



## CITY of NOVI CITY COUNCIL

**Agenda Item 4  
August 11, 2014**

**SUBJECT:** Approval to award a construction contract for the 2014 Chip Seal Program to Highway Maintenance and Construction, the low bidder, in the amount of \$250,630, subject to final review and approval of form of agreement by the City Manager's office and City Attorney; and approval of an additional appropriation in the amount of \$217,700 as a rollover from FY13-14 for this budget line item.

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

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

EXPENDITURE REQUIRED	\$ 250,630
AMOUNT BUDGETED	\$ 209,800 for 2015 Chip Seal Program
APPROPRIATION REQUIRED	\$ 217,700 (Rollover from FY13-14 for 2014 Chip Seal Program)
LINE ITEM NUMBER	203-203.00-866.500

### BACKGROUND INFORMATION:

As part of the City's ongoing asset management approach to maintaining roads, a report was recently completed by URS that evaluated the City's 6.7 miles of streets that have a chip sealed surface treatment. (Chip sealing is the application of an asphalt emulsion to seal the road's surface, followed by placement and compaction of small diameter crushed gravel.) The report identified \$806,200 of capital improvements necessary to improve and maintain the chip seal streets in good condition. The attached memo and report provide additional information regarding the evaluation and recommended improvements.

In anticipation of this report and the deferred capital maintenance on chip sealed roads, the approved FY2013-14 budget for annual local street capital preventative maintenance (CPM) was increased from \$50,000 to \$200,000 to include some chip seal improvements. The findings of the report show that a funding level of approximately \$200,000 each year specifically for chip seal CPM should be maintained through the FY2016-17 budget to make the necessary improvements to chip sealed roads to get them back into good condition. The report recommends an annual budget of \$90,000 beginning in FY2017-18 for routine maintenance, which includes crack sealing and patching in addition to reapplication of chip seal as needed to maintain the roads in good condition.

The scope of the 2014 Chip Seal Program includes CPM, such as drainage improvements, base repair and new chip seal on the following streets (see attached map):

- Buffington
- Henning
- Pembine
- Summit Ct.
- Summit Dr.
- Crown
- Pleasant Cove Dr.
- Shamrock Hill
- Shawood

One (1) bid was received and opened on July 30, 2014 following a public bid solicitation period. The only bidder was Highway Maintenance. Highway Maintenance's bid is recommended as being in the best interest of the City as it is responsive (i.e., Highway Maintenance has complied with all requirements of the bidding instructions). URS' recommendation letter including the bid tabulation is attached. Highway Maintenance's bid is shown below:

Contractor	Bid Price (including Crew Days)*
Highway Maintenance	\$ 260,870.00

\*Crew Days are included to compare bids, but are not included in the award.

Highway Maintenance has satisfactorily completed work for the City in the past, and is considered to be a prominent contractor to perform the chip seal work proposed for this project. Although only one bid was received, Highway Maintenance's bid has been determined to be acceptable after review of the unit costs in the bid as compared to industry standard costs. Only one item's unit cost (for "Ditching") appears to be abnormally high, and likely due to the uncertainty associated with the work associated with this task. This item will be managed closely and only used where appropriate.

The proposed 2014 Chip Seal program exceeds the budget of \$200,000 because this is the first year of a multi-year program and there are several streets that require prompt attention. The 2014 program was funded in FY13-14 and requires that a rollover of funds from the previous fiscal year. Once the 2014 program is complete, the remaining funds in FY14-15 (approximately \$177,000) will be available for the 2015 program.

The construction contract calls for substantial completion of the project within 30 days and final completion of the project within 40 days of the Notice to Proceed. The contractor noted in the bid that the chip seal work cannot commence until mid-September.

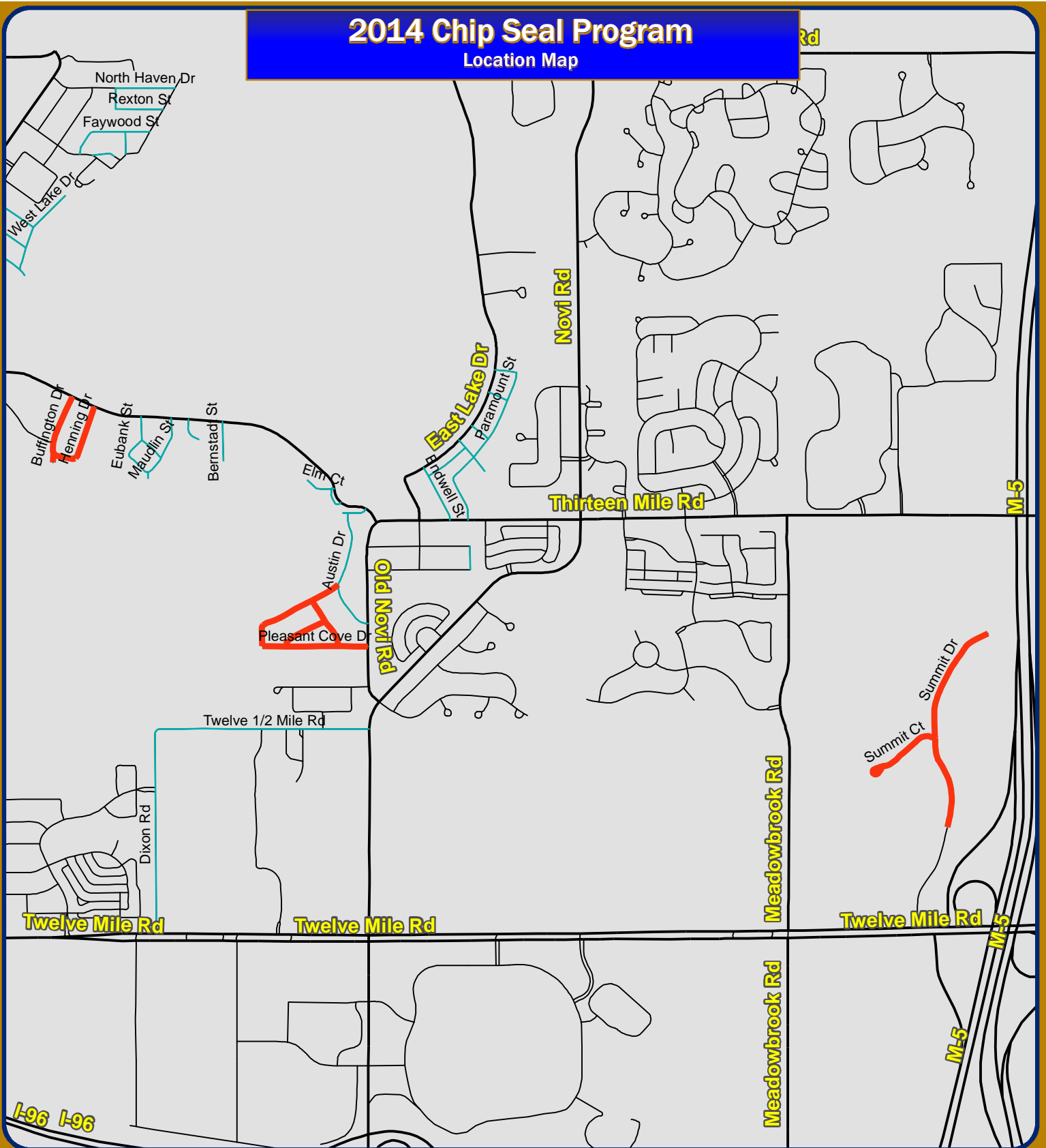
**RECOMMENDED ACTION:** Approval to award a construction contract for the 2014 Chip Seal Program to Highway Maintenance and Construction, the low bidder, in the amount of \$250,630, subject to final review and approval of form of agreement by the City Manager's office and City Attorney.

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

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

# 2014 Chip Seal Program

## Location Map



Map Author: Croy  
 Date: 12/6/13  
 Project: 2014 Chip Seal  
 Version #: v3.0



**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.

### Legend

### Chip Seal Streets

2014 Chip Seal Program



**City of Novi**  
 Engineering Division  
 Department of Public Services  
 26300 Lee BeGole Drive  
 Novi, MI 48375  
[cityofnovi.org](http://cityofnovi.org)



1 inch = 1,650 feet



August 1, 2014

Mr. Ben Croy, PE  
City of Novi  
Engineering Department  
26300 Lee Begole Drive  
Novi, MI 48375

Reference: Bid Analysis and Contract Award Recommendation  
2014 Chip Seal Program Project  
URS Project Number 12944267

Dear Mr. Croy:

Attached is the Bid Tabulation for the above referenced project. One Bid was received and opened. There is one arithmetic error in the bid. After correction, the low bid amount is reduced by \$1500.00.

The corrected bid amount of \$260,870.00 is substantially higher than the Engineer's Estimate of \$198,261.75. The variation appears to be largely due to the high unit price for the ditching pay item.

There also are two apparent irregularities or conditions noted in the bid.

For the pay item "Ditching" a note was added "Major Utility Conflicts Not included" was added. Per the contract documents, the contractor is not responsible for resolving utility conflicts; hence this notation does not change any contract requirements and is not interpreted as a bid condition.

For the pay item Seal, Single Chip, the bid includes the notation "cannot start Chip Seal before Mid Sept." The specifications require the Contractor achieve substantial completion within 60 days of Notice to Proceed. The start date is up to the Contractor to decide, so this notation also is not technically a condition on the bid.

We have worked previously with the low bidder, Highway Maintenance and Construction on other projects for the City of Novi and they have performed well. The bonding company listed in their statement of qualifications has A.M. Best Key rating of "A++", which exceeds the minimum requirements.

We called Jeffrey Demek of Highway Maintenance and Construction and discussed the notations and unit prices in the bid.



Mr. Ben Croy  
August 1, 2014  
Page 2

Mr. Demek understands that the Ditching pay item is to be done as directed by the Engineer and that very little of this work may be ordered by the Engineer. He also understands the completion requirements and liquidated damages included in the contract. Highway Maintenance and Construction does not want to withdraw their bid and desires that the City award the contract to them. However, they request that liquidated damages be waived in the event that the chip seal work extends beyond the required contract completion date due to weather delays on the work they are currently completing or the work on this project. This is a reasonable request and we recommend that this be allowed.

We therefore recommend award of the contract to Highway Maintenance and Construction for the Bid Amount, excluding crew day costs, of \$250,630.00.

Please feel free to contact me if you need anything else or wish to discuss the project.

Sincerely,

**URS Corporation Great Lakes**

A handwritten signature in black ink, appearing to read 'Sean Kelsch'.

Sean Kelsch, P.E.  
Project Manager

cc: Brian Coburn, City of Novi  
Cara Parks, URS

**City of Novi**  
**2014 Chip Seal Program**  
**Tabulation of Bids**  
 Bids Opened 07/30/2014  
 URS JN 12944267

Item No.	Item Description	Unit	Quantity	Engineers Estimate		Highway Maintenance and Construction		
				Unit Price	Cost	Unit Price	Cost	
1	Maintaining Traffic	LS	1	\$ 10,000.00	\$ 10,000.00	\$ 8,000.00	\$ 8,000.00	
2	Erosion Control, Silt Fence	Ft	3,000	\$ 1.75	\$ 5,250.00	\$ 5.10	\$ 15,300.00	
3	Erosion Control, Inlet Prot, Fabric Drop	Ea	2	\$ 350.00	\$ 700.00	\$ 250.00	\$ 500.00	
4	Ditching	Ft	2,500	\$ 7.00	\$ 17,500.00	\$ 36.00	\$ 90,000.00	
5	Dr Structure Cover, Adj, Case 2	Ea	2	\$ 350.00	\$ 700.00	\$ 1,450.00	\$ 2,900.00	
6	Reconstruct Drainage Structure	Ft	4	\$ 150.00	\$ 600.00	\$ 775.00	\$ 3,100.00	
7	Point-up Drainage Structure	Ea	2	\$ 400.00	\$ 800.00	\$ 150.00	\$ 300.00	
8	Seal, Single Chip	Syd	20,000	\$ 2.75	\$ 55,000.00	\$ 2.71	\$ 54,200.00	
9	Seal, Single Chip, Patching	Syd	5,010	\$ 4.25	\$ 21,292.50	\$ 3.00	\$ 15,030.00	
10	Seal, Fog	Syd	20,000	\$ 1.25	\$ 25,000.00	\$ 0.50	\$ 10,000.00	
11	Hand Patching	Ton	30	\$ 150.00	\$ 4,500.00	\$ 300.00	\$ 9,000.00	
12	HMA, 4C	Ton	272	\$ 100.00	\$ 27,200.00	\$ 150.00	\$ 40,800.00	
13	Aggregate Base	Ton	5	\$ 13.00	\$ 65.00	\$ 300.00	\$ 1,500.00	
14	Crew Days	Day	640	\$ 20.00	\$ 12,800.00	16	\$ 10,240.00	
	Contingency for Estimate				\$ 16,854.25			
	<b>TOTAL BID</b>				\$ 198,261.75		\$ 260,870.00	
	<b>Contract Award Amount (Excludes Crew Day Item)</b>							\$ 250,630.00

Only One Bid Received and Opened.  
 Bold indicates corrected entry

Reviewed and Certified Correct:



Sean Kelsch, PE  
 URS Corporation

**BID**  
**2014 Chip Seal Program Project**

Bid of HIGHWAY MAINTENANCE & CONSTRUCTION hereinafter called Bidder, organized and existing under the laws of or a resident of the State of Michigan, doing business as A CORPORATION \*.  
Insert as applicable: "a corporation", "a partnership" or "an individual".

TO THE CITY OF NOVI, MICHIGAN, hereinafter called OWNER:

The undersigned as Bidder hereby declares: that this Bid is made in good faith without fraud or collusion with any person or persons bidding on the same Contract; that the Bidder has read and examined the Advertisement for Bids, Instructions to Bidders, Bid, General Conditions, Supplementary Conditions, Agreement, Forms of Bond, Specifications and Drawings, as prepared by the ENGINEER, and understands all of the same; that the Bidder of its representative has made personal investigation at the site and has become fully familiar with regard to the conditions to be met in the execution of this Contract, and the undersigned proposes to furnish all labor, materials, tools, power, transportation, and construction equipment necessary for the construction of the Project and performing related work in full accordance with the aforesaid Contract Documents, including any and all Addenda officially issued, their receipt of which is hereby acknowledged:

Addendum No.	Addendum Date
_____	_____
_____	_____

The Contract will be awarded to the lowest responsive, responsible Bidder based on the unit prices for all Work specified.

The Bidder agrees to complete the Project for the following unit prices:

**BASE BID**

Item No.	Item Description	Unit	Quantity	Unit Price	Total Price
1	Maintaining Traffic	LS	1		8000 <sup>-</sup>
2	Erosion Control, Silt Fence	Ft	3,000	5 <sup>10</sup>	15,300 <sup>-</sup>
3	Erosion Control, Inlet Protection, Fabric Drop	Ea	2	250 <sup>00</sup>	500 <sup>-</sup>
4	Ditching	Ft	2,500	36 <sup>00</sup>	90,000 <sup>-</sup> *
5	Dr Structure Cover, Adj, Case 2	Ea	2	1450 <sup>00</sup>	2900 <sup>-</sup>
6	Reconstruct Drainage Structure	Ft	4	775 <sup>00</sup>	3100 <sup>-</sup>
7	Point-up Drainage Structure	Ea	2	150 <sup>00</sup>	300 <sup>-</sup>
8	Seal, Single Chip	Syd	20,000	2.71	54,200 <sup>-</sup> DOK
9	Seal, Single Chip, Patching	Syd	5,010	3.00	15,030 <sup>-</sup>
10	Seal, Fog	Syd	20,000	0.50	10,000 <sup>-</sup>



CITY OF NOVI

*Major Utility Conflicts*

July 9, 2014

*Not included*

*xx Cannot start Chip Seal before 14.0 Sept*

**BASE BID**

Item No.	Item Description	Unit	Quantity	Unit Price	Total Price
11	Hand Patching	Ton	30	300 <sup>00</sup>	9,000 <sup>-</sup>
12	HMA, 4C	Ton	272	150 <sup>00</sup>	42,300 <sup>-</sup>
13	Aggregate Base	Ton	5	300 <sup>00</sup>	1,500 <sup>-</sup>
14	Crew Days	Day	16	\$640.00	10,240
<b>TOTAL BASE BID:</b>				\$	262,370 <sup>00</sup> 262,370 <sup>-</sup>

Bidders must provide unit prices for all items and a quantity for the Crew Day Item.

The City's intent is to award to the lowest responsible bidder. Funding for the project is limited and the City may elect to eliminate roadways from the contract, reduce the length of roadways included in the project, or potentially add roadways with similar work to the project in order to match the available budget.

If the foregoing Bid shall be accepted by the OWNER, the undersigned agrees to enter into the attached form of Agreement within ten (10) days after receiving notice of such acceptance, will furnish the OWNER satisfactory bonds and certificates of insurance coverage, and will complete the Project, at the price and within the time stated in this Bid.

The undersigned further agrees that if the foregoing Bid shall be accepted, work will commence immediately after the Contract has been awarded, the Agreement executed, and a Notice to Proceed received.

**Substantial Completion shall be no later than 30 Calendar Days from Notice to Proceed.  
Final Completion shall be no later 40 Calendar Days from Notice to Proceed.**

Bidder acknowledges that each individual roadway shall be completed within **7 calendar days** after work is started on that roadway.

The undersigned attaches hereto its Bid security, as required by the Advertisement for Bids and Instructions to Bidders. The undersigned agrees that in case it shall fail to fulfill its obligations under the foregoing Bid, and/or shall fail to furnish bonds, as specified, the OWNER may, at its option determine that the undersigned has abandoned its rights and interests in such Contract and that its Bid security accompanying its Bid; has been forfeited to the said OWNER, but otherwise the Bid security shall be returned to the undersigned upon the execution of the Contract and the acceptance of the bonds.

The undersigned also agrees that for each and every calendar day that he may be in default of any of the completion dates listed above, the OWNER will suffer a damage of Six Hundred Dollars (\$600.00) per day, and said OWNER shall be compensated therefore at the rate as liquidated damages in accordance with the Agreement.





2014 Chip Seal Program Project

In submitting this Bid, it is understood that the right is reserved by the OWNER to accept any bid, to reject any or all Bids, and to waive irregularities in bidding in the interest of the OWNER.

SUBMITTED on 7/29/14  
Date\*

P.O. Box 74411  
Street\*

ROMULUS, MI 48174-0411  
City, State, ZIP\*

734 941-8885  
Telephone Number\*

734 941-8962  
Facsimile Number\*

BY: HIGHWAY MAINTENANCE & CONSTRUCTION  
Name of Bidder\*

[Signature]  
Signature

JEFFREY S. DEMEK  
Name and Title of Signatory\*  
PRESIDENT

\*Typed or printed in ink.



### BIDDER'S QUALIFICATION AND EXPERIENCE STATEMENT

The OWNER will require supporting evidence regarding Bidder's Qualifications and competency. The Bidder will be required to furnish all of the applicable information listed below, which must be submitted with the sealed Bid at the time of Bid Opening. The Qualifications and Experience Statement must be typewritten and signed in ink.

A fill-in-the blank version of this form is available for your convenience on the City of Novi's website ([www.cityofnovi.org](http://www.cityofnovi.org)) under Forms & Permits/Engineering.

### QUALIFICATIONS AND EXPERIENCE STATEMENT

The undersigned certifies under oath that the information provided herein is true and sufficiently complete so as not to be misleading.

Submitted to: \_\_\_\_\_

Address: \_\_\_\_\_

Submitted by: JEFF DEMEK

Name: HIGHWAY MAINTENANCE & CONSTRUCTION

Address: P.O. BOX 74411

City, State, ZIP ROMULUS, MI 48174-0411

Telephone Number: (734) 941-8885 Fax Number: (734) 941-8962

Principal Office: \_\_\_\_\_

Corporation:  \_\_\_\_\_ Joint Venture: \_\_\_\_\_

Partnership: \_\_\_\_\_ Other: \_\_\_\_\_

Individual: \_\_\_\_\_

Name of Project: 2014 CHIP SEAL PROGRAM

Type of Work (file separate form for each classification of work):

General: \_\_\_\_\_ Paving: \_\_\_\_\_

Utilities: \_\_\_\_\_ Maintaining Traffic: \_\_\_\_\_

Other: \_\_\_\_\_ (Please Specify)



**Organization**

How many years has your organization been in business as a CONTRACTOR?

42 yrs

How many years has your organization been in business under its present business name?

42 yrs

Under what other business names has your organization operated?

If your organization is a corporation, answer the following:

Date of Incorporation: JULY, 1972

State of Incorporation: MICHIGAN

President's Name: JEFFREY S. DEMEK

Vice President's Name: \_\_\_\_\_

Secretary's Name: SANDRA L. DEMEK

Treasurer's Name: CARL E. DEMEK

If your organization is a partnership, answer the following:

Date of Organization: \_\_\_\_\_

Type of Partnership: \_\_\_\_\_

Names of General Partners: \_\_\_\_\_

If your organization is individually owned, answer the following:

Date of Organization: \_\_\_\_\_

Name of OWNER: \_\_\_\_\_

If the form of your organization is other than those listed above, describe it and name the principals:



**Licensing**

List jurisdictional and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable:

List jurisdiction in which your organization's partnership or trade name is filed:

**Experience**

List the categories of work that your organization normally performs with its own forces:

OVERBAND CRACK SEAL, SLURRY SEAL, CHIPSEAL, SPRAY PATCHING

On a separate sheet, list major construction projects your organization has in progress. List the name of project, owner, architect/engineer, contract amount, percent complete, and scheduled completion date.

On a separate sheet, list the major construction projects your organization has completed in the past five (5) years. List the name of the project, owner, architect/engineer, contract amount, date of completion, and percentage of the cost of the work performed with your own forces.

On a separate sheet, list the construction experience and present commitments of the key individuals of your organization who would be employed in the Work.

**Claims and Suits**

If the answer to any of the questions below is yes, please attach details.

Has your organizations ever failed to complete any work awarded to it? NO

Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or officers? NO



**References**

Entity	Contact Name	Phone
<i>Trade References</i>		
1. Asphalt Materials		
2. Stone		
3. Romulus Hardware		
<i>Bank References</i>		
1. PNC BANK	PATRICK DAVIDSON	734-281-5553
2.		
3.		
<i>Surety</i>		
PHILADELPHIA IDENTITY		

Name of Bonding Company: The mercer group

Name of Bonding Agent: Margaret M. Kahlhoff

Address of Bonding Agent: 26622 Woodward Ave Suite 200  
Royal Oak, MI 48067

SUBMITTED on 7/29/14  
Date\*

BY: HIGHWAY MAINTENANCE & CONST.  
Name of Bidder\*

[Signature]  
Signature

JEFFREY S. DEMEK  
Name and Title of Signatory\*  
PRESIDENT

\*Typed or printed in ink

Rebecca Smith being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Subscribed and sworn before me this 29th day of July 2014.

Notary Public: Rebecca Smith

My Commission Expires: July 17, 2017, County of Wayne

**IF THIS INFORMATION IS NOT SUBMITTED WITH THE SEALED BID AT THE TIME OF BID, THE BID WILL BE CONSIDERED INCOMPLETE.**



10/16/2013  
To: Mayor and City Council members  
Background for upcoming engineering award for 2014 chip seal program. Clay

## MEMORANDUM



**TO:** ROB HAYES, P.E.; DIRECTOR OF PUBLIC SERVICES/CITY ENGINEER  
**FROM:** BRIAN COBURN, P.E.; ENGINEERING MANAGER *BTC*  
**SUBJECT:** CHIP SEAL ROAD EVALUATION AND RECOMMENDATIONS  
**DATE:** OCTOBER 14, 2013

There are approximately 6.7 miles of streets in the City of Novi that have a chip sealed surface, representing approximately 4% of the center line miles of roads under Novi's jurisdiction. These roads were gravel surfaced before the chip seal was applied during the time period between 2004 and 2008. Since that time, DPS' Field Operations staff have performed some routine maintenance, but no capital preventative maintenance (CPM) has been completed by the City to keep the chip seal roads in good condition. All of the City's chip sealed roads are classified as local streets on the Act 51 map and are shown on the attached location map.

In keeping with the City's asset management approach to roads, we contracted with URS Corporation to prepare the attached report on chip sealed roads. The report provides an inventory of chip sealed streets, documents existing conditions and deficiencies, provides recommendations for capital maintenance of the roads over the next four years, and provides recommendations and a budget for ongoing maintenance. In general, the chip seal has performed well where adequate drainage exists. The report provides recommendations to improve discrete locations with poor drainage, but generally recommends an additional chip seal treatment in most other areas. This report will serve as a guide to assist staff with budget requests and maintenance activities over the next several years.

In anticipation of this report and the deferred capital maintenance on chip sealed roads, the approved FY2013-14 budget for annual local street CPM was increased from \$50,000 to \$200,000 to include some chip seal improvements. The findings of the report show that a funding level of approximately \$200,000 each year specifically for chip seal capital maintenance should be maintained through the FY2016-17 budget to make the necessary improvements to chip sealed roads to get them back into good condition. The report recommends an annual budget of \$90,000 beginning in FY2017-18 for preventative maintenance, which includes crack sealing and patching in addition to reapplication of chip seal as needed to maintain the good condition of the road.

In addition to the existing chip sealed roads, the consultant was also asked to review three gravel road segments as candidates for chip seal: Dixon Road, 12-1/2 Mile Road, and Sixth Gate. Dixon Road and 12-1/2 Mile Roads were chip sealed around 2007. In 2012, the condition of the chip seal was no longer serviceable and the road was pulverized back to gravel. Sixth Gate was previously chip sealed, but is in very poor condition due to evident drainage problems that were noted in the report. The report included a review of these segments as possible candidates for chip seal, but recommends reconstruction as a paved road in the long term. Our past experience has shown that the poor drainage for these roads has contributed to the premature deterioration of the previously installed chip seal surface. A reconstructed paved roadway would have drainage improvements, including edge drain

and storm sewer, to extend the life of the roadway. The report suggests that a double application of chip seal could be applied as a short term solution for Dixon and 12-1/2 Mile, but would likely deteriorate again within a few years. Staff recommends that if a chip seal treatment is considered for Dixon or 12-1/2 Mile that it occur after the construction of Liberty Park is complete to limit the occurrence of heavier loads and prolong the life of the treatment.

The table on the next page summarizes the report's recommended schedule for making improvements to the chip sealed roads over the next four construction seasons beginning in 2014. The ranking was based on the consultant's observations, PASER ratings, resident complaints received by staff, and location (to complete all streets in a neighborhood in the same construction season). The proposed work for 2014 exceeds the current budget, but we will structure the bidding to include alternates so that decisions can be made later based on actual bid prices.

We will prepare the engineering design award for consideration by City Council at an upcoming meeting so the work can be bid this spring for late spring/early summer construction.

cc: Matt Wiktorowski, Field Operations Senior Manager  
Ben Croy, P.E.; Civil Engineer

**Summary of Chip Seal Road Recommendations  
4-year Schedule and Construction Cost Estimates**

**2014 Construction Year (FY13-14)**

Street Name	2013 PASER Rating	Cost Estimate
Buffington	5	\$13,000
Henning	3	\$13,700
Pembine	4	\$4,800
Summit Ct (overlay)	1	\$42,500
Summit Dr	3	\$60,000
Crown	4	\$12,200
Pleasant Cove Dr	4	\$30,800
Shamrock Hill	1	\$9,100
Shawood Drive	5	\$26,600
<b>2014 Total Construction Cost Estimate</b>		<b>\$212,700</b>

**2015 Construction Year (FY14-15)**

Street Name	2013 PASER Rating	Cost Estimate
Chapman	3	\$11,300
Endwell	2	\$11,900
Herman	4	\$4,400
Lashbrook	6	\$4,300
Monticello	2	\$8,100
Paramount	6	\$82,600
Parklow	5	\$4,100
Bernstadt	4	\$44,500
Eubank	5	\$13,500
Lemay	2	\$12,100
Maudlin	4	\$6,800
Owenton	5	\$6,200
<b>2015 Total Construction Cost Estimate</b>		<b>\$209,800</b>

**2016 Construction Year (FY15-16)**

Street Name	2013 PASER Rating	Cost Estimate
Penhill	6	\$13,800
Pickford	3	\$27,800
South Lake Ct	3	\$12,700
West Lake Dr	3	\$16,300
Garfield Rd	2	\$29,800
11 Mile Rd	4	\$8,400
Taft Rd	3	\$33,000
Austin	2	\$25,400
Charlotte	5	\$4,500
Duana	4	\$5,600
Elm Ct	2	\$5,000
<b>2016 Total Construction Cost Estimate</b>		<b>\$182,300</b>

**2017 Construction Year (FY16-17)**

Street Name	2013 PASER Rating	Cost Estimate
Burton Dr	5	\$19,100
Faywood	3	\$30,000
Lebenta	2	\$3,800
West Lake Dr	2	\$3,400
Amis	7	\$4,000
North Haven Dr	7	\$11,500
Rexton	7	\$7,600
Brenda Ln	4	\$4,600
Joseph Dr	4	\$16,400
Flint St	6	\$24,100
Delmont	3	\$18,200
Dinser	4	\$58,700
<b>2017 Total Construction Cost Estimate</b>		<b>\$201,400</b>

**Other Report Recommendations for Gravel Roads**

Gravel Road	Short Term Recommendations		Long Term Recommendations	
12-1/2 Mile Rd	Chip Seal*	\$46,900.00	Reconstruct as Paved Road	\$812,900
Dixon Rd	Chip Seal*	\$42,600.00	Reconstruct as Paved Road	\$746,700
Sixth Gate	n/a	n/a	Reconstruct as Paved Road	\$79,300

\*Chip seal would have a limited life of only a few years



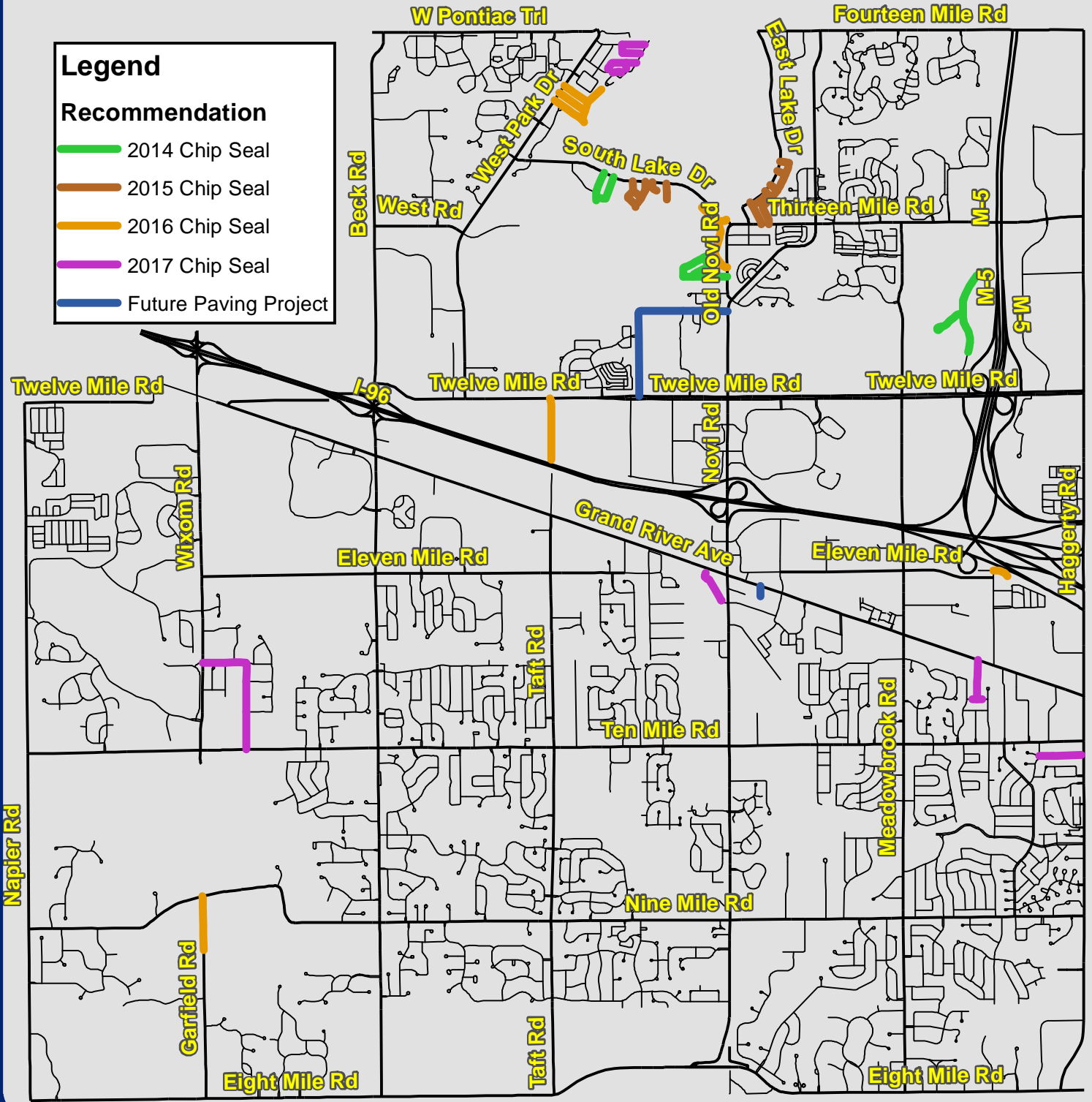
# Chip Seal Recommendations

## Location Map

### Legend

#### Recommendation

- █ 2014 Chip Seal
- █ 2015 Chip Seal
- █ 2016 Chip Seal
- █ 2017 Chip Seal
- █ Future Paving Project



Map Author: Coburn  
 Date: 10/15/13  
 Project: 2013 Chip Seal  
 Version #: v2.0

#### 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.



1 inch = 4,255 feet



**City of Novi**  
 Engineering Division  
 Department of Public Services  
 26300 Lee BeGole Drive  
 Novi, MI 48375  
[cityofnovi.org](http://cityofnovi.org)

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# SCOPING REPORT

CHIP SEAL STREET EVALUATION

CITY OF NOVI  
OAKLAND COUNTY, MICHIGAN

URS Project Number 12943934

Prepared For:

CITY OF NOVI ENGINEERING DEPARTMENT

Prepared By:

**URS**

GRAND RAPIDS – SOUTHFIELD – TRAVERSE CITY

October 7, 2013

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# Table of Contents

Section 1	Summary, Recommendations and Maintenance Schedule.....	1
Section 2	Bloomfield Subdivision.....	8
Section 3	Cenaqua Shores Subdivision.....	12
Section 4	Delmont Drive and Dinser Drive.....	19
Section 5	Dixon Road and Twelve ½ Mile Road.....	21
Section 6	Greys Subdivision.....	24
Section 7	Idlemere Park.....	25
Section 8	Garfield Road.....	30
Section 9	JW Hawthorne’s Sub #2 .....	31
Section 10	Lakewall Subdivision.....	34
Section 11	Lakewoods Subdivision .....	37
Section 12	Leslie Park Subdivision.....	40
Section 13	Novi Manor .....	42
Section 14	Railroad Subdivision .....	43
Section 15	Seeleys Golden Acres .....	44
Section 16	Shawood Walled Lake Heights .....	45
Section 17	Summit Hills.....	53
Section 18	Taft Road.....	55
	Cost Estimates .....	56

# Section 1 Summary and Recommendations

## 1.1 Summary

The City of Novi is developing a chip seal program. 47 different roadway segments were identified by the City of Novi Engineering Department as candidates for the program. URS has performed a field inspection/review of each segment of roadway to determine specific needs and provide recommendations for each roadway.

## 1.2 Recommendations

A chip seal can preserve the condition of a good road for several more years. A chip seal does not fix problems in the pavement like potholes or large cracks, and it does not fix subgrade problems.

Most of the roads in this project are in good condition with potholes or failed pavements in spot locations. These roads are currently good candidates for a chip seal. For these roads, we recommend the following process:

1. Reconstruct pavement at potholes and other failed sections with new asphalt pavement and aggregate base (where needed).
2. Improve drainage where there is evidence that the existing drainage is inadequate and has contributed to pavement failures. Add edge drains in these areas where feasible.
3. Repair remaining cracks and clean the pavement.
4. Apply the chip seal.
5. Spray on a fog seal. The fog seal covers the surface of the chip seal aggregate with a thin layer of asphalt that helps hold the aggregate in place and provides an attractive finish.

Most of the roadways have been previously chip sealed and the chip seals are approaching the end of their life. Therefore, we recommend constructing a chip seal on most of the roads in 2014 and 2015. Delaying longer may result in the roadways needing a more expensive treatment than a chip seal. **Table 1** displays the roadways, recommended improvement, year of improvement, and the cost of that improvement. Cost are shown in 2014 dollars in the estimates in the appendix and in the writeup for each road section. **Table** includes a 3% per year inflation factor for 2015-2017, so cost estimates in the table will be greater than those found in the following sections.

More extensive work may be appropriate for some roadways. Recommendations and estimates for these improvements are summarized in **Table 2**.

Use of a Cape Seal in lieu of a chip seal was investigated for some roadways. A Cape Seal includes placing a layer of Fiberbat on the existing pavement followed by Microsurfacing. The Fiberbat layer includes polymer modified asphalt emulsion, chopped fiberglass strands and fine crushed aggregate. The Fiberbat provides many of the same benefits as a geotextile interlayer fabric. The microsurfacing layer is approximately 0.25 inches thick and consists of specially blended aggregate and asphalt emulsion.

The Cape Seal has a longer service life than a chip seal. Because specialized equipment would need to be mobilized and likely only one contractor will be able to bid the work, the cost for a Cape Seal would be substantially higher than with a chip seal, particularly if only a small amount is done. Several area contractors have the capability to do chip seals and competition in bidding would likely be better than with the Cape Seal process. For this reason, standard chip seals are proposed for this program.

**TABLE 1: CHIP SEAL PROJECT SUMMARY**

Roadway Name	Recommended Improvement	Construction Year/Estimated Cost			
		2014	2015	2016	2017
<b>2.0 Bloomfield Subdivision and Bentley Subdivision</b>					
2.1 Pickford St	Chip seal			\$ 13,800	
2.2 South Lake Ct	Chip seal			\$ 27,800	
2.3 Penhill St	Chip seal			\$ 12,700	
2.4 West Lake Dr	Chip seal			\$ 16,300	
<b>3.0 CENAQUA SHORES SUBDIVISION, CHAPMANS WALLED LAKE SUBDIVISION, AND CZENKUSCH'S ADDITION</b>					
3.1 Chapman Dr	Chip seal		\$ 11,300		
3.2 Endwell St	Chip seal		\$ 11,900		
3.3 Herman St	Chip seal		\$ 4,400		
3.4 Lashbrook St	Chip seal		\$ 4,300		
3.5 Monticello St	Chip seal		\$ 8,100		
3.6 Paramount Ave	Chip seal & Partial Reconst.		\$ 82,600		
3.7 Parklow St	Chip seal		\$ 4,100		
<b>4.0 Delmont and Dinser Drives</b>					
4.1 Delmont Dr	Chip seal				\$ 18,200
4.2 Dinser Dr	Chip Seal				\$ 58,700
<b>5.0 Dixon and Twelve 1/2 Mile Roads</b>					
5.1 Dixon Rd	Double Chipseal	\$ 42,600			
5.2 Twelve 1/2 Mile Rd	Double Chipseal	\$ 46,900			
<b>6.0 Greys Subdivision</b>					
6.1 Burton Dr	Chip seal				\$19,100
<b>7.0 Idlemere Park</b>					
7.1 Bernstadt St	Chip seal & Partial Reconst		\$ 44,500		
7.2 Eubank St	Chip seal		\$ 13,500		
7.3 Maudlin St	Chip seal		\$ 12,100		
7.4 Lemay St	Chip seal		\$ 6,800		
7.5 Owenton St	Chip seal		\$ 6,200		
8.0 Garfield Rd	Chip Seal			\$29,800	
<b>9.0 JW Hawthorne's Sub #2</b>					
9.1 Faywood St	HMA Overlay – see next table				
9.2 Lebenta St	Chip seal				\$ 3,800
9.3 West Lake Dr	Chip seal				\$ 3,400
<b>10.0 Lakewall Subdivision</b>					
10.1 Amis Ave	Chip seal				\$ 4,000
10.2 North Haven Dr	Chip seal				\$ 11,500
10.3 Rexton St	Chip seal				\$ 7,600
<b>11.0 Lakewoods Subdivision</b>					
11.1 Buffington Dr	Chip seal	\$13,000			
11.2 Henning Dr	Chip seal	\$13,700			
11.3 Pembine St	Chip seal	\$4,800			

Roadway Name	Recommended Improvement	Construction Year/Estimated Cost			
		2014	2015	2016	2017
<b>12.0 Leslie Park Subdivision</b>					
12.1 Brenda Ln	Chip seal				\$4,600
12.2 Joseph Dr	Chip seal				\$16,400
<b>13.0 Novi Manor</b>					
13.1 Sixth Gate Dr	Reconstruct – see next table				
<b>14.0 Railroad Subdivision</b>					
14.1 Flint St	Chip seal				\$24,100
<b>15.0 Seeleys Golden Acres</b>					
15.1 Eleven Mile Rd	Chip seal			\$ 8,400	
<b>16.0 Shawood Walled Lake Heights, Pratt's Subdivision and Walled Lake Shores</b>					
16.1 Austin Dr	Chip seal			\$ 25,400	
16.2 Charlotte St	Chip seal			\$ 4,500	
16.3 Crown Dr	Chip seal	\$ 12,200			
16.4 Duana Ave	Chip seal			\$ 5,600	
16.5 Elm Ct	Chip seal			\$ 5,000	
16.6 Pleasant Cove Dr	Chip seal	\$ 30,800			
16.7 Shamrock Hl	Chip seal	\$ 9,100			
16.8 Shawood Dr	Chip seal	\$ 26,600			
<b>17.0 Summit Hills, Spring Valley and Wildwood Hills</b>					
17.1 Summit Dr	Chip seal	\$ 42,500			
17.2 Summit Ct	HMA Overlay – see next table				
18.0 Taft Road	Chip seal			\$ 33,000	
<b>Total Escalated Yearly Cost</b>		\$ 242,200	\$ 209,800	\$ 182,300	\$ 171,400
<b>Total Yearly Cost in 2014 Dollars</b>	<b>All years \$ 774,800</b>	\$ 242,200	\$ 203,700	\$ 171,900	\$ 157,000

Estimates are rounded

**TABLE 2: LONG TERM IMPROVEMENTS**

Roadway Name	Recommended Improvement	Estimated Cost
<b>5.0 Dixon and Twelve 1/2 Mile Roads</b>		
5.1 Dixon Rd	Reconstruct	\$746,700
5.2 Twelve ½ Mile Rd	Reconstruct	\$812,900
<b>9.0 JW Hawthorne's Sub #2</b>		
9.1 Faywood St	HMA Overlay	\$30,000
<b>13.0 Novi Manor</b>		
13.1 Sixth Gate Dr	Reconstruct	\$79,300
<b>17.0 Summit Hills, Spring Valley and Wildwood Hills</b>		
17.2 Summit Ct.	HMA Overlay	60,000

Long Term Improvement Estimates are rounded and are in 2014 dollars

## 1.2 Maintenance Schedule

Table 1 shows improvements recommended for the years 2014 through 2017. This work is needed to restore the roadways studied to good condition.

For future planning, beyond, 2018, a budget figure for an annual chip seal program needs to be developed. In order to do this, the roadways that should be included in the chip seal program need to be determined. All of the subject roadways appear to be candidates for this program, excepting for:

- Dixon Road
- 12 ½ Mile Road
- Sixth Gate Drive

Chip sealing could be expanded to cover all of the asphalt roadways in the City; however, this is not recommended. Neighborhoods that have roadways that have never been chip sealed would likely not be satisfied with the appearance, roughness, and loose gravel inherent in the chip seal process. For neighborhoods which are currently chip sealed, doing additional chip seals would not be viewed as lowering the quality of the roadway.

The total cost for the work needed to restore the studied roadways to good condition is \$774,800, as shown in Table 1. This figure includes base repair/reconstruction and drainage improvements totaling approximately \$90,000 for Paramount Road, Bernstadt Street, and Shawood Drive. This work should not need to be repeated in future years. The cost for the chip sealing work excluding this reconstruction and drainage improvement work is approximately \$700,000

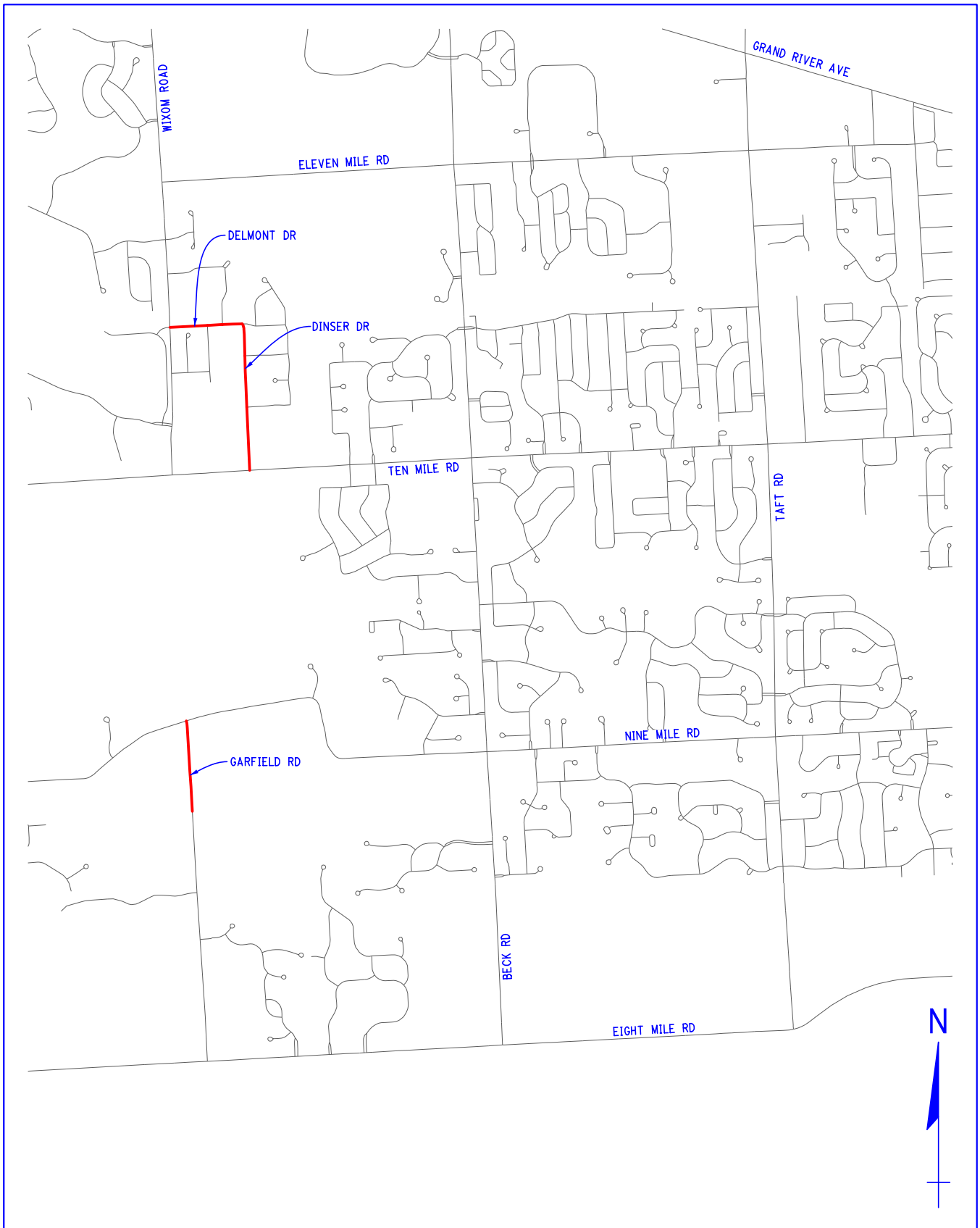
If 12 ½ Mile Road and Dixon Road are reconstructed with curb and gutter in the future, then they may not be good candidates for including in the Chip Seal program. The chip seal work on these roadways *and* included in Table 1 is \$89,500. The cost of improvements in Table 1 excluding the one-time base/drainage improvements and the one-time double chip seal work on Dixon and 12 ½ Mile Road comes to approximately \$610,000.

Other roadways not evaluated as part of this study, but which have previously been chip sealed also may be candidates for including into the chip seal program. If 10% is added to cover additional roadways, then total cost to chip seal all of the roadways in the program once would be perhaps \$700,000 (in 2014 dollars).

The design life of a chip seal is typically 4 to 6 years, but varies significantly depending upon the traffic volumes, truck volumes, and underlying soil/roadway conditions. The roadways evaluated for this project are in much better condition than what would be expected given the dates that the last chip seals were performed. This likely is due to the low traffic volumes and favorable underlying roadway conditions. 8 years between chip seals appears to be reasonable for keeping these roadways in good condition.

Using a cost for one cycle of \$700,000 and an 8 year cycle, an average annual budget of \$90,000 per year (in current dollars) should be adequate to establish a chip seal program once the initial improvements are completed. Each of the roadways included in the program should be evaluated at least once every two years. To maximize design life, crack sealing and patching should be done between chip seals.

To increase efficiency, large contracts with a large amount of chip sealing and/or crack sealing/patching should be used. To ensure this is done, a small contract with just crack sealing and patching could be done on odd numbered years (approximately \$10,000), and a larger contract with crack sealing and chip sealing (approximately \$170,000) done on even numbered years.



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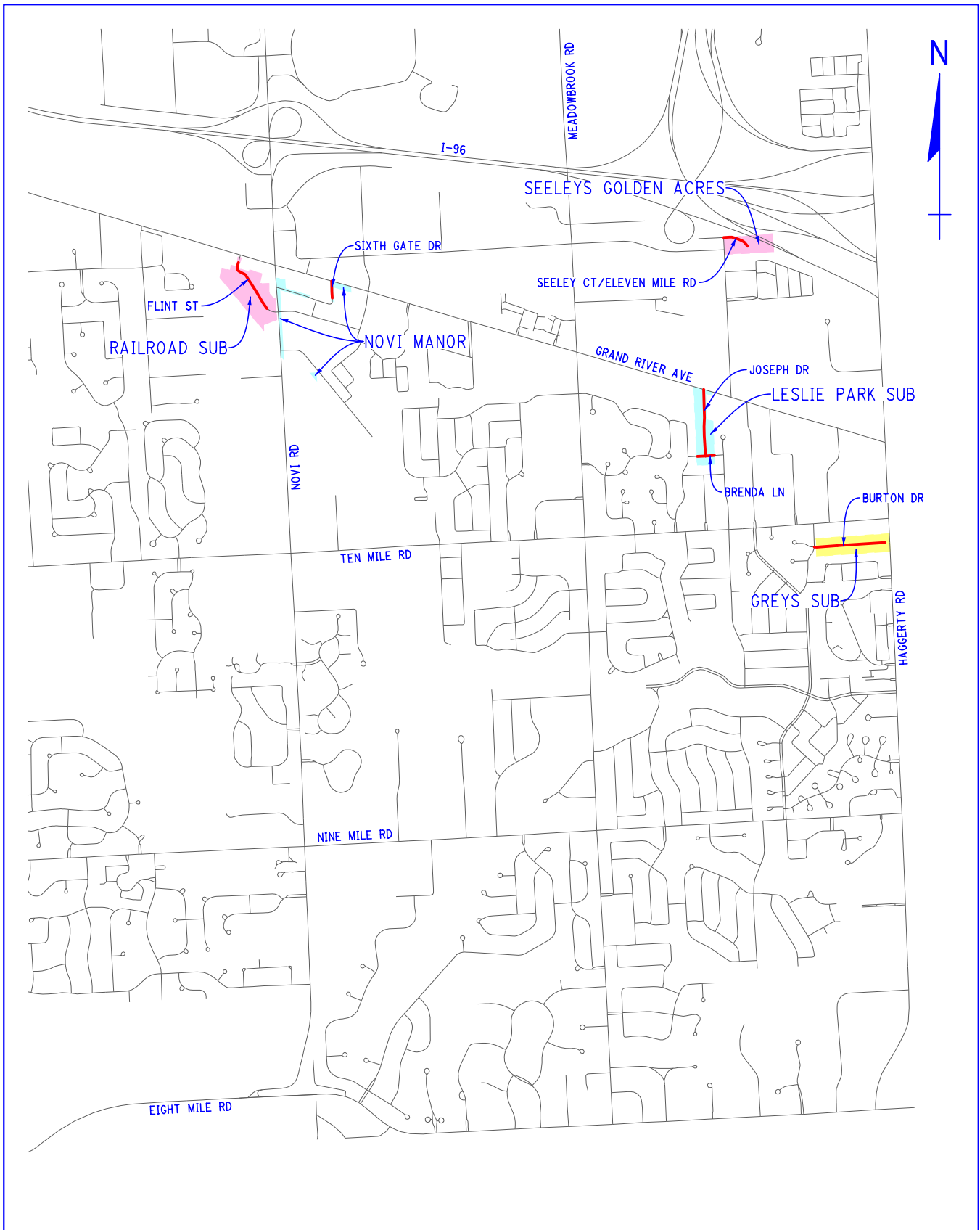
CITY OF NOVI - 2013 CHIP SEAL STREET EVALUATION

SOUTHWEST LOCATION MAP

FIGURE

1





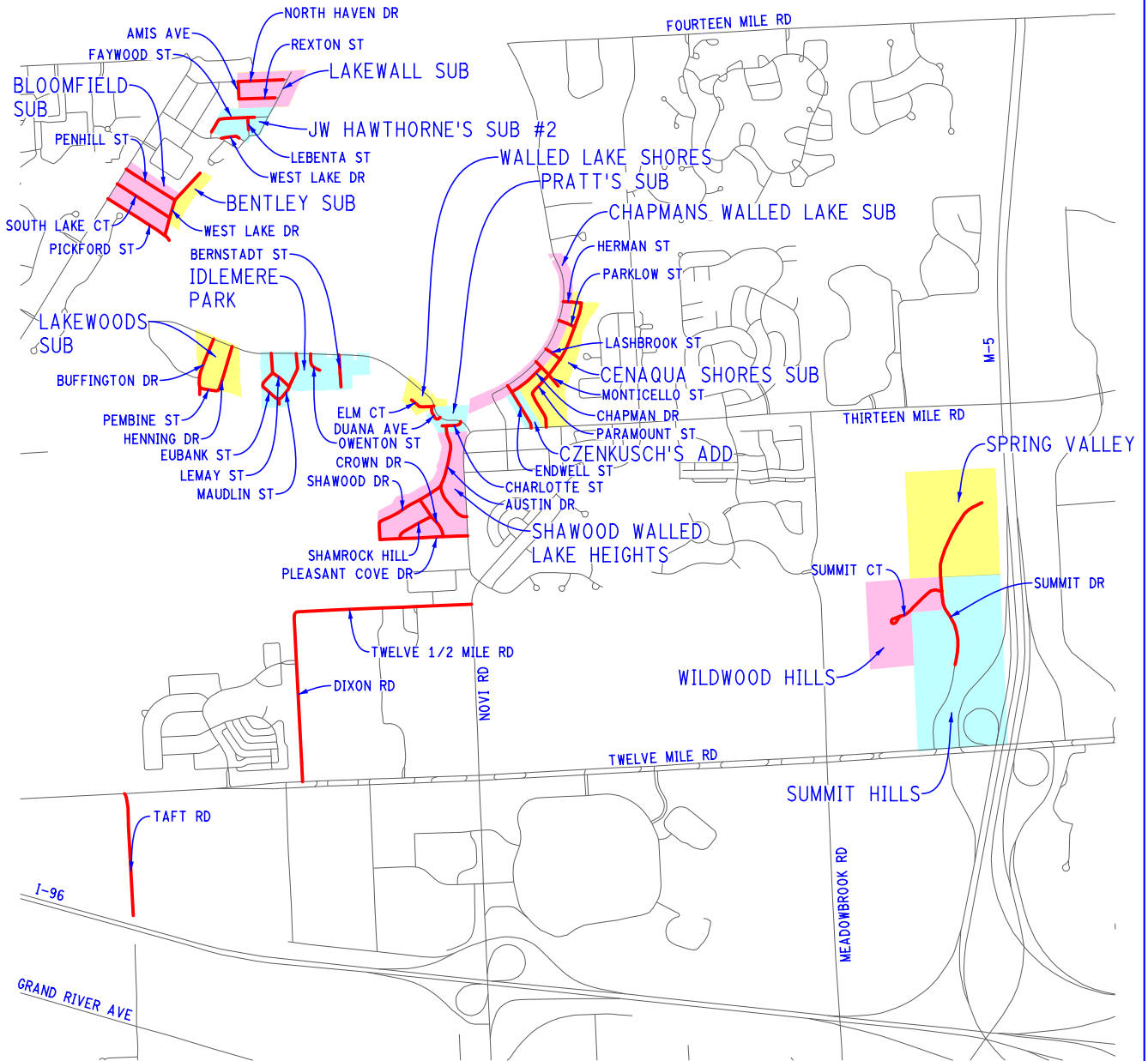
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CITY OF NOVI - 2013 CHIP SEAL STREET EVALUATION

SOUTHEAST LOCATION MAP

FIGURE

2



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CITY OF NOVI - 2013 CHIP SEAL STREET EVALUATION

NORTHEAST LOCATION MAP

FIGURE

3

## Section 2 Bloomfield Subdivision

This section includes roadways in Bloomfield Subdivision and Bentley Subdivision. These roadways are typically 20-foot wide with no curb and gutter and grass shoulders. Original construction of the roadways was completed by chipsealing over gravel roads. They do not have street trees or sidewalks. The right-of-way for these roads varies from 28.6 feet to 66 feet.

There are four roads in these subdivisions, and all were reviewed: Pickford Street, Penhill Street, South Lake Court, and West Lake Drive. These roads were previously chip sealed in 2005-2006.

The roads in Bloomfield Subdivision and Bentley Subdivision are in good condition. There are some potholes and spot locations with poor pavement.

We recommend chip sealing for each of these roads, with full depth pavement and crack repairs as needed.

### 2.1 Pickford Street

Pickford Street was studied from West Park Drive to West Lake Drive. Pickford Street is about 950 feet long and 20 feet wide. It has a right-of-way of 40 feet.

Pickford Street was previously chip sealed in 2005-2006. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$13,000.



## 2.2 Penhill Street

Penhill Street was studied from West Park Drive to West Lake Drive. Penhill Street is about 875 feet long and 20 feet wide. It has a right-of-way of 40 feet.

Penhill Street was previously chip sealed in 2005-2006. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$12,000.



## 2.3 South Lake Court

South Lake Court was studied from West Park Drive to its end, just east of West Lake Drive. South Lake Court is about 1130 feet long and 22 feet wide. It has a right-of-way of 66 feet.

South Lake Court was previously chip sealed in 2005-2006. It is in fair condition with some potholes and several spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$26,200.



## 2.4 West Lake Drive

West Lake Drive was studied from South Lake Court to its end. West Lake Drive is about 1130 feet long and 20 feet wide. Its right-of-way varies from 28.6 to 30.1 feet.

West Lake Drive was previously chip sealed in 2005-2006. It is in good condition with a few potholes and spot locations with poor pavement. At the time of the field review, the segment north of Penhill Street was ice and snow covered, but appeared to be similar to the rest of West Lake Drive.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$15,400.



## Section 3      Cenaqua Shores Subdivision

This section includes roadways in Cenaqua Shores Subdivision, Chapmans Walled Lake Subdivision, and Czenkusch's Addition. These roadways are typically 20-foot wide with no curb and gutter and grass shoulders. Original construction of the roadways was completed by chipsealing over gravel roads. They do not have street trees or sidewalks. The right-of-way for these roads varies from 28 feet to 52 feet.

There are eight roads in these subdivisions, and seven were reviewed: Chapman Drive, Endwell Street, Herman Street, Lashbrook Street, Monticello Street, Paramount Avenue, Parklow Street. East Lake Drive was not included.

These roads were previously chip sealed in 2004-2006.

The roads in Cenaqua Shores Subdivision, Chapmans Walled Lake Subdivision, and Czenkusch's Addition are in good condition. There are some potholes and spot locations with poor pavement.

We recommend chip sealing for each of these roads, with full depth pavement and crack repairs as needed. We recommend additional repairs at a low point on Paramount Avenue.

### 3.1 Chapman Drive

Chapman Drive was studied from Endwell Street to Monticello Street. Chapman Drive is about 590 feet long. It has a right-of-way of 30 feet.

Chapman Drive was previously chip sealed in 2004-2005. It is in fair condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$11,000.



## 3.2 Endwell Street

Endwell Street was studied from Thirteen Mile Road to East Lake Drive. Endwell Street is about 754 feet long. It has a right-of-way of 30 feet.

Endwell Street was previously chip sealed in 2004-2005. It is in fair condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$11,600.





### 3.3 Herman Street

Herman Street was studied from East Lake Drive to Paramount Avenue. Herman Street is about 280 feet long. Its right-of-way varies from 30 feet to 52 feet.

Herman Street was previously chip sealed in 2005-2006. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$4,300.



### 3.4 Lashbrook Street

Lashbrook Street was studied from East Lake Drive to Paramount Avenue. Lashbrook Street is about 270 feet long. Its right-of-way varies from 30 feet to 52 feet.

Lashbrook Street was previously chip sealed in 2004-2005. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$4,200.



### 3.5 Monticello Street

Monticello Street was studied from East Lake Drive to its end. Monticello Street is about 504 feet long. Its right-of-way varies from 28 feet to 52 feet.

Monticello Street was previously chip sealed in 2005-2006. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$7,900.



## 3.6 Paramount Avenue

Paramount Avenue was studied from Thirteen Mile Road to Herman Street. Paramount Avenue is about 2155 feet long. It has a right-of-way of 50 feet.

Paramount Avenue was previously chip sealed in 2005-2006. Most of it is in good condition with a few potholes and spot locations with poor pavement. It has some drainage problems at the curve. There are existing catch basins just north of the curve, but there is a low point just south of it that has no outlet. There was significant ponding on the road, and the pavement in this area is in poor condition. The segment between Thirteen Mile Road and the curve is also in relatively poor condition.

We recommend:

- Chip seal with full depth pavement and crack repairs as needed.
- Mill the existing chipseal-pavement & place HMA overlay overlay for the segment south of the curve (about 275 feet)
- Full reconstruction of the curve area with the addition of two new catch basins at the existing low point and storm sewer to connect them to the existing catch basins (about 200 feet). Edge drains should also be placed in this area.

The estimated cost for the recommended improvements is \$80,200.



### 3.7 Parklow Street

Parklow Street was studied from East Lake Drive to Paramount Avenue. Parklow Street is about 260 feet long. Its right-of-way varies from 30 feet to 49 feet.

Parklow Street was previously chip sealed in 2004-2005. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$4,000.



## Section 4 Delmont Drive and Dinser Drive

This section includes Delmont Drive and Dinser Drive. They are not within platted subdivisions.

These roads were previously chip sealed in 2004-2005.

The roads are in fair to good condition. There are some potholes and spot locations with poor pavement.

### 4.1 Delmont Drive

Delmont Drive was studied from 180 feet east of Wixom Road to Dinser Drive. This segment of Delmont Drive is about 1120 feet long. The roadway is 22-foot wide with no curb and gutter, grass shoulders, and ditches on both sides. It does not have street trees. There is sidewalk along most of the southern side of the street. Its right-of-way varies from 66 feet to 103 feet.

Delmont Drive was previously chip sealed in 2004-2005. It is in generally good condition with a few potholes and spot locations with poor pavement. There is evidence of both recent and older patching.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$16,700.



## 4.2 Dinser Drive

Dinser Drive was studied from Ten Mile Road to Delmont Drive. Dinser Drive is about 2640 feet long. The roadway is 22-foot wide with no curb and gutter, grass shoulders, and ditches on both sides. It does not have street trees. There is sidewalk along most of the eastern side of the street. Its right-of-way varies from 66 feet to 76 feet.

Dinser Drive was previously chip sealed in 2004-2005. It is in fair to good condition, but has many potholes and locations with poor pavement. There is evidence of both recent and older patches along the roadway. It appears to have a stable subgrade, and is therefore in need of surface improvements, not complete reconstruction.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$53,700.



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## **Section 5      Dixon Road and Twelve ½ Mile Road**

This section includes Dixon Road and Twelve ½ Mile Road. They are not within platted subdivisions.

These roads were previously chip sealed in 2006-2007. Both roads are approximately 20-foot wide gravel with no curb and gutter and grass shoulders. They are currently in fair condition, to good condition. Conditions may vary with the weather. Some or all of Twelve ½ Mile Road is a natural beauty road.

There are new developments in various stages of construction with access to these roads. In addition, the south edge of Lakeshore Park is adjacent to Dixon Road and Twelve ½ Mile Road.

Since the new developments will likely result in a substantial increase in traffic on both roads, the City should consider complete reconstruction for both of them as asphalt roads with curb and gutter and storm sewer once the developments are completed. The use of curb and gutter and storm sewer will minimize the impact of construction on the adjacent landscape.

A double chip seal could provide a short-term improvement for both roads and reduce maintenance requirements until complete reconstruction is done. This would involve re-grading the existing aggregate and then applying two chip seal layers, resulting in a thin asphalt pavement. A double chip seal would likely deteriorate within a couple years, but would provide a better driving surface during that time.



## 5.1 Dixon Road

Dixon Road was studied from Twelve Mile Road to Twelve ½ Mile Road. Dixon Road is about 2500 feet long. The roadway is approximately 20-foot wide gravel with no curb and gutter. It does not have street trees or sidewalk. Its right-of-way varies from 66 feet to 76 feet.

Dixon Road was previously chip sealed in 2006-2007, however, the surface is now gravel and there is no evidence of the previous chip seal. The roadway was frozen solid and appeared to be quite smooth during our initial review. On January 29, 2013 heavy rains and warm weather partially thawed the road and numerous ruts and potholes were evident on that day. On May 29, 2013 the roadway had been recently re-graded and was in relatively good condition.

Since the new developments will likely result in a substantial increase in traffic on Dixon Road, we recommend a complete reconstruction as a 24-foot wide asphalt road with curb and gutter and storm sewer. The southern portion of Dixon Road currently has ditches, but the northern portion does not, and trees grow very close to it. The use of curb and gutter and storm sewer will minimize the impact of construction on the adjacent landscape. The estimated cost for the reconstruction of Dixon Road is \$746,700.

A double chip seal could provide a short-term improvement for Dixon Road and is recommended. It would involve re-grading the existing aggregate and then applying two chip seal layers, resulting in a thin asphalt pavement. A double chip seal would likely deteriorate in a couple years, but would provide a better driving surface during that time. The estimated cost for a double chip seal of Dixon Road is \$42,600.



## 5.2 Twelve ½ Mile Road

Twelve ½ Mile Road was studied from Dixon Road to Novi Road. Twelve ½ Mile Road is about 2750 feet long. The roadway is approximately 20-foot wide gravel with no curb and gutter. It does not have street trees. There is sidewalk along some of the southern side of the street. Its right-of-way varies from 66 to 76 feet.

Twelve ½ Mile Road was previously chip sealed in 2006-2007; however the chip seal has deteriorated and it is now a gravel roadway. The roadway was frozen solid and appeared to be quite smooth during our initial review. On January 29, 2013 heavy rains and warm weather partially thawed the road and numerous ruts and potholes were evident on that day. On May 29, 2013, the roadway had been recently re-graded and was in relatively good condition.

Some or all of Twelve ½ Mile Road is a natural beauty road. There are developments planned or under construction along the south side of Twelve ½ Mile Road. There is existing sidewalk adjacent to these developments.

Since the new developments will result in a substantial increase in traffic on Twelve ½ Mile Road, we recommend a complete reconstruction as a 24-foot wide asphalt road with curb and gutter and storm sewer. The use of curb and gutter and storm sewer will minimize the impact of construction on the adjacent landscape. The estimated cost for the recommended improvements is \$812,900.

A double chip seal could provide a short-term improvement for Twelve ½ Mile Road. It would involve re-grading the existing aggregate and then applying two chip seal layers, resulting in a thin asphalt pavement. A double chip seal would likely deteriorate in a couple years, but would provide a better driving surface during that time. The estimated cost for a double chip seal of Twelve ½ Mile Road is \$46,900.



## Section 6 Greys Subdivision

Greys Subdivision has just one road: Burton Drive.

### 6.1 Burton Drive

Burton Drive was studied from Nilan Drive to its end, just west of Haggerty Road. Burton Drive is about 1275 feet long. The roadway is 20-foot wide asphalt pavement with no curb and gutter and grass shoulders. Original construction appears to have consisted of chipsealing over gravel. It does not have street trees or sidewalk. It has a right-of-way of 60 feet.

Previous chip seal information on Burton Drive was not available. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$17,500.



## Section 7 Idlemere Park

The roadways in Idlemere Park are typically 20-foot wide with no curb and gutter and grass shoulders. They do not have street trees or sidewalks. The right-of-way for these roads is 30 feet. Original construction appears to have consisted of chip sealing over gravel.

There are five roads in this subdivision, and all were reviewed: Bernstadt Street, Eubank Street, Maudlin Street, Lemay Street, and Owenton Street.

These roads were previously chip sealed in 2005-2006.

The roads in Idlemere Park are in good condition. There are some potholes and spot locations with poor pavement.

We recommend chip sealing for each of these roads, with full depth pavement and crack repairs as needed. We recommend additional repairs at a low point on Bernstadt Street.

### 7.1 Bernstadt Street

Bernstadt Street was studied from its end to South Lake Drive. Bernstadt Street is about 490 feet long. It has a right-of-way of 30 feet.

Bernstadt Street was previously chip sealed in 2005-2006. Most of it is in good condition with a few potholes and spot locations with poor pavement. About 120 feet south of South Lake Drive, there is a small low point with no outlet and very poor pavement.

We recommend:

- Chip seal the entire length of the roadway, with full depth pavement and crack repairs as needed
- Full reconstruction of approximately the northern 170 feet with asphalt and aggregate base to eliminate the low point prior to placing the chipseal. Drainage improvements and the addition of edge drains also should be completed in this area.

The estimated cost for the recommended improvements is \$43,200.



## 7.2 Eubank Street

Eubank Street was studied from Maudlin Street to South Lake Drive. Eubank Street is about 875 feet long. It has a right-of-way of 30 feet.

Eubank Street was previously chip sealed in 2005-2006. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$13,100.



## 7.3 Maudlin Street

Maudlin Street was studied from Eubank Street to South Lake Drive. Maudlin Street is about 785 feet long. It has a right-of-way of 30 feet.

Maudlin Street was previously chip sealed in 2005-2006. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$11,700.



## 7.4 Lemay Street

Lemay Street was studied from Eubank Street to Maudlin Street. Lemay Street is about 330 feet long. It has a right-of-way of 30 feet.

Lemay Street was previously chip sealed in 2005-2006. It is generally in good condition, but has some potholes and several spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$6,600.



## 7.5 Owenton Street

Owenton Street was studied from South Lake Drive to its end. Owenton Street is about 320 feet long. It has a right-of-way of 30 feet.

Owenton Street was previously chip sealed in 2005-2006. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$6,000.





## Section 8      Garfield Road

Garfield Road is not within a development.

Garfield Road was studied from the end of a previous project north to Nine Mile Road. This segment of Garfield Road is about 1630 feet long. The roadway is 20-foot wide asphalt pavement with no curb and gutter, grass shoulders, and ditches on both sides for most of its length. It does not have street trees. Its right-of-way is 66 feet. Original construction appears to have been HMA pavement for a portion of the roadway and chip seal over gravel for the remainder.

Garfield Road was previously chip sealed in 2007-2008. The pavement surface is in fair condition with a number of potholes and spot locations with poor pavement. There is evidence of both recent and older patching along the roadway.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$28,100.



## Section 9 JW Hawthorne's Sub #2

The roadways in JW Hawthorne's Sub #2 vary from 12 feet to 18 feet wide, with no curb and gutter and grass shoulders. They do not have street trees or sidewalks. The right-of-way for these roads varies from 15 feet to 43 feet. Original construction appears to have been done by chip sealing over gravel.

There are three roads in these subdivisions, and portions of each were reviewed: Faywood Street, Lebenta Street, and West Lake Drive.

These roads were previously chip sealed in 2004-2006.

The roads in JW Hawthorne's Sub #2 are in good condition. There are some potholes and spot locations with poor pavement.

We recommend chip sealing for Lebenta Street and West Lake Drive, with full depth pavement and crack repairs as needed. We recommend a mill & overlay for Faywood Street, with full depth pavement and crack repairs as needed.

### 9.1 Faywood Street

Faywood Street was studied from north of Ludlow Street to west of West Lake Drive. This segment of Faywood Street is about 760 feet long and 18 feet wide. It has a right-of-way of 40 feet.

Faywood Street was previously chip sealed in 2005-2006. It is in fair to poor condition with a number of potholes and spot locations with poor pavement.

We recommend an HMA overlay, with full depth pavement and crack repairs as needed. Areas in poor shape would be removed entirely and replaced with new asphalt. Aggregate base would be removed and replaced in spot locations as required. A fabric interlayer is placed on the existing surface after the repairs are made and then a 2 inch overlay installed. Cold milling is not required, as there is no curb and gutter on this section of roadway. The estimated cost for these recommended long term improvements, as shown in Table 2, is \$30,800.



## 9.2 Lebenta Street

Lebenta Street was studied from West Lake Drive to Faywood Street. Lebenta Street is about 280 feet long and 14 feet wide. Its right-of-way varies from 32 feet to 43 feet.

Lebenta Street was previously chip sealed in 2004-2005. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$3,500.



### 9.3 West Lake Drive

West Lake Drive was studied from north of Ludlow Street to west of a three leg intersection with another West Lake Drive. This segment of West Lake Drive is about 250 feet long and 12 feet wide. Its right-of-way varies from 15 feet to 26 feet.

Information on previous chip seals of West Lake Drive was not available. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$3,100.



## Section 10 Lakewall Subdivision

The roadways in Lakewall Subdivision vary from 16 feet to 18 feet wide. They have asphalt pavement with no curb and gutter and grass shoulders. They do not have street trees or sidewalks. The right-of-way for these roads is 40 feet. Original construction appears to have been done by chip sealing over gravel.

There are four roads in this subdivision, and three were reviewed: Amis Avenue, North Haven Drive, and Rexton Street. West Lake Drive was not reviewed.

These roads were previously chip sealed in 2004-2006.

The roads in Lakewall Subdivision are in good condition. There are some potholes and spot locations with poor pavement.

We recommend chip sealing for each of these roads, with full depth pavement and crack repairs as needed.

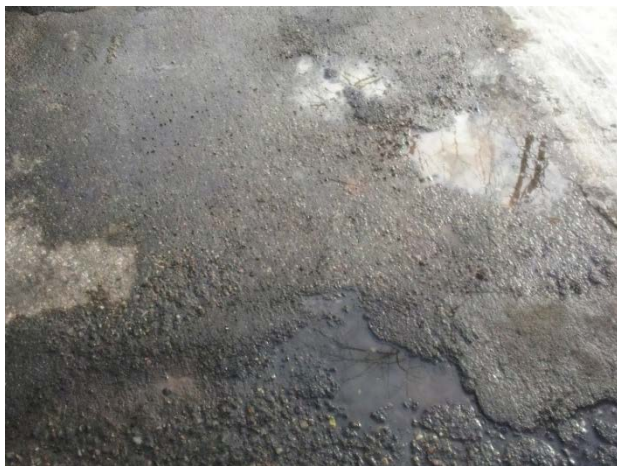
### 10.1 Amis Avenue

Amis Avenue was studied from Rexton Street to North Haven Drive. Amis Avenue is about 265 feet long and 16 feet wide. It has a right-of-way of 40 feet.

Amis Avenue was previously chip sealed in 2005-2006. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$3,700.



## 10.2 North Haven Drive

North Haven Drive was studied from Amis Avenue to just west of West Lake Drive. This segment of North Haven Drive is about 690 feet long and 18 feet wide. It has a right-of-way of 40 feet.

North Haven Drive was previously chip sealed in 2004-2005. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$10,500.



## 10.3 Rexton Street

Rexton Street was studied from Amis Avenue to just west of West Lake Drive. Rexton Street is about 545 feet long and 16 feet wide. It has a right-of-way of 40 feet.

Rexton Street was previously chip sealed in 2004-2005. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$7,000.



## Section 11 Lakewoods Subdivision

The roadways in Lakewoods Subdivision are typically 20-foot wide with no curb and gutter and grass shoulders. They do not have street trees or sidewalks. The right-of-way for these roads varies from 27 feet to 50 feet. Original construction appears to have been done by chip sealing over gravel.

There are three roads in these subdivisions, and all were reviewed: Buffington Drive, Henning Drive, and Pembine Street.

These roads were previously chip sealed in 2004-2007.

The roads in Lakewoods Subdivision are in good condition. There are some potholes and spot locations with poor pavement.

We recommend chip sealing for each of these roads, with full depth pavement and crack repairs as needed.

### 11.1 Buffington Drive

Buffington Drive was studied from Pembine Street to South Lake Drive. Buffington Drive is about 775 feet long. It has a right-of-way of 50 feet.

Buffington Drive was previously chip sealed in 2005-2006. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$13,000.





## 11.2 Henning Drive

Henning Drive was studied from Pembine Street to South Lake Drive. Henning Drive is about 690 feet long. It has a right-of-way of 50 feet.

Henning Drive was previously chip sealed in 2006-2007. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$13,700.



## 11.3 Pembine Street

Pembine Street was studied from Buffington Drive to Henning Drive. Pembine Street is about 290 feet long. It has a right-of-way of 27 feet.

Pembine Street was previously chip sealed in 2004-2005. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$4,800.



## Section 12 Leslie Park Subdivision

The roadways in Leslie Park Subdivision vary from 20 feet to 22 feet wide. They have asphalt pavement with no curb and gutter and grass shoulders. They do not have street trees or sidewalks. The right-of-way for these roads is 60 feet. Original construction appears to have been done by chip sealing over gravel.

There are two roads in these subdivisions, and both were reviewed: Brenda Lane and Joseph Drive.

These roads were previously chip sealed in 2004-2005.

The roads in Lakewoods Subdivision are in good condition. There are some potholes and spot locations with poor pavement.

We recommend chip sealing for each of these roads, with full depth pavement and crack repairs as needed.

### 12.1 Brenda Lane

Brenda Lane was studied from 150 feet west of Joseph Drive to 160 feet east of Joseph Drive. This segment of Brenda Lane is about 310 feet long and 20 feet wide. It has a right-of-way of 60 feet.

Brenda Lane was previously chip sealed in 2004-2005. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$4,200.



## 12.2 Joseph Drive

Joseph Drive was studied from Brenda Lane to Grand River Avenue. Joseph Drive is about 1200 feet long and 22 feet wide. It has a right-of-way of 60 feet.

Joseph Drive was previously chip sealed in 2004-2005. It is in very good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$15,000.



## Section 13      Novi Manor

Novi Manor is a group of three separate properties.

One road was reviewed in this development: Sixth Gate Drive.

### 13.1 Sixth Gate Drive

Sixth Gate Drive was studied from Paul Bunyan Drive to Grand River Avenue. Sixth Gate Drive is about 305 feet long. It is 18-foot wide asphalt pavement with no curb and gutter and grass shoulders. It does not have street trees or sidewalks. It has a right-of-way of 60 feet.

Previous chip seal information on Sixth Gate Drive was not available. It is in very poor condition with drainage problems evident. There are catch basins at the intersection with Grand River Avenue, but the road does not drain to them. The pavement at this location has failed completely.

Therefore, we recommend a complete reconstruction of the roadway as a long term improvement. A 24-foot wide asphalt roadway with aggregate base, edge drains, curb and gutter and storm sewer was assumed for the estimate. The estimated cost for the recommended improvements is \$79,300.



## Section 14 Railroad Subdivision

Railroad Subdivision contains just one road: Flint Street.

### 14.1 Flint Street

Flint Street was studied from 140 feet south of Grand River Avenue to 220 feet west of Novi Road. This segment of Flint Street is about 1025 feet long. It is about 20 feet wide with no curb and gutter and grass shoulders. It does not have street trees or sidewalks. Its right-of-way varies from 45 feet to 90 feet. The northern 140 feet and southern 220 feet of Flint Street have been reconstructed and are not included in this project.

Flint Street was previously chip sealed in 2005-2006. Original construction appears to have done by chip sealing over gravel for at least portions of the roadway.

The northern 605 feet of this segment of Flint Street is asphalt, and is in good condition with a few potholes and spot locations with poor pavement. The southern 420 feet is gravel, and is also in good condition.

The studied segment of Flint Street provides access to a concrete plant, which is now closed. At this time, Flint Street has minimal traffic. In addition, a study is currently under way to relocate Flint Street as part of a re-development plan for this area.

In the event that the roadway is not reconstructed and relocated, we recommend chip sealing the asphalt segment of the road, with full depth pavement and crack repairs as needed. Areas in poor shape would be removed entirely and replaced with new asphalt prior to the chip sealing.

We recommend a double chip seal on the gravel segment and a single chip seal on the HMA/chip seal segment. A double chip seal can be used to develop a low-cost paved road on top of the existing aggregate base.

The estimated cost for the recommended improvements is \$18,200.



## Section 15 Seeleys Golden Acres

Seeleys Golden Acres has just one road: Eleven Mile Road (also known as Seeleys Court).

### 15.1 Eleven Mile Road

Eleven Mile Road was studied from Seeley Road east to its end. This segment of Eleven Mile Road is about 490 feet long. It is about 20 feet wide with no curb and gutter and grass shoulders. It does not have street trees or sidewalk. Its right-of-way varies, with a minimum of 90 feet.

Previous chip seal information on Eleven Mile Road was not available. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$7,900.



## Section 16 Shawood Walled Lake Heights

This section includes roadways in Shawood Walled Lake Heights, Pratt's Subdivision, and Walled Lake Shores. These roadways vary from 12 feet to 20 feet wide. They have asphalt/chip seal pavement with no curb and gutter and grass shoulders. They do not have street trees or sidewalks. The right-of-way for these roads varies from 17 feet to 60 feet.

There are eight roads in these subdivisions, and all were reviewed: Austin Drive, Crown Drive, Pleasant Cove Drive, Shamrock Hill, Shawood Drive, Duana Avenue, Charlotte Street, and Elm Court.

These roads were previously chip sealed in 2004-2006.

The roads in Shawood Walled Lake Heights, Pratt's Subdivision, and Walled Lake Shores are in fair to good condition. There are some potholes and spot locations with poor pavement.

We recommend chip sealing for each of these roads, with full depth pavement and crack repairs as needed.

### 16.1 Austin Drive

Austin Drive was studied from Old Novi Road to Charlotte Street. Austin Drive is about 1600 feet long and 20 feet wide. Its right-of-way varies from 39 feet to 63 feet.

Austin Drive was previously chip sealed in 2004-2005. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$23,900.





## 16.2 Charlotte Street

Charlotte Street was studied from its end to South Lake Drive. Charlotte Street is about 310 feet long and 18 feet wide. It has a right-of-way of 25 feet.

Charlotte Street was previously chip sealed in 2004-2005. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$4,200.



## 16.3 Crown Drive

Crown Drive was studied from Pleasant Cove Drive to Shawood Drive. Crown Drive is about 670 feet long and 20 feet wide. It has a right-of-way of 60 feet.

Crown Drive was previously chip sealed in 2004-2005. It is in good condition with a few potholes and spot locations with poor pavement. For example, the intersection with Shamrock Hill is in poor condition.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$12,200.



## 16.4 Duana Avenue

Duana Avenue was studied from South Lake Drive to Elm Court. Duana Avenue is about 280 feet long and 16 feet wide. Its right-of-way varies from 17 feet to 40 feet.

Duana Avenue was previously chip sealed in 2005-2006. It is in fair condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$5,300.



## 16.5 Elm Court

Elm Court was studied from its end to South Lake Drive. Elm Court is about 270 feet long and 12 feet wide. It has a right-of-way of 25 feet.

Elm Court was previously chip sealed in 2005-2006. It is in poor condition with a number of potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$4,700.



## 16.6 Pleasant Cove Drive

Pleasant Cove Drive was studied from Shawood Drive to Old Novi Road. Pleasant Cove Drive is about 1335 feet long and 20 feet wide. It has a right-of-way of 30 feet.

Pleasant Cove Drive was previously chip sealed in 2005-2006. It is in fair condition with a number of potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$30,800.



## 16.7 Shamrock Hill

Shamrock Hill was studied from Pleasant Cove Drive to Crown Drive. Shamrock Hill is about 605 feet long and 20 feet wide. It has a right-of-way of 60 feet.

Shamrock Hill was previously chip sealed in 2004-2005. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$9,100.



## 16.8 Shawood Drive

Shawood Drive was studied from Pleasant Cove Drive to Austin Drive. Shawood Drive is about 1600 feet long and 18 feet wide. Its right-of-way varies from 30 feet to 60 feet.

Shawood Drive was previously chip sealed in 2004-2005. It is in good condition with a few potholes and spot locations with poor pavement. It has one location with poor drainage just east of the bridge. The low point in the pavement is several feet away from the outlet, which is causing ponding in the road.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

We also recommend an HMA overlay at the low point to raise the pavement 2-3 inches so that it drains to the outlet.

The estimated cost for the recommended improvements is \$26,600.



## Section 17 Summit Hills

The roadways in Summit Hills, Spring Valley, and Wildwood Hills are 20-foot wide asphalt pavement with no curb and gutter and grass shoulders. They do not have street trees or sidewalks. The right-of-way for these roads is 60 feet. Original construction appears to have been done by chip sealing over gravel.

There are two roads in these subdivisions, and both were reviewed: Summit Drive and Summit Court.

These roads were previously chip sealed in 2006-2007.

Summit Drive and Summit Court are in fair to good condition. There are some potholes and spot locations with poor pavement.

We recommend chip sealing for each of these roads, with full depth pavement and crack repairs as needed.

### 17.1 Summit Drive

Summit Drive was studied from about 1350 feet north of Twelve Mile Road to its end. This segment of Summit Drive is about 2750 feet long. It has a right-of-way of 60 feet.

Summit Drive was previously chip sealed in 2006-2007. It is in good condition with a few potholes and spot locations with poor pavement.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$42,500.





## 17.2 Summit Court

Summit Court was studied from its end to Summit Drive. Summit Court is about 1145 feet long. It has a right-of-way of 60 feet.

Summit Court was previously chip sealed in 2006-2007. It is in fair to poor condition with a few potholes and numerous locations with poor pavement. Water ponding on the road may be the cause for the failed areas, as many areas do not have ditches or grading to direct runoff away from the roadway. .

Given the relatively poor condition of the roadway, we recommend a 2 inch overlay with a fabric interlayer over the existing roadway. Full depth pavement and crack repairs should be done prior to the overlay. Failed areas should be removed and replaced with full depth HMA and aggregate base repair completed as needed. Ditching and/or other drainage improvements should be incorporated into the design of the improvements.

The estimated cost for the recommended improvements is \$60,000.



## Section 18 Taft Road

Taft Road is not within a platted subdivision.

Taft Road was studied from its end just north of I-96 to Twelve Mile Road. This segment of Taft Road is about 1860 feet long. The roadway is 20-foot wide asphalt pavement/chip seal roadway with no curb and gutter and grass shoulders. It does not have street trees or sidewalk. Its right-of-way is 66 feet. The southern 220 feet is gravel, and is in fair condition.

Taft Road was previously chip sealed in 2006-2007.

The pavement surface is in fair to poor condition with a number of potholes and spot locations with poor pavement. There is evidence of both recent and older patching along the roadway. The southern 200 feet of Taft Road is gravel, and is in good condition.

We recommend chip sealing, with full depth pavement and crack repairs and crack sealing. Failed areas would be removed and replaced with full depth HMA and aggregate base repair completed as needed.

The estimated cost for the recommended improvements is \$31,100.

