City of Hudson Road Tour

Summary of Street Selection, PCI Rating and Pavement Distresses

July 11, 2020

The City of Hudson selects streets for resurfacing using four major categories:
(1) Condition Rating or PCI, (3) proximity to other streets selected for resurfacing and
(2) Average Daily Traffic (ADT), (4) interaction with other capital improvement projects.

The primary factor selecting local streets (non-state routes) to be paved is a street's Pavement Condition Index (PCI). The PCI is an ASTM standardized method used to establish a numerical "rating" of the street. The ratings range from 0 to 100 with 100 being the best and 0 being the worst condition. Most streets in Hudson are considered Fair or better (see Figure 1 below).

Condition Category	PCI Range	% of Streets
Excellent	92-100	30.2%
Very Good	82-91	20.1%
Good	68-81	15.1%
Fair	50-67	26.6%
Poor	35-49	7.8%
Very Poor	20-34	0.2%
Failed	0-19	0.0%
		100.00%

Fig. 1 - PCI Ratings & Distribution in Hudson

Load Related Distress	Climate Related Distresses	Other Types of Distresses
Alligator Cracking	Block Cracking	Bleeding
Edge Cracking	Joint Reflection	Bumps and Sags
Pothole	L&T Cracking	Corrugation
Rutting	Raveling	Depression
Shoving	Weathering	Lane/Shoulder Drop
Slippage Cracking		Patch/Utility Cut
		Polished Aggregate
		Railroad Crossing
		Swell

Fig. 2 – Types of Pavement Distresses

Figure 2 above notes the types of factors used to determine a streets PCI rating. In order to determine the street's PCI, a field inspection takes place and the types of pavement distress including area and severity for the street are identified. The most common types of pavement distresses found in Hudson are: (1) Alligator Cracking, (2) Block Cracking, (3) Longitudinal/Transverse Cracking, (4) Potholes and (5) Weathering. A description of each of these types of pavement distresses can be found below.

Alligator Cracking

Alligator or fatigue cracking is a series of interconnecting cracks caused by fatigue failure of the asphalt concrete surface under repeated traffic loading. Cracking begins at the bottom of the asphalt surface (or stabilized base) where tensile stress and strain are highest under a wheel load. The cracks propagate to the surface initially as a series of parallel longitudinal cracks. After repeated traffic loading, the cracks connect, forming many sided, sharp-angled pieces that develop a pattern resembling chicken wire or the skin of an alligator. Alligator cracking occurs in areas subjected to repeated traffic loading, such as wheel paths.

Block Cracking

Block cracks are interconnected cracks that divide the pavement into approximately rectangular pieces. The blocks may range in size from approximately 1 x 1 foot to 10 by 10 feet. Block cracking is caused mainly by shrinkage of the asphalt concrete and daily temperature cycling (which results in daily stress/ strain cycling). It is not load-associated.

Block cracking usually indicates that the asphalt has hardened significantly. Block cracking normally occurs over a large portion of the pavement area, but sometimes will occur only in non-traffic areas. This type of distress differs from alligator cracking in that alligator cracks form smaller, many-sided pieces with sharp angles.

Longitudinal and Transverse Cracking

Longitudinal cracks are parallel to the pavement's centerline. Transverse cracks extend across the pavement at approximately right angles to the pavement centerline. They may be caused by:

1. A poorly constructed paving lane joint.

2. Shrinkage of the AC surface due to low temperatures or hardening of the asphalt and/ or daily temperature cycling.

3. A reflective crack caused by cracking beneath the surface course, including cracks in PCC slabs (but not PCC joints).

Potholes

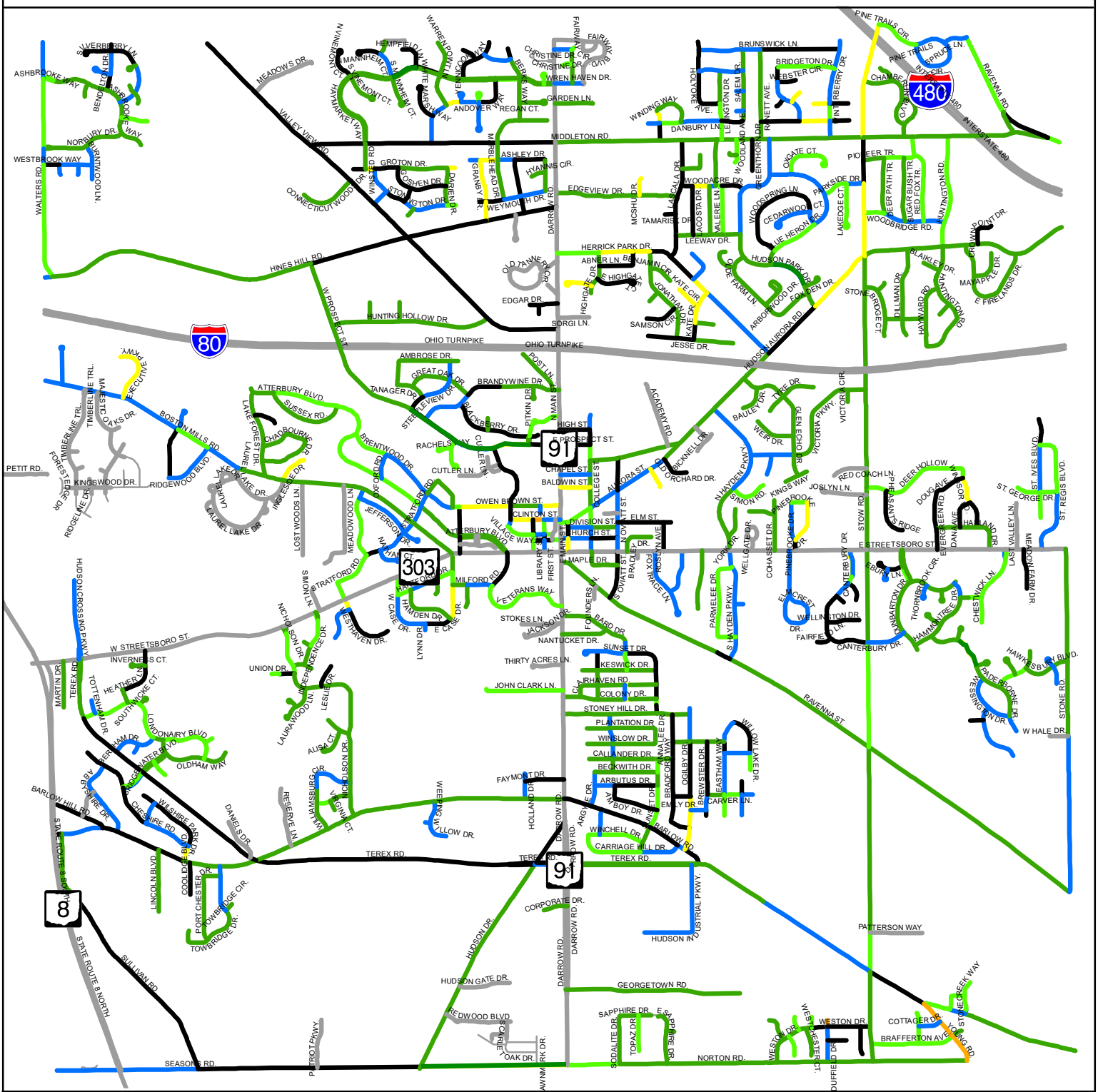
Potholes are caused by the expansion and contraction of water after it has entered into the ground under the pavement. When water freezes, it expands the base material under the pavement surface, causing bending, cracking and weakening of the surface. When ice melts, the pavement contracts and leaves gaps/voids under the surface, where more water can get in and be trapped. When the water freezes and thaws over and over, the pavement weakens continues to degrade and is then displaced by the weight of vehicles causing a pothole.

What happens when salt is brought into the picture? Water will freeze at 32 degrees Fahrenheit. When salt is used, it lowers the temperature that water will freeze. This creates an artificial freeze-thaw cycle that permits more occurrences of the damaging cycle to occur. This happens more often in the spring because of the melting that takes place and because the temperatures fluctuating above and below the freezing point very frequently.

Weathering

Weathering is caused by the wearing away of the asphalt binder and fine aggregate mixture. Weathering is normally caused by oxidation, inadequate compaction, insufficient asphalt content, excessive natural sand, surface water erosion, and traffic. Weathering occurs faster in areas with high solar radiation.

PCI Condition



PCI Rating

- NA
- 0-19 - Failed
- 20-34 - Very Poor
- 35-49 - Poor
- 50-67 - Fair
- 68-81 - Good
- 82-91 - Very Good
- 92-100 - Excellent
- Other Streets

N

OHIO HUDSON

0 0.5 1 Miles

DISCLAIMER:

All data on this map were created for the City of Hudson to assist City Departments in management and planning activities. The suitability of this map for any other use is not guaranteed and the user assumes all risk for such uses. The City of Hudson, Ohio, assumes no legal responsibility for the information on this map. Users noting errors or omissions are encouraged to contact the City of Hudson Geographic Information Services at 330-342-9541.

Map Compiled: July 2020

2020 Asphalt Program

StreetID	Street Location	From	To	Type of Work
1	Brandywine Drive	Darrow Road	Brandywine Bridge	Resurfacing
2	Clairhaven Drive	Colony Drive	Pavement Change	Resurfacing
3	Colony Drive	S. Main Street	Pavement Change	Resurfacing
4	Coolidge Blvd.	Barlow Road	Dead End	Resurfacing
5	Corporate Drive	Darrow Road	Summa Drive	Resurfacing
6	Foxdale Circle	Silverberry Drive	Loop	Resurfacing
7	Georgetown Road	Darrow Road	Dead End	Resurfacing
8	Hammontree Drive	Dunbarton Drive	Paderbourne Drive	Resurfacing
9	Haymarket Way	Mannheim Court	Warren Point	Resurfacing
10	Hudson Street	College Street	Aurora Street	Resurfacing
11	Middleton Road (Lowering)	Darrow Road	305' West	Lowering
12	Middleton Road (Resurfacing)	Darrow Road	Stow Road	Resurfacing
13	Norbury Drive	Walters Road	Ashbrooke Way	Resurfacing
14	Paderbourne Drive	Hammontree Drive	Curbed Area	Resurfacing
15	Pitkin Drive	Brandywine Drive	Loop	Resurfacing
16	Ravenna Street	S. Main Street	N. Hayden Parkway	Resurfacing
17	Seasons Road Ext.	Seasons Road	Dead End	Resurfacing
18	S. Mannheim Court	Haymarket Way	Cul-de-Sac	Resurfacing
19	Southdale Avenue	Colony Drive	Pavement Change	Resurfacing
20	Stoney Hill Drive	S. Main Street	Ogilby Drive	Resurfacing
21	Stow Road	W. Streetsboro Street	Hudson-Aurora Road	Resurfacing
22	Arborwood Drive	Olde Farm Lane	Circle	Overlay
23	Berks Way	N. Marblehead	Pavement Change	Overlay
24	Bauley Drive	Glenn Echo Drive	Cul-de-Sac	Overlay
25	Blue Heron Drive	Hudson Park Drive	Pavement Change	Overlay
26	Carriage House Court	Olde Farm Lane	Cul-de-Sac	Overlay
27	Chadbourne Drive	Lake Forest Drive	Lake Forest Drive	Overlay
28	Foxden Drive	Hudson Park Drive	Circle	Overlay
29	Glenn Echo Drive	Kings Way	Hudson-Aurora Road	Overlay
30	Hudson Park Drive	Hudson-Aurora Road	Pavement Change	Overlay
31	Kings Way	Cul-de-Sac	Cul-de-Sac	Overlay
32	N. Marblehead Drive	Middleton Road	Cul-de-Sac	Overlay
33	Olde Farm Lane	Hudson Park Drive	Hudson Park Drive	Overlay
34	Sussex Road	Atterbury Blvd.	Atterbury Blvd.	Overlay
35	Tyre Drive	E. Cul-de-Sac	W. Cul-de-Sac	Overlay
36	W. Prospect Street	Hines Hill Road	Steepleview Drive	Overlay
37	Patching			Patching
38	MOT/MOB			1/2 Overlay; 1/2 Resurfacing

2020 Crack Sealing Program

	Street	From	To	Length (12' Lane miles)
1	Abbyshire Dr.	Cheshire Rd.	Barlow Rd.	0.80
2	Anna Lee Dr.	Plantation Dr.	Winslow Dr.	0.18
3	Blackfriars Ln.	Hammontree Dr.	Circle	0.24
4	Blue Heron Dr.	Hudson Park Dr.	Concrete Section	1.50
5	Canterbury Dr.	Stow Rd.	Dunbarton Dr.	0.40
6	Chamberlin Blvd.	Stow Rd.	#2910	0.50
7	Chamberlin Ct.	Chamberlin Blvd.	Cul-de Sac	0.20
8	Clairhaven Dr.	Sunset Dr.	Pavement Change	0.26
9	Colony Dr.	Sunset Dr.	Pavement Change	0.26
10	Hawkesbury Blvd.	Stone Rd.	Pickerington Way	0.50
11	Haymarket Way	Middleton Rd.	Mannheim Ct.	1.83
12	Hollis Blvd.	SR 303	Dunbarton Dr.	0.35
13	Hudson Crossings	SR 303	Cul-de-Sac	1.30
14	Inverness Ct	Heather Ln.	Circle	0.20
15	Jefferson Dr.	Prescott Dr.	Circle	0.78
16	Londonairy Cir.	Londonairy Blvd.	Cul-de-Sac	0.16
17	Morning Song Ln	SR 91	W. Prospect St.	0.51
18	N. Westhaven	SR 303	Stratford Rd.	0.20
19	Paderborne Dr.	#6396	Cul-de-Sac	1.06
20	Partridge Meadows Ct.	Partridge Meadows Dr.	Partridge Meadows Dr.	0.09
21	Partridge Meadows Dr.	SR 91	Wren Haven Dr.	0.51
22	Pickerington Way	Paderbourne Dr.	Cul-de-Sac	0.52
23	Plantation Dr.	Anna Lee Dr.	Cul-de Sac	0.70
24	Prescott Dr.	Stratford Rd.	Boston Mills Rd.	0.70
25	Rotherby Cir.	Pickerington Way	Circle	0.26
26	SR 303	WCL	ECL	17.75
27	Sherborne Ln.	Dunbarton Dr.	Circle	0.20
28	Southwicke Ct.	Londonairy Blvd.	Circle	0.14
29	Stratford Dr.	Prescott Dr.	N. Westhaven Dr.	0.42
30	Thackery Ln.	Hammontree Dr.	Cheswick Ln.	0.20
31	Thornebrook Cir	Dunbarton Dr.	Circle	0.20
32	Weir Dr.	Glen Echo Dr.	Cul-de Sac	0.24
33	Winslow Dr.	Anna Lee Dr.	Cul-de Sac	0.70
34	Wren Haven Dr.	SR 91	Private section	0.25
			Total Lane Miles	***34.11***

Street Project Definition Alternates				
35	Keswick Dr.	Sunset Dr.	Cul-de-Sac	0.72
36	Bard Dr.	S. Main St.	Sunset Dr.	0.74
37	Salem Dr.	Brunswick Ln.	Danbury Ln.	0.68
38	Manor Dr.	E. Streetsboro St.	Cul-de Sac	0.62
39	Dunbarton Dr.	Dead End	Dead End	1.28
40	Hammontree Dr.	Dunbarton Dr.	Paderbourne Dr	
			Total Alternate Lane Miles	***4.70***

Street Project Definition Alternates – Parking Lots				
41	Hudson Springs Park	Parking Area Only		36,000 sf
42	Cascade Park	Excluding Basketball Area		
43	Ellsworth Golf	West of Club House		70,312 sf
44	Oak Grove Park	by Baseball Field		18,100 sf
45	Veterans Way Park	Both Parking Lots		45,734 sf

2021 Proposed Asphalt Program

Street Name	From	To	Type of Work	PCI
Clinton St.	Morse Rd.	Pavement Change	Mill & Resurface	30
Westhaven	W. Streetsboro St.	Dead End	Mill & Resurface	36
Lacosta Dr.	Leeway Dr.	Woodacre Dr.	Mill & Resurface	37
W. Highgate Ct.	Highgate Dr.	Loop	Mill & Resurface	38
Kate Dr.	Herrick Park Dr.	Jesse Dr.	Mill & Resurface	38
Stow Rd.	Middleton Rd.	NCL	Mill & Resurface	39
Kate Cir	Kate Dr.	Cul-De-Sac	Mill & Resurface	41
Easthaven Dr.	Rannett Ave.	Cul-De-Sac	Mill & Resurface	41
E. Blackthorne Cir.	Princewood Dr.	Cul-De-Sac	Mill & Resurface	41
Ebury Ln.	Hollis Blvd.	Loop	Mill & Resurface	41
Hudson-Aurora Rd.	Herrick Park Dr.	Stow Rd.	Mill & Resurface	41
McShu Dr.	Edgeview Dr.	Cul-De-Sac	Mill & Resurface	42
Herrick Park Dr.	Highgate Dr.	Johnathan Dr.	Mill & Resurface	43
Crown Point Dr.	Hudson-Aurora Rd.	Cul-De-Sac	Mill & Resurface	43
W. Blackthorne Cir.	Princewood Dr.	Dead End	Mill & Resurface	44
Princwood Dr.	Easthaven Dr.	Bridgeton Dr.	Mill & Resurface	44
Canterbury Dr.	E. Streetsboro St.	Stow Rd.	Mill & Resurface	44
Morse Rd.	Dead End (south)	W. Prospect St.	Mill & Resurface	45
Ellsworth Hill Dr.	Cul-de-Sac	Cul-De-Sac	Mill & Resurface	45
Wellington Cir	Canterbury Dr.	Cul-De-Sac	Mill & Resurface	45
Blackberry Dr.	Brandywine Dr.	Cul-De-Sac	Mill & Resurface	45
Canterbury Ct.	Canterbury Dr.	Cul-De-Sac	Mill & Resurface	46
Fairfield Ln.	Canterbury Dr.	Cul-De-Sac	Mill & Resurface	47
Stow Rd.	Hudson-Aurora Rd.	Middleton Rd	Mill & Resurface	47
Middleton Road	Valleyview Rd.	Darrow Rd.	Mill & Resurface	47
Barlow Hill Rd.	Barlow Rd.	Dead End	Mill & Resurface	51
Abner Ln.	Herrick Park Dr.	Highgate Dr.	Mill & Resurface	56
Ingleside Dr.	Rebuilt Bridge	Property Line	Mill & Resurface	56
Webster Cir.	Princeton Dr.	Cul-de-Sac	Mill & Resurface	60
Ebury Cir.	Ebury Ln.	Cul-De-Sac	Mill & Resurface	66
Brewster Dr.	Mayflower Dr.	Dead End	Asphalt Overlay	65
Carver Ln.	Eastham Way	Cul-De-Sac	Asphalt Overlay	81
Chatham Way	Dead End	Cul-De-Sac	Asphalt Overlay	65
Eastham Way	Dead End	Cul-De-Sac	Asphalt Overlay	74
Miles Standish Ln.	Willow Lake Dr.	Eastham way	Asphalt Overlay	71
Willow Lake Dr.	Eastham Way	Cul-De-Sac	Asphalt Overlay	73
Parmalee Dr.	S. Hayden Pkwy	S. Hayden Pkwy	Asphalt Overlay	88
Simon Rd.	N. Hayden Pkwy	Cul-De-Sac	Asphalt Overlay	88
Southdale Ave.	Sunset Dr.	Pavement Change	Asphalt Overlay	63
Sunset Dr.	Stoney Hill Dr.	Cul-De-Sac	Asphalt Overlay	65
Hickory Ln.	Westhaven	Cul-De-Sac	Asphalt Overlay	67

What Elected and Appointed Local Officials Need to Know *About*

Funding & Maintaining Pavement Maintenance

John G. Calvert
Director – Tennessee Public Works Institute

What Elected and Appointed Local Officials
Need To Know About Pavement Maintenance

Elected and appointed officials in today's government face many trials and tribulations in the process of performing the responsibilities that accompany their positions. The struggle to balance wants and needs with available funding seems to be never ending.

Each year the process of planning, preparing and approving operating budgets grows more cumbersome. Officials are often stuck between a rock and hard spot as they try to accommodate taxpayers desires for low tax rates in a manner that prevents reductions in services for the community. This becomes very difficult considering that the costs of goods, materials and services used by most governments continue to rise annually.

This task can be less stressful in communities that are fortunate to be in a growing mode. However, it can be very difficult and trying in communities that are experiencing very little or no growth. The pressure from citizens to hold property tax and utility rates steady each year is and will always bear heavily on officials responsible for delivering the goods and services their publics desire and often demand.

During times of tight budgets and reductions in funding officials sometimes make reductions in budgets submitted to them for maintenance of the public-owned infrastructures that surround them. This infrastructure includes a community's utilities such as electric, natural gas, water, wastewater and storm water systems. It includes public-owned buildings and facilities. It also includes roads, streets and highways and their related pavements.

In years past, elected and appointed officials of many communities in efforts to prevent rate increases chose to not provide the funding requested by department managers and directors for maintenance of water and wastewater systems. It is also possible that many of the utility managers chose not to ask for increases in funding believing their efforts would be in vain. Whatever the reason, it likely appeared at the time that those officials were helping reduce or minimize costs for their citizens and customers. However, the dollar saved in those past years is often costing the community three or four dollars today as many communities have had to drastically increase maintenance funding in order to comply with state or federal mandates related to the Clean Water Act. Some communities are now having to annually budget millions of dollars for utility infrastructure rehabilitation on systems that in years past failed to have the funding for adequate and proper maintenance.

One other vital public-owned infrastructure has been critically under funded for many years as well by many communities. Funding for maintenance of roads and streets has too often been an area often cut or reduced by elected officials as they toiled with reducing or minimizing tax increases in their community. This practice has ultimately resulted with many communities having streets whose pavements are in very poor and failing condition. Some streets are in such poor condition they are having to be completely reconstructed at costs that are four to five times that which would have been paid if they could have been simply resurfaced on a timely schedule and frequency.

The historical lack of adequate funding in many communities may be attributed to a number of reasons. As noted earlier it could be due to elected officials and their attempts to reduce budgets or minimize increases in funding and tax rates.
It could also be due to reluctance by city managers, public works and street directors or others who are hesitant to request the funding increases sufficient to allow for adequate maintenance believing their attempts would be in vain.

One other possible reason might be that the actual department director or other person responsible for street resurfacing and maintenance is somewhat fearful of asking for funding increases due to fear of how the request might be received by his or her

superior(s). Many city managers and administrators are advising all department heads to submit reduced budgets. As such, department leaders may believe it to be potentially detrimental to them if they made such a request.

And one more possible and very real reason for officials to not provide adequate funding for pavement maintenance could be attributed to a total lack of knowledge and/or understanding of pavements and how they age and deteriorate with time.

This is to be expected considering that most elected officials and city managers typically have no formal experience, education or training in pavement maintenance. They should have confidence in and expect their public works leaders and highway maintenance managers to provide them with background information in this area. However, it is quite common to find public works directors and engineers that actually have no real knowledge in the area of pavement maintenance as well. Many engineers I have known openly admit that they have no experience in this area and acknowledge that their college engineering courses did not address pavement maintenance in depth, but rather focused more on roadway and pavement design and construction.

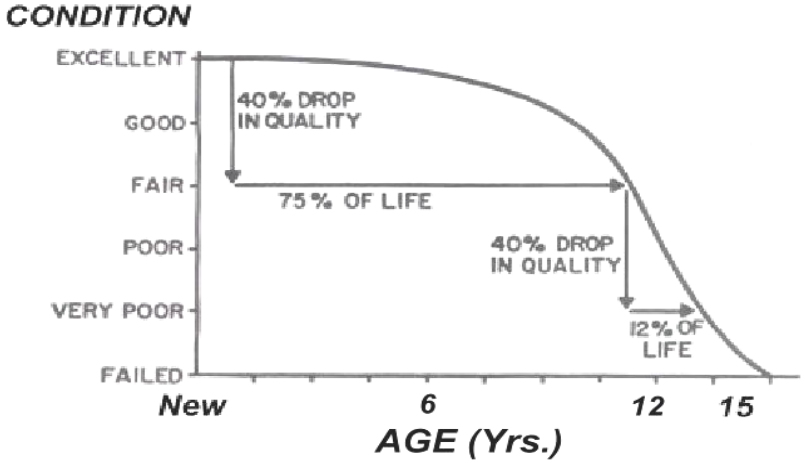
As such, there are ten basic but critical things that elected and appointed officials need to know about pavement maintenance and the consequences for failing to provide adequate annual funding for it.

1. Pavements begin aging and deteriorating the day they are constructed or applied.

2. On the average, most asphalt pavements have a cost-effective useful life of 15 years. Some will have a cost-effective life of only 10 to 15 years while others may have 15 to 20 years depending on design, structure, traffic volumes and weights and climate. This does not mean that pavements will completely fail after 12 to 15 years, although some do. It means that after that age the cost of performing routine maintenance on the pavement will greatly, but unnecessarily increase as the pavements develop more extensive cracking, pot holes, and other defects. Typically pavements remain in excellent to fair condition for the first five or six years of their life. Then after approximately 6 years they begin to exhibit cracking and loss of fine aggregates from the surface. Their condition slowly changes from excellent to fair over the first 11 or so years, then the condition dramatically deteriorates over the next 5 to 7 years as noted on the graph at the top of the following page.

3. In order to keep up with the average rate of deterioration, most independent agencies such a s be resurfa

Typical Asphalt Pavement Deterioration Curve



4. Cities and communities need to resurface 6.6% of their streets annually in order to keep up with the average rate of deterioration and have their pavements on a 15 year cycle.

5. The current (2009) average cost for resurfacing one mile of 25' wide roadway in Tennessee is approximately $80,000. It should be noted that the actual cost for cities and/or counties can vary depending on overlay thickness, volume of work, availability of multiple bidders to provide competitive pricing, and proximity from the lowest bidders to the work location.

6. A formula to use for calculating and determining how much approximate funding should be in a typical city or county's annual resurfacing budget is :

   Total Miles of Street (Centerline miles) X 6.6% X $80,000

   Example: City "A" has 100 centerline miles of street. It should have a resurfacing/contracts budget of $363,000 annually. Using the above formula…… **100 X 6.6% X $80,000 = $528,000.**

7. One dollar spent using proper preventive maintenance during a pavement's first five years of life can save three to four dollars over the pavement's next 10 to 15 years of life.

8. There are many time proven and cost effective preventive maintenance activities, such as penetrating asphalt rejuvenators that can be used during a pavement's first 1 to 5 years of life to extend its useful life from 15 to 20-25 years.

9. Cities can resurface more miles of pavement annually by using thinner hot-mix overlays such as 0.75" and 1.0" in depth rather than the historical and common 1.5" overlay. (One ton of asphalt mix placed at 0.75" thickness will cover twice the amount of pavement as one ton placed 1.5" thick.) Approximately 75% of most cities streets are in residential areas and do not need the thicker 1.5" overlay assuming the street has a sound structure.

10. Longer lasting pavements reduce an agency's pavement's life cycle cost per year. A pavement managed and maintained in a manner that provides for a 20 year life will have an annual life cycle cost that is approximately 25% lower than that of a 15 year pavement.

    Example:

    A. The annual life cycle cost for a 15 Year pavement one mile in length and applied at a cost of $80,000 per mile equals $80,000÷15 or $5,333 per year.

    B. The annual life cycle cost for the same pavement but with a 20 year life equals $80,000 ÷ 20 equals $4,000 per year, a savings of $1,333 per yr.

A survey conducted by the City of Oak Ridge in 2002 indicated that the average per cent of total miles resurfaced annually by the cities surveyed was approximately 4.5%. This amount equates to a 22 year resurfacing cycle, which means those cities are not keeping up with the rate at which pavements deteriorate. A 22 years cycle would result with the overall average condition of the pavements getting worst each year meaning more costly resurfacing and repair techniques would be required.

One of the cities surveyed averaged resurfacing only 1.6% of its streets annually. This means that the city was on a 62 year resurfacing cycle. That city has approximately 400 centerline miles of streets and therefore should have had approximately $1.4 Million in annual resurfacing funds and should have been resurfacing 26 or so miles each year. Instead that city only had an average of $500,000 in its annual resurfacing budget was falling behind on and essentially neglecting nearly 20 miles per year. Since the survey, the city has apparently seen the light of its errors and indicated it plans to spend $3.2 million over the next two years on resurfacing. To avoid future borrowings, the city will need to commit to budgeting of $1.6 Million per year every year afterwards or it will find itself in the same predicament within the next 5 to 10 years. It is good that this city's leaders have stepped up to the plate as their past practice might have otherwise been seriously frowned upon by upcoming GASB 34 guidelines and auditors.

The problems with proper pavement maintenance are not limited to the state of Tennessee. In fact, the Federal Highway Administration and the Federal Pavement Preservation task force has launched a new initiative referred to as Right Treatment for the Right Pavement at the Right Time. In essence they have acknowledged the problems with pavement maintenance by many city, county and state highway agencies across the nation and the fact that historically inadequate funding has been a major force behind the problem. Both agencies are trying to educate and emphasize to cities and counties the availability of cost effective preventive maintenance strategies that can greatly aid in addressing the problems of aging and deteriorating pavements.

So, in summary what can cities do to protect and maintain their costly road and street infrastructure?

First of all, its elected and appointed officials should use the noted formula to determine if the city has adequate funding for street resurfacing and preventive maintenance activities. If they don't meet the formula's calculation, they have no choice but to increase their budgets in a manner that meets that requirement, preferably the sooner the better, like within 1 to 3 years.

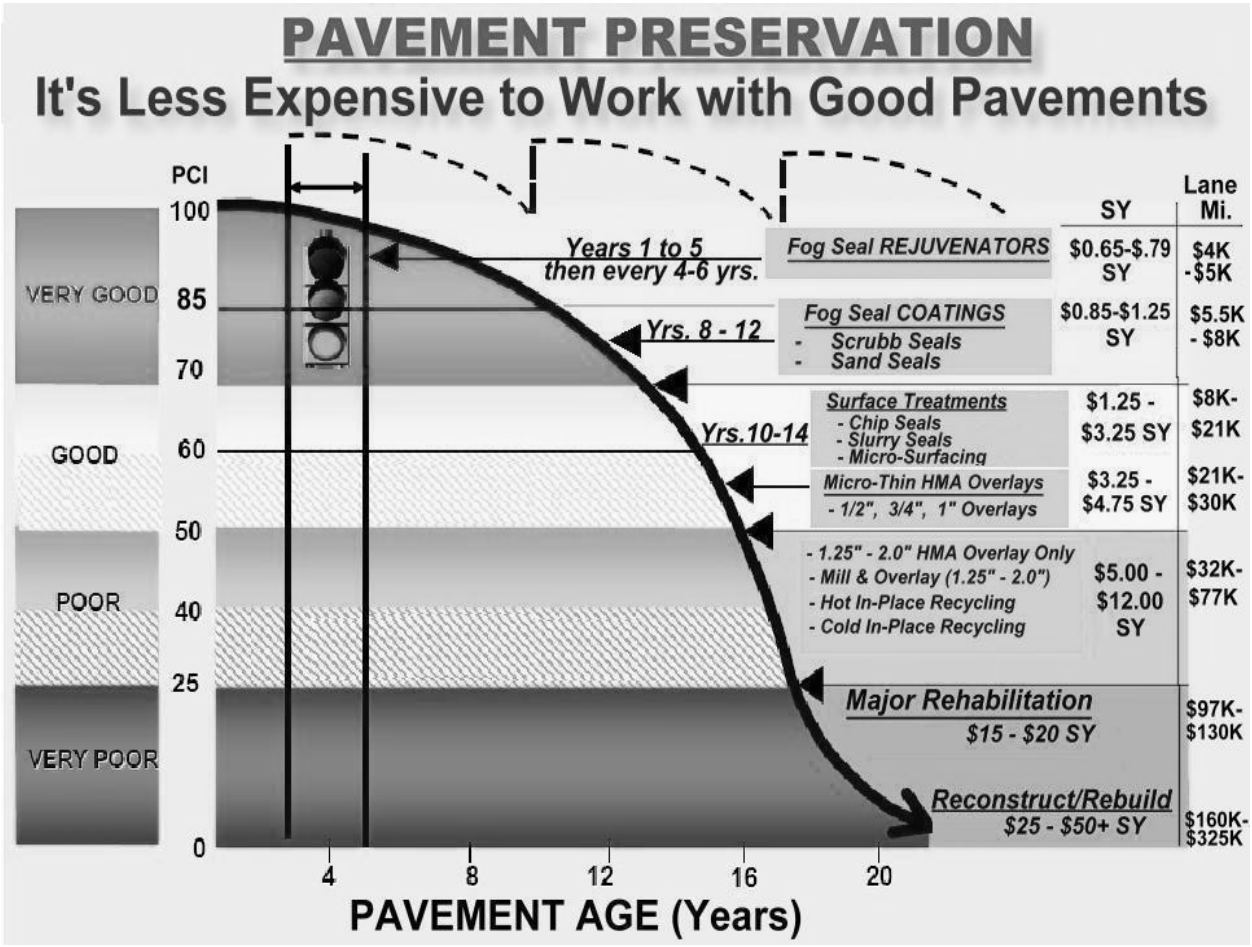
The cities should implement the use of an Enhanced Pavement Maintenance Program (EPMP) that uses a wide variety of both **preventive and corrective** maintenance activities rather than just a conventional 1.5" overlay.

The EPMP should include such activities as:

- **Preventive maintenance** activities including the use of:
    - Penetrating asphalt rejuvenators in years 1 to 5 of a pavement's life.
    - Restorative seals, slurry and micro-thin (1/2-inch) resurfacing for pavements 8 to 10 years old.
    - Crack filling and/or sealing on pavements 8 to 10 years old or older

- **<u>Corrective maintenance</u>** activities should include :
    - A variety of pavement milling techniques and depths including both Wedge and Whole Width milling techniques
    - A finer grade asphalt mix design for use with 0.75” , 1.0” and 1.25” thick overlays
    - Conventional asphalt mix designs for 1.5” thick overlays.

The graph below shows the various maintenance options and approximated costs that should typically be expected and/or used on pavements of various ages.



Elected and appointed city officials and city department heads and leaders should remember they are all on the SAME TEAM. It is all of their professional responsibilities to protect and adequately maintain their taxpayers public-owned roads and streets and other infrastructure. It is also their responsibility to provide sufficient funding and planning to ensure proper maintenance is provided, even when doing so might cause moderate to severe increases in funding levels and tax rates.

Their knowledge and understanding of the pavement deterioration process and maintenance strategies will allow them to properly educate or advise citizens of the reasons behind their decision making process.

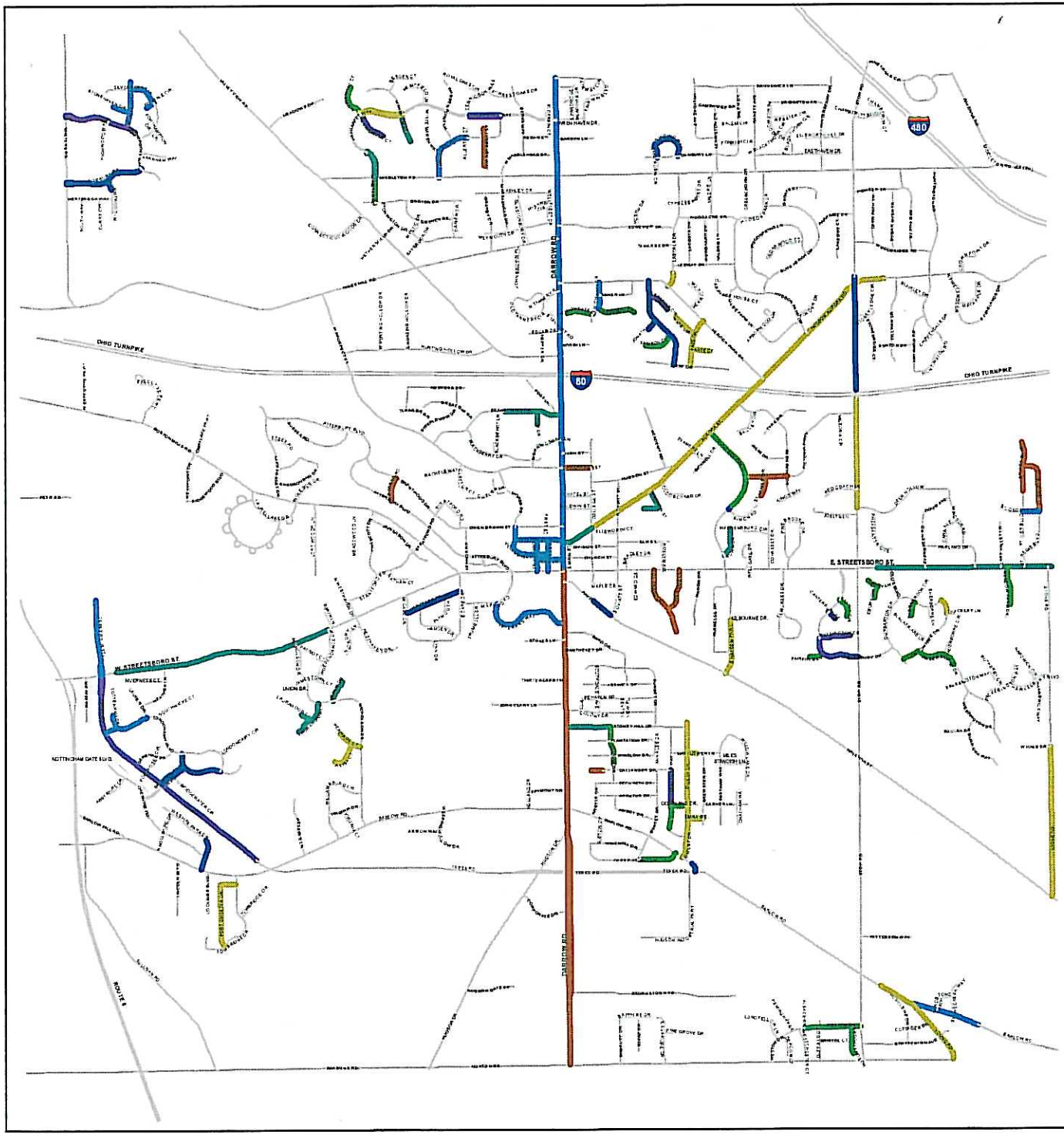
The elected officials have the ultimate and last decision when it comes to providing adequate funding for pavement maintenance. They can choose to ignore the situation in order to prevent tax increases (possibly in an attempt to insure reelection) or they can step up to the plate and do what is necessary. They need to remember during budget preparation that the pavement maintenance dollar they cut or save today will cost their taxpayers of tomorrow three to four dollars, if not more.

The old saying of "*pay me now or pay me later*" is right on when it relates to pavement maintenance, however, a truer version now might be "Pay me a $1 today or Pay me $5 later".

About The Author

John Calvert has over 30 years experience in municipal government and public works. He is a graduate of Middle Tennessee State University and retired from the City of Oak Ridge as Public Works Division Manager in 2003 after 28 years of service. He joined the staff of Pavement Technology, Inc. in July 2003 as technical consultant for the company where he meets and works with local and state public works and highway officials across the nation. He also serves as Director of the Tennessee Public Works Institute and Administrator of the Tennessee Chapter of the American Public Works Association.

He has been a speaker and presenter on pavement maintenance at APWA national and state conferences and served as APWA's Speaker on Pavement Preservation for its 2007 nationwide live webcast on Pavement Maintenance. He has also taught pavement maintenance classes for the UTAH LTAP and UTAH League of Cities "Road School", the University of Tennessee TTAP (LTAP) Office and the National Center for Pavement Preservation funded by the FHWA. He has written various articles for Tennessee Public Works Magazine, the APWA Reporter national magazine and other associations.



Asphalt Replacement Streets 1999-2005

Lane Miles North of 303 = 219.74
Lane Miles South of 303 = 162.58

Legend

- 2005
- 2004
- 2003
- 2002
- 2001
- 2000
- 1999
- No Data

0 0.5 1
Miles

N

CITY OF HUDSON

DISCLAIMER:

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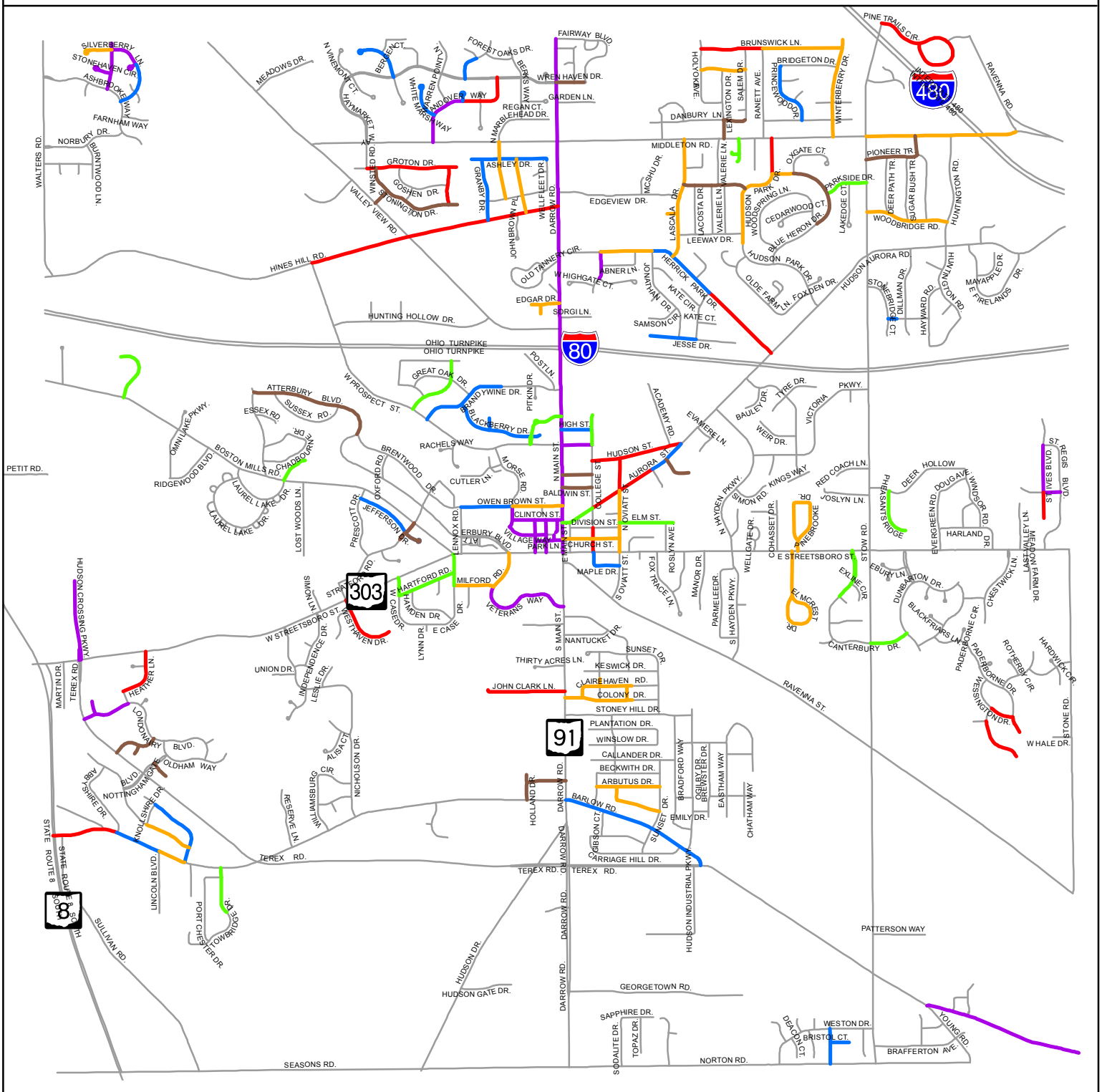
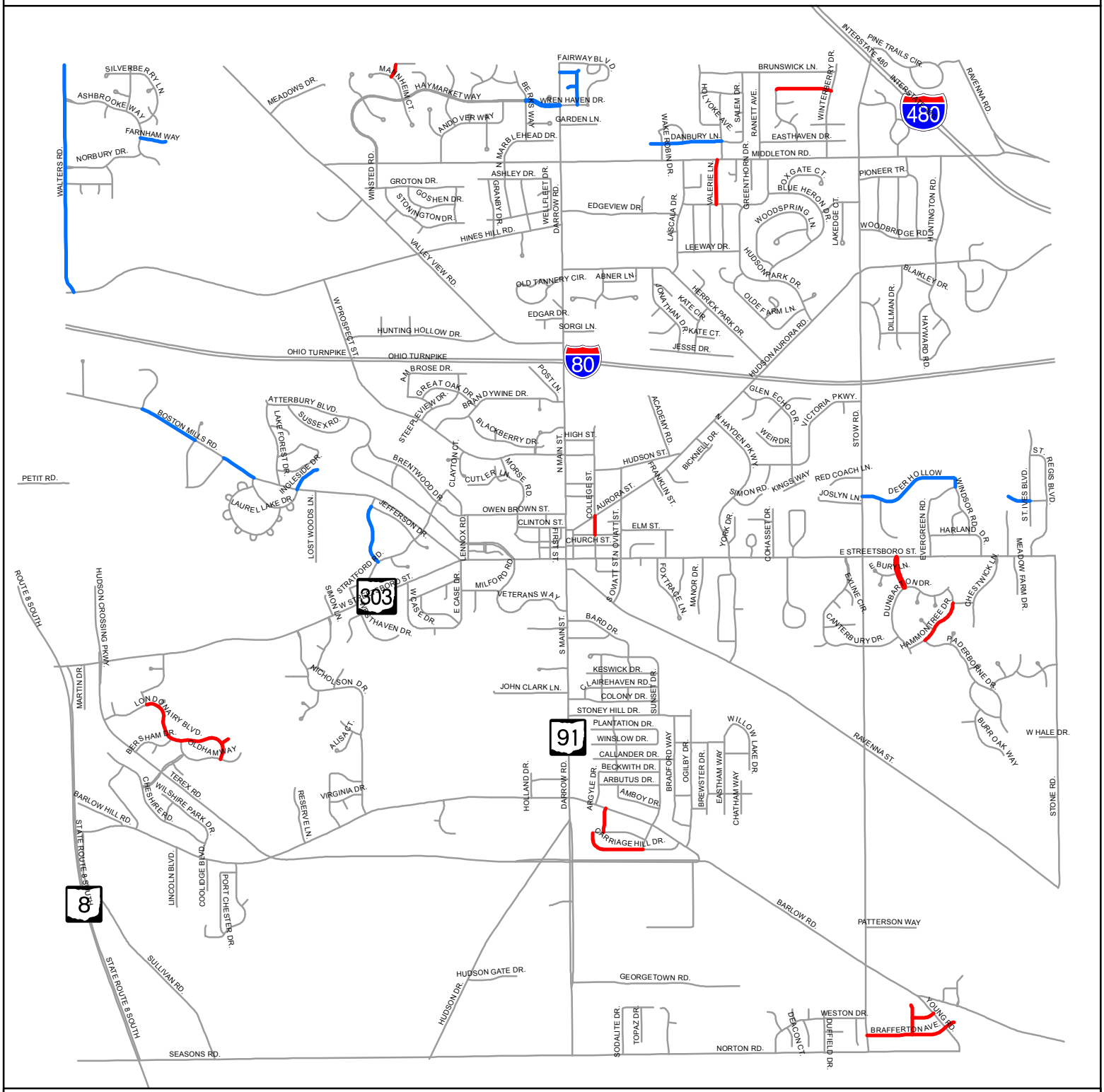
Asphalt Program 2005-2010



Asphalt Program 2011-2012



Year - Lane Miles

- 2012 - 5.9
- 2011 - 7.5
- Other Streets

N

0 0.5 1
Miles

CITY OF HUDSON

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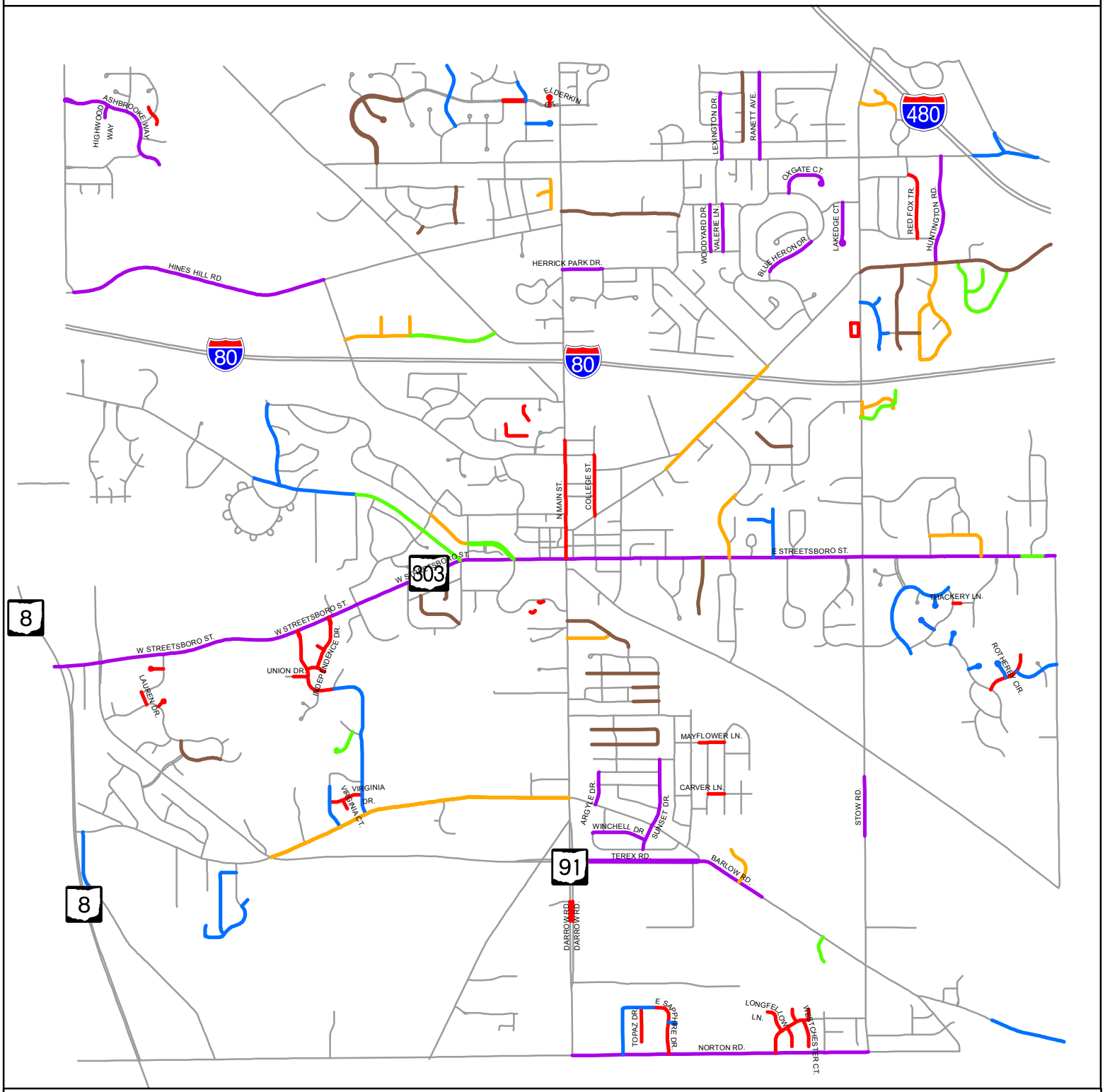
Map Compiled: October 2012

Asphalt Program 2013-2018



2018
2014
2017
2013
2016
Other Streets
2015

N

0 0.5 1
Miles

OHIO
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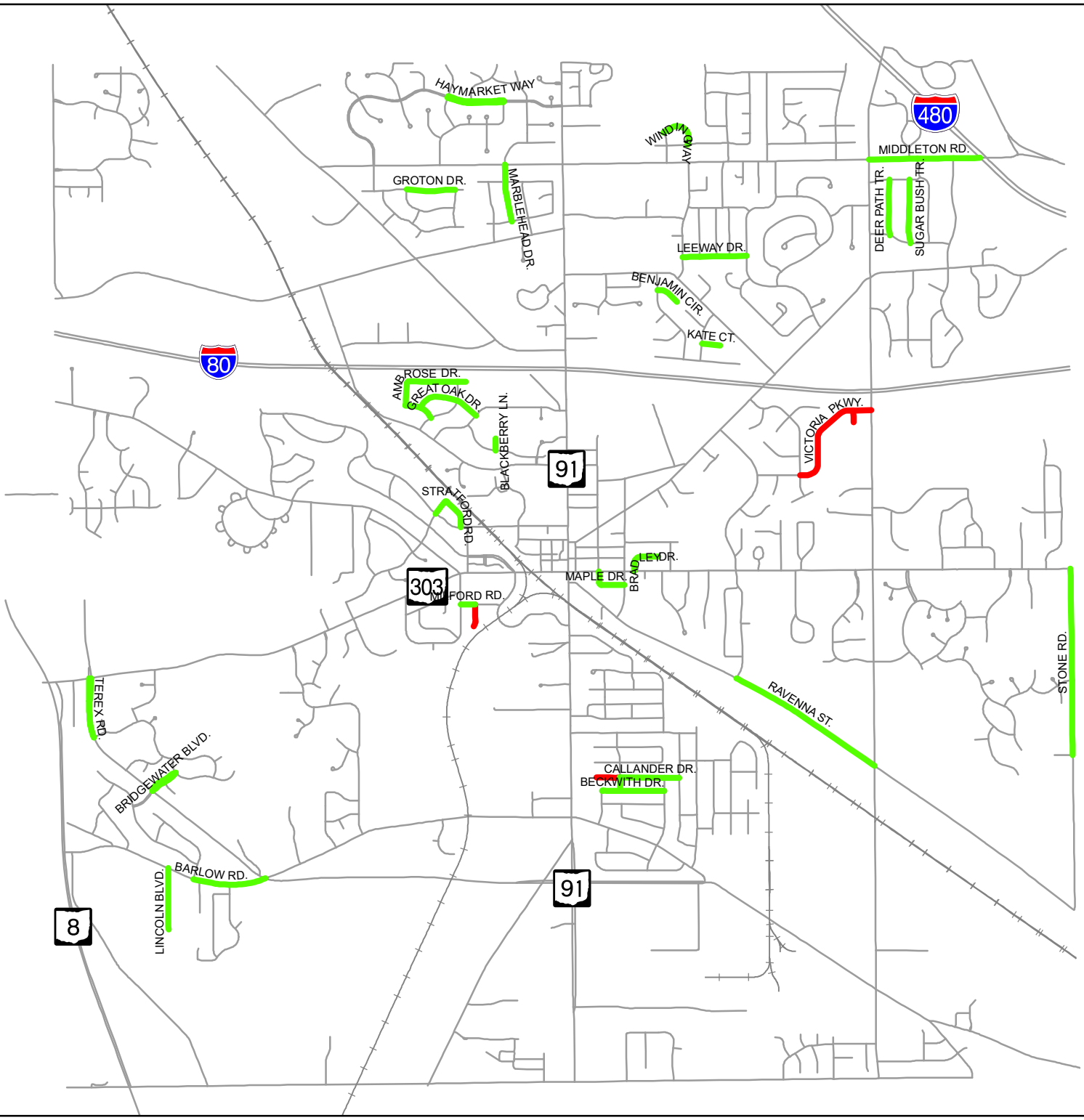
Map Compiled: March 2018

Asphalt Program 2019



Asphalt Program - Resurfacing - 2019

Asphalt Program - Overlay - 2019

Railroads

Streets

N

0 0.5 1

Miles

OHIO HUDSON

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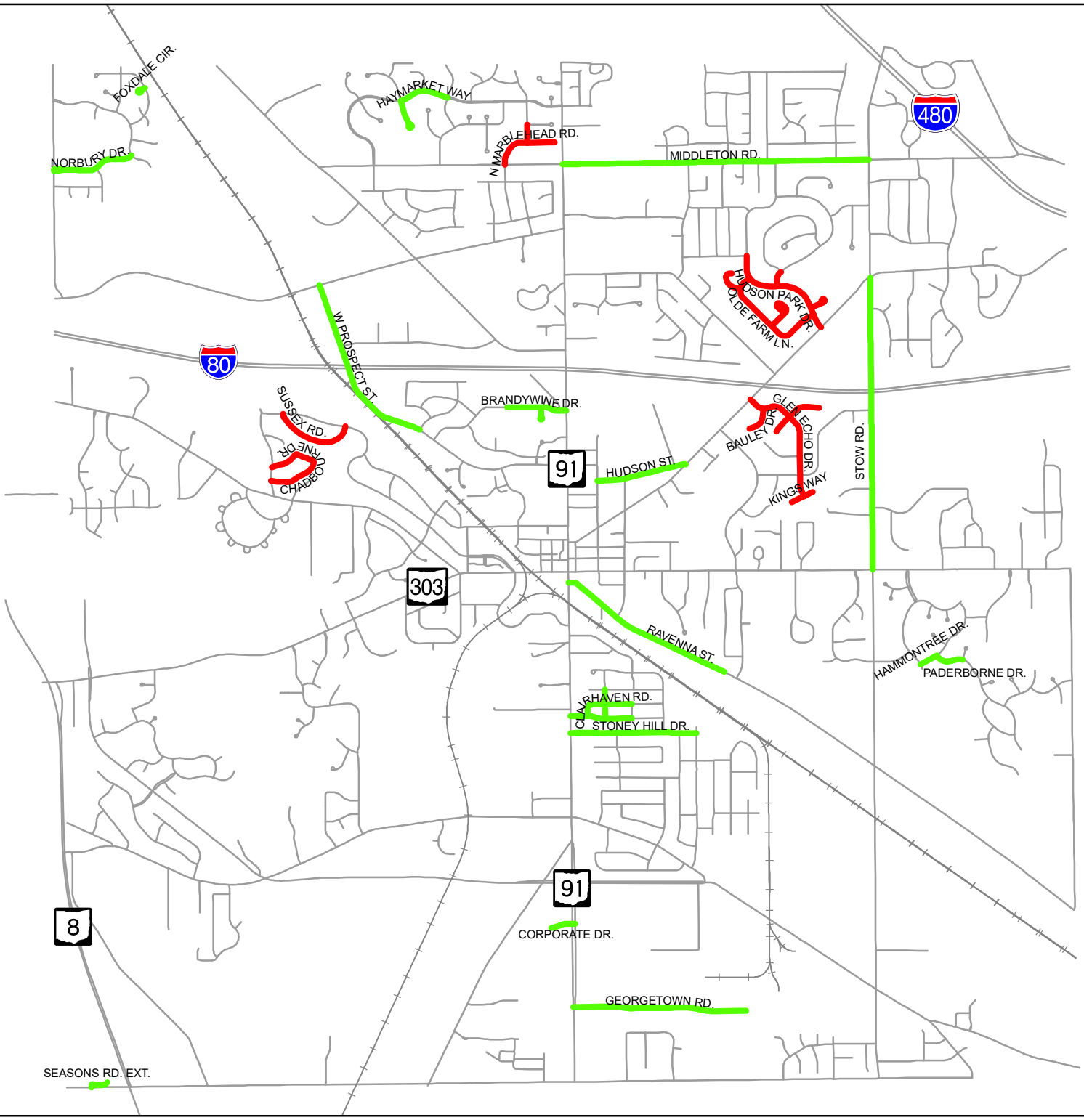
Map Compiled: June 2020

Asphalt Program 2020



- Asphalt Program - Overlay - 2020
- Asphalt Program - Resurfacing - 2020
- Railroads
- Streets

N

0 0.5 1
Miles

OHIO HUDSON

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Map Compiled: June 2020

CITY OF HUDSON, OHIO
FIVE YEAR PLAN - CAPITAL IMPROVEMENT SUMMARY

Project Codes: 1=Mandated 2=Necessary 3=Desirable 4=Includes grant funding and/or timing impacted by grant funding 5= Return on Investment

		Project Code	2020	2021	2022	2023	2024	Unfunded	Total
	Street & Sidewalk Construction Fund								
1	Annual Reconstruction/Resurfacing Program	2	$2,200,000	$2,460,000	$2,450,000	$2,450,000	$2,445,000		$12,005,000
2	Annual Debt Payment on Major Road Resurfacing Bond	3	$0	($265,000)	($265,000)	($265,000)	($265,000)		($1,060,000)
3	Annual Asphalt Patching Program	2	$100,000	$100,000	$100,000	$100,000	$100,000		$500,000
4	Annual Concrete Road Overlay	2	$0	$0	$0	$0	$0		$0
5	Annual Concrete Program	2	$125,000	$125,000	$125,000	$125,000	$125,000		$625,000
6	Annual Striping Program	2	$180,000	$185,000	$185,000	$185,000	$185,000		$920,000
7	Annual Crack Sealing	2	$95,000	$95,000	$105,000	$105,000	$110,000		$510,000
	Total Annual Street & Sidewalk Construction Program		**$2,700,000**	**$2,700,000**	**$2,700,000**	**$2,700,000**	**$2,700,000**	**$0**	**$13,500,000**
	Street & Sidewalk Individual Projects - Financed								
1	Concrete Overlays	3	$1,150,000	$1,150,000					$2,300,000
	Total Street & Sidewalk Individual Projects - Financed		**$1,150,000**	**$1,150,000**	**$0**	**$0**	**$0**	**$0**	**$2,300,000**
	Street Improvement Projects - Pay as you go								
1	S. Main St. (Barlow to Veterans Way) Project (Final Design) (1)	4	$75,000						$75,000
2	S. Main St. (Barlow to Veterans Way) Project (Construction) (1)	4			$600,000				$600,000
3	Adaptive Signals for Downtown (Design)	2	$200,000						$200,000
4	Adaptive Signals for Downtown (Construction)	2		$1,000,000					$1,000,000
5	Hines Hill Road RxR Grade Separation Project (Design)	3						$2,000,000	$2,000,000
6	College Street & Hudson Street Crosswalk Enhancements	3	$90,000						$90,000
7	SR 91 Turn Lanes (Construction Management)	3	$450,000						$450,000
8	Park Ln @ 91 Crosswalk Enhancement	2	$30,000						$30,000
9	Ingleside Drive Bridge (ODOT Project, RW Services) (2)	4	$30,000						$30,000
10	Blackberry Bridge Wingwall Repair	2	$75,000						$75,000
11	Ingleside Drive Bridge (ODOT Project, Construction/Mgnt) (2)	4		$300,000					$300,000
12	Barlow Road/Young Road Intersection Design	3		$60,000					$60,000
13	Barlow Road/Young Road Intersection Construction	3						$850,000	$850,000
14	Owen Brown St. Partial Recon. & Traffic Calming w Brick Accents (Curb & Storm Imp - See storm accont 504)	3			$200,000				$200,000
15	S. Main Street Sidewalk Improvement @ ODOT Bridge	4				$225,000			$225,000
16	SR 303 West Downtown Corridor Imp.(SR 91 to Boston Mills) - Lane Reconfigure. Design	3				$150,000			$150,000
17	Citywide Guardrail Replacement Program	2				$125,000			$125,000
18	AMATS Project Placeholder (3)	3					$1,000,000		$1,000,000
	Total Street Improvement Projects - Pay as you go		**$950,000**	**$1,360,000**	**$800,000**	**$500,000**	**$1,000,000**	**$2,850,000**	**$7,460,000**
	TOTAL STREET & SIDEWALK PROJECTS		**$4,800,000**	**$5,210,000**	**$3,500,000**	**$3,200,000**	**$3,700,000**	**$2,850,000**	**$23,260,000**