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MEMORANDUM

TO: City of Eastpointe

FROM: Mohammed Lutfi, P.E., PTOE

DATE: July 29, 2021

SUBJECT: **9 Mile Road Traffic Study**

As requested, Anderson, Eckstein, and Westrick, Inc. (AEW) has conducted a traffic study on 9 Mile Road from Beechwood Drive (West City Limits) to I-94 Westbound Ramp (East City Limits), in the City of Eastpointe, Macomb County. The objective of this study is to evaluate the traffic impacts of a proposed alternative roadway cross-section created by eliminating vehicular travel lanes in each direction, often called a "road diet".

Existing Traffic Conditions

9 Mile Road is currently a 5-lane road that consist of two lanes westbound, two lanes eastbound, and a two-way center left turn lane. Roadway network lane configuration is provided in Figure: 1 Existing Lane Configuration & Traffic Control, located in Appendix A. 9 Mile Road between Beechwood Drive and Kelly Road currently has a posted speed limit of 35 MPH, and is under the jurisdiction of the City of Eastpointe. Traffic counts were obtained from Macomb County Department of Roads that were collected in 2014 as part of a county-wide corridor signal timing study. Due to reductions in traffic volumes in the region related to COVID-19, random traffic counts in the targeted roadway network were taken in July 2021. The 2014 traffic counts and 2021 traffic counts were found comparable. Existing Peak Hour traffic is presented in Figure 2 & 3 of Appendix B.

Non-Motorized Traffic Conditions

There are currently public transit services along the study area. 9 Mile Road is a SMART Bus route, with stops throughout the corridor. Six (6)-foot sidewalk exists on both sides on 9 Mile Road. All signalized intersections have a pedestrian signal with push buttons and crosswalks. The pedestrian activity at selected study intersection during the peak hours are shown in Table 1:



Table 1: Pedestrian Activity – Peak Hours

Intersection	Pedestrians	
	AM Peak Hour	PM Peak Hour
9 Mile Road & Hayes Ave	9	20
9 Mile Road & Gratiot Ave (M-3)	56	42
9 Mile Road & Donald Ave	6	19
9 Mile Road & Schroeder Ave	23	27
9 Mile Road & Kelly Road	9	12

Intersection Capacity Analysis

AEW modeled the existing conditions and the alternative being considered utilizing Synchro 11 software. All signalized intersections in the study area were analyzed to evaluate the effects on vehicular delay and queuing which may result from a reduction in the number of thru lanes. Analysis periods included typical weekday AM and PM peak hours. AEW referenced the Highway Capacity Manual 6th Edition (HCM) methodology for determining Level of Service (LOS) and queuing at signalized intersections.

For signalized intersections, the HCM defines the level of service (LOS) in terms of control delay. Delay may be measured in the field or it may be estimated. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the volume-to-capacity ratio for the lane group or approach in question. Table 2 indicates the control delay criteria used for determining LOS for signalized intersections.

Table 2: LOS Criteria for Signalized Intersections

LOS	Control Delay per Vehicle (seconds)
A	< 10
B	> 10 to < 20
C	> 20 to < 35
D	> 35 to < 55
E	> 55 to < 80
F	> 80

LOS A describes operations with very low control delay up to 10.0 seconds per vehicle. This occurs when progression is exceptionally 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.

LOS B describes operations with control delay in the range of 10.1 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.

LOS C describes operations with control 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.

LOS D describes operations with control delay in the range of 35.1 to 55.0 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

LOS E describes operations with control delay in the range of 55.1 to 80.0 seconds per vehicle. This is considered to be above the limit of acceptable delay for an urban roadway in the study area. These high delay values generally indicate poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.

LOS F describes operations with control 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 volume-to-capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

LOS Analysis for Existing Conditions & 3-Lane Alternative

Signal timing and phasing data for intersections in the study area were obtained from Macomb County Department of Roads (MCDR). The peak hour intersection volumes, existing approach Peak Hour Factor (PHFs), truck percentage, and default lane utilization factors were used. The LOS for the signalized intersections under existing conditions and with the proposed alternative being considered are shown below in Table 3:



Table 3: Existing LOS and Control Delay

Intersection	Approach	Lane Group	Existing (5 -lanes)		3-Lane		Delay Increase	
			AM-Peak LOS/Delay	PM Peak LOS/Delay	AM-Peak LOS/Delay	PM Peak LOS/Delay	AM Peak	PM Peak
9 Mile Road & Beechwood Drive Signalized	Eastbound	Left	A / 3.0	A / 5.3	A / 2.1	A / 4.8	-0.9	-0.5
		2-Thru/Right	A / 4.6	A / 6.8	A / 4.9	A / 9.7	0.3	-2.9
	Westbound	Left	A / 9.4	A / 3.7	A / 4.1	A / 2.1	-5.3	-1.6
		2-Thru/Right	A / 8.9	A / 3.6	A / 7.1	A / 3.1	-1.8	-0.5
	Northbound	Left / Thru / Right	D / 43.3	D / 41.2	C / 34.9	D / 43.1	-8.4	1.9
	Southbound	Left / Thru / Right	D / 40.9	D / 39.8	C / 33.4	D / 41.5	0	0
Intersection Overall			B / 12.1	A / 7.7	A / 9.9	A / 9.2	-2.2	1.5
9 Mile Road & Hayes Road Signalized	Eastbound	Left	B / 10.8	A / 5.5	A / 7.3	A / 2.0	-3.5	-3.5
		2-Thru/Right	B / 12.7	A / 5.7	B / 10.3	A / 4.4	-2.4	-1.3
	Westbound	Thru/Right	A / 8.6	A / 2.0	B / 10.1	A / 6.4	1.5	4.4
	Southbound	Left / Right	D / 52.3	D / 46.8	D / 41.1	D / 41.2	-11.2	-5.6
Intersection Overall			B / 15.2	A / 7.8	B / 13.6	A / 8.4	-1.6	0.6
9 Mile Road & Grove Street Signalized	Eastbound	Left	A / 7.1	A / 4.8	A / 6.2	A / 5.2	-0.9	0.4
		2-Thru	A / 8.9	A / 5.3	A / 8.7	B / 14.3	-0.2	9.0
	Westbound	2-Thru / Right	B / 19.2	A / 4.9	B / 15.8	A / 3.7	-3.4	-1.2
		Left	B / 13.8	D / 39.2	B / 14.4	D / 43.7	0.6	4.5
	Northbound	2-Thru/Right	B / 12.6	D / 38.3	B / 13.1	D / 42.5	0.5	4.2
		2-Thru/Right	B / 11.6	D / 39.5	B / 12.1	D / 44.2	0.5	5.7
Intersection Overall			B / 14.0	A / 8.0	B / 12.8	B / 12.1	-1.2	4.1
9 Mile Road & Gratiot Avenue (M-3) Signalized	Eastbound	2-thru	C / 28.2	D / 40.3	C / 24.9	E / 78.5	-3.3	38.2
		Right	C / 30.9	D / 42.2	C / 22.6	C / 22.1	-8.3	-20.1
	Westbound	2-Thru	C / 28.1	C / 32.4	B / 17.6	D / 44.0	-10.5	11.6
		Right	C / 29.5	E / 61.3	B / 14.3	D / 47.6	-15.2	-13.7
	Northbound	3-Thru	A / 9.0	B / 15.8	B / 19.5	B / 15.8	10.5	0
		Right	A / 8.5	B / 14.6	B / 17.7	B / 14.6	9.2	0
Southbound	Thru / Right	B / 13.6	B / 15.1	C / 31.6	B / 15.1	18.0	0	
Intersection Overall			B / 15.1	B / 19.8	B / 15.4	C / 25.9	0.3	6.1
9 Mile Road & Pleasant Avenue Signalized	Eastbound	Left	A / 3.6	A / 3.9	B / 10.2	A / 3.1	6.6	-0.8
		2-Thru/Right	A / 3.6	A / 9.5	B / 10.2	B / 12.6	6.6	3.1
	Westbound	Left	A / 1.8	A / 7.9	A / 2.7	A / 2.9	0.9	-5.0
		2-Thru/Right	A / 2.1	A / 9.7	A / 4.2	A / 3.8	2.1	-5.9
	Northbound	Left/Thru/Right	D / 42.5	D / 42.4	D / 41.5	D / 43.5	-1.0	0.9
Southbound	Left/Thru/Right	D / 42.6	D / 42.3	D / 41.6	D / 43.4	-1.0	0.9	
Intersection Overall			A / 6.0	B / 11.7	A / 9.4	B / 10.9	3.4	-0.8
9 Mile Road & Donald Avenue Signalized	Eastbound	Left	A / 2.2	A / 4.2	A / 2.5	A / 6.6	0.3	2.4
		2-Thru/Right	A / 2.8	A / 4.4	A / 3.6	B / 12.6	0.8	8.2
	Westbound	Left	A / 4.3	A / 1.5	A / 2.5	A / 3.5	-1.8	2.0
		2-Thru/Right	B / 10.5	A / 2.7	A / 9.8	B / 11.6	-0.7	8.9
	Northbound	Left/Thru/Right	D / 41.5	D / 42.5	D / 40.6	D / 43.5	-0.9	1.0
Southbound	Left/Thru/Right	D / 40.9	D / 41.5	D / 40.0	D / 42.5	-0.9	1.0	
Intersection Overall			A / 9.4	A / 6.1	A / 9.2	B / 14.0	-0.2	7.9
9 Mile Road & Schroeder Avenue Signalized	Eastbound	Left	A / 4.7	B / 11.2	A / 3.3	A / 2.4	-1.4	-8.8
		2-Thru/Right	A / 6.4	B / 12.7	A / 6.1	A / 4.5	-0.3	-8.2
	Westbound	Left	B / 13.1	A / 5.5	A / 2.5	A / 2.7	-10.6	-2.8
		2-Thru/Right	B / 17.7	A / 6.4	A / 4.2	A / 3.5	-13.5	-2.9
	Northbound	Left/Thru/Right	D / 42.8	D / 46.4	D / 38.4	D / 46.4	-4.4	0
Southbound	Left/Thru/Right	D / 48.4	D / 49.8	D / 42.2	D / 49.8	-6.2	0	
Intersection Overall			B / 16.2	B / 13.6	A / 9.4	A / 8.5	-6.8	-5.1



Intersection	Approach	Lane Group	Existing (5 -lanes)		3-Lane		Delay Increase		
			AM-Peak LOS/Delay	PM Peak LOS/Delay	AM-Peak LOS/Delay	PM Peak LOS/Delay	AM Peak	PM Peak	
9 Mile Road & Kelly Road Signalized	Eastbound	2-Thru	A / 4.5	A / 7.1	B / 14.8	B / 12.6	10.3	5.5	
		Right	A / 0.6	A / 6.2	B / 19.6	A / 7.4	19.0	1.2	
	Westbound	2-Thru	B / 12.2	A / 9.9	B / 11.8	B / 15.7	-0.4	5.8	
		Right	C / 21.9	A / 8.8	A / 5.6	A / 4.6	-16.3	-4.2	
	Northbound	Left/Thru	D / 36.8	D / 46.0	D / 35.9	D / 42.2	-0.9	3.8	
		Right	D / 36.0	D / 50.2	D / 35.1	D / 45.1	-0.9	-5.1	
	Southbound	Left/Thru	D / 38.4	D / 43.2	D / 37.4	D / 41.6	-1.0	-1.6	
		Right	C / 33.5	D / 37.7	C / 32.8	D / 35.7	-0.7	-2.0	
	Intersection Overall			B / 15.0	B / 14.6	B / 17.6	B / 16.1	2.6	1.5

The results of the existing conditions and proposed analysis indicate that nearly all study intersections and individual intersection movements operate acceptably at a LOS D or better, with the exception of the following intersection approaches:

Westbound 9 Mile Road at Gratiot Avenue (M-3)

Additionally, the segment between Kelly Road and I-94 was analyzed in its current 5-lane configuration due to the influence of traffic from I-94 ramps and the distances required to drop a lane.

Alternative Analysis with Mitigation Measures

The analysis also included evaluating various countermeasures to mitigate impacts to the roadway network. Possible countermeasures included adding or extending dedicated turn lanes and optimizing signal timing. The resulting model simulations suggest these countermeasures could reduce control delay in 66% of intersection approaches when compared to the non-optimized signals. The comparison of LOS between the baseline 3-lane alternative and the alternative with mitigation measures can be found below:

Table 4: Non-Optimized Signal vs. Optimized Signal

Intersection	Approach	Lane Group	3-Lane		3 Lane Optimized		Delay Increase	
			AM-Peak LOS/Delay	PM Peak LOS/Delay	AM-Peak LOS/Delay	PM Peak LOS/Delay	AM Peak	PM Peak
9 Mile Road & Beechwood Drive Signalized	Eastbound	Left	A / 2.1	A / 4.8	A / 0.9	A / 5.4	-1.2	0.6
		2-Thru/Right	A / 4.9	A / 9.7	A / 1.3	B / 10.6	-3.6	0.9
	Westbound	Left	A / 4.1	A / 2.1	A / 2.8	A / 1.9	-1.3	-0.2
		2-Thru/Right	A / 7.1	A / 3.1	A / 3.9	A / 3.6	-3.2	0.5
	Northbound	Left / Thru / Right	C / 34.9	D / 43.1	D / 43.3	D / 41.2	8.4	-1.9
	Southbound	Left / Thru / Right	C / 33.4	D / 41.5	D / 40.9	D / 39.8	7.5	-1.7
	Intersection Overall			A / 9.9	A / 9.2	A / 8.3	A / 9.9	-1.6
9 Mile Road & Hayes Road Signalized	Eastbound	Left	A / 7.3	A / 2.0	A / 3.9	A / 1.1	-3.4	-0.9
		2-Thru/Right	B / 10.3	A / 4.4	A / 5.0	A / 1.6	-5.3	-2.8
	Westbound	Thru/Right	B / 10.1	A / 6.4	A / 4.2	A / 3.3	-5.9	-3.1
	Southbound	Left / Right	D / 41.1	D / 41.2	D / 51.3	D / 45.3	10.2	4.1
	Intersection Overall			B / 13.6	A / 8.4	A / 9.8	A / 6.2	-3.8



Intersection	Approach	Lane Group	3-Lane		3 Lane Optimized		Delay Increase	
			AM-Peak LOS/Delay	PM Peak LOS/Delay	AM-Peak LOS/Delay	PM Peak LOS/Delay	AM Peak	PM Peak
9 Mile Road & Grove Street Signalized	Eastbound	Left	A / 6.2	A / 5.2	A / 9.7	A / 4.4	3.5	-0.8
		2-Thru	A / 8.7	B / 14.3	B / 14.8	B / 12.1	6.1	-2.2
	Westbound	2-Thru / Right	B / 15.8	A / 3.7	B / 10.2	A / 7.5	-5.6	3.8
		Left	B / 14.4	D / 43.7	B / 13.4	D / 39.7	-1.0	-4.0
	Northbound	2-Thru/Right	B / 13.1	D / 42.5	B / 12.3	D / 38.7	-0.8	-3.8
		2-Thru/Right	B / 12.1	D / 44.2	B / 11.3	D / 40.0	-0.8	-4.2
Intersection Overall			B / 12.8	B / 12.1	B / 12.3	B / 12.3	-0.5	0.2
9 Mile Road & Gratiot Avenue (M-3) Signalized	Eastbound	2-thru	C / 24.9	E / 78.5	B / 16.0	E / 78.2	-8.9	-0.3
		Right	C / 22.6	C / 22.1	B / 18.5	C / 24.6	-4.1	2.5
	Westbound	2-Thru	B / 17.6	D / 44.0	E / 72.6	D / 40.2	55.0	-3.8
		Right	B / 14.3	D / 47.6	E / 63.2	D / 44.6	48.9	-3.0
	Northbound	3-Thru	B / 19.5	B / 15.8	B / 15.8	B / 15.8	-3.7	0
		Right	B / 17.7	B / 14.6	B / 14.6	B / 15.8	-3.1	1.2
Southbound	Thru / Right	C / 31.6	B / 15.1	B / 15.1	B / 14.6	-16.5	-0.5	
Intersection Overall			B / 15.4	C / 20.2	B / 19.8	C / 25.9	4.4	5.7
9 Mile Road & Pleasant Avenue Signalized	Eastbound	Left	B / 10.2	A / 3.1	A / 8.0	A / 2.9	-2.2	-0.2
		2-Thru/Right	B / 10.2	B / 12.6	A / 8.0	B / 13.8	-2.2	1.2
	Westbound	Left	A / 2.7	A / 2.9	A / 1.4	A / 6.4	-1.3	3.5
		2-Thru/Right	A / 4.2	A / 3.8	A / 3.0	A / 7.2	-1.2	3.4
	Northbound	Left/Thru/Right	D / 41.5	D / 43.5	D / 42.5	D / 42.4	1.0	-1.1
	Southbound	Left/Thru/Right	D / 41.6	D / 43.4	D / 42.6	D / 42.3	1.0	-0.9
Intersection Overall			A / 9.4	B / 10.9	A / 8.1	B / 12.9	-1.3	2.0
9 Mile Road & Donald Avenue Signalized	Eastbound	Left	A / 2.5	A / 6.6	A / 2.8	A / 6.2	0.3	-0.4
		2-Thru/Right	A / 3.6	B / 12.6	A / 3.8	A / 8.4	0.2	-4.2
	Westbound	Left	A / 2.5	A / 3.5	A / 3.3	A / 3.2	0.8	-0.3
		2-Thru/Right	A / 9.8	B / 11.6	A / 8.1	B / 11.0	-1.7	-0.6
	Northbound	Left/Thru/Right	D / 40.6	D / 43.5	D / 41.5	D / 42.5	0.9	-1.0
	Southbound	Left/Thru/Right	D / 40.0	D / 42.5	D / 40.9	D / 41.5	0.9	-1.0
Intersection Overall			A / 9.2	B / 14.0	A / 8.4	B / 11.7	-0.8	-2.3
9 Mile Road & Schroeder Avenue Signalized	Eastbound	Left	A / 3.3	A / 2.4	A / 2.2	A / 2.6	-1.1	0.2
		2-Thru/Right	A / 6.1	A / 4.5	A / 3.5	A / 5.1	-2.6	0.6
	Westbound	Left	A / 2.5	A / 2.7	A / 4.8	A / 3.1	2.3	0.4
		2-Thru/Right	A / 4.2	A / 3.5	A / 8.2	A / 9.3	4.0	5.8
	Northbound	Left/Thru/Right	D / 38.4	D / 46.4	D / 42.8	D / 46.4	4.4	0
	Southbound	Left/Thru/Right	D / 42.2	D / 49.8	D / 48.4	D / 49.8	6.2	0
Intersection Overall			A / 9.4	A / 8.5	B / 10.7	B / 11.2	1.3	2.7
9 Mile Road & Kelly Road Signalized	Eastbound	2-Thru	B / 14.8	B / 12.6	A / 7.1	A / 5.9	-7.7	-6.7
		Right	B / 19.6	A / 7.4	A / 6.2	A / 1.8	-13.4	-5.6
	Westbound	2-Thru	B / 11.8	B / 15.7	A / 9.9	B / 13.6	-1.9	-2.1
		Right	A / 5.6	A / 4.6	A / 8.8	A / 4.3	3.2	-0.3
	Northbound	Left/Thru	D / 35.9	D / 42.2	D / 46.0	D / 46.0	10.1	3.8
		Right	D / 35.1	D / 45.1	D / 50.2	D / 50.2	15.1	5.1
Southbound	Left/Thru	D / 37.4	D / 41.6	D / 45.3	D / 45.3	7.9	3.7	
	Right	C / 32.8	D / 35.7	D / 37.7	D / 37.7	4.9	2.0	
Intersection Overall			B / 17.6	B / 16.1	B / 14.6	B / 14.5	-3.0	-1.6



Crash Analysis

Crash reports from the past 5 years were reviewed to evaluate possible benefits or disbenefits related to the proposed alternative. The crash frequencies, types and severities in the study corridor are summarized in the table below

Table 5: Crash Segment Detail

Segment Link	Segment Length	Crash Type	Crashes	% of Total	KAB Crashes	%KAB
Beechwood to Gratiot	0.7 Miles	Rear End	16	32%	2	33%
		Angle	14	28%	3	50%
		Sideswipe	7	14%	0	0%
		Single	7	14%	0	0%
		Back	0	0%	0	0%
		Head-on Left-Turn	3	6%	0	0%
		Head-on	1	2%	0	0%
		Other includes, Bike, Ped, Motorcycle	2	4%	1	17%
		Total	50	100%	6	100%
Gratiot to Schroeder	1.15 Miles	Rear End	52	25%	5	17%
		Angle	64	30%	8	27%
		Sideswipe	36	17%	1	3%
		Single	22	10%	5	17%
		Back	5	2%	0	0%
		Head-on Left-Turn	3	1%	1	3%
		Head-on	5	2%	2	7%
		Other includes, Bike, Ped, Motorcycle	25	12%	8	27%
		Total	212	100%	30	100%
Schroeder to Kelly	0.5 Miles	Rear End	13	21%	5	56%
		Angle	24	39%	2	22%
		Sideswipe	11	18%	0	0%
		Single	1	2%	0	0%
		Back	0	0%	0	0%
		Head-on Left-Turn	2	3%	0	0%
		Head-on	2	3%	0	0%
		Other includes, Bike, Ped, Motorcycle	8	13%	2	22%
		Total	61	100%	9	100%
Kelly to I-94	0.3 Miles	Rear End	26	28%	0	0%
		Angle	39	41%	4	67%
		Sideswipe	19	20%	0	0%
		Single	3	3%	2	33%
		Back	0	0%	0	0%
		Head-on Left-Turn	2	2%	0	0%
		Head-on	0	0%	0	0%
		Other includes, Bike, Ped, Motorcycle	5	5%	0	0%
		Total	94	100%	6	100%

Note: KAB Crashes are fatal and severe crashes as noted by the KABCO scale: K= fatal crash, A=incapacitating injury, B=non-incapacitating injury, C=possible injury, and O= no injury.

Implementing a road diet on 9 Mile Road will likely reduce the frequency of sideswipe and pedestrian crashes. There is also a reduced potential for multi-threat angle crashes



which have a higher probability of resulting in an injury. The proposed alternative will also likely result in more uniform speeds through the corridor, reducing the frequency of crashes related to large speed differentials, which often result in injury crashes. Better platooning and more uniform speeds, however, may result in increases in head-on left turn type crashes and rear-end crashes.

Queue Analysis

The impacts to queue lengths at signalized intersections due to the proposed alternative was evaluated through SimTraffic microsimulation software. The results of the analysis indicate increasing queues at most intersection approaches, with a significant increase in queue length for EB and WB 9 Mile Road at Gratiot Avenue. The table below summarizes the queue increases for each lane at the study intersections.



Table 6: Queue Analysis

Intersection	Approach	Lane Group	Existing (5 -lanes)		3-Lane		Queue Increase (ft)	
			AM-Peak Queue Length (ft)	PM Peak Queue Length (ft)	AM-Peak Queue Length (ft)	PM Peak Queue Length (ft)	AM Peak	PM Peak
9 Mile Road & Beechwood Drive Signalized	Eastbound	2-Thru/Right	66	152	134	279	68	127
	Westbound	2-Thru/Right	123	61	92	155	-31	94
	Northbound	Left / Thru / Right	68	66	69	79	1	13
	Southbound	Left / Thru / Right	51	40	60	54	9	14
	Intersection Overall							
9 Mile Road & Hayes Road Signalized	Eastbound	2-Thru/Right	157	154	209	67	52	-87
	Westbound	Thru/Right	111	69	181	239	70	170
	Southbound	Left / Right	196	125	130	121	-66	-4
	Intersection Overall							
9 Mile Road & Grove Street Signalized	Eastbound	2-Thru	157	158	98	223	-59	65
	Westbound	2-Thru / Right	183	70	293	196	110	126
	Northbound	Left	76	37	89	32	13	-5
		2-Thru/Right	89	57	66	75	-23	18
	Southbound	2-Thru/Right	45	64	44	60	-1	-4
Intersection Overall								
9 Mile Road & Gratiot Avenue (M-3) Signalized	Eastbound	2-thru	87	227	291	1352	204	1125
		Right	114	207	195	285	81	78
	Westbound	2-Thru	153	231	261	1116	108	885
		Right	179	174	210	239	31	65
	Northbound	3-Thru	176	380	236	351	60	-29
		Right	68	201	118	242	50	41
	Southbound	Thru / Right	340	340	416	248	76	-92
Intersection Overall								
9 Mile Road & Kelly Road Signalized	Eastbound	2-Thru	102	162	238	260	136	98
		Right	49	78	49	111	0	33
	Westbound	2-Thru	163	197	233	359	70	162
		Right	90	112	149	190	59	78
	Northbound	Left/Thru	203	276	193	263	-10	-13
		Right	100	221	105	260	5	39
	Southbound	Left/Thru	231	240	235	247	4	7
		Right	73	77	78	134	5	57
Intersection Overall								

Other Considerations

In preparing this report, other observations were made which warrant additional consideration as part of the evaluation of the proposed alternative. These other considerations will likely have a negative impact on traffic operations under the proposed alternative, but which are not accurately represented in typical corridor modeling and signalized intersection capacity analysis studies. These observations include:

- Poor access management throughout the corridor, including:
 - Combinations of on street parallel and angle parking
 - Significant number of driveways and intersections located between signalized intersections



- A significant number of bus stops are present. In a multi-lane scenario, traffic is able to maneuver around a bus stopped for loading/alighting passengers. Coordination with SMART is recommended to carefully consider options related to bus stop locations (i.e. near side/far side) and in-lane/off-lane bus stops.
- Several fast-food type restaurants, as well as other businesses with drive-thru service, are present along the corridor. Observations were made of drive-thru queues extending into the right lane of 9 Mile Road under existing conditions. Under the proposed alternative, this scenario would result in lane blockages for thru traffic unless additional countermeasures were implemented to mitigate this situation.
- Our analysis assumed that all traffic would remain on 9 Mile Road under the alternative being considered, however, a perceived reduction in travel time or level of service by the motoring public may result in thru traffic filtering into the residential neighborhoods. Traffic that diverts into the neighborhoods will tend to have higher speeds than traffic with residential destinations, and cut-thru patterns may develop over time.
- The City's police and fire personnel utilize their immediate access to 9 Mile to serve the community.

Conclusions

The existing conditions on 9 Mile Road between Beechwood Drive and the I-94 West off-ramp consist of a 5-lane road with a posted speed limit of 35 MPH. The objective of this study is to evaluate an alternative for eliminating travel lanes for vehicles, resulting in a 3-lane cross-section.

Traffic modeling was performed utilizing existing traffic data, Synchro 11, and SimTraffic software. The simulations were conducted to evaluate the differences between the proposed road diet with non-optimized and optimized signals, and determine how they would compare to the existing conditions. In both scenarios, the control delay increased from the existing conditions. The non-optimized signal simulation resulted in one failing LOS at 9 Mile and Gratiot. The simulations with the optimized signals resulted in no failing LOS, and decreased control delays when compared to the non-optimized simulation.

The length of the queues at specified intersections were evaluated under the existing conditions and the proposed road diet. The only intersection that was drastically affected by the road diet was 9 Mile Road and Gratiot Avenue. The significant length increase can be found at the westbound and eastbound thru lanes. The eastbound thru lane queue length increased by 1,125 feet during the PM peak. The westbound thru lane increased by 885 feet during the PM peak.



APPENDIX A: LANE USE MAP

LEGEND

S - Signals

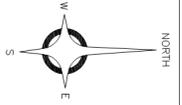
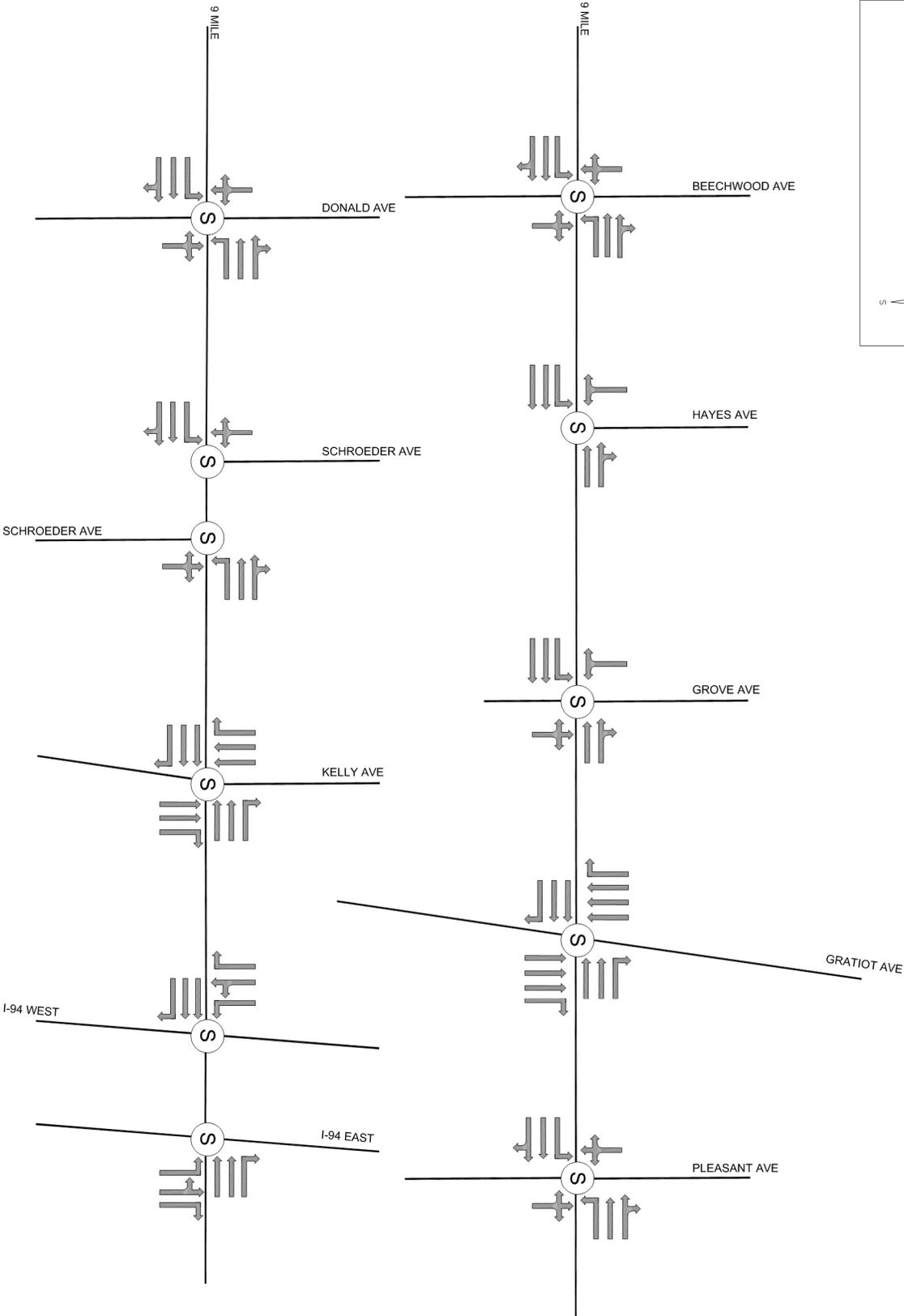


Figure:1 Existing Lane Configuration & Traffic Control



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DATE	08/27/13
PROJECT NAME	9 MILE ROAD TRAFFIC STUDY

9 MILE ROAD TRAFFIC STUDY

SHEET TITLE

CITY OF EASTPOINTE

Final Review Construction Record
 Control Checkered Date

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 SHEET NO:



APPENDIX B: TRAFFIC VOLUME MAPS

LEGEND

(S) - Signals

(###) - AM (PM) Peak Hour Traffic Volumes

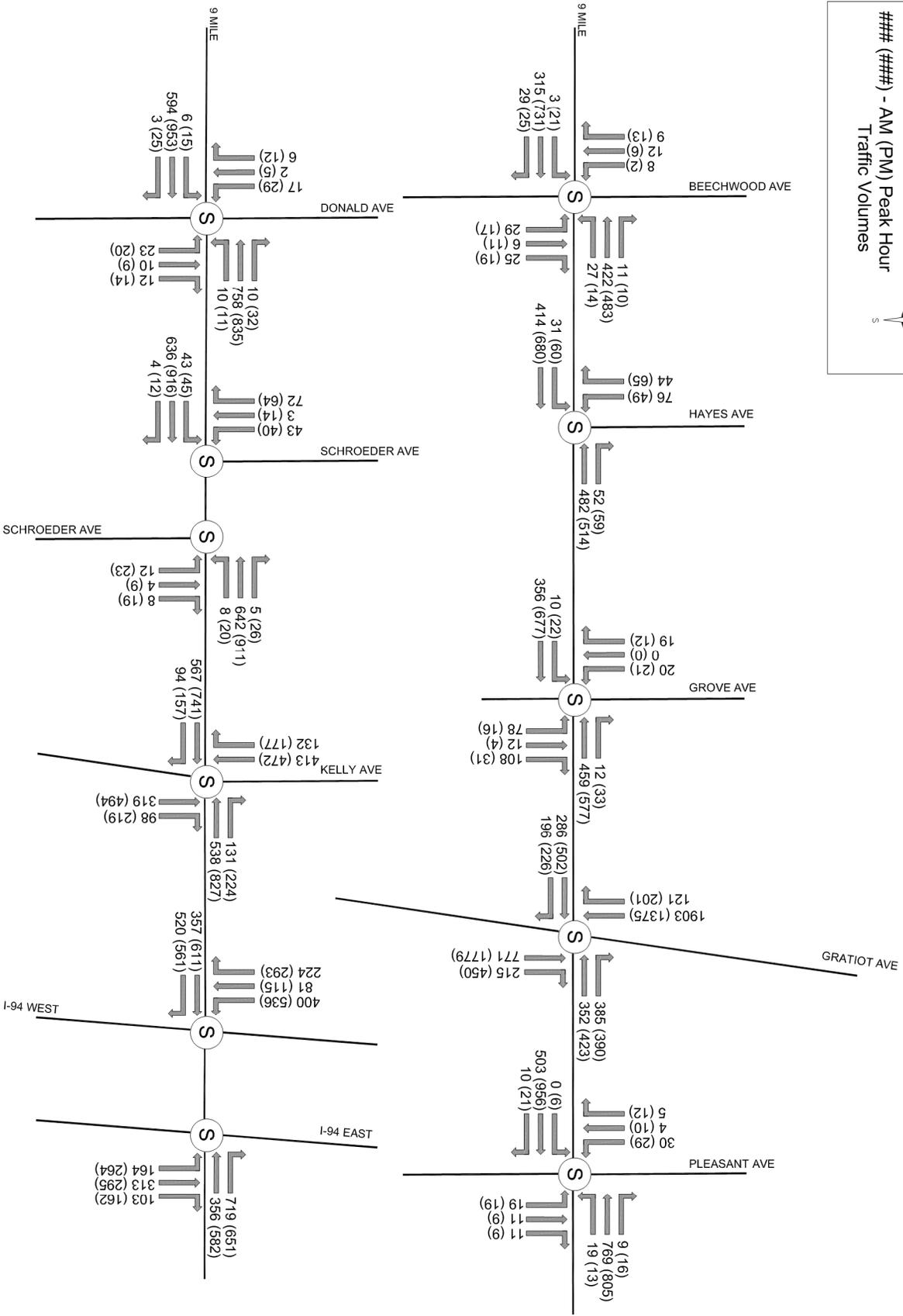
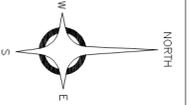


FIGURE 3: EXISTING NORTH/SOUTH TRAFFIC COUNTS



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9 MILE ROAD TRAFFIC STUDY

PROJECT NAME: 9 MILE ROAD TRAFFIC STUDY

DATE: 10/06/11

CLIENT: CITY OF EASTPONTE

PREPARED BY: [] PRELIMINARY [] COMPLETION [] RECORD

DESIGNED BY: [] CHECKED BY: []

SCALE: []



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 GAS, WATER, SEWER, AND TELEPHONE
 LINES. CALL 811 24 HOURS A DAY.
 CALL 811 24 HOURS A DAY.

PROJECT NO: 0145-0835

DATE: 10/06/11

SCALE: AS SHOWN

PROJECT LOCATION: 9 MILE ROAD TRAFFIC STUDY

DATE: 10/06/11