AGENDA REPORT

TO: Mayor & City Commission
FROM: Ken Hibl, City Manager
DATE: July 15, 2016
RE: Presentation of North Sector Traffic Study

For the Agenda of July 18, 2016

Background. The City contracted with Gourdie-Fraser, our engineer of record, in February 2016 (*see copy of att'd Resolution 2016-018*) to conduct a traffic study of the north sector of the City of Clare. The primary reasons for the traffic study were to determine the necessity of the $2M round-about recommended by the Mt. Pleasant TSC; to determine possible alternatives to the proposed round-about; to assist the City in determining the best use of the $375K Small-Urban grant funds earmarked for the City in 2017; to assist the City in forecasting any other needed capital road projects that would be required to support the anticipated commercial and industrial development along E. Colonville Road in Clare; and to determine the potential effect that any increased traffic would have on the existing road infrastructure. Gourdie-Fraser subcontracted the bulk of the traffic study work to Progressive Engineering of Grand Rapids, with oversight of the work by Heather Jamison, a traffic engineer with GFA. Progressive Engineering assigned Peter LaMourie, one of their most senior traffic engineers, to this project. The study, identified as two documents – Clare Avenue Subarea Traffic Study Report and Full Appendix, is attached to this Agenda Report.

The study results were presented to and discussed with the City Staff, the Clare County Road Commission engineer, and the Clare Northern Group. The findings were then presented to the Mt. Pleasant Transportation Service Center by Heather Jamison and Pete LaMourie with representatives of the three aforementioned entities in attendance in early June.

As reflected in the report, increased traffic resulting from the new development can, at least in the near term, be accommodated by new signalization and new turn lanes. But we anticipated that MDOT would not likely concur with these conclusions and thus would not favorably consider any request we would make to them to install new traffic signals. Consequently, we asked Gourdie-Fraser to develop possible conceptual alternatives to the signalization and turn lane traffic controls that are supported by the traffic study.

MDOT's reaction to the proposals offered in the traffic study was as we anticipated. Thus we presented a conceptual alternative that extended and realigned the NB off-ramp of US-127 to a point where it created a new four-way intersection at Clare Avenue with Clare Avenue being the north-south legs of that intersection and the NB on-ramp and the newly aligned NB off-ramp of US-127 being the east-west legs of the four-way intersection. This alternative would relocate the existing traffic signal at the three-way intersection of Clare Avenue and E. Colonville northward to the new, previously described four-way intersection while simultaneously configuring all the primary elements of this portion of the MDOT and City road network for incorporation of the new round-about that MDOT is proposing for this area (the round-about would be located at the newly created four-way intersection). In principle and concept, the City supports and endorses

the proposed round-about – what we don't support or endorse is MDOT's present insistence that it is our responsibility to fund the round-about.

MDOT has reviewed the alternative proposal we presented to them and has agreed in principle that they support the concept. But to proceed with that alternative we will require City Commission agreement and approval to complete the tasks necessary to determine feasibility – the most immediate being to negotiate the purchase of approximately 2.5 acres of some of the most valuable commercial property CNG owns in this sector of the City; the second being that we direct Gourdie-Fraser to commence design of the realignment proposal.

We have initiated preliminary discussions with CNG on the first task with a potential solution that we will pursue with the Commission's agreement to do so. We've asked Heather to prepare probable costs of this alternative and the cost for the design of the project; she will present those costs Monday evening. Our goal is to utilize the $375K Small-Urban funds available to us for this purpose. While that amount may not be sufficient to fund the entirety of the proposed project, the available monies will defray a significant portion of those costs. We will look at means to either phase the project or seek other revenue sources if necessary. But we need to initiate design now to ensure we are ready to bid the project late this fall/early this winter for a spring construction date to maintain our Small-Urban funding eligibility.

Two sidebar informational items: 1. Small-Urban funds cannot be used to purchase property. 2. We will be eligible for another round of Small-Urban funding ($375K) in two years, thus we have some ability to phase this project so long as phasing will allow us to put in place adequate traffic control measures to accommodate any near-term traffic increases.

Following Pete and Heather's presentation Monday evening, we ask that the City Commission ask any questions they deem pertinent and provide us approval to proceed as outlined above or provide us any guidance in respect to other alternatives we should pursue.

Issues & Questions Specified. Should the City Commission approve the traffic study; direct the City Staff to continue to discuss with CNG the purchase of property required for the road realignment proposal; and concurrently direct Gourdie-Fraser to commence design of the proposed project?

Alternatives.

1. Approve the traffic study; direct property purchase discussions continue; direct Gourdie-Fraser commence project design.
2. Approve the traffic study; and provide the City Staff guidance to pursue other alternatives.
3. Disapprove the traffic study and direct a new study be initiated.
4. Direct that the Small-Urban funds not be used and all work on the proposed project be ceased.
5. Defer decision regarding the matter to a subsequently scheduled meeting.

Financial Impact. The City will be obligated to provide local funds the equivalent of 20% ($75K) of the $375K Small-Urban grant – total project funds of $450K – if the City decides to accept the grant.

Recommendation. I recommend that the City Commission approve the traffic study; direct the City Staff to continue discussions with the Clare Northern Group for purchase of property; and direct Gourdie-Fraser to commence design of the proposed road realignment project by adoption of Resolution 2016-076 (*copy att'd*).

Attachments.

1. Resolution 2016-018.
2. Traffic Study Report and Appendix.
3. Resolution 2016-076.

RESOLUTION 2016-018

A RESOLUTION OF THE CLARE CITY COMMISSION APPROVING THE PROPOSAL OF GOURDIE-FRASER TO CONDUCT A TRAFFIC STUDY FOR THE DEVELOPMENT DISTRICT IN THE NORTHERN SECTOR OF CLARE.

WHEREAS, the City of Clare applied for and receive a Small Urban grant for $375,000 to assist in funding the construction of a new round-about in the City's northern sector based on a recommendation of the Mt. Pleasant Transportation Service Center (TSC) in Mt. Pleasant, Michigan; and

WHEREAS, said grant funds must be obligated in 2017; failure to do so will result in the loss of said funds; and

WHEREAS, the Mt. Pleasant TSC estimates that the cost of said round-about construction project to be approximately $2M; and

WHEREAS, although MDOT shall be the primary beneficiary of said round-about due to the resultant elimination of currently predicted and anticipated traffic gridlock of exiting traffic from US-127 once the round-about is completed, said entity is not able to contribute financially to said project due to lack of funds; and

WHEREAS, the City does not have the fiscal means to fund said $2M round-about project and concurrently believes that there are alternative means to control and manage anticipated increased vehicular traffic but has no supporting data or documentary evidence to indicate the magnitude of future anticipated traffic and what actions need to be taken to accommodate any future vehicular traffic increases; and

WHEREAS, the City Staff has recommended to the City Commission that a professional traffic study be completed as soon as possible to formally evaluate what, if any actions need to be taken and has solicited and received a proposal from the City's engineer of record, Gourdie-Fraser, to expeditiously conduct said study; and

WHEREAS, the stipulated cost of the professional traffic study outlined in said proposal is $17,750; and

WHEREAS, the City has the available funds to defray the costs of said study, but a budget amendment approved by the City Commission shall be required to proceed; and

WHEREAS, the Clare County Road Commission has committed to contributing $4,000 to the cost of said recommended study, and MDOT has agreed in principle that it will similarly contribute to defray a portion of the costs of said study but is currently unable to commit to an amount; and

WHEREAS, the City Commission has considered the recommendation of its City Staff and concurs that the study should be conducted immediately prior to proceeding with any other actions related to this matter.

NOW THEREFORE BE IT RESOLVED THAT, the Clare City Commission hereby approves the proposal of Gourdie-Fraser to conduct a formal traffic study of the existing street and road system in the City's northern sector for a cost of $17,750, said study to include an evaluation

of whether the contiguous and related road and street system of MDOT, Clare County, and the City of Clare, to assess whether said systems are capable of safely and efficiently accommodating future new development and resultant vehicle traffic associated with said development and to make recommendations for alternative roadway configurations, if needed, for a cost of $17,750.

BE IT FURTHER RESOLVED THAT the City Commission hereby authorizes the immediate commencement of said study.

BE IT FURTHER RESOLVED THAT the City Commission hereby approves the needed budget amendment associated with said proposal and directs its City Treasure and Finance Director to take any and all necessary actions to facilitate said budget amendment.

ALL RESOLUTIONS AND PARTS OF RESOLUTIONS INSOFAR AS THEY CONFLICT WITH THE PROVISIONS OF THIS RESOLUTION BE AND THE SAME ARE HEREBY RESCINDED.

The Resolution was introduced by Commissioner _____and supported by Commissioner _____ The Resolution declared adopted by the following roll call vote:

YEAS:

NAYS:

ABSENT:

Resolution approved for adoption on this 15th day of February 2016.

_____

Diane Lyon, City Clerk

Subarea Traffic Study
Clare Avenue (US-127 BR)/Colonville Road
Clare, Michigan

Prepared for:

City of Clare
202 W Fifth Street
Clare, MI 48617

and

Gourdie Fraser Associates, Inc.
123 W. Front Street
Traverse City, MI 49684

Prepared by:

Progressive AE
1811 4 Mile Road NE
Grand Rapids, MI 49525

May 2016
Project No. 73590005/002

progressive | ae

Traffic Study – Clare Avenue/Colonville Road Subarea

Subarea Traffic Study
Clare Avenue (US-127 BR)/Colonville Road
Clare, Michigan

Prepared for:

City of Clare
202 W Fifth Street
Clare, MI 48617

and

Gourdie Fraser Associates, Inc.
123 W. Front Street
Traverse City, MI 49684

Prepared by:

Progressive AE
1811 4 Mile Road NE
Grand Rapids, MI 49525
616/361-2664

May 2016

Project No: 77570001/002

Table of Contents

Executive Summary 1

1. Introduction 3

2. Existing Conditions 5

- Key Study Area Roadways 5
- Evaluation of Existing Conditions 6
- Discussion – Recommended Roadway Improvements 6

3. Projected 2026 Future Conditions 8

- 2026 Background Conditions 8
- Development Site Access and Planned/Projected Uses 8
- Project Trip Generation 8
- Project Trip Distribution 10
- Evaluation of Projected 2026 Future Conditions 10
- Discussion – Recommended Roadway Improvements 12
- Other Considerations 14

APPENDIX

List of Figures and Tables

Figures

1 Existing Peak-Hour Traffic Volumes and Levels of Service 7

2 Projected 2026 Development Trip Distribution 11

3 Projected 2026 Peak-Hour Traffic Volumes 12

4 Projected 2026 Peak-Hour Levels of Service (without and with Improvements) 13

Table

1 Projected Future Development Peak Hour Trip Generation 9

Executive Summary

As the City of Clare continues to grow concerns have been expressed regarding longer term transportation system needs that will help maintain and improve the city's roadway infrstructure. Of special concern is the subarea located around the existing northern interchange with US-127/US-10 and Clare Avenue.

A large, mixed use site is developing that already includes significant industrial uses (Consumers Energy, etc) and an upcoming WalMart superstore. The commercial portion of the overall development is called Clare Commoms, and the industrial park portion is called Clare North Industrial Park. Although a traffic impact study was completed for the WalMart store, the city needed to determine the potential traffic impacts that would be created by completion and occupancy of the full development of the overall site, and identify the roadway improvements that are projected to be needed in order to safely and efficiently accommodate that future traffic. For the purposes of this subarea traffic study, the overall site is assumed to be substantially developed and occupied by 2026.

The analyses summarized in this report identify traffic conditions within the study area with an estimate of the conditions that can be expected with future growth, including the full development of the proposed project. These analyses take into account the peak traffic periods that typically occur during the week along the Clare Avenue corridor in this area, including a seasonal factor provided by MDOT to reflect those higher volume conditions.

After the introductory Chapter 1, Chapter 2 summarizes the existing conditions within the study area and identifies where existing problems occur. This chapter is included to use as a basis for the subsequent analyses that are summarized in the following chapters. The results of the existing conditions analysis indicates that all of the individual movements at the study area

intersections are functioning acceptably during peak hours with levels of service (LoS) of C or better.

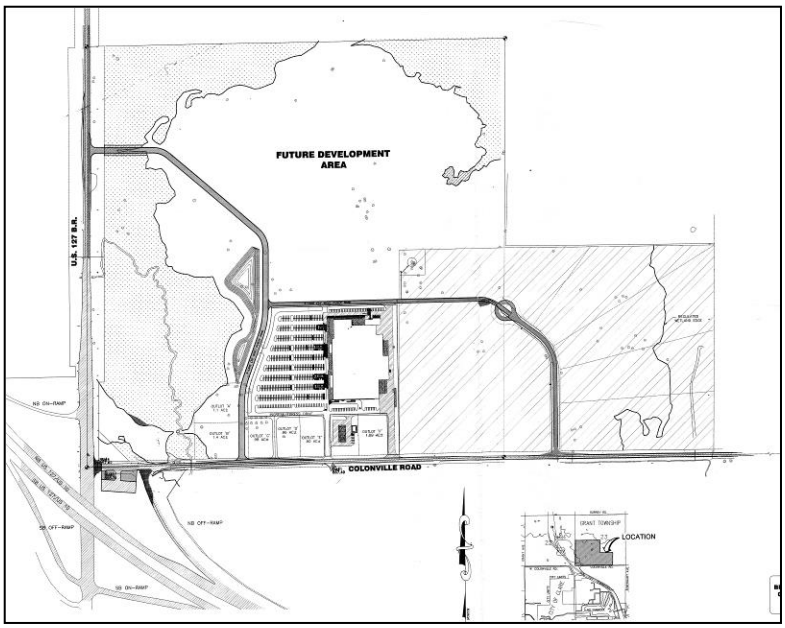
Chapter 3 summarizes the projected 2026 future conditions that include both background traffic growth and full development traffic (the latter is Clare Commons and Clare North Industrial Park combined). In addition to the traffic already being generated by existing uses inside and just outside the overall development, the projected development uses (including WalMart) are expected to generate approximately 1,000 additional morning peak hour trips and 1,600 additional afternoon peak hour trips onto the adjacent surface roadway system. The results of the 2026 future conditions capacity analyses with the above traffic in place indicate that several improvements will be needed to help accommodate future peak-hour traffic, including:

- Adding a second westbound lane on E. Colonville Road at its intersection with the US-127 northbound off-ramp;
- Installing semi-actuated traffic signals at the above E. Colonville Rd./US-127 northbound off-ramp intersection and at the Clare Ave./US-127 southbound ramps intersection;
- Revising lane configurations and signal operations at the Clare Ave/E. Colonville Rd. intersection;
- Minor lengthening of the two-lane cross section on the US-127 northbound off-ramp at its approach to E. Colonville Road; and
- Widening W. Colonville Road to provide a separate eastbound left turn lane.

Chapter 1
Introduction

Progressive AE was retained to complete this subarea traffic study with a focus on the planned mixed use development located on the northeast quadrant of the Clare Avenue (US-127 BR)/E. Colonville Road intersection in Clare, Michigan. For the purposes of this study, the combined Clare Commons and Clare North Industrial Park will be combined and generally referred to as the "overall development." Based upon discussions with staff, current expectations are that the overall development may be fully completed and occupied by 2026. For the purposes of this traffic study, land uses assumed for the remaining, currently undeveloped, sections of the overall site are as follows:

- WalMart superstore and outlot gas station
- 27 acres of industrial park
- sit-down restaurant
- 250,000 square feet of retail
- Auto dealership
- Auto parts store



As shown on the adjacent plan graphic, primary access to/from the overall development would be provided by two driveways/streets to E. Colonville Road and one driveway/street to Clare Avenue.

The purpose of this subarea traffic study was to analyze the potential impacts of the planned development and to identify what physical and/or operational roadway system improvements may be necessary to mitigate impacts created by both the development's traffic and general background traffic growth over the next ten years. The tasks undertaken to complete the analyses include:

1. ***Data Collection.*** Applicable information regarding the existing operating conditions of the adjacent roadways was obtained in March. Morning and afternoon weekday peak-hour turning movement counts were completed at the study area intersections.

Information regarding lane configurations, speed limits, traffic controls, and other related data for the study area roadways was also collected.

2. ***Seasonal Traffic Factor***. Per standard practice, a seasonal factor provided by the Michigan Department of Transportation (MDOT) was applied to the March traffic counts. This results in existing (and future) conditions analyses that reflect a more realistic higher set of traffic volumes on which to base peak-hour capacity analyses and decisions regarding potential improvements.

3. ***Background Growth.*** Per discussions with MDOT staff, an annual background traffic growth rate of 1.5 percent was applied to existing volumes to reflect anticipated non-development traffic increases by the 2026 horizon year.

4. ***Trip Generation/Distribution.*** The number of trips the planned overall development is expected to generate during peak hours was identified. These trips were then assigned to the adjacent roadways based upon the patterns followed by existing traffic and expected market area.

5. ***Levels of Service.*** Capacity calculations were completed at the study area key intersections to identify existing and expected future peak-hour operational characteristics.

6. ***Mitigation.*** Roadway/intersection improvements were identified that will enable the adjacent roadways and study area intersections to maintain equal and/or acceptable levels of operation under future conditions upon the addition of background traffic growth and/or due to development traffic.

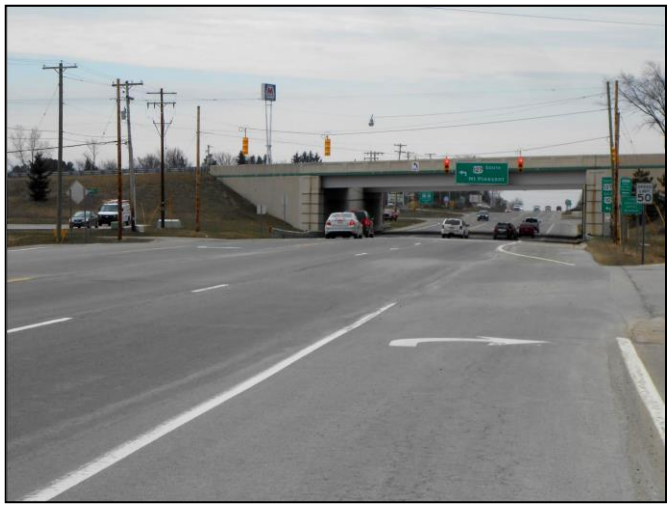
Pre-study coordination was completed with the City of Clare/GFA staff to help identify the required study area, study parameters, and any specific areas of concern. The following chapters outline the results of analyses completed during this study.

Chapter 2
Existing Conditions

The first step in the identification of potential traffic impacts is to determine how well the adjacent roadways are operating under current conditions. These existing, or base, conditions then provide a comparison to subsequent future conditions analyses. This chapter summarizes the data collection and existing operating conditions analysis procedures.

KEY STUDY AREA ROADWAYS

Clare Avenue (US-127 BR)



Within the primary study area Clare Avenue is under MDOT jurisdiction as it functions as part of the US-127/10 business route through the city. Immediately north of the US-127 northbound on-ramp up to the city limits it is under city Jurisdiction. Clare Avenue has a five-lane cross section from E. Colonville Road to the south, with 3-4 lanes to the north of that intersection. It has wide +/-10-foot paved shoulders from the US-127 southbound ramps intersection up to, and past, the northern limits of this study area. The speed limit is predominantly 50 mph in the study area. Clare Avenue carries approximately 9,000 - 10,000 vehicles on a seasonally adjusted weekday in this area. All Clare Avenue intersections in the study area currently have stop sign control on the minor street approach except for the signal controlled intersection at E. Colonville Road.

E. Colonville Road

East Colonville Road within the study area is under city jurisdiction and predominantly has a three-lane cross section. It has a 45 mile per hour speed limit in this area, and currently carries approximately 3,500 vehicles daily on the section between Clare Avenue and the US-127 northbound off-ramp (and considerably less than that east of that point). In addition to the

aforementioned signalized intersection with Clare Avenue, the northbound off-ramp is stop sign controlled at E. Colonville Road.

US-127/10

US-127/10 is a limited access four-lane freeway under MDOT and Federal jurisdiction and generally runs northwest/southeast through the study area. It has a 70 mile per hour speed limit and carries over 18,000 vehicles per day on average. As noted above, its northbound and southbound off-ramp approaches to Clare Avenue and E. Colonville Road are stop sign controlled.

Morning and afternoon peak hour counts were taken in March from 7:00-9:00 AM and 2:00-6:00 PM on a weekday at the Clare Avenue intersections with the US-127 northbound on ramp, E. Colonville Road, US-127 southbound ramps, and W. Colonville Road. Counts were also taken at the E. Colonville/US-127 northbound off-ramp intersection. These counts indicated that the weekday peak hours generally occur between 7:15-8:15 AM and the 4:30-5:30 PM (although 2:30-3:30 PM was another close peak). The above volumes were then increased by the applicable seasonal factor provided by MDOT (1.122) to provide a more appropriate (higher) baseline for study analyses. The left half of Figure 1 on the following page illustrates the existing balanced and seasonally adjusted peak-hour volumes at the study area intersections.

We should note that the data collection efforts also took into account local buggies used by the nearby Amish residents. Four such buggies were observed during the weekday count periods, all of which used E. Colonville Road to go to/from Clare Avenue to the south. Three of those four occurred between 2:30 and 3:30 PM.

EVALUATION OF EXISTING CONDITIONS

Intersection "level of service" calculations were completed to evaluate the current operational efficiency of the study area intersections. These calculations were completed using techniques outlined in the 2010 Highway Capacity Manual by the Transportation Research Board.

Level of service (LoS) at signalized and unsignalized intersections relates to the delay, traffic volumes, and intersection geometry. Levels of service (LoS) are expressed in a range from "A" to "F", with "A" denoting the highest or best operating conditions. Generally, a Level of Service “D” is considered the minimum acceptable service level for signalized and unsignalized intersections in suburban or rural areas such as this. The criteria for determining the levels of service at signalized and unsignalized intersections are outlined in the appendix of this report.

The existing peak hours were analyzed at the study area intersections. The results of the level of service analyses are shown on the right half of Figure 1. Copies of the computer analyses are included in the appendix.

As shown, all of the constrained movements at the study area intersections currently operate acceptably during both morning and afternoon peak hours with levels of service of “C” or better. Subsequent model simulations confirm these findings as no significant queuing issues are indicated.

DISCUSSION - RECOMMENDED ROADWAY IMPROVEMENTS

Given the results of the above Existing Conditions analysis and related traffic simulations, there are no roadway improvements needed to accommodate existing traffic volumes.

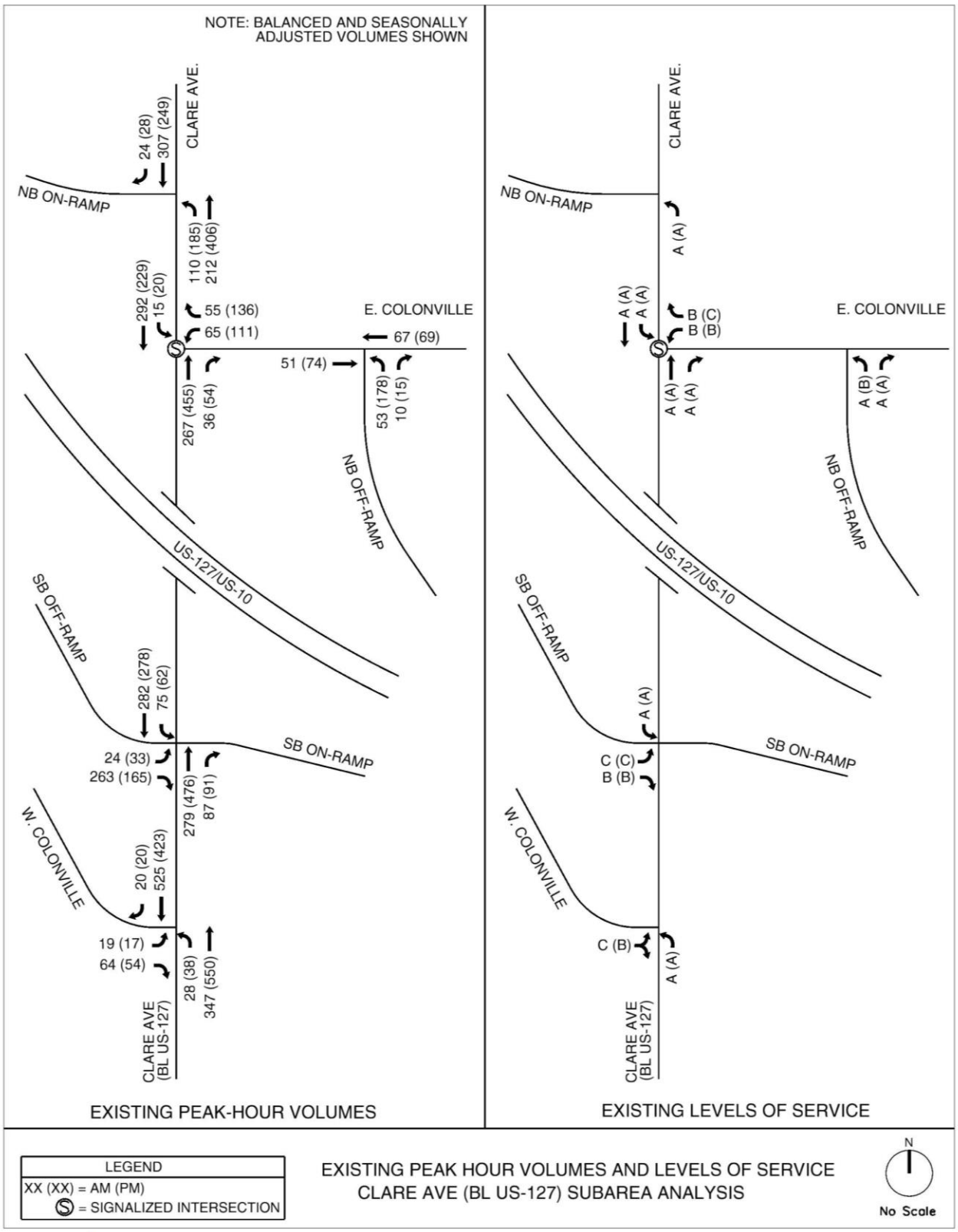

NOTE: BALANCED AND SEASONALLY ADJUSTED VOLUMES SHOWN
CLARE AVE.
NB ON-RAMP
24 (28)
307 (249)
110 (185)
212 (406)
292 (229)
15 (20)
55 (136)
65 (111)
E. COLONVILLE
67 (69)
51 (74)
267 (455)
36 (54)
53 (178)
10 (15)
NB OFF-RAMP
US-127/US-10
SB OFF-RAMP
282 (278)
75 (62)
SB ON-RAMP
24 (33)
263 (165)
279 (476)
87 (91)
W. COLONVILLE
20 (20)
525 (423)
19 (17)
64 (54)
28 (38)
347 (550)
CLARE AVE (BL US-127)
EXISTING PEAK-HOUR VOLUMES
A (A)
A (A)
A (A)
B (C)
B (B)
A (A)
A (A)
A (B)
A (A)
A (A)
C (C)
B (B)
C (B)
A (A)
EXISTING LEVELS OF SERVICE
LEGEND
XX (XX) = AM (PM)
= SIGNALIZED INTERSECTION
EXISTING PEAK HOUR VOLUMES AND LEVELS OF SERVICE
CLARE AVE (BL US-127) SUBAREA ANALYSIS
N
No Scale
progressive ae

Figure 1

Chapter 3
Projected 2026 Future Conditions

The purpose of this chapter is to summarize the expected future 2026 traffic conditions within the study area with background traffic growth and the proposed overall development traffic in place. These analyses provide the before/after comparison of projected conditions and helps define the timing and applicability of any potential 2026 roadway improvements.

2026 BACKGROUND TRAFFIC CONDITIONS

In addition to the overall development, a background traffic volume growth factor was utilized to reflect other development/growth occurring in the general area. Based upon input from the MDOT statewide model and staff, a 1.5% annual growth factor was incorporated into the future 2026 traffic projections.

DEVELOPMENT SITE ACCESS and PLANNED/PROJECTED USES

The combined Clare Commons/Clare North Industrial Park site will ultimately develop several access points, including two primary driveways/streets onto E. Colonville Road and one to Clare Avenue.

Based upon discussions with City staff, upcoming approved and projected projects within the overall development assumed for this study are as follows

- WalMart superstore and outlot gas station
- 27 acres of industrial park
- 6,000 square foot restaurant
- 250,000 square feet of retail (roughly split between a home improvement superstore and another "big box" retailer
- Auto dealership
- Auto parts store

PROJECT TRIP GENERATION

Trip Generation, Ninth Edition, by the Institute of Transportation Engineers (ITE) was used to calculate the additional projected traffic based on the planned/projected development components. Trips are measured individually for inbound and outbound movements. Therefore, a visit to the site by a patron or employee generates two trips, one inbound and one outbound.

In addition to traffic generated by uses already in place (e.g., Consumers Energy), the overall development is expected to generate approximately 1,314 weekday morning peak-hour vehicle trips at its site driveways and 2,146 weekday afternoon peak-hour trips at site driveways. Of those trips, approximately 792 morning and 1,048 afternoon trips will be new trips added to the

roadway system. Per ITE criteria, the remainder will be pass-by trips (from the current Clare Avenue and E. Colonville Road traffic streams) or diverted-linked trips (from existing US-127/US-10 traffic). To help identify worse case conditions, it should be noted that a conservative internal capture rate was also utilized to reflect patrons that go to two or more uses within the overall development. Table 1 summarizes the projected morning and afternoon peak-hour vehicle trip generation based upon the proposed Phase 1 development plan.

Table 1 - Projected Future Development Peak-Hour Trip Generation

WalMart

Land Use	ITE Code	Size	AM In	AM Out	PM In	PM Out
Discount superstore	813	158,600 sf	164	129	338	352
Gas station	944	12 fueling positions	73	73	83	83
		Subtotal:	307	323	421	435
		Less internal capture (10%) (1)	-7	-7	-8	-8
		Subtotal (trips at site driveways):	**300**	**316**	**413**	**427**
		Less pass-by trips (2) :	-79	-79	-128	-128
		Less diverted-linked trips (2) :	-65	-65	-146	-146
		Total primary/new trips:	**156**	**172**	**139**	**153**

Other Projected Development Uses

Projected Land Use(3)	ITE Code	Size	AM In	AM Out	PM In	PM Out
Industrial Park	130	27 acres	183	37	48	182
Commercial (discount store)	815	120,000 sf	86	31	299	299
Commercial (home improve.)	862	130,000 sf	111	83	148	155
Auto dealership	841	60,000 sf	86	29	63	94
Restaurant (sit down)	932	6,000 sf	36	29	35	24
Auto parts store	843	8,000 sf	10	8	24	24
		Subtotal:	512	217	617	778
		Less internal capture (10%) (4)	-20	-11	-44	-45
		Subtotal (trips at development driveways):	**492**	**206**	**573**	**733**
		Less pass-by trips(5) :	-70	-70	-140	-140
		Less diverted-linked trips(5)	-47	-47	-135	-135
		Total primary/new trips:	**375**	**89**	**298**	**458**
		Overall total trips at development driveways:	**792**	**522**	**986**	**1,160**
		Overall total primary/new trips:	**531**	**261**	**437**	**611**

Notes:

1. % capture only applied to gas station trips.
2. Per ITE, PM weekday pass-by/diverted-linked reduction percentages as follows: 28%/35% superstore, 42%/34% gas station. AM percentages assumed to be same for superstore, and 58%/21% gas station.
3. Remaining projected uses and sizes based upon discussions with staff – best estimation at time of this study.
4. % capture only applied to discount store and home improvement store uses.
5. Per ITE, PM weekday pass-by/diverted-linked reduction percentages as follows: 17%/30% discount store, 43%/13% auto parts, 44%/24% home improvement, and 43%/20% restaurant. AM percentages assumed to be same for the purposes of this study. No reductions applied to Industrial Park or Auto dealership uses.

PROJECT TRIP DISTRIBUTION

The directional distribution of the overall development-generated new trips was roughly based upon existing travel patterns and the potential market area for the planned/projected uses. The directional distribution to/from the proposed development for site-generated new trips is expected to be approximately as follows:

- South on Clare Avenue: 40%
- North on US-127/10: 25%
- South on US-127/10: 15%
- East on E. Colonville Rd: 10%
- North on Clare Avenue: 8%
- West on W. Colonville Rd: 2%

100%

The distribution of pass-by trips was based upon current directional split of traffic passing by the overall development. During the morning peak the distribution is roughly 50/50 east/west on E. Colonville Road and 40/60 north/south on Clare Avenue. In the afternoon peak the split is still expected to be 50/50 east/west on E. Colonville, while the somewhat expected opposite 60/40 north/south split will occur on Clare Avenue.

Based upon the above distribution patterns and the overall development layout, the forecast peak-hour project traffic was assigned to the proposed site access points and the adjacent roadway system. Figure 2 on the next page illustrates the above distribution pattern (for new trips) and expected trip assignment of development-generated traffic upon full occupancy.

The forecast project trips were added to the expected future 2026 background peak-hour volumes to depict the estimated total projected 2026 future volumes during the morning and afternoon peak hours. These total 2026 future peak hour traffic volumes are illustrated in Figure 3.

EVALUATION OF PROJECTED 2026 FUTURE CONDITIONS

Intersection level of service calculations were completed to evaluate the projected 2026 future morning and afternoon peak hour conditions at the study area intersections. The results of the level of service analyses without any roadway improvements included are summarized on the left half of Figure 4. Copies of the computer analyses are included in the appendix of this report.

The results of those analyses show that several movements at the study area intersections are expected to operate very poorly during the peak hours if no roadway improvements are completed. Those deficient movements include:

- The US-127 northbound off-ramp left turn at E. Colonville – LoS F during the afternoon peak hour;
- The right and left turn movements on E. Colonville at Clare Avenue – both at LoS F during the afternoon peak hour; and
- The US-127 southbound off-ramp left turn at Clare Avenue – LoS F during both morning and afternoon peak hours.

Related model simulations confirm that these movements will experience significant delays and queuing issues without improvements, particularly the US-127 southbound off-ramp left turn.

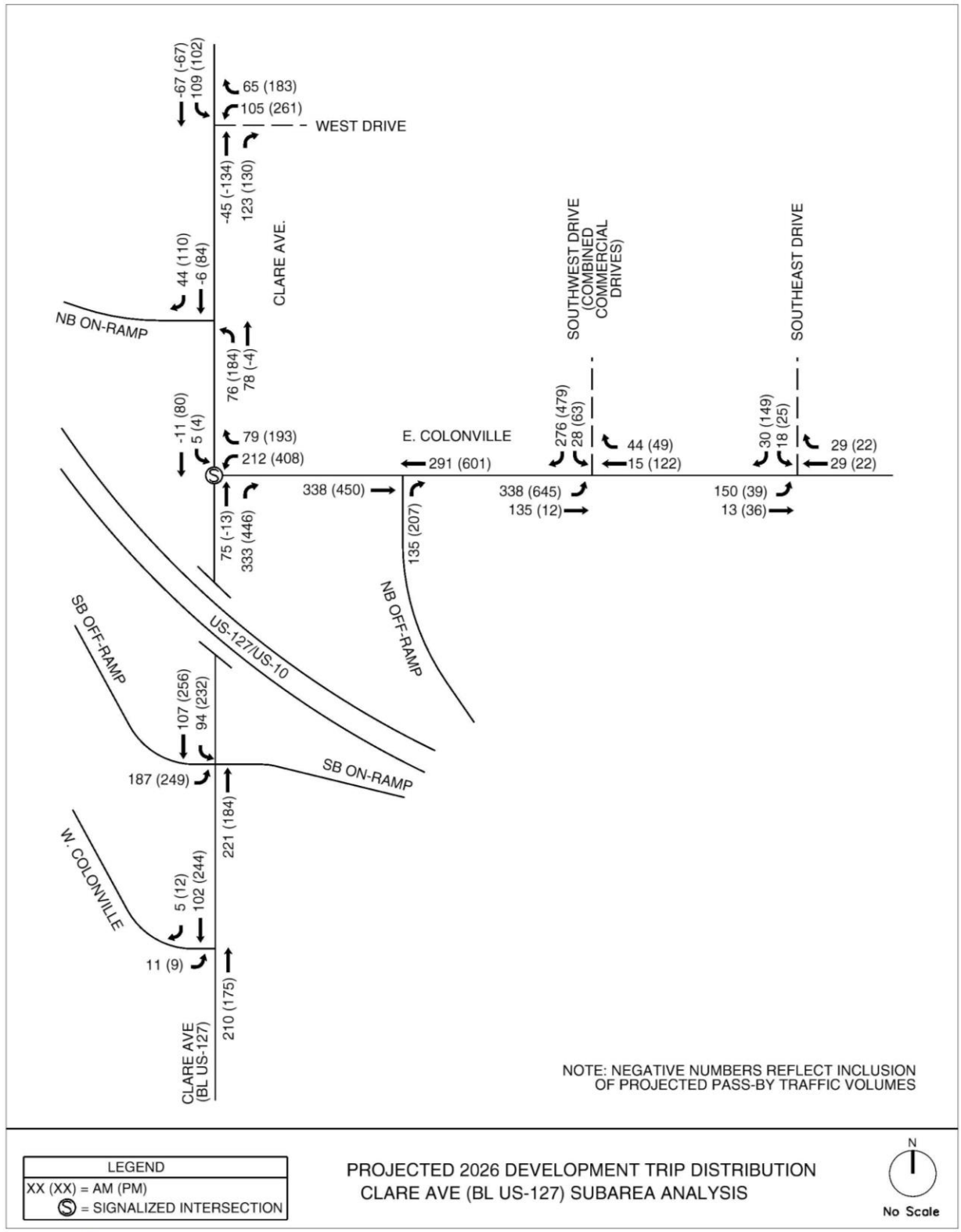

-67 (-67)
109 (102)
65 (183)
105 (261)
WEST DRIVE
-45 (-134)
123 (130)
CLARE AVE.
44 (110)
-6 (84)
NB ON-RAMP
76 (184)
78 (-4)
-11 (80)
5 (4)
79 (193)
212 (408)
E. COLONVILLE
291 (601)
SOUTHWEST DRIVE (COMBINED COMMERCIAL DRIVES)
276 (479)
28 (63)
44 (49)
15 (122)
SOUTHEAST DRIVE
30 (149)
18 (25)
29 (22)
29 (22)
338 (450)
338 (645)
135 (12)
150 (39)
13 (36)
75 (-13)
333 (446)
135 (207)
NB OFF-RAMP
SB OFF-RAMP
US-127/US-10
107 (256)
94 (232)
187 (249)
SB ON-RAMP
221 (184)
W. COLONVILLE
5 (12)
102 (244)
11 (9)
210 (175)
CLARE AVE (BL US-127)
NOTE: NEGATIVE NUMBERS REFLECT INCLUSION OF PROJECTED PASS-BY TRAFFIC VOLUMES
LEGEND
XX (XX) = AM (PM)
= SIGNALIZED INTERSECTION
PROJECTED 2026 DEVELOPMENT TRIP DISTRIBUTION
CLARE AVE (BL US-127) SUBAREA ANALYSIS
N
No Scale
progressive ae

Figure 2

DISCUSSION - RECOMMENDED ROADWAY IMPROVEMENTS

Several alternative improvements were tested along the lines of typical roadway improvements such as lane reconfigurations, widening, and intersection signalization. Based upon those efforts, the following set of improvements will address the projected future conditions deficiencies with relatively minimal cost.

- Add a second westbound lane on E. Colonville Road at its intersection with the US-127 northbound off-ramp;
- Install semi-actuated traffic signals at the above E. Colonville Rd./US-127 northbound off-ramp intersection and at the Clare Ave./US-127 southbound ramps intersection;
- Revising the westbound lane configuration and signal operations at the Clare Ave/E. Colonville Rd. intersection;
- Minor lengthening of the two-lane approach cross section on the US-127 northbound off-ramp at E. Colonville Road; and
- Widening W. Colonville Road to provide a separate eastbound left turn lane.

Intersection level of service calculations were again completed to evaluate the projected 2026 future morning and afternoon peak hour conditions at the study area intersections with these suggested improvements in place. The results of the level of service analyses with the roadway improvements included are summarized on the right half of Figure 4.

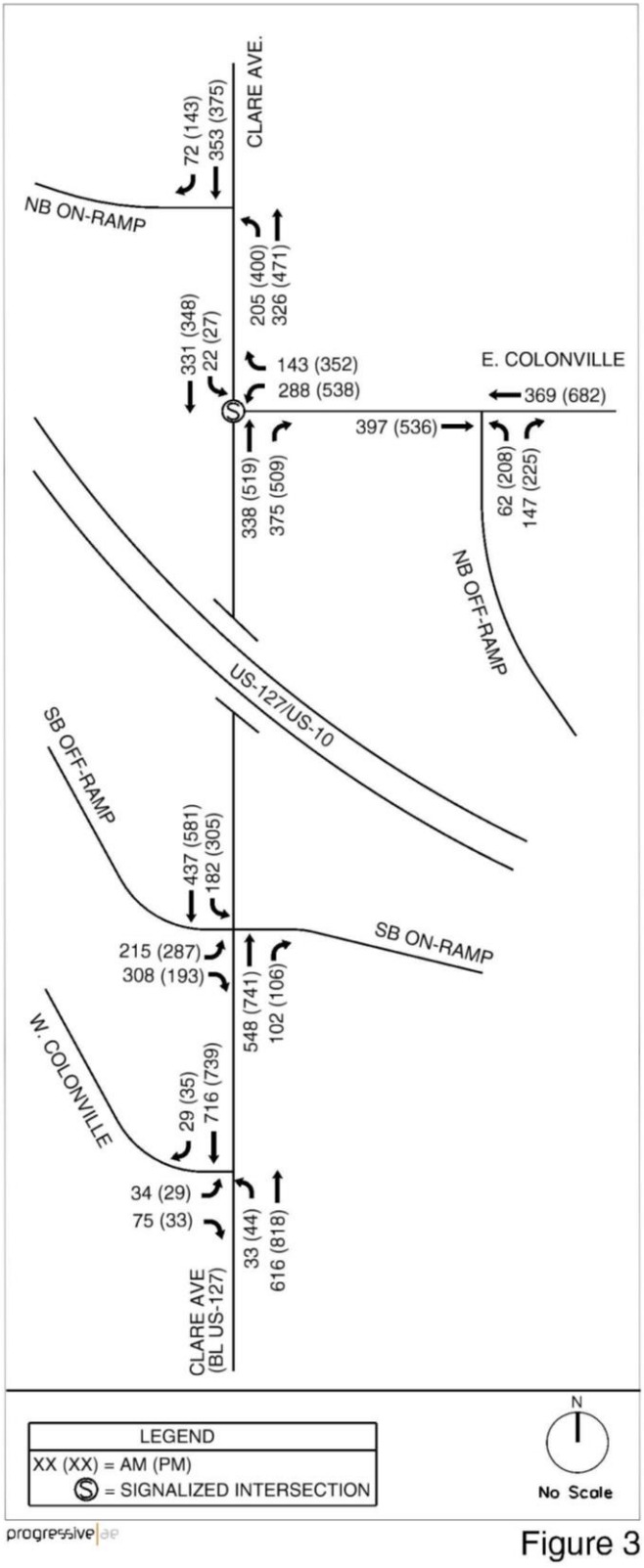


Figure 3

2026 FUTURE PROJECTED PEAK-HOUR VOLUMES
CLARE AVE (BL US-127) SUBAREA ANALYSIS

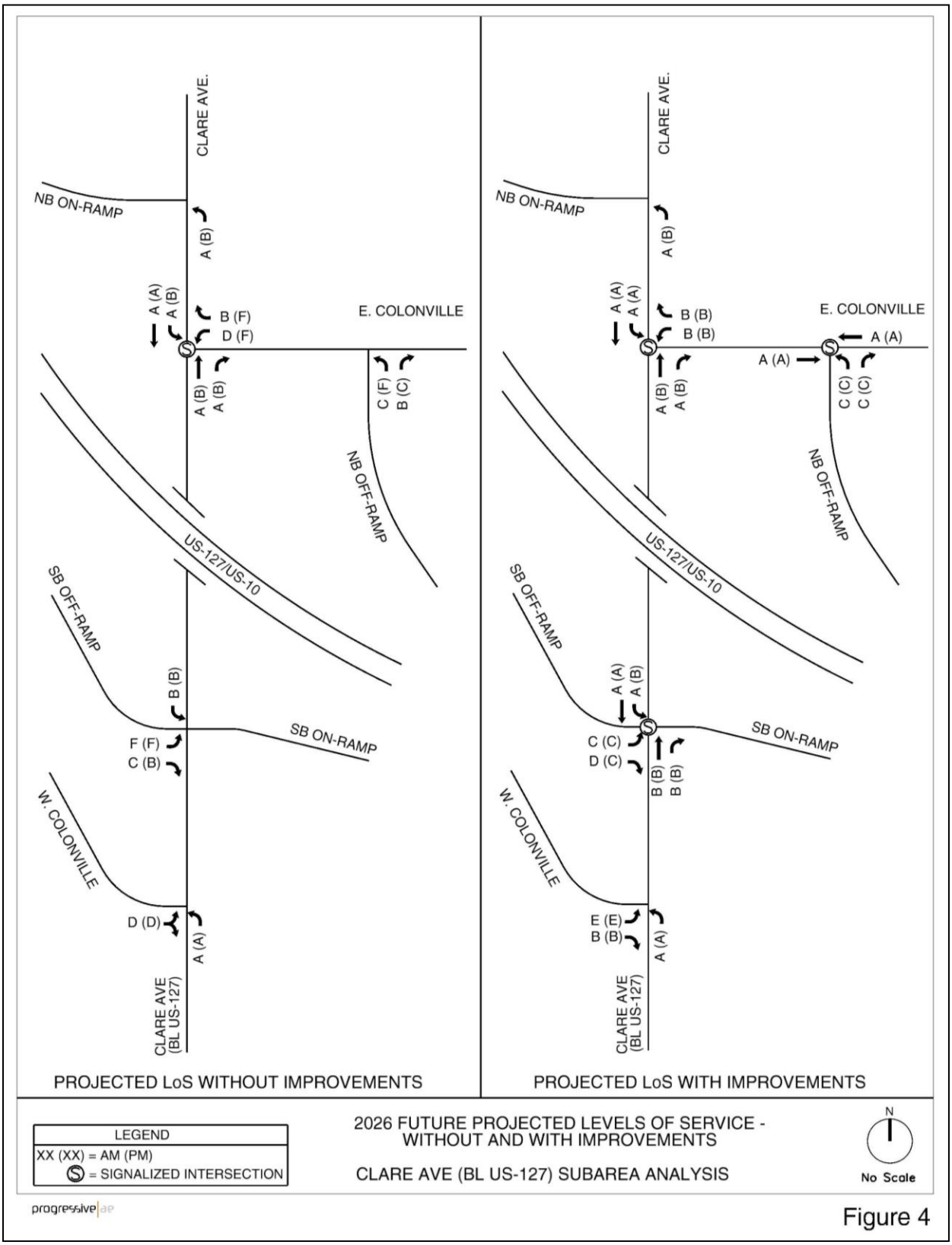

CLARE AVE.
NB ON-RAMP
A (B)
A (A)
A (B)
B (F)
D (F)
E. COLONVILLE
A (B)
A (B)
C (F)
B (C)
NB OFF-RAMP
US-127/US-10
SB OFF-RAMP
B (B)
F (F)
C (B)
SB ON-RAMP
W. COLONVILLE
D (D)
A (A)
CLARE AVE
(BL US-127)
PROJECTED LoS WITHOUT IMPROVEMENTS
CLARE AVE.
NB ON-RAMP
A (B)
A (A)
A (A)
B (B)
B (B)
E. COLONVILLE
A (A)
A (A)
A (B)
A (B)
C (C)
C (C)
NB OFF-RAMP
US-127/US-10
SB OFF-RAMP
A (A)
A (B)
C (C)
D (C)
SB ON-RAMP
B (B)
B (B)
W. COLONVILLE
E (E)
B (B)
A (A)
CLARE AVE
(BL US-127)
PROJECTED LoS WITH IMPROVEMENTS
LEGEND
XX (XX) = AM (PM)
= SIGNALIZED INTERSECTION
2026 FUTURE PROJECTED LEVELS OF SERVICE -
WITHOUT AND WITH IMPROVEMENTS
CLARE AVE (BL US-127) SUBAREA ANALYSIS
N
No Scale
progressive ae

Figure 4

As shown, almost all movements at the study area intersections are expected to operate within acceptable levels of service during both peaks with the improvements in place, with levels of service generally in the A to C range. Per calculations, the exception could be at the W. Colonville Road eastbound left turn at Clare Avenue, where an LoS of E is projected during both peak hours. However, the relatively low left-turn volumes (34 and 29 vehicles for the two peaks, respectively) do not indicate that any other/additional improvements should be considered, and that actual conditions may be better than calculations indicate.

It should be noted that the close proximity of the Clare Ave./E. Colonville and E. Colonville/US-127 northbound off-ramp intersections (about 350 feet) can raise concerns regarding signalization. However, the model results and simulations clearly indicate that a set of well-coordinated, short cycle (60 seconds) signal operations will provide good progression and little, if any, queuing issues even with the adjacent large development fully occupied.

In regards to the suggested addition of traffic signals at the two off-ramp intersections, no specific signal warrant analyses were deemed appropriate at this point. That is largely due to the variability that can be expected related to when the overall development is actually completed, what the actual/final land uses and sizes become, and how that traffic actually distributes onto the surface roadway system.

However, based upon the expected significant amount of commercial development that is projected by 2026 and its trip generation characteristics throughout the day, it is fully expected that both of those two off-ramp intersections will meet one or both of the primary eight-hour signal warrants that are defined by the Michigan Manual of Uniform Traffic Control Devices (MMUTCD) and used by MDOT. It is likely though that MDOT will require that a significant portion of the commercial development is in place and generating traffic (at least the WalMart store) before they will allow signal installation of one or both of those MDOT controlled intersections.

Other Considerations

It is our understanding that there has been discussions between the city and MDOT regarding another set of potential improvements in the immediate Clare Ave/E. Colonville area on the north side of the interchange. That is, some type of roadway reconfiguration that would dovetail with the use of one or more roundabouts as an alternative way to control traffic.

We would certainly be supportive of that type of improvement as modern roundabouts are continuing to prove that they can be an appropriate alternative under many conditions. However, it appears in this case that simpler, and likely much less expensive, typical improvements will easily accommodate projected future traffic. If additional funding for revised analyses, rights-of-way, and construction can be identified, we would suggest that the City keep an open mind to a roundabout alternative. An initial review of the 2026 volumes, roadway configuration, wetlands constraints, etc, indicates that a set of two roundabouts would be most appropriate, as opposed to mixing a single roundabout with an adjacent signalized intersection.

Technical Appendix

Clare Avenue/Colonville Rd. Subarea Study

- **Level of Service Definitions**
- **Glossary**
- **Count/Data Summaries**
- **LoS Analyses Results**
- **Signal Data/miscellaneous**

Level of Service Definitions
<u>Signalized</u> Intersections

Level of Service A: Describes operations with very low average stopped delay, i.e., less than 10.0 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level of Service B: Describes operations with an average stopped delay in the range of 10.0 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level of Service C: Describes operations with an average stopped delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

Level of Service D: Describes operations with an average stopped delay in the range of 35.1 to 55.0 seconds per vehicle. At Level of Service D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c (volume/capacity) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of Service E: Describes operations with an average stopped delay in the range of 55.1 to 80.0 seconds per vehicle. This is considered to be the limit of acceptable delay in many cases. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are a frequent occurrence.

Level of Service F: Describes operations with an average stopped delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Level of Service Definitions
<u>Unsignalized</u> Intersections

Level of Service A:	Average delay per vehicles for impeded movements is less than 10 seconds. There is little or no delay with typically low side street and/or main street traffic.
Level of Service B:	Average stopped delays from 10.1 seconds to 15.0 seconds. Short delays, many acceptable gaps in main street traffic stream.
Level of Service C:	Average delay per vehicle ranges from 15.1 to 25.0 seconds. Average traffic delays with frequent gaps in main street traffic.
Level of Service D:	Average delays from 25.1 to 35.0 seconds for impeded movements. Long traffic delays for impeded movements due in part to a limited number of acceptable gaps.
Level of Service E:	Average delays in the 35.1 to 50.0 second range. May experience very long delays for impeded movements with a very small number of acceptable gaps in the traffic stream.
Level of Service F:	Average vehicle delays of over 50.0 seconds. Extreme traffic delays with virtually no acceptable gaps in main street traffic.

Glossary

Approach: A set of lanes accommodating all left-turn, through, and right-turn movements arriving at an intersection from a given direction.

Arterial: Signalized streets that serve primarily through traffic and provide access to abutting properties as a secondary function.

Average Stopped Delay: The total time vehicles are stopped in an intersection approach or lane group during a specified time interval divided by the volume departing from the approach or lane group during the same time period, in seconds per vehicle.

Background Traffic: Traffic volumes that will be on the roadway network without the presence of the proposed development.

Bypass Lane: A one-lane widening on a two-lane roadway that allows through traffic to pass by waiting left-turn traffic.

Capacity: The maximum rate of flow at which persons or vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic, and control conditions; usually expressed as vehicles per hour or persons per hour.

Conflicting Traffic Volume: The volume of traffic which conflicts with a specific movement at an intersection.

Corridor: A lineal study area aligned with a roadway facility in which traffic, land use, right-of-way, environmental, and other factors are evaluated to determine future transportation facility needs.

Cycle: Any complete sequence of traffic signal indications.

Cycle Length: The total time for a traffic signal to complete one cycle.

Design Hour Volume: The traffic volume for the design hour, usually a forecast of the relevant peak hour volume, in vehicles per hour.

Diverted Linked Trips: Trips from the traffic volume on roadways within the vicinity of the generator but which requires a diversion from that roadway to another roadway to gain access to the site.

Driveway Offset: Distance between driveways on opposite sides of a roadway, measured parallel to roadway.

Freeway: A multi-lane divided highway having a minimum of two lanes for exclusive use of traffic in each direction and full control of access and egress.

Gaps (Critical Gap): The median time headway between vehicles in a major traffic stream which will permit side-street vehicles to cross through or merge with the major traffic stream.

Green Time: The actual length of the "green" indication for a given movement at a signalized intersection.

Level of Service: A qualitative measure describing operational conditions within a traffic stream; generally described in terms of such factors as speed and travel time, delay, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

Operational Analysis: A use of capacity analysis to determine the prevailing level of service on an existing or projected facility, with known or projected traffic, roadway, and control conditions. This analysis can involve a particular location, such as an intersection or a corridor.

Pass-by Trips: Trips made as intermediate stops on the way from an origin to a primary trip destination.

Peak Hour (AM): The one hour period in the morning representing the highest hourly volume of traffic flow on the adjacent public street system.

Peak Hour (PM): The one hour period in the afternoon or evening representing the highest hourly volume of traffic flow on the adjacent public street system.

Peak Hour Factor: The hourly volume during the maximum volume hour of the day divided by four times the peak 15-minute flow within the peak hour; a measure of traffic demand fluctuation within the peak hour.

Phase: The part of the signal cycle allocated to any combination of traffic movements receiving the right-of-way simultaneously during one or more intervals.

Roadway Conditions: Geometric characteristics of a street or highway, including the type of facility, number and width of lanes (by direction), shoulder widths and lateral clearances, design speed, etc.

Service Drive: A roadway (usually private) that provides internal access to two or more uses.

Site Traffic: Existing or projected vehicular traffic generated by the development.

Study Area: The geographic area containing site access points and critical intersections (and connecting highway segments) which are impacted by the site-traffic generated by the development, and should be evaluated.

System Improvements: Added lanes, signal improvements, and other roadway improvements not considered site-related improvements.

Traffic Impact: The adverse impact on intersection Level of Service and/or street and highway safety and operations as determined by the criteria and procedures set forth in this handbook.

Trip (Directional Trip): A single or one-direction vehicle movement with either the origin or the destination (exiting or entering) inside a study site.

Trip Distribution: The distribution or assignment of site traffic into site driveways and study area roadways/intersections based upon expected direction of approach and departure.

Unsignalized Intersection: Any intersection not controlled by traffic signals.

Volume: The number of persons or vehicles passing a point on a lane or roadway during some time interval, such as one hour or during an average day.

Volume-to-Capacity Ratio (V/C): The ratio of demand flow rate to capacity for a traffic facility.

COUNT/DATA SUMMARIES

Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 1US

File Name : TMC_1 Clare&US127_NBOnRamp_3-9-16
Site Code : TMC_1
Start Date : 3/9/2016
Page No : 1

Groups Printed- Pass Cars - Single Units - Heavy Trucks

	Clare Avenue Southbound					Westbound					Clare Avenue Northbound					US-127 NB On-Ramp Eastbound					
Start Time	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	3	41	0	0	44	0	0	0	0	0	0	20	23	0	43	0	0	0	0	0	87
07:15 AM	3	60	0	0	63	0	0	0	0	0	0	32	22	0	54	0	0	0	0	0	117
07:30 AM	4	76	0	0	80	0	0	0	0	0	0	25	28	0	53	0	0	0	0	0	133
07:45 AM	3	94	0	0	97	0	0	0	0	0	0	49	23	0	72	0	0	0	0	0	169
Total	13	271	0	0	284	0	0	0	0	0	0	126	96	0	222	0	0	0	0	0	506
08:00 AM	5	55	0	0	60	0	0	0	0	0	0	66	22	0	88	0	0	0	0	0	148
08:15 AM	9	49	0	0	58	0	0	0	0	0	0	49	25	0	74	0	0	0	0	0	132
08:30 AM	8	40	0	0	48	0	0	0	0	0	0	36	23	0	59	0	0	0	0	0	107
08:45 AM	2	53	0	0	55	0	0	0	0	0	0	29	24	0	53	0	0	0	0	0	108
Total	24	197	0	0	221	0	0	0	0	0	0	180	94	0	274	0	0	0	0	0	495
**** BREAK ****																					
02:00 PM	2	55	0	0	57	0	0	0	0	0	0	60	39	0	99	0	0	0	0	0	156
02:15 PM	4	47	0	0	51	0	0	0	0	0	0	76	45	0	121	0	0	0	0	0	172
02:30 PM	9	62	0	0	71	0	0	0	0	0	0	74	36	0	110	0	0	0	0	0	181
02:45 PM	4	57	0	0	61	0	0	0	0	0	0	66	37	0	103	0	0	0	0	0	164
Total	19	221	0	0	240	0	0	0	0	0	0	276	157	0	433	0	0	0	0	0	673
03:00 PM	9	60	0	0	69	0	0	0	0	0	0	82	50	0	132	0	0	0	0	0	201
03:15 PM	10	49	0	0	59	0	0	0	0	0	0	116	46	0	162	0	0	0	0	0	221
03:30 PM	3	52	0	0	55	0	0	0	0	0	0	89	35	0	124	0	0	0	0	0	179
03:45 PM	5	48	0	0	53	0	0	0	0	0	0	72	39	0	111	0	0	0	0	0	164
Total	27	209	0	0	236	0	0	0	0	0	0	359	170	0	529	0	0	0	0	0	765
04:00 PM	7	73	0	0	80	0	0	0	0	0	0	83	45	0	128	0	0	0	0	0	208
04:15 PM	1	53	0	0	54	0	0	0	0	0	0	73	41	0	114	0	0	0	0	0	168
04:30 PM	3	59	0	0	62	0	0	0	0	0	0	99	42	0	141	0	0	0	0	0	203
04:45 PM	8	51	0	0	59	0	0	0	0	0	0	75	41	0	116	0	0	0	0	0	175
Total	19	236	0	0	255	0	0	0	0	0	0	330	169	0	499	0	0	0	0	0	754
05:00 PM	10	51	0	0	61	0	0	0	0	0	0	99	46	0	145	0	0	0	0	0	206
05:15 PM	11	51	0	0	62	0	0	0	0	0	0	90	36	0	126	0	0	0	0	0	188
05:30 PM	4	49	0	0	53	0	0	0	0	0	0	90	47	0	137	0	0	0	0	0	190
05:45 PM	13	56	0	0	69	0	0	0	0	0	0	74	35	0	109	0	0	0	0	0	178
Total	38	207	0	0	245	0	0	0	0	0	0	353	164	0	517	0	0	0	0	0	762
Grand Total	140	1341	0	0	1481	0	0	0	0	0	0	1624	850	0	2474	0	0	0	0	0	3955
Apprch %	9.5	90.5	0	0		0	0	0	0		0	65.6	34.4	0		0	0	0	0		
Total %	3.5	33.9	0	0	37.4	0	0	0	0	0	0	41.1	21.5	0	62.6	0	0	0	0	0	
Pass Cars	135	1302	0	0	1437	0	0	0	0	0	0	1565	807	0	2372	0	0	0	0	0	3809
% Pass Cars	96.4	97.1	0	0	97	0	0	0	0	0	0	96.4	94.9	0	95.9	0	0	0	0	0	96.3
Single Units	3	25	0	0	28	0	0	0	0	0	0	46	25	0	71	0	0	0	0	0	99
% Single Units	2.1	1.9	0	0	1.9	0	0	0	0	0	0	2.8	2.9	0	2.9	0	0	0	0	0	2.5
Heavy Trucks	2	14	0	0	16	0	0	0	0	0	0	13	18	0	31	0	0	0	0	0	47
% Heavy Trucks	1.4	1	0	0	1.1	0	0	0	0	0	0	0.8	2.1	0	1.3	0	0	0	0	0	1.2

Comments: 6 hour video traffic study conducted during typical weekday (Wednesday) from 7:00-9:00 AM morning & 2:00-6:00 PM afternoon peak hours, while school was in session. Non-signalized, intersection no ped. signals. with push button peds. all quadrants. Video SCU camera was located within NW intersection quadrant.

Traffic Data Collection (TDC)

tdccounts.com

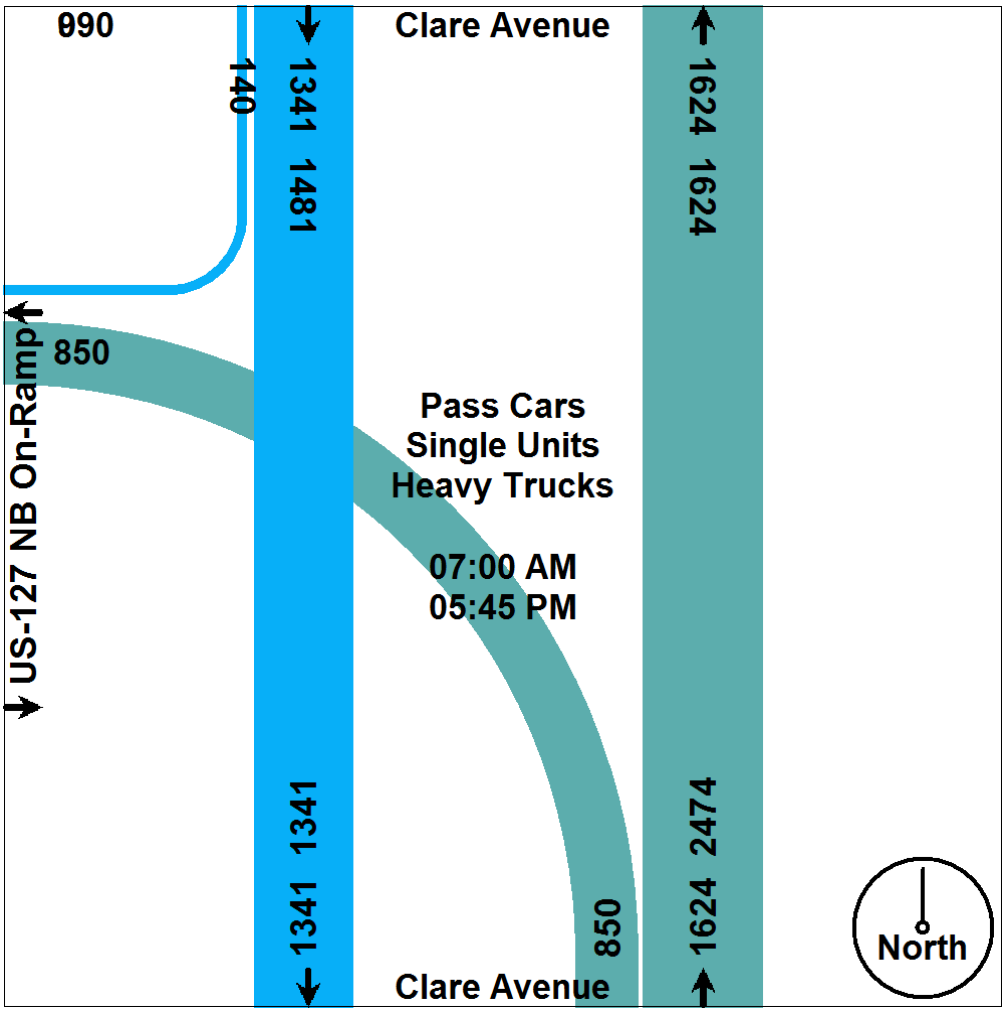
Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 1US

File Name : TMC_1 Clare&US127_NBOnRamp_3-9-16
Site Code : TMC_1
Start Date : 3/9/2016
Page No : 2



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

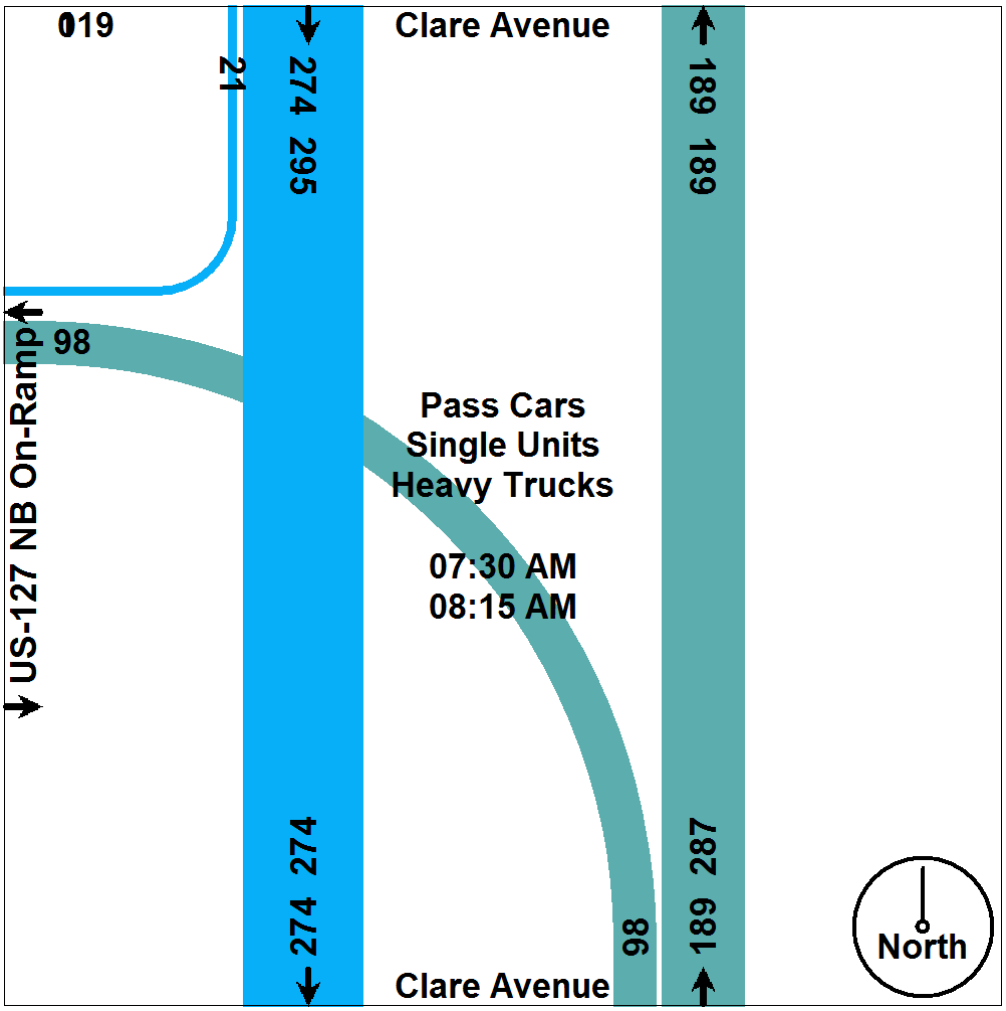
Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 1US

File Name : TMC_1 Clare&US127_NBOnRamp_3-9-16
Site Code : TMC_1
Start Date : 3/9/2016
Page No : 3

	Clare Avenue Southbound				Westbound				Clare Avenue Northbound				US-127 NB On-Ramp Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	4	76	0	80	0	0	0	0	0	25	**28**	53	0	0	0	0	133
07:45 AM	3	**94**	0	**97**	0	0	0	0	0	49	23	72	0	0	0	0	**169**
08:00 AM	5	55	0	60	0	0	0	0	0	**66**	22	**88**	0	0	0	0	148
08:15 AM	**9**	49	0	58	0	0	0	0	0	49	25	74	0	0	0	0	132
Total Volume	21	274	0	295	0	0	0	0	0	189	98	287	0	0	0	0	582
% App. Total	7.1	92.9	0		0	0	0		0	65.9	34.1		0	0	0		
PHF	.583	.729	.000	.760	.000	.000	.000	.000	.000	.716	.875	.815	.000	.000	.000	.000	.861
Pass Cars	18	265	0	283	0	0	0	0	0	185	90	275	0	0	0	0	558
% Pass Cars	85.7	96.7	0	95.9	0	0	0	0	0	97.9	91.8	95.8	0	0	0	0	95.9
Single Units	2	5	0	7	0	0	0	0	0	3	3	6	0	0	0	0	13
% Single Units	9.5	1.8	0	2.4	0	0	0	0	0	1.6	3.1	2.1	0	0	0	0	2.2
Heavy Trucks	1	4	0	5	0	0	0	0	0	1	5	6	0	0	0	0	11
% Heavy Trucks	4.8	1.5	0	1.7	0	0	0	0	0	0.5	5.1	2.1	0	0	0	0	1.9



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

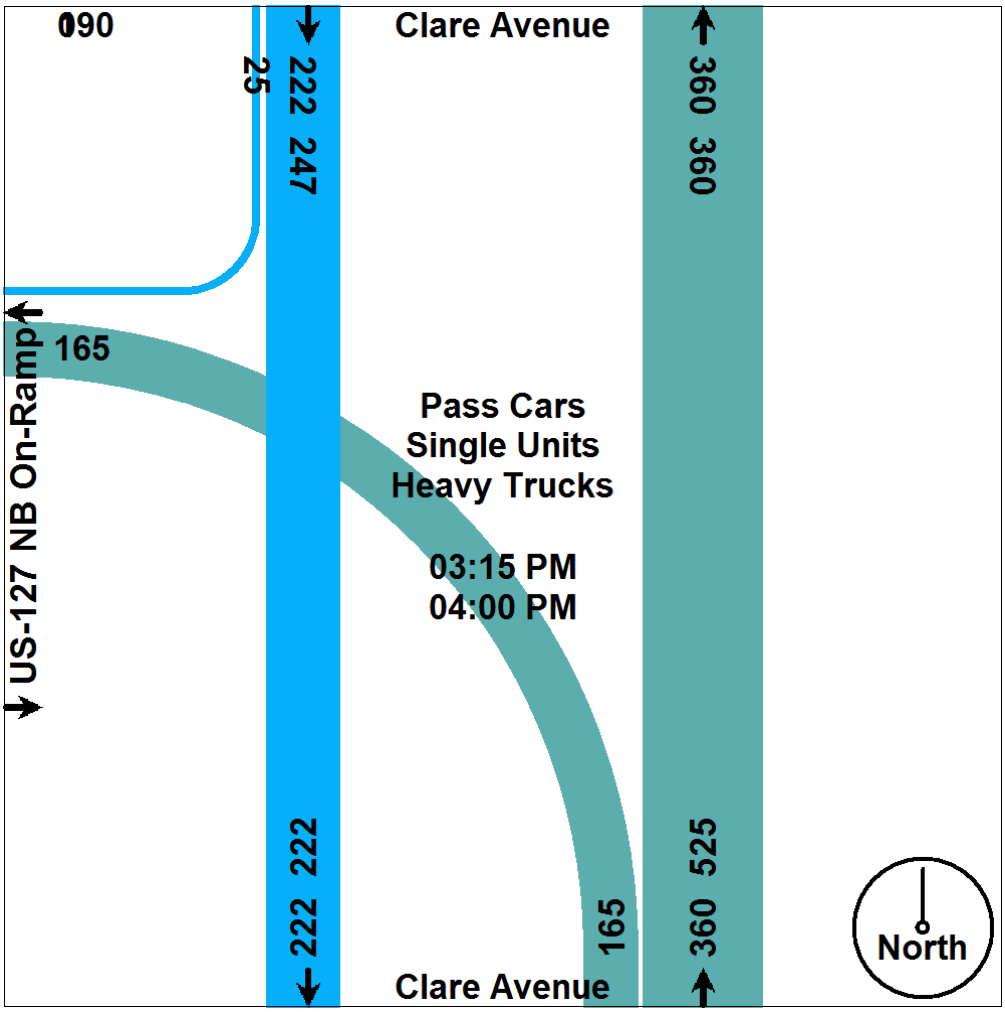
Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 1US

File Name : TMC_1 Clare&US127_NBOnRamp_3-9-16
Site Code : TMC_1
Start Date : 3/9/2016
Page No : 4

	Clare Avenue Southbound				Westbound				Clare Avenue Northbound				US-127 NB On-Ramp Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:15 PM																	
03:15 PM	**10**	49	0	59	0	0	0	0	0	**116**	**46**	**162**	0	0	0	0	**221**
03:30 PM	3	52	0	55	0	0	0	0	0	89	35	124	0	0	0	0	179
03:45 PM	5	48	0	53	0	0	0	0	0	72	39	111	0	0	0	0	164
04:00 PM	7	**73**	0	**80**	0	0	0	0	0	83	45	128	0	0	0	0	208
Total Volume	25	222	0	247	0	0	0	0	0	360	165	525	0	0	0	0	772
% App. Total	10.1	89.9	0		0	0	0		0	68.6	31.4		0	0	0		
PHF	.625	.760	.000	.772	.000	.000	.000	.000	.000	.776	.897	.810	.000	.000	.000	.000	.873
Pass Cars	24	217	0	241	0	0	0	0	0	339	159	498	0	0	0	0	739
% Pass Cars	96.0	97.7	0	97.6	0	0	0	0	0	94.2	96.4	94.9	0	0	0	0	95.7
Single Units	1	2	0	3	0	0	0	0	0	17	5	22	0	0	0	0	25
% Single Units	4.0	0.9	0	1.2	0	0	0	0	0	4.7	3.0	4.2	0	0	0	0	3.2
Heavy Trucks	0	3	0	3	0	0	0	0	0	4	1	5	0	0	0	0	8
% Heavy Trucks	0	1.4	0	1.2	0	0	0	0	0	1.1	0.6	1.0	0	0	0	0	1.0



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 1US

File Name : TMC_1 Clare&US127_NBOnRamp_3-9-16
Site Code : TMC_1
Start Date : 3/9/2016
Page No : 5

Aerial Photo

Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 3DQ

File Name : TMC_2 Clare&ColonvilleE_3-9-16
Site Code : TMC_2
Start Date : 3/9/2016
Page No : 1

Groups Printed- Pass Cars - Single Units - Heavy Trucks

	Clare Avenue Southbound					Colonville Road East Westbound					Clare Avenue Northbound					Eastbound					
Start Time	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	38	3	0	41	9	0	11	0	20	4	35	0	0	39	0	0	0	0	0	100
07:15 AM	0	57	4	0	61	14	0	6	0	20	8	37	0	0	45	0	0	0	0	0	126
07:30 AM	0	74	2	0	76	14	0	12	0	26	3	39	0	0	42	0	0	0	0	0	144
07:45 AM	0	91	2	0	93	11	0	19	0	30	7	61	0	0	68	0	0	0	0	0	191
Total	0	260	11	0	271	48	0	48	0	96	22	172	0	0	194	0	0	0	0	0	561
08:00 AM	0	51	4	0	55	13	0	18	0	31	17	76	0	0	93	0	0	0	0	0	179
08:15 AM	0	45	2	0	47	11	0	9	0	20	4	61	0	0	65	0	0	0	0	0	132
08:30 AM	0	42	0	0	42	9	0	14	0	23	9	50	0	0	59	0	0	0	0	0	124
08:45 AM	0	50	3	0	53	13	0	11	0	24	7	41	0	0	48	0	0	0	0	0	125
Total	0	188	9	0	197	46	0	52	0	98	37	228	0	0	265	0	0	0	0	0	560
**** BREAK ****																					
02:00 PM	0	54	1	0	55	16	0	24	0	40	10	83	0	0	93	0	0	0	0	0	188
02:15 PM	0	46	1	0	47	20	0	26	0	46	14	102	0	0	116	0	0	0	0	0	209
02:30 PM	0	59	4	0	63	19	0	21	0	40	10	89	0	0	99	0	0	0	0	0	202
02:45 PM	0	54	4	0	58	30	0	26	0	56	13	74	0	0	87	0	0	0	0	0	201
Total	0	213	10	0	223	85	0	97	0	182	47	348	0	0	395	0	0	0	0	0	800
03:00 PM	0	58	2	0	60	19	0	28	0	47	19	112	0	0	131	0	0	0	0	0	238
03:15 PM	0	48	1	0	49	23	0	17	0	40	16	136	0	0	152	0	0	0	0	0	241
03:30 PM	0	47	5	0	52	23	0	13	0	36	14	101	0	0	115	0	0	0	0	0	203
03:45 PM	0	44	4	0	48	24	0	14	0	38	15	87	0	0	102	0	0	0	0	0	188
Total	0	197	12	0	209	89	0	72	0	161	64	436	0	0	500	0	0	0	0	0	870
04:00 PM	0	69	2	0	71	20	0	21	0	41	8	108	0	0	116	0	0	0	0	0	228
04:15 PM	0	46	7	0	53	19	0	19	0	38	13	96	0	0	109	0	0	0	0	0	200
04:30 PM	0	53	6	0	59	29	0	24	0	53	13	109	0	0	122	0	0	0	0	0	234
04:45 PM	0	45	6	0	51	28	0	25	0	53	14	88	0	0	102	0	0	0	0	0	206
Total	0	213	21	0	234	96	0	89	0	185	48	401	0	0	449	0	0	0	0	0	868
05:00 PM	0	46	5	0	51	33	0	24	0	57	10	114	0	0	124	0	0	0	0	0	232
05:15 PM	0	51	1	0	52	31	0	23	0	54	11	95	0	0	106	0	0	0	0	0	212
05:30 PM	0	45	3	0	48	38	0	25	0	63	16	101	0	0	117	0	0	0	0	0	228
05:45 PM	0	51	5	0	56	19	0	23	0	42	8	89	0	0	97	0	0	0	0	0	195
Total	0	193	14	0	207	121	0	95	0	216	45	399	0	0	444	0	0	0	0	0	867
Grand Total	0	1264	77	0	1341	485	0	453	0	938	263	1984	0	0	2247	0	0	0	0	0	4526
Apprch %	0	94.3	5.7	0		51.7	0	48.3	0		11.7	88.3	0	0		0	0	0	0		
Total %	0	27.9	1.7	0	29.6	10.7	0	10	0	20.7	5.8	43.8	0	0	49.6	0	0	0	0	0	
Pass Cars	0	1225	74	0	1299	454	0	429	0	883	238	1924	0	0	2162	0	0	0	0	0	4344
% Pass Cars	0	96.9	96.1	0	96.9	93.6	0	94.7	0	94.1	90.5	97	0	0	96.2	0	0	0	0	0	96
Single Units	0	28	2	0	30	15	0	12	0	27	16	44	0	0	60	0	0	0	0	0	117
% Single Units	0	2.2	2.6	0	2.2	3.1	0	2.6	0	2.9	6.1	2.2	0	0	2.7	0	0	0	0	0	2.6
Heavy Trucks	0	11	1	0	12	16	0	12	0	28	9	16	0	0	25	0	0	0	0	0	65
% Heavy Trucks	0	0.9	1.3	0	0.9	3.3	0	2.6	0	3	3.4	0.8	0	0	1.1	0	0	0	0	0	1.4

Comments: 6 hour video traffic study conducted during typical weekday (Wednesday) from 7:00-9:00 AM morning & 2:00-6:00 PM afternoon peak hours, while school was in session. Signalized, intersection no ped. signals. Video SCU camera was located within SW intersection quadrant.

Traffic Data Collection (TDC)

tdccounts.com

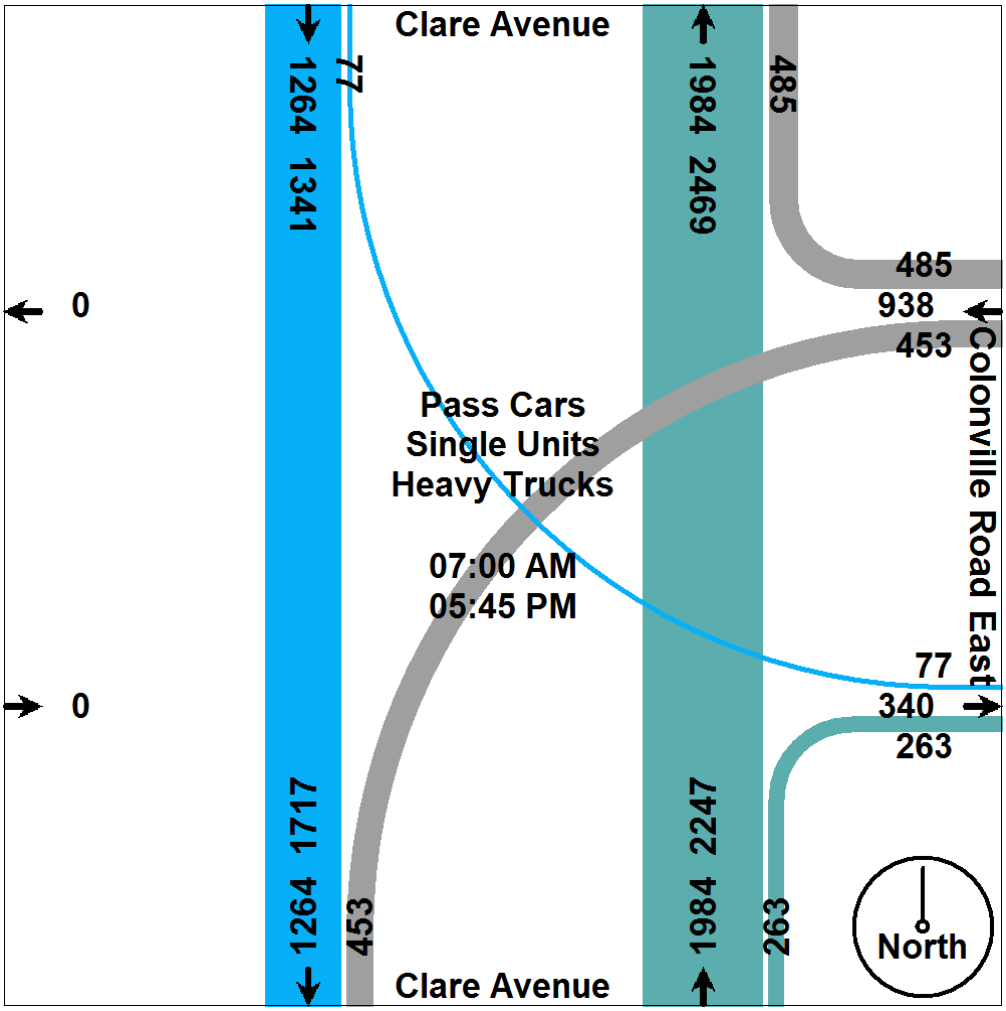
Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 3DQ

File Name : TMC_2 Clare&ColonvilleE_3-9-16
Site Code : TMC_2
Start Date : 3/9/2016
Page No : 2



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

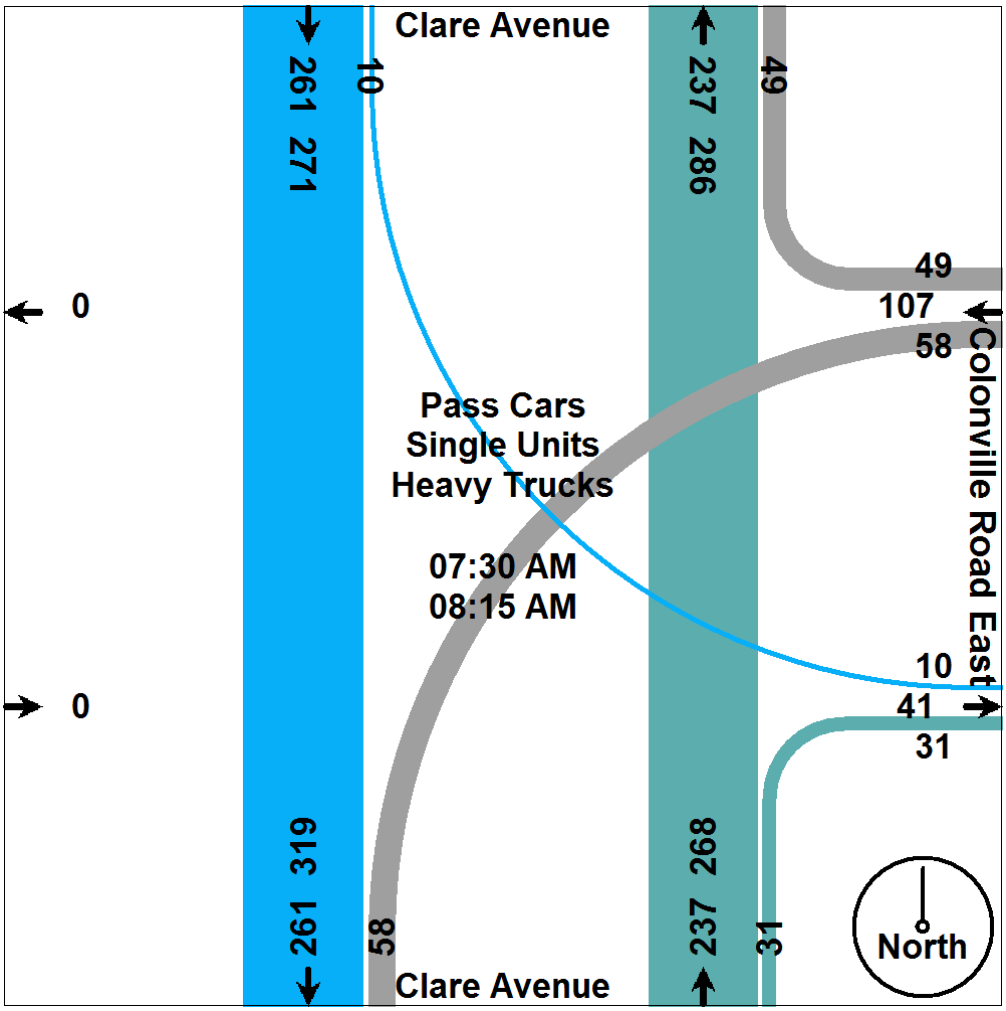
Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 3DQ

File Name : TMC_2 Clare&ColonvilleE_3-9-16
Site Code : TMC_2
Start Date : 3/9/2016
Page No : 3

	Clare Avenue Southbound				Colonville Road East Westbound				Clare Avenue Northbound				Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	74	2	76	**14**	0	12	26	3	39	0	42	0	0	0	0	144
07:45 AM	0	**91**	2	**93**	11	0	**19**	30	7	61	0	68	0	0	0	0	**191**
08:00 AM	0	51	**4**	55	13	0	18	**31**	**17**	**76**	0	**93**	0	0	0	0	179
08:15 AM	0	45	2	47	11	0	9	20	4	61	0	65	0	0	0	0	132
Total Volume	0	261	10	271	49	0	58	107	31	237	0	268	0	0	0	0	646
% App. Total	0	96.3	3.7		45.8	0	54.2		11.6	88.4	0		0	0	0		
PHF	.000	.717	.625	.728	.875	.000	.763	.863	.456	.780	.000	.720	.000	.000	.000	.000	.846
Pass Cars	0	251	10	261	46	0	52	98	30	228	0	258	0	0	0	0	617
% Pass Cars	0	96.2	100	96.3	93.9	0	89.7	91.6	96.8	96.2	0	96.3	0	0	0	0	95.5
Single Units	0	8	0	8	0	0	3	3	1	6	0	7	0	0	0	0	18
% Single Units	0	3.1	0	3.0	0	0	5.2	2.8	3.2	2.5	0	2.6	0	0	0	0	2.8
Heavy Trucks	0	2	0	2	3	0	3	6	0	3	0	3	0	0	0	0	11
% Heavy Trucks	0	0.8	0	0.7	6.1	0	5.2	5.6	0	1.3	0	1.1	0	0	0	0	1.7



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

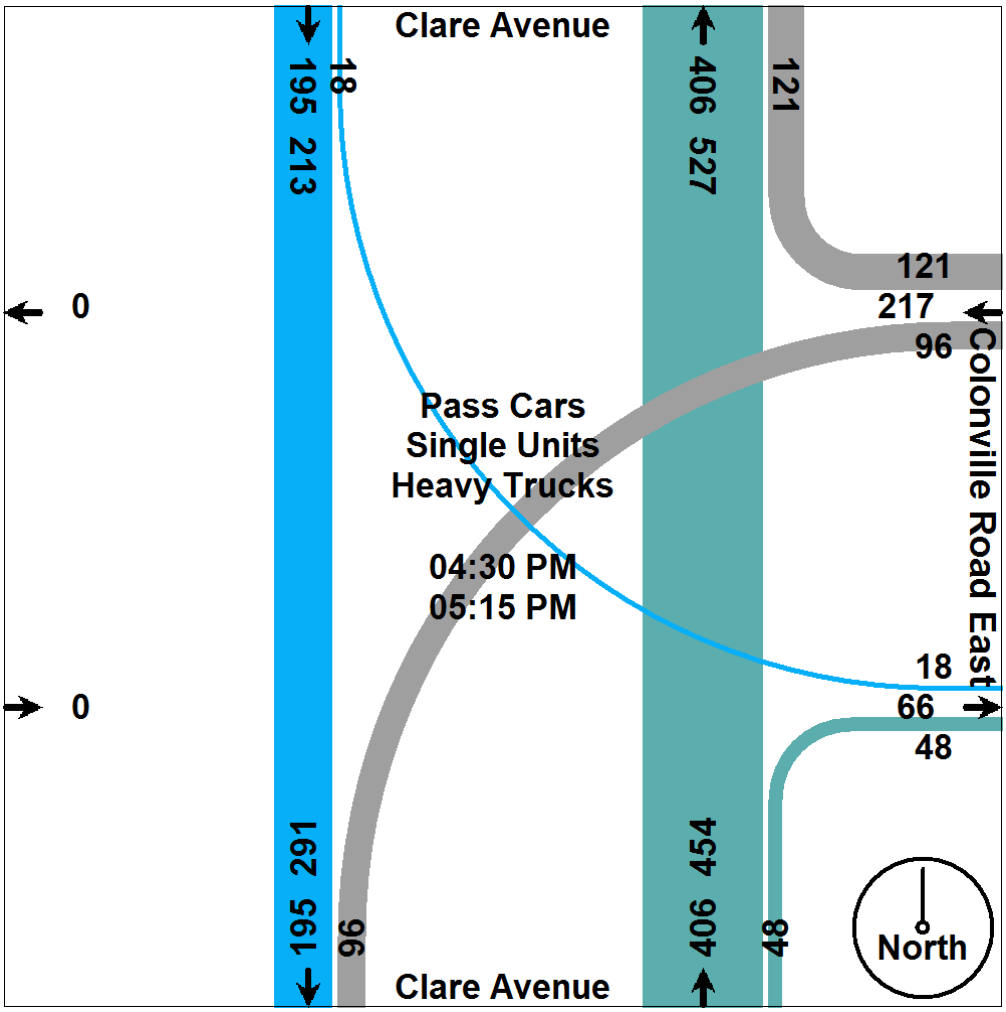
Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 3DQ

File Name : TMC_2 Clare&ColonvilleE_3-9-16
Site Code : TMC_2
Start Date : 3/9/2016
Page No : 4

	Clare Avenue Southbound				Colonville Road East Westbound				Clare Avenue Northbound				Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	**53**	**6**	**59**	29	0	24	53	13	109	0	122	0	0	0	0	**234**
04:45 PM	0	45	6	51	28	0	**25**	53	**14**	88	0	102	0	0	0	0	206
05:00 PM	0	46	5	51	**33**	0	24	**57**	10	**114**	0	**124**	0	0	0	0	232
05:15 PM	0	51	1	52	31	0	23	54	11	95	0	106	0	0	0	0	212
Total Volume	0	195	18	213	121	0	96	217	48	406	0	454	0	0	0	0	884
% App. Total	0	91.5	8.5		55.8	0	44.2		10.6	89.4	0		0	0	0		
PHF	.000	.920	.750	.903	.917	.000	.960	.952	.857	.890	.000	.915	.000	.000	.000	.000	.944
Pass Cars	0	187	17	204	115	0	96	211	45	398	0	443	0	0	0	0	858
% Pass Cars	0	95.9	94.4	95.8	95.0	0	100	97.2	93.8	98.0	0	97.6	0	0	0	0	97.1
Single Units	0	5	1	6	5	0	0	5	1	6	0	7	0	0	0	0	18
% Single Units	0	2.6	5.6	2.8	4.1	0	0	2.3	2.1	1.5	0	1.5	0	0	0	0	2.0
Heavy Trucks	0	3	0	3	1	0	0	1	2	2	0	4	0	0	0	0	8
% Heavy Trucks	0	1.5	0	1.4	0.8	0	0	0.5	4.2	0.5	0	0.9	0	0	0	0	0.9



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 3DQ

File Name : TMC_2 Clare&ColonvilleE_3-9-16
Site Code : TMC_2
Start Date : 3/9/2016
Page No : 5

Aerial Photo

Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 4BT

File Name : TMC_3 ColonvilleE&US127_NBOffRamp_3-9-16
Site Code : TMC_3
Start Date : 3/9/2016
Page No : 1

Groups Printed- Pass Cars - Single Units - Heavy Trucks

	Southbound					Colonville Road East Westbound					US-127 NB Off-Ramp Northbound					Colonville Road East Eastbound					
Start Time	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	11	0	0	11	4	0	8	0	12	0	5	0	0	5	28
07:15 AM	0	0	0	0	0	0	8	0	0	8	5	0	12	0	17	0	12	0	0	12	37
07:30 AM	0	0	0	0	0	0	21	0	0	21	3	0	8	0	11	0	5	0	0	5	37
07:45 AM	0	0	0	0	0	0	19	0	0	19	1	0	11	0	12	0	9	0	0	9	40
Total	0	0	0	0	0	0	59	0	0	59	13	0	39	0	52	0	31	0	0	31	142
08:00 AM	0	0	0	0	0	0	15	0	0	15	0	0	16	0	16	0	19	0	0	19	50
08:15 AM	0	0	0	0	0	0	7	0	0	7	2	0	12	0	14	0	5	0	0	5	26
08:30 AM	0	0	0	0	0	0	7	0	0	7	2	0	13	0	15	0	8	0	0	8	30
08:45 AM	0	0	0	0	0	0	8	0	0	8	1	0	14	0	15	0	8	0	0	8	31
Total	0	0	0	0	0	0	37	0	0	37	5	0	55	0	60	0	40	0	0	40	137
**** BREAK ****																					
02:00 PM	0	0	0	0	0	0	19	0	0	19	1	0	21	0	22	0	11	0	0	11	52
02:15 PM	0	0	0	0	0	0	19	0	0	19	1	0	26	0	27	0	14	0	0	14	60
02:30 PM	0	0	0	0	0	0	16	0	0	16	5	0	24	0	29	0	14	0	0	14	59
02:45 PM	0	0	0	0	0	0	24	0	0	24	5	0	33	0	38	0	17	0	0	17	79
Total	0	0	0	0	0	0	78	0	0	78	12	0	104	0	116	0	56	0	0	56	250
03:00 PM	0	0	0	0	0	0	20	0	0	20	0	0	24	0	24	0	16	0	0	16	60
03:15 PM	0	0	0	0	0	0	14	0	0	14	3	0	27	0	30	0	22	0	0	22	66
03:30 PM	0	0	0	0	0	0	16	0	0	16	6	0	20	0	26	0	19	0	0	19	61
03:45 PM	0	0	0	0	0	0	13	0	0	13	2	0	25	0	27	0	19	0	0	19	59
Total	0	0	0	0	0	0	63	0	0	63	11	0	96	0	107	0	76	0	0	76	246
04:00 PM	0	0	0	0	0	0	15	0	0	15	1	0	26	0	27	0	6	0	0	6	48
04:15 PM	0	0	0	0	0	0	9	0	0	9	3	0	28	0	31	0	22	0	0	22	62
04:30 PM	0	0	0	0	0	0	19	0	0	19	3	0	32	0	35	0	16	0	0	16	70
04:45 PM	0	0	0	0	0	0	13	0	0	13	4	0	39	0	43	0	20	0	0	20	76
Total	0	0	0	0	0	0	56	0	0	56	11	0	125	0	136	0	64	0	0	64	256
05:00 PM	0	0	0	0	0	0	20	0	0	20	5	0	36	0	41	0	16	0	0	16	77
05:15 PM	0	0	0	0	0	0	12	0	0	12	3	0	43	0	46	0	11	0	0	11	69
05:30 PM	0	0	0	0	0	0	19	0	0	19	1	0	45	0	46	0	19	0	0	19	84
05:45 PM	0	0	0	0	0	0	11	0	0	11	2	0	31	0	33	0	12	0	0	12	56
Total	0	0	0	0	0	0	62	0	0	62	11	0	155	0	166	0	58	0	0	58	286
Grand Total	0	0	0	0	0	0	355	0	0	355	63	0	574	0	637	0	325	0	0	325	1317
Apprch %	0	0	0	0		0	100	0	0		9.9	0	90.1	0		0	100	0	0		
Total %	0	0	0	0	0	0	27	0	0	27	4.8	0	43.6	0	48.4	0	24.7	0	0	24.7	
Pass Cars	0	0	0	0	0	0	318	0	0	318	45	0	555	0	600	0	298	0	0	298	1216
% Pass Cars	0	0	0	0	0	0	89.6	0	0	89.6	71.4	0	96.7	0	94.2	0	91.7	0	0	91.7	92.3
Single Units	0	0	0	0	0	0	16	0	0	16	2	0	10	0	12	0	17	0	0	17	45
% Single Units	0	0	0	0	0	0	4.5	0	0	4.5	3.2	0	1.7	0	1.9	0	5.2	0	0	5.2	3.4
Heavy Trucks	0	0	0	0	0	0	21	0	0	21	16	0	9	0	25	0	10	0	0	10	56
% Heavy Trucks	0	0	0	0	0	0	5.9	0	0	5.9	25.4	0	1.6	0	3.9	0	3.1	0	0	3.1	4.3

Comments: 6 hour video traffic study conducted during typical weekday (Wednesday) from 7:00-9:00 AM morning & 2:00-6:00 PM afternoon peak hours, while school was in session. Non-signalized, intersection. Video SCU camera was located within SW intersection quadrant.

Traffic Data Collection (TDC)

tdccounts.com

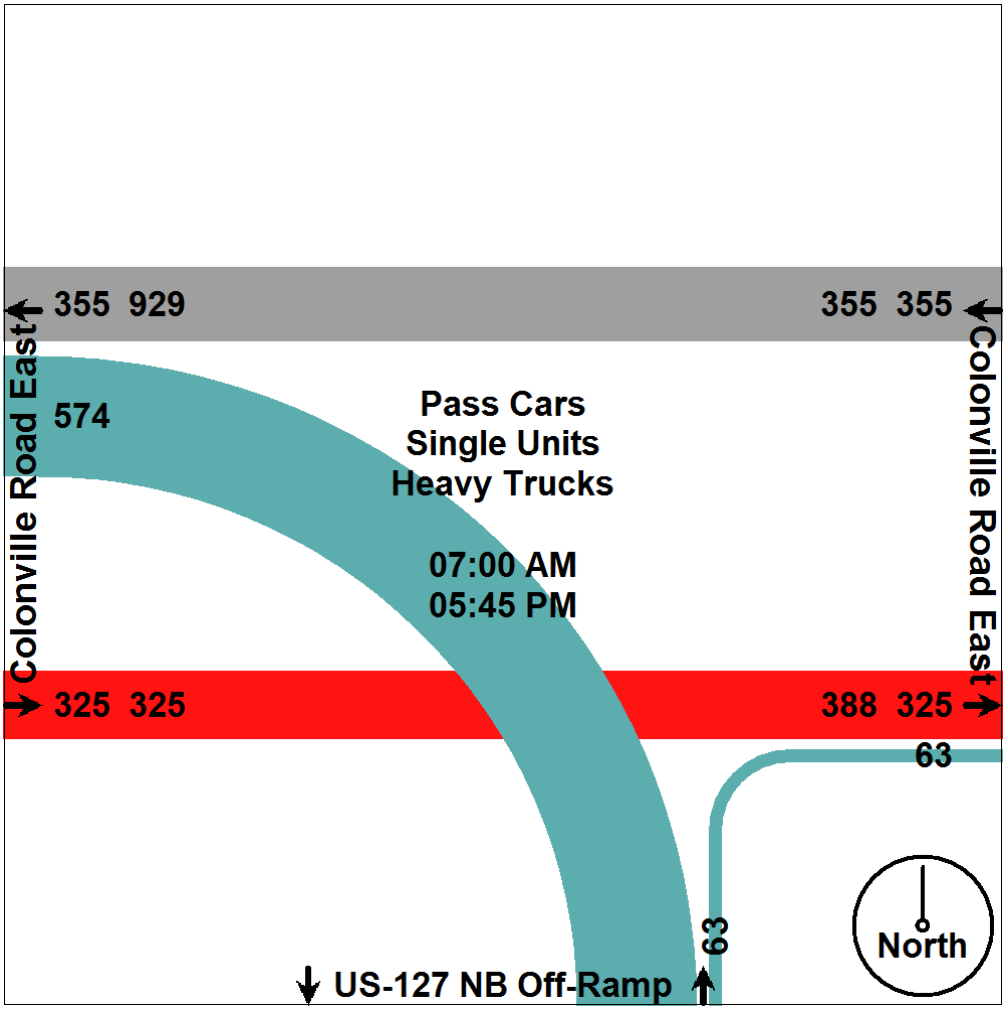
Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 4BT

File Name : TMC_3 ColonvilleE&US127_NBOffRamp_3-9-16
Site Code : TMC_3
Start Date : 3/9/2016
Page No : 2



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

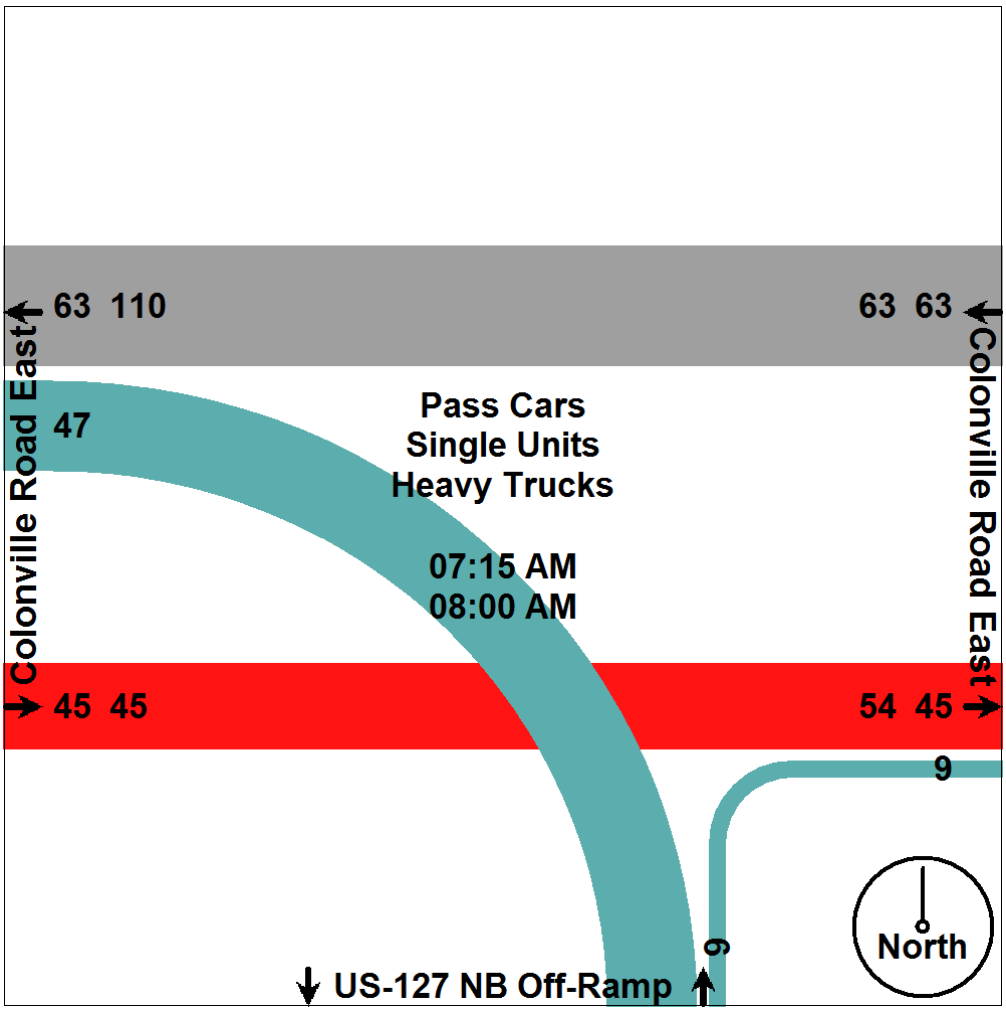
Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 4BT

File Name : TMC_3 ColonvilleE&US127_NBOffRamp_3-9-16
Site Code : TMC_3
Start Date : 3/9/2016
Page No : 3

	Southbound				Colonville Road East Westbound				US-127 NB Off-Ramp Northbound				Colonville Road East Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	8	0	8	**5**	0	12	**17**	0	12	0	12	37
07:30 AM	0	0	0	0	0	**21**	0	**21**	3	0	8	11	0	5	0	5	37
07:45 AM	0	0	0	0	0	19	0	19	1	0	11	12	0	9	0	9	40
08:00 AM	0	0	0	0	0	15	0	15	0	0	**16**	16	0	**19**	0	**19**	**50**
Total Volume	0	0	0	0	0	63	0	63	9	0	47	56	0	45	0	45	164
% App. Total	0	0	0		0	100	0		16.1	0	83.9		0	100	0		
PHF	.000	.000	.000	.000	.000	.750	.000	.750	.450	.000	.734	.824	.000	.592	.000	.592	.820
Pass Cars	0	0	0	0	0	55	0	55	8	0	45	53	0	43	0	43	151
% Pass Cars	0	0	0	0	0	87.3	0	87.3	88.9	0	95.7	94.6	0	95.6	0	95.6	92.1
Single Units	0	0	0	0	0	2	0	2	1	0	1	2	0	2	0	2	6
% Single Units	0	0	0	0	0	3.2	0	3.2	11.1	0	2.1	3.6	0	4.4	0	4.4	3.7
Heavy Trucks	0	0	0	0	0	6	0	6	0	0	1	1	0	0	0	0	7
% Heavy Trucks	0	0	0	0	0	9.5	0	9.5	0	0	2.1	1.8	0	0	0	0	4.3



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

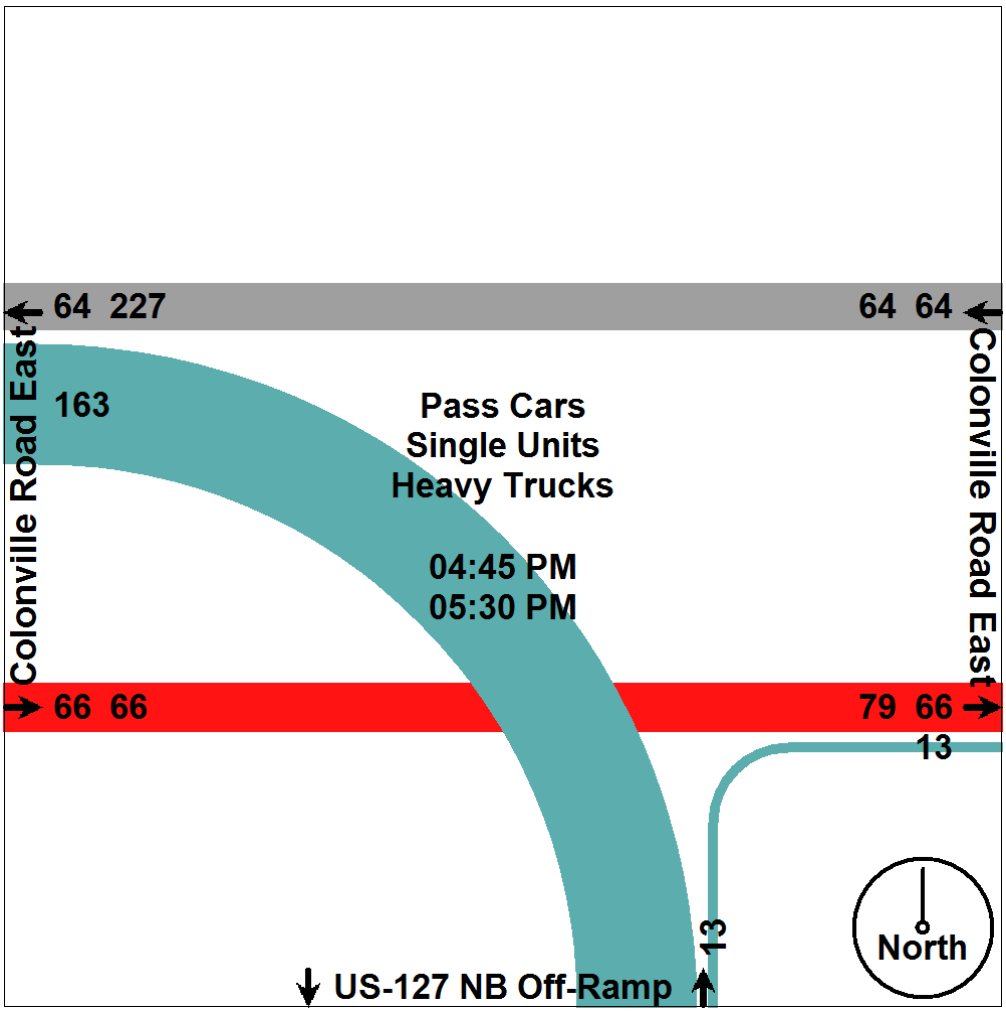
Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 4BT

File Name : TMC_3 ColonvilleE&US127_NBOffRamp_3-9-16
Site Code : TMC_3
Start Date : 3/9/2016
Page No : 4

	Southbound				Colonville Road East Westbound				US-127 NB Off-Ramp Northbound				Colonville Road East Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	13	0	13	4	0	39	43	0	**20**	0	**20**	76
05:00 PM	0	0	0	0	0	**20**	0	**20**	**5**	0	36	41	0	16	0	16	77
05:15 PM	0	0	0	0	0	12	0	12	3	0	43	**46**	0	11	0	11	69
05:30 PM	0	0	0	0	0	19	0	19	1	0	**45**	46	0	19	0	19	**84**
Total Volume	0	0	0	0	0	64	0	64	13	0	163	176	0	66	0	66	306
% App. Total	0	0	0		0	100	0		7.4	0	92.6		0	100	0		
PHF	.000	.000	.000	.000	.000	.800	.000	.800	.650	.000	.906	.957	.000	.825	.000	.825	.911
Pass Cars	0	0	0	0	0	61	0	61	8	0	160	168	0	65	0	65	294
% Pass Cars	0	0	0	0	0	95.3	0	95.3	61.5	0	98.2	95.5	0	98.5	0	98.5	96.1
Single Units	0	0	0	0	0	2	0	2	0	0	3	3	0	1	0	1	6
% Single Units	0	0	0	0	0	3.1	0	3.1	0	0	1.8	1.7	0	1.5	0	1.5	2.0
Heavy Trucks	0	0	0	0	0	1	0	1	5	0	0	5	0	0	0	0	6
% Heavy Trucks	0	0	0	0	0	1.6	0	1.6	38.5	0	0	2.8	0	0	0	0	2.0



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 4BT

File Name : TMC_3 ColonvilleE&US127_NBOffRamp_3-9-16
Site Code : TMC_3
Start Date : 3/9/2016
Page No : 5

Aerial Photo

Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 24L

File Name : TMC_4 Clare&US127_SBRamps_3-9-16
Site Code : TMC_4
Start Date : 3/9/2016
Page No : 1

Groups Printed- Pass Cars - Single Units - Heavy Trucks

	Clare Avenue Southbound					US-127 SB On-Ramp Westbound					Clare Avenue Northbound					US-127 SB Off-Ramp Eastbound					
Start Time	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	36	13	0	49	0	0	0	0	0	12	35	0	0	47	29	0	4	0	33	129
07:15 AM	0	38	24	0	62	0	0	0	0	0	17	41	0	0	58	30	0	7	0	37	157
07:30 AM	0	62	25	0	87	0	0	0	0	0	21	38	0	0	59	65	0	1	0	66	212
07:45 AM	0	94	13	0	107	0	0	0	0	0	13	68	0	0	81	83	0	3	0	86	274
Total	0	230	75	0	305	0	0	0	0	0	63	182	0	0	245	207	0	15	0	222	772
08:00 AM	0	55	16	0	71	0	0	0	0	0	18	84	0	0	102	41	0	6	0	47	220
08:15 AM	0	41	13	0	54	0	0	0	0	0	16	59	0	0	75	45	0	9	0	54	183
08:30 AM	0	41	13	0	54	0	0	0	0	0	15	51	0	0	66	35	0	5	0	40	160
08:45 AM	0	44	15	0	59	0	0	0	0	0	11	46	0	0	57	28	1	4	0	33	149
Total	0	181	57	0	238	0	0	0	0	0	60	240	0	0	300	149	1	24	0	174	712
**** BREAK ****																					
02:00 PM	0	57	20	0	77	0	0	0	0	0	22	92	0	0	114	41	0	6	0	47	238
02:15 PM	0	62	11	0	73	0	0	0	0	0	17	102	0	0	119	32	1	7	0	40	232
02:30 PM	0	64	14	0	78	0	0	0	0	0	15	101	0	0	116	42	0	2	0	44	238
02:45 PM	0	68	11	0	79	0	0	0	0	0	16	86	0	0	102	38	0	4	0	42	223
Total	0	251	56	0	307	0	0	0	0	0	70	381	0	0	451	153	1	19	0	173	931
03:00 PM	0	68	16	0	84	0	0	0	0	0	23	121	0	0	144	33	0	11	0	44	272
03:15 PM	0	55	9	0	64	0	0	0	0	0	11	148	0	0	159	40	0	3	0	43	266
03:30 PM	0	46	13	0	59	0	0	0	0	0	13	108	0	0	121	47	0	6	0	53	233
03:45 PM	0	46	11	0	57	0	0	0	0	0	11	101	0	0	112	41	0	4	0	45	214
Total	0	215	49	0	264	0	0	0	0	0	58	478	0	0	536	161	0	24	0	185	985
04:00 PM	0	76	15	0	91	0	0	0	0	0	18	115	0	0	133	35	0	5	0	40	264
04:15 PM	0	53	13	0	66	0	0	0	0	0	19	99	0	0	118	45	0	4	0	49	233
04:30 PM	0	61	16	0	77	0	0	0	0	0	17	114	0	0	131	33	0	10	0	43	251
04:45 PM	0	58	11	0	69	0	0	0	0	0	16	102	0	0	118	34	0	2	0	36	223
Total	0	248	55	0	303	0	0	0	0	0	70	430	0	0	500	147	0	21	0	168	971
05:00 PM	0	56	14	0	70	0	0	0	0	0	17	114	0	0	131	37	1	10	0	48	249
05:15 PM	0	54	19	0	73	0	0	0	0	0	14	104	0	0	118	37	0	3	0	40	231
05:30 PM	0	52	18	0	70	0	0	0	0	0	19	111	0	0	130	29	0	4	0	33	233
05:45 PM	0	62	11	0	73	0	0	0	0	0	20	95	0	0	115	25	0	2	0	27	215
Total	0	224	62	0	286	0	0	0	0	0	70	424	0	0	494	128	1	19	0	148	928
Grand Total	0	1349	354	0	1703	0	0	0	0	0	391	2135	0	0	2526	945	3	122	0	1070	5299
Apprch %	0	79.2	20.8	0		0	0	0	0		15.5	84.5	0	0		88.3	0.3	11.4	0		
Total %	0	25.5	6.7	0	32.1	0	0	0	0	0	7.4	40.3	0	0	47.7	17.8	0.1	2.3	0	20.2	
Pass Cars	0	1311	328	0	1639	0	0	0	0	0	380	2075	0	0	2455	903	3	99	0	1005	5099
% Pass Cars	0	97.2	92.7	0	96.2	0	0	0	0	0	97.2	97.2	0	0	97.2	95.6	100	81.1	0	93.9	96.2
Single Units	0	29	10	0	39	0	0	0	0	0	4	42	0	0	46	28	0	15	0	43	128
% Single Units	0	2.1	2.8	0	2.3	0	0	0	0	0	1	2	0	0	1.8	3	0	12.3	0	4	2.4
Heavy Trucks	0	9	16	0	25	0	0	0	0	0	7	18	0	0	25	14	0	8	0	22	72
% Heavy Trucks	0	0.7	4.5	0	1.5	0	0	0	0	0	1.8	0.8	0	0	1	1.5	0	6.6	0	2.1	1.4

Comments: 6 hour video traffic study conducted during typical weekday (Wednesday) from 7:00-9:00 AM morning & 2:00-6:00 PM afternoon peak hours, while school was in session. Non-signalized, intersection. Video SCU camera was located within NE intersection quadrant.

Traffic Data Collection (TDC)

tdccounts.com

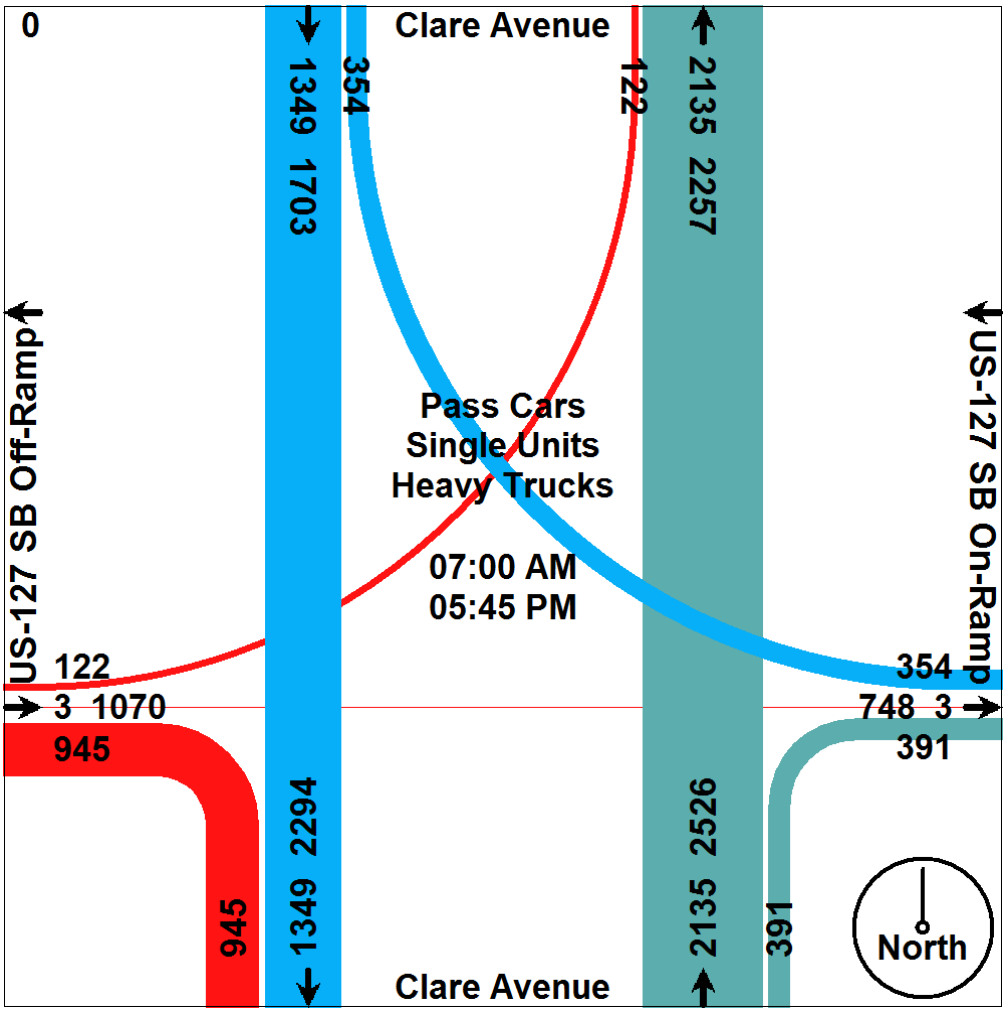
Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 24L

File Name : TMC_4 Clare&US127_SBRamps_3-9-16
Site Code : TMC_4
Start Date : 3/9/2016
Page No : 2



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

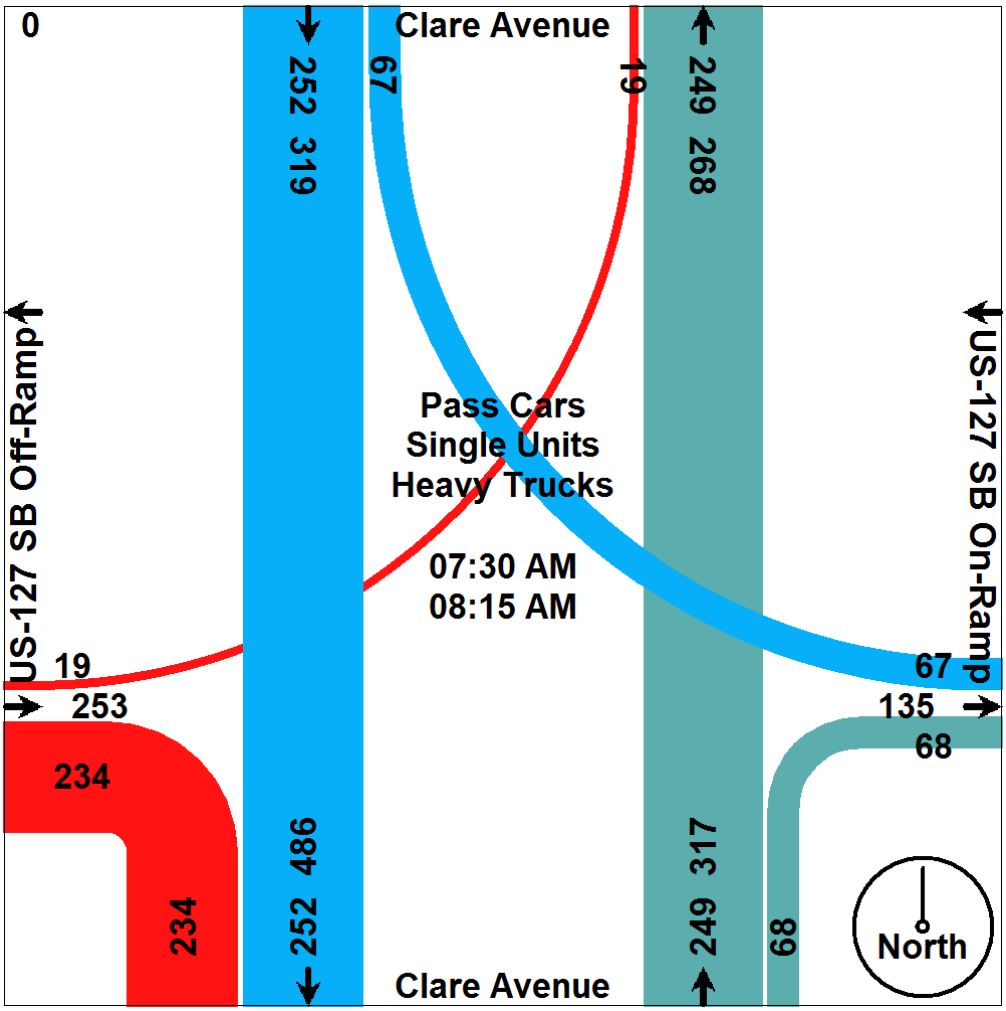
Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 24L

File Name : TMC_4 Clare&US127_SBRamps_3-9-16
Site Code : TMC_4
Start Date : 3/9/2016
Page No : 3

	Clare Avenue Southbound				US-127 SB On-Ramp Westbound				Clare Avenue Northbound				US-127 SB Off-Ramp Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	62	**25**	87	0	0	0	0	**21**	38	0	59	65	0	1	66	212
07:45 AM	0	**94**	13	**107**	0	0	0	0	13	68	0	81	**83**	0	3	**86**	**274**
08:00 AM	0	55	16	71	0	0	0	0	18	**84**	0	**102**	41	0	6	47	220
08:15 AM	0	41	13	54	0	0	0	0	16	59	0	75	45	0	**9**	54	183
Total Volume	0	252	67	319	0	0	0	0	68	249	0	317	234	0	19	253	889
% App. Total	0	79	21		0	0	0		21.5	78.5	0		92.5	0	7.5		
PHF	.000	.670	.670	.745	.000	.000	.000	.000	.810	.741	.000	.777	.705	.000	.528	.735	.811
Pass Cars	0	243	60	303	0	0	0	0	66	239	0	305	229	0	19	248	856
% Pass Cars	0	96.4	89.6	95.0	0	0	0	0	97.1	96.0	0	96.2	97.9	0	100	98.0	96.3
Single Units	0	6	3	9	0	0	0	0	1	7	0	8	3	0	0	3	20
% Single Units	0	2.4	4.5	2.8	0	0	0	0	1.5	2.8	0	2.5	1.3	0	0	1.2	2.2
Heavy Trucks	0	3	4	7	0	0	0	0	1	3	0	4	2	0	0	2	13
% Heavy Trucks	0	1.2	6.0	2.2	0	0	0	0	1.5	1.2	0	1.3	0.9	0	0	0.8	1.5



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

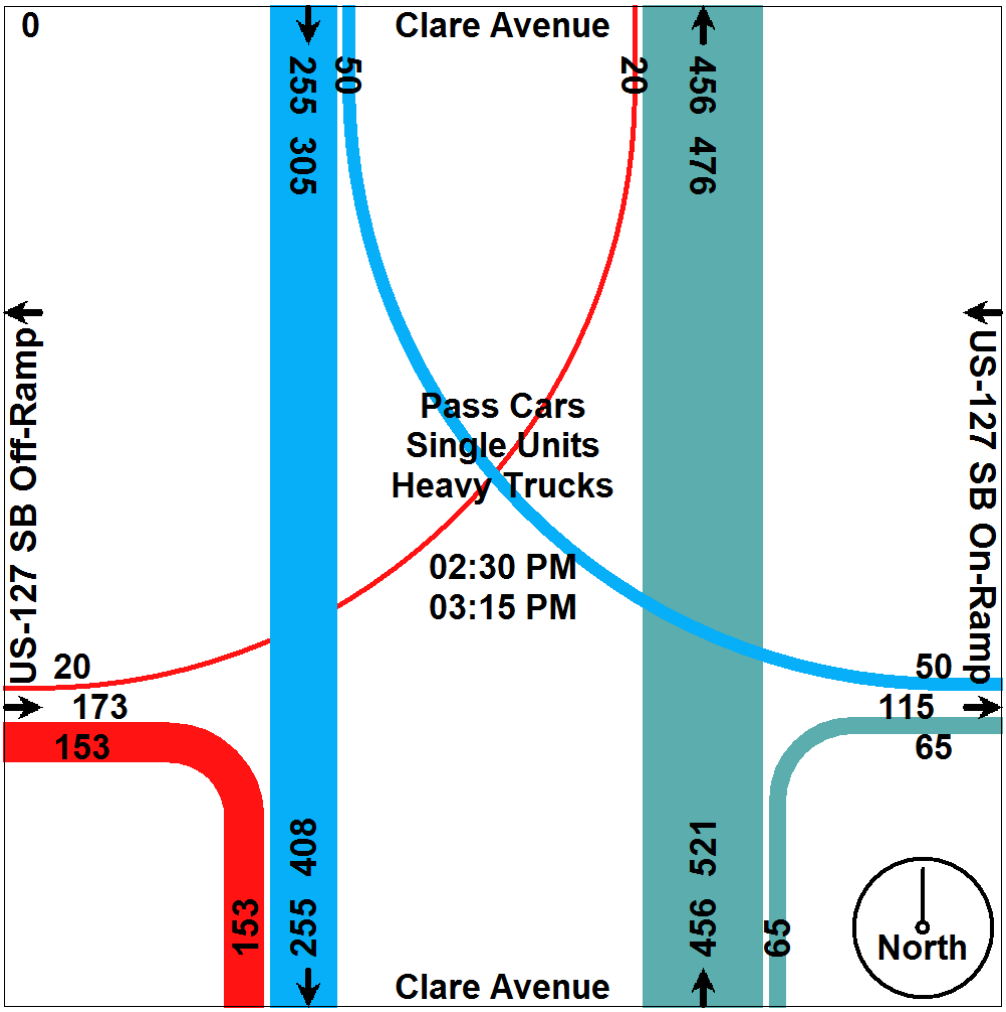
Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 24L

File Name : TMC_4 Clare&US127_SBRamps_3-9-16
Site Code : TMC_4
Start Date : 3/9/2016
Page No : 4

	Clare Avenue Southbound				US-127 SB On-Ramp Westbound				Clare Avenue Northbound				US-127 SB Off-Ramp Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:30 PM																	
02:30 PM	0	64	14	78	0	0	0	0	15	101	0	116	**42**	0	2	**44**	238
02:45 PM	0	**68**	11	79	0	0	0	0	16	86	0	102	38	0	4	42	223
03:00 PM	0	68	**16**	**84**	0	0	0	0	**23**	121	0	144	33	0	**11**	44	**272**
03:15 PM	0	55	9	64	0	0	0	0	11	**148**	0	**159**	40	0	3	43	266
Total Volume	0	255	50	305	0	0	0	0	65	456	0	521	153	0	20	173	999
% App. Total	0	83.6	16.4		0	0	0		12.5	87.5	0		88.4	0	11.6		
PHF	.000	.938	.781	.908	.000	.000	.000	.000	.707	.770	.000	.819	.911	.000	.455	.983	.918
Pass Cars	0	247	45	292	0	0	0	0	63	443	0	506	146	0	14	160	958
% Pass Cars	0	96.9	90.0	95.7	0	0	0	0	96.9	97.1	0	97.1	95.4	0	70.0	92.5	95.9
Single Units	0	5	3	8	0	0	0	0	1	9	0	10	6	0	5	11	29
% Single Units	0	2.0	6.0	2.6	0	0	0	0	1.5	2.0	0	1.9	3.9	0	25.0	6.4	2.9
Heavy Trucks	0	3	2	5	0	0	0	0	1	4	0	5	1	0	1	2	12
% Heavy Trucks	0	1.2	4.0	1.6	0	0	0	0	1.5	0.9	0	1.0	0.7	0	5.0	1.2	1.2



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 24L

File Name : TMC_4 Clare&US127_SBRamps_3-9-16
Site Code : TMC_4
Start Date : 3/9/2016
Page No : 5

Aerial Photo

Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 3CP

File Name : TMC_5 Clare&ColonvilleW_3-9-16
Site Code : TMC_5
Start Date : 3/9/2016
Page No : 1

Groups Printed- Pass Cars - Single Units - Heavy Trucks

	Clare Avenue Southbound					US-127 SB On-Ramp Westbound					Clare Avenue Northbound					Colonville Road West Eastbound					
Start Time	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	2	63	0	0	65	0	0	0	0	0	0	44	3	0	47	3	2	3	0	8	120
07:15 AM	5	63	0	0	68	0	0	0	0	0	0	56	0	0	56	5	3	2	0	10	134
07:30 AM	6	121	0	0	127	0	0	0	0	0	0	56	4	0	60	19	5	3	0	27	214
07:45 AM	4	173	0	0	177	0	0	0	0	0	0	80	3	0	83	20	1	1	0	22	282
Total	17	420	0	0	437	0	0	0	0	0	0	236	10	0	246	47	11	9	0	67	750
08:00 AM	5	91	0	0	96	0	0	0	0	0	0	98	11	0	109	12	4	1	0	17	222
08:15 AM	3	83	0	0	86	0	0	0	0	0	0	75	7	0	82	6	0	2	0	8	176
08:30 AM	3	73	0	0	76	0	0	0	0	0	0	63	3	0	66	4	0	3	0	7	149
08:45 AM	2	70	0	0	72	0	0	0	0	0	0	56	3	0	59	8	1	1	0	10	141
Total	13	317	0	0	330	0	0	0	0	0	0	292	24	0	316	30	5	7	0	42	688
**** BREAK ****																					
02:00 PM	5	93	0	0	98	0	0	0	0	0	0	114	5	0	119	10	0	0	0	10	227
02:15 PM	0	94	0	0	94	0	0	0	0	0	0	119	4	0	123	10	0	0	0	10	227
02:30 PM	1	105	0	0	106	0	0	0	0	0	0	116	6	0	122	5	0	0	0	5	233
02:45 PM	5	101	0	0	106	0	0	0	0	0	0	100	2	0	102	8	1	2	0	11	219
Total	11	393	0	0	404	0	0	0	0	0	0	449	17	0	466	33	1	2	0	36	906
03:00 PM	2	99	0	0	101	0	0	0	0	0	0	144	4	0	148	13	0	0	0	13	262
03:15 PM	5	90	0	0	95	0	0	0	0	0	0	158	14	0	172	11	1	1	0	13	280
03:30 PM	1	92	0	0	93	0	0	0	0	0	0	119	8	0	127	11	1	2	0	14	234
03:45 PM	1	86	0	0	87	0	0	0	0	0	0	112	5	0	117	6	1	0	0	7	211
Total	9	367	0	0	376	0	0	0	0	0	0	533	31	0	564	41	3	3	0	47	987
04:00 PM	5	106	0	0	111	0	0	0	0	0	0	131	8	0	139	10	0	2	0	12	262
04:15 PM	5	93	0	0	98	0	0	0	0	0	0	118	8	0	126	17	2	0	1	20	244
04:30 PM	3	91	0	0	94	0	0	0	0	0	0	128	8	0	136	7	2	3	0	12	242
04:45 PM	5	87	0	0	92	0	0	0	0	0	0	113	10	0	123	14	1	5	0	20	235
Total	18	377	0	0	395	0	0	0	0	0	0	490	34	0	524	48	5	10	1	64	983
05:00 PM	4	89	0	0	93	0	0	0	0	0	0	128	13	0	141	11	0	3	0	14	248
05:15 PM	6	85	0	0	91	0	0	0	0	0	0	114	17	0	131	12	0	4	1	17	239
05:30 PM	2	79	0	0	81	0	0	0	0	0	0	128	12	0	140	7	0	2	0	9	230
05:45 PM	6	81	0	0	87	0	0	0	0	0	0	108	11	0	119	6	1	7	0	14	220
Total	18	334	0	0	352	0	0	0	0	0	0	478	53	0	531	36	1	16	1	54	937
Grand Total	86	2208	0	0	2294	0	0	0	0	0	0	2478	169	0	2647	235	26	47	2	310	5251
Apprch %	3.7	96.3	0	0		0	0	0	0		0	93.6	6.4	0		75.8	8.4	15.2	0.6		
Total %	1.6	42	0	0	43.7	0	0	0	0	0	0	47.2	3.2	0	50.4	4.5	0.5	0.9	0	5.9	
Pass Cars	86	2128	0	0	2214	0	0	0	0	0	0	2407	168	0	2575	233	26	47	2	308	5097
% Pass Cars	100	96.4	0	0	96.5	0	0	0	0	0	0	97.1	99.4	0	97.3	99.1	100	100	100	99.4	97.1
Single Units	0	57	0	0	57	0	0	0	0	0	0	46	1	0	47	2	0	0	0	2	106
% Single Units	0	2.6	0	0	2.5	0	0	0	0	0	0	1.9	0.6	0	1.8	0.9	0	0	0	0.6	2
Heavy Trucks	0	23	0	0	23	0	0	0	0	0	0	25	0	0	25	0	0	0	0	0	48
% Heavy Trucks	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0.9	0	0	0	0	0	0.9

Comments: 6 hour video traffic study conducted during typical weekday (Wednesday) from 7:00-9:00 AM morning & 2:00-6:00 PM afternoon peak hours, while school was in session. Non-signalized intersection. Video SCU camera was located within NE intersection quadrant.

Traffic Data Collection (TDC)

tdccounts.com

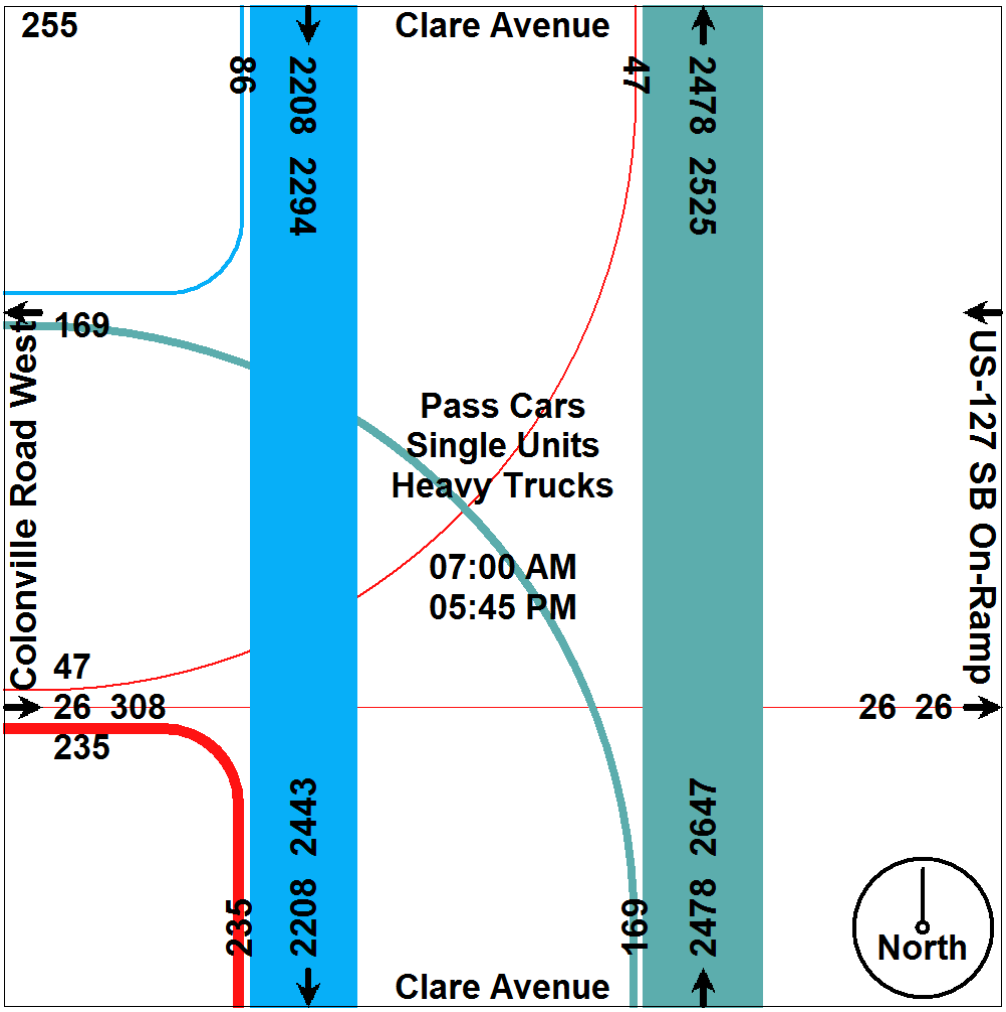
Phone: (586) 786-5407

Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 3CP

File Name : TMC_5 Clare&ColonvilleW_3-9-16
Site Code : TMC_5
Start Date : 3/9/2016
Page No : 2



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

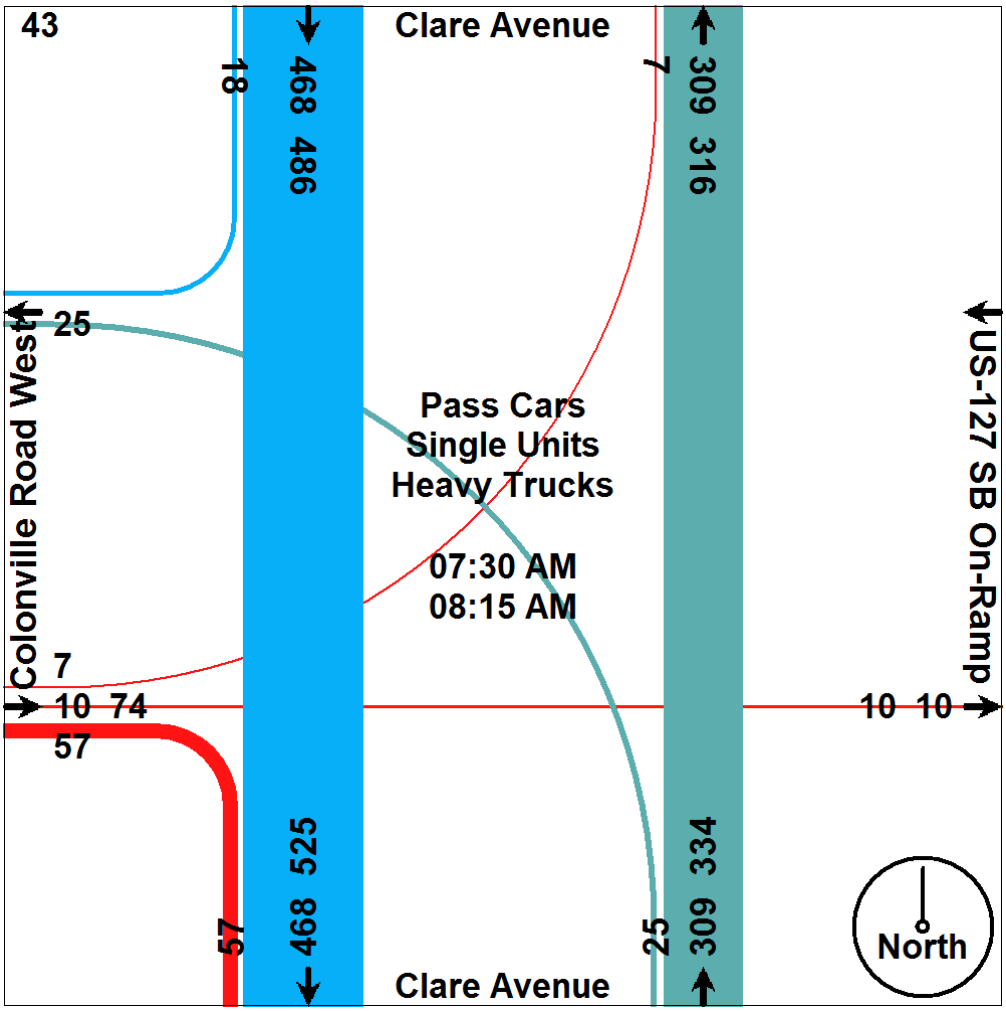
Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 3CP

File Name : TMC_5 Clare&ColonvilleW_3-9-16
Site Code : TMC_5
Start Date : 3/9/2016
Page No : 3

	Clare Avenue Southbound				US-127 SB On-Ramp Westbound				Clare Avenue Northbound				Colonville Road West Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**6**	121	0	127	0	0	0	0	0	56	4	60	19	**5**	**3**	**27**	214
07:45 AM	4	**173**	0	**177**	0	0	0	0	0	80	3	83	**20**	1	1	22	**282**
08:00 AM	5	91	0	96	0	0	0	0	0	**98**	**11**	**109**	12	4	1	17	222
08:15 AM	3	83	0	86	0	0	0	0	0	75	7	82	6	0	2	8	176
Total Volume	18	468	0	486	0	0	0	0	0	309	25	334	57	10	7	74	894
% App. Total	3.7	96.3	0		0	0	0		0	92.5	7.5		77	13.5	9.5		
PHF	.750	.676	.000	.686	.000	.000	.000	.000	.000	.788	.568	.766	.713	.500	.583	.685	.793
Pass Cars	18	454	0	472	0	0	0	0	0	297	25	322	56	10	7	73	867
% Pass Cars	100	97.0	0	97.1	0	0	0	0	0	96.1	100	96.4	98.2	100	100	98.6	97.0
Single Units	0	9	0	9	0	0	0	0	0	8	0	8	1	0	0	1	18
% Single Units	0	1.9	0	1.9	0	0	0	0	0	2.6	0	2.4	1.8	0	0	1.4	2.0
Heavy Trucks	0	5	0	5	0	0	0	0	0	4	0	4	0	0	0	0	9
% Heavy Trucks	0	1.1	0	1.0	0	0	0	0	0	1.3	0	1.2	0	0	0	0	1.0



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

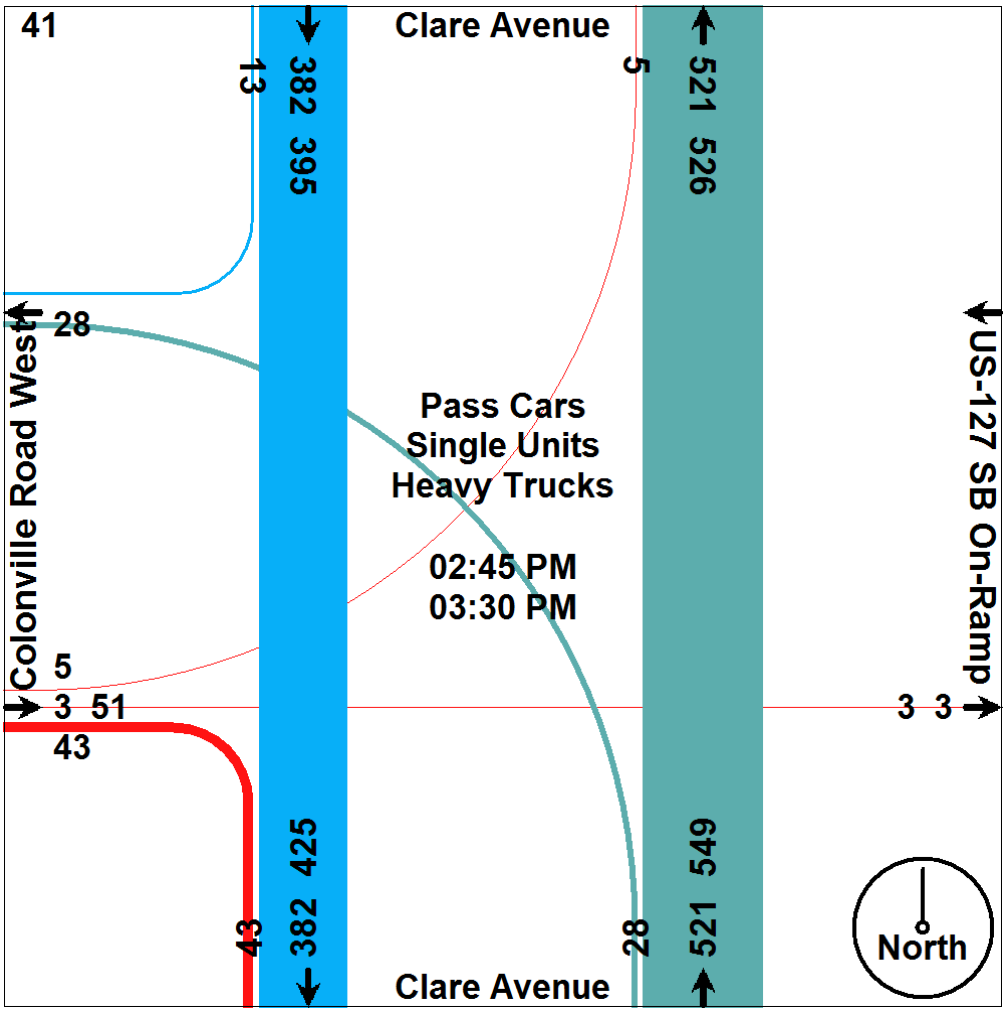
Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 3CP

File Name : TMC_5 Clare&ColonvilleW_3-9-16
Site Code : TMC_5
Start Date : 3/9/2016
Page No : 4

	Clare Avenue Southbound				US-127 SB On-Ramp Westbound				Clare Avenue Northbound				Colonville Road West Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:45 PM																	
02:45 PM	**5**	**101**	0	**106**	0	0	0	0	0	100	2	102	8	**1**	**2**	11	219
03:00 PM	2	99	0	101	0	0	0	0	0	144	4	148	**13**	0	0	13	262
03:15 PM	5	90	0	95	0	0	0	0	0	**158**	**14**	**172**	11	1	1	13	**280**
03:30 PM	1	92	0	93	0	0	0	0	0	119	8	127	11	1	2	**14**	234
Total Volume	13	382	0	395	0	0	0	0	0	521	28	549	43	3	5	51	995
% App. Total	3.3	96.7	0		0	0	0		0	94.9	5.1		84.3	5.9	9.8		
PHF	.650	.946	.000	.932	.000	.000	.000	.000	.000	.824	.500	.798	.827	.750	.625	.911	.888
Pass Cars	13	367	0	380	0	0	0	0	0	507	27	534	42	3	5	50	964
% Pass Cars	100	96.1	0	96.2	0	0	0	0	0	97.3	96.4	97.3	97.7	100	100	98.0	96.9
Single Units	0	10	0	10	0	0	0	0	0	10	1	11	1	0	0	1	22
% Single Units	0	2.6	0	2.5	0	0	0	0	0	1.9	3.6	2.0	2.3	0	0	2.0	2.2
Heavy Trucks	0	5	0	5	0	0	0	0	0	4	0	4	0	0	0	0	9
% Heavy Trucks	0	1.3	0	1.3	0	0	0	0	0	0.8	0	0.7	0	0	0	0	0.9



Traffic Data Collection (TDC)

tdccounts.com

Phone: (586) 786-5407

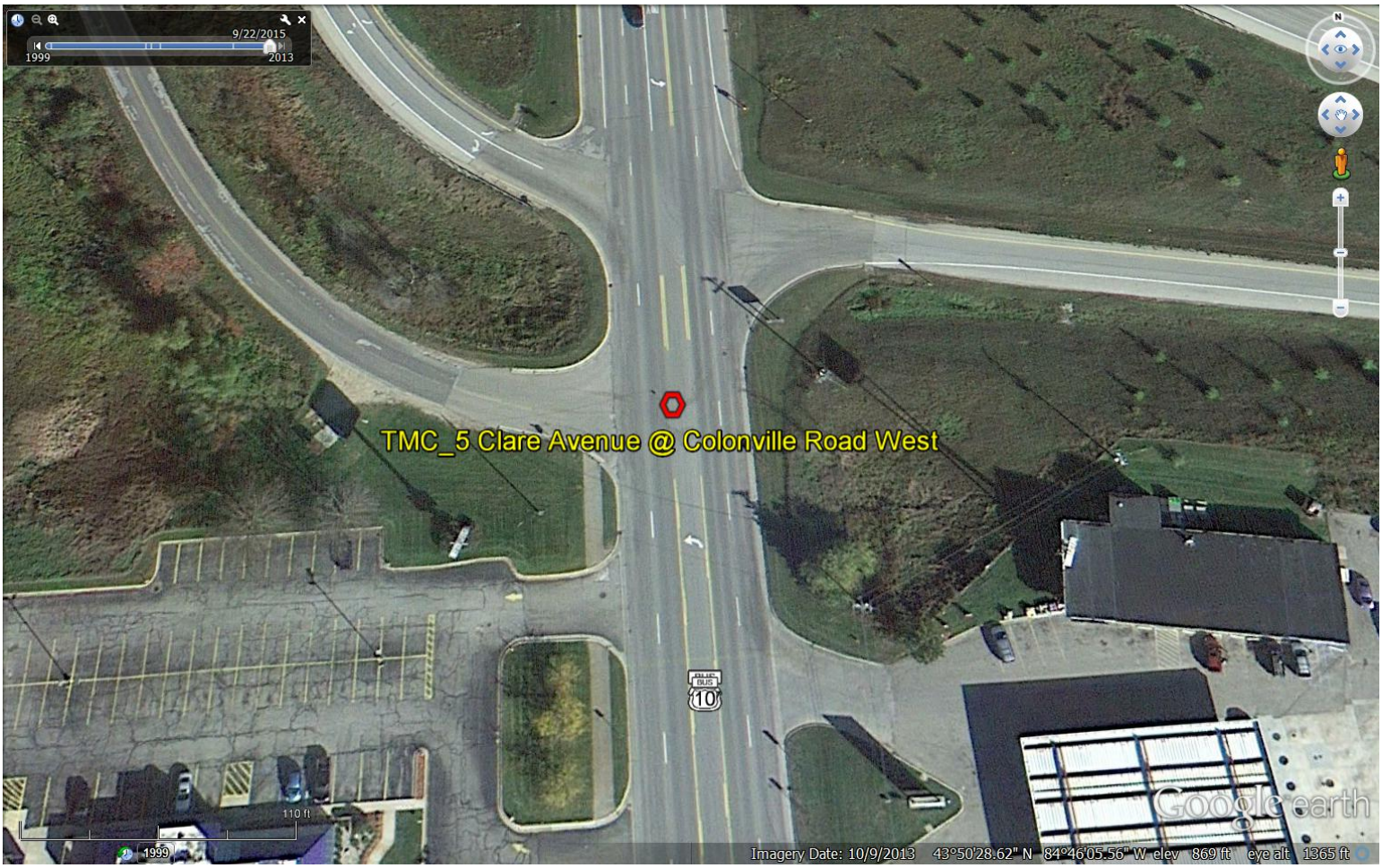
Traffic Study Performed For:

Progressive AE

Project: City of Clare Traffic Study
Type: 6 Hr. Video Turning Movement Count
Weather: Cldy, AM Lt. Rain Temp 50's
Count By: Miovision Video VCU 3CP

File Name : TMC_5 Clare&ColonvilleW_3-9-16
Site Code : TMC_5
Start Date : 3/9/2016
Page No : 5

Aerial Photo



DETAILED SYNCHRO 9 ANALYSIS
OF
EXISTING CONDITIONS

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	51	0	0	67	53	10
Future Vol, veh/h	51	0	0	67	53	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	125
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	65	92	92	75	82	82
Heavy Vehicles, %	1	2	2	9	2	2
Mvmt Flow	78	0	0	89	65	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	167	78
Stage 1	-	-	-	-	78	-
Stage 2	-	-	-	-	89	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	823	983
Stage 1	-	0	0	-	945	-
Stage 2	-	0	0	-	934	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	823	983
Mov Cap-2 Maneuver	-	-	-	-	823	-
Stage 1	-	-	-	-	945	-
Stage 2	-	-	-	-	934	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBT
Capacity (veh/h)	823	983	-	-
HCM Lane V/C Ratio	0.079	0.012	-	-
HCM Control Delay (s)	9.7	8.7	-	-
HCM Lane LOS	A	A	-	-
HCM 95th %tile Q(veh)	0.3	0	-	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	110	212	307	24
Future Volume (Veh/h)	0	0	110	212	307	24
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.82	0.82	0.76	0.76
Hourly flow rate (vph)	0	0	134	259	404	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				317		
pX, platoon unblocked	0.98					
vC, conflicting volume	931	202	436			
vC1, stage 1 conf vol	404					
vC2, stage 2 conf vol	527					
vCu, unblocked vol	922	202	436			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	88			
cM capacity (veh/h)	429	805	1099			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	134	259	202	202	32
Volume Left	134	0	0	0	0
Volume Right	0	0	0	0	32
cSH	1099	1700	1700	1700	1700
Volume to Capacity	0.12	0.15	0.12	0.12	0.02
Queue Length 95th (ft)	10	0	0	0	0
Control Delay (s)	8.7	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	3.0		0.0		
Approach LOS					

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	21.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	65	55	267	36	15	292
Future Volume (veh/h)	65	55	267	36	15	292
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1810	1863	1863	1863	1863
Adj Flow Rate, veh/h	76	64	371	50	21	400
Adj No. of Lanes	1	1	1	1	1	2
Peak Hour Factor	0.86	0.86	0.72	0.72	0.73	0.73
Percent Heavy Veh, %	6	5	2	2	2	2
Cap, veh/h	223	201	1103	938	637	2097
Arrive On Green	0.13	0.13	0.59	0.59	0.59	0.59
Sat Flow, veh/h	1707	1538	1863	1583	962	3632
Grp Volume(v), veh/h	76	64	371	50	21	400
Grp Sat Flow(s),veh/h/ln	1707	1538	1863	1583	962	1770
Q Serve(g_s), s	1.8	1.6	4.4	0.6	0.5	2.3
Cycle Q Clear(g_c), s	1.8	1.6	4.4	0.6	4.9	2.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	223	201	1103	938	637	2097
V/C Ratio(X)	0.34	0.32	0.34	0.05	0.03	0.19
Avail Cap(c_a), veh/h	390	352	1103	938	637	2097
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	17.2	4.5	3.8	5.8	4.1
Incr Delay (d2), s/veh	0.9	0.9	0.8	0.1	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.7	2.5	0.3	0.1	1.2
LnGrp Delay(d),s/veh	18.2	18.1	5.4	3.9	5.9	4.3
LnGrp LOS	B	B	A	A	A	A
Approach Vol, veh/h	140		421			421
Approach Delay, s/veh	18.2		5.2			4.4
Approach LOS	B		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		32.0				32.0		11.7
Change Period (Y+Rc), s		* 6.1				* 6.1		6.0
Max Green Setting (Gmax), s		* 26				* 26		10.0
Max Q Clear Time (g_c+I1), s		6.4				6.9		3.8
Green Ext Time (p_c), s		2.2				2.2		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	6.7
HCM 2010 LOS	A

Notes

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	24	0	263	0	0	0	0	279	87	75	282	0
Future Vol, veh/h	24	0	263	0	0	0	0	279	87	75	282	0
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	230	-	0	-	-	-	-	-	-	370	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	92	92	92	77	77	77	75	75	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	6	2	2
Mvmt Flow	32	0	355	0	0	0	0	362	113	100	376	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	757	-	188	-	0	0	475	0	0
Stage 1	576	-	-	-	-	-	-	-	-
Stage 2	181	-	-	-	-	-	-	-	-
Critical Hdwy	6.84	-	6.94	-	-	-	4.22	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	-	3.32	-	-	-	2.26	-	-
Pot Cap-1 Maneuver	344	0	822	0	-	-	1056	-	0
Stage 1	525	0	-	0	-	-	-	-	0
Stage 2	832	0	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	311	0	822	-	-	-	1056	-	-
Mov Cap-2 Maneuver	311	0	-	-	-	-	-	-	-
Stage 1	475	0	-	-	-	-	-	-	-
Stage 2	832	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.1	0	1.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	311	822	1056	-
HCM Lane V/C Ratio	-	-	0.104	0.432	0.095	-
HCM Control Delay (s)	-	-	17.9	12.7	8.8	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	2.2	0.3	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	19	64	28	347	525	20
Future Vol, veh/h	19	64	28	347	525	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	77	77	69	69
Heavy Vehicles, %	1	1	2	2	1	1
Mvmt Flow	28	93	36	451	761	29

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1073	395	790	0	-	0
Stage 1	775	-	-	-	-	-
Stage 2	298	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.14	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.22	-	-	-
Pot Cap-1 Maneuver	217	607	826	-	-	-
Stage 1	418	-	-	-	-	-
Stage 2	730	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	208	607	826	-	-	-
Mov Cap-2 Maneuver	208	-	-	-	-	-
Stage 1	418	-	-	-	-	-
Stage 2	698	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.9	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	826	-	422	-	-
HCM Lane V/C Ratio	0.044	-	0.285	-	-
HCM Control Delay (s)	9.6	-	16.9	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.2	-	-

Intersection	
Int Delay, s/veh	5.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	74	0	0	69	178	15
Future Vol, veh/h	74	0	0	69	178	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	125
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	92	92	80	95	95
Heavy Vehicles, %	1	2	2	2	2	30
Mvmt Flow	89	0	0	86	187	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	175	89
Stage 1	-	-	-	-	89	-
Stage 2	-	-	-	-	86	-
Critical Hdwy	-	-	-	-	6.42	6.5
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.57
Pot Cap-1 Maneuver	-	0	0	-	815	897
Stage 1	-	0	0	-	934	-
Stage 2	-	0	0	-	937	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	815	897
Mov Cap-2 Maneuver	-	-	-	-	815	-
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	937	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBT
Capacity (veh/h)	815	897	-	-
HCM Lane V/C Ratio	0.23	0.018	-	-
HCM Control Delay (s)	10.7	9.1	-	-
HCM Lane LOS	B	A	-	-
HCM 95th %tile Q(veh)	0.9	0.1	-	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	185	406	249	28
Future Volume (Veh/h)	0	0	185	406	249	28
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.90	0.90
Hourly flow rate (vph)	0	0	201	441	277	31
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				317		
pX, platoon unblocked	0.89					
vC, conflicting volume	1120	138	308			
vC1, stage 1 conf vol	277					
vC2, stage 2 conf vol	843					
vCu, unblocked vol	1075	138	308			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	84			
cM capacity (veh/h)	300	884	1249			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	201	441	138	138	31
Volume Left	201	0	0	0	0
Volume Right	0	0	0	0	31
cSH	1249	1700	1700	1700	1700
Volume to Capacity	0.16	0.26	0.08	0.08	0.02
Queue Length 95th (ft)	14	0	0	0	0
Control Delay (s)	8.4	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	2.6		0.0		
Approach LOS					

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	111	136	455	54	20	229
Future Volume (veh/h)	111	136	455	54	20	229
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1827	1863	1881
Adj Flow Rate, veh/h	117	143	495	59	22	254
Adj No. of Lanes	1	1	1	1	1	2
Peak Hour Factor	0.95	0.95	0.92	0.92	0.90	0.90
Percent Heavy Veh, %	2	2	2	4	2	1
Cap, veh/h	267	238	1079	899	524	2070
Arrive On Green	0.15	0.15	0.58	0.58	0.58	0.58
Sat Flow, veh/h	1774	1583	1863	1553	851	3668
Grp Volume(v), veh/h	117	143	495	59	22	254
Grp Sat Flow(s),veh/h/ln	1774	1583	1863	1553	851	1787
Q Serve(g_s), s	2.7	3.8	6.8	0.7	0.7	1.4
Cycle Q Clear(g_c), s	2.7	3.8	6.8	0.7	7.5	1.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	267	238	1079	899	524	2070
V/C Ratio(X)	0.44	0.60	0.46	0.07	0.04	0.12
Avail Cap(c_a), veh/h	397	354	1079	899	524	2070
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	17.7	5.4	4.1	7.5	4.3
Incr Delay (d2), s/veh	1.1	2.4	1.4	0.1	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	1.8	3.9	0.3	0.2	0.7
LnGrp Delay(d),s/veh	18.4	20.2	6.8	4.3	7.7	4.4
LnGrp LOS	B	C	A	A	A	A
Approach Vol, veh/h	260		554			276
Approach Delay, s/veh	19.4		6.5			4.6
Approach LOS	B		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		32.0				32.0		12.7
Change Period (Y+Rc), s		* 6.1				* 6.1		6.0
Max Green Setting (Gmax), s		* 26				* 26		10.0
Max Q Clear Time (g_c+I1), s		8.8				9.5		5.8
Green Ext Time (p_c), s		2.1				2.1		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	9.1
HCM 2010 LOS	A

Notes

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	33	0	165	0	0	0	0	476	91	62	278	0
Future Vol, veh/h	33	0	165	0	0	0	0	476	91	62	278	0
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	230	-	0	-	-	-	-	-	-	370	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	92	92	92	77	89	89	90	90	90
Heavy Vehicles, %	5	2	2	2	2	2	2	2	2	4	2	2
Mvmt Flow	35	0	174	0	0	0	0	535	102	69	309	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	714	-	154	-	0	0	637	0	0
Stage 1	447	-	-	-	-	-	-	-	-
Stage 2	267	-	-	-	-	-	-	-	-
Critical Hdwy	6.9	-	6.94	-	-	-	4.18	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.55	-	3.32	-	-	-	2.24	-	-
Pot Cap-1 Maneuver	359	0	864	0	-	-	929	-	0
Stage 1	603	0	-	0	-	-	-	-	0
Stage 2	745	0	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	332	0	864	-	-	-	929	-	-
Mov Cap-2 Maneuver	332	0	-	-	-	-	-	-	-
Stage 1	558	0	-	-	-	-	-	-	-
Stage 2	745	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0	1.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	332	864	929	-
HCM Lane V/C Ratio	-	-	0.105	0.201	0.074	-
HCM Control Delay (s)	-	-	17.1	10.2	9.2	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.7	0.2	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	17	54	38	550	423	20
Future Vol, veh/h	17	54	38	550	423	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	89	89	93	93
Heavy Vehicles, %	1	1	2	2	1	1
Mvmt Flow	19	59	43	618	455	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	860	238	476	0	-	0
Stage 1	466	-	-	-	-	-
Stage 2	394	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.14	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.22	-	-	-
Pot Cap-1 Maneuver	297	766	1082	-	-	-
Stage 1	601	-	-	-	-	-
Stage 2	653	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	285	766	1082	-	-	-
Mov Cap-2 Maneuver	285	-	-	-	-	-
Stage 1	601	-	-	-	-	-
Stage 2	627	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1082	-	546	-	-
HCM Lane V/C Ratio	0.039	-	0.143	-	-
HCM Control Delay (s)	8.5	-	12.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Intersection: 9001: US-127 NB off & E. COLONVILLE

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	60	30
Average Queue (ft)	25	7
95th Queue (ft)	49	27
Link Distance (ft)	592	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9002: CLARE AVE (BL 127) & US-127 NB ON-RAMP

Movement	NB	SB
Directions Served	L	T
Maximum Queue (ft)	77	4
Average Queue (ft)	25	0
95th Queue (ft)	57	3
Link Distance (ft)		493
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9003: CLARE AVE (BL 127) & E. COLONVILLE

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	R	T	R	L	T	T
Maximum Queue (ft)	80	54	91	31	39	91	51
Average Queue (ft)	32	20	32	7	7	29	8
95th Queue (ft)	66	44	73	26	28	68	32
Link Distance (ft)	283		683	683		267	267
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155			120		
Storage Blk Time (%)						0	
Queuing Penalty (veh)						0	

Intersection: 9004: CLARE AVE (BL 127) & US-127 SB OFF-RAMP

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	T	TR	L
Maximum Queue (ft)	50	136	5	19	72
Average Queue (ft)	16	48	0	1	16
95th Queue (ft)	43	90	4	9	44
Link Distance (ft)		372	34	34	
Upstream Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	
Storage Bay Dist (ft)	230				370
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 9005: CLARE AVE (BL 127) & W COLONVILLE

Movement	EB	NB	SB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	74	31	28	47
Average Queue (ft)	33	8	1	10
95th Queue (ft)	57	28	10	36
Link Distance (ft)	346		34	34
Upstream Blk Time (%)			0	0
Queuing Penalty (veh)			0	1
Storage Bay Dist (ft)		150		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 2

Intersection: 9001: US-127 NB off & E. COLONVILLE

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	78	68
Average Queue (ft)	39	17
95th Queue (ft)	63	51
Link Distance (ft)	592	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9002: CLARE AVE (BL 127) & US-127 NB ON-RAMP

Movement	NB
Directions Served	L
Maximum Queue (ft)	69
Average Queue (ft)	31
95th Queue (ft)	62
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	150
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9003: CLARE AVE (BL 127) & E. COLONVILLE

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	R	T	R	L	T	T
Maximum Queue (ft)	84	87	136	44	39	73	47
Average Queue (ft)	40	34	63	13	10	26	9
95th Queue (ft)	72	66	118	36	33	57	33
Link Distance (ft)	283		683	683		267	267
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155			120		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 9004: CLARE AVE (BL 127) & US-127 SB OFF-RAMP

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	T	TR	L
Maximum Queue (ft)	66	65	14	8	54
Average Queue (ft)	23	31	0	1	13
95th Queue (ft)	51	55	7	8	38
Link Distance (ft)		372	34	34	
Upstream Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	
Storage Bay Dist (ft)	230				370
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 9005: CLARE AVE (BL 127) & W COLONVILLE

Movement	EB	NB	SB
Directions Served	LR	L	TR
Maximum Queue (ft)	73	38	32
Average Queue (ft)	31	11	8
95th Queue (ft)	55	35	30
Link Distance (ft)	346		34
Upstream Blk Time (%)			0
Queuing Penalty (veh)			1
Storage Bay Dist (ft)		150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 1

DETAILED SYNCHRO 9 ANALYSIS
OF
PROJECTED 2026 FUTURE CONDITIONS

Intersection	
Int Delay, s/veh	3.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	397	0	0	369	62	147
Future Vol, veh/h	397	0	0	369	62	147
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	125
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	92	92	85	82	82
Heavy Vehicles, %	1	2	2	3	2	2
Mvmt Flow	467	0	0	434	76	179

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	901	467
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	434	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	309	596
Stage 1	-	0	0	-	631	-
Stage 2	-	0	0	-	653	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	309	596
Mov Cap-2 Maneuver	-	-	-	-	309	-
Stage 1	-	-	-	-	631	-
Stage 2	-	-	-	-	653	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	15.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBT
Capacity (veh/h)	309	596	-	-
HCM Lane V/C Ratio	0.245	0.301	-	-
HCM Control Delay (s)	20.4	13.6	-	-
HCM Lane LOS	C	B	-	-
HCM 95th %tile Q(veh)	0.9	1.3	-	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	205	326	353	72
Future Volume (Veh/h)	0	0	205	326	353	72
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	241	384	415	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				317		
pX, platoon unblocked	0.91					
vC, conflicting volume	1281	208	500			
vC1, stage 1 conf vol	415					
vC2, stage 2 conf vol	866					
vCu, unblocked vol	1260	208	500			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	77			
cM capacity (veh/h)	263	799	1046			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	241	384	208	208	85
Volume Left	241	0	0	0	0
Volume Right	0	0	0	0	85
cSH	1046	1700	1700	1700	1700
Volume to Capacity	0.23	0.23	0.12	0.12	0.05
Queue Length 95th (ft)	22	0	0	0	0
Control Delay (s)	9.5	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	3.7		0.0		
Approach LOS					

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	288	143	388	375	22	331
Future Volume (veh/h)	288	143	388	375	22	331
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1863	1863	1863	1863
Adj Flow Rate, veh/h	335	166	456	441	26	389
Adj No. of Lanes	1	1	1	1	1	2
Peak Hour Factor	0.86	0.86	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	3	3	2	2	2	2
Cap, veh/h	366	327	1005	854	391	1910
Arrive On Green	0.21	0.21	0.54	0.54	0.54	0.54
Sat Flow, veh/h	1757	1568	1863	1583	618	3632
Grp Volume(v), veh/h	335	166	456	441	26	389
Grp Sat Flow(s),veh/h/ln	1757	1568	1863	1583	618	1770
Q Serve(g_s), s	9.0	4.5	7.2	8.5	1.3	2.7
Cycle Q Clear(g_c), s	9.0	4.5	7.2	8.5	8.4	2.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	366	327	1005	854	391	1910
V/C Ratio(X)	0.92	0.51	0.45	0.52	0.07	0.20
Avail Cap(c_a), veh/h	366	327	1005	854	391	1910
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.6	16.8	6.7	7.1	9.3	5.7
Incr Delay (d2), s/veh	27.0	1.3	1.5	2.2	0.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	2.1	4.0	4.2	0.3	1.4
LnGrp Delay(d),s/veh	45.6	18.1	8.2	9.3	9.6	6.0
LnGrp LOS	D	B	A	A	A	A
Approach Vol, veh/h	501		897			415
Approach Delay, s/veh	36.5		8.7			6.2
Approach LOS	D		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		32.0				32.0		16.0
Change Period (Y+Rc), s		* 6.1				* 6.1		6.0
Max Green Setting (Gmax), s		* 26				* 26		10.0
Max Q Clear Time (g_c+I1), s		10.5				10.4		11.0
Green Ext Time (p_c), s		3.7				3.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	15.8
HCM 2010 LOS	B

Notes

Intersection	
Int Delay, s/veh	84.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	215	0	308	0	0	0	0	548	102	182	437	0
Future Vol, veh/h	215	0	308	0	0	0	0	548	102	182	437	0
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	230	-	0	-	-	-	-	-	-	370	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	74	80	92	92	92	85	85	85	85	85	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	4	2	2
Mvmt Flow	269	0	385	0	0	0	0	645	120	214	514	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1264	-	257	-	0	0	765	0	0
Stage 1	942	-	-	-	-	-	-	-	-
Stage 2	322	-	-	-	-	-	-	-	-
Critical Hdwy	6.84	-	6.94	-	-	-	4.18	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	-	3.32	-	-	-	2.24	-	-
Pot Cap-1 Maneuver	~ 161	0	742	0	-	-	831	-	0
Stage 1	340	0	-	0	-	-	-	-	0
Stage 2	707	0	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	~ 120	0	742	-	-	-	831	-	-
Mov Cap-2 Maneuver	~ 120	0	-	-	-	-	-	-	-
Stage 1	~ 252	0	-	-	-	-	-	-	-
Stage 2	707	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	273	0	3.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	120	742	831	-
HCM Lane V/C Ratio	-	-	2.24	0.519	0.258	-
HCM Control Delay (s)	-	-	$ 642.6	15	10.8	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	23	3	1	-

Notes

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

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	34	75	33	616	716	29
Future Vol, veh/h	34	75	33	616	716	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	85	85	85	85
Heavy Vehicles, %	1	1	2	2	1	1
Mvmt Flow	43	94	39	725	842	34

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1299	438	876	0	-	0
Stage 1	859	-	-	-	-	-
Stage 2	440	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.14	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.22	-	-	-
Pot Cap-1 Maneuver	154	569	766	-	-	-
Stage 1	378	-	-	-	-	-
Stage 2	619	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	146	569	766	-	-	-
Mov Cap-2 Maneuver	146	-	-	-	-	-
Stage 1	378	-	-	-	-	-
Stage 2	587	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26.7	0.5	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	766	-	299	-	-
HCM Lane V/C Ratio	0.051	-	0.456	-	-
HCM Control Delay (s)	10	-	26.7	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0.2	-	2.3	-	-

Intersection	
Int Delay, s/veh	50.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	536	0	0	682	208	225
Future Vol, veh/h	536	0	0	682	208	225
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	125
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	92	92	80	90	90
Heavy Vehicles, %	1	2	2	2	2	5
Mvmt Flow	646	0	0	853	231	250

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	1499	646
Stage 1	-	-	-	-	646	-
Stage 2	-	-	-	-	853	-
Critical Hdwy	-	-	-	-	6.42	6.25
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.345
Pot Cap-1 Maneuver	-	0	0	-	~ 135	466
Stage 1	-	0	0	-	522	-
Stage 2	-	0	0	-	418	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	~ 135	466
Mov Cap-2 Maneuver	-	-	-	-	~ 135	-
Stage 1	-	-	-	-	522	-
Stage 2	-	-	-	-	418	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	206.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBT
Capacity (veh/h)	135	466	-	-
HCM Lane V/C Ratio	1.712	0.536	-	-
HCM Control Delay (s)	$ 406.8	21.3	-	-
HCM Lane LOS	F	C	-	-
HCM 95th %tile Q(veh)	17.1	3.1	-	-

Notes

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	400	471	375	143
Future Volume (Veh/h)	0	0	400	471	375	143
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.90	0.90
Hourly flow rate (vph)	0	0	435	512	417	159
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				317		
pX, platoon unblocked						
vC, conflicting volume	1799	208	576			
vC1, stage 1 conf vol	417					
vC2, stage 2 conf vol	1382					
vCu, unblocked vol	1799	208	576			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	56			
cM capacity (veh/h)	108	797	993			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	435	512	208	208	159
Volume Left	435	0	0	0	0
Volume Right	0	0	0	0	159
cSH	993	1700	1700	1700	1700
Volume to Capacity	0.44	0.30	0.12	0.12	0.09
Queue Length 95th (ft)	57	0	0	0	0
Control Delay (s)	11.4	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	5.2		0.0		
Approach LOS					

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	538	352	519	509	27	348
Future Volume (veh/h)	538	352	519	509	27	348
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1827	1863	1881
Adj Flow Rate, veh/h	598	391	564	553	30	387
Adj No. of Lanes	1	1	1	1	1	2
Peak Hour Factor	0.90	0.90	0.92	0.92	0.90	0.90
Percent Heavy Veh, %	2	2	2	4	2	1
Cap, veh/h	370	330	1005	838	321	1929
Arrive On Green	0.21	0.21	0.54	0.54	0.54	0.54
Sat Flow, veh/h	1774	1583	1863	1553	502	3668
Grp Volume(v), veh/h	598	391	564	553	30	387
Grp Sat Flow(s),veh/h/ln	1774	1583	1863	1553	502	1787
Q Serve(g_s), s	10.0	10.0	9.6	12.2	2.0	2.7
Cycle Q Clear(g_c), s	10.0	10.0	9.6	12.2	11.6	2.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	370	330	1005	838	321	1929
V/C Ratio(X)	1.62	1.19	0.56	0.66	0.09	0.20
Avail Cap(c_a), veh/h	370	330	1005	838	321	1929
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	19.0	7.3	7.9	11.1	5.7
Incr Delay (d2), s/veh	290.3	109.9	2.3	4.1	0.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	34.6	14.4	5.5	6.0	0.3	1.4
LnGrp Delay(d),s/veh	309.3	128.9	9.6	12.0	11.7	5.9
LnGrp LOS	F	F	A	B	B	A
Approach Vol, veh/h	989		1117			417
Approach Delay, s/veh	238.0		10.8			6.4
Approach LOS	F		B			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		32.0				32.0		16.0
Change Period (Y+Rc), s		* 6.1				* 6.1		6.0
Max Green Setting (Gmax), s		* 26				* 26		10.0
Max Q Clear Time (g_c+I1), s		14.2				13.6		12.0
Green Ext Time (p_c), s		4.1				4.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	99.1
HCM 2010 LOS	F

Notes

Intersection	
Int Delay, s/veh	519.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	287	0	193	0	0	0	0	741	106	305	581	0
Future Vol, veh/h	287	0	193	0	0	0	0	741	106	305	581	0
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	230	-	0	-	-	-	-	-	-	370	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	95	90	92	92	92	77	89	89	90	90	90
Heavy Vehicles, %	4	2	2	2	2	2	2	2	2	4	2	2
Mvmt Flow	319	0	214	0	0	0	0	833	119	339	646	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1739	-	323	-	0	0	952	0	0
Stage 1	1323	-	-	-	-	-	-	-	-
Stage 2	416	-	-	-	-	-	-	-	-
Critical Hdwy	7.58	-	6.94	-	-	-	4.18	-	-
Critical Hdwy Stg 1	6.58	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.58	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.54	-	3.32	-	-	-	2.24	-	-
Pot Cap-1 Maneuver	~ 55	0	673	0	-	-	705	-	0
Stage 1	~ 162	0	-	0	-	-	-	-	0
Stage 2	579	0	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	~ 34	-	673	-	-	-	705	-	-
Mov Cap-2 Maneuver	~ 34	-	-	-	-	-	-	-	-
Stage 1	~ 162	-	-	-	-	-	-	-	-
Stage 2	579	-	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 2394.7	0	5.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	34	673	705	-
HCM Lane V/C Ratio	-	-	9.379	0.319	0.481	-
HCM Control Delay (s)	-	-	$ 3996.5	12.8	14.7	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	38.7	1.4	2.6	-

Notes

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

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	29	63	44	818	739	35
Future Vol, veh/h	29	63	44	818	739	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	89	89	93	93
Heavy Vehicles, %	1	1	2	2	1	1
Mvmt Flow	32	69	49	919	795	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1371	416	832	0	-	0
Stage 1	813	-	-	-	-	-
Stage 2	558	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.14	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.22	-	-	-
Pot Cap-1 Maneuver	138	588	796	-	-	-
Stage 1	399	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	130	588	796	-	-	-
Mov Cap-2 Maneuver	130	-	-	-	-	-
Stage 1	399	-	-	-	-	-
Stage 2	507	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.1	0.5	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	796	-	279	-	-
HCM Lane V/C Ratio	0.062	-	0.362	-	-
HCM Control Delay (s)	9.8	-	25.1	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0.2	-	1.6	-	-

DETAILED SYNCHRO 9 ANALYSIS
OF
PROJECTED 2026 FUTURE CONDITIONS - IMPROVED

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	397	0	0	369	62	147
Future Volume (veh/h)	397	0	0	369	62	147
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	0	0	1845	1863	1863
Adj Flow Rate, veh/h	467	0	0	434	76	179
Adj No. of Lanes	1	0	0	2	1	1
Peak Hour Factor	0.85	0.92	0.92	0.85	0.82	0.82
Percent Heavy Veh, %	1	0	0	3	2	2
Cap, veh/h	1263	0	0	2353	267	238
Arrive On Green	0.67	0.00	0.00	0.67	0.15	0.15
Sat Flow, veh/h	1881	0	0	3689	1774	1583
Grp Volume(v), veh/h	467	0	0	434	76	179
Grp Sat Flow(s),veh/h/ln	1881	0	0	1752	1774	1583
Q Serve(g_s), s	6.5	0.0	0.0	2.8	2.3	6.5
Cycle Q Clear(g_c), s	6.5	0.0	0.0	2.8	2.3	6.5
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1263	0	0	2353	267	238
V/C Ratio(X)	0.37	0.00	0.00	0.18	0.29	0.75
Avail Cap(c_a), veh/h	1263	0	0	2353	577	515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.3	0.0	0.0	3.7	22.6	24.4
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.2	0.6	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.0	1.4	1.2	3.1
LnGrp Delay(d),s/veh	5.1	0.0	0.0	3.9	23.2	29.2
LnGrp LOS	A			A	C	C
Approach Vol, veh/h	467			434	255	
Approach Delay, s/veh	5.1			3.9	27.4	
Approach LOS	A			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		13.5		46.5				46.5
Change Period (Y+Rc), s		4.5		6.2				6.2
Max Green Setting (Gmax), s		19.5		29.8				29.8
Max Q Clear Time (g_c+I1), s		8.5		8.5				4.8
Green Ext Time (p_c), s		0.6		2.4				2.5

Intersection Summary	
HCM 2010 Ctrl Delay	9.6
HCM 2010 LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	205	326	353	72
Future Volume (Veh/h)	0	0	205	326	353	72
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	241	384	415	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				317		
pX, platoon unblocked	0.92					
vC, conflicting volume	1281	208	500			
vC1, stage 1 conf vol	415					
vC2, stage 2 conf vol	866					
vCu, unblocked vol	1262	208	500			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	77			
cM capacity (veh/h)	263	799	1046			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	241	384	208	208	85
Volume Left	241	0	0	0	0
Volume Right	0	0	0	0	85
cSH	1046	1700	1700	1700	1700
Volume to Capacity	0.23	0.23	0.12	0.12	0.05
Queue Length 95th (ft)	22	0	0	0	0
Control Delay (s)	9.5	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	3.7		0.0		
Approach LOS					

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	288	143	388	375	22	331
Future Volume (vph)	288	143	388	375	22	331
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.1	6.1	6.1	6.1
Lane Util. Factor	0.97		1.00	1.00	1.00	0.95
Frt	0.95		1.00	0.85	1.00	1.00
Flt Protected	0.97		1.00	1.00	0.95	1.00
Satd. Flow (prot)	3291		1863	1583	1770	3539
Flt Permitted	0.97		1.00	1.00	0.47	1.00
Satd. Flow (perm)	3291		1863	1583	881	3539
Peak-hour factor, PHF	0.86	0.86	0.85	0.85	0.85	0.85
Adj. Flow (vph)	335	166	456	441	26	389
RTOR Reduction (vph)	134	0	0	175	0	0
Lane Group Flow (vph)	367	0	456	266	26	389
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%
Turn Type	Prot		NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	11.7		36.2	36.2	36.2	36.2
Effective Green, g (s)	11.7		36.2	36.2	36.2	36.2
Actuated g/C Ratio	0.19		0.60	0.60	0.60	0.60
Clearance Time (s)	6.0		6.1	6.1	6.1	6.1
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	641		1124	955	531	2135
v/s Ratio Prot	c0.11		c0.24			0.11
v/s Ratio Perm				0.17	0.03	
v/c Ratio	0.57		0.41	0.28	0.05	0.18
Uniform Delay, d1	21.9		6.3	5.7	4.9	5.3
Progression Factor	0.85		0.68	1.11	1.00	1.00
Incremental Delay, d2	1.2		0.9	0.6	0.2	0.2
Delay (s)	19.9		5.2	6.9	5.0	5.5
Level of Service	B		A	A	A	A
Approach Delay (s)	19.9		6.0			5.5
Approach LOS	B		A			A

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.1
Intersection Capacity Utilization	43.2%	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 (veh/h)	215	0	308	0	0	0	0	548	102	182	437	0
Future Volume (veh/h)	215	0	308	0	0	0	0	548	102	182	437	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	1863				0	1863	1900	1827	1863	0
Adj Flow Rate, veh/h	269	0	385				0	645	120	214	514	0
Adj No. of Lanes	1	0	1				0	2	0	1	2	0
Peak Hour Factor	0.80	0.74	0.80				0.85	0.85	0.85	0.85	0.85	0.80
Percent Heavy Veh, %	2	0	2				0	2	2	4	2	0
Cap, veh/h	479	0	428				0	1118	208	435	1952	0
Arrive On Green	0.27	0.00	0.27				0.00	0.37	0.37	0.20	1.00	0.00
Sat Flow, veh/h	1774	0	1583				0	3074	554	1740	3632	0
Grp Volume(v), veh/h	269	0	385				0	383	382	214	514	0
Grp Sat Flow(s),veh/h/ln	1774	0	1583				0	1770	1765	1740	1770	0
Q Serve(g_s), s	7.8	0.0	14.1				0.0	10.3	10.4	4.3	0.0	0.0
Cycle Q Clear(g_c), s	7.8	0.0	14.1				0.0	10.3	10.4	4.3	0.0	0.0
Prop In Lane	1.00		1.00				0.00		0.31	1.00		0.00
Lane Grp Cap(c), veh/h	479	0	428				0	664	662	435	1952	0
V/C Ratio(X)	0.56	0.00	0.90				0.00	0.58	0.58	0.49	0.26	0.00
Avail Cap(c_a), veh/h	488	0	435				0	664	662	447	1952	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.90	0.90	0.00
Uniform Delay (d), s/veh	18.8	0.0	21.1				0.0	15.0	15.0	8.9	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	21.1				0.0	3.6	3.7	0.8	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	8.6				0.0	5.7	5.7	2.0	0.1	0.0
LnGrp Delay(d),s/veh	20.3	0.0	42.2				0.0	18.6	18.6	9.7	0.3	0.0
LnGrp LOS	C		D					B	B	A	A	
Approach Vol, veh/h		654						765			728	
Approach Delay, s/veh		33.2						18.6			3.0	
Approach LOS		C						B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	10.6	28.7		20.7		39.3		
Change Period (Y+Rc), s	4.5	6.2		4.5		6.2		
Max Green Setting (Gmax), s	6.5	21.8		16.5		32.8		
Max Q Clear Time (g_c+I1), s	6.3	12.4		16.1		2.0		
Green Ext Time (p_c), s	0.0	4.8		0.1		8.5		

Intersection Summary	
HCM 2010 Ctrl Delay	17.8
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	34	75	33	616	716	29
Future Vol, veh/h	34	75	33	616	716	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	150	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	85	85	85	85
Heavy Vehicles, %	1	1	2	2	1	1
Mvmt Flow	43	94	39	725	842	34

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1299	438	876	0	-	0
Stage 1	859	-	-	-	-	-
Stage 2	440	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.14	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.22	-	-	-
Pot Cap-1 Maneuver	154	569	766	-	-	-
Stage 1	378	-	-	-	-	-
Stage 2	619	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	146	569	766	-	-	-
Mov Cap-2 Maneuver	146	-	-	-	-	-
Stage 1	378	-	-	-	-	-
Stage 2	587	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21	0.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	766	-	146	569	-	-
HCM Lane V/C Ratio	0.051	-	0.291	0.165	-	-
HCM Control Delay (s)	10	-	39.5	12.6	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.1	0.6	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	536	0	0	682	208	225
Future Volume (veh/h)	536	0	0	682	208	225
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	0	0	1863	1863	1810
Adj Flow Rate, veh/h	646	0	0	802	231	250
Adj No. of Lanes	1	0	0	2	1	1
Peak Hour Factor	0.83	0.92	0.92	0.85	0.90	0.90
Percent Heavy Veh, %	1	0	0	2	2	5
Cap, veh/h	1156	0	0	2176	367	318
Arrive On Green	0.61	0.00	0.00	0.61	0.21	0.21
Sat Flow, veh/h	1881	0	0	3725	1774	1538
Grp Volume(v), veh/h	646	0	0	802	231	250
Grp Sat Flow(s),veh/h/ln	1881	0	0	1770	1774	1538
Q Serve(g_s), s	12.1	0.0	0.0	6.8	7.1	9.2
Cycle Q Clear(g_c), s	12.1	0.0	0.0	6.8	7.1	9.2
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1156	0	0	2176	367	318
V/C Ratio(X)	0.56	0.00	0.00	0.37	0.63	0.79
Avail Cap(c_a), veh/h	1156	0	0	2176	577	500
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.8	0.0	0.0	5.8	21.7	22.5
Incr Delay (d2), s/veh	1.6	0.0	0.0	0.5	1.8	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.0	0.0	3.4	3.6	4.3
LnGrp Delay(d),s/veh	8.4	0.0	0.0	6.2	23.5	26.8
LnGrp LOS	A			A	C	C
Approach Vol, veh/h	646			802	481	
Approach Delay, s/veh	8.4			6.2	25.2	
Approach LOS	A			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		16.9		43.1				43.1
Change Period (Y+Rc), s		4.5		6.2				6.2
Max Green Setting (Gmax), s		19.5		29.8				29.8
Max Q Clear Time (g_c+I1), s		11.2		14.1				8.8
Green Ext Time (p_c), s		1.2		4.1				4.4

Intersection Summary	
HCM 2010 Ctrl Delay	11.7
HCM 2010 LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	400	471	375	143
Future Volume (Veh/h)	0	0	400	471	375	143
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.90	0.90
Hourly flow rate (vph)	0	0	435	512	417	159
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				317		
pX, platoon unblocked						
vC, conflicting volume	1799	208	576			
vC1, stage 1 conf vol	417					
vC2, stage 2 conf vol	1382					
vCu, unblocked vol	1799	208	576			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	56			
cM capacity (veh/h)	108	797	993			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	435	512	208	208	159
Volume Left	435	0	0	0	0
Volume Right	0	0	0	0	159
cSH	993	1700	1700	1700	1700
Volume to Capacity	0.44	0.30	0.12	0.12	0.09
Queue Length 95th (ft)	57	0	0	0	0
Control Delay (s)	11.4	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	5.2		0.0		
Approach LOS					

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	538	352	519	509	27	348
Future Volume (vph)	538	352	519	509	27	348
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.1	6.1	6.1	6.1
Lane Util. Factor	0.97		1.00	1.00	1.00	0.95
Frt	0.94		1.00	0.85	1.00	1.00
Flt Protected	0.97		1.00	1.00	0.95	1.00
Satd. Flow (prot)	3300		1863	1553	1770	3574
Flt Permitted	0.97		1.00	1.00	0.32	1.00
Satd. Flow (perm)	3300		1863	1553	594	3574
Peak-hour factor, PHF	0.90	0.90	0.92	0.92	0.90	0.90
Adj. Flow (vph)	598	391	564	553	30	387
RTOR Reduction (vph)	133	0	0	292	0	0
Lane Group Flow (vph)	856	0	564	261	30	387
Heavy Vehicles (%)	2%	2%	2%	4%	2%	1%
Turn Type	Prot		NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	19.6		28.3	28.3	28.3	28.3
Effective Green, g (s)	19.6		28.3	28.3	28.3	28.3
Actuated g/C Ratio	0.33		0.47	0.47	0.47	0.47
Clearance Time (s)	6.0		6.1	6.1	6.1	6.1
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1078		878	732	280	1685
v/s Ratio Prot	c0.26		c0.30			0.11
v/s Ratio Perm				0.17	0.05	
v/c Ratio	0.79		0.64	0.36	0.11	0.23
Uniform Delay, d1	18.4		12.0	10.1	8.8	9.4
Progression Factor	0.82		0.69	1.08	1.00	1.00
Incremental Delay, d2	3.9		2.4	0.9	0.8	0.3
Delay (s)	18.9		10.7	11.8	9.6	9.7
Level of Service	B		B	B	A	A
Approach Delay (s)	18.9		11.2			9.7
Approach LOS	B		B			A

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.1
Intersection Capacity Utilization	63.8%	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 (veh/h)	287	0	193	0	0	0	0	741	106	305	581	0
Future Volume (veh/h)	287	0	193	0	0	0	0	741	106	305	581	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	0	1863				0	1863	1900	1827	1863	0
Adj Flow Rate, veh/h	319	0	214				0	833	119	339	646	0
Adj No. of Lanes	1	0	1				0	2	0	1	2	0
Peak Hour Factor	0.90	0.95	0.90				0.77	0.89	0.89	0.90	0.90	0.90
Percent Heavy Veh, %	4	0	2				0	2	2	4	2	0
Cap, veh/h	385	0	351				0	1297	185	426	2124	0
Arrive On Green	0.22	0.00	0.22				0.00	0.42	0.42	0.22	1.00	0.00
Sat Flow, veh/h	1740	0	1583				0	3203	444	1740	3632	0
Grp Volume(v), veh/h	319	0	214				0	474	478	339	646	0
Grp Sat Flow(s),veh/h/ln	1740	0	1583				0	1770	1784	1740	1770	0
Q Serve(g_s), s	10.5	0.0	7.3				0.0	12.8	12.8	6.5	0.0	0.0
Cycle Q Clear(g_c), s	10.5	0.0	7.3				0.0	12.8	12.8	6.5	0.0	0.0
Prop In Lane	1.00		1.00				0.00		0.25	1.00		0.00
Lane Grp Cap(c), veh/h	385	0	351				0	738	744	426	2124	0
V/C Ratio(X)	0.83	0.00	0.61				0.00	0.64	0.64	0.80	0.30	0.00
Avail Cap(c_a), veh/h	478	0	435				0	738	744	426	2124	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.71	0.71	0.00
Uniform Delay (d), s/veh	22.3	0.0	21.0				0.0	13.9	13.9	11.1	0.0	0.0
Incr Delay (d2), s/veh	9.6	0.0	1.7				0.0	4.3	4.2	7.4	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	3.3				0.0	7.1	7.1	4.0	0.1	0.0
LnGrp Delay(d),s/veh	31.8	0.0	22.7				0.0	18.2	18.2	18.5	0.3	0.0
LnGrp LOS	C		C					B	B	B	A	
Approach Vol, veh/h		533						952			985	
Approach Delay, s/veh		28.2						18.2			6.5	
Approach LOS		C						B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	11.0	31.2		17.8		42.2		
Change Period (Y+Rc), s	4.5	6.2		4.5		6.2		
Max Green Setting (Gmax), s	6.5	21.8		16.5		32.8		
Max Q Clear Time (g_c+I1), s	8.5	14.8		12.5		2.0		
Green Ext Time (p_c), s	0.0	4.7		0.8		11.6		

Intersection Summary	
HCM 2010 Ctrl Delay	15.7
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	29	63	44	818	739	35
Future Vol, veh/h	29	63	44	818	739	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	150	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	89	89	93	93
Heavy Vehicles, %	1	1	2	2	1	1
Mvmt Flow	32	69	49	919	795	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1371	416	832	0	-	0
Stage 1	813	-	-	-	-	-
Stage 2	558	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.14	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.22	-	-	-
Pot Cap-1 Maneuver	138	588	796	-	-	-
Stage 1	399	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	130	588	796	-	-	-
Mov Cap-2 Maneuver	130	-	-	-	-	-
Stage 1	399	-	-	-	-	-
Stage 2	507	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.2	0.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	796	-	130	588	-	-
HCM Lane V/C Ratio	0.062	-	0.245	0.118	-	-
HCM Control Delay (s)	9.8	-	41.5	11.9	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.9	0.4	-	-

Intersection: 9001: US-127 NB off & E. COLONVILLE

Movement	EB	WB	WB	NB	NB
Directions Served	T	T	T	L	R
Maximum Queue (ft)	142	96	78	128	169
Average Queue (ft)	69	35	23	45	77
95th Queue (ft)	123	77	58	100	131
Link Distance (ft)	284	409	409	592	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					125
Storage Blk Time (%)				0	1
Queuing Penalty (veh)				0	1

Intersection: 9002: CLARE AVE (BL 127) & US-127 NB ON-RAMP

Movement	NB	SB
Directions Served	L	R
Maximum Queue (ft)	100	17
Average Queue (ft)	43	1
95th Queue (ft)	77	6
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	280
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9003: CLARE AVE (BL 127) & E. COLONVILLE

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	LR	T	R	L	T	T
Maximum Queue (ft)	171	146	158	117	50	112	71
Average Queue (ft)	86	64	65	56	13	53	18
95th Queue (ft)	145	119	133	98	39	98	53
Link Distance (ft)	284	284	677	677		272	272
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					120		
Storage Blk Time (%)						0	
Queuing Penalty (veh)						0	

Intersection: 9004: CLARE AVE (BL 127) & US-127 SB OFF-RAMP

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	R	T	TR	L	T	T
Maximum Queue (ft)	214	278	75	91	133	66	55
Average Queue (ft)	98	145	57	58	52	28	11
95th Queue (ft)	201	267	83	78	103	59	37
Link Distance (ft)		372	34	34		677	677
Upstream Blk Time (%)	0	2	18	35			
Queuing Penalty (veh)	0	0	60	119			
Storage Bay Dist (ft)	230				370		
Storage Blk Time (%)	0	5					
Queuing Penalty (veh)	0	13					

Intersection: 9005: CLARE AVE (BL 127) & W COLONVILLE

Movement	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	T	TR
Maximum Queue (ft)	149	152	44	113	160	12	52
Average Queue (ft)	67	47	15	24	53	1	9
95th Queue (ft)	170	152	40	80	120	8	39
Link Distance (ft)		346		484	484	34	34
Upstream Blk Time (%)		1				0	0
Queuing Penalty (veh)		0				0	2
Storage Bay Dist (ft)	150		150				
Storage Blk Time (%)	13	0		0			
Queuing Penalty (veh)	10	0		0			

Zone Summary

Zone wide Queuing Penalty: 206

Intersection: 9001: US-127 NB off & E. COLONVILLE

Movement	EB	WB	WB	NB	NB
Directions Served	T	T	T	L	R
Maximum Queue (ft)	236	136	145	216	200
Average Queue (ft)	128	65	65	94	103
95th Queue (ft)	218	117	122	166	166
Link Distance (ft)	284	409	409	592	
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					125
Storage Blk Time (%)				1	3
Queuing Penalty (veh)				3	7

Intersection: 9002: CLARE AVE (BL 127) & US-127 NB ON-RAMP

Movement	NB	NB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	166	114	4	44
Average Queue (ft)	77	7	0	5
95th Queue (ft)	135	80	3	24
Link Distance (ft)		272	493	
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		3		
Storage Bay Dist (ft)	150			280
Storage Blk Time (%)	1			
Queuing Penalty (veh)	5			

Intersection: 9003: CLARE AVE (BL 127) & E. COLONVILLE

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	LR	T	R	L	T	T
Maximum Queue (ft)	208	245	325	207	77	135	92
Average Queue (ft)	104	116	148	95	24	71	26
95th Queue (ft)	172	203	262	160	60	117	68
Link Distance (ft)	284	284	677	677		272	272
Upstream Blk Time (%)		0					
Queuing Penalty (veh)		0					
Storage Bay Dist (ft)					120		
Storage Blk Time (%)						0	
Queuing Penalty (veh)						0	

Intersection: 9004: CLARE AVE (BL 127) & US-127 SB OFF-RAMP

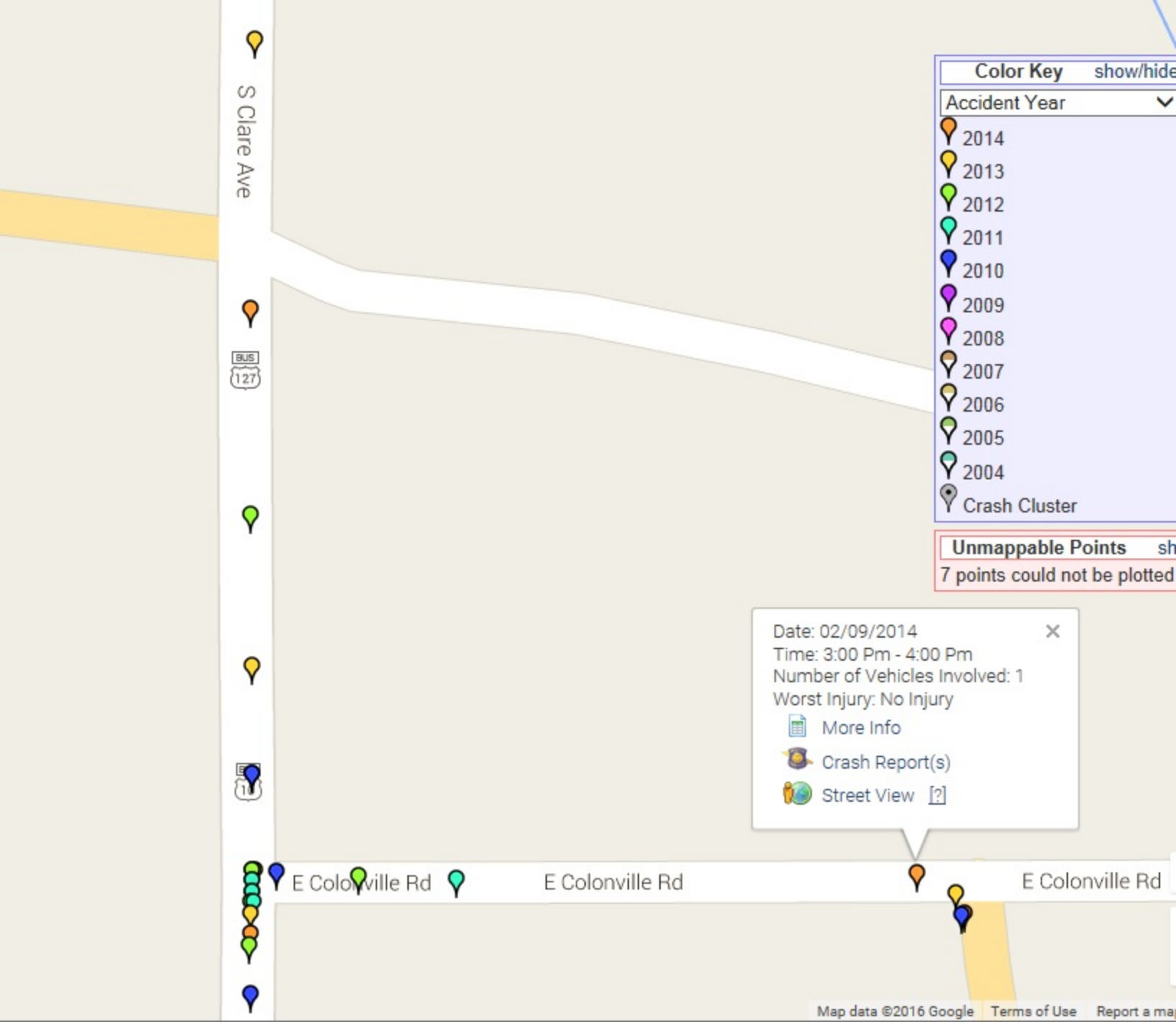
Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	R	T	TR	L	T	T
Maximum Queue (ft)	267	175	86	100	231	79	67
Average Queue (ft)	129	77	67	67	104	30	13
95th Queue (ft)	225	141	85	89	198	62	44
Link Distance (ft)		372	34	34		677	677
Upstream Blk Time (%)			36	51			
Queuing Penalty (veh)			156	222			
Storage Bay Dist (ft)	230				370		
Storage Blk Time (%)	1						
Queuing Penalty (veh)	3						

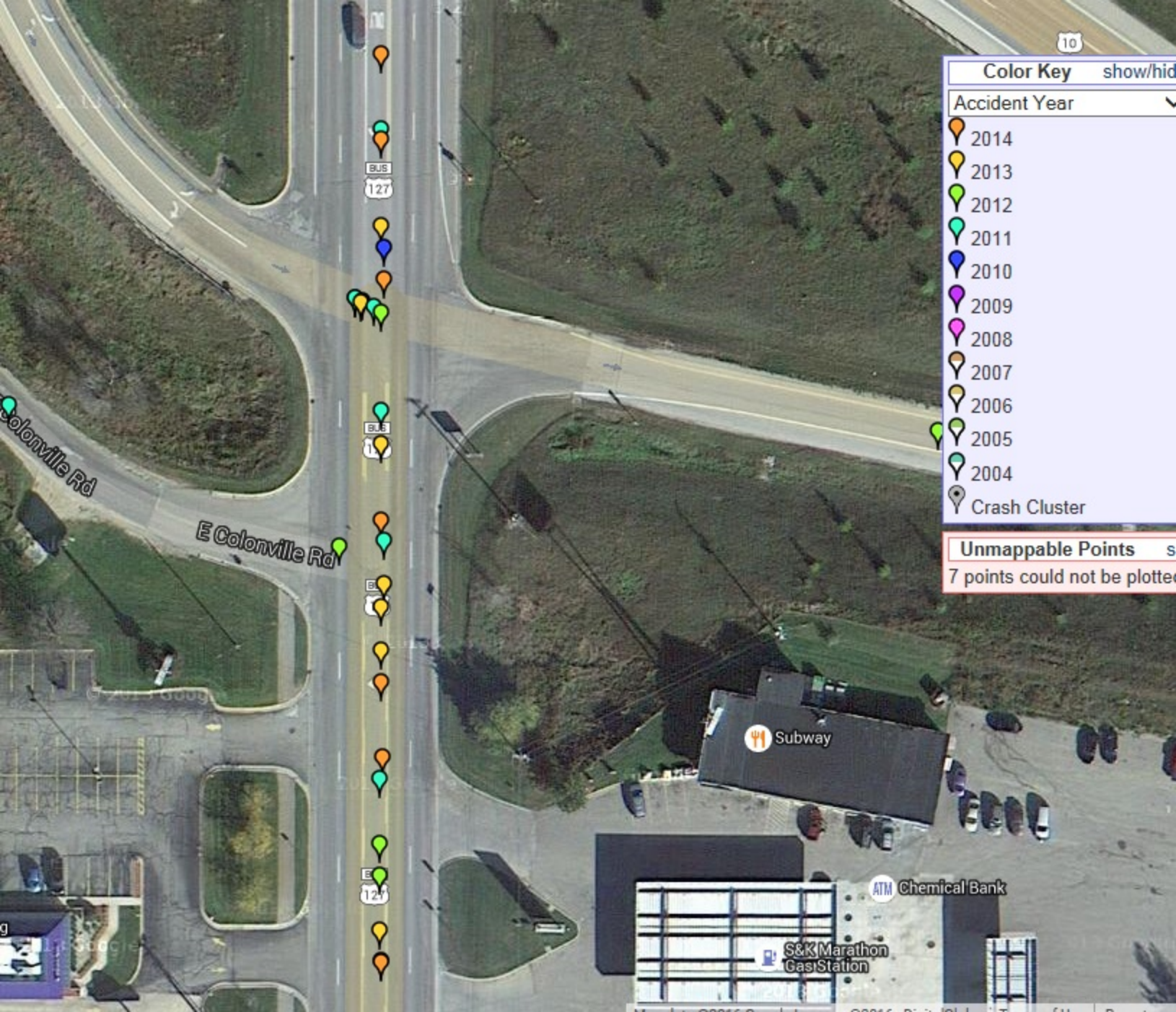
Intersection: 9005: CLARE AVE (BL 127) & W COLONVILLE

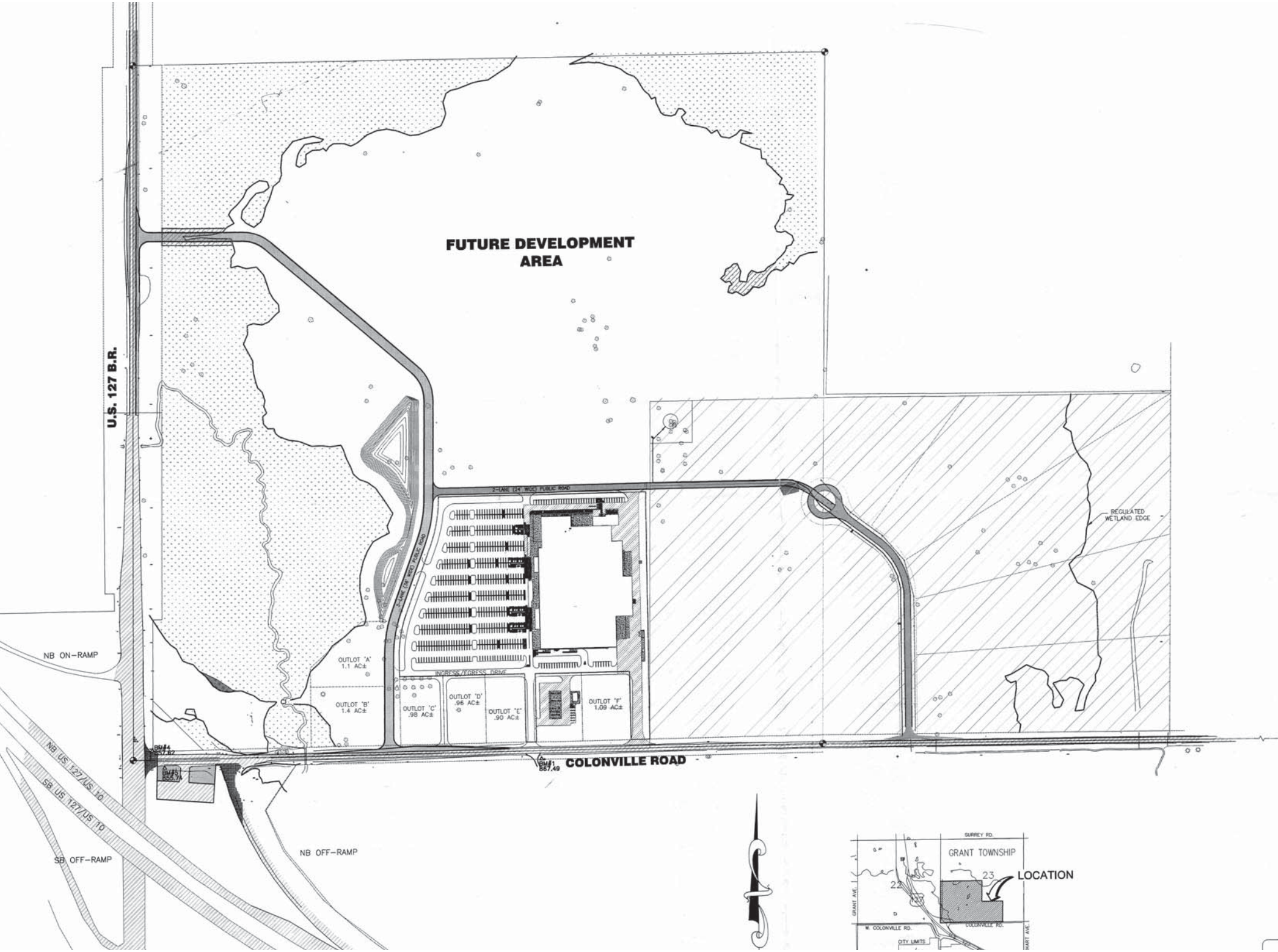
Movement	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	T	TR
Maximum Queue (ft)	239	298	153	274	322	23	51
Average Queue (ft)	142	82	25	83	123	1	6
95th Queue (ft)	269	264	71	207	252	7	32
Link Distance (ft)		346		484	484	34	34
Upstream Blk Time (%)		6				0	0
Queuing Penalty (veh)		0				0	1
Storage Bay Dist (ft)	150		150				
Storage Blk Time (%)	52	0		3			
Queuing Penalty (veh)	34	0		1			

Zone Summary

Zone wide Queuing Penalty: 436


S Clare Ave
BUS
127
E Colonville Rd
E Colonville Rd
E Colonville Rd
Color Key
show/hide
Accident Year
2014
2013
2012
2011
2010
2009
2008
2007
2006
2005
2004
Crash Cluster
Unmappable Points
7 points could not be plotted
Date: 02/09/2014
Time: 3:00 Pm - 4:00 Pm
Number of Vehicles Involved: 1
Worst Injury: No Injury
More Info
Crash Report(s)
Street View
Map data ©2016 Google
Terms of Use


Color Key
show/hid
Accident Year
2014
2013
2012
2011
2010
2009
2008
2007
2006
2005
2004
Crash Cluster
Unmappable Points
7 points could not be plotte
E Colonville Rd
Colonville Rd
BUS
127
10
Subway
Chemical Bank
S&K Marathon
Gas Station


FUTURE DEVELOPMENT AREA
U.S. 127 B.R.
2-LANE (24' WIDE) PUBLIC ROAD
2-LANE (24' WIDE) PUBLIC ROAD
REGULATED WETLAND EDGE
NB ON-RAMP
OUTLOT 'A' 1.1 AC±
INGRESS/EGRESS DRIVE
OUTLOT 'B' 1.4 AC±
OUTLOT 'C' .98 AC±
OUTLOT 'D' .96 AC±
OUTLOT 'E' .90 AC±
OUTLOT 'F' 1.09 AC±
BM#1 867.87
BM#3 867.74
BM#1 867.49
COLONVILLE ROAD
NB US 127/US 10
SB US 127/US 10
SB OFF-RAMP
NB OFF-RAMP
SURREY RD.
GRANT TOWNSHIP
23
LOCATION
22
GRANT AVE.
W. COLONVILLE RD.
COLONVILLE RD.
CITY LIMITS
HART AVE.

TRAFFIC SIGNAL TIMING PERMIT

PHASE	1	2	3	4	5	6	7	8
APPROACH	NB/SB	WB						
MINIMUM GREEN	10	7						
PASSAGE	0.0	3.0						
MAXIMUM NO. 1	32	16						
MAXIMUM NO. 2	0	0						
YELLOW CHANGE	4.7	3.5						
RED CLEARANCE	1.4	2.5						
WALK	0	0						
PEDESTRIAN CLEARANCE	0	0						
EXTENDED PED. CLEARANCE	0	0						
REST IN WALK	0	0						
INITIALIZATION	4	1						
NON-ACT RESPONSE	0	0						
VEHICLE RECALL	3	0						
PEDESTRIAN RECALL	0	0						
NON-LOCK MEMORY	0	0						
DUAL ENTRY	0	0						

	CYCLE								O1	O2	O3
DIAL 1 SPLIT 1											
DIAL 2 SPLIT 1											
DIAL 3 SPLIT 1											
DIAL SPLIT											
DIAL SPLIT											
DIAL SPLIT											
	MODE										

PHASE

1 US-127BR/US-10BR

2 COLONVILLE

3

4

5

6

7

8

HOURS OF OPERATION
MAX 1 - NORMAL

OVERLAPS

Overlap Phase	Load Bays	Phases Overlapped	T.G. (s)	Y (s)	R (s)	-G/Y	+GRN
=							
=							
=							
=							

TIMING INSTALLED

REMARKS

OPTIMIZED BY URS

- REVISED MIN GREEN, PASSAGE, MAX TIMES, & CLEARANCE INTERVALS

PREPARED BY: DPR DATE: 10/14/08

FLASH HOURS:

00:01 to 06:00 DAILY ☒ NONE ☐

NIGHT FLASH:

FY = US-127BR FR = COLONVILLE

CONFLICT FLASH:

FY = US-127BR FR = COLONVILLE

CONTROLLER TYPE:

☒ EPAC

☐ Other:

PRE-EMPT ☐

COUNTDOWN PEDS ☐

LOCATION:

US-127BR/US-10BR @ COLONVILLE

CITY/TWP: GRANT TWP

COUNTY : CLARE

MILE POINT	CONTROL SECTION-SPOT #
2.16	18033-01-008

Job # (If Applicable): 101124

CLEAR PAGE 1

CLEAR ALL

Page 3 included only if Pre-Empt Checked

ADVANCED TIMING PARAMETERS FORM

SYSTEM INFORMATION

Controller Type:
- [x] EPAC
- [ ] Other:

System Type:
- [ ] Closed Loop
  - [ ] Stand By
  - [ ] Group 1
  - [ ] Group 2
  - Address:
- [ ] TBC
- [ ] TBC/GPS
- [x] None
- [ ] Other:

If TBC, Synch by:
- [ ] TOD
- [ ] Event

Interconnect Type:
- [ ] Hardwire
- [ ] Fiber-Optic
- [ ] Radio
- [ ] Phone Drop
- [x] None
- [ ] Other:

If Phone Drop, Phone #

Controller Status:
- [ ] Master
- [ ] Slave
- [x] Isolated
- [ ] TBC

If Slave, Master Location:

Master Spot # :

LEFT-TURN PHASING

Phase # / Description	*Permissive-Protected* Lead	*Permissive-Protected* Lag	*Protected-Only* Split	*Protected-Only* Lead	*Protected-Only* Lag
	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]

RING AND BARRIER STRUCTURE

	B1	B2	B3	B4
R1	1	2		
R2				
R3				
R4				

VEHICULAR AND PEDESTRIAN DETECTION

Approach	*Vehicular Detection* Movements and Call Delay (s) Left		Thru		Right		Type Loop	Video	Other	*Pedestrian Detection* Push-Button Crossing Locations
WB COLONVILLE	[x]	2	[ ]		[x]	15	[ ]	[x]	[ ]	
	[ ]		[ ]		[ ]		[ ]	[ ]	[ ]	
	[ ]		[ ]		[ ]		[ ]	[ ]	[ ]	
	[ ]		[ ]		[ ]		[ ]	[ ]	[ ]	
	[ ]		[ ]		[ ]		[ ]	[ ]	[ ]	
	[ ]		[ ]		[ ]		[ ]	[ ]	[ ]	

DISAPPEARING LEGEND CASE SIGNS

ADDITIONAL DIAL SPLIT DATA

		PHASE	1	2	3	4	5	6	7	8	O1	O2	O3
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											

COORDINATION DATA

Operation Mode	0
Coordination Mode	0
Maximum Mode	1
Correction Mode	0
Offset Mode	0
Force Mode	0
Max Dwell	0
Yield Period	0

REMARKS:

ADDITIONAL OVERLAP DATA

Overlap Phase	*Load Bays*	*Phases Overlapped*	T.G. (s)	Y (s)	R (s)	-G/Y	+GRN
=							
=							
=							
=							

PREPARED BY: DPR DATE: 10/14/08

- [ ] MDOT
- [ ] County
- [ ] City
- [x] Consultant

LOCATION: US-127BR/US-10BR @ COLONVILLE

CONTROL SECTION-SPOT # 18033-01-008

CLEAR PAGE 2

PREEMPTION INFORMATION FORM

Preemption Description:

Preempt # =	Time (s)	Phases		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
SEL Ped Cl		Vehicle	Track																	☐ Locking	
SEL Yellow			Dwell																		
SEL Red Cl			Cycle																	☐ Non-Locking	
TRACK Green			Exit																		
TRACK Ped Cl		Ped	Track																	Delay (s)	
TRACK Yellow			Dwell																	Extend (s)	
TRACK Red CL			Cycle																	Duration (s)	
DWELL Green		Overlap Vehicle	Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Max Call (s)	
RET Ped Cl			Track																	Lockout (s)	
RET Yellow			Dwell																	Link PE #	
RET Red Cl			Cycle																		

Preemption Description:

Preempt # =	Time (s)	Phases		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
SEL Ped Cl		Vehicle	Track																	☐ Locking	
SEL Yellow			Dwell																		
SEL Red Cl			Cycle																	☐ Non-Locking	
TRACK Green			Exit																		
TRACK Ped Cl		Ped	Track																	Delay (s)	
TRACK Yellow			Dwell																	Extend (s)	
TRACK Red CL			Cycle																	Duration (s)	
DWELL Green		Overlap Vehicle	Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Max Call (s)	
RET Ped Cl			Track																	Lockout (s)	
RET Yellow			Dwell																	Link PE #	
RET Red Cl			Cycle																		

Preemption Description:

Preempt # =	Time (s)	Phases		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
SEL Ped Cl		Vehicle	Track																	☐ Locking	
SEL Yellow			Dwell																		
SEL Red Cl			Cycle																	☐ Non-Locking	
TRACK Green			Exit																		
TRACK Ped Cl		Ped	Track																	Delay (s)	
TRACK Yellow			Dwell																	Extend (s)	
TRACK Red CL			Cycle																	Duration (s)	
DWELL Green		Overlap Vehicle	Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Max Call (s)	
RET Ped Cl			Track																	Lockout (s)	
RET Yellow			Dwell																	Link PE #	
RET Red Cl			Cycle																		

Preemption Description:

Preempt # =	Time (s)	Phases		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
SEL Ped Cl		Vehicle	Track																	☐ Locking	
SEL Yellow			Dwell																		
SEL Red Cl			Cycle																	☐ Non-Locking	
TRACK Green			Exit																		
TRACK Ped Cl		Ped	Track																	Delay (s)	
TRACK Yellow			Dwell																	Extend (s)	
TRACK Red CL			Cycle																	Duration (s)	
DWELL Green		Overlap Vehicle	Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Max Call (s)	
RET Ped Cl			Track																	Lockout (s)	
RET Yellow			Dwell																	Link PE #	
RET Red Cl			Cycle																		

Preempt System Data

Ring	1	2	3	4		
MIN GRN/WLK (s)						
Priority	PE/FL	PE1/2	PE2/3	PE3/4	PE4/5	PE5/6
Status						

REMARKS :

PREPARED BY: DPR DATE: 10/14/08

LOCATION:

US-127BR/US-10BR @ COLONVILLE

CONTROL SECTION-SPOT #

18033-01-008

CLEAR PAGE 3