WHEN REENTERING TRAFFIC, HELPING TO

MINIMIZE

BLIND SPOTS.

Parallel Parking

Parallel parking involves vehicles parking parallel to the curb, typically in a single line. Converting angled parking to parallel parking on Main Street will enhance safety by reducing the likelihood and severity of crashes. Parallel parking improves drivers' visibility of oncoming vehicles and cyclists when reentering traffic, helping to minimize blind spots. The slower and more controlled maneuvering required for parallel parking also lowers crash severity. Unlike angled parking, which often forces drivers to back blindly into traffic, parallel parking provides safer reentry into travel lanes.

This change will be implemented in areas currently using angled parking.

ADVANTAGES

- Improves visibility when reentering traffic
- Reduces crash likelihood and severity
- Safer for cyclists and through traffic
- Slower, more controlled parking maneuvers

DISADVANTAGES

- Reduces the total number of parking spaces
- May be more difficult for some drivers to perform
- Can increase traffic congestion during parking maneuvers

Backplates

Backplates are mounted behind traffic signal heads to enhance their visibility by providing a contrasting background. These backplates often include a 1- to 3-inch yellow retroreflective border, which increases signal conspicuity in both daytime and nighttime conditions. According to studies, the addition of backplates can reduce crash rates by up to 15% by making signals more noticeable to approaching drivers. Backplates will be installed at high-crash locations and intersections with poor lighting to improve safety.

ADVANTAGES

- Enhances visibility of traffic signals
- Improves safety in low-light conditions
- Reduces crash rates by making signals more noticeable
- Cost-effective safety improvement

DISADVANTAGES

- May require maintenance of reflective borders over time
- Effectiveness may be reduced in visually cluttered areas
- Limited impact if drivers are distracted or impaired

ACCORDING TO STUDIES, THE ADDITION OF BACKPLATES CAN REDUCE CRASH RATES BY UP TO

15%

BY MAKING SIGNALS MORE NOTICEABLE TO APPROACHING DRIVERS.

1. (CMF ID: 1410) Sayed, T., Leur, P., and Pump, J., "Safety Impact of Increased Traffic Signal Backboards Conspicuity." 2005 TRB 84th Annual Meeting: Compendium of Papers CD-ROM, Vol. TRB#05-16, Washington, D.C., (2005).

SIGNAL IMPROVEMENTS INVOLVE UPGRADING TRAFFIC SIGNAL CONFIGURATIONS TO ENHANCE

INTERSECTION SAFETY AND VISIBILITY.

Signal Improvements

Signal improvements involve upgrading traffic signal configurations to enhance intersection safety and visibility. This includes installing signal heads on the far side of each approach, ensuring there is at least one signal head per lane. A box span layout will be used, offering improved visibility and better alignment with driver sight lines compared to traditional diagonal signal configurations. These upgrades will be prioritized at intersections currently using diagonal signals and at locations with a history of high crash rates.

ADVANTAGES

- Improves signal visibility and alignment with driver sight lines
- Enhances intersection safety
- Ensures consistent signal coverage for all lanes
- Reduces confusion and potential driver error

DISADVANTAGES

- Higher installation cost compared to standard signal setups
- May require structural or electrical modifications
- Possible short-term traffic disruptions during installation

Road Diet

A road diet improves roadway safety by converting a four-lane undivided roadway into a three-lane configuration — two through lanes and a center two-way left-turn lane (TWLTL). According to the Federal Highway Administration, road diet conversions can reduce total crashes by 19–47%. This design reduces the likelihood of rear-end and left-turn collisions by providing a dedicated space for turning vehicles, minimizing conflict points, and improving overall traffic flow. Road diets are ideal for roadways where traffic volumes can be managed with fewer lanes and where operational benefits of four lanes are minimal. This strategy also supports traffic calming, enhanced pedestrian and cyclist accessibility, and overall improved safety for all road users.

ADVANTAGES

- Reduces total crashes by up to 47%
- Minimizes conflict points and improves traffic flow
- Enhances pedestrian and cyclist safety
- Supports traffic calming and livability goals

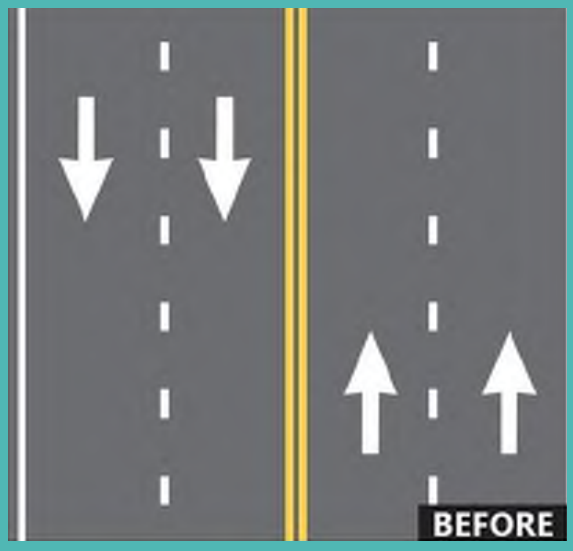
DISADVANTAGES

- May reduce vehicle capacity on high-volume roads
- Can increase travel time during peak hours
- Requires public outreach to build community support

ACCORDING TO THE FHWA, ROAD DIET CONVERSIONS CAN REDUCE TOTAL CRASHES BY

19% TO 47%

1. (CMF ID: 5554, 2841) Evaluation of Lane Reduction "Road Diet" Measures on Crashes, FHWA-HRT-10-053, (2010).



Crosswalk Visibility Enhancements

Implementing crosswalk visibility enhancements significantly improves pedestrian safety and overall roadway clarity. These improvements are especially beneficial for vulnerable road users such as pedestrians, bicyclists, transit users, and individuals using wheelchairs or other mobility devices by increasing their visibility to drivers and encouraging safer crossing behavior. The three primary types of crosswalk visibility enhancements include:

HIGH-VISIBILITY CROSSWALK MARKINGS

ACCORDING TO THE FHWA, HIGH-VISIBILITY CROSSWALKS CAN REDUCE PEDESTRIAN INJURY CRASHES BY

40%

ADVANTAGES

- Increases driver awareness of crossing locations, especially in urban or high-speed environments. Proven to reduce pedestrian-vehicle collisions.

DISADVANTAGES

- Require more frequent maintenance due to wear, especially in high-traffic or snowplow areas.

ENHANCED LIGHTING

ACCORDING TO THE FHWA, INTERSECTION LIGHTING CAN REDUCE PEDESTRIAN CRASHES UP TO

42%

ADVANTAGES

- Improves safety during nighttime hours; critical at midblock crossings and near transit stops.

DISADVANTAGES

- Installation and maintenance costs can be high; poorly designed lighting can cause glare or light pollution.

SIGNAGE & PAVEMENT MARKINGS

ACCORDING TO THE FHWA, ADVANCE YIELD OR STOP MARKINGS AND SIGNS CAN REDUCE PEDESTRIAN CRASHES BY

25%

ADVANTAGES

- Reinforces driver expectations and promotes yielding behavior. Pavement markings help guide both drivers and pedestrians.

DISADVANTAGES

- Effectiveness can diminish over time due to weathering or driver desensitization without enforcement or additional treatments.

10.0 PLAN ADOPTION

On September 16, 2025, the Downtown District Safety Action Plan was formally adopted by the City Council during its regular public meeting. As part of the adoption process, a presentation was prepared and delivered to provide an overview of the report, highlight its key findings, and summarize the recommendations intended to improve safety within the downtown district. The presentation also outlined the importance of the plan in guiding future investments, prioritizing safety projects, and supporting funding opportunities through state and federal programs.

The adoption of the Safety Action Plan marks an important milestone for the city, demonstrating a strong commitment to improving transportation safety for all users, including drivers, pedestrians, and bicyclists. By adopting the plan, the City Council has established a framework for addressing crash trends, implementing targeted countermeasures, and ensuring that community feedback is incorporated into decision-making.

For reference, a copy of the official resolution adopting the Downtown District Safety Action Plan is provided in **Appendix H**.

Appendix A

COMMUNITY SURVEY RESPONSES

LOCATIONS	OWERSHIP	FEEDBACK CATEGORY	PLUBLIC FEEDBACK	RESPONSE ID	FEEDBACK COUNT
SB Gratiot Ave & Cass Ave	State	Signal Timing	At Cass & SB Gratiot the yellow light timing is short. People run the yellow red, and you can't safely make a left turn.	12	5
		Signal Timing	Cars are constantly turning on red lights on southbound Gratiot even with pedestrians crossing, ESPECIALLY at the lights by both SVS vision locations. Those two crosswalks are dangerous for pedestrians!	21	
		Signal Timing	When you are turning left at this light it blinks yellow but then goes straight to red. There is too much traffic congestion at this intersection so you are not able to turn left in time. I got pulled over for turning when it was red, but there is no other way to turn there because there's too much traffic while its blinking yellow. The cop did not write me a ticket but he told me that intersection is a problem and to take another way going forward. The funny thing is a couple months later I watched a cop do the exact same thing I did! This intersection needs a green arrow for people turning left, it's very unsafe the way it is right now.	33	
		Bike/Pedestrian Related	Crossing Gratiot to get to the downtown district is difficult for cars, bikes and pedestrians.	35	
		Bike/Pedestrian Related	Very difficult to safely cross Cass and or SB Gratiot at that intersection when on a bicycle	41	
Cass Ave & S Walnut St	County	Intersection Related	The main safety issue is turning on to north and south bound Gratiot from Cass. the turn lanes are too small and there's no turn signal so the chances of turning can be a pain. Also when busses turn left on to Cass from south bound Gratiot the turn lane needs to be further back for them so they can make the turn and cars stay far enough back.	14	2
		Intersection Related	Gets incredibly congested in that center area with their being left turn lanes that fit maybe 2 cars at a time (barely)	16	
Market St & Pine St	City	Bike/Pedestrian Related	Church goers never use a crosswalk	7	1
N Main St & Macomb Pl	City	Speeding	Heavy traffic moving faster than posted speeds with obstructed visibility due to parked vehicles. It is not a safe place for pedestrians to cross.	52	1

LOCATIONS	OWERSHIP	FEEDBACK CATEGORY	PLUBLIC FEEDBACK	RESPONSE ID	FEEDBACK COUNT
Macomb Pl & Pine St	City	Intersection Related	Vagrants wandering in front of my car, other cars running stop signs	13	1
Main St & Mid-Block Crossing	City	Roadway Related	Main street gets congested, people just walk in front of cars, you don't know if someone is backing out of a parking spot because the spots are too close to the road	18	4
		Sight Distance	Cars lined up and hard to see people when driving and crossing. Even harder when trucks are stopped in the middle for drop offs	25	
		Sight Distance	On weekdays there is more traffic by the courthouses, and people cannot see what traffic is coming when they try to back out of the angled parking. Drivers do not always understand the need to respect the crosswalks and stop for the pedestrians trying to use them.	30	
		Bike/Pedestrian Related	Traffic congestion, speeding, pedestrian not crossing at crosswalks, delivery vehicles blocking sight for vehicle traffic & pedestrians	31	
Market St & Cherry St	City	Sight Distance	Blind spot for cars	50	1
New St & Cherry St	City	Roadway Related	The entire downtown lacks maintenance and repair! The sidewalks are busted and cracking. The brick paver sections are unlevel and dangerous, the curbs are inconsistent, etc. The parking lots are embarrassing with crumbling. There is more cold patch than solid surface in the blue lot. Red lot is cracked and starting to crumble.	45	1
NB Gratiot Ave & Welts St	State	Bike/Pedestrian Related	Do not feel safe walking in this area.	19	1
NB Gratiot Ave & Dickinson St	State	Bike/Pedestrian Related	Busy stop across the street, people walking out into traffic.	15	2
		Bike/Pedestrian Related	When it's time for me to walk there is cars still in a hurry to turn almost got hit three times because people are in a hurry so bad	24	

LOCATIONS	OWERSHIP	FEEDBACK CATEGORY	PLUBLIC FEEDBACK	RESPONSE ID	FEEDBACK COUNT
Cass Ave & Main St	County	Bike/Pedestrian Related	High speeds, lack of pedestrian or cyclist infrastructure	3	7
		Speeding	People are consistently speeding on all streets but definitely southbound Gratiot. And they are constantly running red lights at Cass and Main	6	
		Bike/Pedestrian Related & Signal Timing	Traffic moves to fast, lights aren't long enough, pedestrians cross and do whatever they want.	8	
		Intersection Related	Too much traffic	10	
		Intersection Related	Turning	42	
		Speeding	Drag racing on Main Street between Cass and Robertson, primarily Church to Robertson. Best solution is to go to two lanes and add parking in the two current outer lanes. This would help businesses, stop the racing, and right size the street to current traffic levels.	36	
		Speeding	Cars speeding	49	
NB Gratiot Ave & Crocker Blvd	State	Roadway Related	Gratiot Avenue should be limited to less lanes to force slower traffic in downtown. I believe this is the case for both southbound and northbound traffic, I usually walk from old North Avenue into downtown and crossing southbound. Gratiot gives me a lot of anxiety. I want don't want to drive my car when its less than a 10 minute walk to downtown from my home. But Gratiot acts as a "moat" around downtown that I believe keeps individuals from coming in downtown from the neighborhoods. Not currently in the project scope, but old north avenue from Hubbard to Canfield should have pedestrian crossings between Canfield manor and Kendrick farms neighborhoods. It would also slow traffic and provide necessary safe pedestrian circulation. Thank you!	5	1
Main St & Market St	City	Intersection Related	Along Main Street, when trucks, vans and other commercial vehicles park across the street from Three Blind Mice, turning can be difficult due to large trucks, vans or other commercial vehicles parking there versus in the parking lot.	43	2
		Bike/Pedestrian Related	Safety of pedestrians moving around the area	11	

LOCATIONS	OWERSHIP	FEEDBACK CATEGORY	PLUBLIC FEEDBACK	RESPONSE ID	FEEDBACK COUNT
Main St & New St	City	Sight Distance	hard for those backing out of their parking spot, blindly into traffic. Especially when traffic is going over the 15 mph.	47	2
		Sight Distance	Can't see cars coming from either direction because of parked cars. Traffic is coming pretty fast when trying to inch out.	39	
SB Gratiot Ave & Macomb Pl	State	Intersection Related & Bike/Pedestrian Related	People turning right from Macomb place onto southbound Gratiot, which is a one-way street, this occurrence happens multiple times a day. The crosswalks at Gratiot and Macomb place are difficult to navigate a mini drivers running red lights from North Avenue as they emerge onto Gratiot. Lots of distracted drivers in that area, feels very unsafe for pedestrians. I have witnessed a pedestrian getting hit there.	23	2
		Bike/Pedestrian Related & Signal Timing	The crosswalk transition happens too quickly for someone with mobility issues, children, or pets to cross in time. Pedestrians are often forced to jog, which is dangerous for many. A longer light as well as an audible "walk" signal would be helpful. Drivers come flying down North Ave or SB Gratiot and speed limits should be monitored and enforced more seriously, and potentially lowered.	9	
Macomb Pl& Cherry St	Private	Pavement Conditions	Uneven pavement	44	2
		Bike/Skateboard Related	There are signs that say no bicycles and no skateboards downtown Mount Clemens. You need to take these signs down. It would promote more foot traffic. Also there are no bike racks anywhere. Maybe a secure bike rack with extra lighting and a security camera to prevent theft. I also don't want to see nazi propaganda plastered downtown. I like seeing the changes downtown lately. Take down the no bike and no skateboard signs	46	
Macomb Pl & N Walnut St	City	Bike/Pedestrian Related	People don't look when driving for pedestrians	4	1

Appendix B

CITYWIDE CRASH DATA

Intersection	Crash Type	# of Crashes	% of Crashes	# of KAB	% of KAB
Avery & Crocker	Sideswipe - Same Direction	1	100%		
	Total	**1**	**100%**		
Avery & Dickinson	Angle	1	100%		
	Total	**1**	**100%**		
Avery & Michigan	Single Motor Vehicle	1	100%		
	Total	**1**	**100%**		
Avery & Rathbone	Angle	1	100%		
	Total	**1**	**100%**		
Avery & Saint Francis	Angle	1	100%		
	Total	**1**	**100%**		
Boehme & Euclid	Angle	1	100%		
	Total	**1**	**100%**		
Broadway & Clemens	Angle	1	100%		
	Total	**1**	**100%**		
Broadway & Park	Rear End	1	50%		
	Single Motor Vehicle	1	50%	1	100%
	Total	**2**	**100%**	**1**	**100%**
Brooks & Orchard	Other	1	100%		
	Total	**1**	**100%**		
Byron & Cass	Rear End	2	100%		
	Total	**2**	**100%**		
Church & Floral	Angle	2	100%		
	Total	**2**	**100%**		
Church & Highland	Angle	1	100%		
	Total	**1**	**100%**		
Church & Main	Angle	1	100%		
	Total	**1**	**100%**		
Church & Moross	Other	2	100%	1	100%
	Total	**2**	**100%**	**1**	**100%**
Clair & North	Rear End	1	50%		
	Sideswipe - Same Direction	1	50%		
	Total	**2**	**100%**		
Clair & Wells	Angle	1	100%		
	Total	**1**	**100%**		
Clemens & Court	Angle	2	100%		
	Total	**2**	**100%**		
Clemens & Walnut	Angle	2	67%		
	Backing	1	33%		
	Total	**3**	**100%**		
Colonial & Greiner	Angle	1	100%		
	Total	**1**	**100%**		
Court & Clemens	Head On - Left Turn	1	50%		
	Sideswipe - Opposit Direction	1	50%		
	Total	**2**	**100%**		
Crocker & 1st	Angle	1	33%		
	Rear End	2	67%		
	Total	**3**	**100%**		

Intersection	Crash Type	# of Crashes	% of Crashes	# of KAB	% of KAB
Crocker & 2nd	Sideswipe - Same Direction	1	100%		
	Total	**1**	**100%**		
Crocker & 3rd	Rear End	1	50%		
	Sideswipe - Same Direction	1	50%		
	Total	**2**	**100%**		
Crocker & 4th	Angle	2	100%		
	Total	**2**	**100%**		
Crocker & 5th	Angle	1	100%		
	Total	**1**	**100%**		
Crocker & Amvet	Angle	1	100%		
	Total	**1**	**100%**		
Crocker & Avon	Sideswipe - Same Direction	1	100%		
	Total	**1**	**100%**		
Crocker & Harper	Angle	1	50%	1	100%
	Rear End	1	50%		
	Total	**2**	**100%**	**1**	**100%**
Crocker & Lawndale	Rear End	1	100%		
	Total	**1**	**100%**		
Dickinson & 5th	Backing	1	50%		
	Single Motor Vehicle	1	50%		
	Total	**2**	**100%**		
Dickinson & Rathbone	Other	1	50%		
	Rear End	1	50%		
	Total	**2**	**100%**		
Dunham & Elizabeth	Single Motor Vehicle	1	100%		
	Total	**1**	**100%**		
Dunham & Rose	Angle	2	100%	1	100%
	Total	**2**	**100%**	**1**	**100%**
Eldredge & Cass	Rear End	1	100%		
	Total	**1**	**100%**		
Elizabeth & Dunham	Angle	2	100%		
	Total	**2**	**100%**		
Elizabeth & North	Rear End	3	43%		
	Sideswipe - Same Direction	4	57%		
	Total	**7**	**100%**		
Euclid & Boehme	Angle	1	100%		
	Total	**1**	**100%**		
Euclid & Gold	Sideswipe - Opposit Direction	1	100%		
	Total	**1**	**100%**		
Euclid & North	Angle	1	100%		
	Total	**1**	**100%**		
Floral & Cass	Angle	2	33%		
	Head On - Left Turn	2	33%	1	100%
	Rear End	2	33%		
	Total	**6**	**100%**	**1**	**100%**
Floral & Church	Angle	1	50%		
	Other	1	50%		
	Total	**2**	**100%**		

Intersection	Crash Type	# of Crashes	% of Crashes	# of KAB	% of KAB
Gallup & Madison	Sideswipe - Same Direction	1	100%		
	Total	**1**	**100%**		
Gallup & North	Single Motor Vehicle	1	100%		
	Total	**1**	**100%**		
Grand & Cass	Angle	1	100%		
	Total	**1**	**100%**		
Grand & Eldredge	Angle	1	50%	1	50%
	Head On - Left Turn	1	50%	1	50%
	Total	**2**	**100%**	**2**	**100%**
Gratiot & Ahrens	Angle	2	40%		
	Head On - Left Turn	1	20%		
	Other	1	20%		
	Sideswipe - Same Direction	1	20%		
	Total	**5**	**100%**		
Gratiot & Brooks	Angle	1	17%		
	Other	3	50%	2	100%
	Sideswipe - Same Direction	2	33%		
	Total	**6**	**100%**	**2**	**100%**
Gratiot & Buckingham	Angle	1	100%		
	Total	**1**	**100%**		
Gratiot & Canfield	Angle	1	20%		
	Other	2	40%		
	Sideswipe - Same Direction	2	40%		
	Total	**5**	**100%**		
Gratiot & Cass	Angle	18	32%	1	25%
	Backing	4	7%		
	Head On	1	2%	1	25%
	Head On - Left Turn	1	2%		
	Other	3	5%		
	Rear End	14	25%	1	25%
	Rear End - Left Turn	1	2%		
	Rear End - Right Turn	1	2%		
	Sideswipe - Same Direction	10	18%		
	Single Motor Vehicle	4	7%	1	25%
	Total	**57**	**100%**	**4**	**100%**
Gratiot & Church	Angle	6	26%	1	50%
	Head On - Left Turn	1	4%		
	Other	5	22%	1	50%
	Rear End	4	17%		
	Rear End - Left Turn	2	9%		
	Sideswipe - Same Direction	3	13%		
	Single Motor Vehicle	2	9%		
	Total	**23**	**100%**	**2**	**100%**
Gratiot & Clair	Angle	8	47%	3	100%
	Other	4	24%		
	Rear End	3	18%		
	Sideswipe - Same Direction	2	12%		
	Total	**17**	**100%**	**3**	**100%**

Intersection	Crash Type	# of Crashes	% of Crashes	# of KAB	% of KAB
Gratiot & Clinton River	Angle	7	39%	1	100%
	Other	1	6%		
	Sideswipe - Same Direction	6	33%		
	Single Motor Vehicle	4	22%		
	Total	**18**	**100%**	**1**	**100%**
Gratiot & Euclid	Angle	4	50%		
	Other	1	13%		
	Rear End	2	25%		
	Single Motor Vehicle	1	13%		
	Total	**8**	**100%**		
Gratiot & Gallup	Angle	4	50%	1	100%
	Other	1	13%		
	Sideswipe - Same Direction	3	38%		
	Total	**8**	**100%**	**1**	**100%**
Gratiot & Grand	Sideswipe - Same Direction	1	100%		
	Total	**1**	**100%**		
Gratiot & Gratiot	Angle	1	100%		
	Total	**1**	**100%**		
Gratiot & Harrington	Angle	12	48%	1	25%
	Other	5	20%	3	75%
	Rear End	3	12%		
	Sideswipe - Same Direction	4	16%		
	Unknown	1	4%		
	Total	**25**	**100%**	**4**	**100%**
Gratiot & Henry B Joy	Angle	2	25%		
	Other	2	25%	1	33%
	Rear End - Left Turn	1	13%	2	67%
	Sideswipe - Same Direction	3	38%		
	Total	**8**	**100%**	**3**	**100%**
Gratiot & High	Angle	2	67%		
	Sideswipe - Same Direction	1	33%		
	Total	**3**	**100%**		
Gratiot & Huron	Angle	2	50%	1	100%
	Other	1	25%		
	Sideswipe - Same Direction	1	25%		
	Total	**4**	**100%**	**1**	**100%**
Gratiot & Inches	Angle	2	67%		
	Rear End	1	33%		
	Total	**3**	**100%**		
Gratiot & Iroquois	Angle	1	25%		
	Head On	1	25%		
	Rear End	1	25%		
	Single Motor Vehicle	1	25%	1	100%
	Total	**4**	**100%**	**1**	**100%**
Gratiot & Jones	Angle	1	50%		
	Other	1	50%		
	Total	**2**	**100%**		

Intersection	Crash Type	# of Crashes	% of Crashes	# of KAB	% of KAB
Gratiot & Kibbee	Angle	2	50%	1	100%
	Other	1	25%		
	Rear End - Right Turn	1	25%		
	Total	**4**	**100%**	**1**	**100%**
Gratiot & Kibbie	Sideswipe - Opposit Direction	1	100%		
	Total	**1**	**100%**		
Gratiot & Macomb	Angle	2	33%		
	Rear End	2	33%		
	Sideswipe - Same Direction	1	17%		
	Single Motor Vehicle	1	17%	1	100%
	Total	**6**	**100%**	**1**	**100%**
Gratiot & Main	Angle	6	21%		
	Head On - Left Turn	1	4%		
	Other	3	11%		
	Rear End	15	54%		
	Rear End - Right Turn	1	4%		
	Sideswipe - Same Direction	1	4%		
	Single Motor Vehicle	1	4%		
	Total	**28**	**100%**		
Gratiot & Market	Angle	25	45%	5	100%
	Backing	1	2%		
	Head On - Left Turn	1	2%		
	Other	6	11%		
	Rear End	9	16%		
	Rear End - Left Turn	1	2%		
	Sideswipe - Same Direction	7	13%		
	Single Motor Vehicle	4	7%		
	Unknown	1	2%		
	Total	**55**	**100%**	**5**	**100%**
Gratiot & Moser	Angle	2	40%		
	Head On - Left Turn	1	20%		
	Sideswipe - Same Direction	2	40%		
	Total	**5**	**100%**		
Gratiot & New	Angle	2	40%		
	Sideswipe - Same Direction	1	20%		
	Single Motor Vehicle	2	40%		
	Total	**5**	**100%**		
Gratiot & North	Single Motor Vehicle	1	100%		
	Total	**1**	**100%**		
Gratiot & Park	Angle	1	33%		
	Sideswipe - Same Direction	2	67%		
	Total	**3**	**100%**		
Gratiot & Pine	Angle	1	100%		
	Total	**1**	**100%**		
Gratiot & River	Single Motor Vehicle	2	100%	1	100%
	Total	**2**	**100%**	**1**	**100%**

Intersection	Crash Type	# of Crashes	% of Crashes	# of KAB	% of KAB
Gratiot & Robertson	Angle	8	57%	2	67%
	Other	1	7%		
	Rear End	2	14%		
	Sideswipe - Same Direction	1	7%		
	Single Motor Vehicle	2	14%	1	33%
	Total	**14**	**100%**	**3**	**100%**
Gratiot & Scott	Angle	2	67%		
	Single Motor Vehicle	1	33%	1	100%
	Total	**3**	**100%**	**1**	**100%**
Gratiot & Walnut	Other	1	17%		
	Rear End	1	17%		
	Rear End - Left Turn	1	17%		
	Sideswipe - Opposit Direction	1	17%		
	Sideswipe - Same Direction	2	33%		
	Total	**6**	**100%**		
Gratiot & Wellington	Angle	3	27%		
	Rear End	3	27%	1	100%
	Rear End - Right Turn	1	9%		
	Sideswipe - Same Direction	4	36%		
	Total	**11**	**100%**	**1**	**100%**
Gratiot & Wells	Angle	2	33%	1	100%
	Other	1	17%		
	Rear End	2	33%		
	Sideswipe - Same Direction	1	17%		
	Total	**6**	**100%**	**1**	**100%**
Greosbeck & Church	Rear End	1	100%		
	Total	**1**	**100%**		
Greosbeck & Cass	Angle	1	100%	2	100%
	Total	**1**	**100%**	**2**	**100%**
Groesbeck & Cass	Angle	11	15%		
	Head On - Left Turn	3	4%	1	25%
	Other	5	7%	1	25%
	Rear End	35	49%	1	25%
	Sideswipe - Same Direction	17	24%		
	Single Motor Vehicle	1	1%	1	25%
	Total	**72**	**100%**	**4**	**100%**
Groesbeck & Church	Angle	7	33%	2	100%
	Other	3	14%		
	Rear End	9	43%		
	Sideswipe - Opposit Direction	1	5%		
	Sideswipe - Same Direction	1	5%		
	Total	**21**	**100%**	**2**	**100%**

Intersection	Crash Type	# of Crashes	% of Crashes	# of KAB	% of KAB
Groesbeck & Elizabeth	Angle	11	31%	3	50%
	Backing	2	6%		
	Head On - Left Turn	5	14%	3	50%
	Other	1	3%		
	Rear End	12	33%		
	Rear End - Right Turn	1	3%		
	Sideswipe - Opposit Direction	1	3%		
	Sideswipe - Same Direction	1	3%		
	Single Motor Vehicle	2	6%		
	Total	**36**	**100%**	**6**	**100%**
Groesbeck & Groesbeck	Angle	4	44%	1	100%
	Head On - Left Turn	1	11%		
	Other	1	11%		
	Rear End	1	11%		
	Sideswipe - Same Direction	2	22%		
	Total	**9**	**100%**	**1**	**100%**
Groesbeck & Hillcrest	Other	1	20%		
	Rear End	3	60%	1	100%
	Sideswipe - Same Direction	1	20%		
	Total	**5**	**100%**	**1**	**100%**
Groesbeck & Hubbard	Angle	3	33%	1	25%
	Head On - Left Turn	1	11%	1	25%
	Other	4	44%	2	50%
	Single Motor Vehicle	1	11%		
	Total	**9**	**100%**	**4**	**100%**
Groesbeck & Lafayette	Rear End	1	50%		
	Sideswipe - Same Direction	1	50%	1	100%
	Total	**2**	**100%**	**1**	**100%**
Groesbeck & Lafayette Ave	Sideswipe - Same Direction	1	100%	1	100%
	Total	**1**	**100%**	**1**	**100%**
Groesbeck & Malow	Angle	2	33%		
	Backing	1	17%		
	Head On - Left Turn	1	17%		
	Rear End	1	17%		
	Sideswipe - Same Direction	1	17%		
	Total	**6**	**100%**		
Groesbeck & Rose	Angle	2	11%		
	Head On - Left Turn	4	21%	1	33%
	Other	1	5%		
	Rear End	6	32%	2	67%
	Sideswipe - Opposit Direction	1	5%		
	Sideswipe - Same Direction	2	11%		
	Single Motor Vehicle	3	16%		
	Total	**19**	**100%**	**3**	**100%**
Grove Park & Hubbard	Sideswipe - Same Direction	1	100%		
	Total	**1**	**100%**		
Hampton & Esplanade	Angle	1	100%		
	Total	**1**	**100%**		

Intersection	Crash Type	# of Crashes	% of Crashes	# of KAB	% of KAB
Harper & Crocker	Angle	2	29%		
	Head On - Left Turn	1	14%	1	100%
	Rear End	2	29%		
	Single Motor Vehicle	2	29%		
	Total	**7**	**100%**	**1**	**100%**
Harper & Harper	Angle	1	50%		
	Other	1	50%		
	Total	**2**	**100%**		
Harrington & Hampton	Angle	2	67%		
	Single Motor Vehicle	1	33%		
	Total	**3**	**100%**		
Harrington & Harrington	Angle	1	50%		
	Other	1	50%		
	Total	**2**	**100%**		
Harrington & Hilldale	Angle	3	38%		
	Rear End	3	38%		
	Sideswipe - Same Direction	2	25%		
	Total	**8**	**100%**		
Harrington & Shiawassee	Rear End	1	100%		
	Total	**1**	**100%**		
Harrington & Wellesley	Angle	1	50%		
	Other	1	50%		
	Total	**2**	**100%**		
Harrington & Wellington	Angle	3	60%		
	Other	1	20%		
	Rear End	1	20%		
	Total	**5**	**100%**		
Howard & Euclid	Sideswipe - Same Direction	1	100%		
	Total	**1**	**100%**		
Hubbard & Grove Park	Angle	1	100%	1	100%
	Total	**1**	**100%**	**1**	**100%**
Hubbard & Madison	Angle	3	50%		
	Head On	1	17%	2	100%
	Rear End	1	17%		
	Single Motor Vehicle	1	17%		
	Total	**6**	**100%**	**2**	**100%**
Hubbard & Mary	Angle	1	100%		
	Total	**1**	**100%**		
Hubbard & North	Angle	2	50%		
	Head On - Left Turn	1	25%		
	Single Motor Vehicle	1	25%		
	Total	**4**	**100%**		
Hubbard & Rose	Angle	1	100%		
	Total	**1**	**100%**		
Hubbard & Washington	Angle	2	100%		
	Total	**2**	**100%**		
Jones & Clinton River	Sideswipe - Opposit Direction	1	100%		
	Total	**1**	**100%**		

Intersection	Crash Type	# of Crashes	% of Crashes	# of KAB	% of KAB
Jones & North	Sideswipe - Same Direction	1	100%		
	Total	**1**	**100%**		
Judge & Gibbs	Sideswipe - Same Direction	1	100%		
	Total	**1**	**100%**		
Kibbee & Colonial	Rear End	1	100%		
	Total	**1**	**100%**		
Lafayette & North	Sideswipe - Opposit Direction	1	100%		
	Total	**1**	**100%**		
Lafayette & Wilson	Single Motor Vehicle	1	100%		
	Total	**1**	**100%**		
Lincoln & Washington	Angle	1	100%		
	Total	**1**	**100%**		
Lodewyck & Cass	Rear End	2	67%		
	Single Motor Vehicle	1	33%		
	Total	**3**	**100%**		
Lodewyck & Church	Angle	1	100%	1	100%
	Total	**1**	**100%**	**1**	**100%**
Logan & Cass	Angle	2	33%		
	Backing	1	17%		
	Other	1	17%		
	Rear End	1	17%		
	Sideswipe - Same Direction	1	17%		
	Total	**6**	**100%**		
Mack & Cass	Rear End	1	100%		
	Total	**1**	**100%**		
Macomb & Macomb	Other	1	100%		
	Total	**1**	**100%**		
Madison & Hubbard	Angle	2	67%		
	Other	1	33%		
	Total	**3**	**100%**		
Main & Cass	Angle	4	21%		
	Backing	1	5%		
	Head On - Left Turn	2	11%		
	Other	1	5%	1	33%
	Rear End	4	21%		
	Rear End - Left Turn	1	5%		
	Sideswipe - Same Direction	2	11%		
	Single Motor Vehicle	4	21%	2	67%
	Total	**19**	**100%**	**3**	**100%**
Main & Main	Sideswipe - Same Direction	1	50%		
	Single Motor Vehicle	1	50%		
	Total	**2**	**100%**		
Main & Market	Other	1	100%		
	Total	**1**	**100%**		
Main & Robertson	Angle	4	100%	1	100%
	Total	**4**	**100%**	**1**	**100%**
Main & Terry	Angle	1	100%		
	Total	**1**	**100%**		

Intersection	Crash Type	# of Crashes	% of Crashes	# of KAB	% of KAB
Malow & Rose	Single Motor Vehicle	1	100%		
	Total	**1**	**100%**		
Market & Main	Angle	2	67%		
	Sideswipe - Same Direction	1	33%		
	Total	**3**	**100%**		
Market & Walnut	Single Motor Vehicle	1	100%		
	Total	**1**	**100%**		
Mary & Cass	Angle	1	20%		
	Backing	1	20%		
	Rear End	3	60%		
	Total	**5**	**100%**		
Michigan & Dickinson	Angle	1	100%		
	Total	**1**	**100%**		
Miller & Cass	Rear End	1	100%		
	Total	**1**	**100%**		
Moross & Cass	Angle	1	33%		
	Head On - Left Turn	1	33%		
	Rear End	1	33%		
	Total	**3**	**100%**		
New & Main	Other	1	100%		
	Total	**1**	**100%**		
North & Clair	Angle	2	50%		
	Rear End	1	25%	2	100%
	Sideswipe - Same Direction	1	25%		
	Total	**4**	**100%**	**2**	**100%**
North & Clinton River	Sideswipe - Same Direction	1	100%		
	Total	**1**	**100%**		
North & Elizabeth	Angle	1	25%		
	Other	2	50%		
	Sideswipe - Same Direction	1	25%		
	Total	**4**	**100%**		
North & High	Angle	1	50%		
	Head On - Left Turn	1	50%		
	Total	**2**	**100%**		
North & Hollywood	Rear End	1	100%		
	Total	**1**	**100%**		
North & Hubbard	Single Motor Vehicle	1	100%		
	Total	**1**	**100%**		
North & Lincoln	Sideswipe - Same Direction	1	100%		
	Total	**1**	**100%**		
North & North	Rear End	1	100%		
	Total	**1**	**100%**		
Orchard & Clemens	Single Motor Vehicle	1	100%		
	Total	**1**	**100%**		
Park & Broadway	Angle	1	100%		
	Total	**1**	**100%**		
Park & Court	Angle	1	100%		
	Total	**1**	**100%**		

Intersection	Crash Type	# of Crashes	% of Crashes	# of KAB	% of KAB
Park & River	Rear End	1	50%		
	Single Motor Vehicle	1	50%		
	Total	**2**	**100%**		
Park & Walnut	Angle	3	100%	1	100%
	Total	**3**	**100%**	**1**	**100%**
Rathbone & Dickinson	Angle	1	100%	1	100%
	Total	**1**	**100%**	**1**	**100%**
River & I 94/River Ramp	Rear End	1	100%		
	Total	**1**	**100%**		
River & Jones	Single Motor Vehicle	1	100%		
	Total	**1**	**100%**		
River & Park	Angle	2	33%		
	Head On - Left Turn	2	33%		
	Other	1	17%		
	Sideswipe - Same Direction	1	17%		
	Total	**6**	**100%**		
River & River	Other	1	100%		
	Total	**1**	**100%**		
River & Riverview	Angle	1	50%		
	Rear End	1	50%		
	Total	**2**	**100%**		
Riverside & Avon	Single Motor Vehicle	1	100%	1	100%
	Total	**1**	**100%**	**1**	**100%**
Roberston & Beyne	Single Motor Vehicle	1	100%	1	100%
	Total	**1**	**100%**	**1**	**100%**
Robertson & Main	Angle	4	67%		
	Other	1	17%		
	Single Motor Vehicle	1	17%		
	Total	**6**	**100%**		
Rose & Cass	Angle	10	67%		
	Other	1	7%		
	Rear End	2	13%		
	Rear End - Right Turn	1	7%		
	Sideswipe - Same Direction	1	7%		
	Total	**15**	**100%**		
Rose & Christine	Single Motor Vehicle	1	100%		
	Total	**1**	**100%**		
Rose & Church	Angle	2	67%		
	Backing	1	33%		
	Total	**3**	**100%**		
Rose & Dunham	Angle	1	50%		
	Sideswipe - Opposit Direction	1	50%	1	100%
	Total	**2**	**100%**	**1**	**100%**
Rose & Hubbard	Backing	1	50%		
	Sideswipe - Same Direction	1	50%		
	Total	**2**	**100%**		
Shadyside & Barbara	Angle	1	100%		
	Total	**1**	**100%**		

Intersection	Crash Type	# of Crashes	% of Crashes	# of KAB	% of KAB
Sheridan & Cass	Angle	1	25%		
	Other	2	50%		
	Rear End	1	25%		
	Total	**4**	**100%**		
Smith & Lois	Angle	1	100%		
	Total	**1**	**100%**		
Walnut & Cass	Head On - Left Turn	1	25%		
	Other	1	25%		
	Rear End	1	25%		
	Single Motor Vehicle	1	25%		
	Total	**4**	**100%**		
Walnut & Clemens	Angle	4	100%		
	Total	**4**	**100%**		
Walnut & Euclid	Single Motor Vehicle	1	100%		
	Total	**1**	**100%**		
Walnut & Park	Angle	4	80%		
	Other	1	20%		
	Total	**5**	**100%**		
Washington & Cass	Other	1	50%		
	Single Motor Vehicle	1	50%		
	Total	**2**	**100%**		
Washington & Hubbard	Rear End	1	100%		
	Total	**1**	**100%**		
Washington & Lincoln	Angle	1	100%		
	Total	**1**	**100%**		
Wellesley & Harrington	Sideswipe - Same Direction	1	100%		
	Total	**1**	**100%**		
Wellington & Harrington	Angle	1	100%		
	Total	**1**	**100%**		
Wilson & Cass	Angle	1	33%		
	Backing	1	33%		
	Rear End	1	33%		
	Total	**3**	**100%**		
Wilson & Church	Other	1	100%		
	Total	**1**	**100%**		
Wilson & Hubbard	Sideswipe - Opposit Direction	1	100%		
	Total	**1**	**100%**		
Wilson & Jones	Backing	1	33%		
	Rear End	1	33%		
	Sideswipe - Same Direction	1	33%		
	Total	**3**	**100%**		
Wilson & Robertson	Backing	1	100%		
	Total	**1**	**100%**		

Appendix C

N. MAIN STREET LOS REPORTS

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	18	48	16	27	113	5	29	199	42	32	190	13
Future Volume (veh/h)	18	48	16	27	113	5	29	199	42	32	190	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	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	1730	1730	1730	1744	1744	1744	1730	1730	1730	1800	1800	1800
Adj Flow Rate, veh/h	25	68	23	36	149	7	38	262	55	43	253	17
Peak Hour Factor	0.71	0.71	0.71	0.76	0.76	0.76	0.76	0.76	0.76	0.75	0.75	0.75
Percent Heavy Veh, %	5	5	5	4	4	4	5	5	5	0	0	0
Cap, veh/h	314	170	58	362	249	307	335	343	72	242	351	24
Arrive On Green	0.06	0.14	0.14	0.06	0.14	0.14	0.07	0.25	0.25	0.03	0.21	0.21
Sat Flow, veh/h	1647	1235	418	1661	1744	1467	1647	1386	291	1714	1668	112
Grp Volume(v), veh/h	25	0	91	36	149	7	38	0	317	43	0	270
Grp Sat Flow(s),veh/h/ln	1647	0	1653	1661	1744	1467	1647	0	1677	1714	0	1780
Q Serve(g_s), s	0.0	0.0	2.3	0.0	3.6	0.0	0.0	0.0	8.0	0.0	0.0	6.4
Cycle Q Clear(g_c), s	0.0	0.0	2.3	0.0	3.6	0.0	0.0	0.0	8.0	0.0	0.0	6.4
Prop In Lane	1.00		0.25	1.00		1.00	1.00		0.17	1.00		0.06
Lane Grp Cap(c), veh/h	314	0	228	362	249	307	335	0	415	242	0	375
V/C Ratio(X)	0.08	0.00	0.40	0.10	0.60	0.02	0.11	0.00	0.76	0.18	0.00	0.72
Avail Cap(c_a), veh/h	442	0	696	483	734	715	481	0	702	457	0	745
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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.2	0.0	17.8	17.0	18.2	14.3	17.7	0.0	15.8	20.8	0.0	16.7
Incr Delay (d2), s/veh	0.1	0.0	1.1	0.1	2.3	0.0	0.1	0.0	2.9	0.3	0.0	2.6
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	0.2	0.0	0.8	0.3	1.4	0.1	0.3	0.0	2.9	0.4	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	18.3	0.0	19.0	17.1	20.5	14.3	17.8	0.0	18.8	21.1	0.0	19.3
LnGrp LOS	B		B	B	C	B	B		B	C		B
Approach Vol, veh/h		116			192			355			313	
Approach Delay, s/veh		18.8			19.7			18.7			19.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	12.4	9.0	15.6	8.7	12.1	7.3	17.2
Change Period (Y+Rc), s	5.9	5.9	6.0	6.0	5.9	5.9	6.0	6.0
Max Green Setting (Gmax), s	6.1	19.1	7.0	19.0	6.1	19.1	7.0	19.0
Max Q Clear Time (g_c+I1), s	2.0	5.6	2.0	8.4	2.0	4.3	2.0	10.0
Green Ext Time (p_c), s	0.0	0.6	0.0	1.1	0.0	0.3	0.0	1.2

Intersection Summary	
HCM 7th Control Delay, s/veh	19.2
HCM 7th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	271	123	57	290	42	19	54	11	8	105	17
Future Volume (vph)	52	271	123	57	290	42	19	54	11	8	105	17
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1647	1748	1485	1661	1765	1500	1674	1765	1500	1667	1728	
Flt Permitted	0.55	1.00	1.00	0.57	1.00	1.00	0.63	1.00	1.00	0.72	1.00	
Satd. Flow (perm)	947	1748	1485	1004	1765	1500	1111	1765	1500	1261	1728	
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.91	0.91	0.91	0.60	0.60	0.60
Adj. Flow (vph)	57	295	134	63	322	47	21	59	12	13	175	28
RTOR Reduction (vph)	0	0	71	0	0	25	0	0	8	0	9	0
Lane Group Flow (vph)	57	295	63	63	322	22	21	59	4	13	194	0
Confl. Peds. (#/hr)	9			17			1			3		
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0	20.0	20.0	20.0	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0	20.0	20.0	20.0	
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.33	0.33	0.33	0.33	0.33	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	441	815	693	468	823	700	370	588	500	420	576	
v/s Ratio Prot		0.17			c0.18			0.03			c0.11	
v/s Ratio Perm	0.06		0.04	0.06		0.01	0.02		0.00	0.01		
v/c Ratio	0.13	0.36	0.09	0.13	0.39	0.03	0.06	0.10	0.01	0.03	0.34	
Uniform Delay, d1	9.1	10.3	8.9	9.1	10.4	8.7	13.6	13.8	13.4	13.5	15.0	
Progression Factor	1.00	1.00	1.00	0.53	0.49	0.59	0.64	0.66	1.00	1.00	1.00	
Incremental Delay, d2	0.6	1.2	0.3	0.4	1.0	0.1	0.3	0.3	0.0	0.1	1.6	
Delay (s)	9.7	11.5	9.2	5.2	6.1	5.1	9.0	9.4	13.4	13.6	16.6	
Level of Service	A	B	A	A	A	A	A	A	B	B	B	
Approach Delay (s/veh)		10.7			5.8			9.9			16.4	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	9	129	139	20	4	5
Future Vol, veh/h	9	129	139	20	4	5
Conflicting Peds, #/hr	2	0	0	4	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	70	70	60	60
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	11	157	199	29	7	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	231	0	-	0	399	217
Stage 1	-	-	-	-	217	-
Stage 2	-	-	-	-	182	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1337	-	-	-	610	828
Stage 1	-	-	-	-	824	-
Stage 2	-	-	-	-	854	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1332	-	-	-	601	825
Mov Cap-2 Maneuver	-	-	-	-	653	-
Stage 1	-	-	-	-	814	-
Stage 2	-	-	-	-	851	-

Approach	NB	SB	SE
HCM Ctrl Dly, s/v	0.5	0	9.97
HCM LOS			A

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1332	-	739	-	-
HCM Lane V/C Ratio	0.008	-	0.02	-	-
HCM Ctrl Dly (s/v)	7.7	-	10	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	19	100	167	8	6	8
Future Vol, veh/h	19	100	167	8	6	8
Conflicting Peds, #/hr	10	0	0	0	14	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	35	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	76	76	72	72	70	70
Heavy Vehicles, %	3	3	3	3	0	0
Mvmt Flow	25	132	232	11	9	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	253	0	-	0	443	248
Stage 1	-	-	-	-	248	-
Stage 2	-	-	-	-	195	-
Critical Hdwy	4.13	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1306	-	-	-	576	796
Stage 1	-	-	-	-	798	-
Stage 2	-	-	-	-	842	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1294	-	-	-	554	789
Mov Cap-2 Maneuver	-	-	-	-	619	-
Stage 1	-	-	-	-	775	-
Stage 2	-	-	-	-	834	-

Approach	NB	SB	SE
HCM Ctrl Dly, s/v	1.25	0	10.25
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1294	-	706	-	-
HCM Lane V/C Ratio	0.019	-	0.028	-	-
HCM Ctrl Dly (s/v)	7.8	-	10.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	85	165	44	58	87	14	41	488	19	41	251	27
Future Volume (veh/h)	85	165	44	58	87	14	41	488	19	41	251	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	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	1800	1800	1800	1786	1786	1786	1772	1772	1772	1786	1786	1786
Adj Flow Rate, veh/h	120	232	62	72	107	17	43	514	20	44	267	29
Peak Hour Factor	0.71	0.71	0.71	0.81	0.81	0.81	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	1	1	1	2	2	2	1	1	1
Cap, veh/h	384	293	78	182	191	367	369	545	21	166	335	36
Arrive On Green	0.14	0.21	0.21	0.04	0.11	0.11	0.14	0.32	0.32	0.03	0.21	0.21
Sat Flow, veh/h	1714	1368	366	1701	1786	1499	1688	1694	66	1701	1583	172
Grp Volume(v), veh/h	120	0	294	72	107	17	43	0	534	44	0	296
Grp Sat Flow(s),veh/h/ln	1714	0	1733	1701	1786	1499	1688	0	1760	1701	0	1755
Q Serve(g_s), s	0.0	0.0	9.5	0.0	3.4	0.0	0.0	0.0	17.5	0.0	0.0	9.4
Cycle Q Clear(g_c), s	0.0	0.0	9.5	0.0	3.4	0.0	0.0	0.0	17.5	0.0	0.0	9.4
Prop In Lane	1.00		0.21	1.00		1.00	1.00		0.04	1.00		0.10
Lane Grp Cap(c), veh/h	384	0	371	182	191	367	369	0	566	166	0	371
V/C Ratio(X)	0.31	0.00	0.79	0.40	0.56	0.05	0.12	0.00	0.94	0.26	0.00	0.80
Avail Cap(c_a), veh/h	384	0	560	298	578	691	369	0	566	323	0	565
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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.7	0.0	22.0	27.5	25.0	17.1	21.8	0.0	19.5	28.0	0.0	22.1
Incr Delay (d2), s/veh	0.5	0.0	4.5	1.4	2.6	0.1	0.1	0.0	24.5	0.8	0.0	4.6
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	1.4	0.0	4.0	1.0	1.5	0.2	0.5	0.0	10.2	0.6	0.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.1	0.0	26.5	28.9	27.6	17.2	22.0	0.0	44.1	28.8	0.0	26.7
LnGrp LOS	C		C	C	C	B	C		D	C		C
Approach Vol, veh/h		414			196			577			340	
Approach Delay, s/veh		25.2			27.2			42.4			27.0	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.3	12.2	14.0	18.5	8.0	18.5	7.5	25.0
Change Period (Y+Rc), s	5.9	5.9	6.0	6.0	5.9	5.9	6.0	6.0
Max Green Setting (Gmax), s	6.1	19.1	7.0	19.0	6.1	19.1	7.0	19.0
Max Q Clear Time (g_c+I1), s	2.0	5.4	2.0	11.4	2.0	11.5	2.0	19.5
Green Ext Time (p_c), s	0.1	0.4	0.0	1.0	0.0	1.0	0.0	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	32.4
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	539	25	46	390	49	84	194	63	45	79	46
Future Volume (vph)	62	539	25	46	390	49	84	194	63	45	79	46
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1683	1782	1515	1702	1800	1530	1707	1800	1530	1671	1667	
Flt Permitted	0.41	1.00	1.00	0.29	1.00	1.00	0.65	1.00	1.00	0.49	1.00	
Satd. Flow (perm)	727	1782	1515	517	1800	1530	1175	1800	1530	869	1667	
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	0.85	0.61	0.61	0.61	0.77	0.77	0.77
Adj. Flow (vph)	68	592	27	54	459	58	138	318	103	58	103	60
RTOR Reduction (vph)	0	0	14	0	0	31	0	0	69	0	35	0
Lane Group Flow (vph)	68	592	13	54	459	27	138	318	34	58	128	0
Confl. Peds. (#/hr)	9			17			1			3		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0	20.0	20.0	20.0	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0	20.0	20.0	20.0	
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.33	0.33	0.33	0.33	0.33	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	339	831	707	241	840	714	391	600	510	289	555	
v/s Ratio Prot		c0.33			0.26			c0.18			0.08	
v/s Ratio Perm	0.09		0.01	0.10		0.02	0.12		0.02	0.07		
v/c Ratio	0.20	0.71	0.02	0.22	0.55	0.04	0.35	0.53	0.07	0.20	0.23	
Uniform Delay, d1	9.4	12.8	8.6	9.5	11.5	8.7	15.1	16.2	13.6	14.3	14.4	
Progression Factor	1.00	1.00	1.00	0.53	0.47	0.57	0.94	0.94	0.85	1.00	1.00	
Incremental Delay, d2	1.3	5.2	0.0	1.5	1.8	0.1	2.5	3.3	0.3	1.6	1.0	
Delay (s)	10.7	17.9	8.7	6.5	7.1	5.0	16.7	18.5	11.8	15.8	15.4	
Level of Service	B	B	A	A	A	A	B	B	B	B	B	
Approach Delay (s/veh)		16.9			6.8			16.8			15.5	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	18	296	149	4	5	11
Future Vol, veh/h	18	296	149	4	5	11
Conflicting Peds, #/hr	2	0	0	4	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	75	75	80	80	80	80
Heavy Vehicles, %	1	1	3	3	0	0
Mvmt Flow	24	395	186	5	6	14

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	195	0	-	0	638	193
Stage 1	-	-	-	-	193	-
Stage 2	-	-	-	-	446	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1384	-	-	-	444	854
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	650	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1378	-	-	-	433	851
Mov Cap-2 Maneuver	-	-	-	-	522	-
Stage 1	-	-	-	-	827	-
Stage 2	-	-	-	-	647	-

Approach	NB	SB	SE
HCM Ctrl Dly, s/v	0.44	0	10.21
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1378	-	711	-	-
HCM Lane V/C Ratio	0.017	-	0.028	-	-
HCM Ctrl Dly (s/v)	7.7	-	10.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	37	279	126	24	27	21
Future Vol, veh/h	37	279	126	24	27	21
Conflicting Peds, #/hr	10	0	0	0	14	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	35	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	71	71	83	83	80	80
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	52	393	152	29	34	26

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	191	0	-	0	687	176
Stage 1	-	-	-	-	176	-
Stage 2	-	-	-	-	511	-
Critical Hdwy	4.11	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.209	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1389	-	-	-	412	867
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	602	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1376	-	-	-	389	859
Mov Cap-2 Maneuver	-	-	-	-	482	-
Stage 1	-	-	-	-	814	-
Stage 2	-	-	-	-	596	-

Approach	NB	SB	SE
HCM Ctrl Dly, s/v	0.9	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1376	-	597	-	-
HCM Lane V/C Ratio	0.038	-	0.101	-	-
HCM Ctrl Dly (s/v)	7.7	-	11.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	19	52	17	29	122	5	31	215	45	35	205	14
Future Volume (veh/h)	19	52	17	29	122	5	31	215	45	35	205	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	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	1730	1730	1730	1744	1744	1744	1730	1730	1730	1800	1800	1800
Adj Flow Rate, veh/h	27	73	24	38	161	7	41	283	59	47	273	19
Peak Hour Factor	0.71	0.71	0.71	0.76	0.76	0.76	0.76	0.76	0.76	0.75	0.75	0.75
Percent Heavy Veh, %	5	5	5	4	4	4	5	5	5	0	0	0
Cap, veh/h	295	166	54	362	258	318	331	361	75	233	368	26
Arrive On Green	0.06	0.13	0.13	0.07	0.15	0.15	0.07	0.26	0.26	0.03	0.22	0.22
Sat Flow, veh/h	1647	1245	409	1661	1744	1468	1647	1388	289	1714	1663	116
Grp Volume(v), veh/h	27	0	97	38	161	7	41	0	342	47	0	292
Grp Sat Flow(s),veh/h/ln	1647	0	1654	1661	1744	1468	1647	0	1677	1714	0	1779
Q Serve(g_s), s	0.0	0.0	2.5	0.0	4.1	0.0	0.0	0.0	8.9	0.0	0.0	7.2
Cycle Q Clear(g_c), s	0.0	0.0	2.5	0.0	4.1	0.0	0.0	0.0	8.9	0.0	0.0	7.2
Prop In Lane	1.00		0.25	1.00		1.00	1.00		0.17	1.00		0.07
Lane Grp Cap(c), veh/h	295	0	220	362	258	318	331	0	436	233	0	393
V/C Ratio(X)	0.09	0.00	0.44	0.10	0.62	0.02	0.12	0.00	0.78	0.20	0.00	0.74
Avail Cap(c_a), veh/h	417	0	672	460	709	697	464	0	678	438	0	719
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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	18.8	17.5	18.8	14.5	18.3	0.0	16.2	21.7	0.0	17.1
Incr Delay (d2), s/veh	0.1	0.0	1.4	0.1	2.5	0.0	0.2	0.0	3.2	0.4	0.0	2.8
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	0.3	0.0	1.0	0.3	1.6	0.1	0.4	0.0	3.3	0.5	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.5	0.0	20.1	17.7	21.2	14.5	18.5	0.0	19.4	22.1	0.0	19.8
LnGrp LOS	B		C	B	C	B	B		B	C		B
Approach Vol, veh/h		124			206			383			339	
Approach Delay, s/veh		20.0			20.3			19.3			20.1	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	12.9	9.2	16.4	9.2	12.2	7.4	18.2
Change Period (Y+Rc), s	5.9	5.9	6.0	6.0	5.9	5.9	6.0	6.0
Max Green Setting (Gmax), s	6.1	19.1	7.0	19.0	6.1	19.1	7.0	19.0
Max Q Clear Time (g_c+I1), s	2.0	6.1	2.0	9.2	2.0	4.5	2.0	10.9
Green Ext Time (p_c), s	0.0	0.7	0.0	1.2	0.0	0.3	0.0	1.3

Intersection Summary	
HCM 7th Control Delay, s/veh	19.9
HCM 7th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	293	133	62	313	45	21	58	12	9	113	18
Future Volume (vph)	56	293	133	62	313	45	21	58	12	9	113	18
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	12	12	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1648	1748	1485	1662	1765	1500	1674	1765	1500	1612	1671	
Flt Permitted	0.52	1.00	1.00	0.55	1.00	1.00	0.62	1.00	1.00	0.72	1.00	
Satd. Flow (perm)	901	1748	1485	962	1765	1500	1096	1765	1500	1213	1671	
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.91	0.91	0.91	0.60	0.60	0.60
Adj. Flow (vph)	61	318	145	69	348	50	23	64	13	15	188	30
RTOR Reduction (vph)	0	0	77	0	0	27	0	0	9	0	9	0
Lane Group Flow (vph)	61	318	68	69	348	23	23	64	4	15	209	0
Confl. Peds. (#/hr)	9			17			1			3		
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0	20.0	20.0	20.0	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0	20.0	20.0	20.0	
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.33	0.33	0.33	0.33	0.33	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	420	815	693	448	823	700	365	588	500	404	557	
v/s Ratio Prot		0.18			c0.20			0.04			c0.12	
v/s Ratio Perm	0.07		0.05	0.07		0.02	0.02		0.00	0.01		
v/c Ratio	0.15	0.39	0.10	0.15	0.42	0.03	0.06	0.11	0.01	0.04	0.37	
Uniform Delay, d1	9.2	10.4	8.9	9.2	10.6	8.7	13.6	13.8	13.4	13.5	15.2	
Progression Factor	1.00	1.00	1.00	0.53	0.48	0.58	0.65	0.66	1.00	1.00	1.00	
Incremental Delay, d2	0.7	1.4	0.3	0.5	1.1	0.1	0.3	0.4	0.0	0.2	1.9	
Delay (s)	9.9	11.8	9.2	5.4	6.2	5.1	9.1	9.5	13.4	13.7	17.2	
Level of Service	A	B	A	A	A	A	A	A	B	B	B	
Approach Delay (s/veh)		10.9			6.0			9.9			16.9	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	10	139	150	22	4	5
Future Vol, veh/h	10	139	150	22	4	5
Conflicting Peds, #/hr	2	0	0	4	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	70	70	60	60
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	12	170	214	31	7	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	250	0	-	0	431	234
Stage 1	-	-	-	-	234	-
Stage 2	-	-	-	-	197	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1316	-	-	-	585	810
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	841	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1311	-	-	-	575	807
Mov Cap-2 Maneuver	-	-	-	-	575	-
Stage 1	-	-	-	-	799	-
Stage 2	-	-	-	-	838	-

Approach	NB	SB	SE
HCM Ctrl Dly, s/v	0.52	0	10.38
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1311	-	685	-	-
HCM Lane V/C Ratio	0.009	-	0.022	-	-
HCM Ctrl Dly (s/v)	7.8	-	10.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	21	108	180	9	6	9
Future Vol, veh/h	21	108	180	9	6	9
Conflicting Peds, #/hr	10	0	0	0	14	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	76	76	72	72	70	70
Heavy Vehicles, %	3	3	3	3	0	0
Mvmt Flow	28	142	250	13	9	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	273	0	-	0	478	266
Stage 1	-	-	-	-	266	-
Stage 2	-	-	-	-	211	-
Critical Hdwy	4.13	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1285	-	-	-	550	777
Stage 1	-	-	-	-	783	-
Stage 2	-	-	-	-	829	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1273	-	-	-	528	770
Mov Cap-2 Maneuver	-	-	-	-	528	-
Stage 1	-	-	-	-	759	-
Stage 2	-	-	-	-	821	-

Approach	NB	SB	SE
HCM Ctrl Dly, s/v	1.28	0	10.72
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1273	-	651	-	-
HCM Lane V/C Ratio	0.022	-	0.033	-	-
HCM Ctrl Dly (s/v)	7.9	-	10.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	92	178	48	63	94	15	44	527	21	44	271	29
Future Volume (veh/h)	92	178	48	63	94	15	44	527	21	44	271	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	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	1800	1800	1800	1786	1786	1786	1772	1772	1772	1786	1786	1786
Adj Flow Rate, veh/h	130	251	68	78	116	19	46	555	22	47	288	31
Peak Hour Factor	0.71	0.71	0.71	0.81	0.81	0.81	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	1	1	1	2	2	2	1	1	1
Cap, veh/h	399	309	84	181	193	343	344	533	21	166	353	38
Arrive On Green	0.15	0.23	0.23	0.04	0.11	0.11	0.12	0.32	0.32	0.03	0.22	0.22
Sat Flow, veh/h	1714	1363	369	1701	1786	1500	1688	1693	67	1701	1585	171
Grp Volume(v), veh/h	130	0	319	78	116	19	46	0	577	47	0	319
Grp Sat Flow(s),veh/h/ln	1714	0	1733	1701	1786	1500	1688	0	1760	1701	0	1755
Q Serve(g_s), s	0.0	0.0	10.5	0.0	3.7	0.0	0.0	0.0	19.0	0.0	0.0	10.4
Cycle Q Clear(g_c), s	0.0	0.0	10.5	0.0	3.7	0.0	0.0	0.0	19.0	0.0	0.0	10.4
Prop In Lane	1.00		0.21	1.00		1.00	1.00		0.04	1.00		0.10
Lane Grp Cap(c), veh/h	399	0	393	181	193	343	344	0	555	166	0	391
V/C Ratio(X)	0.33	0.00	0.81	0.43	0.60	0.06	0.13	0.00	1.04	0.28	0.00	0.82
Avail Cap(c_a), veh/h	399	0	549	292	566	656	344	0	555	317	0	553
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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.5	0.0	22.1	28.0	25.6	18.2	23.0	0.0	20.6	28.5	0.0	22.2
Incr Delay (d2), s/veh	0.5	0.0	6.3	1.6	3.0	0.1	0.2	0.0	49.1	0.9	0.0	6.3
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	1.5	0.0	4.6	1.1	1.7	0.2	0.6	0.0	14.5	0.7	0.0	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.0	0.0	28.4	29.6	28.6	18.3	23.2	0.0	69.7	29.5	0.0	28.6
LnGrp LOS	C		C	C	C	B	C		F	C		C
Approach Vol, veh/h		449			213			623			366	
Approach Delay, s/veh		26.6			28.0			66.3			28.7	
Approach LOS		C			C			E			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.2	12.4	13.2	19.4	8.1	19.6	7.6	25.0
Change Period (Y+Rc), s	5.9	5.9	6.0	6.0	5.9	5.9	6.0	6.0
Max Green Setting (Gmax), s	6.1	19.1	7.0	19.0	6.1	19.1	7.0	19.0
Max Q Clear Time (g_c+I1), s	2.0	5.7	2.0	12.4	2.0	12.5	2.0	21.0
Green Ext Time (p_c), s	0.1	0.5	0.0	1.0	0.0	1.0	0.0	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	42.2
HCM 7th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	582	27	50	421	53	91	210	69	49	85	50
Future Volume (vph)	67	582	27	50	421	53	91	210	69	49	85	50
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	12	12	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1684	1782	1515	1703	1800	1530	1707	1800	1530	1615	1611	
Flt Permitted	0.38	1.00	1.00	0.25	1.00	1.00	0.65	1.00	1.00	0.46	1.00	
Satd. Flow (perm)	668	1782	1515	441	1800	1530	1162	1800	1530	780	1611	
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	0.85	0.61	0.61	0.61	0.77	0.77	0.77
Adj. Flow (vph)	74	640	30	59	495	62	149	344	113	64	110	65
RTOR Reduction (vph)	0	0	16	0	0	33	0	0	75	0	35	0
Lane Group Flow (vph)	74	640	14	59	495	29	149	344	38	64	140	0
Confl. Peds. (#/hr)	9			17			1			3		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0	20.0	20.0	20.0	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0	20.0	20.0	20.0	
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.33	0.33	0.33	0.33	0.33	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	311	831	707	205	840	714	387	600	510	260	537	
v/s Ratio Prot		c0.36			0.28			c0.19			0.09	
v/s Ratio Perm	0.11		0.01	0.13		0.02	0.13		0.02	0.08		
v/c Ratio	0.24	0.77	0.02	0.29	0.59	0.04	0.39	0.57	0.07	0.25	0.26	
Uniform Delay, d1	9.6	13.3	8.6	9.9	11.8	8.7	15.3	16.5	13.7	14.5	14.6	
Progression Factor	1.00	1.00	1.00	0.51	0.46	0.58	0.94	0.94	0.86	1.00	1.00	
Incremental Delay, d2	1.8	6.8	0.1	2.4	2.1	0.1	2.9	3.9	0.3	2.2	1.2	
Delay (s)	11.4	20.1	8.7	7.5	7.5	5.1	17.3	19.5	12.0	16.8	15.8	
Level of Service	B	C	A	A	A	A	B	B	B	B	B	
Approach Delay (s/veh)		18.8			7.3			17.5			16.0	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	19	320	161	4	5	12
Future Vol, veh/h	19	320	161	4	5	12
Conflicting Peds, #/hr	2	0	0	4	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	75	75	80	80	80	80
Heavy Vehicles, %	1	1	3	3	0	0
Mvmt Flow	25	427	201	5	6	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	210	0	-	0	688	208
Stage 1	-	-	-	-	208	-
Stage 2	-	-	-	-	480	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1366	-	-	-	415	838
Stage 1	-	-	-	-	832	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1361	-	-	-	404	835
Mov Cap-2 Maneuver	-	-	-	-	404	-
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	624	-

Approach	NB	SB	SE
HCM Ctrl Dly, s/v	0.43	0	10.86
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1361	-	636	-	-
HCM Lane V/C Ratio	0.019	-	0.033	-	-
HCM Ctrl Dly (s/v)	7.7	-	10.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	40	301	136	26	29	23
Future Vol, veh/h	40	301	136	26	29	23
Conflicting Peds, #/hr	10	0	0	0	14	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	71	71	83	83	80	80
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	56	424	164	31	36	29

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	205	0	-	0	740	190
Stage 1	-	-	-	-	190	-
Stage 2	-	-	-	-	551	-
Critical Hdwy	4.11	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.209	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1372	-	-	-	384	852
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	578	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1359	-	-	-	361	844
Mov Cap-2 Maneuver	-	-	-	-	361	-
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	572	-

Approach	NB	SB	SE
HCM Ctrl Dly, s/v	0.91	0	13.6
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1359	-	484	-	-
HCM Lane V/C Ratio	0.041	-	0.134	-	-
HCM Ctrl Dly (s/v)	7.8	-	13.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	19	52	17	29	122	5	31	215	45	35	205	14
Future Volume (veh/h)	19	52	17	29	122	5	31	215	45	35	205	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	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	1730	1730	1730	1744	1744	1744	1730	1730	1730	1800	1800	1800
Adj Flow Rate, veh/h	27	73	24	38	161	7	41	283	59	47	273	19
Peak Hour Factor	0.71	0.71	0.71	0.76	0.76	0.76	0.76	0.76	0.76	0.75	0.75	0.75
Percent Heavy Veh, %	5	5	5	4	4	4	5	5	5	0	0	0
Cap, veh/h	294	165	54	362	258	319	332	363	76	234	370	26
Arrive On Green	0.06	0.13	0.13	0.07	0.15	0.15	0.07	0.26	0.26	0.03	0.22	0.22
Sat Flow, veh/h	1647	1245	409	1661	1744	1468	1647	1388	289	1714	1663	116
Grp Volume(v), veh/h	27	0	97	38	161	7	41	0	342	47	0	292
Grp Sat Flow(s),veh/h/ln	1647	0	1654	1661	1744	1468	1647	0	1677	1714	0	1779
Q Serve(g_s), s	0.0	0.0	2.5	0.0	4.1	0.0	0.0	0.0	8.9	0.0	0.0	7.2
Cycle Q Clear(g_c), s	0.0	0.0	2.5	0.0	4.1	0.0	0.0	0.0	8.9	0.0	0.0	7.2
Prop In Lane	1.00		0.25	1.00		1.00	1.00		0.17	1.00		0.07
Lane Grp Cap(c), veh/h	294	0	220	362	258	319	332	0	439	234	0	395
V/C Ratio(X)	0.09	0.00	0.44	0.11	0.62	0.02	0.12	0.00	0.78	0.20	0.00	0.74
Avail Cap(c_a), veh/h	415	0	671	458	707	696	429	0	712	402	0	755
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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.5	0.0	18.8	17.6	18.8	14.5	18.3	0.0	16.1	21.7	0.0	17.0
Incr Delay (d2), s/veh	0.1	0.0	1.4	0.1	2.5	0.0	0.2	0.0	3.0	0.4	0.0	2.7
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	0.3	0.0	1.0	0.3	1.6	0.1	0.4	0.0	3.3	0.5	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.6	0.0	20.2	17.7	21.3	14.6	18.5	0.0	19.2	22.1	0.0	19.8
LnGrp LOS	B		C	B	C	B	B		B	C		B
Approach Vol, veh/h		124			206			383			339	
Approach Delay, s/veh		20.1			20.4			19.1			20.1	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	12.9	9.2	16.5	9.3	12.2	7.4	18.3
Change Period (Y+Rc), s	5.9	5.9	6.0	6.0	5.9	5.9	6.0	6.0
Max Green Setting (Gmax), s	6.1	19.1	6.0	20.0	6.1	19.1	6.0	20.0
Max Q Clear Time (g_c+I1), s	2.0	6.1	2.0	9.2	2.0	4.5	2.0	10.9
Green Ext Time (p_c), s	0.0	0.7	0.0	1.2	0.0	0.3	0.0	1.4

Intersection Summary	
HCM 7th Control Delay, s/veh	19.8
HCM 7th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	293	133	62	313	45	21	58	12	9	113	18
Future Volume (vph)	56	293	133	62	313	45	21	58	12	9	113	18
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1648	1748	1485	1662	1765	1500	1674	1765	1500	1667	1728	
Flt Permitted	0.53	1.00	1.00	0.56	1.00	1.00	0.62	1.00	1.00	0.72	1.00	
Satd. Flow (perm)	920	1748	1485	978	1765	1500	1096	1765	1500	1255	1728	
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.91	0.91	0.91	0.60	0.60	0.60
Adj. Flow (vph)	61	318	145	69	348	50	23	64	13	15	188	30
RTOR Reduction (vph)	0	0	73	0	0	25	0	0	9	0	10	0
Lane Group Flow (vph)	61	318	73	69	348	25	23	64	4	15	208	0
Confl. Peds. (#/hr)	9			17			1			3		
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	30.0	30.0	30.0	30.0	30.0	30.0	18.0	18.0	18.0	18.0	18.0	
Effective Green, g (s)	30.0	30.0	30.0	30.0	30.0	30.0	18.0	18.0	18.0	18.0	18.0	
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50	0.50	0.30	0.30	0.30	0.30	0.30	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	460	874	742	489	882	750	328	529	450	376	518	
v/s Ratio Prot		0.18			c0.20			0.04			c0.12	
v/s Ratio Perm	0.07		0.05	0.07		0.02	0.02		0.00	0.01		
v/c Ratio	0.13	0.36	0.10	0.14	0.39	0.03	0.07	0.12	0.01	0.04	0.40	
Uniform Delay, d1	8.0	9.2	7.9	8.1	9.3	7.6	15.0	15.3	14.7	14.9	16.7	
Progression Factor	1.00	1.00	1.00	0.51	0.47	0.53	0.63	0.64	1.00	1.00	1.00	
Incremental Delay, d2	0.6	1.2	0.3	0.4	0.9	0.1	0.4	0.5	0.0	0.2	2.3	
Delay (s)	8.6	10.3	8.1	4.5	5.3	4.1	9.8	10.2	14.8	15.1	19.0	
Level of Service	A	B	A	A	A	A	A	B	B	B	B	
Approach Delay (s/veh)		9.5			5.1			10.7			18.8	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	10	139	150	22	4	5
Future Vol, veh/h	10	139	150	22	4	5
Conflicting Peds, #/hr	2	0	0	4	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	70	70	60	60
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	12	170	214	31	7	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	250	0	-	0	431	234
Stage 1	-	-	-	-	234	-
Stage 2	-	-	-	-	197	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1316	-	-	-	585	810
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	841	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1311	-	-	-	575	807
Mov Cap-2 Maneuver	-	-	-	-	575	-
Stage 1	-	-	-	-	799	-
Stage 2	-	-	-	-	838	-

Approach	NB	SB	SE
HCM Ctrl Dly, s/v	0.52	0	10.38
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1311	-	685	-	-
HCM Lane V/C Ratio	0.009	-	0.022	-	-
HCM Ctrl Dly (s/v)	7.8	-	10.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	21	108	180	9	6	9
Future Vol, veh/h	21	108	180	9	6	9
Conflicting Peds, #/hr	10	0	0	0	14	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	76	76	72	72	70	70
Heavy Vehicles, %	3	3	3	3	0	0
Mvmt Flow	28	142	250	13	9	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	273	0	-	0	478	266
Stage 1	-	-	-	-	266	-
Stage 2	-	-	-	-	211	-
Critical Hdwy	4.13	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1285	-	-	-	550	777
Stage 1	-	-	-	-	783	-
Stage 2	-	-	-	-	829	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1273	-	-	-	528	770
Mov Cap-2 Maneuver	-	-	-	-	528	-
Stage 1	-	-	-	-	759	-
Stage 2	-	-	-	-	821	-

Approach	NB	SB	SE
HCM Ctrl Dly, s/v	1.28	0	10.72
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1273	-	651	-	-
HCM Lane V/C Ratio	0.022	-	0.033	-	-
HCM Ctrl Dly (s/v)	7.9	-	10.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	92	178	48	63	94	15	44	527	21	44	271	29
Future Volume (veh/h)	92	178	48	63	94	15	44	527	21	44	271	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	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	1800	1800	1800	1786	1786	1786	1772	1772	1772	1786	1786	1786
Adj Flow Rate, veh/h	130	251	68	78	116	19	46	555	22	47	288	31
Peak Hour Factor	0.71	0.71	0.71	0.81	0.81	0.81	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	1	1	1	2	2	2	1	1	1
Cap, veh/h	388	304	82	172	189	381	379	582	23	158	354	38
Arrive On Green	0.15	0.22	0.22	0.04	0.11	0.11	0.15	0.34	0.34	0.03	0.22	0.22
Sat Flow, veh/h	1714	1363	369	1701	1786	1499	1688	1693	67	1701	1585	171
Grp Volume(v), veh/h	130	0	319	78	116	19	46	0	577	47	0	319
Grp Sat Flow(s),veh/h/ln	1714	0	1733	1701	1786	1499	1688	0	1760	1701	0	1755
Q Serve(g_s), s	0.0	0.0	11.2	0.0	4.0	0.0	0.0	0.0	20.5	0.0	0.0	11.0
Cycle Q Clear(g_c), s	0.0	0.0	11.2	0.0	4.0	0.0	0.0	0.0	20.5	0.0	0.0	11.0
Prop In Lane	1.00		0.21	1.00		1.00	1.00		0.04	1.00		0.10
Lane Grp Cap(c), veh/h	388	0	386	172	189	381	379	0	605	158	0	392
V/C Ratio(X)	0.34	0.00	0.83	0.45	0.61	0.05	0.12	0.00	0.95	0.30	0.00	0.81
Avail Cap(c_a), veh/h	388	0	517	248	533	669	379	0	605	245	0	603
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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.0	0.0	23.7	29.8	27.4	18.1	23.1	0.0	20.5	30.3	0.0	23.6
Incr Delay (d2), s/veh	0.5	0.0	8.0	1.9	3.2	0.1	0.1	0.0	25.7	1.0	0.0	4.9
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	1.6	0.0	5.1	1.2	1.8	0.2	0.6	0.0	11.9	0.7	0.0	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	23.5	0.0	31.7	31.7	30.6	18.2	23.2	0.0	46.2	31.4	0.0	28.5
LnGrp LOS	C		C	C	C	B	C		D	C		C
Approach Vol, veh/h		449			213			623			366	
Approach Delay, s/veh		29.3			29.9			44.5			28.9	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.7	12.7	15.4	20.3	8.2	20.2	7.7	28.0
Change Period (Y+Rc), s	5.9	5.9	6.0	6.0	5.9	5.9	6.0	6.0
Max Green Setting (Gmax), s	5.1	19.1	5.0	22.0	5.1	19.1	5.0	22.0
Max Q Clear Time (g_c+I1), s	2.0	6.0	2.0	13.0	2.0	13.2	2.0	22.5
Green Ext Time (p_c), s	0.1	0.5	0.0	1.2	0.0	0.9	0.0	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	35.0
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	582	27	50	421	53	91	210	69	49	85	50
Future Volume (vph)	67	582	27	50	421	53	91	210	69	49	85	50
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	12	12	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1684	1782	1515	1703	1800	1530	1707	1800	1530	1615	1611	
Flt Permitted	0.39	1.00	1.00	0.26	1.00	1.00	0.65	1.00	1.00	0.45	1.00	
Satd. Flow (perm)	685	1782	1515	467	1800	1530	1162	1800	1530	760	1611	
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	0.85	0.61	0.61	0.61	0.77	0.77	0.77
Adj. Flow (vph)	74	640	30	59	495	62	149	344	113	64	110	65
RTOR Reduction (vph)	0	0	16	0	0	32	0	0	77	0	36	0
Lane Group Flow (vph)	74	640	15	59	495	30	149	344	36	64	139	0
Confl. Peds. (#/hr)	9			17			1			3		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	29.0	29.0	29.0	29.0	29.0	29.0	19.0	19.0	19.0	19.0	19.0	
Effective Green, g (s)	29.0	29.0	29.0	29.0	29.0	29.0	19.0	19.0	19.0	19.0	19.0	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.32	0.32	0.32	0.32	0.32	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	331	861	732	225	870	739	367	570	484	240	510	
v/s Ratio Prot		c0.36			0.28			c0.19			0.09	
v/s Ratio Perm	0.11		0.01	0.13		0.02	0.13		0.02	0.08		
v/c Ratio	0.22	0.74	0.02	0.26	0.57	0.04	0.41	0.60	0.07	0.27	0.27	
Uniform Delay, d1	9.0	12.5	8.1	9.2	11.0	8.2	16.1	17.3	14.3	15.3	15.3	
Progression Factor	1.00	1.00	1.00	0.51	0.46	0.56	0.94	0.94	0.85	1.00	1.00	
Incremental Delay, d2	1.6	5.8	0.0	1.9	1.9	0.1	3.3	4.7	0.3	2.7	1.3	
Delay (s)	10.5	18.3	8.1	6.6	6.9	4.6	18.4	21.0	12.5	18.0	16.7	
Level of Service	B	B	A	A	A	A	B	C	B	B	B	
Approach Delay (s/veh)		17.1			6.6			18.8			17.0	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	19	320	161	4	5	12
Future Vol, veh/h	19	320	161	4	5	12
Conflicting Peds, #/hr	2	0	0	4	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	75	75	80	80	80	80
Heavy Vehicles, %	1	1	3	3	0	0
Mvmt Flow	25	427	201	5	6	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	210	0	-	0	688	208
Stage 1	-	-	-	-	208	-
Stage 2	-	-	-	-	480	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1366	-	-	-	415	838
Stage 1	-	-	-	-	832	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1361	-	-	-	404	835
Mov Cap-2 Maneuver	-	-	-	-	404	-
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	624	-

Approach	NB	SB	SE
HCM Ctrl Dly, s/v	0.43	0	10.86
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1361	-	636	-	-
HCM Lane V/C Ratio	0.019	-	0.033	-	-
HCM Ctrl Dly (s/v)	7.7	-	10.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	40	301	136	26	29	23
Future Vol, veh/h	40	301	136	26	29	23
Conflicting Peds, #/hr	10	0	0	0	14	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	71	71	83	83	80	80
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	56	424	164	31	36	29

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	205	0	-	0	740	190
Stage 1	-	-	-	-	190	-
Stage 2	-	-	-	-	551	-
Critical Hdwy	4.11	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.209	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1372	-	-	-	384	852
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	578	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1359	-	-	-	361	844
Mov Cap-2 Maneuver	-	-	-	-	361	-
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	572	-

Approach	NB	SB	SE
HCM Ctrl Dly, s/v	0.91	0	13.6
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1359	-	484	-	-
HCM Lane V/C Ratio	0.041	-	0.134	-	-
HCM Ctrl Dly (s/v)	7.8	-	13.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Appendix D

S. MAIN STREET EXISTING/ ROAD DIET LOS REPORTS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	271	123	57	290	42	19	54	11	8	105	17
Future Volume (vph)	52	271	123	57	290	42	19	54	11	8	105	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1565	1660	1411	1578	1676	1425	1590	1676	1425	1584	1642	
Flt Permitted	0.55	1.00	1.00	0.57	1.00	1.00	0.63	1.00	1.00	0.72	1.00	
Satd. Flow (perm)	899	1660	1411	954	1676	1425	1055	1676	1425	1198	1642	
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.91	0.91	0.91	0.60	0.60	0.60
Adj. Flow (vph)	57	295	134	63	322	47	21	59	12	13	175	28
RTOR Reduction (vph)	0	0	71	0	0	25	0	0	8	0	9	0
Lane Group Flow (vph)	57	295	63	63	322	22	21	59	4	13	194	0
Confl. Peds. (#/hr)	9			17			1			3		
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0	20.0	20.0	20.0	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0	20.0	20.0	20.0	
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.33	0.33	0.33	0.33	0.33	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	419	774	658	445	782	665	351	558	475	399	547	
v/s Ratio Prot		0.18			c0.19			0.04			c0.12	
v/s Ratio Perm	0.06		0.04	0.07		0.02	0.02		0.00	0.01		
v/c Ratio	0.14	0.38	0.10	0.14	0.41	0.03	0.06	0.11	0.01	0.03	0.35	
Uniform Delay, d1	9.1	10.4	8.9	9.1	10.6	8.7	13.6	13.8	13.4	13.5	15.1	
Progression Factor	1.00	1.00	1.00	0.52	0.48	0.57	0.64	0.65	1.00	1.00	1.00	
Incremental Delay, d2	0.7	1.4	0.3	0.4	1.0	0.1	0.3	0.4	0.0	0.2	1.8	
Delay (s)	9.8	11.8	9.2	5.2	6.1	5.0	9.1	9.4	13.4	13.6	16.9	
Level of Service	A	B	A	A	A	A	A	A	B	B	B	
Approach Delay (s/veh)		10.9			5.9			9.8			16.7	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	37	49	6	39	18	8	32	2	13	144	7
Future Volume (vph)	57	37	49	6	39	18	8	32	2	13	144	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4			5.4			5.4			5.4	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.95			0.96			0.99			0.99	
Flt Protected		0.98			1.00			0.99			1.00	
Satd. Flow (prot)		1583			1559			3041			3034	
Flt Permitted		0.86			0.97			0.91			0.94	
Satd. Flow (perm)		1381			1525			2793			2861	
Peak-hour factor, PHF	0.72	0.72	0.72	0.93	0.93	0.93	0.75	0.75	0.75	0.84	0.84	0.84
Adj. Flow (vph)	79	51	68	6	42	19	11	43	3	15	171	8
RTOR Reduction (vph)	0	32	0	0	12	0	0	2	0	0	4	0
Lane Group Flow (vph)	0	166	0	0	55	0	0	55	0	0	190	0
Heavy Vehicles (%)	1%	1%	1%	5%	5%	5%	5%	5%	5%	6%	6%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		20.6			20.6			28.6			28.6	
Effective Green, g (s)		20.6			20.6			28.6			28.6	
Actuated g/C Ratio		0.34			0.34			0.48			0.48	
Clearance Time (s)		5.4			5.4			5.4			5.4	
Lane Grp Cap (vph)		474			523			1331			1363	
v/s Ratio Prot												
v/s Ratio Perm		c0.12			0.04			0.02			c0.07	
v/c Ratio		0.35			0.10			0.04			0.14	
Uniform Delay, d1		14.7			13.4			8.4			8.8	
Progression Factor		1.00			1.00			1.00			1.23	
Incremental Delay, d2		2.0			0.4			0.1			0.2	
Delay (s)		16.8			13.8			8.4			11.0	
Level of Service		B			B			A			B	
Approach Delay (s/veh)		16.8			13.8			8.4			11.0	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.1

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations				↑↑↑	↰	
Traffic Vol, veh/h	0	0	0	854	73	0
Future Vol, veh/h	0	0	0	854	73	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	80	73	92
Heavy Vehicles, %	2	2	2	5	8	2
Mvmt Flow	0	0	0	1068	100	0

Major/Minor	Major2		Minor1	
Conflicting Flow All	-	-	427	-
Stage 1	-	-	0	-
Stage 2	-	-	427	-
Critical Hdwy	-	-	5.86	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	6.16	-
Follow-up Hdwy	-	-	3.88	-
Pot Cap-1 Maneuver	0	-	578	0
Stage 1	0	-	-	0
Stage 2	0	-	558	0
Platoon blocked, %		-		
Mov Cap-1 Maneuver	-	-	578	-
Mov Cap-2 Maneuver	-	-	578	-
Stage 1	-	-	-	-
Stage 2	-	-	558	-

Approach	SB	SW
HCM Ctrl Dly, s/v	0	12.53
HCM LOS		B

Minor Lane/Major Mvmt	SBTSWLn1
Capacity (veh/h)	- 578
HCM Lane V/C Ratio	- 0.173
HCM Ctrl Dly (s/v)	- 12.5
HCM Lane LOS	- B
HCM 95th %tile Q(veh)	- 0.6

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↱
Traffic Vol, veh/h	6	24	4	12	21	32	1	3	1	22	76	12
Future Vol, veh/h	6	24	4	12	21	32	1	3	1	22	76	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	75	75	75	63	63	63	77	77	77
Heavy Vehicles, %	6	6	6	2	2	2	0	0	0	6	6	6
Mvmt Flow	8	31	5	16	28	43	2	5	2	29	99	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	178	165	99	180	180	6	114	0	0	6	0	0
Stage 1	156	156	-	9	9	-	-	-	-	-	-	-
Stage 2	22	10	-	171	171	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.12	6.52	6.22	4.1	-	-	4.16	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.518	4.018	3.318	2.2	-	-	2.254	-	-
Pot Cap-1 Maneuver	775	720	946	782	714	1077	1487	-	-	1589	-	-
Stage 1	837	761	-	1013	888	-	-	-	-	-	-	-
Stage 2	986	880	-	830	757	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	701	705	946	728	699	1077	1487	-	-	1589	-	-
Mov Cap-2 Maneuver	701	705	-	728	699	-	-	-	-	-	-	-
Stage 1	821	746	-	1011	887	-	-	-	-	-	-	-
Stage 2	916	879	-	776	742	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	10.28	9.7	1.48	1.46
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	343	-	-	726	853	404	-	-
HCM Lane V/C Ratio	0.001	-	-	0.061	0.102	0.018	-	-
HCM Ctrl Dly (s/v)	7.4	0	-	10.3	9.7	7.3	0	-
HCM Lane LOS	A	A	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.3	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	539	25	46	390	49	84	194	63	45	79	46
Future Volume (vph)	62	539	25	46	390	49	84	194	63	45	79	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1599	1693	1439	1617	1710	1454	1622	1710	1454	1587	1584	
Flt Permitted	0.41	1.00	1.00	0.29	1.00	1.00	0.65	1.00	1.00	0.49	1.00	
Satd. Flow (perm)	691	1693	1439	491	1710	1454	1116	1710	1454	826	1584	
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	0.85	0.61	0.61	0.61	0.77	0.77	0.77
Adj. Flow (vph)	68	592	27	54	459	58	138	318	103	58	103	60
RTOR Reduction (vph)	0	0	14	0	0	31	0	0	69	0	35	0
Lane Group Flow (vph)	68	592	13	54	459	27	138	318	34	58	128	0
Confl. Peds. (#/hr)	9			17			1			3		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0	20.0	20.0	20.0	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0	20.0	20.0	20.0	
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.33	0.33	0.33	0.33	0.33	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	322	790	671	229	798	678	372	570	484	275	528	
v/s Ratio Prot		c0.35			0.27			c0.19			0.08	
v/s Ratio Perm	0.10		0.01	0.11		0.02	0.12		0.02	0.07		
v/c Ratio	0.21	0.75	0.02	0.24	0.58	0.04	0.37	0.56	0.07	0.21	0.24	
Uniform Delay, d1	9.5	13.1	8.6	9.6	11.7	8.7	15.2	16.4	13.7	14.3	14.5	
Progression Factor	1.00	1.00	1.00	0.52	0.46	0.55	0.93	0.94	0.84	1.00	1.00	
Incremental Delay, d2	1.5	6.4	0.1	1.5	1.9	0.1	2.8	3.9	0.3	1.7	1.1	
Delay (s)	11.0	19.6	8.7	6.5	7.3	4.8	17.0	19.2	11.8	16.1	15.6	
Level of Service	B	B	A	A	A	A	B	B	B	B	B	
Approach Delay (s/veh)		18.3			7.0			17.3			15.7	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	45	35	5	68	15	17	63	8	8	192	20
Future Volume (vph)	35	45	35	5	68	15	17	63	8	8	192	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4			5.4			5.4			5.4	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.96			0.98			0.99			0.99	
Flt Protected		0.99			1.00			0.99			1.00	
Satd. Flow (prot)		1568			1633			3144			3137	
Flt Permitted		0.89			0.99			0.88			0.95	
Satd. Flow (perm)		1414			1614			2790			2975	
Peak-hour factor, PHF	0.74	0.74	0.74	0.79	0.79	0.79	0.88	0.88	0.88	0.60	0.60	0.60
Adj. Flow (vph)	47	61	47	6	86	19	19	72	9	13	320	33
RTOR Reduction (vph)	0	26	0	0	12	0	0	5	0	0	13	0
Lane Group Flow (vph)	0	129	0	0	99	0	0	95	0	0	353	0
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		20.6			20.6			28.6			28.6	
Effective Green, g (s)		20.6			20.6			28.6			28.6	
Actuated g/C Ratio		0.34			0.34			0.48			0.48	
Clearance Time (s)		5.4			5.4			5.4			5.4	
Lane Grp Cap (vph)		485			554			1329			1418	
v/s Ratio Prot												
v/s Ratio Perm		c0.09			0.06			0.03			c0.12	
v/c Ratio		0.27			0.18			0.07			0.25	
Uniform Delay, d1		14.2			13.8			8.5			9.3	
Progression Factor		1.00			1.00			1.00			1.11	
Incremental Delay, d2		1.3			0.7			0.1			0.4	
Delay (s)		15.6			14.5			8.6			10.8	
Level of Service		B			B			A			B	
Approach Delay (s/veh)		15.6			14.5			8.6			10.8	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	4.4

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations				↑↑↑	↰	
Traffic Vol, veh/h	0	0	0	1183	198	0
Future Vol, veh/h	0	0	0	1183	198	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	60	60
Heavy Vehicles, %	2	2	1	1	2	2
Mvmt Flow	0	0	0	1286	330	0

Major/Minor	Major2		Minor1	
Conflicting Flow All	-	-	514	-
Stage 1	-	-	0	-
Stage 2	-	-	514	-
Critical Hdwy	-	-	5.74	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	6.04	-
Follow-up Hdwy	-	-	3.82	-
Pot Cap-1 Maneuver	0	-	539	0
Stage 1	0	-	-	0
Stage 2	0	-	516	0
Platoon blocked, %		-		
Mov Cap-1 Maneuver	-	-	539	-
Mov Cap-2 Maneuver	-	-	539	-
Stage 1	-	-	-	-
Stage 2	-	-	516	-

Approach	SB	SW
HCM Ctrl Dly, s/v	0	21.69
HCM LOS		C

Minor Lane/Major Mvmt	SBTSWLn1
Capacity (veh/h)	- 539
HCM Lane V/C Ratio	- 0.613
HCM Ctrl Dly (s/v)	- 21.7
HCM Lane LOS	- C
HCM 95th %tile Q(veh)	- 4.1

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↰	↱
Traffic Vol, veh/h	23	49	3	5	54	45	0	2	0	30	190	25
Future Vol, veh/h	23	49	3	5	54	45	0	2	0	30	190	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	63	63	63	90	90	90	60	60	60	62	62	62
Heavy Vehicles, %	0	0	0	1	1	1	0	0	0	3	3	3
Mvmt Flow	37	78	5	6	60	50	0	3	0	48	306	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	437	407	306	445	447	3	347	0	0	3	0	0
Stage 1	403	403	-	3	3	-	-	-	-	-	-	-
Stage 2	33	3	-	442	444	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.11	6.51	6.21	4.1	-	-	4.13	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.509	4.009	3.309	2.2	-	-	2.227	-	-
Pot Cap-1 Maneuver	534	537	738	525	508	1083	1223	-	-	1612	-	-
Stage 1	628	603	-	1022	895	-	-	-	-	-	-	-
Stage 2	968	897	-	596	577	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	432	517	738	429	489	1083	1223	-	-	1612	-	-
Mov Cap-2 Maneuver	432	517	-	429	489	-	-	-	-	-	-	-
Stage 1	604	581	-	1022	895	-	-	-	-	-	-	-
Stage 2	879	897	-	494	556	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	14.61	11.92	0	0.89
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1223	-	-	493	636	245	-	-
HCM Lane V/C Ratio	-	-	-	0.242	0.182	0.03	-	-
HCM Ctrl Dly (s/v)	0	-	-	14.6	11.9	7.3	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.9	0.7	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	309	140	65	331	48	22	62	13	9	120	19
Future Volume (vph)	59	309	140	65	331	48	22	62	13	9	120	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	1660	1411	1570	1676	1425	1590	1634		1584	1642	
Flt Permitted	0.50	1.00	1.00	0.53	1.00	1.00	0.61	1.00		0.70	1.00	
Satd. Flow (perm)	823	1660	1411	879	1676	1425	1028	1634		1173	1642	
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.91	0.91	0.91	0.60	0.60	0.60
Adj. Flow (vph)	64	336	152	72	368	53	24	68	14	15	200	32
RTOR Reduction (vph)	0	0	81	0	0	28	0	9	0	0	9	0
Lane Group Flow (vph)	64	336	71	72	368	25	24	73	0	15	223	0
Confl. Peds. (#/hr)	9			17			1			3		
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2			2		
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0		20.0	20.0	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0		20.0	20.0	
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.33	0.33		0.33	0.33	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	384	774	658	410	782	665	342	544		391	547	
v/s Ratio Prot		0.20			c0.22			0.04			c0.14	
v/s Ratio Perm	0.08		0.05	0.08		0.02	0.02			0.01		
v/c Ratio	0.17	0.43	0.11	0.18	0.47	0.04	0.07	0.13		0.04	0.41	
Uniform Delay, d1	9.3	10.7	9.0	9.3	10.9	8.7	13.7	14.0		13.5	15.4	
Progression Factor	1.00	1.00	1.00	0.52	0.48	0.54	0.61	0.58		1.00	1.00	
Incremental Delay, d2	0.9	1.8	0.3	0.6	1.3	0.1	0.4	0.5		0.2	2.2	
Delay (s)	10.2	12.5	9.3	5.4	6.5	4.8	8.7	8.5		13.7	17.7	
Level of Service	B	B	A	A	A	A	A	A		B	B	
Approach Delay (s/veh)		11.3			6.2			8.6			17.4	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	42	56	7	44	21	9	36	2	15	164	8
Future Volume (vph)	65	42	56	7	44	21	9	36	2	15	164	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4			5.4		5.4	5.4		5.4	5.4	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			0.96		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1583			1556		1547	1614		1533	1601	
Flt Permitted		0.85			0.97		0.63	1.00		0.72	1.00	
Satd. Flow (perm)		1366			1511		1025	1614		1168	1601	
Peak-hour factor, PHF	0.72	0.72	0.72	0.93	0.93	0.93	0.75	0.75	0.75	0.84	0.84	0.84
Adj. Flow (vph)	90	58	78	8	47	23	12	48	3	18	195	10
RTOR Reduction (vph)	0	32	0	0	15	0	0	2	0	0	3	0
Lane Group Flow (vph)	0	194	0	0	63	0	12	49	0	18	202	0
Heavy Vehicles (%)	1%	1%	1%	5%	5%	5%	5%	5%	5%	6%	6%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		20.6			20.6		28.6	28.6		28.6	28.6	
Effective Green, g (s)		20.6			20.6		28.6	28.6		28.6	28.6	
Actuated g/C Ratio		0.34			0.34		0.48	0.48		0.48	0.48	
Clearance Time (s)		5.4			5.4		5.4	5.4		5.4	5.4	
Lane Grp Cap (vph)		468			518		488	769		556	763	
v/s Ratio Prot								0.03			c0.13	
v/s Ratio Perm		c0.14			0.04		0.01			0.02		
v/c Ratio		0.42			0.12		0.02	0.06		0.03	0.26	
Uniform Delay, d1		15.1			13.5		8.3	8.5		8.3	9.4	
Progression Factor		1.00			1.00		1.00	1.00		1.14	1.20	
Incremental Delay, d2		2.7			0.5		0.1	0.2		0.1	0.8	
Delay (s)		17.8			14.0		8.4	8.6		9.6	12.1	
Level of Service		B			B		A	A		A	B	
Approach Delay (s/veh)		17.8			14.0			8.6			11.9	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↱	
Traffic Vol, veh/h	7	27	5	14	24	36	1	3	1	25	87	14
Future Vol, veh/h	7	27	5	14	24	36	1	3	1	25	87	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	75	75	75	63	63	63	77	77	77
Heavy Vehicles, %	6	6	6	2	2	2	0	0	0	6	6	6
Mvmt Flow	9	35	6	19	32	48	2	5	2	32	113	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	211	197	122	204	205	6	131	0	0	6	0	0
Stage 1	187	187	-	9	9	-	-	-	-	-	-	-
Stage 2	24	10	-	195	196	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.12	6.52	6.22	4.1	-	-	4.16	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.518	4.018	3.318	2.2	-	-	2.254	-	-
Pot Cap-1 Maneuver	738	692	918	754	692	1077	1467	-	-	1589	-	-
Stage 1	806	738	-	1013	888	-	-	-	-	-	-	-
Stage 2	984	880	-	806	739	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	658	677	918	695	677	1077	1467	-	-	1589	-	-
Mov Cap-2 Maneuver	658	677	-	695	677	-	-	-	-	-	-	-
Stage 1	789	723	-	1011	887	-	-	-	-	-	-	-
Stage 2	905	879	-	746	723	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	10.57	9.91	1.49	1.45
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	343	-	-	697	831	1589	-	-
HCM Lane V/C Ratio	0.001	-	-	0.073	0.119	0.02	-	-
HCM Ctrl Dly (s/v)	7.5	0	-	10.6	9.9	7.3	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.4	0.1	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations				↑↑↑	↰	
Traffic Vol, veh/h	0	0	0	974	83	0
Future Vol, veh/h	0	0	0	974	83	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	80	73	92
Heavy Vehicles, %	2	2	2	5	8	2
Mvmt Flow	0	0	0	1218	114	0

Major/Minor	Major2		Minor1	
Conflicting Flow All	-	-	487	-
Stage 1	-	-	0	-
Stage 2	-	-	487	-
Critical Hdwy	-	-	5.86	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	6.16	-
Follow-up Hdwy	-	-	3.88	-
Pot Cap-1 Maneuver	0	-	540	0
Stage 1	0	-	-	0
Stage 2	0	-	518	0
Platoon blocked, %		-		
Mov Cap-1 Maneuver	-	-	540	-
Mov Cap-2 Maneuver	-	-	540	-
Stage 1	-	-	-	-
Stage 2	-	-	518	-

Approach	SB	SW
HCM Ctrl Dly, s/v	0	13.44
HCM LOS		B

Minor Lane/Major Mvmt	SBTSWLn1
Capacity (veh/h)	- 540
HCM Lane V/C Ratio	- 0.211
HCM Ctrl Dly (s/v)	- 13.4
HCM Lane LOS	- B
HCM 95th %tile Q(veh)	- 0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	614	29	52	445	56	96	221	72	51	90	52
Future Volume (vph)	71	614	29	52	445	56	96	221	72	51	90	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1600	1693	1439	1607	1710	1454	1622	1647		1589	1584	
Flt Permitted	0.35	1.00	1.00	0.22	1.00	1.00	0.64	1.00		0.28	1.00	
Satd. Flow (perm)	589	1693	1439	365	1710	1454	1094	1647		469	1584	
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	1.00	0.61	0.61	0.61	0.77	0.77	0.77
Adj. Flow (vph)	78	675	32	61	524	56	157	362	118	66	117	68
RTOR Reduction (vph)	0	0	17	0	0	30	0	19	0	0	35	0
Lane Group Flow (vph)	78	675	15	61	524	26	157	461	0	66	150	0
Confl. Peds. (#/hr)	9			28			1			3		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2			2		
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0		20.0	20.0	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	20.0		20.0	20.0	
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.33	0.33		0.33	0.33	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	274	790	671	170	798	678	364	549		156	528	
v/s Ratio Prot		c0.40			0.31			c0.28			0.09	
v/s Ratio Perm	0.13		0.01	0.17		0.02	0.14			0.14		
v/c Ratio	0.28	0.85	0.02	0.36	0.66	0.04	0.43	0.84		0.42	0.28	
Uniform Delay, d1	9.8	14.2	8.6	10.2	12.3	8.7	15.6	18.5		15.5	14.7	
Progression Factor	1.00	1.00	1.00	1.11	0.99	1.54	1.01	1.01		1.00	1.00	
Incremental Delay, d2	2.6	11.4	0.1	4.8	3.5	0.1	3.7	14.3		8.2	1.4	
Delay (s)	12.4	25.6	8.7	16.3	15.7	13.5	19.4	33.0		23.7	16.1	
Level of Service	B	C	A	B	B	B	B	C		C	B	
Approach Delay (s/veh)		23.6			15.6			29.6			18.1	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	51	40	6	78	17	19	72	9	9	219	23
Future Volume (vph)	40	51	40	6	78	17	19	72	9	9	219	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.4	5.4		5.4	5.4	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.96			0.98		1.00	0.98		1.00	0.99	
Flt Protected		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1568			1633		1608	1665		1593	1653	
Flt Permitted		0.87			0.98		0.46	1.00		0.70	1.00	
Satd. Flow (perm)		1389			1605		775	1665		1169	1653	
Peak-hour factor, PHF	0.74	0.74	0.74	0.79	0.79	0.79	0.88	0.88	0.88	0.60	0.60	0.60
Adj. Flow (vph)	54	69	54	8	99	22	22	82	10	15	365	38
RTOR Reduction (vph)	0	27	0	0	13	0	0	5	0	0	6	0
Lane Group Flow (vph)	0	150	0	0	116	0	22	87	0	15	397	0
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		20.0			20.0		28.6	28.6		28.6	28.6	
Effective Green, g (s)		20.0			20.0		28.6	28.6		28.6	28.6	
Actuated g/C Ratio		0.33			0.33		0.48	0.48		0.48	0.48	
Clearance Time (s)		6.0			6.0		5.4	5.4		5.4	5.4	
Lane Grp Cap (vph)		463			535		369	793		557	787	
v/s Ratio Prot								0.05			c0.24	
v/s Ratio Perm		c0.11			0.07		0.03			0.01		
v/c Ratio		0.32			0.22		0.06	0.11		0.03	0.50	
Uniform Delay, d1		15.0			14.4		8.5	8.7		8.3	10.8	
Progression Factor		1.00			1.00		1.00	1.00		1.33	1.26	
Incremental Delay, d2		1.9			0.9		0.3	0.3		0.1	2.3	
Delay (s)		16.8			15.3		8.8	8.9		11.2	15.9	
Level of Service		B			B		A	A		B	B	
Approach Delay (s/veh)		16.8			15.3			8.9			15.7	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	6.4

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations				↑↑↑	↰	
Traffic Vol, veh/h	0	0	0	1349	226	0
Future Vol, veh/h	0	0	0	1349	226	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	60	92
Heavy Vehicles, %	2	2	2	1	2	2
Mvmt Flow	0	0	0	1466	377	0

Major/Minor	Major2		Minor1	
Conflicting Flow All	-	-	587	-
Stage 1	-	-	0	-
Stage 2	-	-	587	-
Critical Hdwy	-	-	5.74	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	6.04	-
Follow-up Hdwy	-	-	3.82	-
Pot Cap-1 Maneuver	0	-	497	0
Stage 1	0	-	-	0
Stage 2	0	-	473	0
Platoon blocked, %		-		
Mov Cap-1 Maneuver	-	-	497	-
Mov Cap-2 Maneuver	-	-	497	-
Stage 1	-	-	-	-
Stage 2	-	-	473	-

Approach	SB	SW
HCM Ctrl Dly, s/v	0	31.53
HCM LOS		D

Minor Lane/Major Mvmt	SBTSWLn1
Capacity (veh/h)	- 497
HCM Lane V/C Ratio	- 0.758
HCM Ctrl Dly (s/v)	- 31.5
HCM Lane LOS	- D
HCM 95th %tile Q(veh)	- 6.5

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↕	
Traffic Vol, veh/h	26	56	3	6	62	51	0	2	0	34	217	29
Future Vol, veh/h	26	56	3	6	62	51	0	2	0	34	217	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	63	63	63	90	90	90	60	60	60	62	62	62
Heavy Vehicles, %	0	0	0	1	1	1	0	0	0	3	3	3
Mvmt Flow	41	89	5	7	69	57	0	3	0	55	350	47

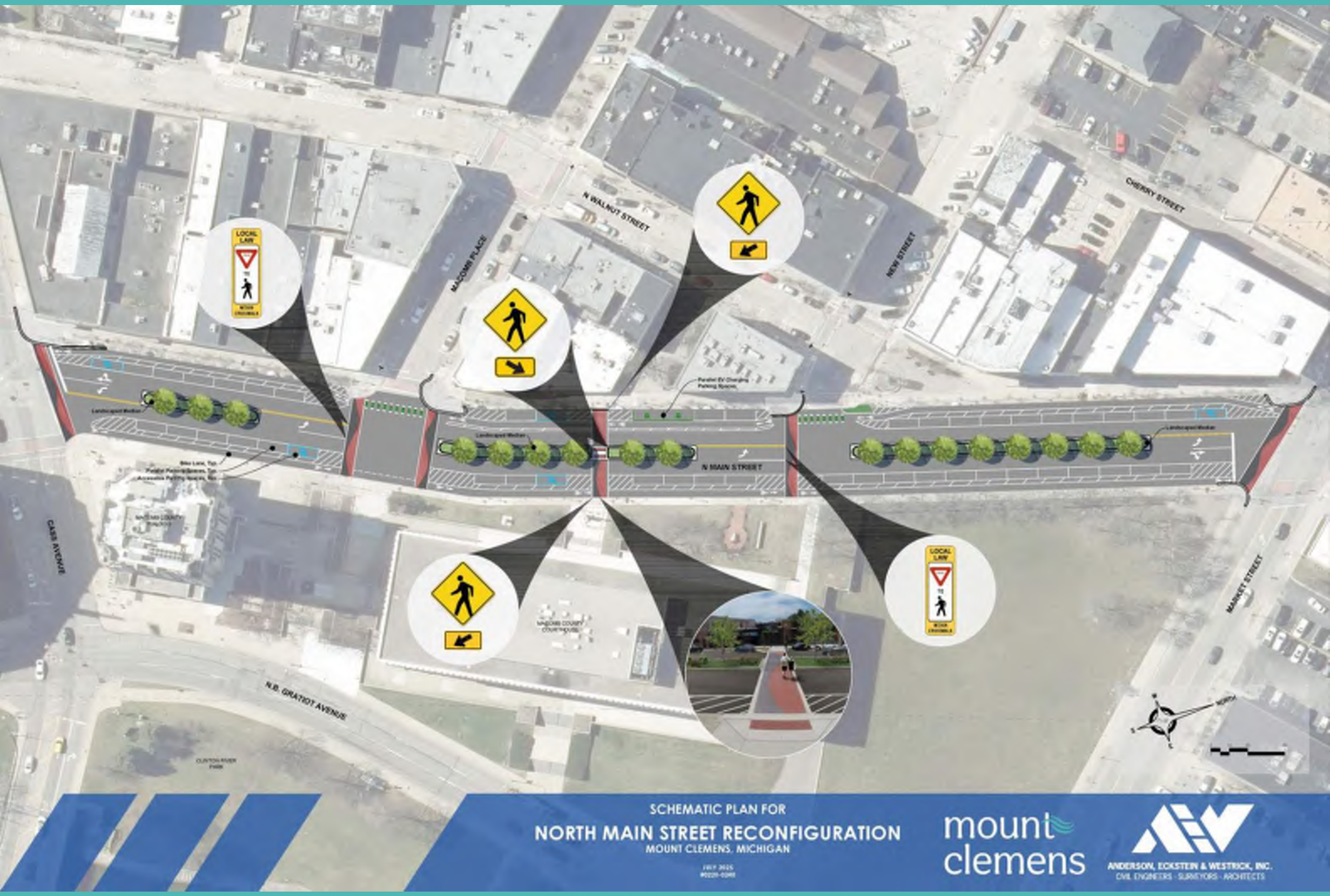
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	521	486	373	507	510	3	397	0	0	3	0	0
Stage 1	483	483	-	3	3	-	-	-	-	-	-	-
Stage 2	38	3	-	504	506	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.11	6.51	6.21	4.1	-	-	4.13	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.509	4.009	3.309	2.2	-	-	2.227	-	-
Pot Cap-1 Maneuver	469	484	677	477	468	1083	1173	-	-	1612	-	-
Stage 1	569	556	-	1022	895	-	-	-	-	-	-	-
Stage 2	963	897	-	552	541	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	366	468	677	373	452	1083	1173	-	-	1612	-	-
Mov Cap-2 Maneuver	366	468	-	373	452	-	-	-	-	-	-	-
Stage 1	549	537	-	1022	895	-	-	-	-	-	-	-
Stage 2	860	897	-	442	523	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	16.94	12.78	0	0.89
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1173	-	-	435	594	1612	-	-
HCM Lane V/C Ratio	-	-	-	0.31	0.223	0.034	-	-
HCM Ctrl Dly (s/v)	0	-	-	16.9	12.8	7.3	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.3	0.8	0.1	-	-

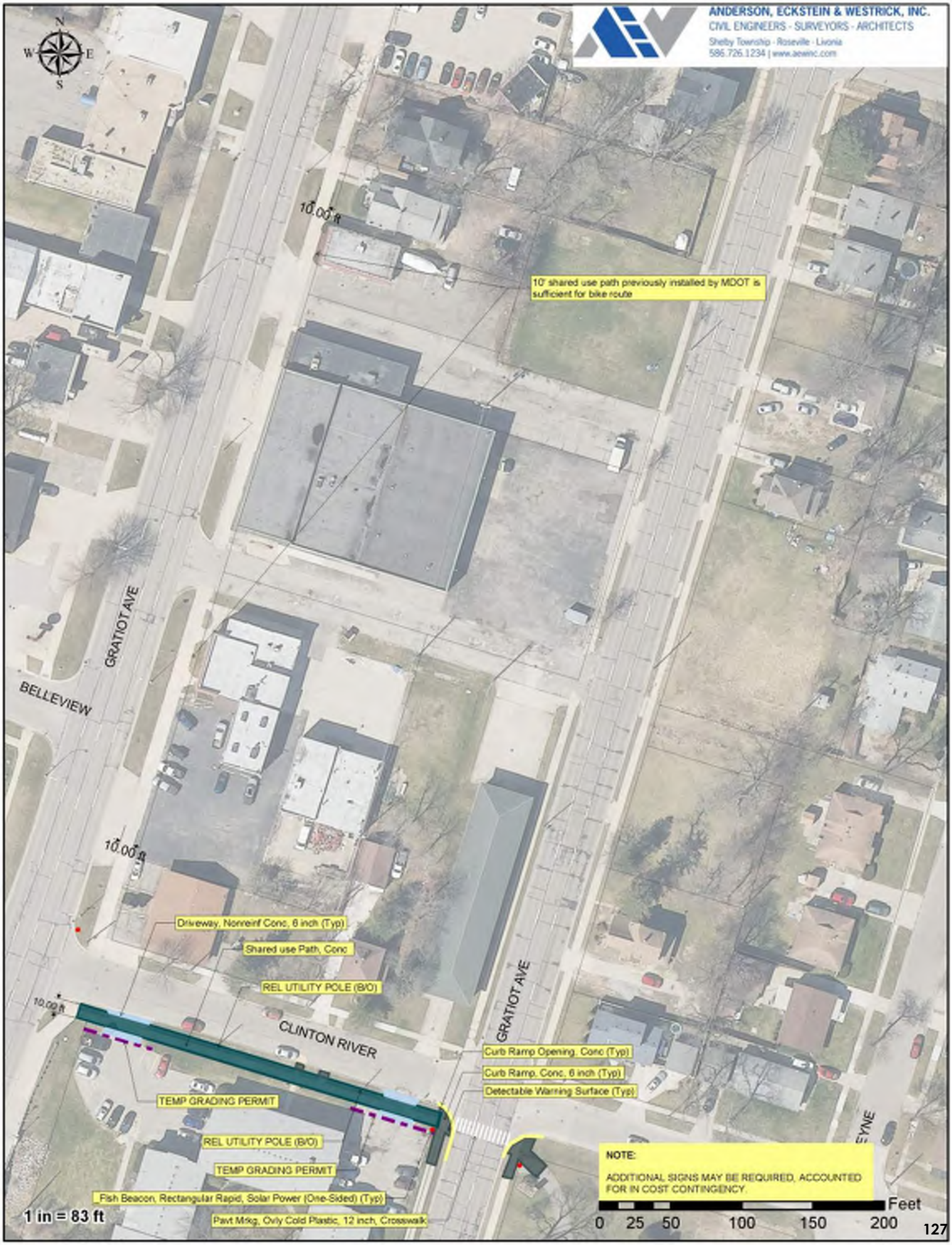
Appendix E

N. MAIN STREET SCHEMATIC PLAN


LOCAL LAW
N WALNUT STREET
MACOMB PLACE
NEW STREET
CHERRY STREET
N MAIN STREET
CASS AVENUE
N.B. GRATIOT AVENUE
MARKET STREET
SCHEMATIC PLAN FOR
NORTH MAIN STREET RECONFIGURATION
MOUNT CLEMENS, MICHIGAN
mount clemens
ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS · SURVEYORS · ARCHITECTS

Appendix F

S. MAIN STREET ROAD DIET AND BIKE PATH PLAN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CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
Shelby Township - Roseville - Livonia
586.726.1234 | www.aewinc.com
N
W
E
S
10.00 ft
10' shared use path previously installed by MDOT is sufficient for bike route
GRATIOT AVE
BELLEVIEW
10.00 ft
Driveway, Nonreinf Conc, 6 inch (Typ)
Shared use Path, Conc
REL UTILITY POLE (B/O)
10.00 ft
CLINTON RIVER
GRATIOT AVE
Curb Ramp Opening, Conc (Typ)
Curb Ramp, Conc, 6 inch (Typ)
Detectable Warning Surface (Typ)
TEMP GRADING PERMIT
REL UTILITY POLE (B/O)
TEMP GRADING PERMIT
Fish Beacon, Rectangular Rapid, Solar Power (One-Sided) (Typ)
Pavt Mrkg, Ovly Cold Plastic, 12 inch, Crosswalk
NOTE:
ADDITIONAL SIGNS MAY BE REQUIRED, ACCOUNTED FOR IN COST CONTINGENCY.
1 in = 83 ft
Feet
0 25 50 100 150 200


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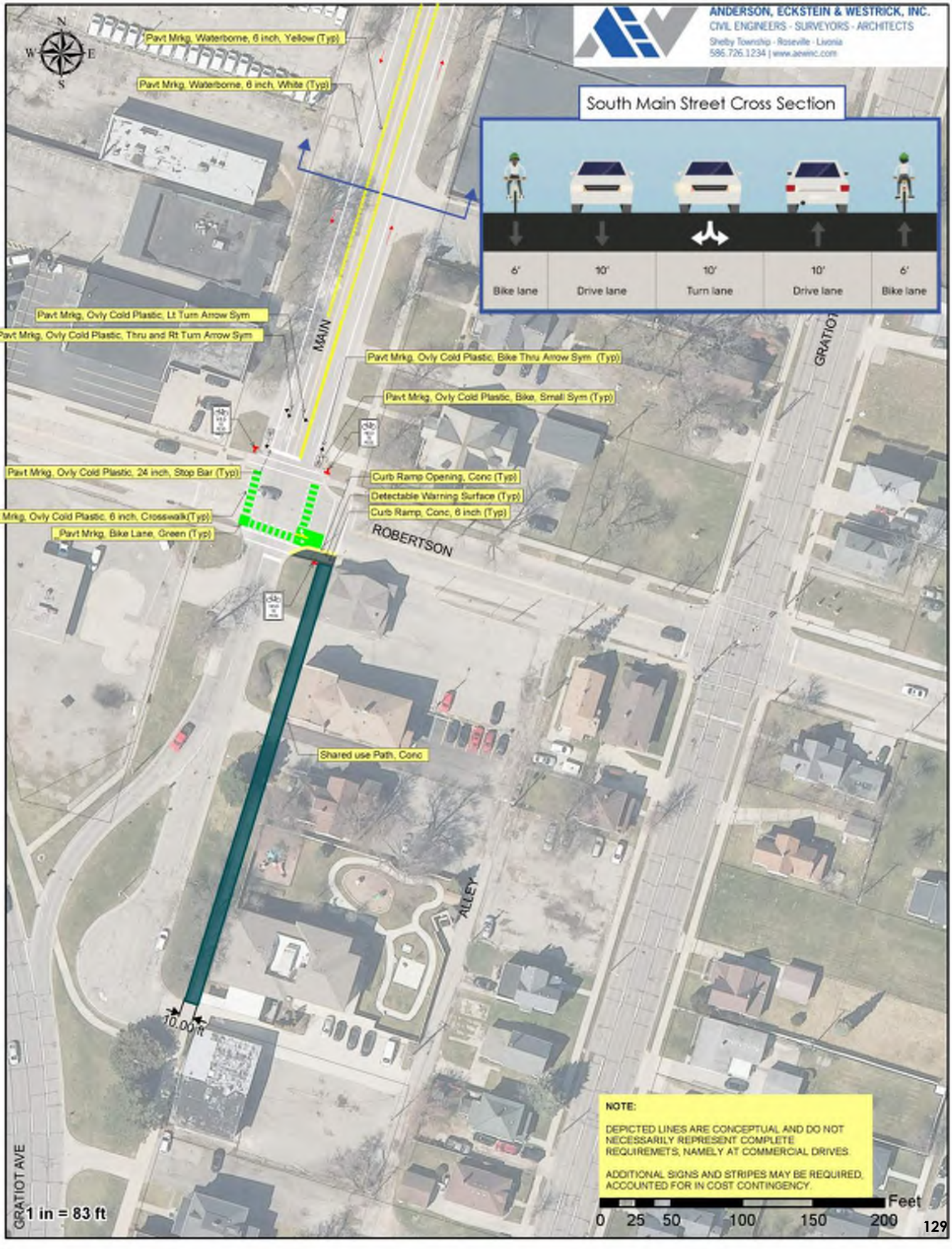
N
W
E
S
MAIN
MAIN
ALLEY
10' shared use path previously installed by MDOT is sufficient for bike route
10.00 ft
COLONIAL
KIBBEE
GRATIOT AVE
GRATIOT AVE
10.00 ft
NOTE:
ADDITIONAL SIGNS MAY BE REQUIRED, ACCOUNTED FOR IN COST ESTIMATE.
1 in = 83 ft
Feet
0 25 50 100 150 200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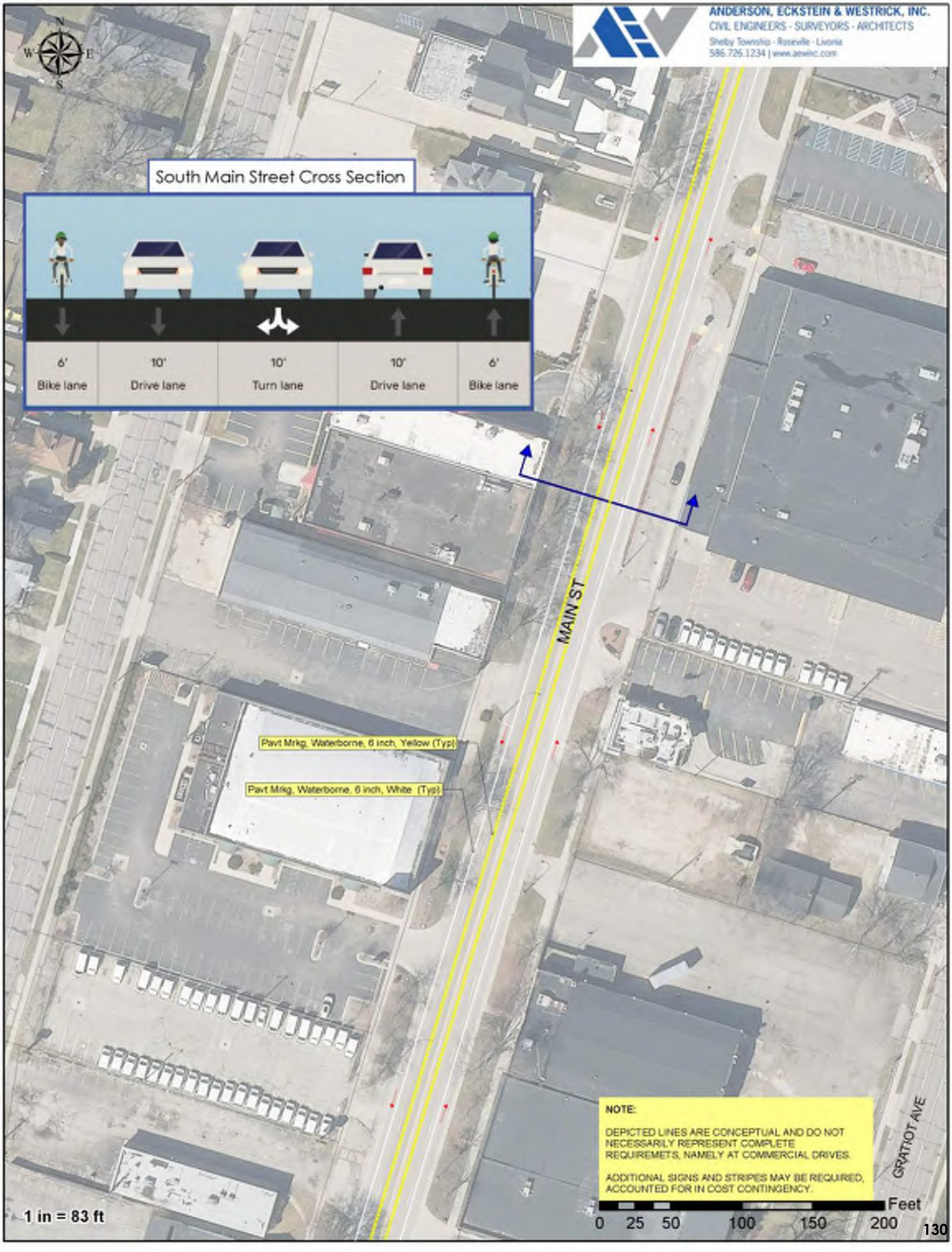
Shelby Township - Roseville - Livonia
586.726.1234 | www.aewinc.com
South Main Street Cross Section
6' Bike lane
10' Drive lane
10' Turn lane
10' Drive lane
6' Bike lane
Pavt Mrkg, Waterborne, 6 inch, Yellow (Typ)
Pavt Mrkg, Waterborne, 6 inch, White (Typ)
Pavt Mrkg, Ovly Cold Plastic, Lt Turn Arrow Sym
Pavt Mrkg, Ovly Cold Plastic, Thru and Rt Turn Arrow Sym
Pavt Mrkg, Ovly Cold Plastic, Bike Thru Arrow Sym (Typ)
Pavt Mrkg, Ovly Cold Plastic, Bike, Small Sym (Typ)
Pavt Mrkg, Ovly Cold Plastic, 24 inch, Stop Bar (Typ)
Curb Ramp Opening, Conc (Typ)
Detectable Warning Surface (Typ)
Curb Ramp, Conc, 6 inch (Typ)
Pavt Mrkg, Ovly Cold Plastic, 6 inch, Crosswalk (Typ)
Pavt Mrkg, Bike Lane, Green (Typ)
Shared use Path, Conc
10.00 ft
MAIN
ROBERTSON
ALLEY
GRATIOT AVE
NOTE:
DEPICTED LINES ARE CONCEPTUAL AND DO NOT NECESSARILY REPRESENT COMPLETE REQUIREMETS, NAMELY AT COMMERCIAL DRIVES.
ADDITIONAL SIGNS AND STRIPES MAY BE REQUIRED, ACCOUNTED FOR IN COST CONTINGENCY.
1 in = 83 ft
0 25 50 100 150 200 Feet


ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
Shelby Township - Roseville - Livonia
586.726.1234 | www.aewinc.com
South Main Street Cross Section
6'
Bike lane
10'
Drive lane
10'
Turn lane
10'
Drive lane
6'
Bike lane
MAIN ST
Pavt Mrkg, Waterborne, 6 inch, Yellow (Typ)
Pavt Mrkg, Waterborne, 6 inch, White (Typ)
GRATIOT AVE
NOTE:
DEPICTED LINES ARE CONCEPTUAL AND DO NOT NECESSARILY REPRESENT COMPLETE REQUIREMETS, NAMELY AT COMMERCIAL DRIVES.
ADDITIONAL SIGNS AND STRIPES MAY BE REQUIRED, ACCOUNTED FOR IN COST CONTINGENCY.
1 in = 83 ft
0 25 50 100 150 200 Feet

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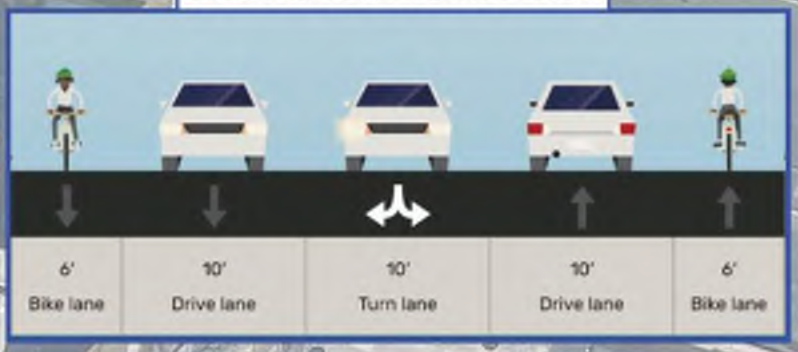
South Main Street Cross Section



Pavt Mrkg, Waterborne, 6 inch, Yellow(Typ)

Pavt Mrkg, Waterborne, 6 inch, White (Typ)

Pavt Mrkg, Waterborne, 6 inch, White (Typ)

Pavt Mrkg, Ovly Cold Plastic, 24 inch, Stop Bar(Typ)

Pavt Mrkg, Ovly Cold Plastic, 24 inch, Stop Bar (Typ)

Pavt Mrkg, Ovly Cold Plastic, Lt Turn Arrow Sym (Typ)

Pavt Mrkg, Ovly Cold Plastic, Thru and Rt Turn Arrow Sym (Typ)

Pavt Mrkg, Ovly Cold Plastic, Bike Thru Arrow Sym (Typ)

Pavt Mrkg, Ovly Cold Plastic, Bike, Small Sym (Typ)

Pavt Mrkg, Waterborne, 6 inch, Yellow (Typ)

Pavt Mrkg, Waterborne, 6 inch, White (Typ)

MAIN ST

MAIN ST

TERRY

GRATIOT AVE

GRATIOT AVE

CHURCH

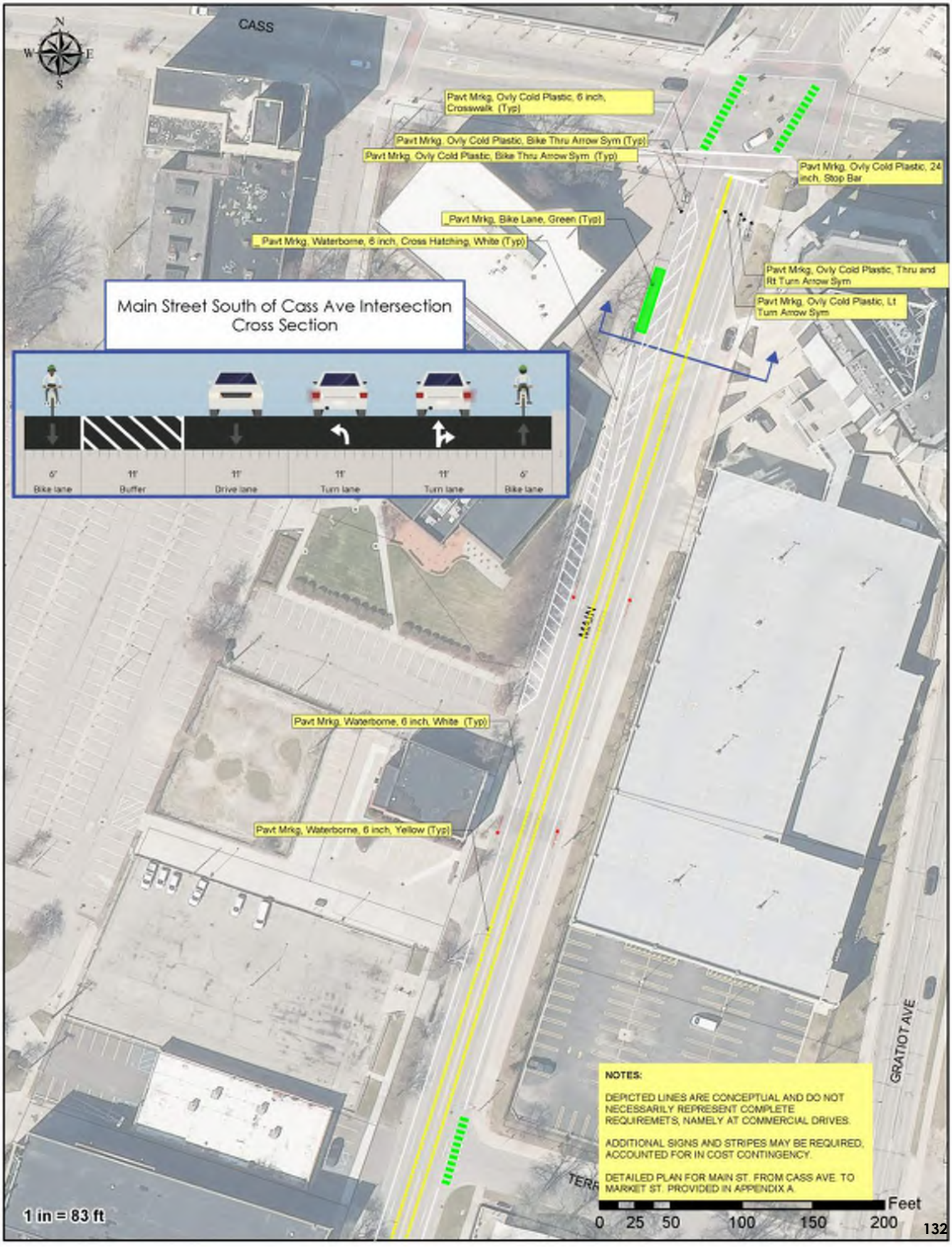
NOTE:

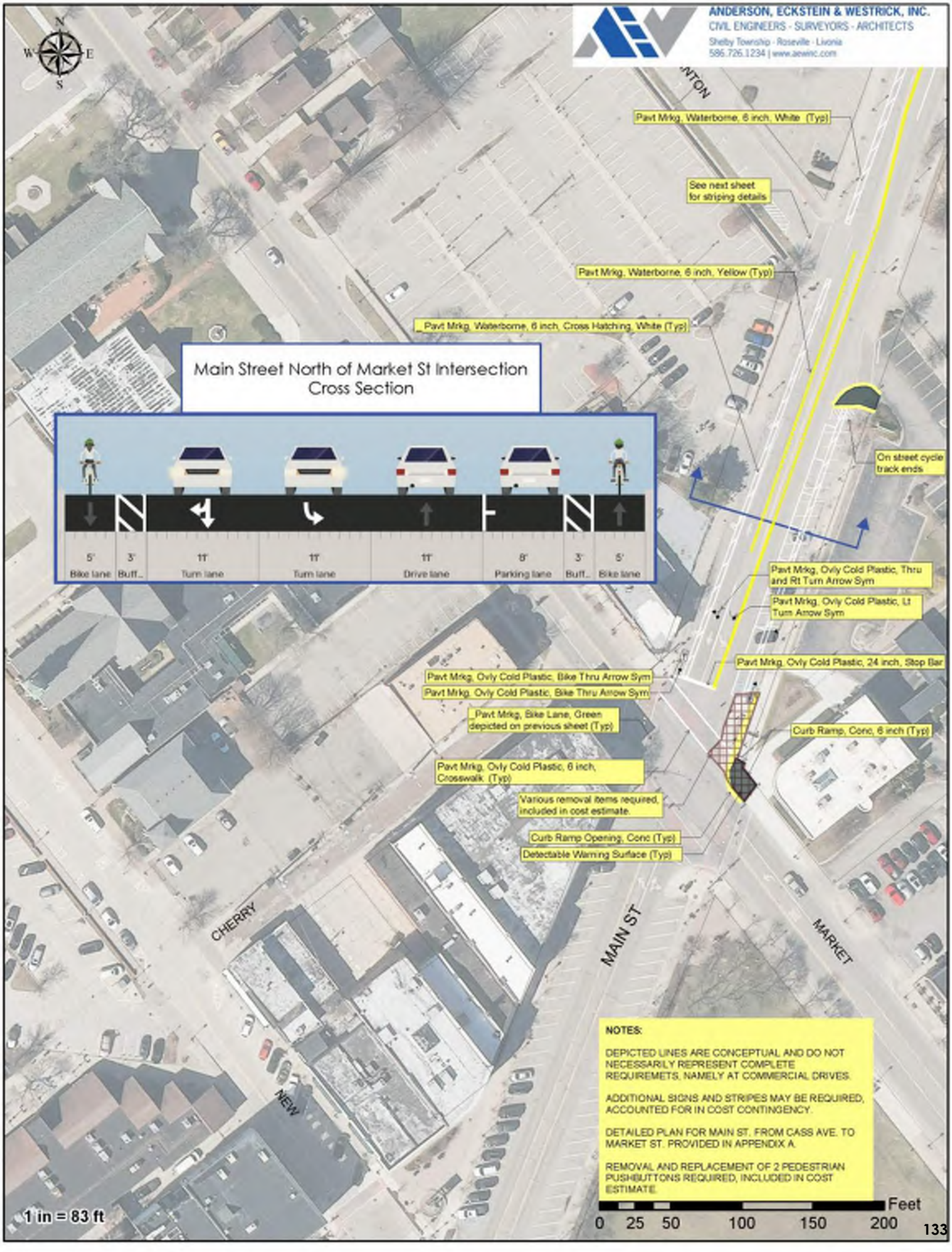
DEPICTED LINES ARE CONCEPTUAL AND DO NOT NECESSARILY REPRESENT COMPLETE REQUIREMETS, NAMELY AT COMMERCIAL DRIVES.

ADDITIONAL SIGNS AND STRIPES MAY BE REQUIRED, ACCOUNTED FOR IN COST CONTINGENCY.

1 in = 83 ft

0 25 50 100 150 200 Feet


CASS
Pavt Mrkg, Ovly Cold Plastic, 6 inch, Crosswalk (Typ)
Pavt Mrkg, Ovly Cold Plastic, Bike Thru Arrow Sym (Typ)
Pavt Mrkg, Ovly Cold Plastic, Bike Thru Arrow Sym (Typ)
Pavt Mrkg, Ovly Cold Plastic, 24 inch, Stop Bar
Pavt Mrkg, Bike Lane, Green (Typ)
Pavt Mrkg, Waterborne, 6 inch, Cross Hatching, White (Typ)
Pavt Mrkg, Ovly Cold Plastic, Thru and Rt Turn Arrow Sym
Pavt Mrkg, Ovly Cold Plastic, Lt Turn Arrow Sym
Main Street South of Cass Ave Intersection Cross Section
6' Bike lane
11' Buffer
11' Drive lane
11' Turn lane
11' Turn lane
6' Bike lane
MAIN
Pavt Mrkg, Waterborne, 6 inch, White (Typ)
Pavt Mrkg, Waterborne, 6 inch, Yellow (Typ)
GRATIOT AVE
NOTES:
DEPICTED LINES ARE CONCEPTUAL AND DO NOT NECESSARILY REPRESENT COMPLETE REQUIREMETS, NAMELY AT COMMERCIAL DRIVES.
ADDITIONAL SIGNS AND STRIPES MAY BE REQUIRED, ACCOUNTED FOR IN COST CONTINGENCY.
DETAILED PLAN FOR MAIN ST. FROM CASS AVE. TO MARKET ST. PROVIDED IN APPENDIX A.
1 in = 83 ft
0 25 50 100 150 200 Feet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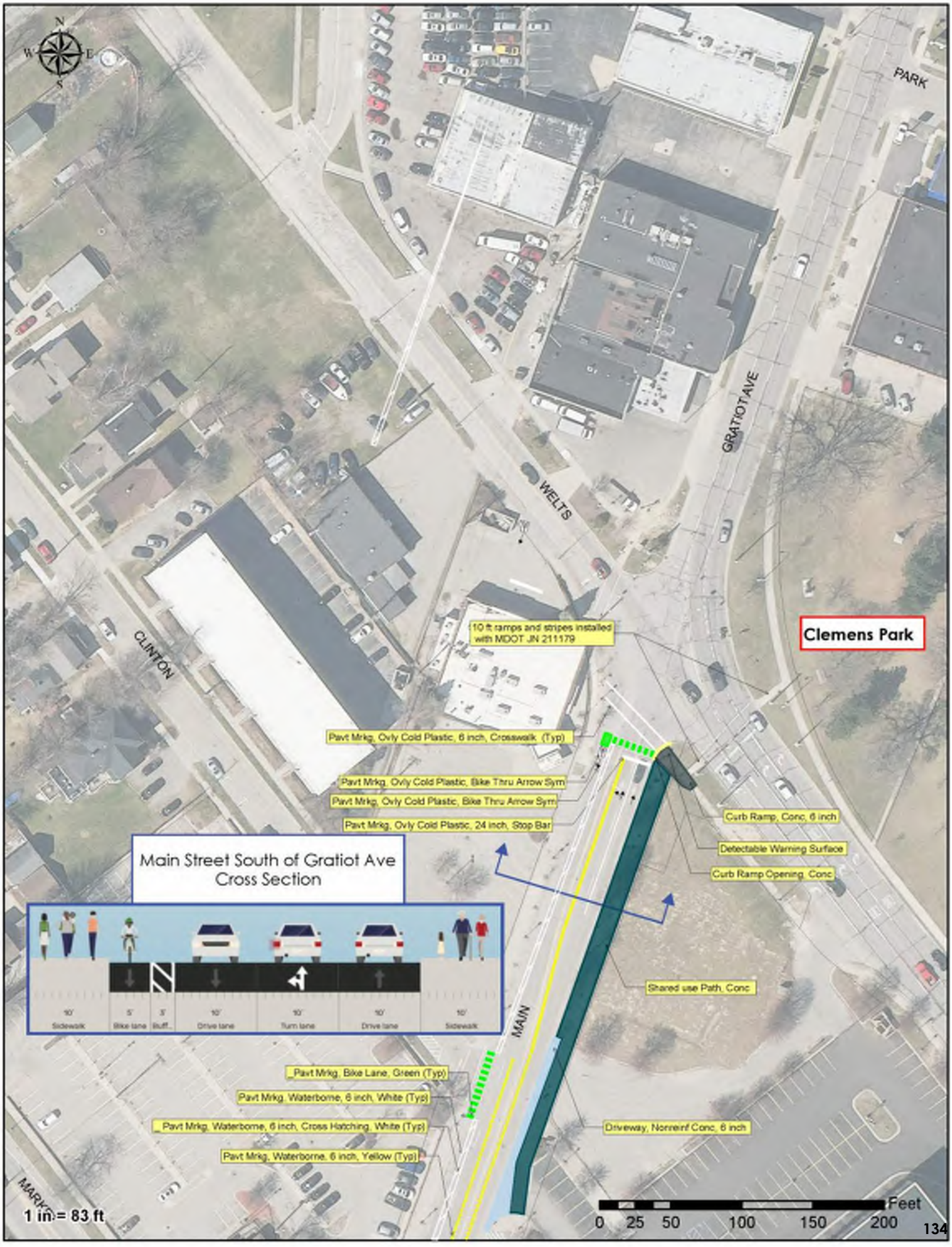
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
Shelby Township - Roseville - Livonia
586.726.1234 | www.aewinc.com
Pavt Mrkg, Waterborne, 6 inch, White (Typ)
See next sheet for striping details
Pavt Mrkg, Waterborne, 6 inch, Yellow (Typ)
Pavt Mrkg, Waterborne, 6 inch, Cross Hatching, White (Typ)
Main Street North of Market St Intersection
Cross Section
5' Bike lane
3' Buff..
11' Turn lane
11' Turn lane
11' Drive lane
8' Parking lane
3' Buff..
5' Bike lane
On street cycle track ends
Pavt Mrkg, Ovly Cold Plastic, Thru and Rt Turn Arrow Sym
Pavt Mrkg, Ovly Cold Plastic, Lt Turn Arrow Sym
Pavt Mrkg, Ovly Cold Plastic, 24 inch, Stop Bar
Pavt Mrkg, Ovly Cold Plastic, Bike Thru Arrow Sym
Pavt Mrkg, Ovly Cold Plastic, Bike Thru Arrow Sym
Pavt Mrkg, Bike Lane, Green depicted on previous sheet (Typ)
Curb Ramp, Conc, 6 inch (Typ)
Pavt Mrkg, Ovly Cold Plastic, 6 inch, Crosswalk (Typ)
Various removal items required, included in cost estimate.
Curb Ramp Opening, Conc (Typ)
Detectable Warning Surface (Typ)
CHERRY
MAIN ST
MARKET
NEW
NOTES:
DEPICTED LINES ARE CONCEPTUAL AND DO NOT NECESSARILY REPRESENT COMPLETE REQUIREMETS, NAMELY AT COMMERCIAL DRIVES.
ADDITIONAL SIGNS AND STRIPES MAY BE REQUIRED, ACCOUNTED FOR IN COST CONTINGENCY.
DETAILED PLAN FOR MAIN ST. FROM CASS AVE. TO MARKET ST. PROVIDED IN APPENDIX A.
REMOVAL AND REPLACEMENT OF 2 PEDESTRIAN PUSHBUTTONS REQUIRED, INCLUDED IN COST ESTIMATE.
1 in = 83 ft
Feet
0 25 50 100 150 200


PARK
GRATIOT AVE
WELTS
CLINTON
MAIN
MARKET
10 ft ramps and stripes installed with MDOT JN 211179
Clemens Park
Pavt Mrkg, Ovly Cold Plastic, 6 inch, Crosswalk (Typ)
Pavt Mrkg, Ovly Cold Plastic, Bike Thru Arrow Sym
Pavt Mrkg, Ovly Cold Plastic, Bike Thru Arrow Sym
Pavt Mrkg, Ovly Cold Plastic, 24 inch, Stop Bar
Curb Ramp, Conc, 6 inch
Detectable Warning Surface
Curb Ramp Opening, Conc
Shared use Path, Conc
Main Street South of Gratiot Ave
Cross Section
10' Sidewalk
5' Bike lane
3' Buff.
10' Drive lane
10' Turn lane
10' Drive lane
10' Sidewalk
Pavt Mrkg, Bike Lane, Green (Typ)
Pavt Mrkg, Waterborne, 6 inch, White (Typ)
Pavt Mrkg, Waterborne, 6 inch, Cross Hatching, White (Typ)
Pavt Mrkg, Waterborne, 6 inch, Yellow (Typ)
Driveway, Nonreinf Conc, 6 inch
1 in = 83 ft
Feet
0 25 50 100 150 200

Appendix G

PROPOSED BIKE LANE CONCEPTS

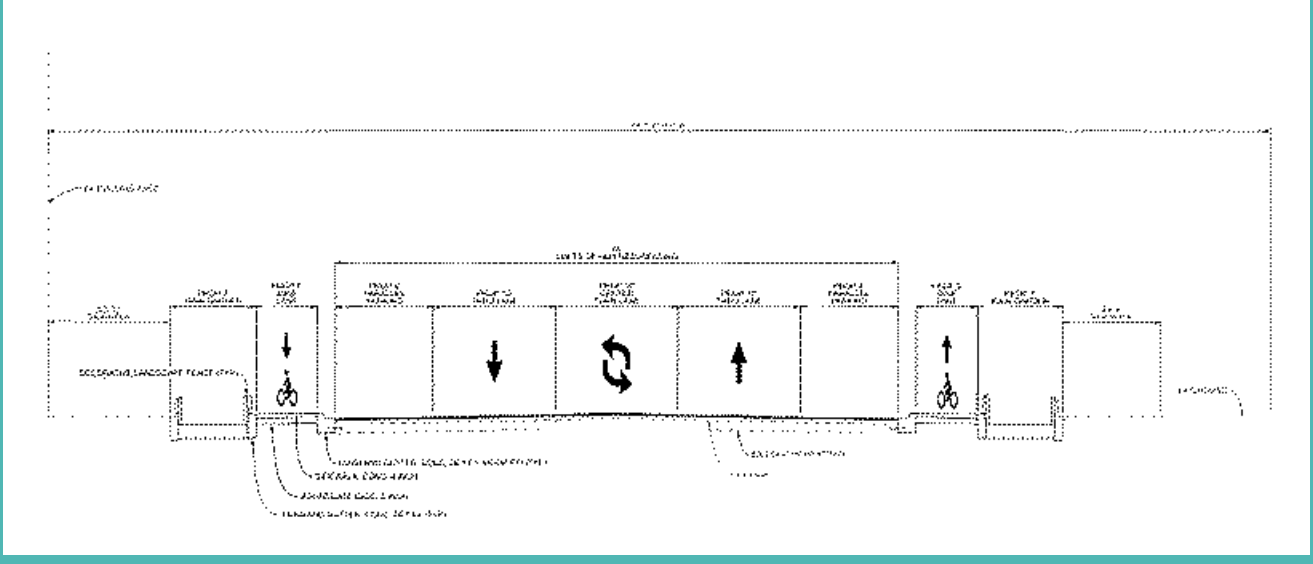
Option 1: Bike Lane

ADVANTAGES

- Improved cyclist safety by physically separating bikes from vehicle traffic.
- Reduced bike-vehicle conflict points, especially at midblock locations.
- Enhanced comfort for cyclists of all ages and abilities.
- ·Potential for green infrastructure, such as rain gardens, if space and funding allow.

DISADVANTAGES

- Complex transition from on-street to off-street at Cass Ave intersection, requiring special striping and ADA ramp design.
- Pedestrians and cyclist confusion at transition points.
- Roadway curb and gutter relocation required, which could disrupt existing drainage patterns.
- New drainage solutions (e.g., linear rain gardens, piecewise storm sewers) would be required behind the curb.
- Constructability challenges due to regrading, underground utility adjustments, and concrete work.
- Significant cost increase from additional concrete, storm sewer infrastructure, and design complexity.



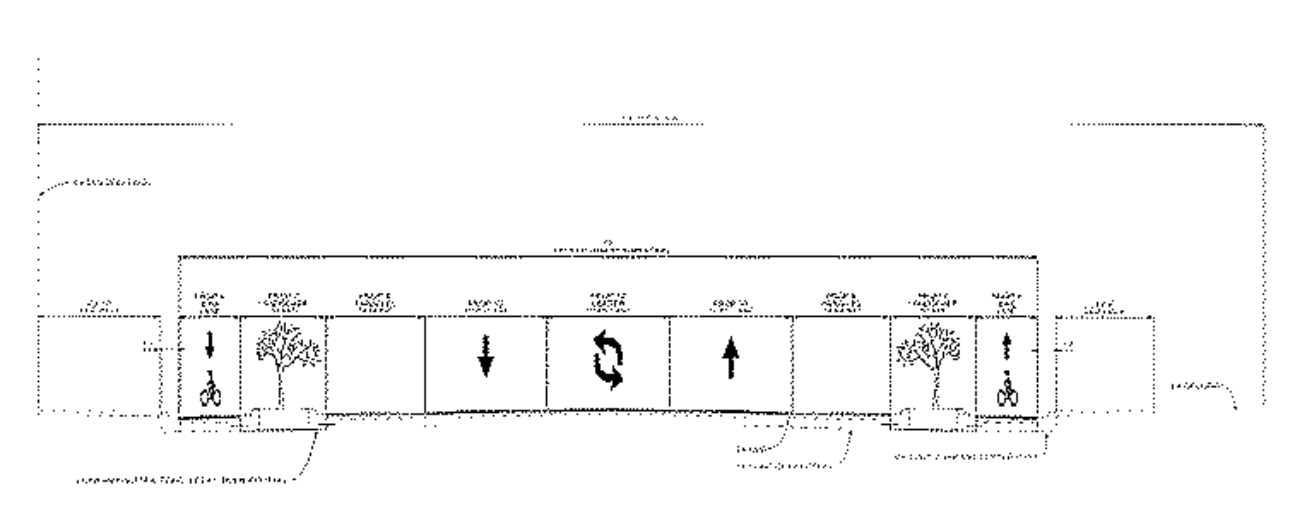
Option 2: Bike Lane

ADVANTAGES

- Improved cyclist safety through physical separation from traffic using landscaped buffers.
- Avoids complex transitions at intersections (like Cass Ave), since the facility remains on-street.
- Preserves existing roadway curb and gutter, reducing some disruption compared to option #1.
- Opportunities for aesthetic enhancement with landscaping (e.g., trees, planting strips).

DISADVANTAGES

- High construction costs due to installation of four new curbs and gutter lines.
- Complex drainage requirements, as new inlets and pipes are needed to connect to the existing storm sewer system.
- Channelized flow over cycle tracks is not permitted, increasing infrastructure needs.
- Construction complexity involving new curb alignments and underground utility coordination.
- Maintenance concerns landscape buffers and additional drainage infrastructure.



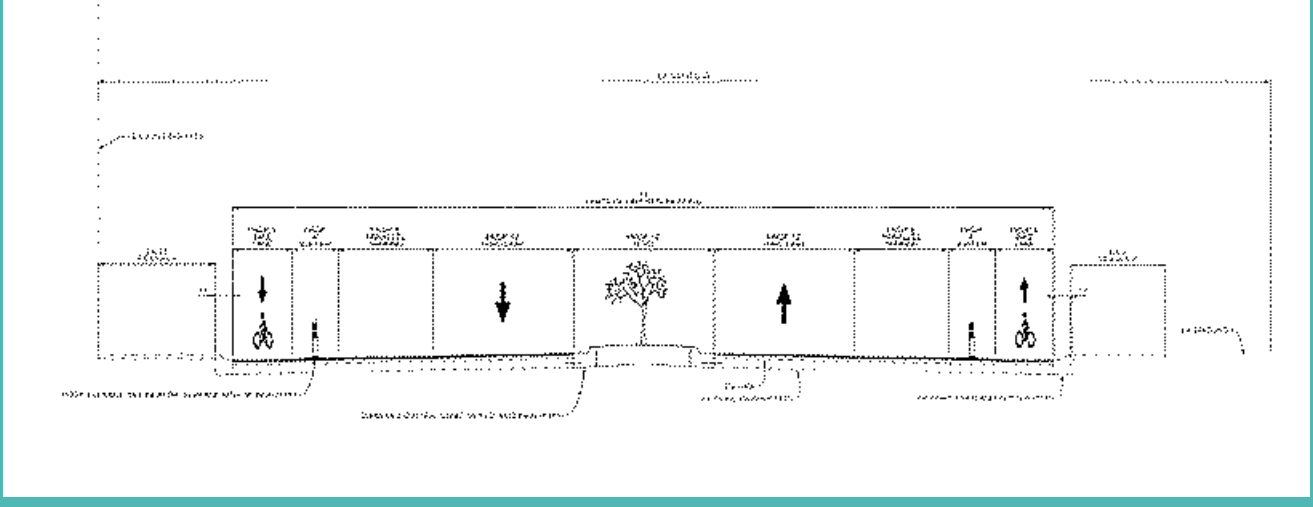
Option 3: Bike Lane

ADVANTAGES

- Lower construction costs due to minimal disruption to existing curb and gutter.
- Avoids major drainage conflicts, since the roadway curb remains in place.
- Seamless connection of cycle tracks into the downtown area, maintaining orientation and continuity.
- Improved safety with delineated separation between cyclists and vehicles.
- Wider 12-ft through lanes, reducing friction with parked vehicles and improving traffic flow.
- Favorable for grants, as wider lanes and clear separations are often preferred in safety evaluations.
- Landscaped median enhances aesthetics without introducing drainage issues (center-crowned with spill curb).

DISADVANTAGES

- Conflicts with existing pedestrian infrastructure, such as curb extensions and pedestrian push buttons, may require redesign or relocation.
- Less robust physical separation compared to landscape islands or off-street paths (striping and delineators offer minimal protection).
- Potential maintenance issues for delineators and striping over time.
- Limited space for additional amenities, such as planter strips or utility features.



Appendix H

RESOLUTION ADOPTION

CITY OF MOUNT CLEMENS, MICHIGAN

RESOLUTION TO ADOPT THE DOWNTOWN DISTRICT SAFETY ACTION PLAN

WHEREAS, the City of Mount Clemens has undertaken a planning process to determine safety concerns and improvements needed in the Downtown District; and

WHEREAS, the residents of Mount Clemens were provided with diverse opportunities during the development of the draft plan to express opinions and concerns of all modes of transportation in the Downtown District; and

WHEREAS, the proposed Downtown District Safety Action Plan is a comprehensive analysis and strategic safety action plan for Mount Clemens; and

WHEREAS, the Downtown District Safety Action Plan identifies recommended improvements to curb safety risks such as traffic-related deaths and injuries to pedestrians, drivers and cyclists; and

WHEREAS, the City commits to implementing the Downtown District Safety Action Plan to the extent possible of the City to achieve a goal of zero roadway fatalities and serious injuries in the Downtown District by 2035; and

NOW THEREFOR IT BE RESOLVED, that the City of Mount Clemens formally adopts said Downtown District Safety Action Plan.

AYES: Rick, Yore, Calhoun, Dempsey, Fournier, Kropp, McGarity
NAYS: None
ABSENT: None

CLERK'S CERTIFICATON: I hereby certify that the foregoing is a true and complete copy of a Resolution adopted by the Mount Clemens City Commission at its meeting held on September 15, 2025 .

Cathleen Martin, City Clerk