



# CITY of NOVI CITY COUNCIL

Agenda Item E  
June 3, 2013

**SUBJECT:** Approval to award a contract for design engineering services for the Meadowbrook Road and Eight Mile Road Signal Replacement project to Orchard, Hiltz & McCliment for a design fee of \$13,006.

**SUBMITTING DEPARTMENT:** Department of Public Services, Engineering Division *BTL*

**CITY MANAGER APPROVAL:** *[Signature]*

EXPENDITURE REQUIRED	\$13,006
AMOUNT BUDGETED	\$0
APPROPRIATION REQUIRED	\$13,006 (To be included in 4 <sup>th</sup> quarter Budget Amendment)
LINE ITEM NUMBER	204-204-00-863.505

## BACKGROUND INFORMATION:

The existing signal at the intersection of Meadowbrook Road and Eight Mile Road was recently reviewed by the City's traffic consultant based on feedback received from the public and City Council that it is difficult to complete an eastbound left turn at Meadowbrook Road due to heavy westbound traffic on Eight Mile Road. This intersection was not included in the 2012 study of the 12 high crash/high casualty intersections in Novi because the crash rate was not higher than the average for a comparatively large set of intersections elsewhere in Southeast Michigan having similar physical characteristics and traffic volumes. However, based on the feedback received from the public and City Council about the intersection's operation, we asked the traffic consultant to review the intersection using the same criteria as the 2012 intersection study and to report any findings and recommendations.

The attached Traffic and Safety Study of 8 Mile (Baseline)/Meadowbrook Intersection confirms that while there is not a significant crash history to indicate that there are safety issues with the intersection, there are some operational issues. The report concludes that during the afternoon peak hour there is a significant delay for eastbound left turns. This delay is causing motorists to complete left turns after the signal has turned red. Although the number of crashes was not significant at the intersection, there are probably many "near miss" incidents due to frustrated motorists as a result of the congestion at this location.

The attached report recommends that a left turn signal be added for eastbound Eight Mile Road at Meadowbrook Road and also recommends the addition of a westbound right turn lane for Eight Mile Road at the intersection to further reduce congestion. The design for the new signal will include any appropriate upgrades and modernization as necessary to bring the intersection up to current standards. The existing signals hang from a diagonal span wire, which will be improved to a box span configuration with flashing yellow arrow signals to meet the current standards. The signal is owned and operated by

the Wayne County Department of Public Services and the signal will be designed and constructed to meet any other standards required in the permit.

Orchard Hiltz & McCliment's (OHM) engineering fees are based on the fixed fee schedule established in the Agreement for Professional Engineering Services for Public Projects. The design fees for this project will be \$13,006 (9.00% of the estimated construction cost of \$144,520). The construction phase engineering fees will be awarded at the time of construction award and will be based on the contractor's bid price and the fee percentage established in the Agreement for Professional Engineering Services for Public Projects. A draft of the Supplemental Professional Engineering Services Agreement for this project is enclosed and includes the project scope and schedule.

It is anticipated that the project would be ready for construction in early 2014.

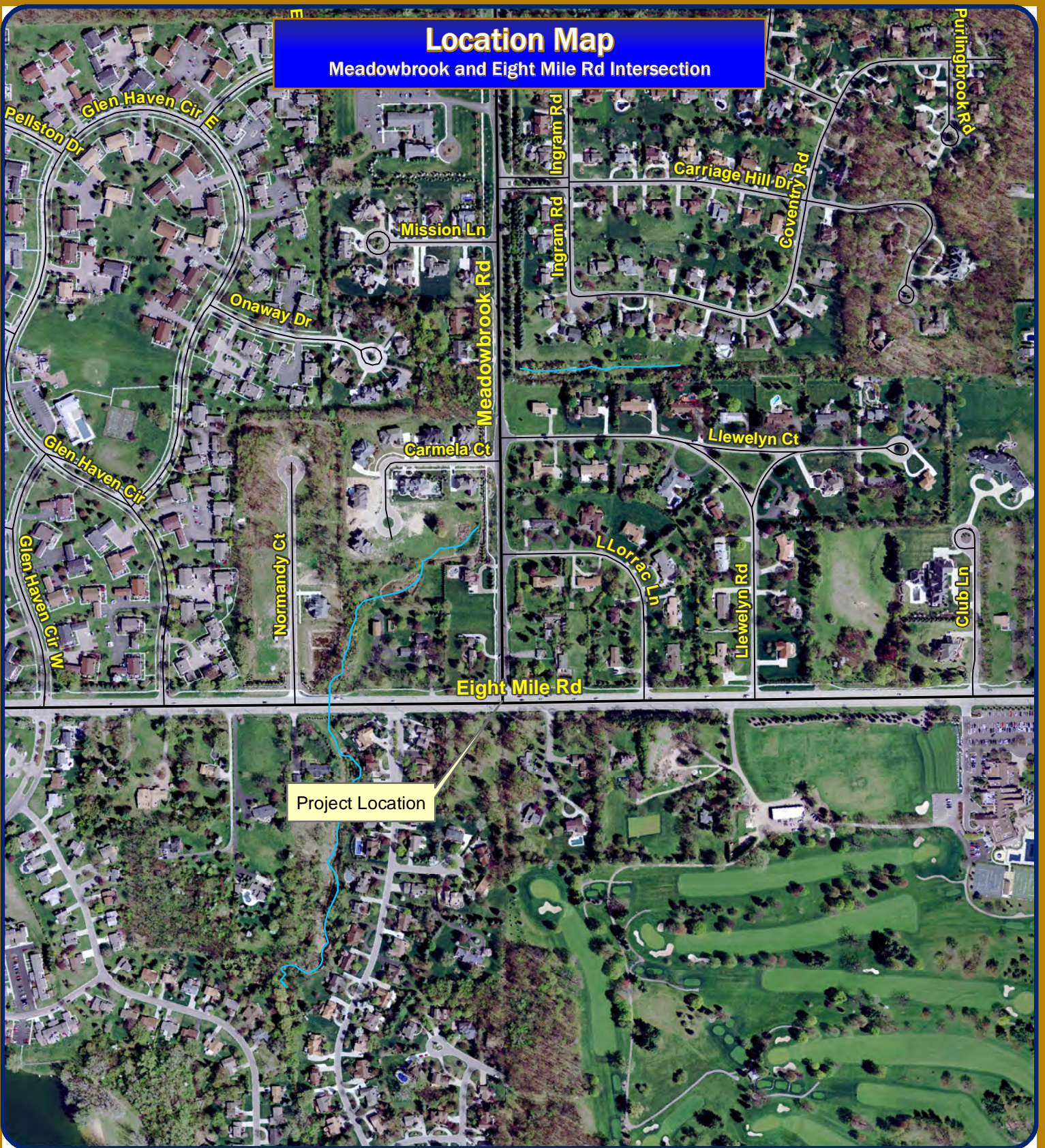
**RECOMMENDED ACTION:** Approval to award a contract for design engineering services for the Meadowbrook Road and Eight Mile Road Signal Replacement project to Orchard, Hiltz & McCliment for a design fee of \$13,006.

	1	2	Y	N
Mayor Gatt				
Mayor Pro Tem Staudt				
Council Member Casey				
Council Member Fischer				

	1	2	Y	N
Council Member Margolis				
Council Member Mutch				
Council Member Wrobel				

# Location Map

## Meadowbrook and Eight Mile Rd Intersection



Map Author: Brian Coburn  
Date: 5/24/13  
Project:  
Version #:

### MAP INTERPRETATION NOTICE

Map information depicted is not intended to replace or substitute for any official or primary source. This map was intended to meet National Map Accuracy Standards and use the most recent, accurate sources available to the people of the City of Novi. Boundary measurements and area calculations are approximate and should not be construed as survey measurements performed by a licensed Michigan Surveyor as defined in Michigan Public Act 132 of 1970 as amended. Please contact the City GIS Manager to confirm source and accuracy information related to this map.



### City of Novi

Engineering Division  
Department of Public Services  
26300 Lee BeGole Drive  
Novi, MI 48375  
cityofnovi.org



1 inch = 500 feet

5/15/2013

To: Mayor and City Council members  
Action forthcoming for consideration. There was \$175,000 added to the FY 2013/14 Budget.  
Clay



## MEMORANDUM

**TO:** ROB HAYES, P.E; DIRECTOR OF PUBLIC SERVICES/CITY ENGINEER  
**FROM:** BRIAN COBURN, P.E.; ENGINEERING MANAGER *BIC*  
**SUBJECT:** MEADOWBROOK AND EIGHT MILE SIGNAL IMPROVEMENTS  
**DATE:** MAY 14, 2013

As a follow-up to the discussion at the April 15, 2013 City Council budget meeting, we requested a traffic and safety study of the Meadowbrook Road and Eight Mile Road intersection from our traffic consultant, Clearzoning (formerly Birchler-Arroyo). This intersection was not included in the 2012 study of the 12 high crash/high casualty intersections in Novi because the crash rate was not higher than the average for a comparatively large set of intersections elsewhere in Southeast Michigan having similar physical characteristics and traffic volumes. However, based on the feedback received from the public and City Council about the intersection's operation, we asked Clearzoning to review the intersection using the same criteria as the 2012 intersection study and to report any findings and recommendations.

The attached *Traffic and Safety Study of 8 Mile (Baseline)/Meadowbrook Intersection* confirms the feedback received about operational issues. The report concludes that during the afternoon peak hour there is a significant delay for east bound left turns. This delay is causing motorists to complete left turns after the signal has turned red. Although the number of crashes was not significant at the intersection, there are probably many "near miss" incidents due to frustrated motorists as a result of the congestion at this location.

Clearzoning recommends that a left turn signal be added for eastbound Eight Mile Road (also called Baseline Road by Wayne County) at Meadowbrook Road. The report also recommends the addition of a westbound right turn lane for Eight Mile Road at Meadowbrook to further help reduce congestion at the intersection. This portion of Eight Mile Road and the traffic signal are under the jurisdiction of the Wayne County Department of Public Services, so all future improvements would need to be coordinated with and approved by this agency. There is adequate right-of-way available on the north side of Eight Mile Road for the signal improvements. We have also confirmed with Northville Township that there is adequate right-of-way on the south side.

The proposed budget for FY2013-14 includes the reconstruction of the traffic signal at this intersection. Based on the public feedback and the report from Clearzoning, we recommend awarding the design engineering as soon as possible this fiscal year to facilitate construction of the signal this construction season. A motion sheet for engineering award will be prepared for an upcoming Council agenda if you concur with this approach. The estimated project cost is \$164,500. The estimated design engineering costs to award this fiscal year would be \$10,200.

Please let me know how you would like us to proceed.

**TRAFFIC AND SAFETY STUDY OF  
8 MILE-BASELINE / MEADOWBROOK INTERSECTION**



Prepared for  
CITY OF NOVI, MI

By  
CLEARZONING, INC.  
Lathrup Village, MI

April 2013

**CONTENTS**

EXECUTIVE SUMMARY ..... ii

INTRODUCTION ..... 1

EVALUATION OF PEAK-HOUR OPERATIONS ..... 1

    Traffic Counts and Signal Timing ..... 1

    Capacity Analysis of Alternative Intersection Signalization ..... 6

    Evaluation of Criteria for Left-Turn Phasing .....6

EVALUATION OF CRASH HISTORY ..... 9

    Key Features and Contributing Factors .....9

    Casualty Ratios .....9

    Significant Crash Patterns .....11

    Possible Causes of Significant Crash Patterns .....11

RECOMMENDATIONS .....16

## TRAFFIC AND SAFETY STUDY OF 8 MILE-BASELINE / MEADOWBROOK INTERSECTION

### EXECUTIVE SUMMARY

The intersection of 8 Mile-Baseline and Meadowbrook has long been controlled by a simple pre-timed, two-phase traffic signal wherein all movements on either road are shown a simultaneous green display. A 2006 signal timing optimization at this intersection assumed that the pre-existing two-phase operation would continue, and that the purpose of optimization was to minimize overall average intersection delay. Experience has shown, however, that these criteria do not adequately serve certain key movements, particularly eastbound left turns.

During the afternoon peak period, as many as ten left-turn vehicles have been observed waiting at the same time, with some taking as many as three cycles to complete their turn. At the busiest times, only two vehicles are able to turn left per cycle, typically at the end of the yellow and early in the red. Westbound through traffic at those times commonly continues through the intersection during all of the yellow and most or all of the all-red. Occasionally, the last eastbound left-turn vehicle turns after the end of the all-red interval – early in Meadowbrook’s green – thus delaying the latter approach and risking angle crashes.

Given the above observations, the City of Novi asked Clearzoning, Inc. to evaluate the intersection relative to both its peak-hour operations and its recent crash history. The operational evaluation found that:

- ❑ Eastbound left turns are now delayed an average of about 193 sec in the PM peak hour.
- ❑ Introducing an eastbound leading green would reduce that delay to only about 22 sec, while increasing overall average intersection delay by only 4.4 sec.
- ❑ Adding a westbound right-turn lane with overlap phasing (a green arrow) would reduce overall average intersection delay by 3-6 sec, effectively eliminating the 4.4-sec penalty for using a leading green eastbound. At the same time, this treatment would reduce the average delay for westbound right turns to only about 6 sec (from 33 sec).

Guidelines recommended by the Federal Highway Administration show that left-turn phasing (introduced via the cited leading green) is warranted from the standpoint of the conflicting traffic volumes, aggregate peak-hour left-turn delay, and crash experience.

The crash analysis found that Angle crashes comprise 46% of the intersection’s total crashes, a share 74% above-average for similar intersections in Southeast Michigan. This crash type was also found to have one of the highest Casualty Ratios, 0.323. Most of the crashes in this category were related to eastbound left turns; however, some were related to westbound right turns attempting to turn too fast and/or on a slippery surface.

Based on the findings of this study, Clearzoning recommends that the City arrange as soon as possible to revise the existing signal phasing to provide for an eastbound leading green. When the opportunity arises for more costly mitigation, it is further recommended that the signalization be upgraded to a fully-actuated box span, and that a westbound right-turn lane with a phasing overlap (green arrow) be added.

## INTRODUCTION

The intersection of 8 Mile-Baseline and Meadowbrook has long been controlled by a simple pre-timed, two-phase traffic signal wherein all movements on either road are shown a simultaneous green display. Three different timing plans are used between 6:00 a.m. and 11:00 p.m., seven days a week: one in the 6:00-9:00 a.m. peak period, one in the 3:00-7:00 p.m. peak period, and one in all other hours (flashing operation occurs overnight). An 80-sec cycle is used in the peak periods and a 70-sec cycle is used other times. The signal timing permit (Appendix A) lists different offsets by time period (or dial), indicating that this signal is coordinated with those to the east and west (Figures 1-2). The existing signal timing plan was “optimized” in 2006 as part of the RCOC Signal Timing Optimization Project (zone NO-1).

The 2006 signal timing optimization assumed that the pre-existing two-phase operation would continue, and that the purpose of optimization was to minimize overall average intersection delay. Experience has shown, however, that these criteria do not adequately serve certain key movements, particularly eastbound left turns. During the afternoon peak period, as many as ten left-turn vehicles have been observed waiting at the same time, with some taking as many as three cycles to complete their turn (Figures 3-6).

At the busiest times, only two vehicles are able to turn left per cycle, typically at the end of the yellow and early in the red. Westbound through traffic at those times commonly continues through the intersection during all of the yellow and most or all of the all-red. Occasionally, the last eastbound left-turn vehicle turns after the end of the all-red interval – early in Meadowbrook’s green – thus delaying the latter approach and risking angle crashes.

Given the above observations, the City of Novi asked Clearzoning, Inc. to evaluate the intersection relative to both its peak-hour operations and its recent crash history. The safety evaluation consisted on expanding the previously available crash history to cover all of the past seven years (2006-2012), examining in detail the characteristics of the documented crashes, and applying the diagnostic methodology previously used in Birchler Arroyo’s Citywide Phase 2 Crash Study (as presented in the report entitled *Crash-Data-Assisted Safety Evaluation of 12 Intersections in the City of Novi*, June 2012).

## EVALUATION OF PEAK-HOUR TRAFFIC OPERATIONS

### Traffic Counts and Signal Timing

Clearzoning made manual turning-movement counts of the subject intersection during the 7:00-9:00 a.m. and 4:00-6:00 p.m. peak periods of Tuesday, April 23, 2013. The weather was mostly cloudy and seasonably cool. These counts are both summarized and detailed in Appendix A. The respective peak hours were found to be 7:30-8:30 a.m. and 4:45-5:45 p.m.

The current signal timing permit (Appendix B) was obtained from the Wayne County Department of Public Services. As indicated above, this plan was last optimized seven years ago.



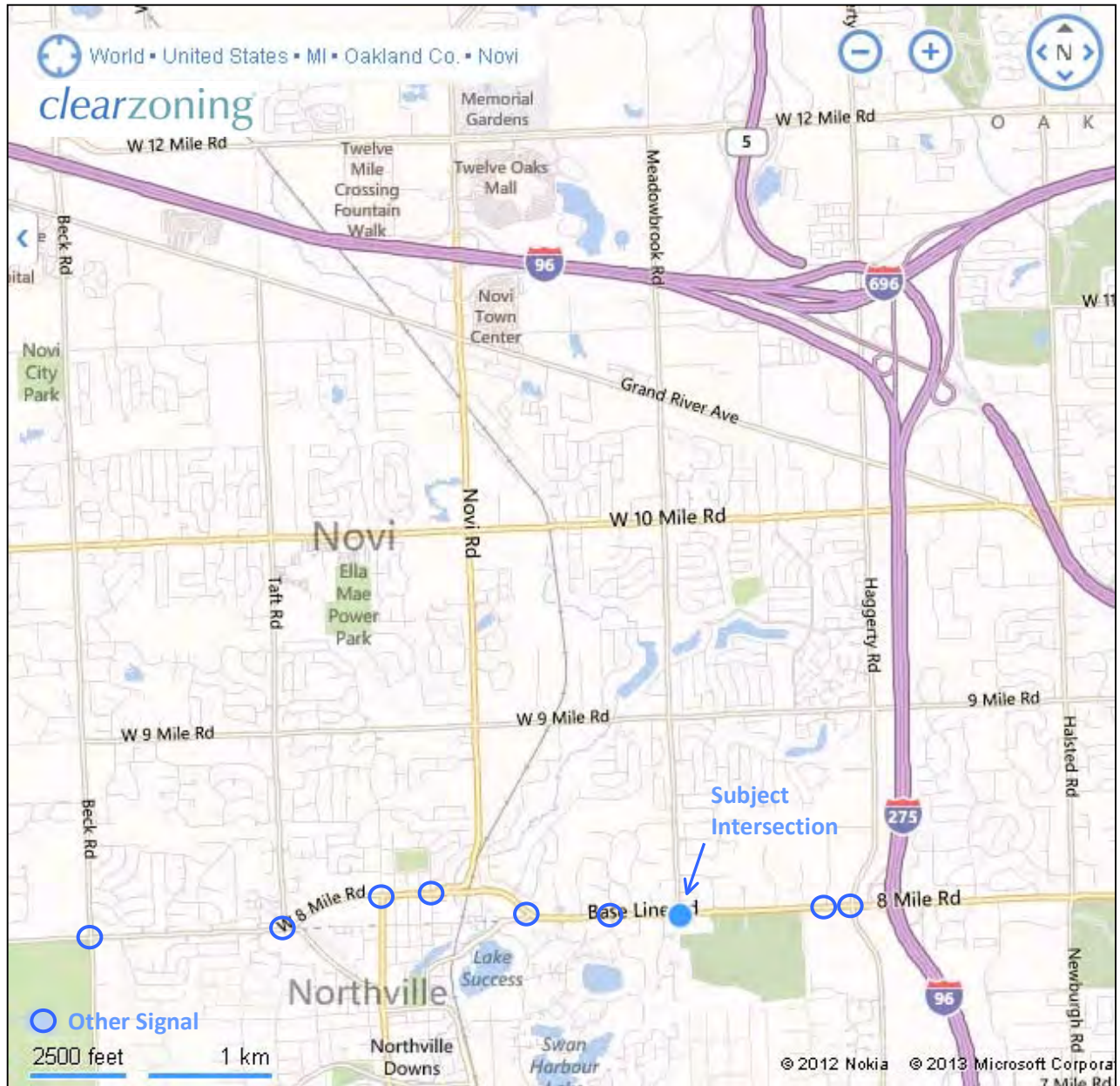


Figure 1. Vicinity Map

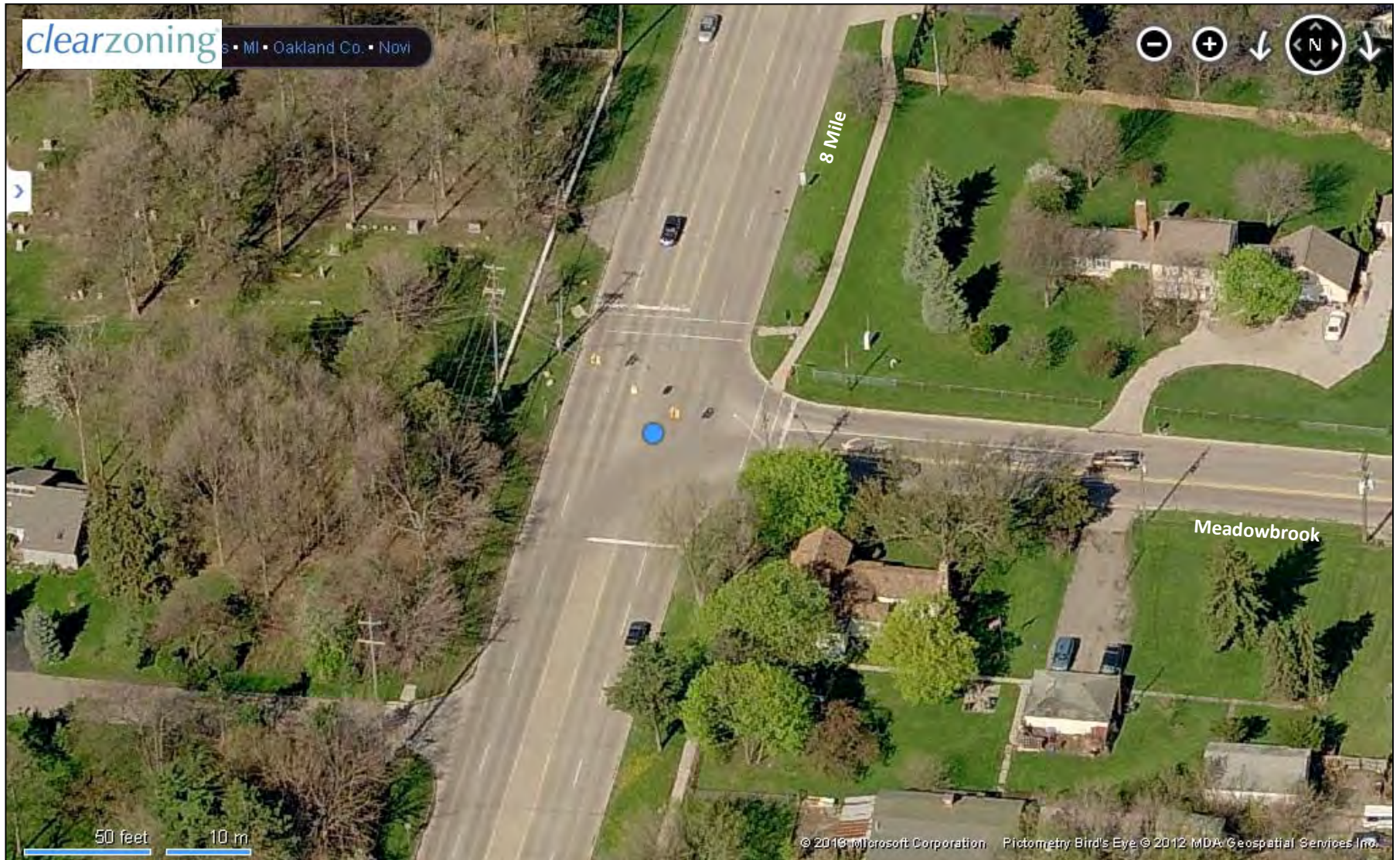


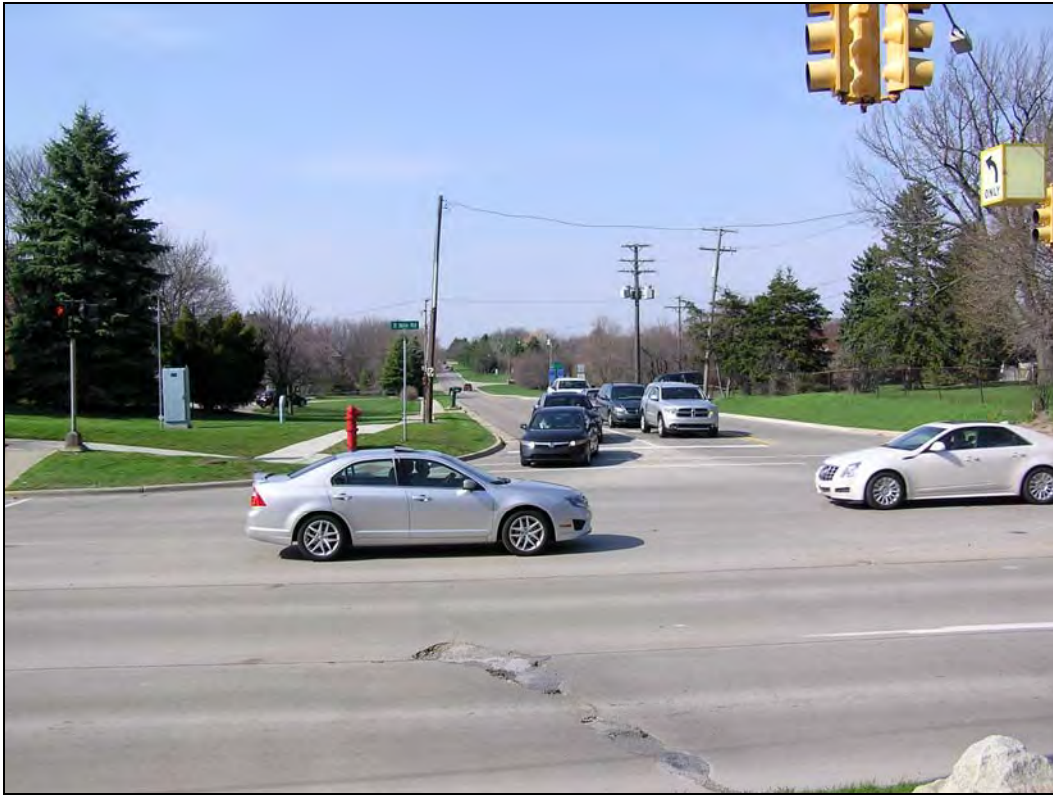
Figure 2. Birdseye Aerial View of 8 Mile and Meadowbrook Intersection



**Figure 3. EB Left -Turn Back Ups Are Often 5-10 Cars Long in PM Peak Hour**



**Figure 4. EB Lefts Waiting in Intersection to Turn on Red Often Delay SB Lefts**



**Figure 5. EB Lefts Waiting for Next Cycle to Turn Often Block Near Crosswalk**



**Figure 6. WB Traffic Back-Ups Delay Right Turns onto Meadowbrook**

## Capacity Analysis of Alternative Intersection Signalization

Clearzoning applied its *Synchro 7* traffic model to evaluate the existing signal operation and four potential alternative plans, as follows:

- Pre-timed with leading green EB (existing lanes)
- Fully-actuated with leading green EB (existing lanes)
- Pre-timed with leading green EB and an added WB right-turn lane (with green arrow)
- Fully-actuated with leading green EB and an added WB right-turn lane (with green arrow)

The detailed Synchro printouts are presented in Appendix C. The key results, summarized in Table 1 (below) show that:

- Overall average intersection delay does not vary substantially across all of the plans evaluated, ranging from about 14-16 sec in the AM peak hour (level of service B) to about 22-27 sec in the PM peak hour (level of service C).
- The simple addition of a leading green eastbound (of 16 sec in the PM peak hour) would substantially reduce the eastbound average delay (to 21.6 sec from 192.7 sec), while only modestly increasing overall average intersection delay (to 27.2 sec from 22.8 sec). (Note: The optimized signal cycle in the PM peak hour under this alternative plan would be 90 sec long, representing a 10-sec increase that would have to also be added at other nearby intersections if coordination is to be maintained.)
- Converting to fully-actuated operation with a leading green eastbound would not further change peak-hour delays significantly; however, such operation would better serve traffic flows during off-peak hours.
- Adding a westbound right-turn lane, and equipping it with overlap phasing (a green arrow) that would permit this movement to move continuously while southbound Meadowbrook moves, would reduce the overall intersection delay in the PM peak hour by another 3.0 sec (fully-actuated) to 5.5 sec (pre-timed). Most benefiting would be westbound right-turn motorists, whose average delay would decrease to only 6 sec (from 33 sec).

## Evaluation of Criteria for Left-Turn Phasing

The Federal Highway Administration has recommended, and at least one local highway agency (RCOC) has adopted, specific quantitative criteria for determining when left-turn phasing should be provided. Table 2 (below) summarizes these criteria and shows that left-turn phasing is, indeed, warranted at 8 Mile-Baseline and Meadowbrook. The best method of implementing such phasing (here as well as at most tee intersections generally) would be to introduce a leading green in the direction of the critical left turn (as discussed above).

**Table 1. Levels of Service for Alternative Intersection Signalization<sup>1</sup>**

Configuration	Signalization	Approach	Movement	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
Existing	Existing Pre-Timed	Overall Intersection		14.9	B	22.8	C
		EB	L	9.5	A	192.7	F
			T	14.6	B	8.9	A
		WB	T + R	8.6	A	13.5	B
		SB	L	30.6	C	36.2	D
			R	22.4	C	28.6	C
	Pre-Timed with Leading Green EB	Overall Intersection		14.8	B	27.2	C
		EB	L	7.9	A	21.6	C
			T	13.8	B	7.8	A
		WB	T + R	13.7	B	33.3	C
		SB	L	26.1	C	48.9	D
			R	16.6	B	29.0	C
	Fully-Actuated with Leading Green EB	Overall Intersection		15.7	B	26.7	C
		EB	L	8.1	A	18.2	B
			T	16.0	B	7.5	A
		WB	T+ R	13.6	B	32.9	C
		SB	L	22.1	C	48.3	D
			R	15.7	B	28.8	C
With WB Right-Turn-Only Lane and Overlap Phasing (Green Arrow)	Pre-Timed with Leading Green EB	Overall Intersection		14.2	B	21.7	C
		EB	L	7.3	A	15.1	B
			T	13.8	B	7.8	A
		WB	T	12.9	B	29.1	C
			R	4.5	A	6.3	A
		SB	L	26.1	C	41.3	D
	R		16.6	B	23.9	C	
	Fully-Actuated with Leading Green EB	Overall Intersection		15.1	B	23.7	C
		EB	L	7.7	A	15.8	B
			T	16.0	B	8.9	A
		WB	T	13.1	B	31.5	C
			R	3.7	A	5.2	A
SB		L	22.1	C	46.1	D	
	R	15.7	B	26.9	C		

<sup>1</sup> See Synchro printouts in Appendix C.

**Table 2. Evaluation of Left-Turn Phase Criteria<sup>1</sup>**

Criterion	Evaluation														
<p><b>Volume</b> Product of left-turn volume and conflicting through volume in peak hour &gt; 100,000 for “four-lane” street? If so, “Consider left-turn phasing... further study is required.”</p>	<p>In PM peak hour, there are 119 EB left-turn vehicles, 1237 opposing through vehicles, and 253 opposing right-turn vehicles now sharing the outer through lane. Product 1 = <math>(119)(1237) = 147,203</math> and Product 2 = <math>(119)(1237+253) = 177,310</math>. Both are &gt; 100,000; hence, <b>criteria is satisfied.</b></p>														
<p><b>Delay</b> Left-turn delay on critical approach &gt; 2.0 vehicle-hours in peak hour? If so, install left-turn phasing.</p>	<p>Based on Synchro traffic modeling, delay on the critical EB approach in the PM peak hour now = <math>(192.7 \text{ sec/veh})(119 \text{ veh})/3600 \text{ sec/hr} = 6.4 \text{ veh-hrs} \gg 2.0</math>; hence, <b>delay-based criterion indicates need for LT phasing.</b></p>														
<p><b>Crash Experience</b> Left-turn crashes on critical approach &gt; 4 in one year or &gt; 6 in two years? If so, install left-turn phasing.</p>	<p>Left-turn crashes by year were as follows:</p> <table border="1" data-bbox="727 835 1289 898"> <thead> <tr> <th><u>2012</u></th> <th><u>2011</u></th> <th><u>2010</u></th> <th><u>2009</u></th> <th><u>2008</u></th> <th><u>2007</u></th> <th><u>2006</u></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2</td> <td>2</td> <td>3</td> <td>3</td> <td>3</td> <td>6</td> </tr> </tbody> </table> <p>Hence, <b>crash-based criterion indicates need for LT phasing.</b></p>	<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>	<u>2008</u>	<u>2007</u>	<u>2006</u>	1	2	2	3	3	3	6
<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>	<u>2008</u>	<u>2007</u>	<u>2006</u>									
1	2	2	3	3	3	6									

<sup>1</sup> Recommended in FHWA’s *Traffic Control Devices Handbook* (and adopted by the RCOC’s Traffic-Safety Department).

## EVALUATION OF CRASH HISTORY

Both a tabular summary and individual (UD-10) police reports were obtained from the Traffic Improvement Association (TIA) for the subject intersection. Those obtained in Birchler Arroyo's Citywide Phase 1 Crash Study – for 2006-2010 – were supplemented by new data acquired for 2011-2012.

### Key Features and Contributing Factors

Appendix Table D-1 lists the key features of the revised 73-crash data base, including each event's date, time of day, distance from the 8 Mile/Meadowbrook intersection, crash type, crash severity, and potential contributing factors (gleaned mostly from the crash diagram and accompanying narrative). Frequencies shown at the bottom of the table indicate that:

- ❑ 67 of the crashes were likely intersection-related (i.e., six crashes were clearly *not* related, such as a deer accident north of 8 Mile).
- ❑ The most common crash types were Angle (31 crashes, or 46%) and Rear-End (24 crashes, or 36%). A large share of the Angle crashes – 20 – appear to have involved eastbound left turns.
- ❑ Another fairly common crash type involved westbound right turns, many appearing to be due to those turns being attempted at too high of a speed and/or on slippery pavement (11 crashes, or 16%).
- ❑ Slippery pavement generally was cited in 21 of the intersection-related crashes (31%). However, it should be noted that other (undocumented) contributing factors may have interacted with pavement condition to result in the reported crashes.

### Casualty Ratios

Table 3 (below) shows the number of intersection-related crashes by type and severity, along with the Casualty Ratio of each crash type. Casualty Ratio is the number of (F + A + B + C) injury crashes divided by the total number of crashes. Of particular interest is the relatively high Casualty Ratio found for Angle crashes, 0.323. This reflects both the nature of the typical angle impact and the relatively high speeds on 8 Mile road.

The similarly high ratio for Single-Vehicle crashes, on the other hand, largely reflects the statistical influence of the one reported fatal accident. That accident involved a 21-year-old driver running off the north side of the road 186 ft east of Meadowbrook at about 8:00 p.m. on October 24, 2007, where a tree was struck. A blood test on the driver showed negligible alcohol. Lacking additional detailed information, this crash has been attributed to the subject intersection (e.g., the driver may have been avoiding a rear-end collision with a vehicle slowing or stopped for the signal).



**Table 3. Casualty Ratio by Crash Type at 8 Mile and Meadowbrook**

Crash Type	Total Crashes	Crashes by Severity, 2006-2012					Casualty Ratio
		F	A	B	C	PDO	
Single-Vehicle	6	1	0	0	1	4	0.333
Head-On & SS/OD	4	0	0	0	0	4	0.000
Head-Left/Rear-Left	0	0	0	0	0	0	0.000
Angle	31	0	0	6	4	21	0.323
Rear-End/Rear-Right & SS/SD	26	0	0	2	4	20	0.231
Other/Unknown	0	0	0	0	0	0	0.000
All	67	1	0	8	9	49	0.269
	100%	1%	0%	12%	13%	73%	

## Significant Crash Patterns

The worksheet used in Birchler Arroyo's Citywide Phase 2 Crash Study for identifying and prioritizing crash patterns was applied in the current study to the 8 Mile/Meadowbrook intersection. Table 4 (below) lists the number and percent of crashes by type; comparison statistics for similar intersections elsewhere in Southeast Michigan; an indication of whether or not this intersection is over-represented with respect to certain crash types; and where it is, an appropriate Severity Rating (the Casualty Ratio from Table 3) and the resulting Pattern Priority Index (PPI). As the PPI has been defined in the table, the lower its value, the higher the priority should be for attempting to mitigate the associated crash type.

Noteworthy is the fact that Single-Vehicle crashes are over-represented at the subject intersection by a factor of 2.18, and Angle crashes are over-represented by a factor of 1.74. Also significant is the fact that both of these over-represented crash types have relatively high Casualty Ratios: 0.333 and 0.323, respectively.

As can be seen in Table 4, relatively low values of PPI were therefore found for both of the two significant crash patterns: 13.8 for Single-Vehicle crashes and 17.8 for Angle crashes. As can be further seen in Table 5, there were relatively few PPI values of this general size among the 12 high-crash/high-crash-severity intersections evaluated in the Phase 2 Crash Study. Even though the 8 Mile/Meadow-brook intersection did not qualify for consideration in that earlier study, the current study shows that it has two of the higher-priority significant crash patterns discovered to-date.

## Possible Causes of Significant Crash Patterns

The worksheet used in Birchler Arroyo's Citywide Phase 2 Crash Study for identifying possible causes of significant crash patterns was re-applied in the current study. Table 6 (below) lists eight possible causes for over-represented Angle crashes: Excessive Speed; Restricted Sight Distance; Slippery Surface; Inadequate Signal Change Interval; Poor Visibility of Traffic Signal; Unexpected/Unnecessary Stops Due to Signal; Unsafe Right-Turns-on-Red; and Proper Stopping Position Unclear. In this case, there were no multiple significant crash patterns to evaluate. (Note: The original worksheet did not include Single-Vehicle crashes as a pattern, or Absence of Warranted Left-Turn Signal Phasing as a possible cause, and these items have not been added.)

Table 7 lists each of the above eight possible causes and offers commentary on how these general causes may apply to this particular intersection. Of particular interest are the comments shown in red, which basically indicate that:

- Signal back plates may have made a difference in at least three crashes.
- The lack of both eastbound left-turn phasing and a westbound right-turn lane results in unnecessary stops (often in awkward locations, such as within the intersection); higher-speed turns; and excessive angle crashes.

**Table 4. Crash Pattern Identification and Prioritization at 8 Mile and Meadowbrook**Average Daily Traffic (ADT): [21,776](#) (2011-2012<sup>1</sup>)

Evaluation Criteria		Possible Crash Pattern									
		Single-Vehicle		Head-On & SS/OD		Head-Left/Rear-Left		Angle		Rear-End/Rear-Right & SS/SD	
Location's Crashes	No. by Type / Total No.	6	67	4	67	0	67	31	67	26	67
	Location's %	9.0		6.0		0.0		46.3		38.8	
Regional Crash % <sup>2</sup>	Table 4.1. Area Type: <a href="#">Urban</a>	4.2		5.3		11.3		26.2		42.6	
	Table 4.2. Functional Class: <a href="#">Arterial</a>	4.2		5.3		11.4		26.0		42.7	
	Table 4.3. No. of Lanes: <a href="#">2</a>	4.1		5.4		10.0		28.2		40.5	
	Table 4.4. Signal <a href="#">X</a> / No Signal <a href="#">__</a>	3.9		5.3		11.6		26.0		42.7	
Significant Pattern?	Enter YES if Location's % Exceeds at Least One of the Above Regional %s	YES		YES				YES			
Pattern Priority <sup>3</sup>	Average Regional % <sup>4</sup>	4.1		5.3				26.6			
	Over-Representation Ratio (ORR) = Location's % / Average Regional %	2.18		1.12				1.74			
	Severity Weighting (SW) = Casualty Ratio	0.333		0.000				0.323			
	Pattern Priority Index (PPI) = 10 / (ORR x SW)	13.7		-				17.8			
Relative Priority		2		3				1			

<sup>1</sup> See Table A-9 in BA/Clearzoning's January 2012 report *Identification of High-Crash Intersections in the City of Novi, 2006-2010*.<sup>2</sup> From *SEMCOG Traffic Safety Manual - 2nd Edition, 1997*.<sup>3</sup> Highlight, and then average, only those regional %s which are less than the location's %. This is necessary to guarantee an ORR greater than 1.0.<sup>4</sup> Complete this block only for significant patterns.

Note: "Other &amp; Uncoded" collision types not listed here, so %s may not add to 100.

**Table 5. Crash Pattern Priority Indices for Selected Novi Intersections<sup>1</sup>**

Intersection	PPI Values for Significant Crash Patterns				
	Single-Vehicle	Head-On & SS/OD	Head-Left/ Rear-Left	Angle	Rear-End/Rear- Right & SS/SD
<b>Previously Found to be High-Crash</b>					
Haggerty & 14 Mile				58.6	60.2
Haggerty & 12 Mile					60.4
Haggerty & Gr. River					42.9
Haggerty & 8 Mile	21.2		<b>13.9</b>		68.0
M-5 & 14 Mile	50.3				51.4
Novi & 12 Mile					40.4
Novi & Grand River					39.8
Novi & 10 Mile		79.6		51.3	40.1
Beck & Pontiac Trail		69.7	36.0	57.0	
Beck & Grand River	52.8				44.8
Beck & 8 Mile			<b>13.1</b>		22.7
<b>Previously Found to be High-Crash-Severity</b>					
Napier & 10 Mile	<b>18.3</b>	<b>9.4</b>		<b>11.3</b>	
<b>Intersection Now Under Study</b>					
Meadowbrook & 8 Mile	<b>13.7</b>			<b>17.8</b>	

<sup>1</sup> The Pattern Priority Index (PPI) = 10 / (ORR x SW), where ORR = Over-Representation Ratio and SW = Severity Weighting. The lower the PPI value, the higher the priority that should be assigned to mitigating the intersection's crashes. The highest priority PPI values (i.e., those under 20) are bolded in red for emphasis.

**Table 6. Possible Causes for Multiple-Vehicle Crash Patterns at 8 Mile and Meadowbrook**

Possible Cause	Crash Pattern					
	Head-On & SS/OD	Head-Left/ Rear-Left	Angle		Rear-End/Rear-Right & SS/SD	
			Signal	No Signal	Signal	No Signal
<b>Pattern Priority Index (PPI)</b>			<b>17.8</b>			
<b>Excessive Speed</b>	o	o	o	o	o	o
<b>Restricted Sight Distance</b>	o	o	o	o		o
<b>Slippery Surface</b>			o	o	o	o
Narrow Lanes	o				o	o
<b>Inadequate Signal Change Interval</b>		o	o			
Turning Vehicles Slowing or Stopping in Through Lanes					o	o
Unexpected Slowing and Lane Changing					o	o
<b>Poor Visibility of Traffic Signal</b>			o		o	
<b>Unexpected/Unnecessary Stops Due to Signal</b>			o		o	
<b>Unsafe Right-Turns-on-Red</b>			o		o	
Crossing Pedestrians					o	o
Poor Visibility of STOP/YIELD Signs				o		o
<b>Proper Stopping Position Unclear</b>			o	o		
Inadequate Pavement Markings	o					
Inadequate Roadway Shoulders	o					
Inadequate Maintenance	o					
Severe Curves	o					
Inadequate Gaps in Oncoming Traffic		o				
Inadequate Signalization for Left-Turn Volume		o				
Inadequate Gaps for Turning and Accelerating						o
Unexpected Cross Traffic				o		

Note: Significant crash patterns are those for which a PPI value is listed and bulleted cells underneath are shaded. The highest priority crash pattern is the one with the lowest PPI value and bolded column heading; higher-priority possible causes are those associated with either this pattern or multiple significant crash patterns. Such higher-priority possible causes are bolded here as well as separately tabled.

**Table 7. Higher-Priority Possible Causes for Crash Patterns at 8 Mile and Meadowbrook**

Crash Pattern	Possible Cause	Applicable? (Step 7)		Comments
		Yes	No	
Causes Associated with Highest Priority Pattern (Step 3)				
Angle	<b>Excessive Speed</b>		X	No evidence of a speeding problem.
	<b>Restricted Sight Distance</b>		X	Not an issue for reported angle crashes.
	<b>Slippery Surface</b>		X	Not an issue for reported angle crashes.
	<b>Inadequate Signal Change Interval</b>		X	No – MDOT guidelines are met: Yellow 3.5 sec on 30-mph Meadowbrook and 4.3 sec on 45-mph Baseline, and All-Red 2.5 sec for 90 ft of travel on 30-mph Meadowbrook and 1.8 sec for 100 ft of travel on 45-mph Baseline (eastbound).
	<b>Poor Visibility of Traffic Signal</b>			It appears that no more than about 3 of the 24 rear-end crashes may have been due to poor signal visibility (assuming those citing slippery pavement to be unrelated). However, <b>given the east-west orientation of Baseline, signal back plates would be beneficial and are now standard for a 45-mph major road.</b>
	<b>Unexpected/Unnecessary Stops Due to Signal</b>			<b>The lack of EB left-turn phasing substantially increases the risk of angle crashes (which are over-represented by 74%). Also, the lack of right-turn overlap phasing for WB right turns encourages higher-speed turns and more collisions with SB left-turn traffic.</b>
	<b>Unsafe Right-Turns-on-Red</b>			Not an issue for reported angle crashes.
	<b>Proper Stopping Position Unclear</b>			<b>The lack of EB left-turn phasing, along with significant red-light running WB, results in EB left-turn vehicles often becoming stranded in the intersection, where they occasionally impede SB traffic when it receives the green. At the busiest times, only 2 vehicles are able to turn left at the end of the cycle.</b>
Causes Associated with Multiple Crash Patterns (Step 4)				
Not applicable.				

Note: Step numbers refer to procedural steps described on pages 4-32 and 4-33 of the *SEMCOG Traffic Safety Manual – 2<sup>nd</sup> Edition, 1997*.

## **RECOMMENDATIONS**

Based on the findings of this study, Clearzoning recommends that the City arrange as soon as possible to revise the existing signal phasing to provide for an eastbound leading green. When the opportunity arises for more costly mitigation, it is further recommended that the signalization be upgraded to a fully-actuated box span, and that a westbound right-turn lane with a phasing overlap (green arrow) be added.

**SUPPLEMENTAL PROFESSIONAL ENGINEERING SERVICES AGREEMENT**

**MEADOWBROOK AND EIGHT MILE SIGNAL  
MODERNIZATION AND RECONSTRUCTION**

This Agreement shall be considered as made and entered into as of the date of the last signature hereon, and is between the City of Novi, 45175 W. Ten Mile Road, Novi, MI 48375-3024, hereafter, "City," and Orchard, Hiltz & McCliment, Inc., whose address is 34000 Plymouth Road, Livonia, Michigan 48150, hereafter, "Consultant."

**RECITALS:**

This Agreement shall be supplemental to, and hereby incorporates the terms and conditions of the AGREEMENT FOR PROFESSIONAL ENGINEERING SERVICES FOR PUBLIC PROJECTS, and attached exhibits, entered into between the City and the Consultant on December 18, 2012.

The project includes the design and the preparation of plans and specifications for the removal and replacement of the existing traffic signal. The design will involve upgrading the traffic signals to a box span configuration, adding permissive-protected left-turn phasing for eastbound Eight Mile Road, installing countdown pedestrian signals, adding a right turn lane to westbound Eight Mile Road at Meadowbrook and other improvements as required by the Wayne County Department of Public Services.

NOW, THEREFORE, in consideration of the foregoing, the City and Consultant agree as follows:

**Section 1. Professional Engineering Services.**

For and in consideration of payment by the City as provided under the "Payment for Engineering Services" section of this Agreement, Consultant shall perform the work described in the manner provided or required by the following Scope of Services, which is attached to and made a part of this Agreement as Exhibit A, all of said services to be done in a competent, efficient, timely, good and workmanlike manner and in compliance with all terms and conditions of this Agreement.

Exhibit A                      Scope of Services

**Section 2. Payment for Professional Engineering Services.**

1. Basic Fee.

- a. Design Phase Services: The Consultant shall complete the design phase services as described herein for a lump sum fee of \$13,006, which is 9.0 % of the estimated construction cost (\$144,520) as indicated on the design and construction engineering fee curve provided in Exhibit B of the Agreement for Professional Engineering Services for Public Projects.



- b. Construction Phase Services will be awarded at the time of construction award, should it occur.

2. Payment Schedule for Professional Engineering Services Fee.

Consultant shall submit monthly statements for professional engineering services rendered. The statements shall be based on Consultant's estimate of the proportion of the total services actually completed for each task as set forth in Exhibit A at the time of billing. The City shall confirm the correctness of such estimates, and may use the City's own engineer for such purposes. The monthly statements should be accompanied by such properly completed reporting forms and such other evidence of progress as may be required by the City. Upon such confirmation, the City shall pay the amount owed within 30 days.

Final billing under this agreement shall be submitted in a timely manner but not later than three (3) months after completion of the services. Billings for work submitted later than three (3) months after completion of services will not be paid. Final payment will be made upon completion of audit by the City.

3. Payment Schedule for Expenses.

All expenses required to complete the scope of services described herein, including but not limited to costs related to mileage, vehicles, reproduction, computer use, etc., shall be included in the basic fee and shall not be paid separately. However, as compensation for expenses that are not included in the standard scope of services, when incurred in direct connection with the project, and approved by the City, the City shall pay the Consultant its actual cost times a factor of 1.15.

**Section 4. Ownership of Plans and Documents; Records.**

1. Upon completion or termination of this agreement, all documents prepared by the Consultant, including tracings, drawings, estimates, specifications, field notes, investigations, studies, etc., as instruments of service shall become the property of the City.

2. The City shall make copies, for the use of the Consultant, of all of its maps, records, laboratory tests, or other data pertinent to the work to be performed by the Consultant under this Agreement, and also make available any other maps, records, or other materials available to the City from any other public agency or body.

3. The Consultant shall furnish to the City, copies of all maps, records, field notes, and soil tests that were developed in the course of work for the City and for which compensation has been received by the Consultant.

**Section 5. Termination.**

1. This Agreement may be terminated by either party upon 7- days' prior written notice to the other party in the event of substantial failure by the other party to fulfill its obligations under this agreement through no fault of the terminating party.

2. This Agreement may be terminated by the City for its convenience upon 90 days' prior written notice to the Consultant.

3. In the event of termination, as provided in this Article, the Consultant shall be paid as compensation in full for services performed to the date of that termination, an amount calculated in accordance with Section 2 of this Agreement. Such amount shall be paid by the City upon the Consultant's delivering or otherwise making available to the City, all data, drawings, specifications, reports, estimates, summaries, and that other information and materials as may have been accumulated by the Consultant in performing the services included in this Agreement, whether completed or in progress.

**Section 6. Disclosure.**

The Consultant affirms that it has not made or agreed to make any valuable gift whether in the form of service, loan, thing, or promise to any person or any of the person's immediate family, having the duty to recommend, the right to vote upon, or any other direct influence on the selection of consultants to provide professional engineering services to the City within the two years preceding the execution of this Agreement. A campaign contribution, as defined by Michigan law shall not be considered as a valuable gift for the purposes of this Agreement.

**Section 7. Insurance Requirements.**

1. The Consultant shall maintain at its expense during the term of this Agreement, the following insurance:

- A. Worker's Compensation insurance relative to all Personnel engaged in performing services pursuant to this Agreement, with coverage not less than that required by applicable law.
- B. Comprehensive General Liability insurance with maximum bodily injury limits of \$1,000,000 (One Million Dollars) each occurrence and/or aggregate and minimum Property Damage limits of \$1,000,000 (One Million Dollars) each occurrence and/or aggregate.
- C. Automotive Liability insurance covering all owned, hired, and non-owned vehicles with Personal Protection insurance to comply with the provisions of the Michigan No Fault Insurance Law including Residual Liability insurance with minimum bodily injury limits of \$1,000,000 (One Million Dollars) each occurrence and/or aggregate minimum property damage limits of \$1,000,000 (One Million Dollars) each occurrence and/or aggregate.
- D. The Consultant shall provide proof of Professional Liability coverage in the amount of not less than \$1,000,000 (One Million Dollars) per occurrence and/or aggregate, and Environmental Impairment coverage.

2. The Consultant shall be responsible for payment of all deductibles contained in any insurance required hereunder.

3. If during the term of this Agreement changed conditions or other pertinent factors should in the reasonable judgment of the City render inadequate insurance limits, the Consultant will furnish on demand such additional coverage as may reasonably be required under the circumstances. All such insurance shall be effected at the Consultant's expense, under valid and enforceable policies, issued by the insurers of recognized responsibility which are well-rated by national rating organizations and are acceptable to the City.

4. All policies shall name the Consultant as the insured and shall be accompanied by a commitment from the insurer that such policies shall not be canceled or reduced without at least thirty (30) days prior notice to the City.

With the exception of professional liability, all insurance policies shall name the City of Novi, its officers, agents, and employees as additional insured. Certificates of Insurance evidencing such coverage shall be submitted to Sue Morianti, Purchasing Manager, City of Novi, 45175 West Ten Mile Road, Novi, MI 48375-3024 prior to commencement of performance under this Agreement and at least fifteen (15) days prior to the expiration dates of expiring policies.

5. If any work is sublet in connection with this Agreement, the Consultant shall require each subconsultant to effect and maintain at least the same types and limits of insurance as fixed for the Consultant.

6. The provisions requiring the Consultant to carry said insurance shall not be construed in any manner as waiving or restricting the liability of the Consultant under this Agreement.

**Section 8. Indemnity and Hold Harmless.**

A. The Consultant agrees to indemnify and hold harmless the City, its elected and appointed officials and employees, from and against any and all claims, demands, suits, losses and settlements, including actual attorney fees incurred and all costs connected therewith, for any damages which may be asserted, claimed or recovered against the City by reason of personal injury, death and/or property damages which arises out of or is in any way connected or associated with the actions or inactions of the Consultant in performing or failing to perform the work.

The Consultant agrees that it is its responsibility and not the responsibility of the City to safeguard the property and materials used in performing this Agreement. Further, this Consultant agrees to hold the City harmless for any loss of such property and materials used pursuant to the Consultant's performance under this Agreement.

**Section 9. Nondiscrimination.**

The Consultant shall not discriminate against any employee, or applicant for employment because of race, color, sex, age or handicap, religion, ancestry, marital status, national origin, place of birth, or sexual preference. The Consultant further covenants that it will comply with the Civil Rights Act of 1973, as amended; and the Michigan Civil Rights Act of 1976 (78. Stat. 252 and 1976 PA 4563) and will require a similar covenant on the part of any consultant or subconsultant employed in the performance of this Agreement.

**Section 10. Applicable Law.**

This Agreement is to be governed by the laws of the State of Michigan and the City of Novi Charter and Ordinances.

**Section 11. Approval; No Release.**

Approval of the City shall not constitute nor be deemed release of the responsibility and liability of Consultant, its employees, associates, agents and subconsultants for the accuracy and competency of their designs, working drawings, and specifications, or other documents and services; nor shall that approval be deemed to be an assumption of that responsibility by the City for any defect in the designs, working drawings and specifications or other documents prepared by Consultant, its employees, subconsultants, and agents.

After acceptance of final plans and special provisions by the City, Consultant agrees, prior to and during the construction of this project, to perform those engineering services as may be required by City to correct errors or omissions on the original plans prepared by Consultant and to change the original design as required.

**Section 12. Compliance With Laws.**

This Contract and all of Consultants professional services and practices shall be subject to all applicable state, federal and local laws, rules or regulations, including without limitation, those which apply because the City is a public governmental agency or body. Consultant represents that it is in compliance with all such laws and eligible and qualified to enter into this Agreement.

**Section 13. Notices.**

Written notices under this Agreement shall be given to the parties at their addresses on page one by personal or registered mail delivery to the attention of the following persons:

City: Rob Hayes, P.E., Director of Public Services and Maryanne Cornelius, Clerk, with a copy to Thomas R. Schultz, City Attorney

Consultant: James Stevens, P.E.

**Section 14. Waivers.**

No waiver of any term or condition of this Agreement shall be binding and effective unless in writing and signed by all parties, with any such waiver being limited to that circumstance only and not applicable to subsequent actions or events.

**Section 15. Inspections, Notices, and Remedies Regarding Work.**

During the performance of the professional services by Consultant, City shall have the right to inspect the services and its progress to assure that it complies with this Agreement. If such inspections reveal a defect in the work performed or other default in this Agreement, City

shall provide Consultant with written notice to correct the defect or default within a specified number of days of the notice. Upon receiving such a notice, Consultant shall correct the specified defects or defaults within the time specified. Upon a failure to do so, the City may terminate this Agreement by written notice and finish the work through whatever method it deems appropriate, with the cost in doing so being a valid claim and charge against Consultant; or, the City may preserve the claims of defects or defaults without termination by written notice to Consultant.

All questions which may arise as to the quality and acceptability of work, the manner of performance and rate of progress of the work, and the interpretation of plans and specifications shall be decided by the City. All questions as to the satisfactory and acceptable fulfillment of the terms of this agreement shall be decided by the City.

**Section 16. Delays.**

No charges or claims for damages shall be made by the Consultant for delays or hindrances from any cause whatsoever during the progress of any portions of the services specified in this agreement, except as hereinafter provided.

In case of a substantial delay on the part of the City in providing to the Consultant either the necessary information or approval to proceed with the work, resulting, through no fault of the Consultant, in delays of such extent as to require the Consultant to perform its work under changed conditions not contemplated by the parties, the City will consider supplemental compensation limited to increased costs incurred as a direct result of such delays. Any claim for supplemental compensation must be in writing and accompanied by substantiating data.

When delays are caused by circumstances or conditions beyond the control of the Consultant as determined by the City, the Consultant shall be granted an extension of time for such reasonable period as may be mutually agreed upon between the parties, it being understood, however, that the permitting of the Consultant to proceed to complete the services, or any part of them, after the date to which the time of completion may have been extended, shall in no way operate as a waiver on the part of the City of any of its rights herein set forth.

**Section 17. Assignment.**

No portion of the project work, heretofore defined, shall be sublet, assigned, or otherwise disposed of except as herein provided or with the prior written consent of the City. Consent to sublet, assign, or otherwise dispose of any portion of the services shall not be construed to relieve the Consultant of any responsibility for the fulfillment of this agreement.

**Section 18. Dispute Resolution.**

The parties agree to try to resolve any disputes as to professional engineering services or otherwise in good faith. In the event that the parties cannot resolve any reasonable dispute, the parties agree to seek alternative dispute resolution methods agreeable to both parties and which are legally permissive at the time of the dispute. The parties agree to use their best efforts to resolve any good faith dispute within 90 (ninety) days notice to the other party. In the event the parties cannot resolve that dispute as set forth above, they may seek such remedies as may be permitted by law.

WITNESSES

Orchard, Hiltz & McCliment, Inc.

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
By:  
Its:

The foregoing \_\_\_\_\_ was acknowledged before me this \_\_\_\_ day of \_\_\_\_\_,  
20\_\_\_\_, by \_\_\_\_\_ on behalf of  
\_\_\_\_\_.

\_\_\_\_\_  
Notary Public  
\_\_\_\_\_ County, Michigan  
My Commission Expires: \_\_\_\_\_

WITNESSES

CITY OF NOVI

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
By: Robert J. Gatt  
Its: Mayor

The foregoing \_\_\_\_\_ was acknowledged before me this \_\_\_\_ day of \_\_\_\_\_,  
20\_\_\_\_, by \_\_\_\_\_ on behalf of the City of Novi.

\_\_\_\_\_  
Notary Public  
Oakland County, Michigan  
My Commission Expires: \_\_\_\_\_

## **EXHIBIT A - SCOPE OF SERVICES**

Consultant shall provide the City professional engineering services in all phases of the Project to which this Agreement applies as hereinafter provided. These services will include serving as the City's professional engineering representative for the Project, providing professional engineering consultation and advice and furnishing customary civil, structural, mechanical and electrical engineering services and customary engineering services incidental thereto, as described below.

### **A. Basic Services.**

[see attached]

### **B. Performance.**

1. The Consultant agrees that, immediately upon the execution of this Agreement, it will enter upon the duties prescribed in this agreement, proceed with the work continuously, and make the various submittals on or before the dates specified in the attached schedule. The City is not liable and will not pay the Consultant for any services rendered before written authorization is received by the Consultant.
2. The Consultant shall submit, and the City shall review and approve a timeline for submission of plans and/or the completion of any other work required pursuant to this Scope of Services. The Consultant shall use its best efforts to comply with the schedule approved by the City.
3. If any delay is caused to the Consultant by order of the City to change the design or plans; or by failure of the city to designate right-of-way, or to supply or cause to be supplied any data not otherwise available to the Consultant that is required in performing the work described; or by other delays due to causes entirely beyond the control of the Consultant; then, in that event, the time schedules will be adjusted equitably in writing, as mutually agreed between the City and the Consultant at the moment a cause for delay occurs.
4. Since the work of the Consultant must be coordinated with the activities of the City (including firms employed by and governmental agencies and subdivisions working with the City), the Consultant shall advise the City in advance, of all meetings and conferences between the Consultant and any party, governmental agency, political subdivision, or third party which is necessary to the performance of the work of the Consultant.

## EXHIBIT A - Scope of Services

### Meadowbrook and 8 Mile Box Span Signal Upgrade

Orchard, Hiltz & McCliment, Inc. is pleased to provide engineering services to the City of Novi. We understand that the City wishes to upgrade the traffic signal at the intersection of Meadowbrook and Eight Mile Road from an existing diagonal span to a box span and add a right turn lane to westbound Eight Mile Road at Meadowbrook Road. Pedestrian countdown signals will also be included in the project.

The scope of engineering services shall include the following tasks:

1. Conduct a site visit and offer recommendations for the proposed improvements (locations of signal poles, ped signals, push buttons).
2. Attend one meeting with City staff to finalize the specific improvements.
3. Prepare a preliminary opinion of probable construction costs for the selected improvements and adjust as necessary based upon available budget.
4. Coordinate with the City's Geotechnical Engineer on soil borings if applicable.
5. Perform Topographical survey of the project area as necessary based upon the selected improvements.
6. Attend one meeting with the City, Wayne County, and DTE to review the preliminary design and address any requested revisions.

The following services are not anticipated to be required for this project and have not included:

1. Permit or application fees
2. Coordination or design for utility relocations or repairs
3. Remediation or removal of contaminated or hazardous soils or materials

We can perform any of these above-mentioned services. In the event any of these services are required, an addendum to the supplemental engineering agreement will be submitted for your approval prior to performing said services.

Tentative Schedule:

Task	Completion
Authorization to proceed	by 31-May-13
Field meeting with WCDPS	by 21-Jun-13
Survey information	by 21-Jun-13
Preliminary design to WCDPS	by 5-Jul-13
WCDPS review of preliminary design	by 16-Aug-13
Final design to WCDPS	by 30-Aug-13
WCDPS review of final design	by 11-Oct-13
Bidding process	by 25-Oct-13
Award Job, Contractor NTP	by 11-Nov-13
Contractor submits shop drawings	by 22-Nov-13



Shop drawings approval	by	29-Nov-13
Install underground elements	by	25-Apr-14
Foundation pour and cure	by	23-May-14
Install poles, spans, signals, controller	by	6-Jun-14
Final cutover	by	20-Jun-14

ITEM CODE	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	COST
8190026	Conduit, DB, 1, 1 1/4 inch	Ft	480	\$ 7.50	\$ 3,600.00
8190032	Conduit, DB, 2, 3 inch	Ft	110	\$ 11.00	\$ 1,210.00
8190036	Conduit, DB, 3, 4 inch	Ft	25	\$ 45.00	\$ 1,125.00
8190260	Hh, Round	Ea	2	\$ 700.00	\$ 1,400.00
8190495	Wood Pole, Fit Up, Sec Cable Pole	Ea	1	\$ 500.00	\$ 500.00
8200020	Case Sign, Rem	Ea	1	\$ 75.00	\$ 75.00
8200030	Controller and Cabinet, Rem	Ea	1	\$ 150.00	\$ 150.00
8200045	Controller Fdn, Base Mount	Ea	1	\$ 2,000.00	\$ 2,000.00
8200051	GPS Module	Ea	1	\$ 850.00	\$ 850.00
8200135	Serv Disconnect	Ea	1	\$ 800.00	\$ 800.00
8200136	Serv Disconnect, Rem	Ea	1	\$ 100.00	\$ 100.00
8200141	Span Wire, Rem	Ea	1	\$ 150.00	\$ 150.00
8200145	Steel Pole, Rem	Ea	1	\$ 225.00	\$ 225.00
8200182	TS, Span Wire Mtd, Rem	Ea	2	\$ 80.00	\$ 160.00
8200180	TS, Pedestrian, Pedestal Mtd, Rem	Ea	2	\$ 75.00	\$ 150.00
8200181	TS, Pedestrian, Bracket Arm Mtd, Rem	Ea	1	\$ 87.00	\$ 87.00
8200339	TS, Pedestrian, Two Way Bracket Arm Mtd (LED) Countdown	Ea	4	\$ 1,250.00	\$ 5,000.00
8200110	Pedestal, Rem	Ea	2	\$ 100.00	\$ 200.00
8200106	Pedestal Fdn, Rem	Ea	2	\$ 200.00	\$ 400.00
8190254	Hh, Rem	Ea	2	\$ 130.00	\$ 260.00
8207050	_Controller and Cabinet, Digital Type Actuated, RCOC	Ea	1	\$ 1,500.00	\$ 1,500.00
8207050	_Pushbutton and Sign, RCOC	Ea	4	\$ 450.00	\$ 1,800.00
8207050	_Span Wire, Box, RCOC	Ea	1	\$ 1,500.00	\$ 1,500.00
8207050	_Strain Pole, Steel, Anchor Base, 30 foot, RCOC	Ea	4	\$ 3,000.00	\$ 12,000.00
8207050	_TS, One Way Span Wire Mtd, Three Sect (LED), RCOC	Ea	6	\$ 865.00	\$ 5,190.00
8207050	_TS, One Way Span Wire Mtd, Four Sect (LED), RCOC	Ea	1	\$ 950.00	\$ 950.00
8207050	_Bracket Arm, 18 foot, RCOC	Ea	2	\$ 750.00	\$ 1,500.00
8207050	_Pushbutton Support Post, RCOC	Ea	4	\$ 1,000.00	\$ 4,000.00
8207050	_Hh, Square, RCOC	Ea	1	\$ 1,500.00	\$ 1,500.00
8207050	_Controller and Cabinet, Digital Type Actuated, Delivered, RCOC	Ea	1	\$ 16,000.00	\$ 16,000.00
8207050	_Strain Pole, Steel, Anchor Fdn, RCOC	Ea	4	\$ 3,000.00	\$ 12,000.00
8207050	_Optical Priority Control System, RCOC	Ea	1	\$ 5,000.00	\$ 5,000.00
	Additional Right Turn Lane	LSUM	1	\$ 50,000.00	\$ 50,000.00

\$ 131,382.00

Contingency \$13,138.20

Construction Total \$ 144,520.20

Design Engineering \$ 13,006.82