CLINTON COUNTY ROAD COMMISSION
2023 Transportation Asset Management Plan

A plan describing the CLINTON COUNTY ROAD COMMISSION's transportation assets and conditions

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EXECUTIVE SUMMARY

As conduits for commerce and connections to vital services, roads and bridges are some of the most important assets in any community, and other assets like culverts, traffic signs, traffic signals, and utilities support and affect roads and bridges. The CLINTON COUNTY ROAD COMMISSION's (CCRC) roads, bridges, and support systems are also some of the most valuable and extensive public assets, all of which are paid for with taxes collected from ordinary citizens and businesses. The cost of building and maintaining these assets, their importance to society, and the investment made by taxpayers all place a high level of responsibility on local agencies to plan, build, and maintain roads, bridges, and support assets in an efficient and effective manner. This asset management plan is intended to report on how CCRC is meeting its obligations to maintain the public assets for which it is responsible.

This plan identifies CCRC's assets and condition and how CCRC maintains and plans to improve the overall condition of those assets. An asset management plan is required by Michigan Public Act 325 of 2018, and this document represents fulfillment of some of CCRC's obligations towards meeting these requirements. However, this plan and its supporting documents are intended to be much more than a fulfillment of required reporting. This asset management plan helps to demonstrate CCRC's responsible use of public funds by providing elected and appointed officials as well as the general public with the inventory and condition information of CCRC's assets, and it gives taxpayers the information they need to make informed decisions about investing in CCRC's essential transportation infrastructure.

INTRODUCTION

Asset management is defined by Public Act 325 of 2018 as "an ongoing process of maintaining, preserving, upgrading, and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment and investment to achieve established performance goals". In other words, asset management is a process that uses data to manage and track assets, like roads and bridges, in a cost-effective manner using a combination of engineering and business principles. This process is endorsed by leaders in municipal planning and transportation infrastructure, including the Michigan Municipal League, County Road Association of Michigan, the Michigan Department of Transportation (MDOT), and the Federal Highway Administration (FHWA). The CLINTON COUNTY ROAD COMMISSION is supported in its use of asset management principles and processes by the Michigan Transportation Asset Management Council (TAMC), formed by the State of Michigan.

Asset management, in the context of this plan, ensures that public funds are spent as effectively as possible to maximize the condition of the road and bridge network. Asset management also provides a transparent decision-making process that allows the public to understand the technical and financial challenges of managing transportation infrastructure with a limited budget.

The CLINTON COUNTY ROAD COMMISSION (CCRC) has adopted an "asset management" business process to overcome the challenges presented by having limited financial, staffing, and other resources while needing to meet road users' expectations. CCRC is responsible for maintaining and operating over 1195.487 centerline miles of roads and 123 bridge structures. It is also responsible for 2121 culverts and 12 signals.

This 2023 plan identifies CCRC's transportation assets and their condition as well as the strategy that CCRC uses to maintain and upgrade particular assets given CCRC's condition goals, priorities of network's road users, and resources. An updated plan is to be released approximately every three years both to comply with Public Act 325 and to reflect changes in road conditions, finances, and priorities.

Questions regarding the use or content of this plan should be directed to Marc Trotter P.E., Director of Engineering at 3536 S US HWY 27, ST JOHNS, MI 48879or at (989)-224-3274 and/or CCRC@CCRC-ROADS.COM.A copy of this plan can be accessed on our website at ccrc-roads.com.

1. PAVEMENT ASSETS

CCRC is responsible for 1195.487 centerline miles of public roads. An inventory of these miles divides them into different network classes based on road purpose/use and funding priorities as identified at the state level: county primary road network, which is prioritized for state-level funding, and county local road network.

Inventory of Assets

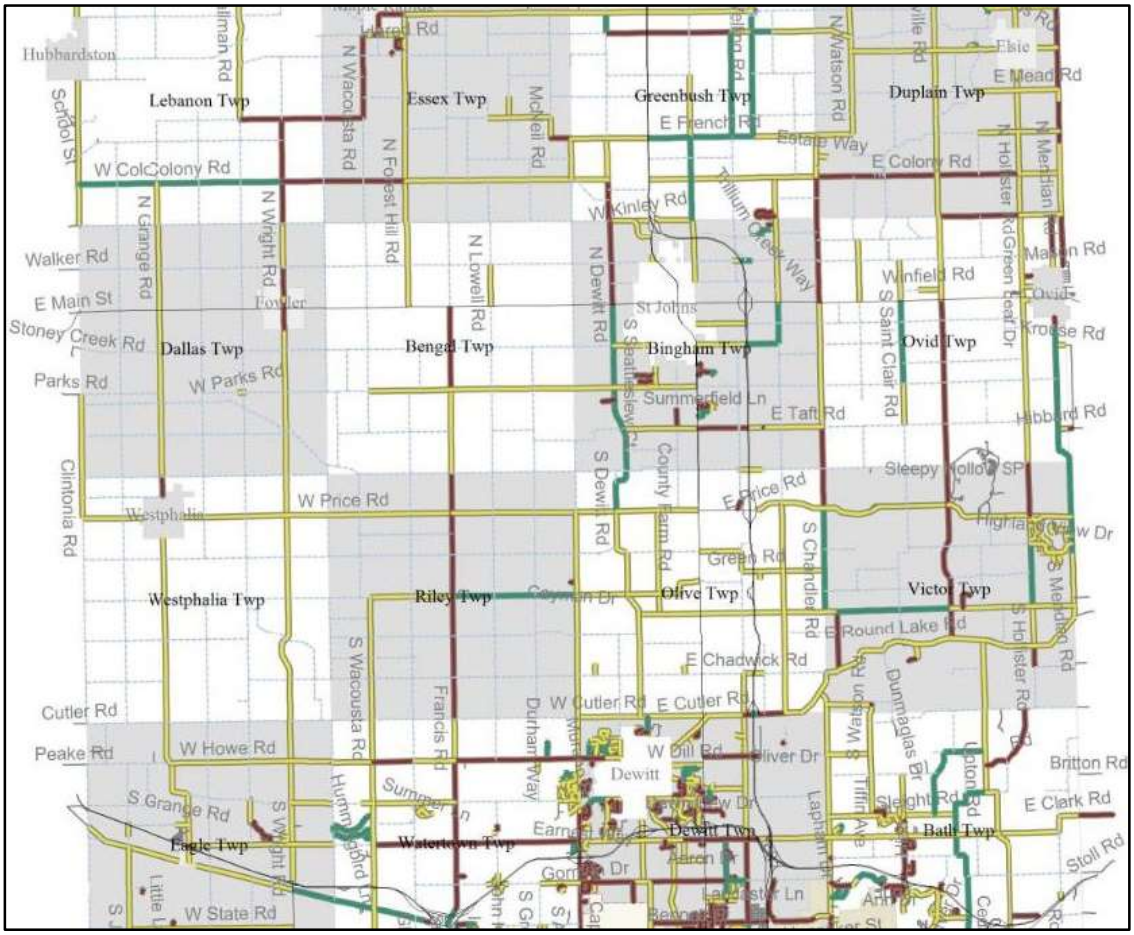


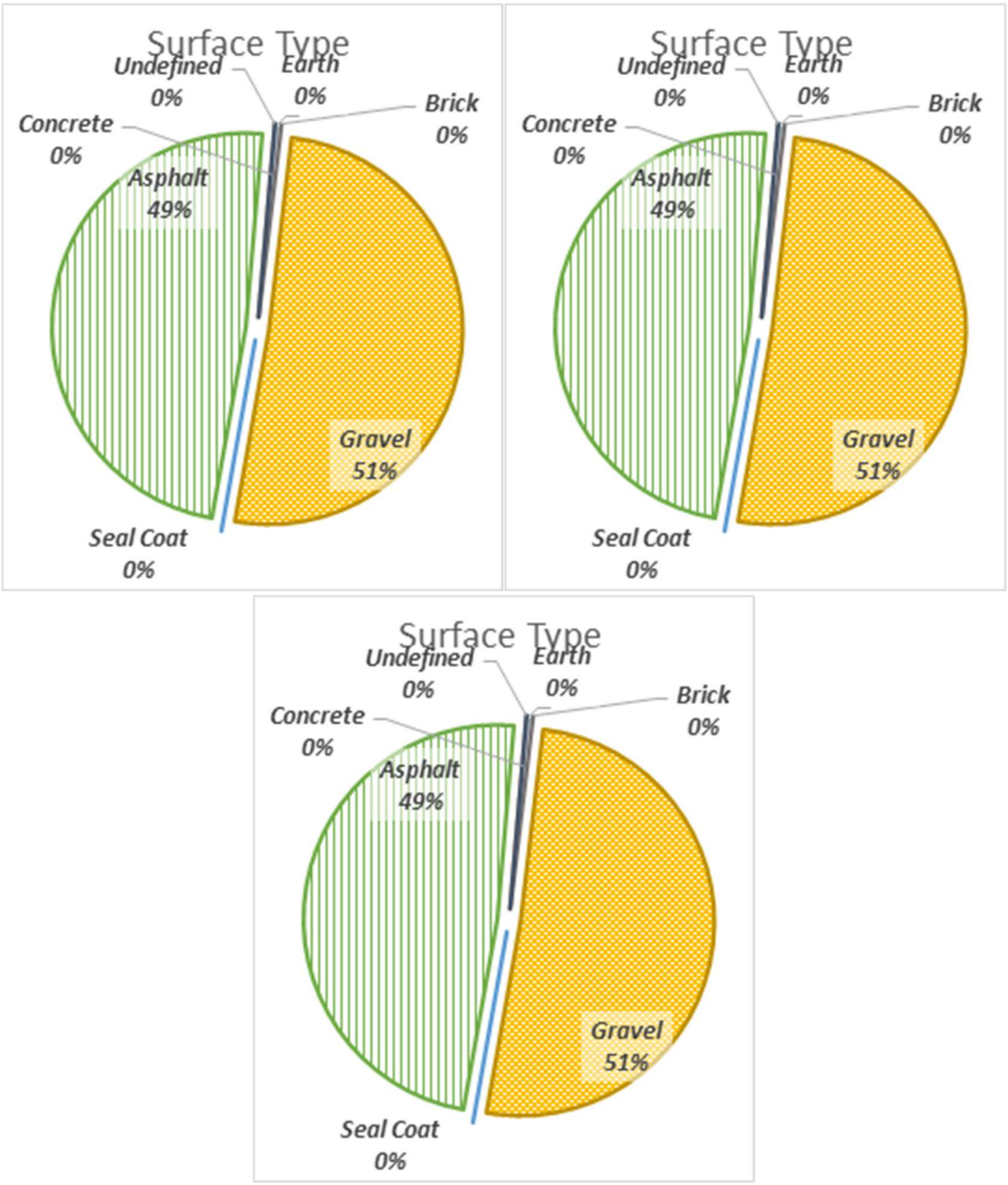
Figure 1: Map showing location or roads managed by CCRC and the current condition for paved roads in green for good (PASER 10, 9, 8), yellow for fair (PASER 7, 6, 5), and red for poor (PASER 4, 3, 2, 1) and for unpaved roads in blue

Of CCRC's 1195.487 miles of road, 353.694 miles are classified as county primary and 841.793 miles are classified as county local (Figure 1identifies these paved roads in green, yellow, and red with the colors being determined based on the road segment's condition). CCRC also manages 0 miles that are classified as part of the National Highway System (NHS); the NHS is subject to special rules and regulations and has its own performance metrics dictated by the FHWA. In addition, CCRC has 614.468 miles of unpaved roads (Figure 1 identifies these unpaved roads in blue).

More detail about these road assets can be found in CCRC's Roadsoft database or by contacting CCRC.

Types

CCRC has multiple types of pavements in its jurisdiction, including asphalt, sealcoat, concrete, and undefined; it also has unpaved roads (i.e., gravel and/or earth). ..Figure 2 shows a breakdown of these pavement types for all of CCRC's road assets.



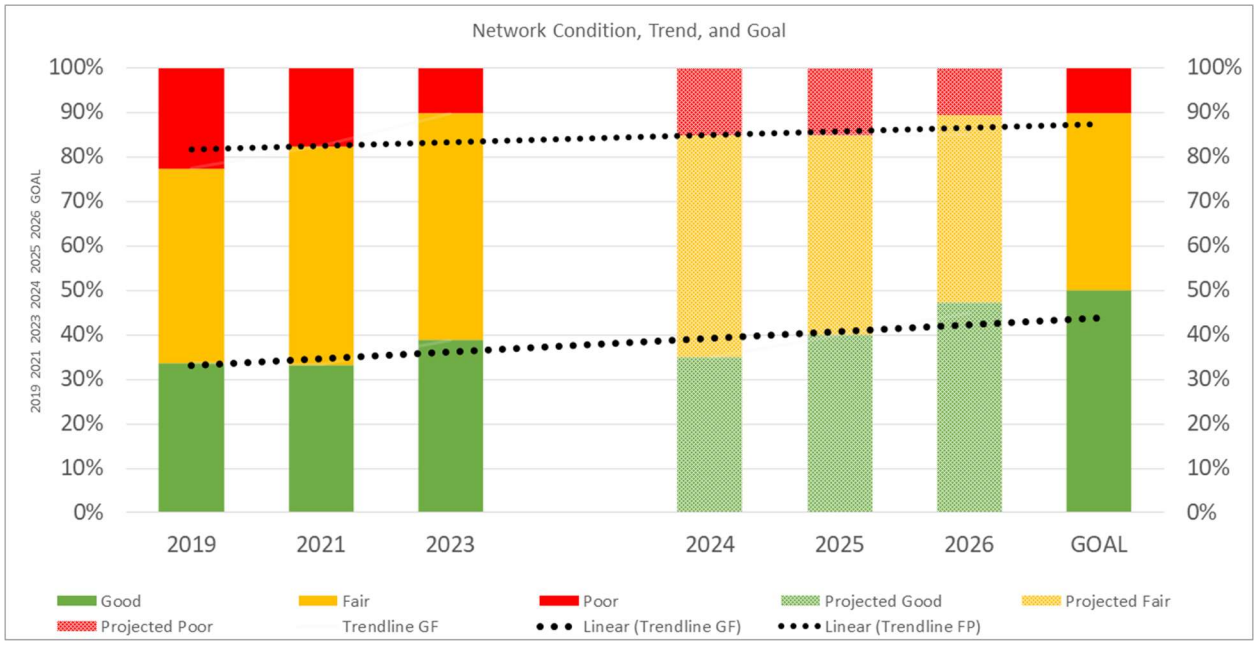
..Figure 2: Pavement type by percentage maintained by CCRC. Undefined pavements have not been inventoried in CCRC's asset management system to date, but will be included as data becomes available.

Condition, Goals, and Trend

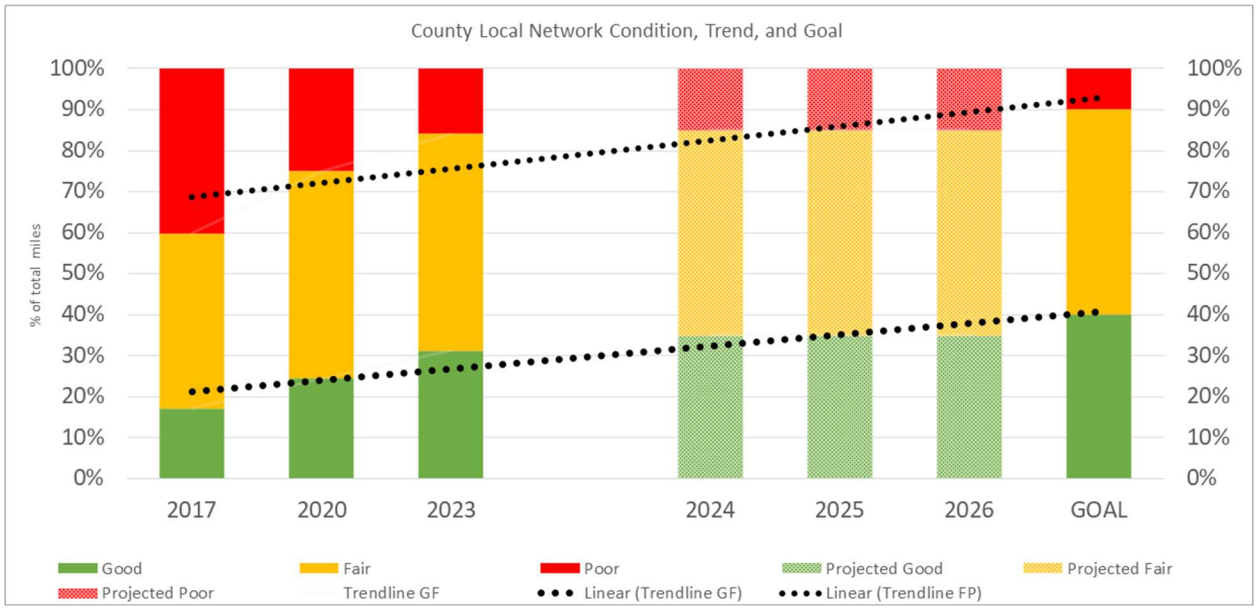
Paved Roads

Paved roads in Michigan are rated using the Pavement Surface Evaluation and Rating (PASER) system, which is a 1 to 10 scale with 10 being a newly constructed surface and 1 being a completely failed surface. PASER scores are grouped into TAMC definition categories of good (8-10), fair (5-7), and poor (1-4) categories. CCRC collects PASER data every two years on 100 percent of those portions of its county primary and county local networks that are eligible for federal funding. In addition, CCRC uses its own staff and resources to collect PASER data on 100 percent of its county primary and county local networks that are not eligible for federal funding.

Currently, the county primary network has 39% of its roads in good condition, 52% in fair condition, and 9% in poor condition, and the county local network has 35% of its roads in good condition, 52% in fair condition, and 12% in poor condition (..Figure 3 and ..Figure 4). CCRC's long-range goal for the county primary network is to have 50% of roads in good condition, 40% in fair condition, and 10% in poor condition, and for the county local network is to have 40% of roads in good condition, 50% in fair condition, and 10% in poor condition (..Figure 3 and ..Figure 4). ..Figure 3 and ..Figure 4 illustrate the historical and current condition (solid bars) of CCRC's county primary and county local networks, respectively; they also illustrate the projected trend (shaded bars), the overall trend in condition (trendlines), and CCRC's goal (final solid bar).



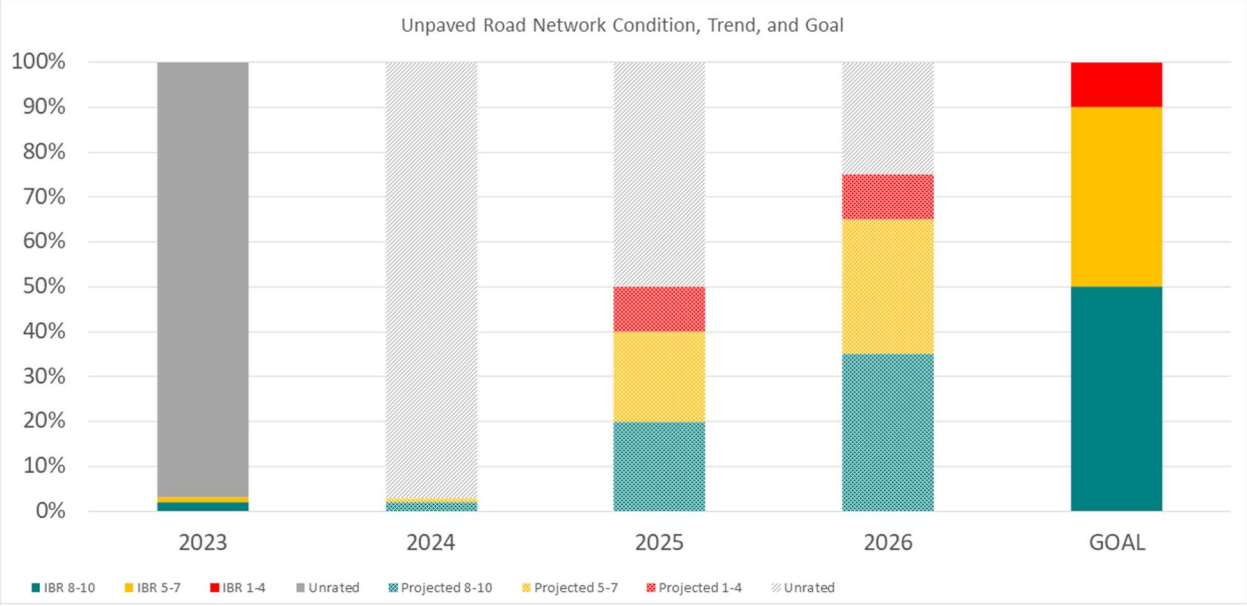
..Figure 3: county primary network condition, goals, and trend



..Figure 4: county local network condition, goals, and trend

Unpaved Roads

Unpaved roads rated with the Inventory-based Rating System™ receive an IBR number ranging from 1 to 10, with a 9 or 10 (less than one year old) having good surface width, good or fair drainage, and good structural adequacy and a 1 having poor surface width, poor drainage, and poor structural adequacy. IBR numbers can be grouped in a similar fashion as the TAMC definitions into good (8-10), fair (5-7), and poor (1-4) categories. ..Figure 5 illustrates the historical and/or current condition (solid bar[s]), the projected trend (shaded bars), and CCRC's goal (final solid bar).



..Figure 5: Distribution of IBR numbers for current condition (solid) and for goals (dotted)

Modelled Trends, Gap Analysis, and Planned Projects

Table 1: Roadsoft Modelled Trends, Planned Projects, and Gap Analysis for 's Road Assets

Network 1 (<353.694 miles)

Treatment	Annual Miles of Treatment	Years of Life	Trigger-Reset	Pavement Condition Forecast			
				Annual Miles of Treatment	Trigger-Reset	Annual Miles of Treatment	Trigger-Reset
Crack Seal	60	1	7 7	60	7 7	20	7 7
Chip Seal	80	5	5, 6-8	80	5, 6-8	20	5, 6-8
Overlay	6	10	3, 4-9	6	3, 4-9	4	3, 4-9
Resurface	4	18	1, 2, 3-10	4	1, 2, 3-10	8	1, 2, 3-10

Network 2 (841.793 miles)

Treatment	Annual Miles of Treatment	Years of Life	Trigger-Reset	Pavement Condition Forecast		Additional Work Necessary to Overcome Deficit	
				Annual Miles of Treatment	Trigger-Reset	Annual Miles of Treatment	Trigger-Reset
Crack Seal	10	1	7 7	10	7 7	5	7 7
Chip Seal	20	5	5, 6-8	20	5, 6-8	5	5, 6-8
Overlay	2	10	3, 4-9	2	3, 4-9	2	3, 4-9
Resurface	1	18	1, 2, 3-10	2	1, 2, 3-10	2	1, 2, 3-10

The Roadsoft network analysis of CCRC's planned projects for the county primary and county local networks from CCRC's currently-available budget does not allow CCRC to reach its pavement condition goals given the projects planned for the next three years.

Results from the Roadsoft for the county primary and county local network condition models indicate that the necessary additional work needed to meet the agency condition goal would cost an additional $2,000,000 per year.

Unpaved Road Condition Trends

Overall CCRC primary unpaved roads are in adequate condition with respect to roadway width, drainage, and gravel surface.

Planned Projects

CCRC has projects planned for the next three years. These projects are identified in Figure 6.

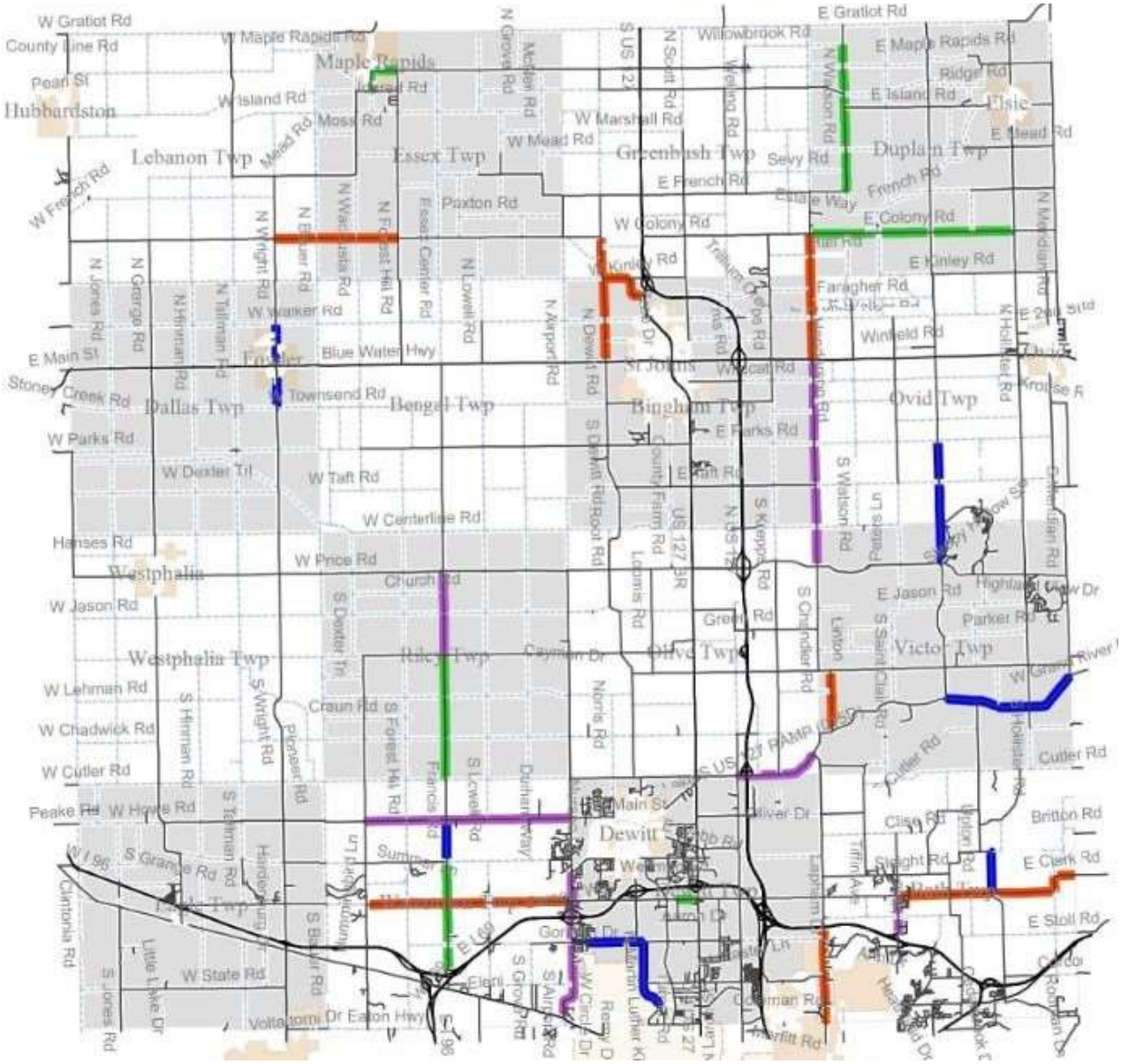


Figure 6 : Map illustrating planned projects for pavement assets

The total cost of the projects illustrated in Figure 6 is approximately $20,000,000

2. BRIDGE ASSETS

CCRC is responsible for 123 bridges that provide safe service to road users across the agency network. CCRC seeks to implement a cost-effective program of preventive maintenance to maximize the useful service life and safety of the local bridges under its jurisdiction.

Inventory of Assets

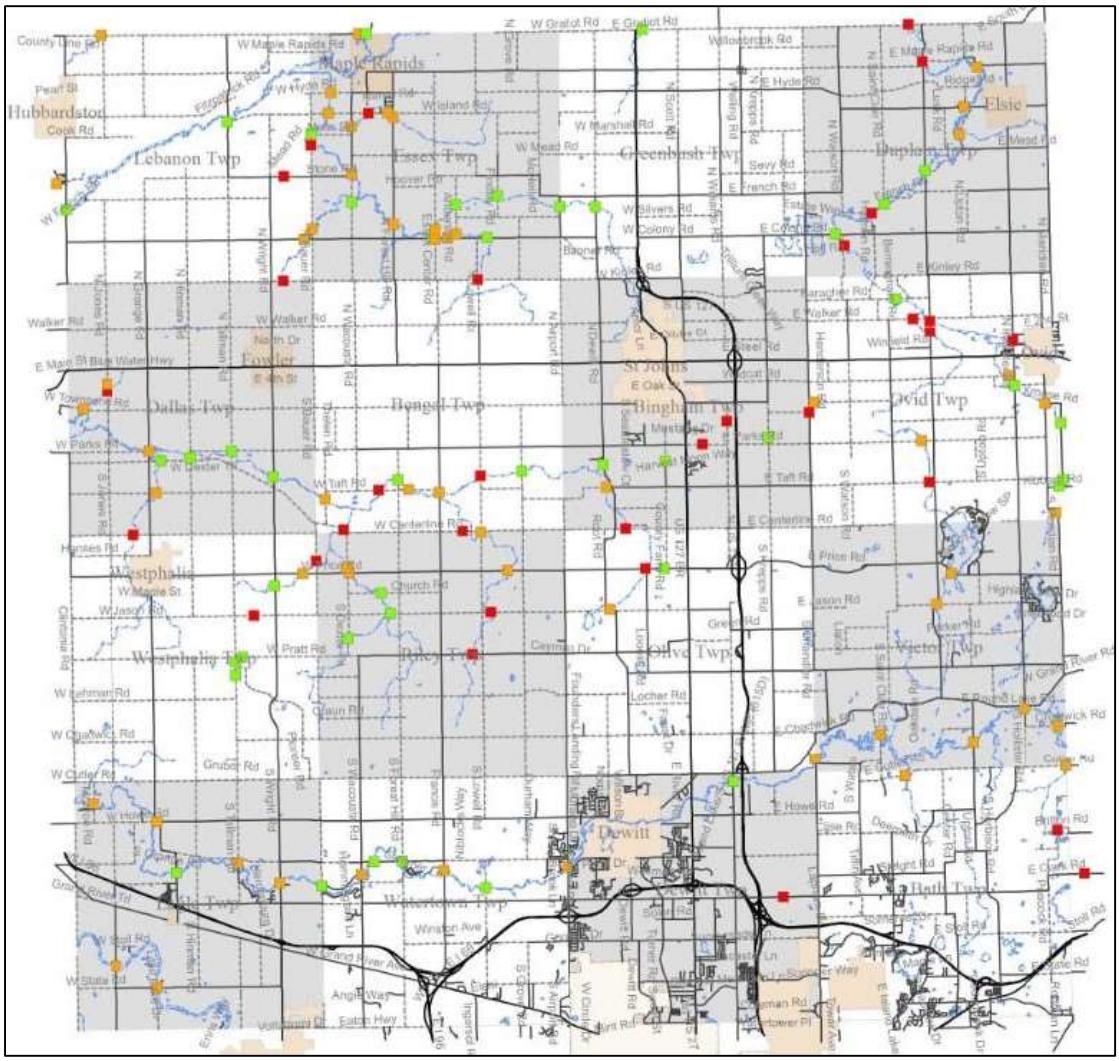


Figure 7: Map illustrating locations of CCRC's bridge assets

CCRC has 123 total bridges in its road and bridge network; these bridges connect various points of the road network, as illustrated in Figure 7. These bridge structures can be summarized by type, size, and condition, which are detailed in

Table 2. More information about each of these structures can be found in CCRC's MiBRIDGE database or by contacting CCRC.

Table 2: Type, Size, and Condition of CCRC's Bridge Assets								
Bridge Type	Total Number of Bridges	Total Deck Area (sq ft)	Condition: Structurally Deficient, Posted, or Closed			2023 Condition		
			Struct. Deficient	Posted	Closed	Poor	Fair	Good
Concrete Arch thru	1	2380	0	1	0	0	1	0
Concrete Culvert	10	8476	0	0	0	0	4	6
Concrete Tee beam	2	1221	2	2	0	2	0	0
Prestressed concrete Box beam/girders multiple	87	181149	25	5	0	25	48	14
Prestressed concrete Multistringer	3	15913	0	0	0	0	2	1
Prestressed concrete Tee beam	1	829	0	0	0	0	1	0
Steel Box beam/girders single/spread	2	10221	0	0	0	0	0	2
Steel Culvert	11	7614	0	0	3	5	1	3
Steel Multistringer	3	6501	1	2	0	1	2	0
Steel Truss thru and pony	1	4211	0	0	0	0	1	0
Timber Slab	2	1588	1	1	0	1	1	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
Total SD/Posted/Closed			**34**	**11**	**3**			
Total	**123**	**240103**				**34**	**63**	**26**
Percentage (%)			**28%**	**9**	**2**	**28**	**51**	**21**

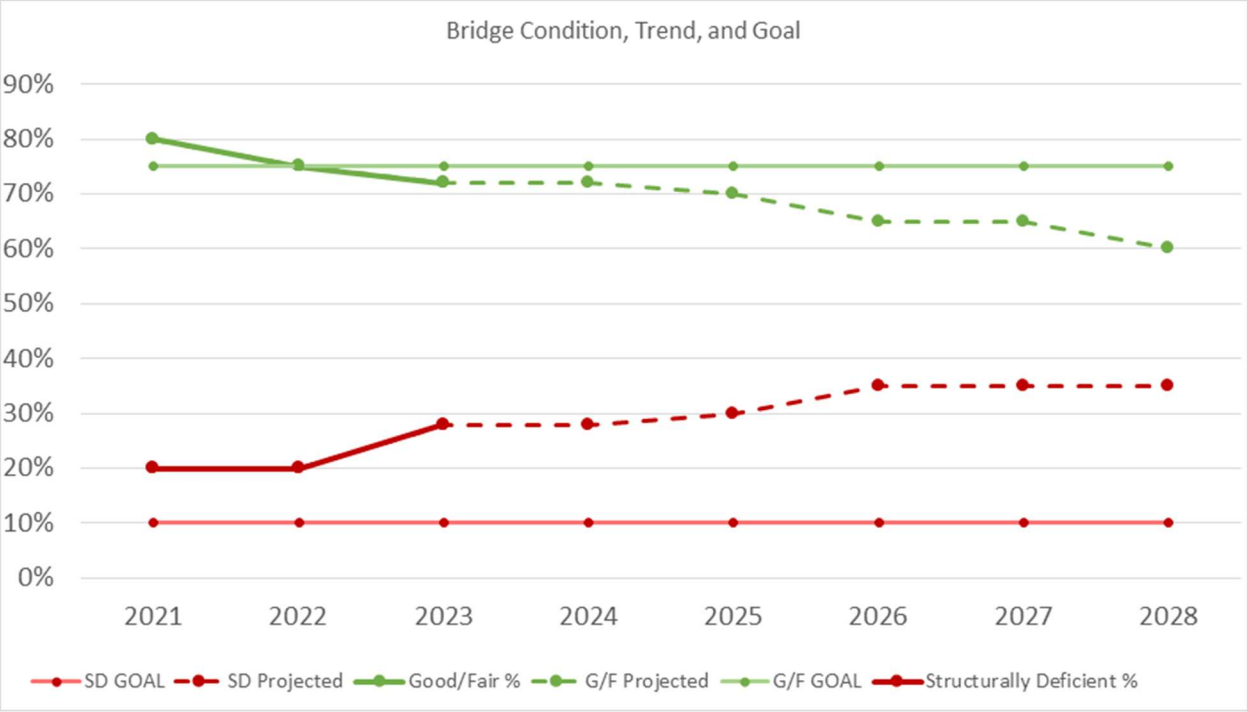
Condition, Goals, and Trend

Bridges in Michigan are given a good, fair, or poor rating based on the National Bridge Inspection Standards (NBIS) rating scale, which was created by the Federal Highway Administration to evaluate a bridge's deficiencies and to ensure the safety of road users. The current condition of CCRC's bridge network based on the NBIS is 26 structures rated good, 63 structures rated fair, and 34 structures rated poor (Table 2).

Bridges are designed to carry legal loads in terms of vehicles and traffic. Due to a decline in condition, a bridge may be "posted" with a restriction for what would be considered safe loads passing over the bridge. On occasion, posting a bridge may also restrict other load-capacity-related elements like speed and number of vehicles on the bridge, but this type of posting designates the bridge differently. CCRC has 11 structures that are posted for load restriction (Table 2). Designating a bridge as "posted" has no influence on its condition rating. A "closed" bridge is one that is closed to all traffic. Closing a bridge is contingent upon its ability to carry a set minimum live load. CCRC has 3 structures that are closed (Table 2).

The goal of the program is the preservation and safety of CCRC's bridge network.

Figure 8 illustrates the baseline condition, projected trend, and goal that CCRC has for its good/fair and its structurally deficient bridges.



..Figure 8: Condition, projected trend, and goal for CCRC's good/fair and structurally deficient bridges

Programmed/Funded Projects, Gap Analysis, and Planned Projects

CCRC will receive $62,000 in total funding for the years 2023-2026. Preventive maintenance is a more effective use of these funds than the costly alternative of major rehabilitation or replacement. Since CCRC recognizes that limited funds are available for improving the bridge network, it seeks to identify those bridges that will benefit from a planned maintenance program, and it plans to spend $62,000 per year for the next three years on preventive maintenance of bridges. CCRC plans to replace four bridges within the next three years at a cost of $2,000,000 . By performing the aforementioned preventive maintenance and replacement of bridge structures, CCRC will not achieve its goal of keeping its overall bridge network at the same condition.

Table 3 illustrates the programmed/funded projects that will be undertaken in order to achieve CCRC's goal. These programmed/funded projects are juxtaposed with priority projects that remain unfunded.

Table 3: Planned Projects and Gap Analysis

Strategy	2023	2024	2025	2026	2027	GAP
New						
SN	-	-	-	-	-	-
Subtotal	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
Replacement						
SN 1896	-	-	-	-	$1,873,000	-
1917	-	-	-	-	$2,319,000	-
1935	-	-	-	-	$765,000	-
1936	-	-	-	-	$1,820,000	-
1940	-	-	-	-	$1,446,000	-
Subtotal	*$0*	*$0*	*$0*	*$0*	*$8,223,000*	*$0*
Rehabilitation						
SN	-	-	-	-	-	-
Subtotal	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
Scheduled Maintenance						
SN	-	-	-	-	-	-
Subtotal	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
Preventive Maintenance						
1938	-	$64,000	-	-	-	-
Subtotal	*$0*	*$64,000*	*$0*	*$0*	*$0*	*$0*
Other - Culvert						
1945	-	$894,000	-	-	-	-
1997	-	$593,000	-	-	-	-
1934	-	$416,000	-	-	-	-
2023	-	-	$545,000	-	-	-
Subtotal	*$0*	*$1,903,000*	*$545,000*	*$0*	*$0*	*$0*

3. CULVERT ASSETS

CCRC exercises awareness of its culvert assets.

Inventory of Assets

At present, CCRC tracks inventory data of its culvert assets only. CCRC has inventoried 2065 culverts, which is 97 percent of the actual 2121 culverts that CCRC owns.

More detail about these culvert assets can be found in CCRC's Roadsoft database or by contacting CCRC.

Goals

The goal of CCRC's asset management program is the preservation of its culvert network. CCRC is responsible for preserving 2065 inventoried culverts as well as any un-inventoried culverts that underlie its entire road network.

Planned Projects

CCRC's policy is to replace or repair culvert assets concurrent with projects affecting road segments carried by the particular culverts. CCRC also includes culvert assets in scheduled maintenance projects affecting road segments carried by the particular culverts.

4. SIGNAL ASSETS

CCRC exercises awareness of its traffic sign and signal assets.

Inventory of Assets

At present, CCRC tracks only inventory data for traffic signals. CCRC plans to inventory all 12 traffic signals that CCRC owns in 2024 & 2025.

More detail about these traffic signal assets can be obtained by contacting CCRC.

Goals

The goal of CCRC's asset management program is the preservation of its traffic signals. CCRC is responsible for preserving 12 inventoried traffic signals as well as any un-inventoried traffic signals along its entire road network.

Planned Projects

CCRC's policy is to evaluate traffic signal assets based on condition assessment for replacement or repair during any reconstruction, rehabilitation, preventive maintenance, of schedule maintenance activities on the roadway affected by the particular signal. It also conducts replacements or repairs for those traffic signal assets reported as non-functional or as performing with reduced function. CCRC adheres to regular maintenance and servicing policies outlined in the *Michigan Manual of Uniform Traffic Control Devices*.

5. FINANCIAL RESOURCES

Public entities must balance the quality and extent of services they can provide with the tax resources provided by citizens and businesses, all while maximizing how efficiently funds are used. Therefore, CCRC will overview its general expenditures and financial resources currently devoted to transportation infrastructure maintenance. This financial information is not intended to be a full financial disclosure or a formal report. Full details of CCRC's financial status can be found on our website at ccrc-roads.com.

Anticipated Revenues & Expenses

CCRC receives funding from the following sources:

- **State funds** – CCRC's principal source of transportation funding is received from the Michigan Transportation Fund (MTF). This fund is supported by vehicle registration fees and the state's per-gallon gas tax. Allocations from the MTF are distributed to state and local governmental units based on a legislated formula, which includes factors such as population, miles of certified roads, and vehicle registration fees for vehicles registered in the agency's jurisdiction. CCRC also receives revenue from the Michigan Department of Transportation to maintain (e.g. plow, patch, mow) the state trunklines within its jurisdictional boundary. Revenue from these maintenance contracts are received on a time and materials basis as resources are expended to maintain the State's roads. While these contracts do not allow for capital gain (profit) and only bring in revenue to cover the cost of the work, they do provide a benefit to CCRC by allowing an economy of scale that enables us to provide better service at a lower cost for CCRC's roads while allowing the same for the State of Michigan. Examples of state grants also include local bridge grants, economic development funds, and metro funds.

- **Federal and state grants for individual projects** – These are typically competitive funding applications that are targeted at a specific project type to accomplish a specific purpose. These may include safety enhancement projects, economic development projects, or other targeted funding. Examples of federal funds include Surface Transportation Program (STP) funds, C and D funds, bridge funds, MDOT payments to private contractors, and negotiated contracts.
- **Local government entities or private developer contributions to construction projects for specific improvements** – This category includes funding received to mitigate the impact of commercial developments as a condition of construction of a specific development project, and can also include funding from a special assessment district levied by another governmental unit. Examples of contributions from local units include city, village, and township contributions to the county; special assessments; county appropriations; bond and note proceeds; contributions from counties to cities and villages; city general fund transfers; city municipal street funds; capital improvement funds; and tax millages (see below).
- **Local tax millages** – Many local agencies in Michigan use local tax millages to supplement their road-funding budget. These taxes can provide for additional construction and maintenance for new or existing roads that are also funded using MTF or MDOT funds. CCRC has local tax millages in its road-funding budget. 6 Township Millages - Greenbush, Bingham, Duplain, Riley, Victor, Bengal
- **Interest** – Interest from invested funds.
- **Permit fees** – Generally, permit fees cover the cost of a permit application review.
- **Other** – Other revenues can be gained through salvage sales, property rentals, land and building sales, sundry refunds, equipment disposition or installation, private sources, and financing.
- **Charges for services** – Funds from partner agencies who contract with CCRC to construct or maintain its roads, or roads under joint or neighboring jurisdictions, including state trunkline maintenance and non-maintenance services and preservation.

CCRC is required to report transportation fund expenditures to the State of Michigan using a prescribed format with predefined expenditure categories. The definitions of these categories according to Public Act 51 of 1951 may differ from common pavement management nomenclature and practice. For the purposes of reporting under PA 51, the expenditure categories are:

- **Construction/Capacity Improvement Funds** – According to PA 51 of 1951, this financial classification of projects includes, "new construction of highways, roads, streets, or bridges, a project that increases the capacity of a highway facility to accommodate that part of traffic having neither an origin nor destination within the local area, widening of a lane width or more, or adding turn lanes of more than 1/2 mile in length."[1]
- **Preservation and Structural Improvement Funds** – Preservation and structural improvements are "activit[ies] undertaken to preserve the integrity of the existing roadway system."[2]

[1] Public Act 51 of 1951, 247.660c Definitions
[2] Public Act 51 of 1951, 247.660c Definitions

Preservation includes items such as a reconstruction of an existing road or bridge, or adding structure to an existing road.

- **Routine and Preventive Maintenance Funds** – Routine maintenance activities are "actions performed on a regular or controllable basis or in response to uncontrollable events upon a highway, road, street, or bridge".[3] Preventive maintenance activities are "planned strategy[ies] of cost-effective treatments to an existing roadway system and its appurtenances that preserve assets by retarding deterioration and maintaining functional condition without significantly increasing structural capacity".[4]
- **Winter Maintenance Funds** – Expenditures for snow and ice control.
- **Trunkline Maintenance Funds** – Expenditures spent under CCRC's maintenance agreement with MDOT for maintenance it performs on MDOT trunkline routes.
- **Administrative Funds** – There are specific items that can and cannot be included in administrative expenditures as specified in PA 51 of 1951. The law also states that the amount of MTF revenues that are spent on administrative expenditures is limited to 10 percent of the annual MTF funds that are received.
- **Other Funds** – Expenditures for equipment, capital outlay, debt principal payment, interest expense, contributions to adjacent governmental units, principal, interest and bank fees, and miscellaneous for cities and villages.

The Table (below) details the revenues and expenditures for CCRC.

Table 4: Annual Fiscal-Year Revenues & Expenditures per Fiscal Year

REVENUES			EXPENDITURES		
Item	Estimated $	Percent of Total	Item	Estimated $	Percent of Total
State funds	12647000	55.2	Construction & capacity improvement (CCI)	195825	0.9
Federal funds	2734000	11.9	Preservation & structural improvement (PSI)	7664200	34.1
Contributions for local units	3101600	13.5	Routine maintenance	8996000	40.1
Interest, rents, and other	2017000	8.8	Winter maintenance	1315000	5.9
Charges for services	2415000	10.5	Trunkline maintenance	1321400	5.9
			Administrative	801740	3.6
			Other	2165219	9.6
TOTAL	22,914,600	100	TOTAL	22,459,384	100

Verify the information in this table. You can find your agency's information in the TAMC dashboard at https://www.mcgi.state.mi.us/mitrp/tamcDashboards.

[3] Public Act 51 of 1951, 247.660c Definitions
[4] Public Act 51 of 1951, 247.660c Definitions

6. RISK OF FAILURE ANALYSIS

Transportation infrastructure is designed to be resilient. The system of interconnecting roads and bridges maintained by CCRC provides road users with multiple alternate options in the event of an unplanned disruption of one part of the system. There are, however, key links in the transportation system that may cause significant inconvenience to users if they are unexpectedly closed to traffic. Key transportation links include:

- **Geographic divides:** Areas where a geographic feature (river, lake, hilly terrain, or limited access road) limits crossing points of the feature; bridge failures, in particular, can create loss of access to entire regions of the state
- **Emergency alternate routes for high-volume roads and bridges:** Roads and bridges that are routinely used as alternate routes for high-volume assets are included in an emergency response plan
- **Limited access areas:** Roads and bridges that serve remote or limited access areas that result in long detours if closed
- **Main access to key commercial districts:** Areas with a large concentration of businesses or where large-size business will be significantly impacted if a road is unavailable
- Our road and bridge network includes the following critical assets: 0 1895 - State Rd over Grand River; 1928 - Airport Rd over Looking Glass River; 1933 - Wood Rd over Looking Glass River; 1950 - Forest Hill over Stoney Creek; 1916 - Grange over Looking Glass River; 1965 - Jones over Grand River; 1905 - Price Rd over Little Maple River; 1915 - Tallman over Maple River; 1940 - Hollister Rd over Maple River; 1896 Clark Rd over Br Looking Glass River.. Figure 9 illustrates the key transportation links in CCRC's road and bridge network.

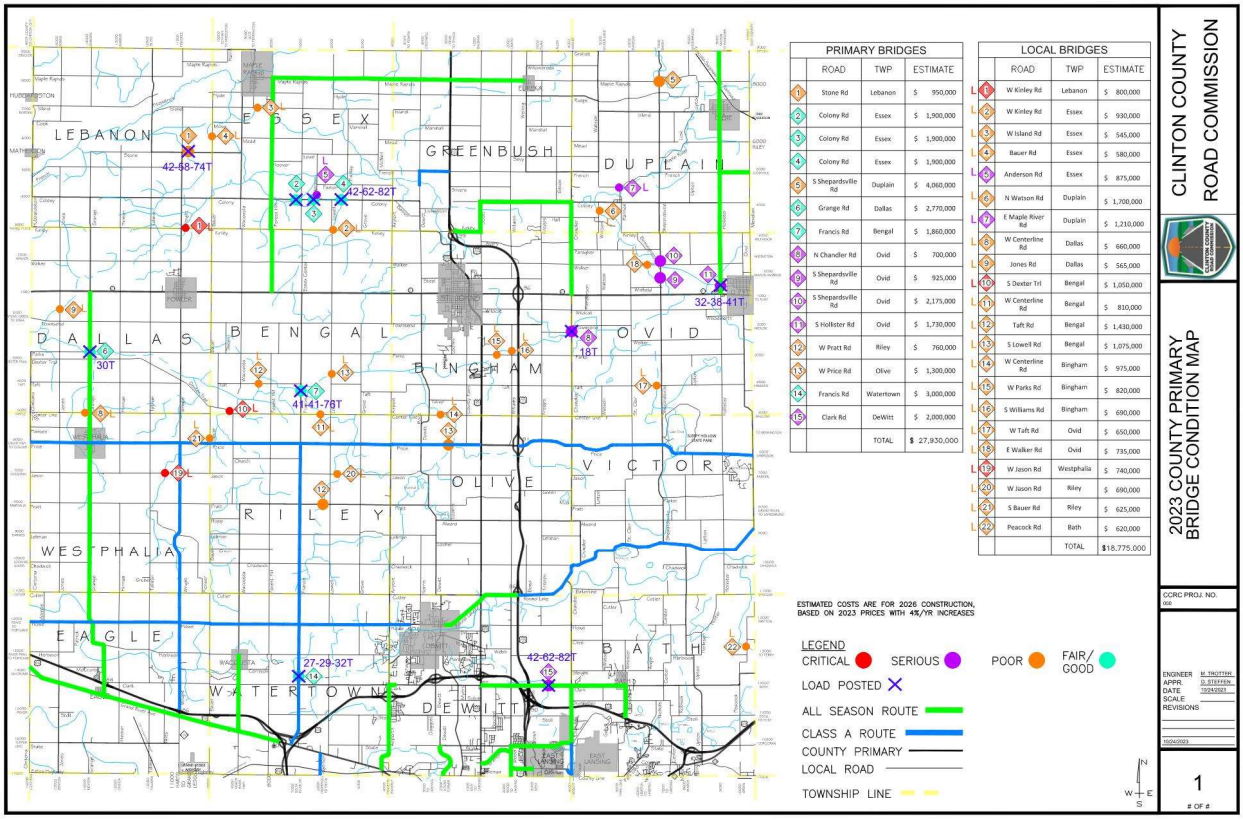


Figure 9: Key transportation links in CCRC's road and bridge network

7. COORDINATION WITH OTHER ENTITIES

An asset management plan provides a significant value for infrastructure owners because it serves as a platform to engage other infrastructure owners using the same shared right of way space. CCRC communicates with both public and private infrastructure owners to coordinate work in the following ways:

An asset management plan provides a significant value for infrastructure owners because it serves as a platform to engage other infrastructure owners using the same shared right of way space. CCRC communicates with both public and private infrastructure owners to coordinate work in the following ways:

CCRC maintains storm sewer assets in addition to transportation assets. CCRC follows an asset management process for all of its assets, and those of local municipal utility agencies, by coordinating the upgrade, maintenance, and operation of all major assets.

Sub-surface utility asset management plans implemented by municipal utility agencies are coordinated with the transportation infrastructure plans to maximize value and minimize service disruptions and cost to the public.

CCRC takes advantage of coordinated infrastructure work to reduce cost and maximize value using the following policies:

A. Roads which are in poor condition that have a subsurface infrastructure project planned which will destroy more than half the lane with will be rehabilitated or reconstructed full width using transportation funds to repair the balance of the road width.

B. Subsurface infrastructure projects which will cause damage to pavements in good condition will be delayed as long as possible, or will consider methods that do not require pavement cuts.

C. Subsurface utility projects will be coordinated to allow all under pavement assets to be upgraded in the same project regardless of ownership.

D. Road reconstruction projects will not be completed until agency owned sub surface utilities are upgraded to have at least a 40 years of remaining service life.

Annually CCRC convenes a traffic planning summit, in conjunction with the MDOT Lansing TSC, in the fourth quarter of the year. Representatives from all of the local Townships and major public infrastructure owners are provided notice for the meeting and are invited to attend. An attempt is made to coordinate the schedule of the event to allow the majority of Townships and infrastructure owners to attend.

CCRC provides all attendees of the traffic planning summit with a list of all planned road projects for the next three years that include new pavement structure. Attendees are encouraged to discuss planned projects that would disrupt transportation services or cause damage to pavements. Projects which may cause damage to pavements in good or fair condition are discussed and mitigation measures are proposed to minimize the impact to pavements. Mitigation measures could include rescheduling and coordinating projects to maximize value and minimize disruptions and cost to the public.

Signature: Douglas Steffen

Email: steffend@ccrc-roads.com

Signature: Karla Gurski

Email: gurskik@ccrc-roads.com

8. PROOF OF ACCEPTANCE

PUBLIC ACT 325

CERTIFICATION OF TRANSPORTATION ASSET MANAGEMENT PLAN

Certification Year: 2023

Local Road-owning Agency Name: Clinton County Road Commission

Beginning October 2019 and on a three-year cycle thereafter, certification must be made for compliance to Public Act 325. A local road-owning agency with 100 certified miles or more must certify that it has developed an asset management plan for the road, bridge, culvert, and traffic signal assets. Signing this form certifies that the hitherto referred agency meets with minimum requirements as outlined by Public Act 325 and agency-defined goals and objectives.

This form must be signed by the chairperson of the local road-owning agency or the county executive and chief financial officer of the local road-owning agency.

Signature Douglas Steffen		Signature Karla Gurski	
Printed Name Doug Steffen		Printed Name Karla Gurski	
Title Managing Director	Date 01/22/2024	Title Director of Finance/Clerk	Date 01/22/2024

Due every three years based on agency submission schedule

Submittal Date: 12/31/2023

See attached council meeting minutes and/or resolution.

CLINTON COUNTY
ROAD COMMISSION

January 22, 2024

To Whom it may Concern:

Following is an excerpt from the minutes of January 18, 2024, meeting of the Clinton County Board of Road Commissioners:

MOTION TO ADOPT THE CCRC TRANSPORATION ASSET MANAGEMENT PLAN

Motion to adopt the Clinton County Road Commission Transportation Asset Management Plan as submitted on December 31, 2023.

Move: Kevin Holt Second: Michael Frederick Motion: Passed

I hereby certify that the above is a true and correct copy of action taken by the Board of Clinton County Road Commissioners at its regular meeting held on January 18, 2024.

ATTEST:

Karla Gurski

Karla Gurski
Director of Finance/Clerk

3536 S. US Highway 27 / St. Johns, MI 48879 / Ph (989)224-3274 / Fax (989)224-4003
Website: www.ccrc-roads.com **Email: ccrc@ccrc-roads.com**

A. PAVEMENT ASSET MANAGEMENT PLAN

An attached pavement asset management plan follows.

Clinton County Road Commission
2023 Pavement
Asset Management Plan

A plan describing the Clinton County Road Commission's roadway assets and conditions

Prepared by:
Author: Marc Trotter, PE
Author's title: Director of Engineering
Contact information: (989) 224-3274; ccrc@ccrc-roads.com

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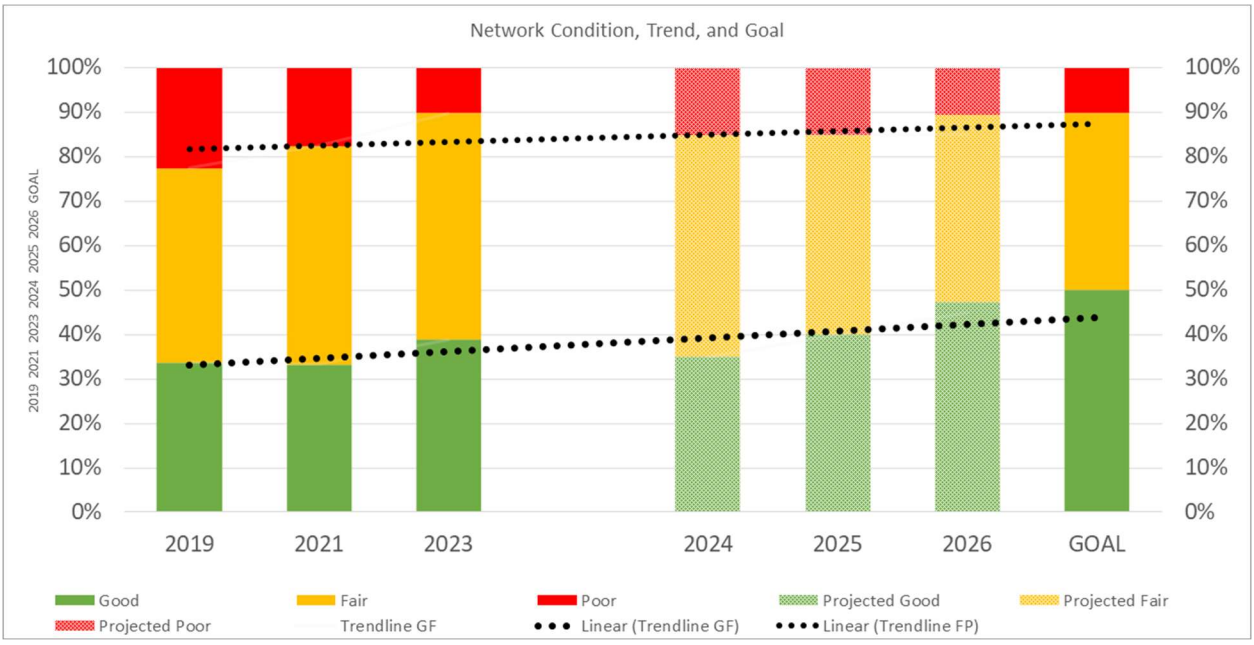
EXECUTIVE SUMMARY

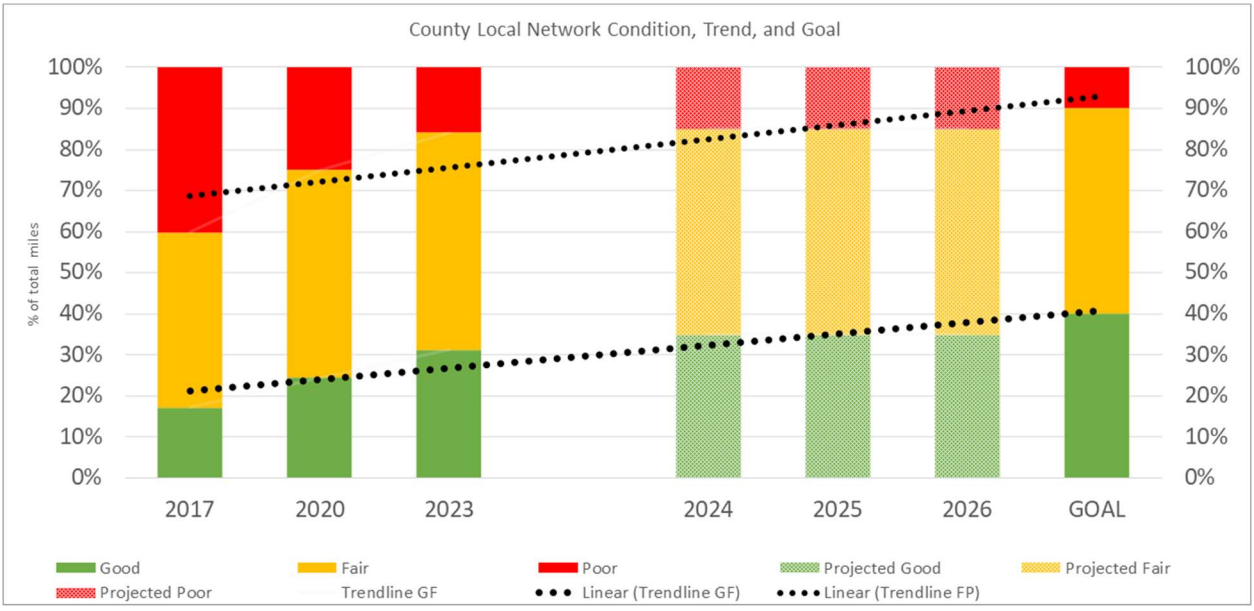
As conduits for commerce and connections to vital services, roads are among the most important assets in any community along with other assets like bridges, culverts, traffic signs, traffic signals, and utilities that support and affect roads. The Clinton County Road Commission's (CCRC) roads, other transportation assets, and support systems are also some of the most valuable and extensive public assets, all of which are paid for with taxes collected from ordinary citizens and businesses. The cost of building and maintaining roads, their importance to society, and the investment made by taxpayers all place a high level of responsibility on local agencies to plan, build, and maintain the road network in an efficient and effective manner. This asset management plan is intended to report on how CCRC is meeting its obligations to maintain the public assets for which it is responsible.

This plan overviews CCRC's road assets and condition, and explains how CCRC works to maintain and improve the overall condition of those assets. These explanations can help answer the following questions:

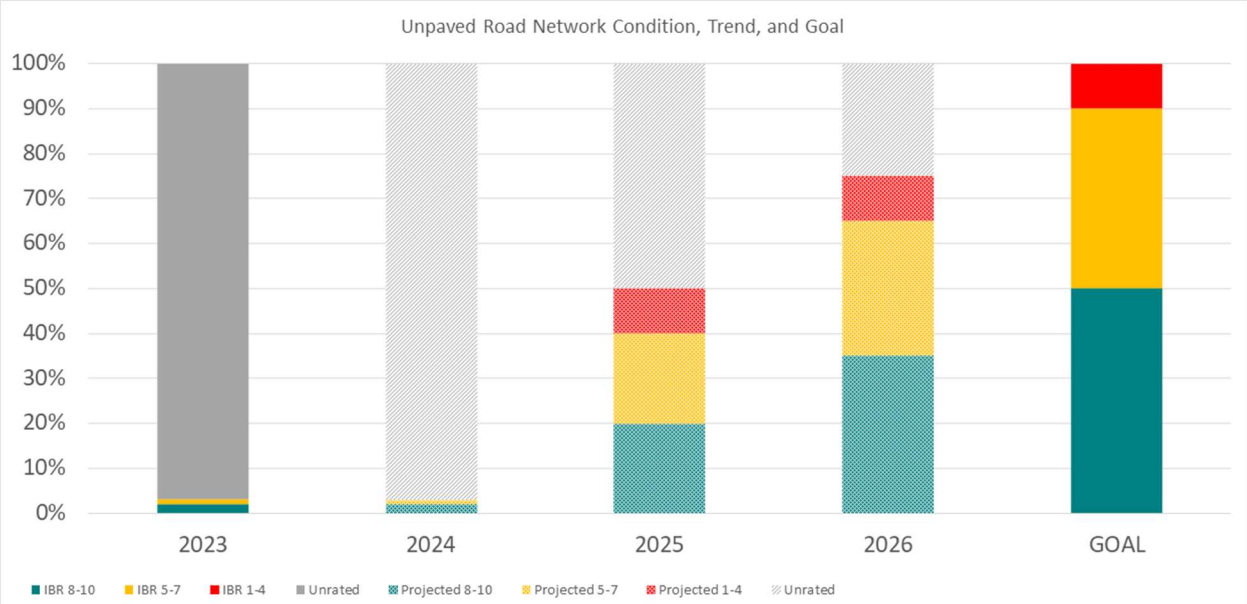
- What kinds of road assets CCRC has in its jurisdiction, who owns them, and the different options for maintaining these assets.
- What tools and processes CCRC uses to track and manage road assets and funds.
- What condition CCRC's road assets are in compared to statewide averages.
- Why some road assets are in better condition than others and the path to maintaining and improving road asset conditions through proper planning and maintenance.
- How agency transportation assets are funded and where those funds come from.
- How funds are used and the costs incurred during CCRC's road assets' normal life cycle.
- What condition CCRC can expect its road assets if those assets continue to be funded at the current funding levels
- How changes in funding levels can affect the overall condition of all of CCRC's road assets.

CCRC owns and/or manages 1195.487 centerline of roads. This road network can be divided into the county primary network, the county local network, the unpaved road network, and the National Highway System (NHS) network based on the different factors these roads have that influence asset management decisions. A summary of CCRC historical and current network conditions, projected trends, and goals for county primary network and county local network can be seen in the two figures, below:


Network Condition, Trend, and Goal
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2019 2021 2023 2024 2025 2026 GOAL
2019
2021
2023
2024
2025
2026
GOAL
Good
Fair
Poor
Projected Good
Projected Fair
Projected Poor
Trendline GF
Linear (Trendline GF)
Linear (Trendline FP)


County Local Network Condition, Trend, and Goal
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
% of total miles
2017
2020
2023
2024
2025
2026
GOAL
Good
Fair
Poor
Projected Good
Projected Fair
Projected Poor
Trendline GF
Linear (Trendline GF)
Linear (Trendline FP)

A summary of CCRC historical and current network conditions, projected trend and goal for the unpaved road network can be seen in the figure, below:



An asset management plan is required by Michigan Public Act 325 of 2018, and this document represents fulfillment of some of CCRC's obligations towards meeting these requirements. This asset management plan also helps demonstrate CCRC's responsible use of public funds by providing elected and appointed officials as well as the general public with inventory and condition information of CCRC's road assets, and gives taxpayers the information they need to make informed decisions about investing in its essential transportation infrastructure.

INTRODUCTION

Asset management is defined by Public Act 325 of 2018 as "an ongoing process of maintaining, preserving, upgrading, and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment and investment to achieve established performance goals". In other words, asset management is a process that uses data to manage and track assets, like roads and bridges, in a cost-effective manner using a combination of engineering and business principles. This process is endorsed by leaders in municipal planning and transportation infrastructure, including the Michigan Municipal League, County Road Association of Michigan, the Michigan Department of Transportation (MDOT), and the Federal Highway Administration (FHWA). CCRC is supported in its use of asset management principles and processes by the Michigan Transportation Asset Management Council (TAMC), formed by the State of Michigan.

Asset management, in the context of this plan, ensures that public funds are spent as effectively as possible to maximize the condition of the road network. Asset management also provides a transparent decision-making process that allows the public to understand the technical and financial challenges of managing road infrastructure with a limited budget.

The Clinton County Road Commission (CCRC) has adopted an "asset management" business process to overcome the challenges presented by having limited financial, staffing, and other resources while needing to meet road users' expectations. CCRC is responsible for maintaining and operating over 1195.487 centerline of roads.

This plan outlines how CCRC determines its strategy to maintain and upgrade road asset condition given agency goals, priorities of its road users, and resources provided. An updated plan is to be released approximately every three years to reflect changes in road conditions, finances, and priorities.

Questions regarding the use or content of this plan should be directed to Marc Trotter PE, Director of Engineering at 3536 S US HWY 27, St Johns, MI 48879 or at (989)-224-3274 and/or ccrc@ccrc-roads.com. ccrc-roads.com Key terms used in this plan are defined in CCRC's comprehensive

transportation asset management plan (also known as the "compliance plan") used for compliance with PA 325 or 2018.

Knowing the basic features of the asset classes themselves is a crucial starting point to understanding the rationale behind an asset management approach. The following primer provides an introduction to pavements.

Pavement Primer

Roads come in two basic forms—paved and unpaved. Paved roads have hard surfaces. These hard surfaces can be constructed from asphalt, concrete, composite (asphalt and concrete), sealcoat, and brick and block materials. On the other hand, unpaved roads have no hard surfaces. Examples of these surfaces are gravel and unimproved earth.

The decision to pave with a particular material as well as the decision to leave a road unpaved allows road-owning agencies to tailor a road to a particular purpose, environment, and budget. Thus, selecting a pavement type or leaving a road unpaved depends upon purpose, materials available, and budget. Each choice represents a trade-off between budget and costs for construction and maintenance.

Maintenance enables the road to fulfill its particular purpose. To achieve the maximum service for a pavement or an unpaved road, continual monitoring of a road's pavement condition is essential for choosing the right time to apply the right fix in the right place.

Here is a brief overview of the different types of pavements, how condition is assessed, and treatment options that can lengthen a road's service life.

Surfacing

Pavement type is influenced by several different factors, such as cost of construction, cost of maintenance, frequency of maintenance, and type of maintenance. These factors can have benefits affecting asset life and road user experience.

Paved Surfacing

Typical benefits and tradeoffs for hard surface types include:

- **Concrete pavement:** Concrete pavement, which is sometimes called a rigid pavement, is durable and lasts a long time when properly constructed and maintained. Concrete pavement can have longer service periods between maintenance activities, which can help reduce maintenance-related traffic disruptions. However, concrete pavements have a high initial cost and can be challenging to rehabilitate and maintain at the end of their service life. A typical concrete pavement design life will provide service for 30 years before major rehabilitation is necessary.
- **Hot-mix asphalt pavement (HMA):** HMA pavement, sometimes known as asphalt or flexible pavement, is currently less expensive to construct than concrete pavement (this is, in some part, due to the closer link between HMA material costs and oil prices that HMA pavements have in comparison with other pavement types). However, they require frequent maintenance activities to

maximize their service life. A typical HMA pavement design life will provide service for 18 years before major rehabilitation is necessary. The vast majority of local-agency-owned pavements are HMA pavements.

- **Composite pavements:** Composite pavement is a combination of concrete and asphalt layers. Typically, composite pavements are old concrete pavements exhibiting ride-related issues that were overlaid by several inches of HMA in order to gain more service life from the pavement before it would need reconstruction. Converting a concrete pavement to a composite pavement is typically used as a "holding pattern" treatment to maintain the road in usable condition until reconstruction funds become available.

- **Sealcoat pavement:** Sealcoat pavement is a gravel road that have been sealed with a thin asphalt binder coating that has stone chips spread on top (not to be confused with a chip seal treatment over HMA pavement). This type of a pavement relies on the gravel layer to provide structure to support traffic, and the asphalt binder coating and stone chips shed water and eliminate the need for maintenance grading. Nonetheless, sealcoat pavement does require additional maintenance steps that asphalt and gravel do not require and does not last as long as HMA pavement, but it provides a low-cost alternative for lightly-trafficked areas and competes with asphalt for ride quality when properly constructed and maintained. Sealcoat pavement can provide service for ten or more years before the surface layer deteriorates and needs to be replaced.

Unpaved Surfacing

Typical benefits and tradeoffs for non-hard surfacing include:

- **Gravel:** Gravel is a low-cost, easy-to-maintain road surface made from layers of soil and aggregate (gravel). However, there are several potential drawbacks such as dust, mud, and ride smoothness when maintenance is delayed or traffic volume exceeds design expectations. Gravel roads require frequent low-cost maintenance activities. Gravel can be very cost effective for lower-volume, lower-speed roads. In the right conditions, a properly constructed and maintained gravel road can provide a service life comparable to an HMA pavement and can be significantly less expensive than the other pavement types.

Pavement Condition

Besides traffic congestion, pavement condition is what road users typically notice most about the quality of the roads that they regularly use—the better the pavement condition, the more satisfied users are with the service provided by the roadwork performed by road-owning agencies. Pavement condition is also a major factor in determining the most cost-effective treatment—that is, routine maintenance, capital preventive maintenance, or structural improvement—for a given section of pavement. As pavements age, they transition between "windows" of opportunity when a specific type of treatment can be applied to gain an increase in quality and extension of service life. Routine maintenance is day-to-day, regularly-scheduled, low-cost activity applied to "good" roads to prevent water or debris intrusion. Capital preventive maintenance (CPM) is a planned set of cost-effective treatments for "fair" roads that corrects pavement defects, slows further deterioration, and maintains the functional condition without increasing

structural capacity. CCRC uses pavement condition and age to anticipate when a specific section of pavement will be a potential candidate for preventive maintenance. More detail on this topic is included in the *Pavement Treatment* section of this primer.

Pavement condition data is also important because it allows road owners to evaluate the benefits of preventive maintenance projects. This data helps road owners to identify the most cost-effective use of road construction and maintenance dollars. Further, historic pavement condition data can enable road owners to predict future road conditions based on budget constraints and to determine if a road network's condition will improve, stay the same, or degrade at the current or planned investment level. This analysis can help determine how much additional funding is necessary to meet a network's condition improvement goals.

Paved Road Condition Rating System

CCRC is committed to monitoring the condition of its road network and using pavement condition data to drive cost-effective decision-making and preservation of valuable road assets. CCRC uses the Pavement Surface Evaluation and Rating (PASER) system to assess its paved roads. PASER was developed by the University of Wisconsin Transportation Information Center to provide a simple, efficient, and consistent method for evaluating road condition through visual inspection. The widely-used PASER system has specific criteria for assessing asphalt, concrete, sealcoat, and brick and block pavements. Information regarding the PASER system and PASER manuals may be found on the TAMC website at: http://www.michigan.gov/tamc/0,7308,7-356-82158_82627---,00.html.

The TAMC has adopted the PASER system for measuring statewide pavement conditions in Michigan for asphalt, concrete, composite, sealcoat, and brick-and-block paved roads. Broad use of the PASER system means that data collected at CCRC is consistent with data collected statewide. PASER data is collected using trained inspectors in a slow-moving vehicle using GPS-enabled data collection software provided to road-owning agencies at no cost to them. The method does not require extensive training or specialized equipment, and data can be collected rapidly, which minimizes the expense for collecting and maintaining this data.

The PASER system rates surface condition using a 1-10 scale where 10 is a brand new road with no defects that can be treated with routine maintenance, 5 is a road with distresses but is structurally sound that can be treated with preventive maintenance, and 1 is a road with extensive surface and structural distresses that is in need of total reconstruction.

Roads with lower PASER scores generally require costlier treatments to restore their quality than roads with higher PASER scores. The cost effectiveness of treatments generally decreases the as the PASER number decreases. In other words, as a road deteriorates, it costs more dollars per mile to fix it, and the dollars spent are less efficient in increasing the road's service life. Nationwide experience and asset management principles tell us that a road that has deteriorated to a PASER 4 or less will cost more to improve and the dollars spent are less efficient. Understanding this cost principle helps to draw meaning from the current PASER condition assessment.

The TAMC has developed statewide definitions of road condition by creating three simplified condition categories—"good", "fair", and "poor"—that represent bin ranges of PASER scores having similar contexts with regard to maintenance and/or reconstruction. The definitions of these rating conditions are:

- "Good" roads, according to the TAMC, have PASER scores of 8, 9, or 10. Roads in this category have very few, if any, defects and only require minimal maintenance; they may be kept in this category longer using PPM. These roads may include those that have been recently seal coated or newly constructed. Figure 1 illustrates an example of a road in this category.
- "Fair" roads, according to the TAMC, have PASER scores of 5, 6, or 7. Roads in this category still show good structural support, but their surface is starting to deteriorate. Figure 1 illustrates two road examples in this category. CPM can be cost effective for maintaining the road's "fair" condition or even raising it to "good" condition before the structural integrity of the pavement has been severely impacted. CPM treatments can be likened to shingles on a roof of a house: while the shingles add no structural value, they protect the house from structural damage by maintaining the protective function of a roof covering.
- "Poor" roads, according to the TAMC, have PASER scores of 1, 2, 3, or 4. These roads exhibit evidence that the underlying structure is failing, such as alligator cracking and rutting. These roads must be rehabilitated with treatments like a heavy overlay, crush and shape, or total reconstruction. Figure 1 illustrates a road in this category.

Figure 1: *Top image, right*– PASER 8 road that is considered "good" by the TAMC exhibit only minor defects. *Second image, right*– PASER 5 road that is considered "fair" by the TAMC. Exhibiting structural soundness but could benefit from CPM. *Third image, right*– PASER 6 road that is considered "fair" by the TAMC. *Bottom image, right*– PASER 2 road that is considered "poor" by the TAMC exhibiting significant structural distress.

The TAMC's good, fair, and poor categories are based solely on the definitions, above. Therefore, caution should be exercised when comparing other condition assessments with these categories because other

condition assessments may have “good”, “fair”, or “poor” designations similar to the TAMC condition categories but may not share the same definition. Often, other condition assessment systems define the “good”, “fair”, and “poor” categories differently, thus rendering the data of little use for cross-system comparison. The TAMC’s definitions provide a statewide standard for all of Michigan’s road-owning agencies to use for comparison purposes.

PASER data is collected 100 percent every two years on all federal-aid-eligible roads in Michigan. The TAMC dictates and funds the required training and the format for this collection, and it shares the data regionally and statewide. In addition, CCRC collects 100 percent of its paved non-federal-aid-eligible network using its own staff and resources.

Pavement Treatments

Selection of repair treatments for roads aims to balance costs, benefits, and road life expectancy. All pavements are damaged by water, traffic weight, freeze/thaw cycles, and sunlight. Each of the following treatments and strategies—reconstruction, structural improvements, capital preventive maintenance, and others used by CCRC—counters at least one of these pavement-damaging forces.

Reconstruction

Pavement reconstruction treats failing or failed pavements by completely removing the old pavement and base and constructing an entirely new road (Figure 3). Every pavement has to eventually be reconstructed and it is usually done as a last resort after more cost-effective treatments are done, or if the road requires significant changes to road geometry, base, or buried utilities. Compared to the other treatments, which are all improvements of the existing road, reconstruction is the most extensive rehabilitation of the roadway and therefore, also the most expensive per mile and most disruptive to regular traffic patterns. Reconstructed pavement will subsequently require one or more of the previous maintenance treatments to maximize service life and performance. A reconstructed road lasts approximately 20 years and costs $600,000 per mile. The following descriptions outline the main reconstruction treatments used by CCRC.

Figure 3: Examples of reconstruction treatments—(left) reconstructing a road and (right) road prepared for full-depth repair.

Ditching (for Unpaved Roads)

Water needs to drain away from any roadway to delay softening of the pavement structure, and proper drainage is critical for unpaved roads where there is no hard surface on top to stop water infiltration into the road surface and base. To improve drainage, new ditches are dug or old ones are cleaned out. Unpaved roads typically need to be re-ditched every 15 years at a cost of $10,000 per mile.

Gravel Overlay (for Unpaved Roads)

Unpaved roads will exhibit gravel loss over time due to traffic, wind, and rain. Gravel on an unpaved road provides a wear surface and contributes to the structure of the entire road. Unpaved roads typically need to be overlaid with four inches of new gravel every 15 years at a cost of $25,000 per mile.

Structural Improvement

Roads requiring structural improvements exhibit alligator cracking and rutting and rated poor in the TAMC scale. Road rutting is evidence that the underlying structure is beginning to fail and it must be either rehabilitated with a structural treatment. Examples of structural improvement treatments include HMA overlay with or without milling, and crush and shape (Figure 4). The following descriptions outline the main structural improvement treatments used by CCRC.

Figure 4: Examples of structural improvement treatments—(from left) HMA overlay on an unmilled pavement, milling asphalt pavement, and pulverization of a road during a crush-and-shape project.

Hot-mix Asphalt (HMA) Overlay with/without Milling

An HMA overlay is a layer of new asphalt (liquid asphalt and stones) placed on an existing pavement (Figure 4). Depending on the overlay thickness, this treatment can add significant structural strength. This treatment also creates a new wearing surface for traffic and seals the pavement from water, debris, and sunlight damage. An HMA overlay lasts approximately five to ten years and costs $200,000 per mile. The top layer of severely damaged pavement can be removed by the milling, a technique that helps prevent structural problems from being quickly reflected up to the new surface. Milling is also done to keep roads at the same height of curb and gutter that is not being raised or reinstalled in the project. Milling adds $25,000 per mile to the HMA overlay cost.

Crush and Shape

During a crush and shape treatment, the existing pavement and base are pulverized and then the road surface is reshaped to correct imperfections in the road's profile (Figure 4). An additional layer of gravel is often added along with a new wearing surface such as an HMA overlay or chip seal. Additional gravel and an HMA overlay give an increase in the pavements structural capacity. This treatment is usually done

on rural roads with severe structural distress; Adding gravel and a wearing surface makes it more prohibitive for urban roads if the curb and gutter is not raised up. Crush and shape treatments last approximately 14 years and cost $400,000 per mile.

Capital Preventive Maintenance

Capital preventive maintenance (CPM) addresses pavement problems of fair-rated roads before the structural integrity of the pavement has been severely impacted. CPM is a planned set of cost-effective treatments applied to an existing roadway that slows further deterioration and that maintains or improves the functional condition of the system without significantly increasing the structural capacity. Examples of such treatments include crack seal, fog seal, chip seal, slurry seal, and microsurface (Figure 5). The purpose of the following CPM treatments is to protect the pavement structure, slow the rate of deterioration, and/or correct pavement surface deficiencies. The following descriptions outline the main CPM treatments used by CCRC.

Figure 5: Examples of capital preventive maintenance treatments—(from left) crack seal, fog seal, chip seal, and slurry seal/microsurface.

Crack Seal

Water that infiltrates the pavement surface softens the pavement structure and allows traffic loads to cause more damage to the pavement than in normal dry conditions. Crack sealing helps prevent water infiltration by sealing cracks in the pavement with asphalt sealant (Figure 5). CCRC seals pavement cracks early in the life of the pavement to keep it functioning as strong as it can and for as long as it can. Crack sealing lasts approximately two years and costs $8,000 per mile. Even though it does not last very long compared to other treatments, it does not cost very much compared to other treatments. This makes it a very cost effective treatment when CCRC looks at what crack filling costs per year of the treatment's life.

Fog Seal

Fog sealing sprays a liquid asphalt coating onto the entire pavement surface to fill hairline cracks and prevent damage from sunlight (Figure 5). Fog seals are best for good to very good pavements and last approximately two years at a cost of $2,000 per mile.

Chip Seal

A chip seal, also known as a sealcoat, is a two-part treatment that starts with liquid asphalt sprayed onto the old pavement surface followed by a single layer of small stone chips spread onto the wet liquid asphalt layer (Figure 5). The liquid asphalt seals the pavement from water and debris and holds the stone chips in place, providing a new wearing surface for traffic that can correct friction problems and helping to prevent further surface deterioration. Chip seals are best applied to pavements that are not exhibiting problems with strength, and their purpose is to help preserve that strength. These treatments last approximately five years and cost $25,000 per mile.

Slurry Seal/Microsurface

A slurry seal or microsurface's purpose is to protect existing pavement from being damaged by water and sunlight. The primary ingredients are liquid asphalt (slurry seal) or modified liquid asphalt (microsurface), small stones, water and portland cement applied in a very thin (less than a half an inch) layer (Figure 5). The main difference between a slurry seal and a microsurface is the modified liquid asphalt used in microsurfacing provides different curing and durability properties, which allows microsurfacing to be used for filling pavement ruts. Since the application is very thin, these treatments do not add any strength to the pavement and only serves to protect the pavement's existing strength by sealing the pavement from sunlight and water damage. These treatments work best when applied before cracks are too wide and too numerous. A slurry seal treatment lasts approximately four years and costs $40,000 per mile, while a microsurface treatment tends to last for seven years and costs $60,000 per mile.

Partial-Depth Concrete Repair

A partial-depth concrete repair involves removing spalled (i.e., fragmented) or delaminated (i.e., separated into layers) areas of concrete pavement, usually near joints and cracks and replacing with new concrete (Figure 6). This is done to provide a new wearing surface in isolated areas, to slow down water infiltration, and to help delay further freeze/thaw damage. This repair lasts approximately five years and typically costs $20,000 per mile.

Maintenance Grading (for Unpaved Roads)

Maintenance grading involves regrading an unpaved road to remove isolated potholes, washboarding, and ruts then restoring the compacted crust layer (Figure 6). Crust on an unpaved road is a very tightly compacted surface that sheds water with ease but takes time to be created, so destroying a crusted surface with maintenance grading requires a plan to restore the crust. Maintenance grading often needs to be performed three to five times per year and each grading costs $300 per mile.

Dust Control (for Unpaved Roads)

Dust control typically involves spraying chloride or other chemicals on a gravel surface to reduce dust loss, aggregate loss, and maintenance (Figure 6). This is a relatively short-term fix that helps create a crusted surface. Chlorides work by attracting moisture from the air and existing gravel. This fix is not effective if the surface is too dry or heavy rain is imminent, so timing is very important. Dust control is done two to four times per year and each application costs $700 per mile.

Figure 6: Examples of capital preventive maintenance treatments, cont'd—(from left) concrete road prepared for partial-depth repair, gravel road undergoing maintenance grading, and gravel road receiving dust control application (dust control photo courtesy of Weld County, Colorado, weldgov.com).

Innovative Treatments

Innovative treatments are those newer, unique, non-standard treatments that provide ways of treating pavements using established engineering principles in new and cost-effective ways. CCRC strives to be innovative with its pavement treatments by looking for ways to prevent pavement damage and save taxpayer dollars.

Spray Patching

Spray patching is a mobile process that applies liquid asphalt emulsion and aggregate in a single pass, from a manually controlled spray wand, similar to overband crack sealing, but able to fill much larger gaps and small potholes. CCRC uses spray patching as a cost effective way to improve fair condition roads (PASER 3-7) prior to chip sealing.

Hot-Applied Mastic Sealants

Mastic sealants are designed to fill large cracks and distressed surface areas, similar to spray patching, but with more durable materials, able withstand heavy traffic and thermal movement. CCRC uses mastic sealants as an efficient one time fix for cracks and potholes on high volume roadways, where conventional patching materials (cold patch, crack sealing, spray patch) would require repetitive applications.

Maintenance

Maintenance is the most cost-effective strategy for managing road infrastructure and prevents good and fair roads from reaching the poor category, which require costly rehabilitation and reconstruction treatments to create a year of service life. It is most effective to spend money on routine maintenance and CPM treatments, first; then, when all maintenance project candidates are treated, reconstruction and rehabilitation can be performed as money is available. This strategy is called a "mix-of-fixes" approach to managing pavements.

1. PAVEMENT ASSETS

Building a mile of new road can cost over $1 million due to the large volume of materials and equipment that are necessary. The high cost of constructing road assets underlines the critical nature of properly managing and maintaining the investments made in this vital infrastructure. The specific needs of every mile of road within an agency's overall road network is a complex assessment, especially when considering rapidly changing conditions and the varying requisites of road users; understanding each road-mile's needs is an essential duty of the road-owning agency.

In Michigan, many different governmental units (or agencies) own and maintain roads, so it can be difficult for the public to understand who is responsible for items such as planning and funding construction projects, [patching] repairs, traffic control, safety, and winter maintenance for any given road. MDOT is responsible for state trunkline roads, which are typically named with "M", "I", or "US" designations regardless of their geographic location in Michigan. Cities and villages are typically responsible for all public roads within their geographic boundary with the exception of the previously mentioned state trunkline roads managed by MDOT. County road commissions (or departments) are typically responsible for all public roads within the county's geographic boundary, with the exception of those managed by cities, villages, and MDOT.

In cases where non-trunkline roads fall along jurisdictional borders, local and intergovernmental agreements dictate ownership and maintenance responsibility. Quite frequently, roads owned by one agency may be maintained by another agency because of geographic features that make it more cost effective for a neighboring agency to maintain the road instead of the actual road owner. Other times, road-owning agencies may mutually agree to coordinate maintenance activities in order to create economies of scale and take advantage of those efficiencies.

The CCRC is responsible for a total of 1195.487 centerline of public roads, as shown in Figure 7.

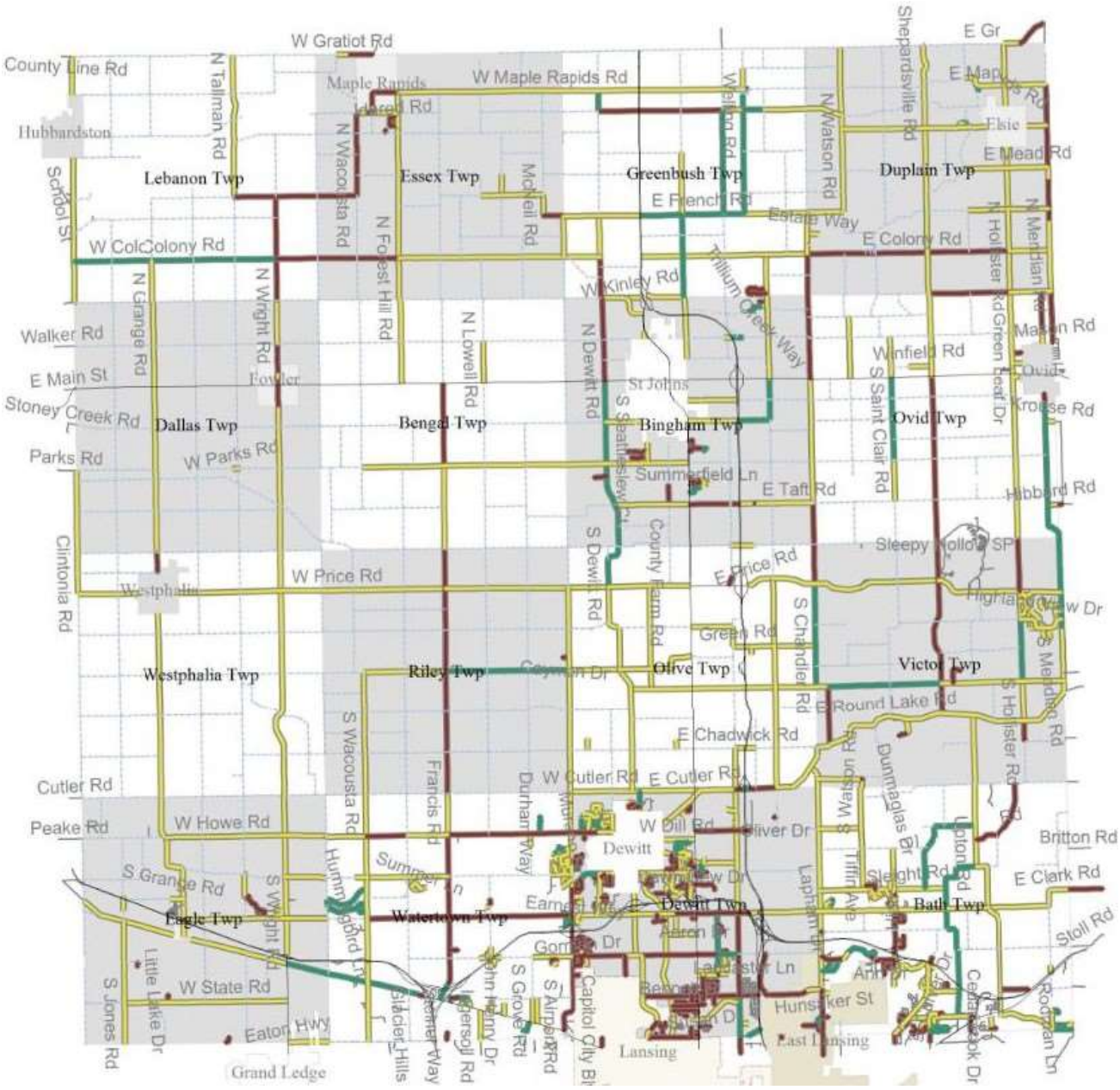


Figure 7: Map showing location of CCRC's paved roads (i.e., those managed by CCRC) and their current condition for paved roads with green for good (i.e., PASER 10, 9, 8), yellow for fair (i.e., PASER 7, 6, 5), and red for poor (i.e., PASER 4, 3, 2, 1), as well as the location of CCRC's unpaved roads in blue

Inventory

Michigan Public Act 51 of 1951 (PA 51), which defines how funds from the Michigan Transportation Fund (MTF) are distributed to and spent by road-owning agencies, classifies roads owned by CCRC as either county primary or county local roads. State statute prioritizes expenditures on the county primary road network.

Of the 1195.487 centerline of public roads owned and/or managed by CCRC, approximately 82% of all County Primary roads are classified as federal aid eligible, which allows them to receive federal funding for their maintenance and construction. Only 1% of County Local roads are considered federal aid eligible, which means state and local funds must be used to manage these roads.

Figure 8 illustrates the percentage of roads owned by CCRC that are classified as county primary and county local roads. ..Figure 9 illustrates this breakdown of these road networks by township boundary within CCRC's jurisdiction.

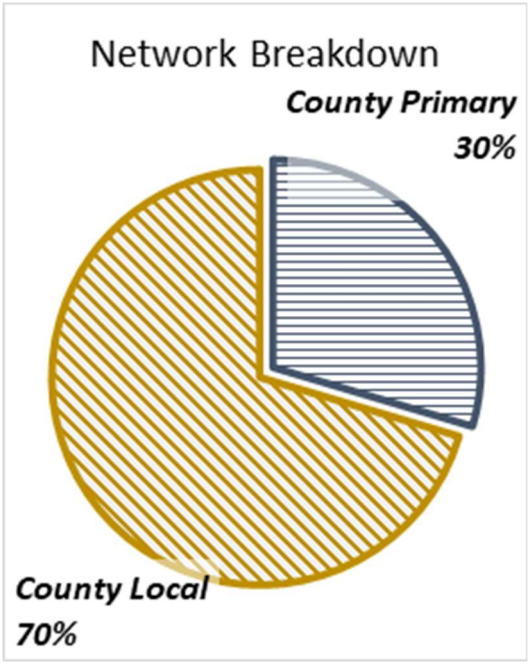
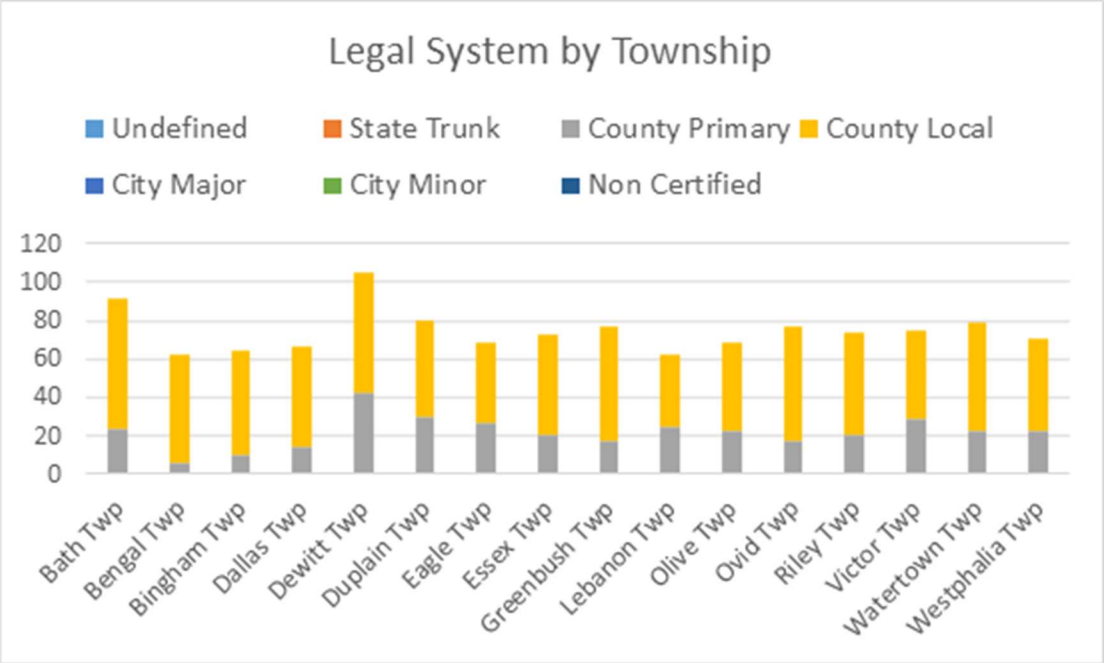


Figure 8: Percentage of county primary and county local roads for CCRC.



..Figure 9: county primary and county local roads by township for CCRC's jurisdiction.

CCRC manages 0 miles of roads that are part of the National Highway System (NHS)—in other words, those roads that are critical to the nation's economy, defense, and mobility—and monitors and maintains their condition. The NHS is subject to special rules and regulations and has its own performance metrics dictated by the FHWA. While most NHS roads in Michigan are managed by MDOT, CCRC manages a percentage of those roads located in its jurisdiction, as shown in Figure 10.

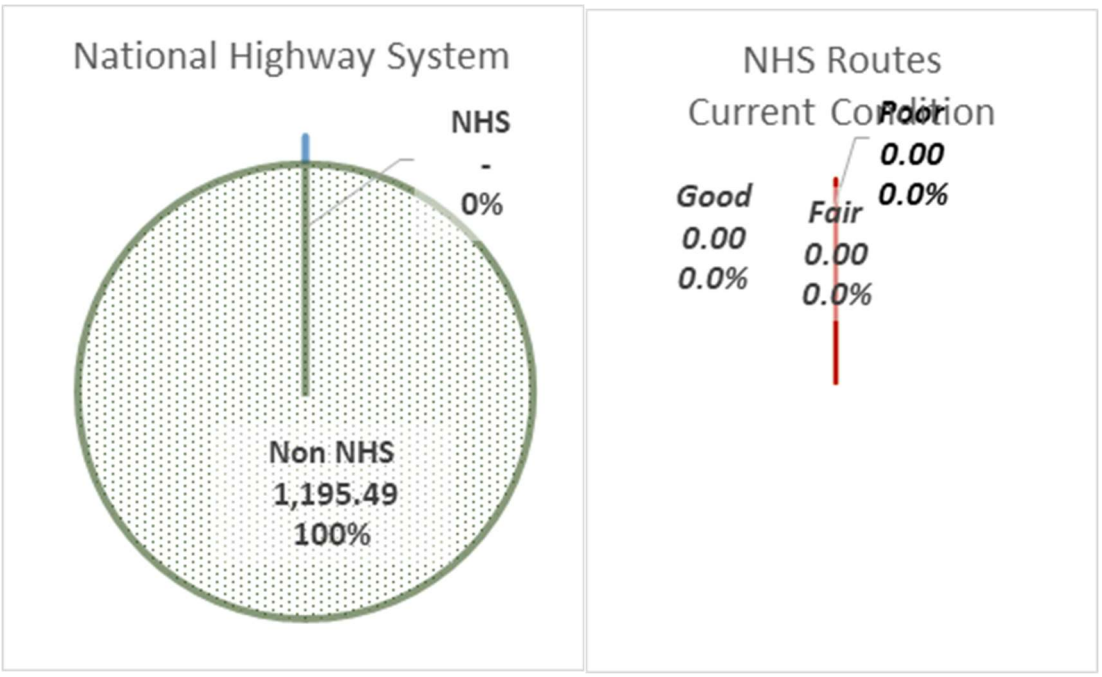


Figure 10: Miles of roads managed by CCRC that are part of the National Highway System and condition.

CCRC also owns and manages 614.468 miles of unpaved roads.

Types

CCRC has multiple types of pavements in its jurisdiction, including: asphalt, sealcoat, concrete, and undefined; it also has unpaved roads (i.e., gravel and/or earth). Factors influencing pavement type include cost of construction, cost of maintenance, frequency of maintenance, type of maintenance, asset life, and road user experience. More information on pavement types is available in the Introduction's Pavement Primer.

Figure 11 illustrates the percentage of various pavement types that CCRC has in its network. Figure 12 shows the pavement type by Township boundary for CCRC's jurisdiction.

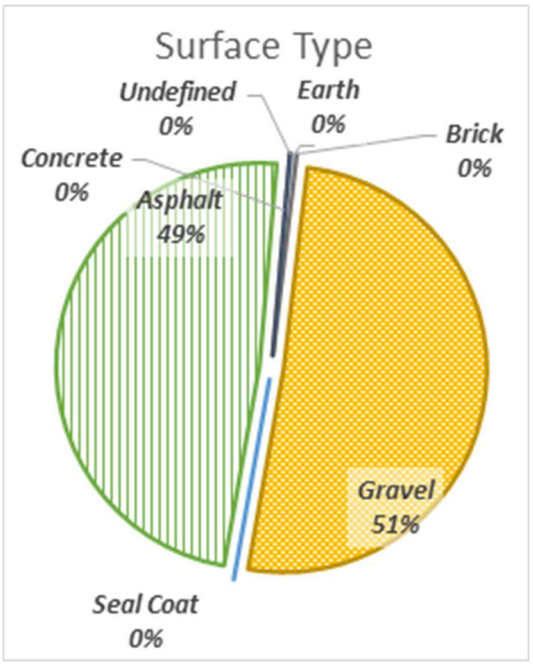


Figure 11: Pavement type by percentage maintained by CCRC Undefined pavements have not been inventoried in CCRC's asset management system to date, but will be included as data becomes available.

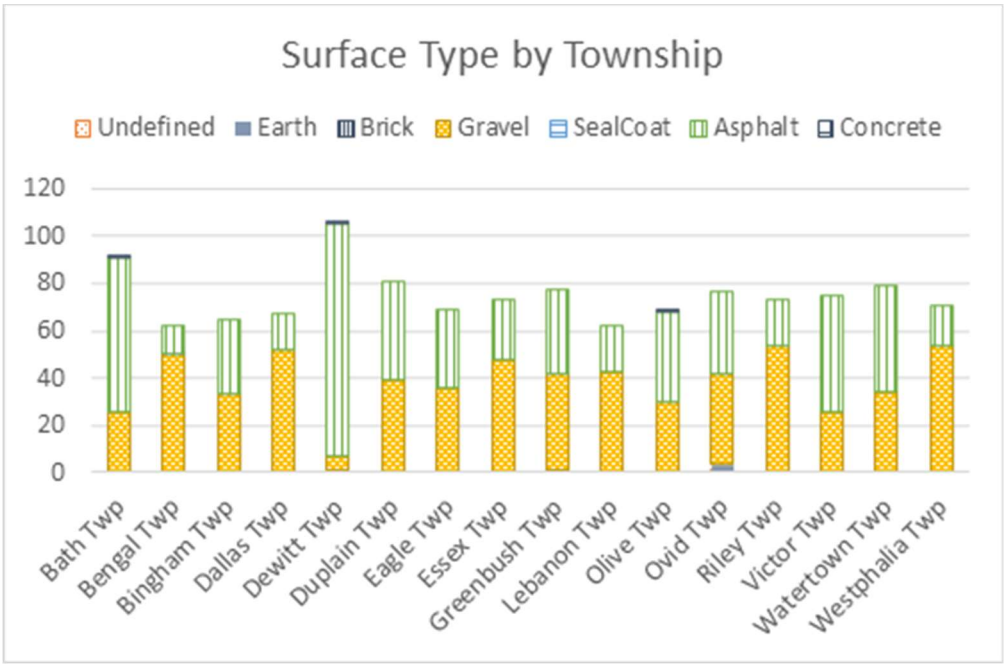


Figure 12: Pavement type by township within CCRC's jurisdiction. Undefined pavements have not been inventoried in CCRC's asset management system to date, but will be included as data becomes available.

Locations

Locations and sizes of each asset can be found in CCRC's Roadsoft database. For more detail, please refer to the agency contact listed in the *Introduction* of this pavement asset management plan.

Condition

The road characteristic that road users most readily notice is pavement condition. Pavement condition is a major factor in determining the most cost-effective treatment—that is, routine maintenance, capital preventive maintenance, or structural improvement—for a given section of pavement. CCRC uses pavement condition and age to anticipate when a specific section of pavement will be a potential candidate for preventive maintenance. Pavement condition data enables CCRC to evaluate the benefits of preventive maintenance projects and to identify the most cost-effective use of road construction and maintenance dollars. Historic pavement condition data can be used to predict future road conditions based on budget constraints and to determine if a road network's condition will improve, stay the same, or degrade at the current or planned investment level. This analysis helps to determine how much additional funding is necessary to meet a network's condition improvement goals. More detail on this topic is included in the Introduction's *Pavement Primer*.

Paved Roads

CCRC is committed to monitoring the condition of its road network and using pavement condition data to drive cost-effective decision-making and preservation of valuable road assets. CCRC uses the Pavement Surface Evaluation and Rating (PASER) system, which has been adopted by the TAMC for measuring statewide pavement conditions, to assess its paved roads. The PASER system provides a simple, efficient, and consistent method for evaluating road condition through visual inspection. More information regarding the PASER system can be found in the Introduction's Pavement Primer.

CCRC collects 100 percent of its PASER data every two years on all federal-aid-eligible roads in Michigan. In addition, CCRC collects100 percent of its paved non-federal-aid-eligible network using its own staff and resources.

CCRC's 2023 paved county primary road network has 39 percent of roads in the TAMC good condition category, 52 percent in fair, and 9 percent in poor (Figure 13A). The paved county local road network has 35 percent in good, 52 percent in fair, and 12 percent in poor (Figure 13B).

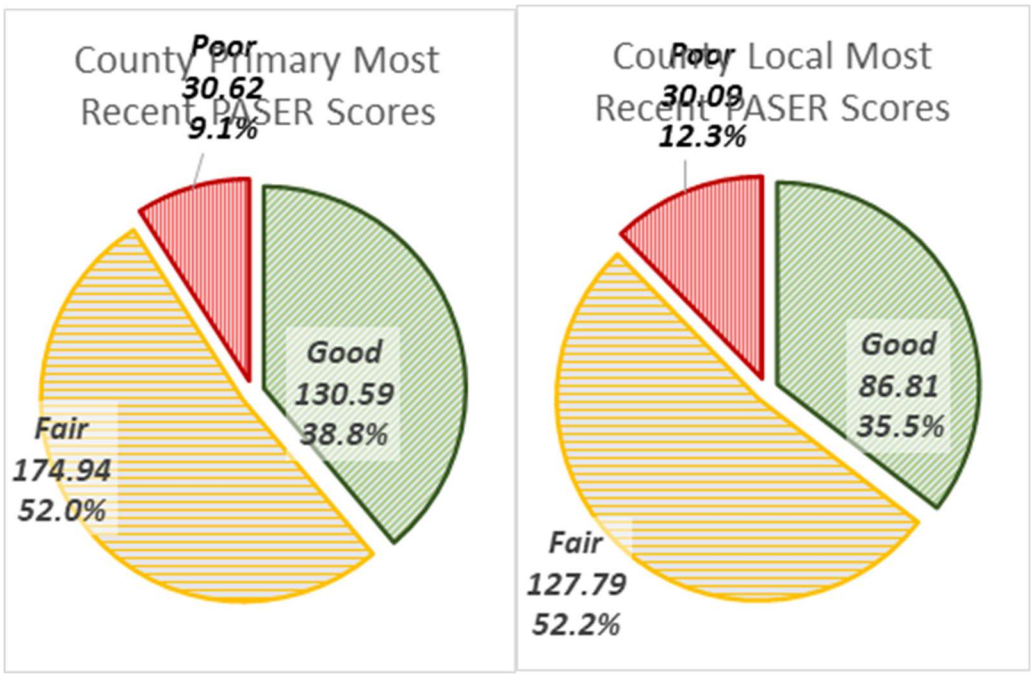


Figure 13: (A) Left: CCRC paved county primary road network conditions by percentage of good, fair, or poor, and (B) Right: paved county local road network conditions by percentage of good, fair, or poor

In comparison, the statewide paved county primary road network has 50 percent of roads in the TAMC good condition category, 40 percent in fair, and 10 percent in poor (Figure 14A). The statewide paved county local road network has 40 percent in good, 50 percent in fair, and 10 percent in poor (Figure 14B). Comparing Figure 13A and Figure 14A shows that CCRC's paved county primary road network is better than similarly-classified roads in the rest of the state, while Figure 13B and Figure 14B show that CCRC's paved county local road network is better than similarly-classified roads in the rest of the state. Other road condition graphs can be viewed on the TAMC pavement condition dashboard at: http://www.mcgi.state.mi.us/mitrp/Data/PaserDashboard.aspx.

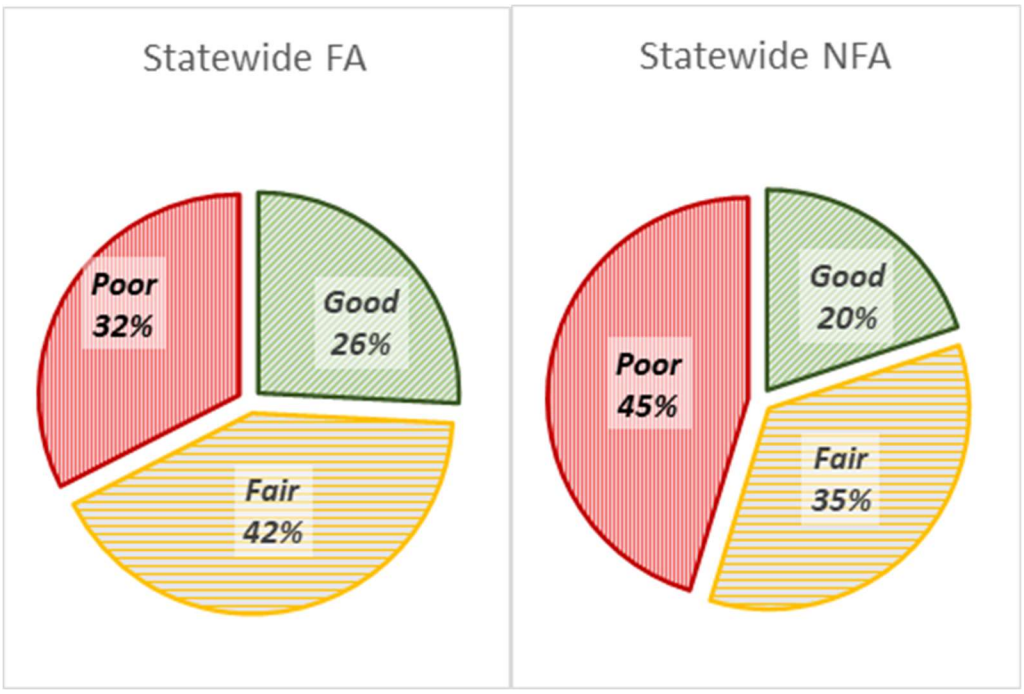


Figure 14: (A) Left: Statewide paved county primary road network conditions by percentage of good, fair, or poor, and (B) Right: paved county local road network conditions by percentage of good, fair, or poor

CCRC network conditions are generally better than the statewide average. The current conditions are a result of implementing proper long- and short-term maintenance strategies and budgeting.

Figure 15 and Figure 16 show the number of miles for CCRC's roads with PASER scores expressed in TAMC definition categories for the paved county primary road network (Figure 15) and the paved county local road network (Figure 16). CCRC considers road miles on the transition line between good and fair (PASER 8) and the transition line between fair and poor (PASER 5) as representing parts of the road network where there is a risk of losing the opportunity to apply less expensive treatments that gain significant improvements in service life.

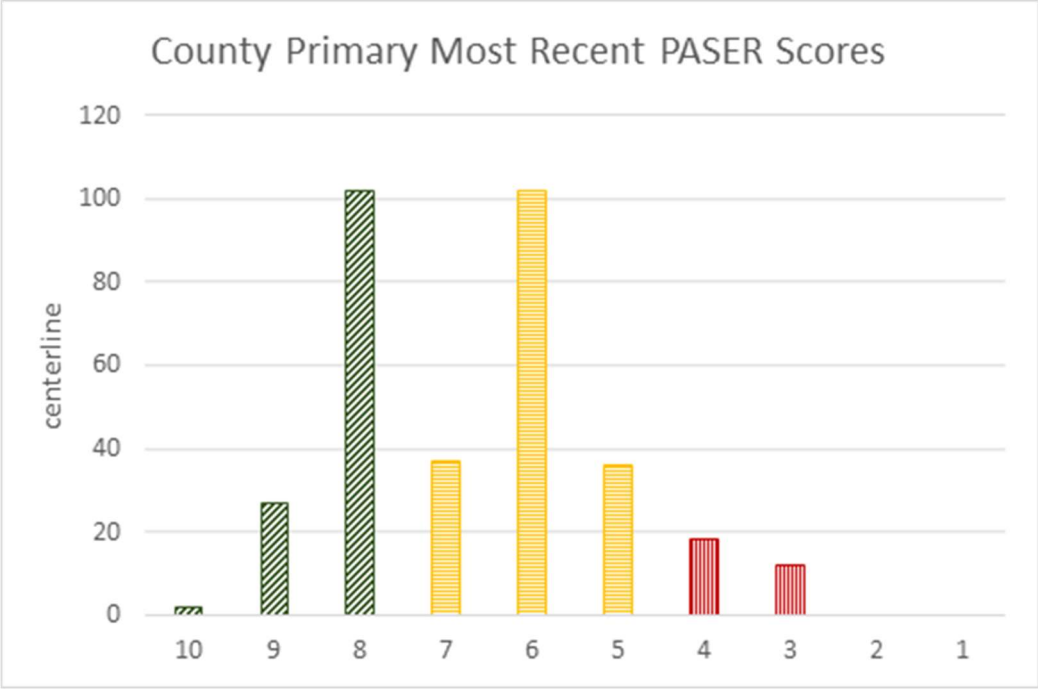


Figure 15: CCRC paved county primary road network conditions. Bar graph colors correspond to good/fair/poor TAMC designations.

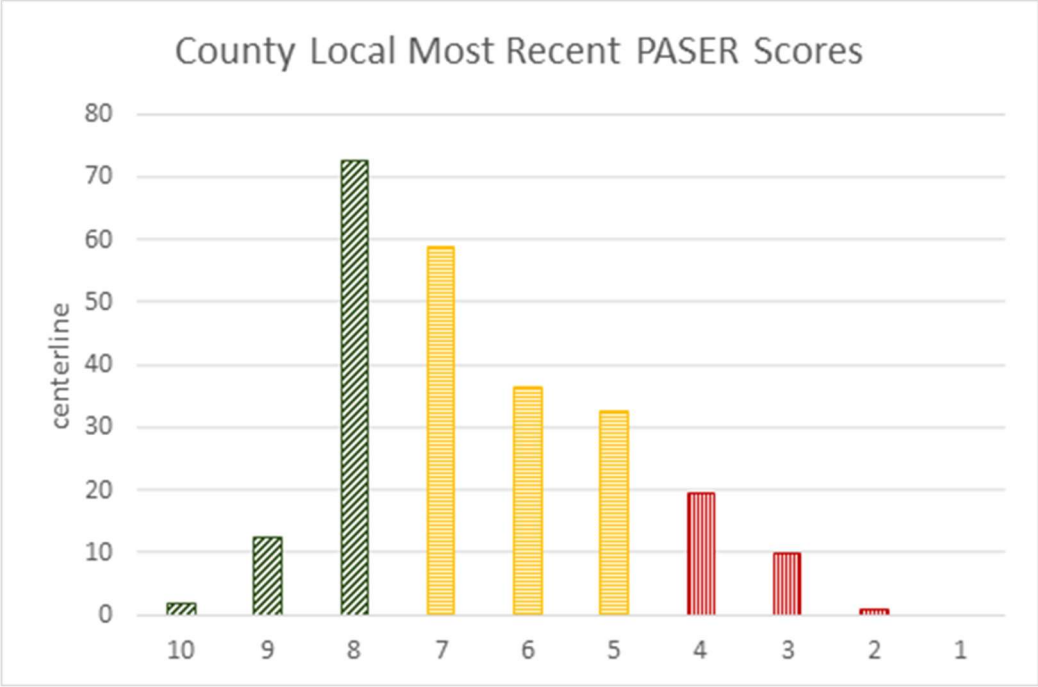


Figure 16: CCRC paved county local network condition by PASER rating. Bar graph colors correspond to good/fair/poor TAMC designations.

Figure 17 illustrates CCRC's entire paved road network divided by township into the TAMC good/fair/poor designations.

Figure 18 provides a map illustrating the geographic location of paved roads and their respective PASER condition. An online version of the most recent PASER data is located at https://www.mcgi.state.mi.us/tamcMap/.

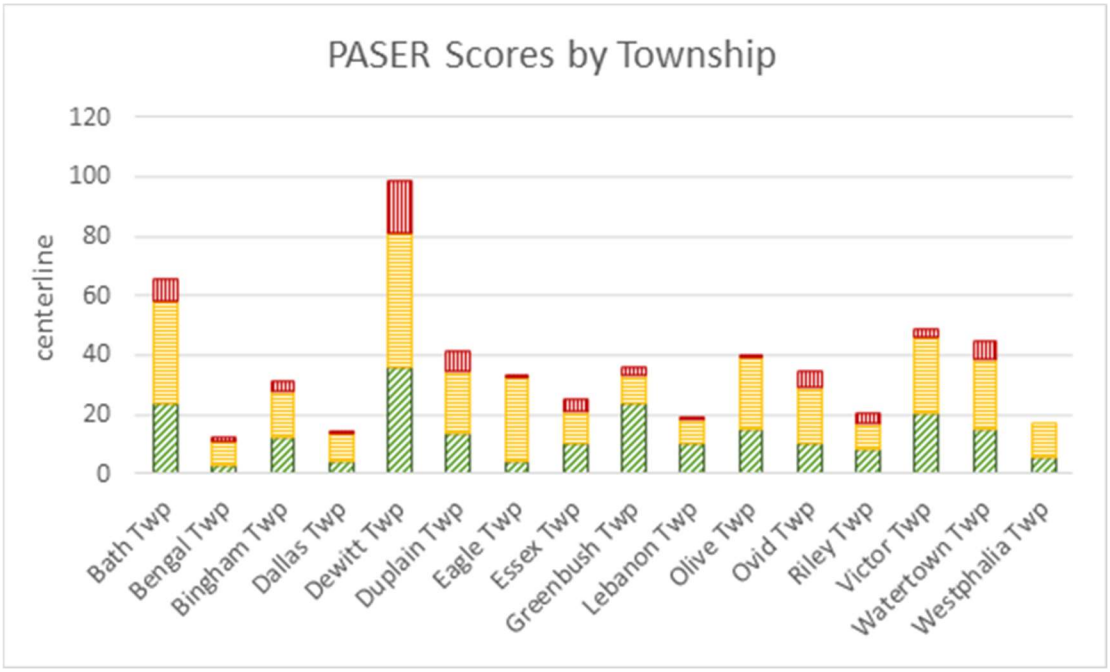


Figure 17: Number of miles of paved road in each township divided in categories of good (PASER 10, 9, 8), fair (PASER 7, 6, 5), and poor (PASER 4, 3, 2, 1).

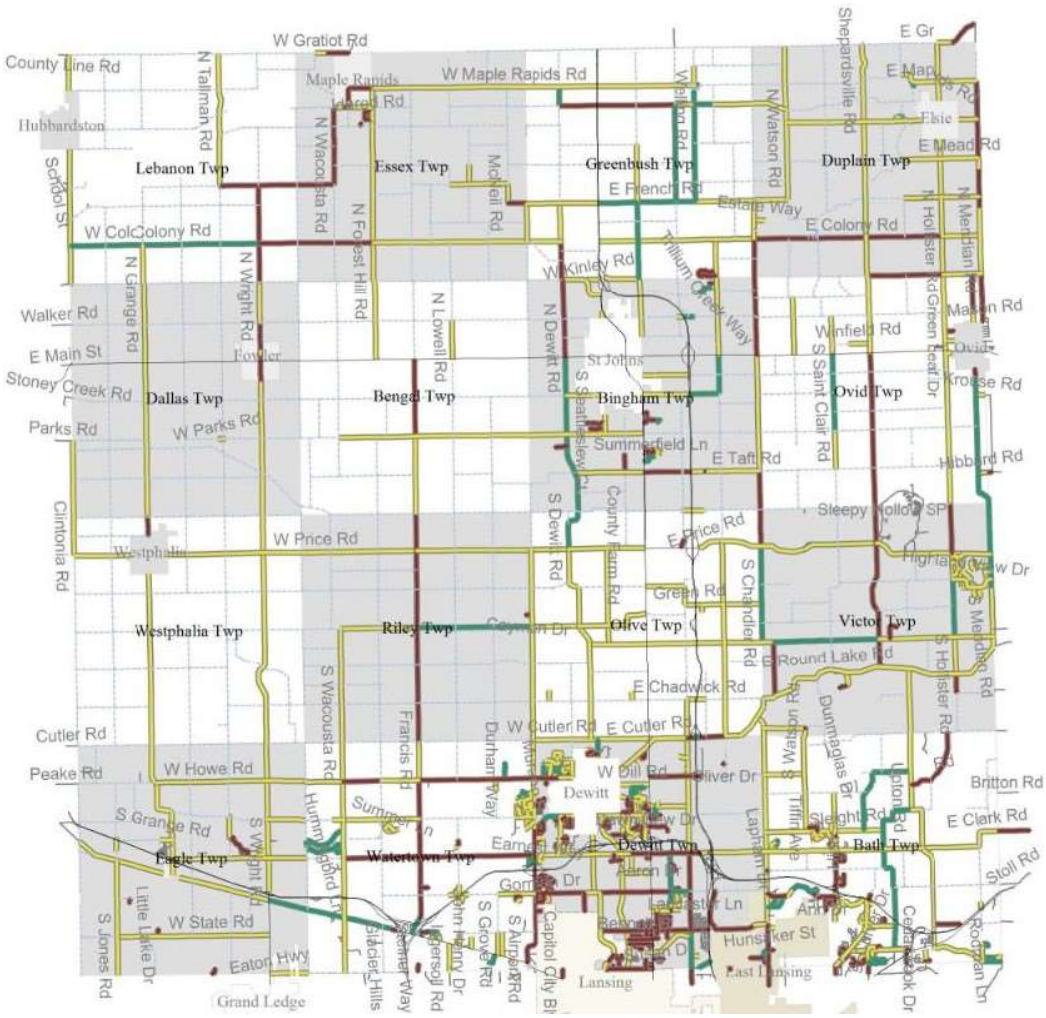


Figure 18: Map of the current paved road condition in good (PASER 10, 9, 8) shown in green, fair (PASER 7, 6, 5) shown in yellow, and poor (PASER 4, 3, 2, 1) shown in red. Only Roads owned by CCRC are shown.

Currently CCRC has an acceptable distribution of roads along the PASER system, some on poor end, more on the good end, but with the majority in the fair condition range. The good condition range has been increasing steadily, however there is significant risk at the lower end of the fair condition range. These roads are nearing the end of the effectiveness of low cost preventative maintenance treatments, and will soon need expensive rehabilitation or reconstruction. Without significant investment going forward, these roads will slip into the poor category.

Historically, the overall quality of CCRC's paved county primary roads have been increasing, as can be observed in Figure 19. Over the past 10 years, CCRC's good roads have increased from the 10% range to greater than 30%, while at the same time reducing the percentage of poor roads from 30% to 10%.

Comparing CCRC's paved county primary road condition trends illustrated in Figure 19 with overall statewide condition trends for similarly-classified roads, which are illustrated in Figure 20, shows a similar trend locally as in the rest of the state.

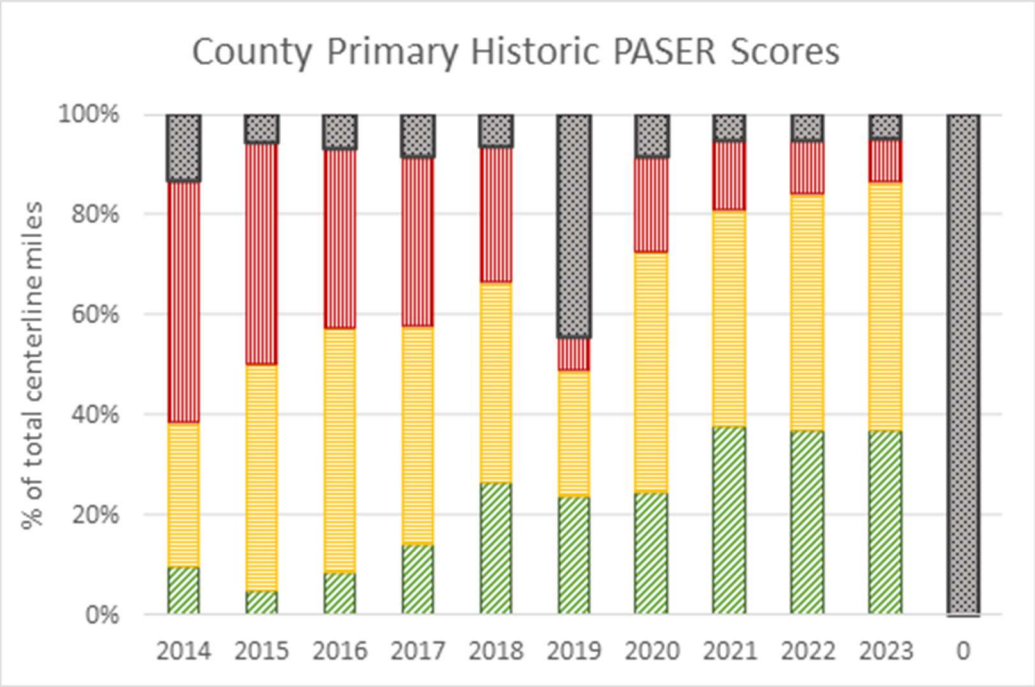


Figure 19: Historical CCRC paved county primary road network condition trend

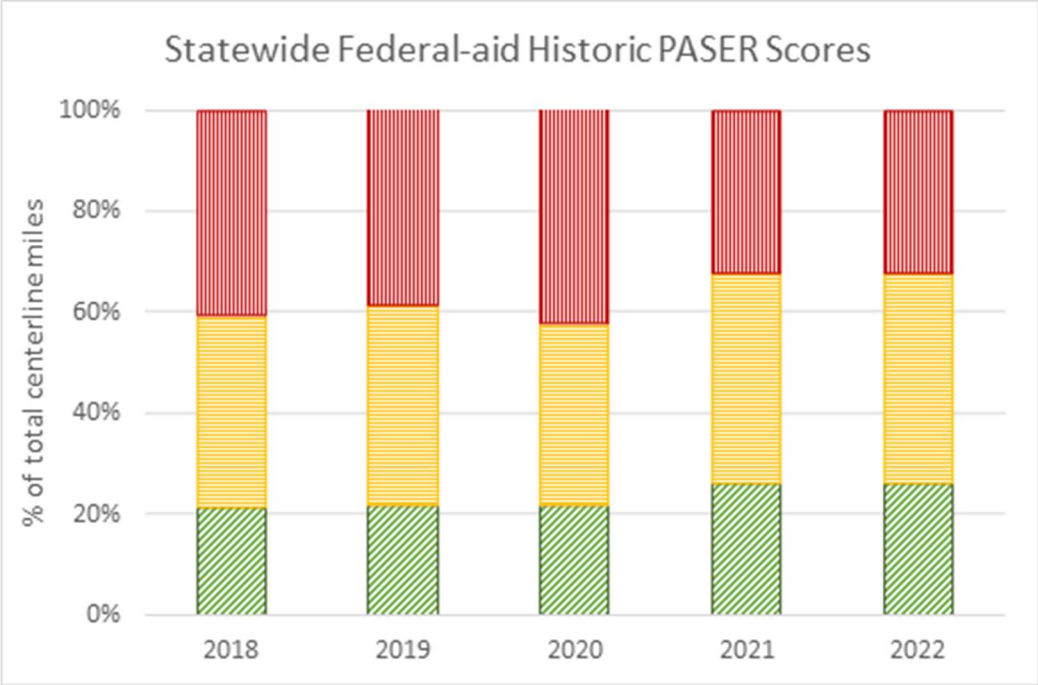


Figure 20: Historical statewide county primary road network condition trend

Historically, the overall quality of CCRC's paved county local roads have been decreasing more than the paved county primary road network because they lack a source of state and federal funding and therefore must be supported locally. Figure 21 illustrates the condition of the paved county local road network in CCRC while Figure 22 illustrates these conditions statewide.

Comparing CCRC's paved county local road condition trends illustrated in Figure 21 with overall statewide condition trends for all paved county local roads illustrated in Figure 22 indicates a similar trend locally as in the rest of the state. The year-to-year variation in the paved county local road network is likely due to the fact that only a portion of the network is collected each year, both locally and statewide. This variation is likely a result of reporting bias since a representative sample of roads is not collected each year.

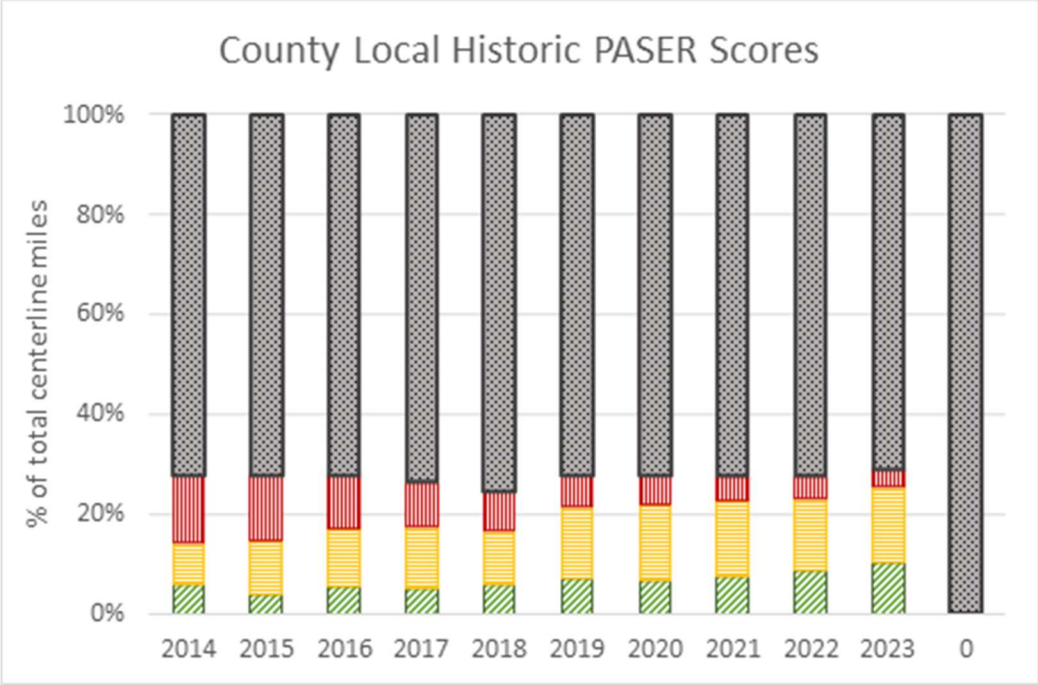


Figure 21: Historical CCRC paved county local road network condition trend

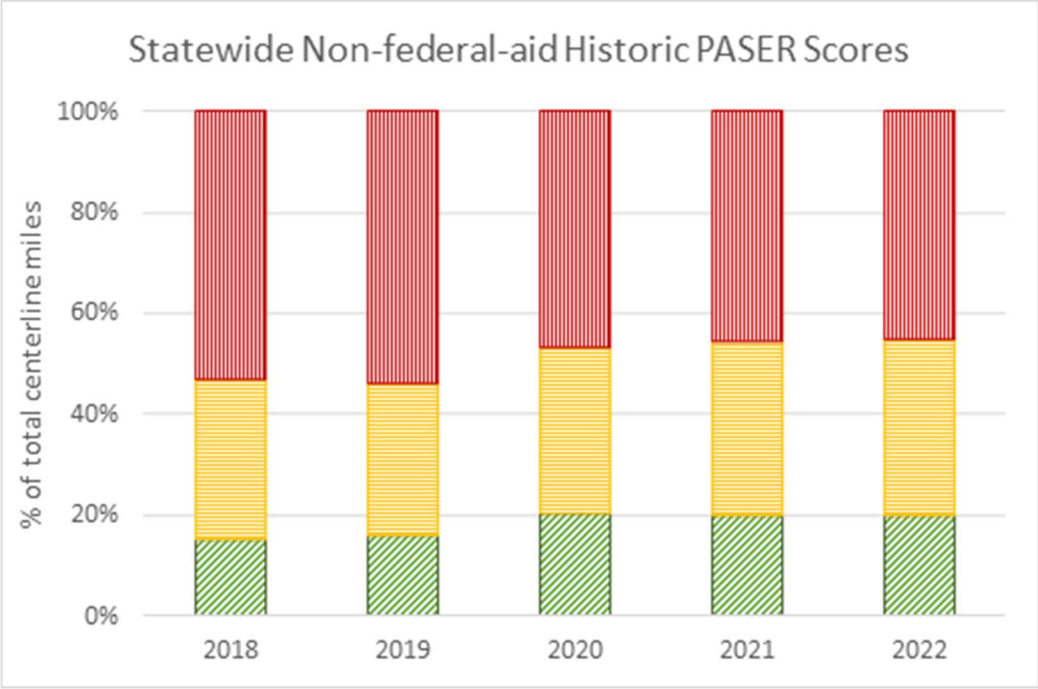


Figure 22: Historical statewide paved county local road network condition trend

Unpaved Roads

The condition of unpaved roads can be rapidly changing, which makes it difficult to obtain a consistent surface condition rating over the course of weeks or even days. The TAMC adopted the Inventory Based Rating (IBR) System™ for rating unpaved roads, and CCRC uses the IBR System™ for rating its unpaved primary roads. More information regarding the IBR System™ can be found in Introduction's Pavement Primer.

CCRC maintains approximately 18 miles of unpaved primary roads. These are generally low traffic volume roads but serve as necessary connections to the paved primary grid network, providing access for local agricultural industries and rural populations. The annual maintenance costs for grading, dust control, and re-graveling are relatively low since CCRC crews and equipment are routinely in these areas maintaining the local unpaved road network. CCRC evaluates the need to convert these roads to paved surfaces based on traffic type, volume, and drainage conditions.

Figure 23 shows the percentage of unpaved primary roads in each IBR number ranges of 10, 9, and 8; 7, 6, and 5; and 4, 3, 2, and 1, for all roads. Figure 24 illustrates the miles of unpaved primary roads in IBR number ranges of 10, 9, and 8; 7, 6, and 5; and 4, 3, 2, and 1, for each township.

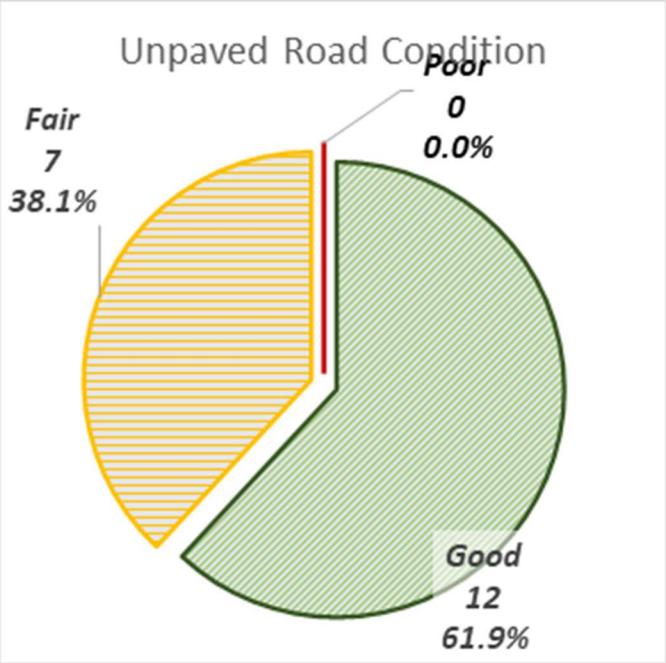


Figure 23: CCRC's unpaved road network condition by percentage of roads with IBR numbers of 10, 9, and 8; roads with IBR numbers of 7, 6, and 5; and IBR numbers of 4, 3, 2, and 1.

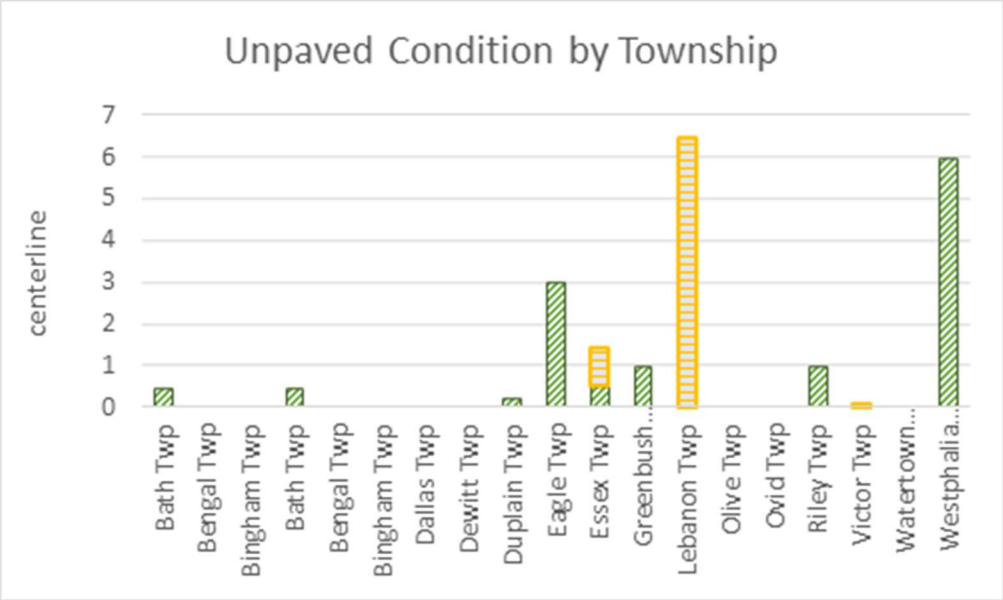


Figure 24: Number of miles of unpaved road in each township divided in categories of roads with IBR numbers of 10, 9, and 8; IBR numbers of 7, 6, and 5; and IBR numbers of 4, 3, 2, and 1.

Figure 25, Figure 26, and Figure 27 are maps illustrating the geographic location of unpaved roads and the assessment of the IBR elements, respectively: surface width, drainage adequecy, and structural adequecy.

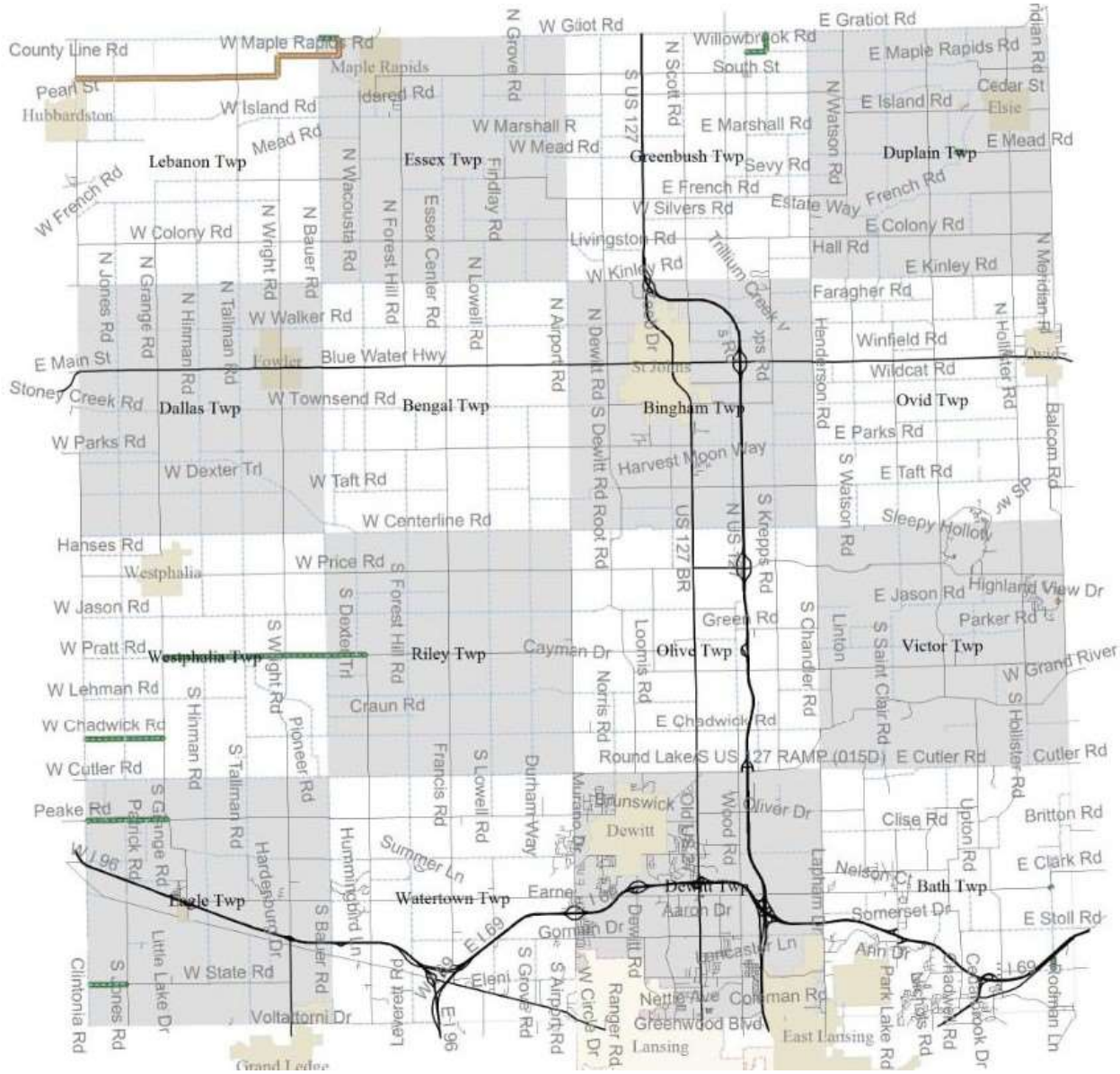


Figure 25: Map of the current IBR for surface width with good (22' and greater) shown in green, fair (16' to 21') shown in orange, and poor (15' or less) shown in red. Only unpaved roads owned by CCRC are shown.

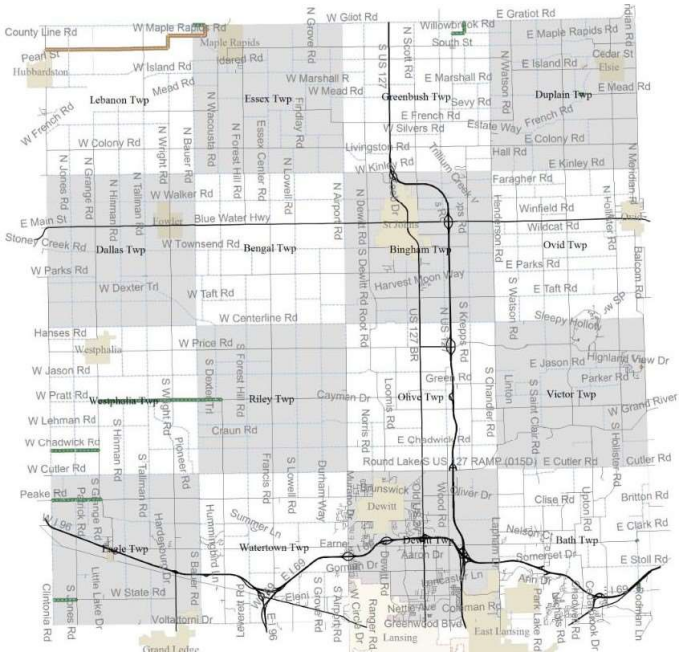


Figure 26: Map of the current IBR for drainage adequacy with good (2' or more) shown in green, fair (0.5' to less than 2') shown in orange, and poor (less than 0.5') shown in red. Only unpaved roads owned by CCRC are shown.

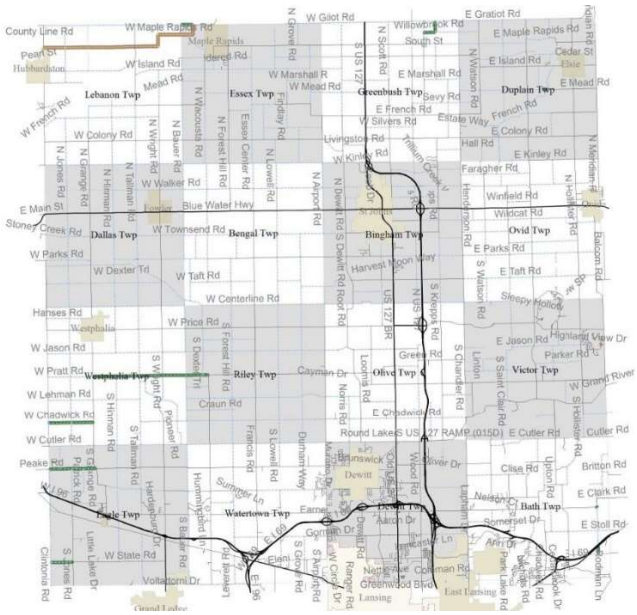


Figure 27: Map of the current IBR structural adequacy good (greater than 7") shown in green, fair (4" to 7") shown in orange, and poor (less than 4") shown in red. Only unpaved roads owned by CCRC are shown.

Overall CCRC primary unpaved roads are in adequate condition with respect to roadway width, drainage, and gravel surface.

Goals

Goals help set expectations to how pavement conditions will change in the future. Pavement condition changes are influenced by water infiltration, soil conditions, sunlight exposure, traffic loading, and repair work performed. CCRC is not able to control any of these factors fully due to seasonal weather changes, traffic pattern changes, and its limited budget. In spite of the uncontrollable variables, it is still important to set realistic network condition goals that efficiently use budget resources to build and maintain roads meeting taxpayer expectations. An assessment of the progress toward these goals is provided in the *1. Pavement Assets*: *Gap Analysis* section of this plan.

Goals for Paved County Primary Roads

The overall goal for CCRC's paved county primary road network is to maintain or improve road conditions network-wide at 2023 levels. The baseline condition for this goal is illustrated in Figure 28.

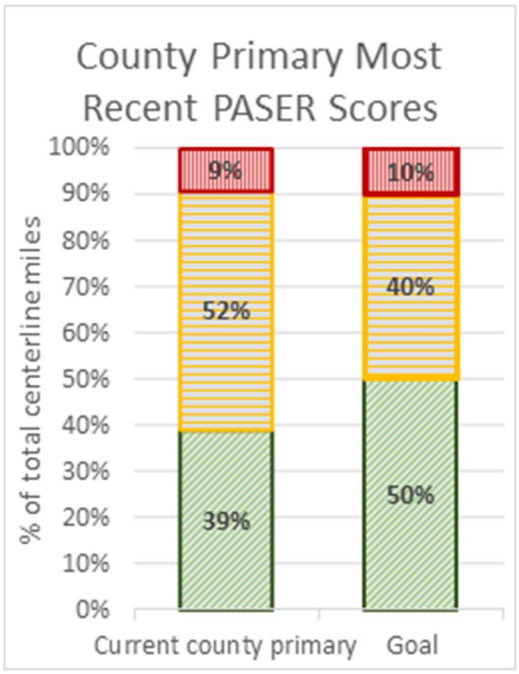


Figure 28: CCRC's 2023 county primary road network condition by percentage of good/fair/poor

CCRC's network-level pavement condition strategy for paved county primary roads is:

1. Prevent its good and fair (PASER 10 - 5) paved county primary from becoming poor (PASER 4 - 1).
2. Continue with 10 percent or less of paved county primary roads rated in the poor category.

Goals for Paved County Local Roads

The overall goal for CCRC's paved county local road network is to maintain or improve road conditions network-wide at 2023 levels. The baseline condition for this goal is illustrated in Figure 29.

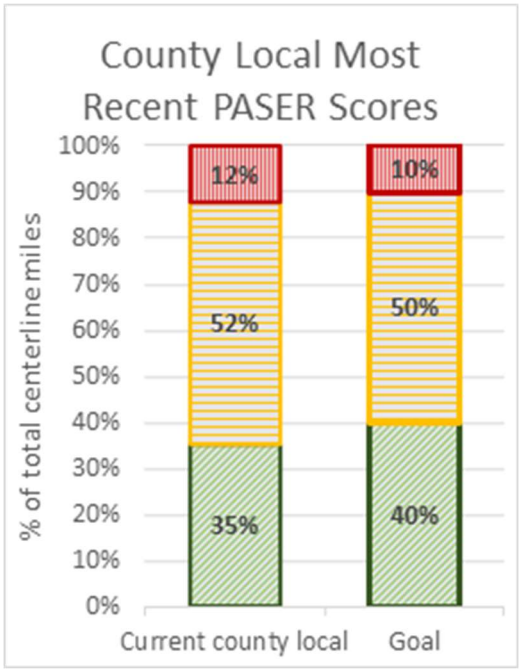


Figure 29: CCRC 2023 paved county local road network condition by percentage of good/fair/poor

CCRC's network-level pavement condition strategy for paved county local roads is:

1. Prevent its good and fair (PASER 10 - 5) paved county local roads from becoming poor (PASER 4 - 1).
2. Move 2 percent of paved county local roads out of the poor category, maintaining 10 percent or less in poor condition.

Goals for Unpaved Roads

The overall goal for CCRC's unpaved road network is to maintain or improve road conditions network-wide at 2023 levels. The baseline condition for this goal is illustrated in Figure 30.

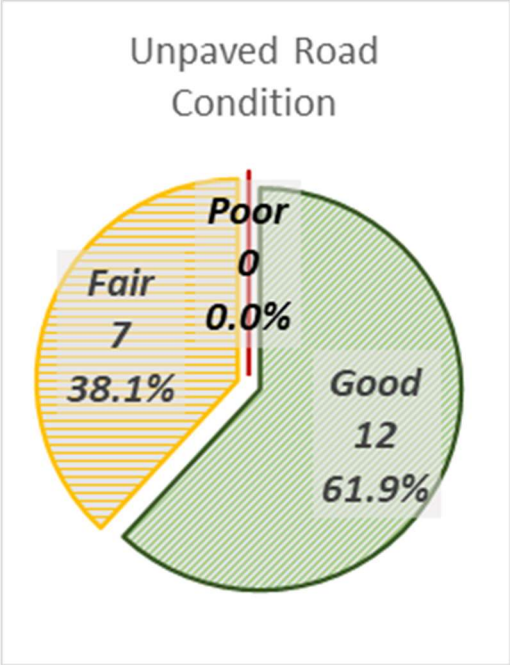


Figure 30: CCRC's 2023 unpaved road network condition by percentage of good/fair/poor

Our year-round unpaved roads will be maintained at their current structural adequacy assessments and current drainage adequacy assessments for roads where these two IBR elements are assessed as good or fair. Currently, 100 percent of CCRC's year-round unpaved roads have good or fair structural adequacy and 100 percent have good or fair drainage adequacy. Year-round unpaved roads that have either or both of these two categories assessed as poor will be strategically upgraded as funding is available to address, first, drainage issues and, then, structural issues. Surface widths will be addressed on an as-needed basis to provide service or to address safety issues. Seasonal roads will be addressed to provide passability and safety but do not have a goal associated with them.

Modelled Trends

Roads age and deteriorate just like any other asset. All pavements are damaged by water, traffic weight, freeze/thaw cycles, sunlight, and traffic weight. To offset natural deterioration and normal wear-and-tear on the road, CCRC must complete treatment projects that either protect and/or add life to its pavements. The year-end condition of the whole network depends upon changes or preservation of individual road section condition that preservation treatments have affected.

CCRC uses many types of repair treatments for its roads, each selected to balance costs, benefits, and road life expectancy. When agency trends are modelled, any gap between goals and accomplishable work becomes evident. Financial resources influence how much work can be accomplished across the network within agency budget and what treatments and strategies can be afforded; a full discussion of CCRC's financial resources can be found in the *5. Financial Resources* section.

Treatments and strategies that counter pavement-damaging forces include reconstruction, structural improvement, capital preventive maintenance, innovative treatments, and maintenance. For a complete discussion on the pavement treatment tools, refer to the *1. Introduction*'s *Pavement Primer*.

Correlating with each PASER score are specific types of treatments best performed either to protect the pavement (CPM) or to add strength back into the pavement (structural improvement) (Table 1). MDOT provides guidance regarding when a specific pavement may be a candidate for a particular treatment. These identified PASER scores "trigger" the timing of projects appropriately to direct the right pavement fix at the right time, thereby providing the best chance for a successful project. The information provided in Table 1 is a guide for identifying potential projects; however, this table should not be the sole criteria for pavement treatment selection. Other information such as future development, traffic volume, utility projects, and budget play a role in project selection. This table should not be a substitute for engineering judgement.

Table 1: Service Life Extension (in Years) for Pavement Types Gained by Fix Type[1]

Fix Type	Life Extension (in years)*			PASER
	Flexible	Composite	Rigid	
HMA crack treatment	1-3	1-3	N/A	6-7
Overband crack filling	1-2	1-2	N/A	6-7
One course non-structural HMA overlay	5-7	4-7	N/A	4-5****
Mill and one course non-structural HMA overlay	5-7	4-7	N/A	3-5
Single course chip seal	3-6	N/A	N/A	5-7†
Double chip seal	4-7	3-6	N/A	5-7†
Single course microsurface	3-5	**	N/A	5-6
Multiple course microsurface	4-6	**	N/A	4-6****
Ultra-thin HMA overlay	3-6	3-6	N/A	4-6****
Paver placed surface seal	4-6	**	N/A	5-7
Full-depth concrete repair	N/A	N/A	3-10	4-5***
Concrete joint resealing	N/A	N/A	1-3	5-8
Concrete spall repair	N/A	N/A	1-3	5-7
Concrete crack sealing	N/A	N/A	1-3	4-7
Diamond grinding	N/A	N/A	3-5	4-6
Dowel bar retrofit	N/A	N/A	2-3	3-5***
Longitudinal HMA wedge/scratch coat with surface treatment	3-7	N/A	N/A	3-5****
Flexible patching	**	**	N/A	N/A
Mastic joint repair	1-3	1-3	N/A	4-7
Cape seal	4-7	4-7	N/A	4-7
Flexible interlayer “A”	4-7	4-7	N/A	4-7
Flexible interlayer “B” (SAMI)	4-7	4-7	N/A	3-7
Flexible interlayer “C”	4-7	4-7	N/A	3-7
Fiber reinforced flexible membrane	4-7	4-7	N/A	3-7
Fog seal	**	**	N/A	7-10
GSB 88	**	**	N/A	7-10
Mastic surface treatment	**	**	N/A	7-10
Scrub seal	**	**	N/A	4-8

* The time range is the expected life extending benefit given to the pavement, not the anticipated longevity of the treatment.

** Data is not available to quantify the life extension.

*** The concrete slabs must be in fair to good condition.

**** Can be used on a pavement with a PASER equal to 3 when the sole reason for rating is rutting or severe raveling of the surface asphalt layer.

† For PASER 4 or less providing structural soundness exists and that additional pre-treatment will be required for example, wedging, bar seals, spot double chip seals, injection spray patching or other pre-treatments.

[1] Part of Appendix D-1 from *MDOT Local Agency Programs Guidelines for Geometrics on Local Agency Projects* 2017 Edition Approved Preventive Maintenance Treatments

Roadsoft Pavement Condition Forecast to Forecast Future Trends

CCRC uses Roadsoft, an asset management software suite, to manage road- and bridge-related infrastructure. Roadsoft is developed by Michigan Technological University and is available for Michigan local agencies at no cost to them. Roadsoft uses pavement condition data to drive network-level deterioration models that forecast future road conditions based on planned construction and maintenance work. A screenshot of Roadsoft's pavement condition model and the associated output is shown in Figure 31.

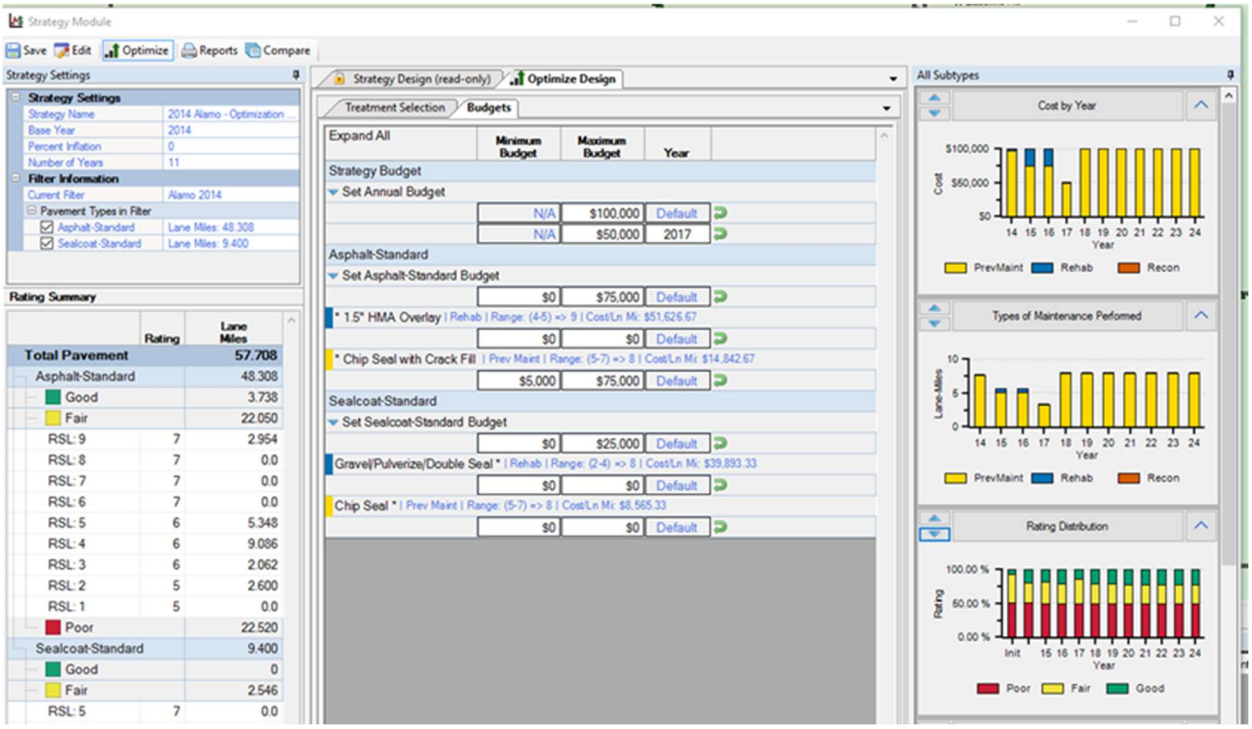


Figure 31: Pavement condition forecast model in the software program Roadsoft.

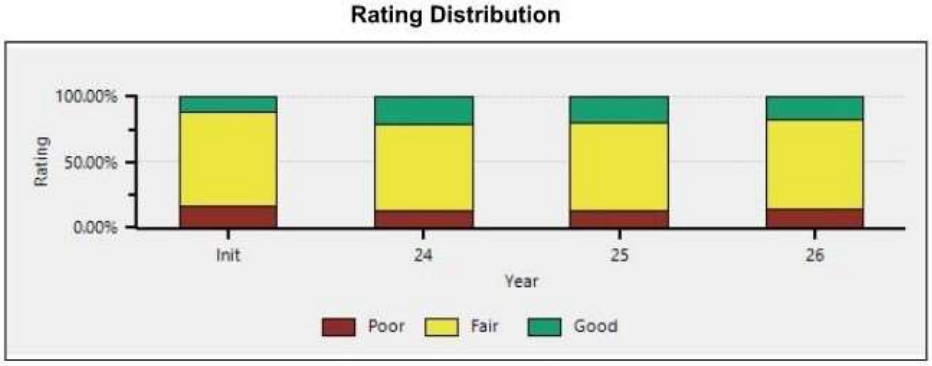
Paved County Primary Roads

Table 4 illustrates the network-level model inputs for Roadsoft on the paved county primary road network. Other pavement types in this network were neglected due to their small numbers relative to HMA pavements. The treatments outlined in Table 4 are the average treatment volume of planned projects scheduled to be completed in 2024-2026 See Appendix A of this plan for details on planned projects. Full model inputs and outputs are included in Appendix D.

Table 4: Roadsoft Modelled Trends, Planned Projects, and Gap Analysis for 's Road Assets—Modelled Trends: Roadsoft Annual Work Program for the Paved County Primary Road Network Forecast

Treatment Name	Annual Miles of Treatment	Years of Life	Trigger-Reset
Crack Seal	60	1	7–7
Chip Seal	80	5	5, 6-8
Overlay	6	10	3, 4-9
Resurface	4	18	1, 2, 3-10

Results from the Roadsoft network condition model for the county primary roads are shown in Figure 32. The Roadsoft network analysis of CCRC's planned projects from its currently-available budget does not allow CCRC to reach its pavement condition goals given the projects planned for the next three years.



2024-26

Initial Values Lane Miles	%	Rating	2024		2025		2026		2027	2028	2029	2030	2031
143.271	12.2	Good	253.390	21.6	234.211	20.0	209.409	17.9					
837.765	71.4	Fair	765.207	65.2	788.518	67.2	800.853	68.3					
192.429	16.4	Poor	154.868	13.2	150.736	12.9	163.203	13.9					
1,173.46	100.0	Total											

Figure 32: Forecast good/fair/poor changes to CCRC network condition from planned projects on the county primary road network.

Paved County Local ***Road***

A screenshot of Roadsoft's pavement condition model and the associated output is shown in Figure 33.

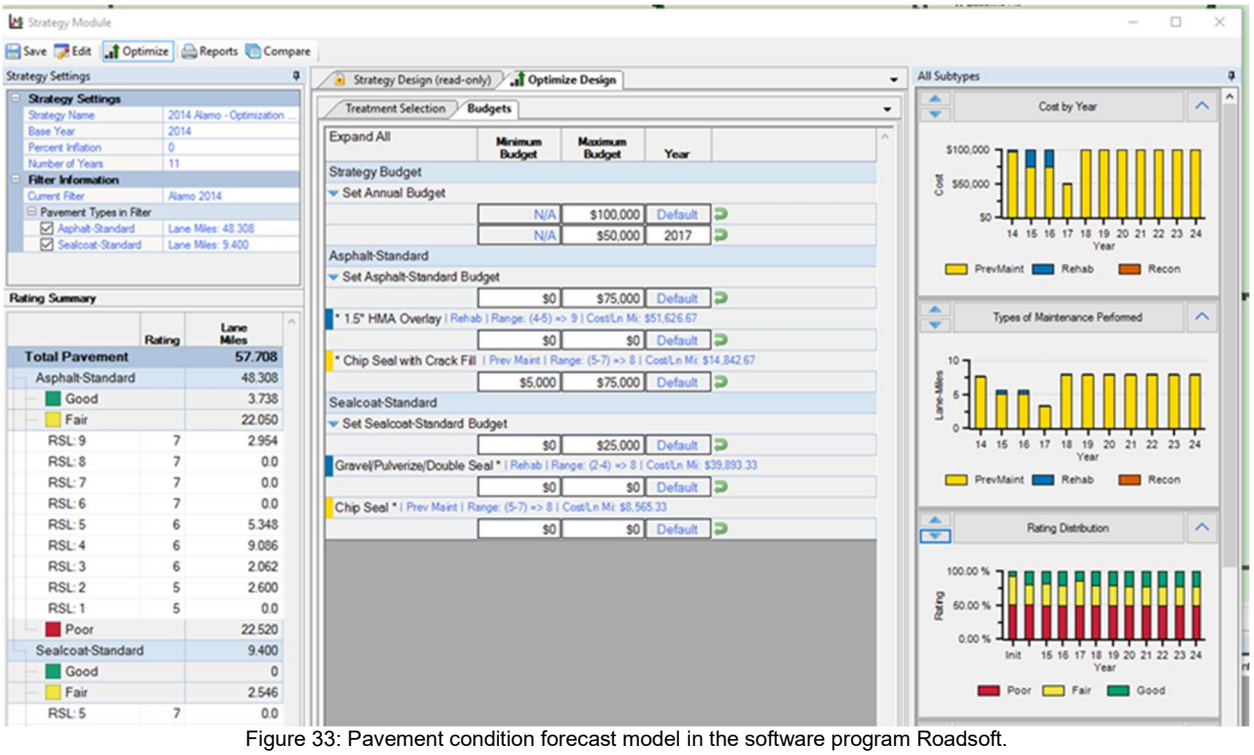


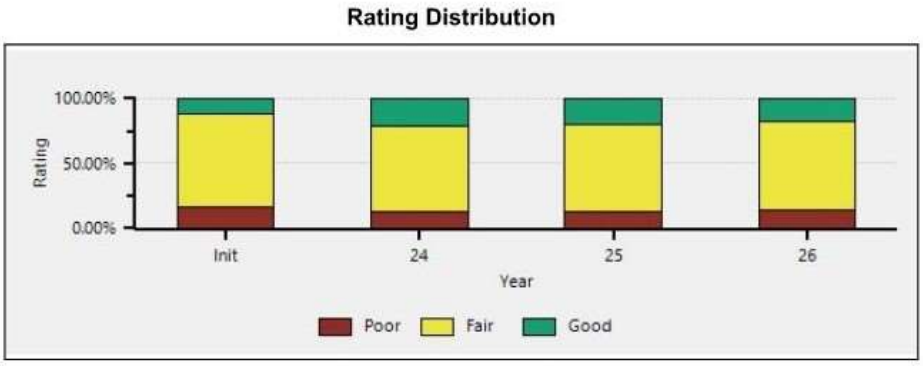
Figure 33: Pavement condition forecast model in the software program Roadsoft.

Table 5 illustrates the network-level model inputs for Roadsoft on the paved county local road network. Other pavement types in this network were neglected due to their small numbers relative to HMA pavements. The treatments outlined in Table 5 are the average treatment volume of planned projects scheduled to be completed in 2024-2026. Details on planned projects are included in Appendix A, and full model inputs and outputs are included in Appendix D.

Table 5: Roadsoft Modelled Trends, Planned Projects, and Gap Analysis for 's Road Assets—Modelled Trends: Roadsoft Annual Work Program for the Paved County Local Road Network Forecast

Treatment Name	Annual Miles of Treatment	Years of Life	Trigger-Reset
Crack Seal	10	1	7–7
Chip Seal	20	5	5, 6-8
Overlay	2	10	3, 4-9
Resurface	1	18	1, 2, 3-10

Results from the Roadsoft network condition model for the paved county local roads are shown in Figure 34. The Roadsoft network analysis of CCRC's planned projects from its currently available budget does not allow CCRC to reach its pavement condition goal given the projects planned for the next three years.



2024-26

Initial Values Lane Miles	%	Rating	2024		2025		2026		2027	2028	2029	2030	2031
143.271	12.2	Good	253.390	21.6	234.211	20.0	209.409	17.9					
837.765	71.4	Fair	765.207	65.2	788.518	67.2	800.853	68.3					
192.429	16.4	Poor	154.868	13.2	150.736	12.9	163.203	13.9					
1,173.46	100.0	Total											

Figure 34: Forecast good/fair/poor changes to CCRC network condition from planned projects on the paved county local road network.

Unpaved Road Condition Trends

The overall goal for CCRC's unpaved road network is to maintain or improve road conditions network-wide at 2023 levels.

Planned Projects

CCRC plans construction and maintenance projects several years in advance. A multi-year planning threshold is required due to the time necessary to plan, design, and finance construction and maintenance projects on the paved county primary road network. This includes planning and programming requirements from state and federal agencies that must be met prior to starting a project and can include studies on environmental and archeological impacts, review of construction and design documents and plans, documentation of rights-of-way ownership, planning and permitting for storm water discharges, and other regulatory and administrative requirements.

Per PA 499 of 2002 (later amended by PA 199 of 2007), road projects for the upcoming three years are required to be reported annually to the TAMC. Planned projects represent the best estimate of future activity; however, changes in design, funding, and permitting may require CCRC to alter initial plans.

Project planning information is used to predict the future condition of the road networks that CCRC maintains. The *1. Pavement Assets*: *Modelled Trends* section of this plan provides a detailed analysis of the impact of the proposed projects on their respective road networks.

For 2024-2026 CCRC plans to do the following projects:

Paved County Primary Projects

CCRC is currently planning the construction and maintenance projects listed in Appendix A for the paved county primary road network. The locations of these projects are shown in Figure 35, Figure 36, and Figure 37. The total cost of these projects is approximately $20,000,000

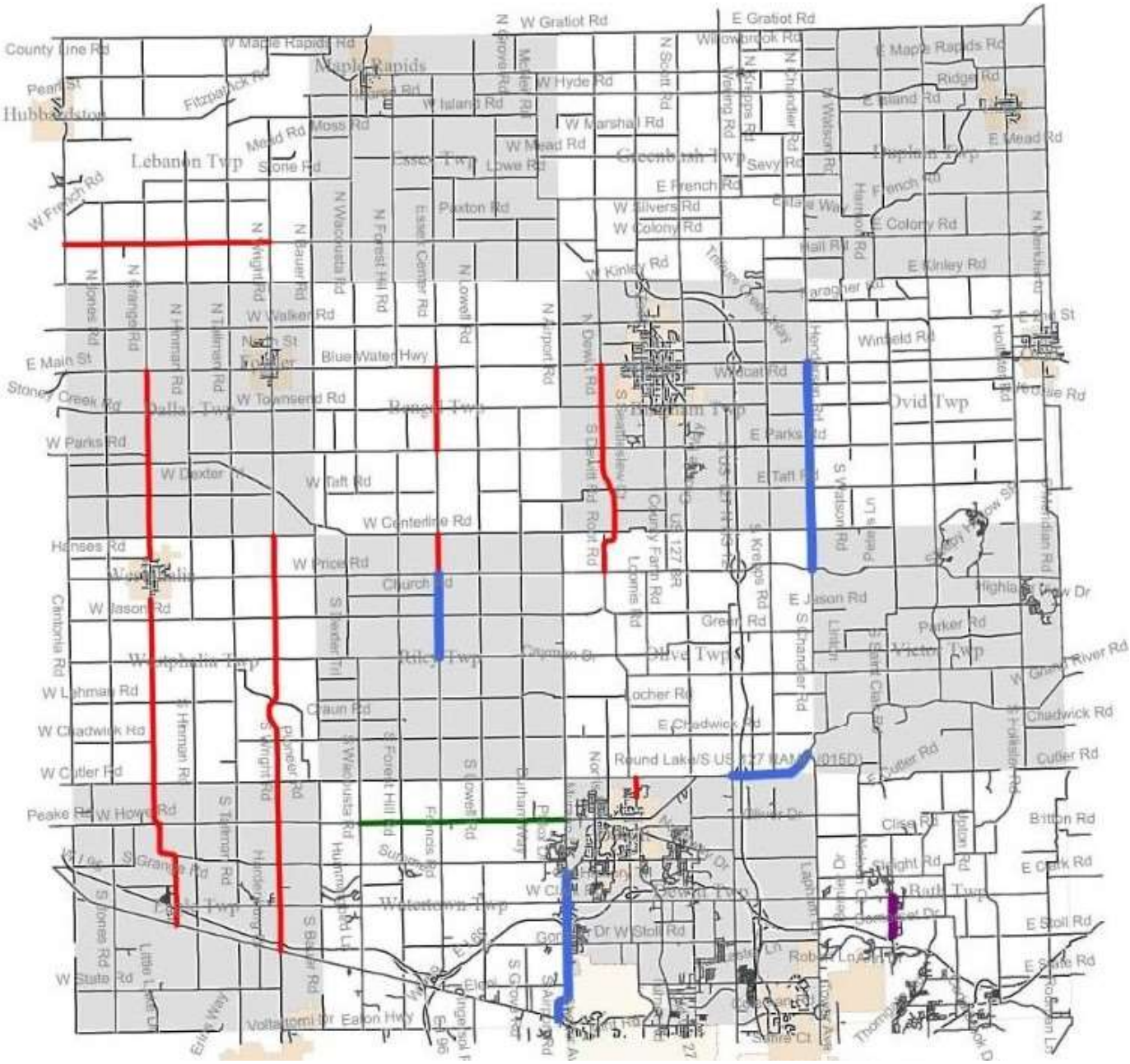


Figure 35: Map showing paved county primary road projects planned for 2024.

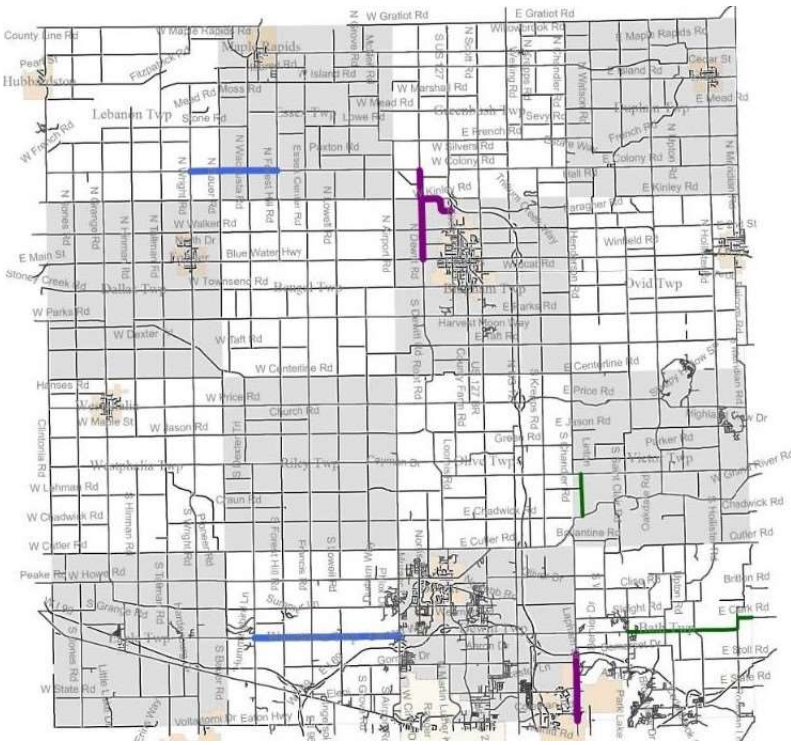


Figure 36: Map showing paved county primary road projects planned for 2025.

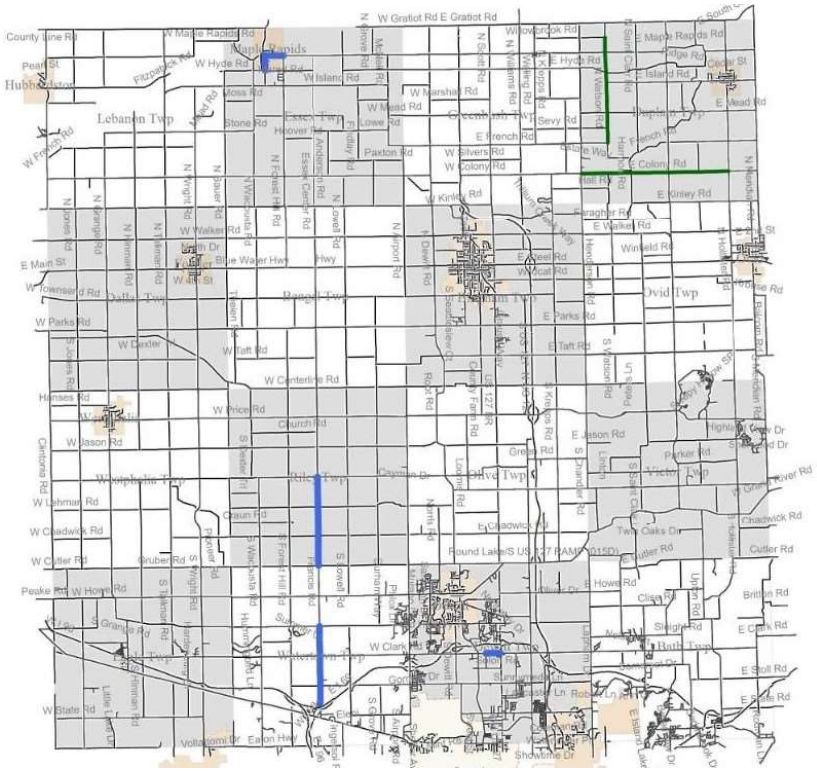


Figure 37: Map showing paved county primary road projects planned for 2026.

Paved County Local Projects

CCRC provides recommended maintenace projects for paved local roads, based on PASER ratings, on a yearly basis to each Township. The 2024 recommended projects are listed in Appendix B. Project location maps are determined on a yearly basis after countywide unit price bids are received in late spring. Recommended projects that are unselected in a current year stay on the list for future years. Location maps shown in Figure 38, Figure 39, and Figure 40 will be updated as projects are selected. The total cost of these projects is dependent on Township budgets that change on an annual basis.

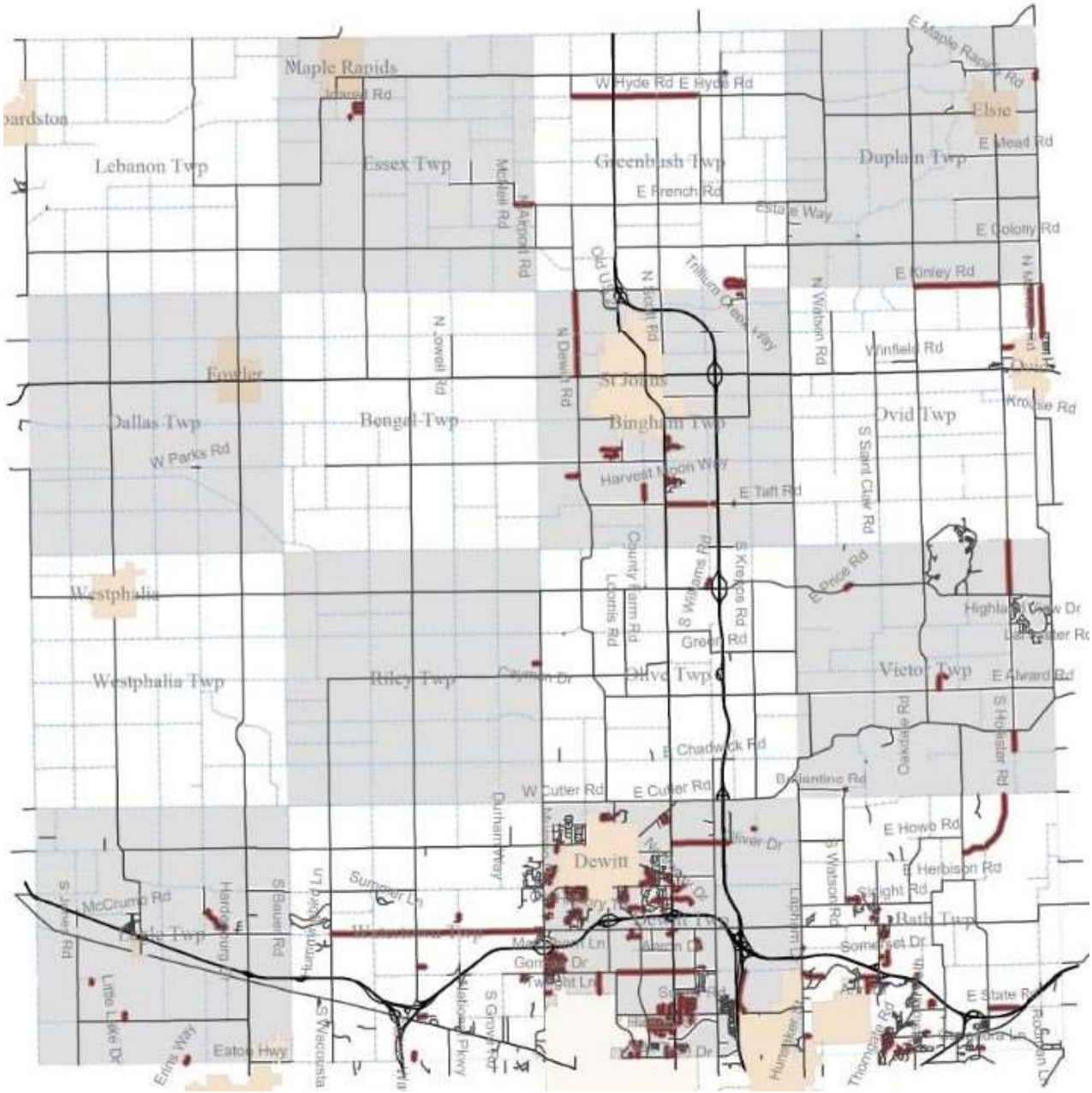


Figure 38: Map showing paved county local recommended projects as of 2024.

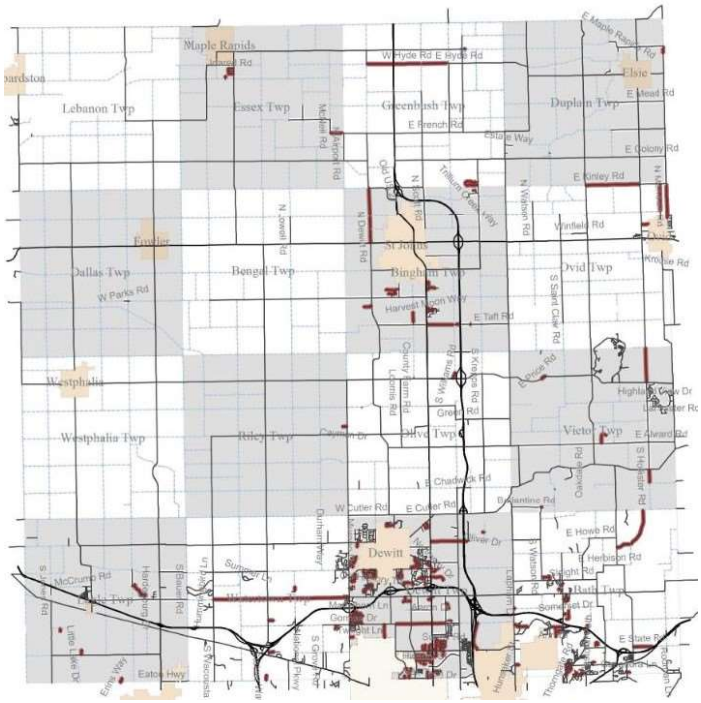


Figure 39: Map showing paved county local road projects planned for 2025.

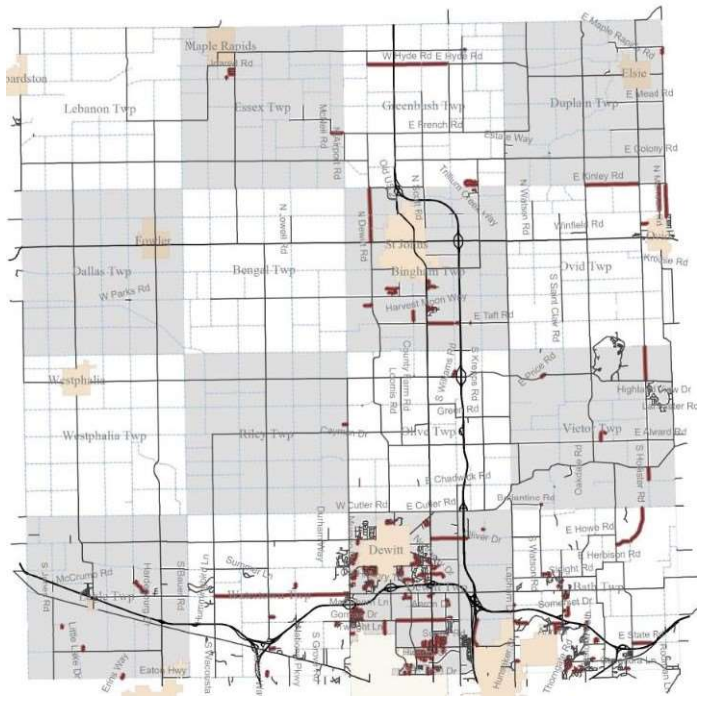


Figure 40: Map showing paved county local road projects planned for 2026.

Unpaved Road Projects

CCRC is currently planning the construction and maintenance projects listed in Appendix B for the unpaved road network. The location of these projects are shown in Figure 41. The total cost of these projects is variable based on annual Township budgets.

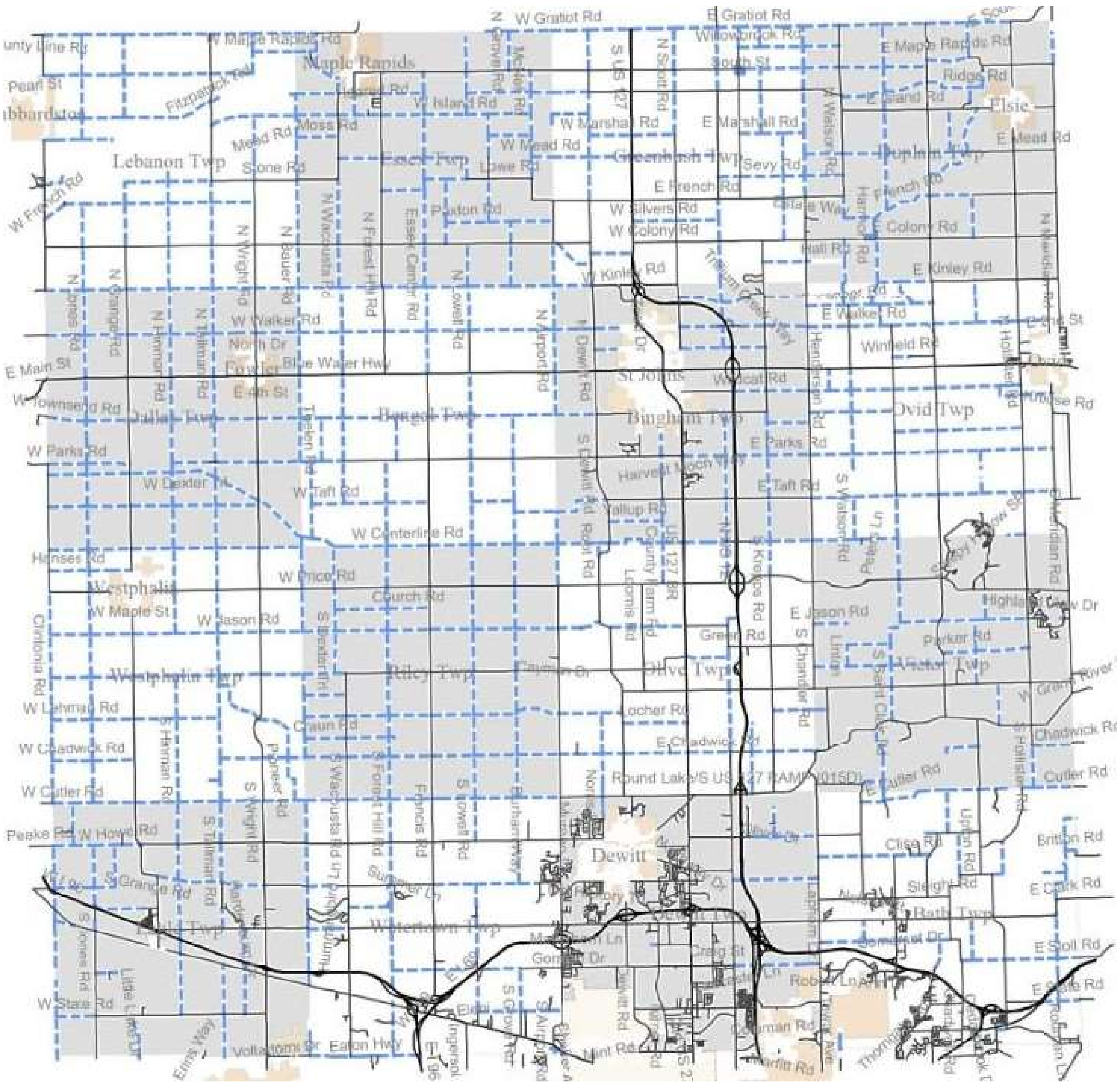


Figure 41: Map showing unpaved road projects planned for 2024-2026.

More detailed information on these projects can be found in Appendix A-C.

Gap Analysis

The current funding levels that CCRC receives are not sufficient to meet the goals for the paved county primary road network, the paved county local road network, and the unpaved road network. The *1. Pavement Assets*: *Goals* section of this plan provides further detail about the goals and the *1. Pavement Assets*: *Modelled Trends* section provides further detail on the shortfall given the current budget. However, CCRC believes that the overall condition of this network can be maintained or improved with additional funding for construction and maintenance. An alternate strategy may be used to overcome the current shortfall and meet the goals on the paved county primary road network, the paved county local road network, and the unpaved road network:

Roadsoft Pavement Condition Forecast for the Paved County Primary and County Local Network

CCRC used Roadsoft to forecast the necessary additional construction and maintenance work for meeting agency goals on the paved county primary and county local road networks. Table 8 and Table 9 illustrate the network-level model inputs used for this simulation. Full model inputs and outputs are included in Appendix D.

Table 8: Roadsoft Modelled Trends, Planned Projects, and Gap Analysis for 's Road Assets—Pavement Condition Forecast and Gap Analysis: Roadsoft Annual Work Program for Paved County Primary Road Network Forecast

Pavement Condition Forecast

Treatment Name	Annual Miles of Treatment	Years of Life	Trigger-Reset
Crack Seal	60	1	7–7
Chip Seal	80	5	5, 6-8
Overlay	6	10	3, 4-9
Resurface	4	18	1, 2, 3-10

Treatment	Annual Miles of Treatment	Years of Life	Trigger-Reset
Crack Seal	20	1	7–7
Chip Seal	20	5	5, 6-8
Overlay	4	10	3, 4-9
Resurface	8	18	1, 2, 3-10

Table 9: Roadsoft Modelled Trends, Planned Projects, and Gap Analysis for 's Road Assets—Pavement Condition Forecast and Gap Analysis: Roadsoft Annual Work Program for Paved County Local Road Network Forecast

Pavement Condition Forecast

Treatment Name	Annual Miles of Treatment	Years of Life	Trigger-Reset
Crack Seal	10	1	7–7
Chip Seal	20	5	5, 6-8
Overlay	2	10	3, 4-9
Resurface	2	18	1, 2, 3-10

Additional Work Necessary to Overcome Deficit

Treatment	Annual Miles of Treatment	Years of Life	Trigger-Reset
Crack Seal	5	1	7–7
Chip Seal	5	5	5, 6-8
Overlay	2	10	3, 4-9
Resurface	8	18	1, 2, 3-10

Results for the paved county local road network from the Roadsoft network condition model given the inputs in Table 9 are shown in Figure 42 below. Results indicate that the necessary additional work needed to meet the agency condition goal would cost an additional $2,000,000 per year.

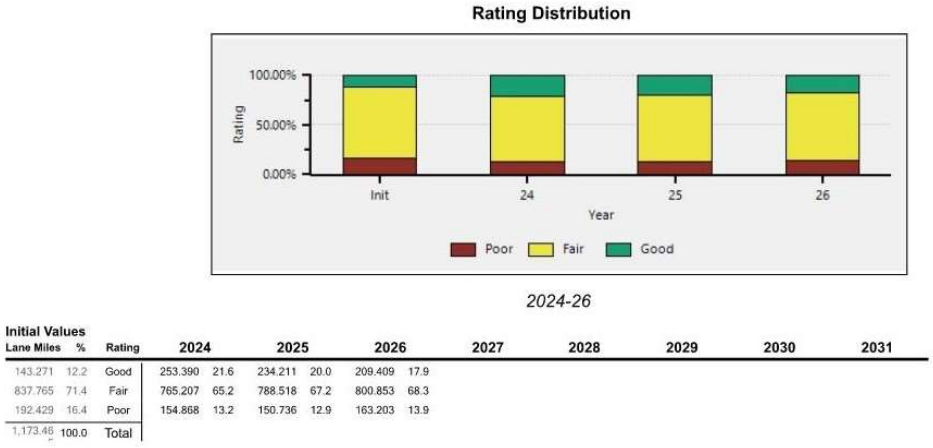


Figure 42: Forecast good/fair/poor Changes to CCRC Network Condition from planned projects on the county local paved road network.

2. FINANCIAL RESOURCES

Public entities must balance the quality and extent of services they can provide with the tax resources provided by citizens and businesses, all while maximizing how efficiently funds are used. CCRC will overview its general expenditures and financial resources currently devoted to pavement maintenance and construction. This financial information is not intended to be a full financial disclosure or a formal report. Michigan agencies are required to submit an Act 51 Report to the Michigan Department of Transportation each year; this is a full financial report that outlines revenues and expenditures. This report can be obtained on our website at ccrc-roads.com.

CCRC has a total budget for pavement asset management of $9,000,000.

County Primary Network

CCRC has historically spent $8,000,000 annually on pavement-related projects. Over the next three years, CCRC plans to spend $8,000,000 on county primary-network projects consisting of, but not limited to, reconstruction, overlay, culvert replacement, and preventive maintenance. Spending on projects depends on revenue from Michigan Transportation Fund (MTF).

County Local Network

CCRC has historically spent $1,000,000 annually on pavement-related projects. Over the next three years, CCRC plans to spend $1,000,000 on county local-network projects consisting of, but not limited to, reconstruction, overlay, culvert replacement, and preventive maintenance. Spending on projects depends on revenue from Michigan Transportation Fund (MTF), millages, township contributions Many local agencies in Michigan use local tax millages to supplement their road-funding budget. These taxes can

provide for additional construction and maintenance for new or existing roads that are also funded using MTF or MDOT funds. CCRC has local tax millages in its road-funding budget.6 Township Millages - Greenbush, Bingham, Duplain, Riley, Victor, Bengal.

3. RISK OF FAILURE ANALYSIS

Transportation infrastructure is designed to be resilient. The system of interconnecting roads and bridges maintained by CCRC provides road users with multiple alternate options in the event of an unplanned disruption of one part of the system. There are, however, key links in the transportation system that may cause significant inconvenience to users if they are unexpectedly closed to traffic. Figure 43 illustrates the key transportation links in CCRC's road network, including those that meet the following types of situations:

- **Geographic divides:** Areas where a geographic feature (river, lake, mountain or limited access road) limits crossing points of the feature
- **Emergency alternate routes for high-volume roads:** Roads which are routinely used as alternate routes for high volume roads or roads that are included in an emergency response plan
- **Limited access areas:** Roads that serve remote or limited access areas that result in long detours if closed
- **Main access to key commercial districts:** Areas where large number or large size business will be significantly impacted if a road is unavailable.

Our road network includes the following critical assets: East-West routes - Grand River Ave, Clark Rd, Price Rd, Maple Rapids Rd. North-South routes - Grange Rd, Wright Rd, Francis Rd, DeWitt Rd, Airport Rd, Chandler Rd, Shepardsville Rd, Hollister Rd (see Figure 43).

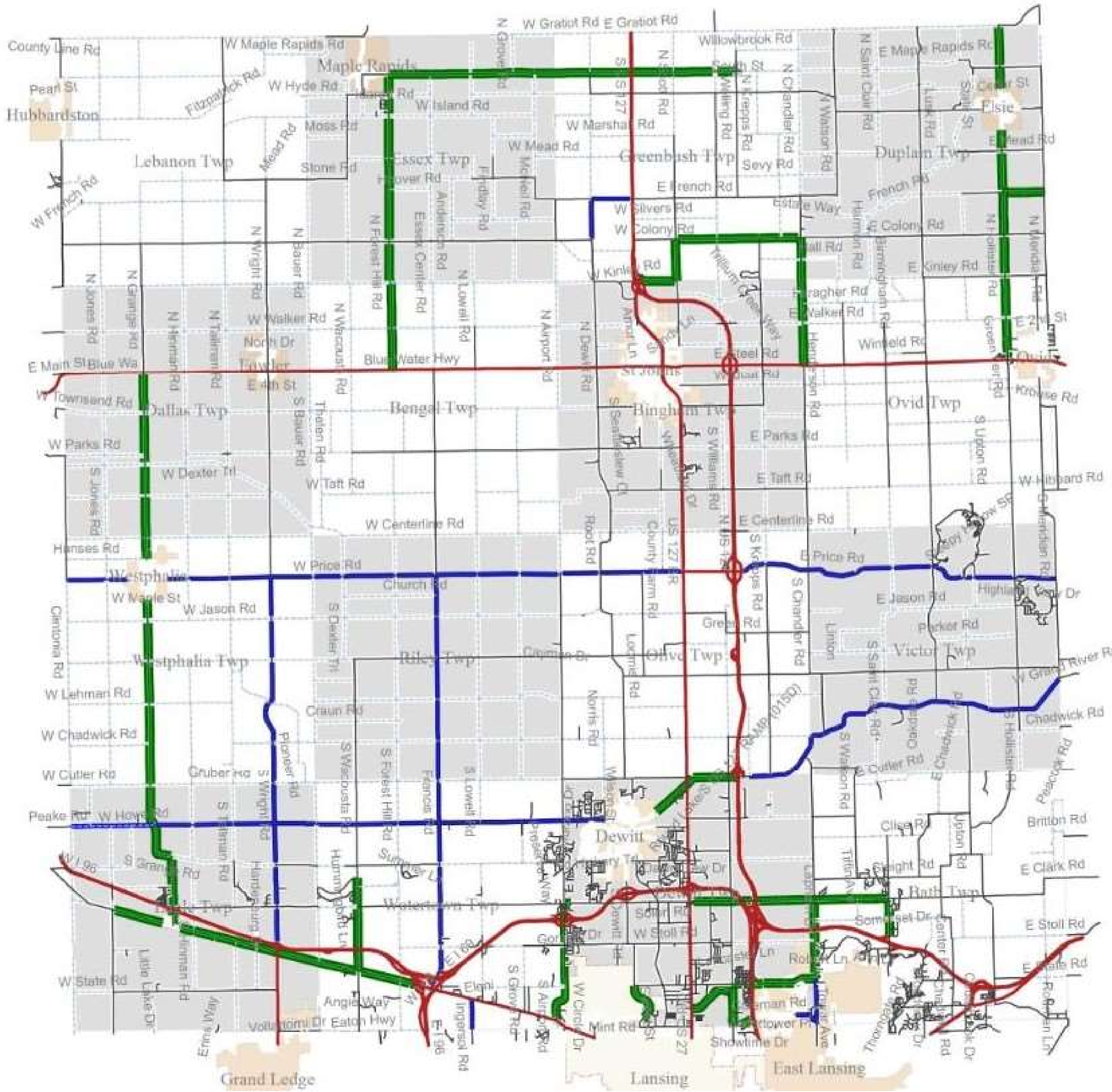


Figure 43: Key transportation links in CCRC's road network

4. COORDINATION WITH OTHER ENTITIES

An asset management plan provides a significant value for infrastructure owners because it serves as a platform to engage other infrastructure owners using the same shared right of way space. CCRC communicates with both public and private infrastructure owners to coordinate work in the following ways:

CCRC maintains storm sewer assets in addition to transportation assets. CCRC follows an asset management process for all of its assets, and those of local municipal utility agencies, by coordinating the upgrade, maintenance, and operation of all major assets.

Sub-surface utility asset management plans implemented by municipal utility agencies are coordinated with the transportation infrastructure plans to maximize value and minimize service disruptions and cost to the public.

CCRC takes advantage of coordinated infrastructure work to reduce cost and maximize value using the following policies:

- Roads which are in poor condition that have a subsurface infrastructure project planned which will destroy more than half the lane with will be rehabilitated or reconstructed full width using transportation funds to repair the balance of the road width.
- Subsurface infrastructure projects which will cause damage to pavements in good condition will be delayed as long as possible, or will consider methods that do not require pavement cuts.
- Subsurface utility projects will be coordinated to allow all under pavement assets to be upgraded in the same project regardless of ownership.

- Road reconstruction projects will not be completed until agency owned sub surface utilities are upgraded to have at least a 40 years of remaining service life.

Annually CCRC convenes a traffic planning summit, in conjunction with the MDOT Lansing TSC, in the fourth quarter of the year. Representatives from all of the local Townships and major public infrastructure owners are provided notice for the meeting and are invited to attend. An attempt is made to coordinate the schedule of the event to allow the majority of Townships and infrastructure owners to attend.

CCRC provides all attendees of the traffic planning summit with a list of all planned road projects for the next three years that include new pavement structure. Attendees are encouraged to discuss planned projects that would disrupt transportation services or cause damage to pavements. Projects which may cause damage to pavements in good or fair condition are discussed and mitigation measures are proposed to minimize the impact to pavements. Mitigation measures could include rescheduling and coordinating projects to maximize value and minimize disruptions and cost to the public.

APPENDIX A: 2024-2026 PAVED COUNTY PRIMARY ROAD PLANNED PROJECTS

Projects By Year Report

Year	Project Number/ Description	Location	Surface SubType	Treatment/Memo	Reset Rating	Source of Funds	Status	Estimated Costs	Total Costs
2024									
	C_2024_001	Colony - Hubbardston to Wright	Asphalt-Standard	Sealcoat	8	MTF - CCRC Primary	Sched	$116,202	$0
								Difference: -$116,202	
	C_2024_002	Grange - Grand River to M-21	Asphalt-Standard	Sealcoat	8	MTF - CCRC Primary	Sched	$350,970	$0
								Difference: -$350,970	
	C_2024_003	Wright - Grand River to M-21	Asphalt-Standard	Sealcoat	8	MTF - CCRC Primary	Sched	$278,568	$0
								Difference: -$278,568	
	C_2024_004	Francis - Parks to M-21	Asphalt-Standard	Sealcoat	8	MTF - CCRC Primary	Sched	$55,021	$0
								Difference: -$55,021	
	C_2024_005	Francis - Price to Centerline	Asphalt-Standard	Sealcoat	8	MTF - CCRC Primary	Sched	$26,440	$0
								Difference: -$26,440	
	C_2024_006	DeWitt - Price to M-21	Asphalt-Standard	Sealcoat	8	MTF - CCRC Primary	Sched	$121,061	$0
								Difference: -$121,061	
	C_2024_007	DeWitt - City Limit to Cutler	Asphalt-Standard	Sealcoat	8	MTF - CCRC Primary	Sched	$13,261	$0
								Difference: -$13,261	
	P_2024_001	Howe - Wacousta to Airport	Asphalt-Standard	HMA Wedge & Sealcoat	9	MTF - CCRC PRIMARY	Sched	$501,346	$0
								Difference: -$501,346	
	P_2024_002	Round Lake - Wood to S Chandler	Asphalt-Standard	Mill & Overlay - 3" Thick	9	MTF - CCRC Primary	Sched	$462,862	$0
								Difference: -$462,862	
	P_2024_003	Chandler - Price to Taft	Asphalt-Standard	Mill & Overlay - 3" Thick	9	MTF - CCRC Primary	Sched	$448,219	$0
								Difference: -$448,219	
	P_2024_004	Chandler - Taft to Townsend	Asphalt-Standard	Mill & Overlay - 3" Thick	9	FED AID - STL	Sched	$456,913	$0
								Difference: -$456,913	
	P_2024_005	Chandler - Townsend to M-21	Asphalt-Standard	Mill & Overlay - 3" Thick	9	MTF - CCRC Primary	Sched	$232,003	$0
								Difference: -$232,003	
	P_2024_006	Francis - Pratt to Price	Asphalt-Standard	Mill & Overlay - 3" Thick	9	MTF - CCRC Primary	Sched	$493,732	$0
								Difference: -$493,732	
	P_2024_007	Airport - Grand River to Herbison	Asphalt-Standard	Mill & Overlay - 3" Thick	9	Fed Aid Buyout, EGLE grant, MTF CCRC Primary	Sched	$2,000,000	$0
								Difference: -$2,000,000	

Projects By Year Report

Year	Project Number/ Description	Location	Surface SubType	Treatment/Memo	Reset Rating	Source of Funds	Status	Estimated Costs	Total Costs
2024									
	P_2024_008	Webster - I69 to Clark	Asphalt-Standard	Reconstruction - 6" base, 3" top	10	Fed Aid STU, MTF CCRC Primary	Sched	$1,400,000	$0
								Difference: -$1,400,000	
								Year 2024 Total Estimated Costs: $6,956,598	
								Year 2024 Total Costs: $0	
								Year 2024 Total vs. Estimated Costs: -$6,956,598	
2025									
	P_2025_001	Chandler - County Line to Stoll	Asphalt-Standard	Reconstruction - 6" base, 3" top	10	State Earmark	Sched	$4,000,000	$0
								Difference: -$4,000,000	
	P_2025_002	2025 DeWitt - M21 to Colony	Asphalt-Standard	Reconstruction - 6" base, 3" top	10	State Earmark	Sched	$3,200,000	$0
								Difference: -$3,200,000	
	P_2025_003	2025 Clark - Wacousta to Airport	Asphalt-Standard	Mill & Overlay - 3" Thick	9	MTF - CCRC Primary, Watertown Twp Local	Sched	$1,115,408	$0
								Difference: -$1,115,408	
	P_2025_004	Chandler - M21 to Colony	Asphalt-Standard	Overlay - 3" Thick	9	MTF - CCRC Primary	Sched	$617,723	$0
								Difference: -$617,723	
	P_2025_005	Colony Rd - Wright to Forest Hill	Asphalt-Standard	Mill & Overlay - 3" Thick	9	MTF - CCRC Primary	Sched	$688,608	$0
								Difference: -$688,608	
	P_2025_006	Chandler - Round Lake to Alward	Asphalt-Standard	HMA Wedge & Sealcoat	9	MTF - CCRC Primary	Sched	$146,477	$0
								Difference: -$146,477	
	P_2025_007	Clark - Webster to CL	Asphalt-Standard	HMA Wedge & Sealcoat	9	MTF - CCRC Primary	Sched	$476,658	$0
								Difference: -$476,658	
								Year 2025 Total Estimated Costs: $10,244,874	
								Year 2025 Total Costs: $0	
								Year 2025 Total vs. Estimated Costs: -$10,244,874	
2026									
	P_2026_001	Francis - I69 to Herbison	Asphalt-Standard	Mill & Overlay - 3" Thick	9	Fed Aid - STL & D	Sched	$911,243	$0
								Difference: -$911,243	
	P_2026_002	Watson - French to Willowbrook	Asphalt-Standard	HMA Wedge & Sealcoat	9	MTF - CCRC Primary	Sched	$332,538	$0
								Difference: -$332,538	

Projects By Year Report

Year	Project Number/ Description	Location	Surface SubType	Treatment/Memo	Reset Rating	Source of Funds	Status	Estimated Costs	Total Costs
2026									
	P_2026_003	Francis - Cutler to Pratt	Asphalt-Standard	Mill & Overlay - 3" Thick	9	MTF - CCRC Primary	Sched	$695,200	$0
									Difference: -$695,200
	P_2026_004	Maple Rapids - Hyde to Forest Hill	Asphalt-Standard	Mill & Overlay - 3" Thick	9	MTF - CCRC Primary	Sched	$267,678	$0
									Difference: -$267,678
	P_2026_005	Colony - Chandler to Hollister	Asphalt-Standard	HMA Wedge & Sealcoat	9	MTF - CCRC Primary	Sched	$495,306	$0
									Difference: -$495,306
	P_2026_006	Clark - Myers to BR-27	Asphalt-Standard	Mill & Overlay - 3" Thick	9	MTF - CCRC Primary	Sched	$114,171	$0
									Difference: -$114,171
								Year 2026 Total Estimated Costs: $2,816,136	
								Year 2026 Total Costs: $0	
								Year 2026 Total vs. Estimated Costs: -$2,816,136	
								Total Costs: $0	

APPENDIX B: CCRC RECOMMENDED LOCAL ROAD PROJECTS

BATH CHARTER TOWNSHIP
RECOMMENDED 2024 PROJECTS

Pricing quotes are estimates only. Prices may change in 2024

	ESTIMATE
ASPHALT	
Ann Dr, Gary Ln, Timothy Ln, and Jessael Dr (CARRIED OVER FROM 2023) **1.3 mile Mill n Fill**	
Hunter rd - Upton east to Gravel 1.10 mile Mill n Fill	$236,500.00
Bath Village - Walnut st, High st, Clinton st, Chestnut st, Cherry st. .73 mile Mill n Fill (does not include Main st or Vine st)	$115,500.00
Nelson Subdivision - Tiffin ave, Fawn Valley rd, and Nelson st .44mile Mill n Fill	$121,000.00
GRAVEL	
Babcock rd - Cutler to Twsp Line .2 mile 350ton of 23amod gravel	$6,500.00
Drumheller rd - Webster to Center 1.27mile 1875ton of 23amod gravel	$32,000.00
Hunter rd - Cutler south to Asphalt .83mile - 1500ton of 23amod gravel	$25,000.00
Center rd - Herbison to Howe 1.01mile - 1500ton of 23amod gravel	$25,000.00
Center rd - Howe to Cutler 1mile - 1500ton of 23amod gravel	$25,000.00
Coleman rd - Perry to Upton .26mile 400ton of 23amod gravel	$6,500.00
Towar Ave & County Line - County line North to end of road(Dead End) .37mile 550ton of 23amod gravel	$12,000.00
Nichols rd - Drumheller south to Asphalt 1.05mile - 1500ton of 23amod gravel	$25,000.00
GRAVEL ROAD MOWING Mow all gravel roads in Twp.	$5,000.00
OVERBAND	$25,000.00
BRUSH SPRAY	$8,500.00
CHLORIDE Consumers paying for 3 apps of 38% chloride	$0.00

BENGAL TOWNSHIP
2024 RECOMMENDED PROJECTS

CHIP SEAL- 2024 AVERAGE COST IS $25,000 A MILE

Lowell- M-21 to Walker (22)
Parks- Wacousta to Foerest Hill (SB) (22)
Parks- Forest Hill (SB) to Francis (22)
Parks- Francis to Lowell (20)
Parks- Lowell to Grove (20)
Parks- Grove to East Twp. Line (18)

GRAVEL

Townsend Rd.- Francis to Lowell
1.0 Mile 23A 1500 Ton **(2015)**

Townsend Rd.-Lowell to Grove
.99 Mile 23A 1800 Ton **(2015)**

Walker Rd.- Wacousta to Forest Hill
1.01 Mile 23A 1500 Ton **(2015)**

Walkler Rd.- Forest Hill to Essex Center
1.01 Mile 22A **(2015)**

Townsend Rd.- Wacousta to Forest Hill
1.27 Mile 23A **(2016)**

Townsend Rd.- Forest Hill to Francis
.75 Mile 23A **(2016)**

OVERBAND $ 7000.00
BRUSH SPRAY $4000.00
ROADSIDE MOWING (GRAVELS) $3400.00
SPOT GRAVEL 500 TON $7000.00

CULVERTS Checked 2023

60" Essex Center South of Kinley-Rusting (24)
60" Walker Rd. Eaast of Lowell- Ends Rusting (25-26)
126"x84" Doubles- Walker @ Essex Center (Rusting Bad Spots) 26-27

120" Double Dexter Trail- East of Bauer (Condemed)

BINGHAM TOWNSHIP
2024 PROJECTS

PRICES ARE ESTIMATES ONLY (prices may change in 2024)

CHIP SEAL

Taft - BR127 to Chandler 3 miles crs2m, slag stone, and fog seal	$80,000
Bentley Dr - West of Dewitt rd .33mile crs2m, slag stone, and fog seal	$13,000

REGRAVELS

Townsend - Airport to Dewitt 1.01mile 1500ton of 23amod gravel	$22,000
Townsend - Krepps to Chandler 1mile 1500ton of 23amod gravel	$22,000
Centerline - Krepps to Chandler 1mile 1500ton of 23amod gravel	$22,000
Walker - Williams to Krepps 1.01 miles 1500ton of 23amod gravel	$22,000
Wildcat - Krepps west to dead end .74mile 1200ton of 23amod gravel	$18,000
Williams - Taft to Parks 1.01miles 1500ton of 23amod gravel	$22,000

CULVERTS

Parks - 1/8mile west of BR127 84" x 60' CMP rusted with holes- drain commission to size	$23,000

SPOT GRAVEL - 500 ton	$8,000
OVERBAND	$8,000
CHLORIDE	$50,000

DALLAS TOWNSHIP
2024 RECOMMENDED PROJECTS

GRAVEL

Centerline Rd.- Wright to Tallman
1.0 Miles (2016)

Jones Rd.- Taft to Centerline
1.01 Mile (2016)

Tallman Rd.- Taft to Parks
1.02 Mile (2016)

Townsend Rd.- Hinman to Tallman
1.0 Mile (2016)

Walker Rd.- Grange to Hinman
1.01 Mile (2016)

Hinman Rd.- M-21 to Walker
1.01 Mile (2017)

SPOT GRAVEL 500 TON $7000.00
BRUSH SPRAY $ 4,000.00

CULVERTS Checked 2023
43"x67" CMP Parks rd west of jones-Holes In Culvert (24-25)
48" Centerline Just East of Wright- Holes (3-5 years)
36" Parks Rd. .5 Mile West of Wright- Holes (24-25)

CHIPSEAL

Parks Rd- Intersection at Tallman (Done 22)

DEWITT CHARTER TOWNSHIP
2024 PROJECTS

PRICES ARE ESTIMATES ONLY

ASPHALT PAVING

IDLECREST SUBDIVISION - DISCUSS Stoll rd East of Airport	??
Creekside Sub- Between Herbison and Turner .84 mile mill and fill 330 lbs/yd	$195,000
Parkwood Drive - Off Schavey N. Of Clark .23 mile mill and fill 330 lbs/yds	$64,000
Creeping Brook Estates off Dewitt S. of Cutler .75 mile mill and fill 330lbs/yd	$185,000
Theresa and Everett off Clark and Turner .52 mile mill and fill 330lbs/yd	$125,000
Willow Creek Sub (Sage, Prairie, Azalea, Mulberry, Tumbleweed, Wisteria, Ivy) .52 mile mill and fill 330lbs/yd	$180,000
Wellman - Turner east to sub. Sanborn Drive - Specklewopod to Dead End .48 mile mill and fill 330 lbs/syd	$150,000
Stoll Road - Dewitt to Turner .58 mile HMA paving, stabilizing through swamp areas	$220,000

Gravel

Stoll - Brown to Chandler 1.08 mile 1500ton of 23a mod gravel	$24,000
Howe - Wood to Krepps 1.01 mile 1500ton of 23a mod gravel	$24,000
BRUSH SPRAY (2,000 gallons)	$4,000
CHLORIDE	$14,000
OVERBAND	$25,000

DUPLAIN TOWNSHIP
2024 PROJECTS
PRICES ARE ESTIMATES ONLY (may change in 2024)

CHIPSEAL- Chipsealing east side of county in 2025

GRAVEL	
Upton - Maple Rapids rd north to Gratiot Co Line .81 mile 1500ton of 23a mod gravel	$21,000
Kinley - Harmon to Shepardsville 1.26 mile 1850ton of 23a mod gravel	$27,000
Ridge - Shepardsville to Upton 1.1 mile 1500ton of 23a mod gravel	$21,000
Lusk - Mead to Island 1 mile 1500ton of 23a mod gravel	$21,000
Mead Road - Chandler to Watson .9 mile 1500 ton of 23a mod gravel	$21,000
Mead Road - Watson to St Clair(2005) 1.02 mile 1500 ton of 23a mod gravel	$21,000
Mead Road - St Clair to Shepardsville 1.01 mile 1500 ton of 23a mod gravel	$21,000
Maple River - Harmon to Shepardsville 1.48 mile 2250 ton of 23a mod gravel	$32,000
Chandler - French to Ridge 2.52 mile 3750 ton of 23a mod gravel	$52,500
SPOT GRAVEL 1500 ton 23a various locations	$17,500
OVERBAND	$8,500
BRUSH SPRAY (4,000 gallons)	$6,000
CHLORIDE	$23,000

EAGLE TOWNSHIP

2024 RECOMMENDED PROJECTS

ASPHALT

CHIP SEAL- 2024 AVERAGE COST IS $25,000 A MILE

Clark Rd.- Grange to Hinman .5 mile
Chipsealed (2020)

Clark Rd- Hinman to Tallman 1.01 mile
Chipsealed (2020)

Clark Rd.- Tallman to Wright 1.01 mile
Chipsealed (2020)

Clark Rd.- Wright to Bauer 1.0 mile
Chipsealed (2020)

Herbison Rd.- Wrihgt to Bauer 1.0 Mile
Chipsealed (2022)

Jones Rd. - North and South of I-96 Overpass .25 Mile
Chipsealed (2022)

McCrumb Rd.- West of Grange .3 Mile
Chipsealed (2022)

Tallman Road- South of Herbison .25 Mile
Chipsealed (2022)

Eaton Highway- Wright to Bauer 1.01 Mile
Chipsealed (2020)
Repaving of Eaton Highway with 2" Overlay $155,000-$160,00
With Chipseal $180,000-$185,00

GRAVEL
Hinman Rd.- Grand River North to Dead End
.5 Mile 23A 900 Ton (2017)

Niles Rd.- Clark South to Dead End
.57 Mile 23A (2017)

Tallman Rd.- State to Grand River
1.18 Miles (2018)

GRAVEL ROADSIDE MOWING $3700.00
OVERBAND $7500.00

BRUSH SPRAYING **$ 5,000.00**

CHLORIDE

**Chloride the park drive off Grange Road

CULVERTS **Checked 2023**

Tallman Rd.- North of Howe 57" x 87" (RUSTING) 2-3 Years
Herbison Rd.- West of Bauer 48" (Rust on Bottom No Holes) 3-4 years
Herbison Rd.- Wright to Tallman 54" (Rust on Bottom No Holes) 3-4 yrs.

ESSEX TOWNSHIP

RECOMMENDED 2024 PROJECTS

CHIP SEAL- AVG COST OF CHIPSEAL IS $25,000 PER MILE **2024**

Findley Rd- Lowe North to gravel
.5 Sealcoat (2022)

Lowe Rd. Mcneil to Findlay
1.02 miles Chip Seal with CRS-2M **(2022)**

Lowe Rd- Lowell to Findley
.51 miles Sealcoat **(2022)**

French Rd.- Airport to McNeil
.5 Miles **(2018)**

Hyde Rd.- Maple Ave. to Forest Hill
.64 Miles **(2018)**

Mcneil Rd.- French to Lowe
.51 Miles **(2020)**

GRAVEL

Paxton Rd.- Findlay to Grove
.51 Miles **(2006)**

Paxton Rd.- Grovve to Airport
1.01 Miles **(2006)**

Essex Center Rd.- Hyde to Maple Rapids
.5 Mile **(2008)**

Island Rd.- Essex Center to Lowell
1.01 Mile **(2008)**

Marshall Rd.- Finley to McNeil
1.01 Mile **(2008)**

Anderson Rd.- Paxton to Lowe
1.01 Mile **(2012)**

Anderson Rd.- Colony to Paxton
.51 Mile **(2012)**

CULVERTS **Checked 2023**

Island Rd.- West of Wacousta 60"- Some Rust (26-27)

McNeil- 500 Feet North of Lowe 36"- Bottom Rusted 2-3 years

SPOT GRAVEL 500 TON	$7,000.00
SPRAY foliar spray	$5,000.00
BRUSH MOW	$7,000.00
OVERBAND	$7,500.00

GREENBUSH TOWNSHIP
RECOMMENDED 2024 PROJECTS

PRICES ARE ESTIMATES ONLY. PRICES MAY CHANGE IN 2023

CHIPSEAL Approx. cost per mile 26,000.00

Dewitt Road - Hyde to Maple Rapids .51 mile - Double Chipseal over Gravel with Tack Coat, Crs2m, and Slag Stone	$30,000.00

Spot Gravel

300ton of 23a mod gravel	$4,000.00

GRAVEL

Gilson Road - Colony to French 1.01 miles 1500 ton 23a gravel	$19,300.00
Marshall Road- Us-127 to Scott 1.02 mile 1,500 ton 23a gravel	$19,300.00
Island Road - Dewitt Road west to dead end 1.20 mile 1,800 ton 23A gravel	$22,750.00
Mead Road - Airport to Dewitt .91mile 1500 ton of 23amod gravel	$19,300.00
Williams - Colony South to Twsp line 1mile 1500 ton of 23amod	$19,300.00
Williams - Colony to French 1mile 1500 ton of 23amod	$19,300.00

BRUSH SPRAY $5,000.00

CHLORIDE

2 APPLICATIONS OF CHLORIDE	$24,000.00
3 APPLICATIONS OF CHLORIDE	$36,000.00

LEBANON TOWNSHIP

2024 RECOMMENDED PROJECTS

GRAVEL

Tallman Rd.- Kinley to Colony
1.01 Mile **(2015)**

Grange Rd.- Island to Maple Rapids
1.01 Mile **(2015)**

Grange Rd.- Maple Rapids to Gratiot
.94 Mile **(2015)**

Island Rd.- Jones to Grange
1.01 Mile **(2016)**

Kinley Rd.- Wright to Bauer
1.01 Mile **(2016)**

Tallman Rd.- Colony to French
1.01 Mile **(2017)**

Grange Rd.- Colony to French
1.01 Mile **(2017)**

CULVERTS **Checked 2023**
42" Island rd East of Grange (Rusting) 3-4 years
78" Jones rd North of Maple Rapids (Holes On Ends) (4yrs)
36" Tallman Rd South of French (Haunches Flaking) 24-26

120"x78" Double- Kinley East of Wright 1st Set (2023-2024)

BRUSH SPRAY	$5,000.00
SPOT GRAVEL 500 TON	$7,000.00
CHLORIDE	

OLIVE TOWNSHIP
Recommended 2024 Projects
PRICES ARE ESTIMATES ONLY

	ESTIMATES
CHIPSEAL	
Williams - Price North to Gravel .6mile Slag, CRS2M, and Fog Seal	$15,000
County Farm North off Price .08mile CRS2M, Slag, and Fog Seal	$5,000
Krepps - Alward to Price 2.68miles Slag, CRS2M, and Fog Seal	$70,500
GRAVEL	
Airport - Price to Centerline 1mile 1500ton of 23amod gravel	$23,500
Williams - Chadwick to Alward 1.51miles 2250ton of 23amod gravel	$36,000
Jason - Loomis to BR127 1mile 1500ton of 23amod gravel	$23,500
Bond - Round Lake to Chadwick 1mile 1500ton of 23amod gravel	$23,500
SPOT GRAVEL 600ton	$8,500
OVERBAND	$15,000
MOW GRAVEL SHOULDERS	$7,000
BRUSH SPRAY	$8,500
CHLORIDE	$40,000

OVID TOWNSHIP
RECOMMENDED 2024 PROJECTS
PRICES ARE ESTIMATES ONLY
Chipsealing back on east side in 2025

Asphalt		
High St - Hollister E. to Village limits		
.25mile crush and shape 440lbs/yd	(Option #1)	$120,000.00
.25mile overlay 330lbs/yd	(Option #2)	$ 75,000.00
SPOT GRAVEL		
600 ton spot gravel		$ 8,500.00
Gravel		
Woodworth - Hollister to Meridian		$ 15,500.00
.75mile 1200ton of 23amod gravel		
Woodworth - Wildcat to Hollister		$ 15,500.00
.73mile 1200ton 23amod gravel		
Wildcat - Chandler to St. Clair		$ 42,000.00
1.99miles 3000ton 23amod gravel		
Centerline - Hollister west to Dead End		$ 12,000.00
.41mile 750ton of 23amod gravel		
Walker - Shepardsville to Hollister		$ 42,000.00
1.99miles 3000ton 23amod gravel		
Watson - M21 to Parks		$ 42,000.00
2miles 3000ton of 23amod gravel		
Taft - St Clair to Shepardsville		$ 21,000.00
1mile 1500ton of 23amod gravel		
BRUSH SPRAY		$ 7,000.00
OVERBAND		$ 10,000.00
CHLORIDE		$ -
Consumers paying for 3 apps of 38%		

RILEY TOWNSHIP

2024 RECOMMENDED PROJECTS

GRAVEL

Craun Rd.- Wacousta to Forest Hill
1.0 Mile 22A **(2011)**

Craun Rd.- Bauer to Wacousta
.98 Mile 22A **(2012)**

Chadwick Rd.- Francis to Lowell
1.0 Mile 22A **(2013)**

Chadwick Rd.- Lowell to Grove
1.0 Mile 22A **(2013)**

Chadwick Rd.- Grove to Airport
1.0 Mile 22A **(2013)**

Lehman rd.- Francis to Lowell
1.01 Miles **(2013)**

Lehman Rd.- Lowell to Grove
1.01 Miles **(2013)**

Lehman rd.- Grove to Airport
1.07 Miles **(2013)**

Chadwick Rd.- Wacousta to Forest Hill
1.0 Miles **(2014)**

Chadwick Rd.- Bauer to Wacousta
1.0 Miles **(2014)**

CULVERTS Checked 2023

72" Chadwick east of Francis- Haunches Rusting Holes on South End (2-3 years)
78" Chadwick East of Wacousta-Haunches Rusting holes on Ends (24-25)
48" CMP Cutler East of Bauer -Haunches Rusting (3-5 years)

BRUSH SPRAY $4,000.00
OVERBAND
SPOT GRAVEL 500 TON $7,000.00

CHIPSEAL 2024

VICTOR TOWNSHIP
2024 PROJECTS
PRICES ARE ESTIMATES ONLY

CHIP SEALS (Chip Sealing back on east side of county in 2025)

ASPHALT

Country Farm Estates - Country Farm Lane & Cross Creek Dr .43mile mill n fill	130,000.00

REGRAVEL

St. Clair - Round Lake to Alward .8mile 1500ton 23amod gravel	23,000.00
Upton - Round Lake to Alward .98mile - 1500ton 23amod gravel	23,000.00
Upton - Alward to Parker .8mile - 1200ton 23amod gravel	19,000.00
Upton - Parker to Jason .71mile 1200ton 23amod gravel	19,000.00
Upton - Jason to Price .7mile 1200ton of 23amod gravel	19,000.00
Chadwick - Hollister East to Twsp line 1.07 1500ton of 23amod gravel	23,000.00
Ballantine - Watson to Babcock .52mile 750ton of 23amod gravel	11,500.00
Babcock - Round Lake to South Twsp Line1 1.6mile 2400ton 23amod gravel	35,000.00
Parker - Shepardsville to Upton .78mile 1200ton of 23amod gravel	19,000.00
Parker - Upton to Hollister 1.26mile 1875ton of 23amod gravel	28,000.00

Spot Gravel

500 ton- Various Local Gravel Roads	8,500.00

OVERBAND	10,000.00
BRUSH SPRAY (3,000 gallons)	5,000.00
CHLORIDE Cosumers paying for 3 apps of 38% chloride	0.00

WATERTOWN TOWNSHIP

RECOMMENDED 2024 PROJECTS

OVERBAND

Stoll East of Lowell Rd.
Stoll West of Lowell Rd.
Bunkerhill
Industrial Parkway
Felton
Grove Rd North of Grand River
Lowell Rd. North of Grand River
Grove Rd. South of Howe

CHIPSEAL 2024 AVERAGE COST IS $25,000 PER MILE

Watertown Pkwy. North of Grand River
.16 Mile with CRS-2M (2004)

Steiner Way- 1129 Feet (Repave)

Winston Ave.- 1162 Feet (Repave)

CULVERTS Checked 2023

HERBISON EAST OF FOREST HILL 60" (5 YEARS)

GRAVEL

Corrison Rd.- Wacousta to Forest Hill
1 mile 2400 ton 23 A mod gravel **(2006)**

State Road - Airport Road to Grove Road
1.00 Mile 2400 Ton 23a Mod Gravel **(2009)**

State Road-Grove to Lowell
1.00 mile 2400 Ton 23A Mod Gravel **(2009)**

Grove Rd.- Herbison North to Pavement
.7 mile Gravel **(2010)**

Stoll Rd. Forest Hill to Francis
1.0 mile 2400 T 23A Mod. **(2008)**

Bauer Rd. Clark South to Dead End
1.0 mile 2400 T 23A Mod.**(2003**)

Lowell Rd.- Howe to Cutler
1.01 Mile Gravel **(2010)**

Herbison Rd.- Lowell to Grove
1.01 Mile **(2013)**

Herbison Rd.- Grove East to Pavement
.5 Mile **(2013)**

Herbison Rd.- Francis to Lowell
1.0 Mile **(2013)**

OVERBAND	**$19,800.00**
ARM MOW	**$10,000.00**
BRUSH SPRAY (5,000 gallons)	**$ 5,000.00**
SPOT GRAVEL 750 TON	**$12,000.00**
CHLORIDE	

Do not forget the park drive and the township hall off Wacousta Road

WESTPHALIA TOWNSHIP

2024 RECOMMENDED PROJECTS

GRAVEL

Tallman Road- Price to Centerline*
.99 Mile **(2008)**

Jason Rd.- Tallman to Wright*
1.0 Mile **(2012)**

Chadwick Rd.- Wright to Bauer*
1.0 Miles (2012)

Pioneer Rd.- Chadwick to Wright
1.48 Miles (2012)

Jason Rd.- Jones to grange*
1.0 Miles (2012)

Clintonia Rd.- Price to Jason
1.0 Mile (2016

BRUSH SPRAYING	$5,000.00
SPOT GRAVEL 500 TON	$7,000.00

CULVERTS **Checked 2021**

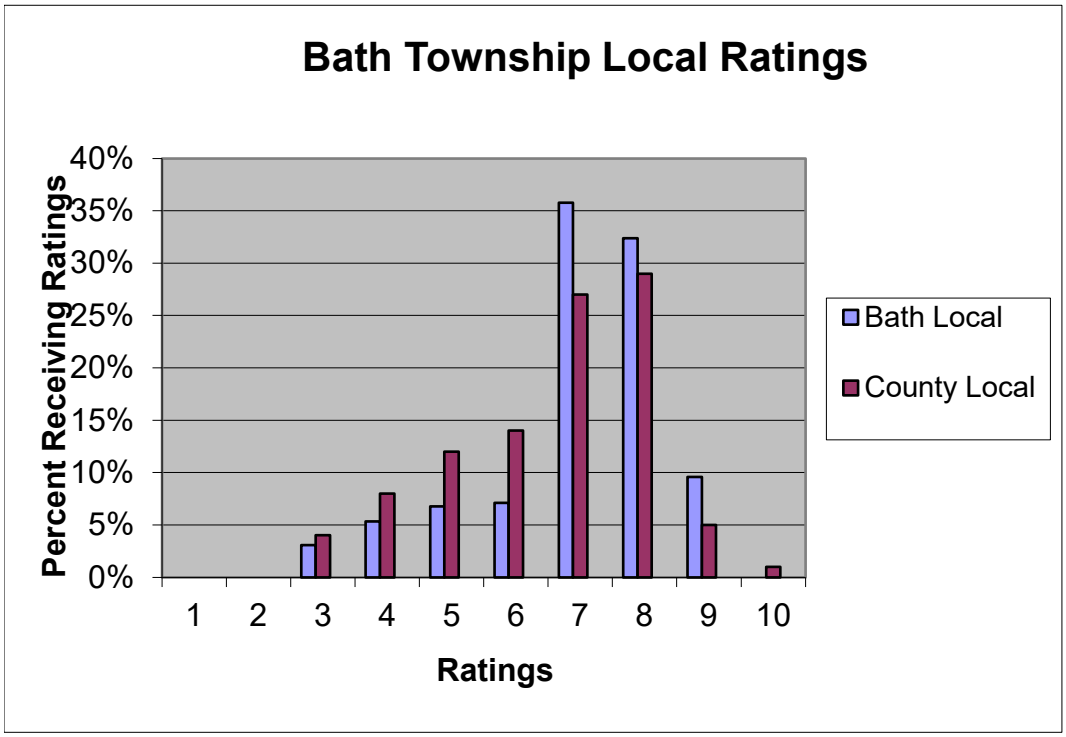
84"X117" CMP ON TALLMAN NORTH OF CUTLER (Haunches Rusting Holes on Both ends) 24-25
72" CUTLER E OF TALLMAN (Haunches Rusting and Small Holes) 3-5 Years
2- 88" DOUBLES JASON EAST OF TALLMAN RD
(Haunches Rusting on Both South Ends About 5 Feet in On One Side of Each Culvert) 24
84"X132" JASON WEST OF GRANGE (Small Holes) 4-5 Years

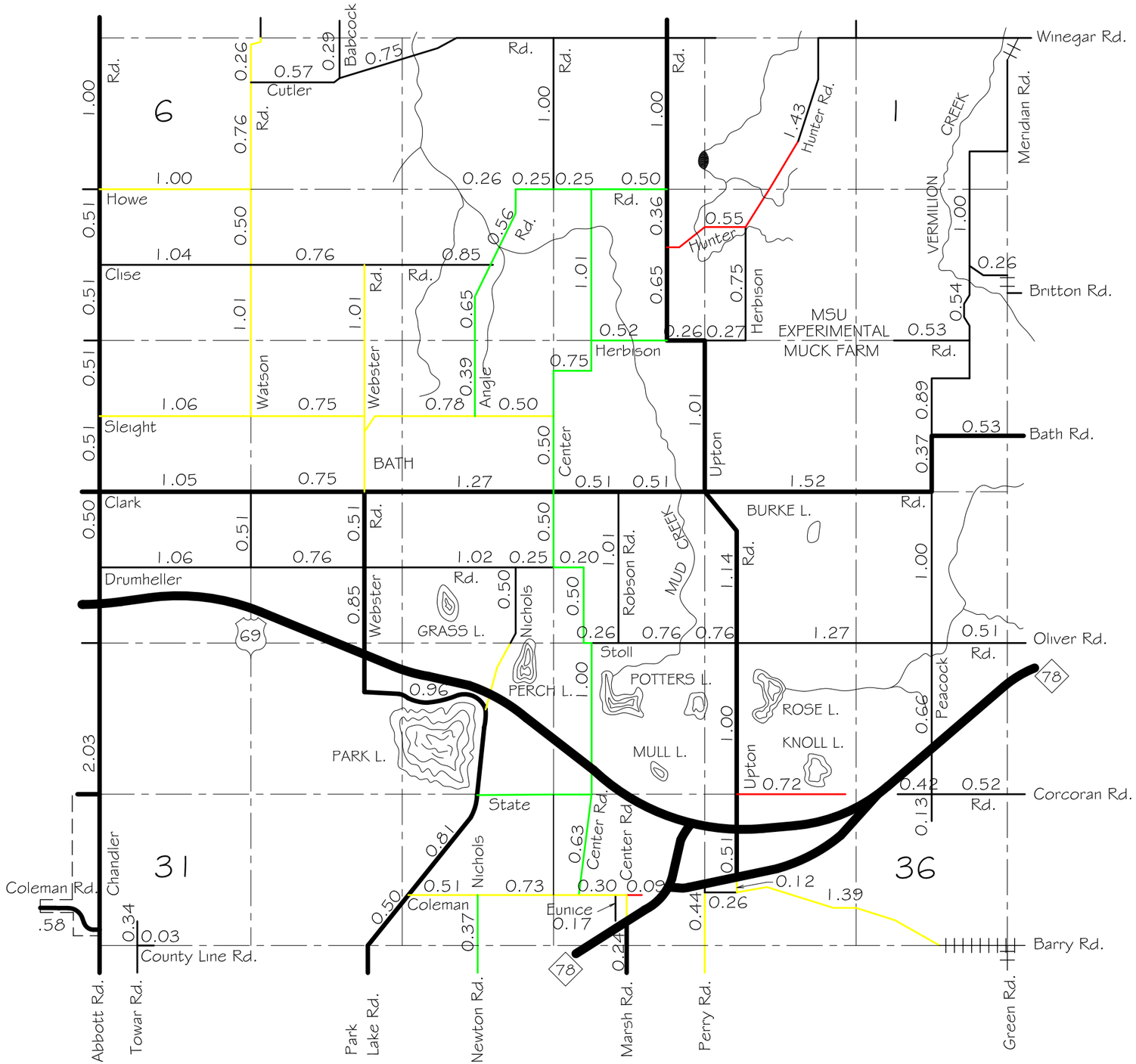
APPENDIX C: CCRC LOCAL PASER RATING SUMMARIES

BATH TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	Bath Township Rating Breakdown (Local Roads)	County Local Road Breakdown	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0	0%	0%	0%
3	1.23	3%	4%	6%
4	2.14	5%	8%	7%
5	2.72	7%	12%	14%
6	2.85	7%	14%	16%
7	14.35	36%	27%	33%
8	12.99	32%	29%	19%
9	3.84	10%	5%	7%
10	0	0%	1%	0%

Average Rating		7.03	6.64	6.46
	Change In Average Rating	**0.57**		





LEGEND

- SECTION LINE
- CORPORATE LIMITS
- STATE TRUNKLINE
- COUNTY PRIMARY
- COUNTY LOCAL
- ADJACENT COUNTY
- CITY OR VILLAGE
- STREET

PRIMARY ROAD SYSTEM IS 22.46 MILES

LOCAL ROAD SYSTEM IS 46.37 MILES

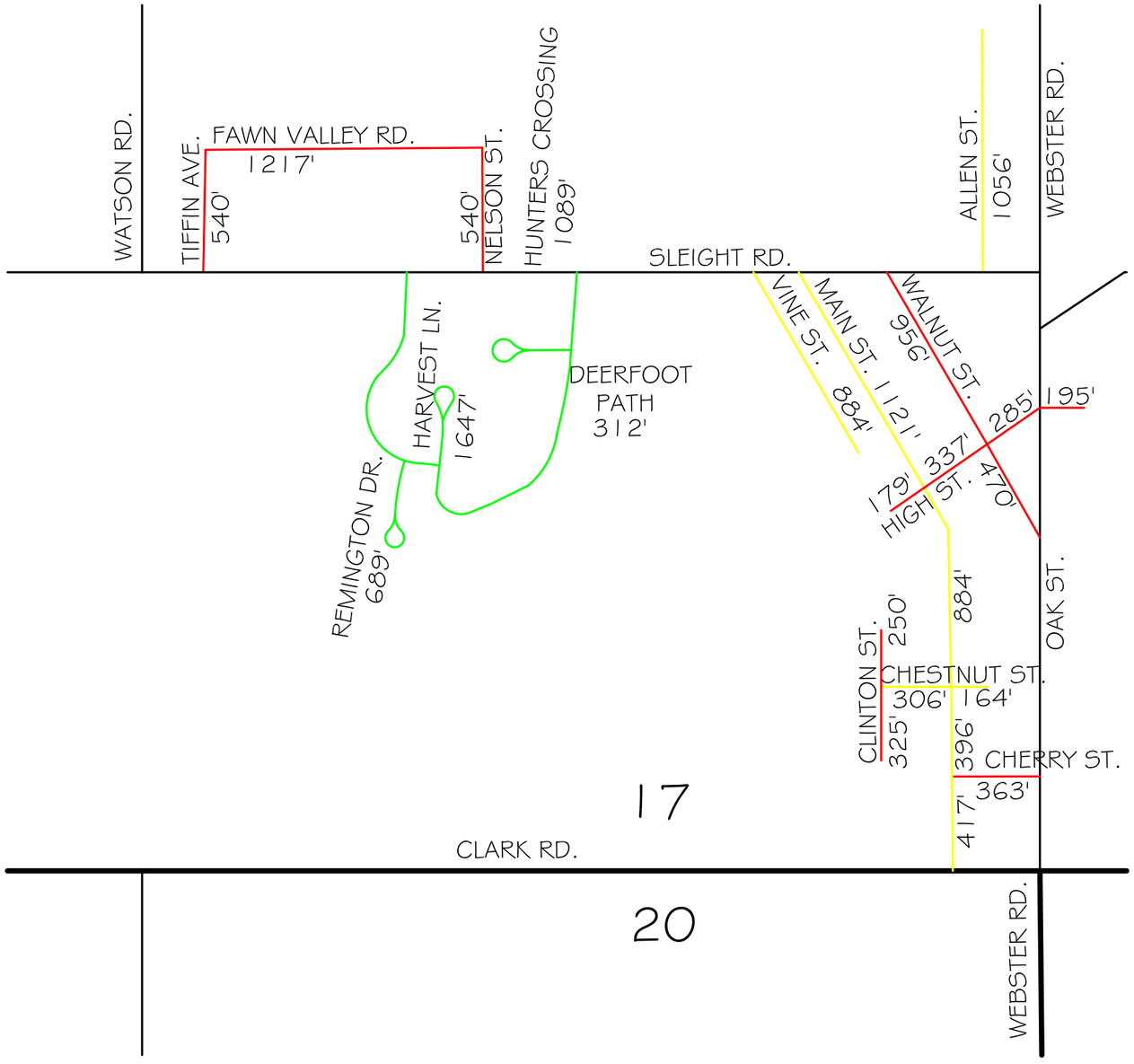
T. 5N R. 1W

- Good 8-10
- Fair 5-7
- Poor 1-4

Scale 0 1/2 1 Mile
One Inch Equals 4000 Ft.

PREPARED BY
CLINTON COUNTY RD. COMM.

BATH TWP. 19-01



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 15230 EQUALS 2.88 MILES

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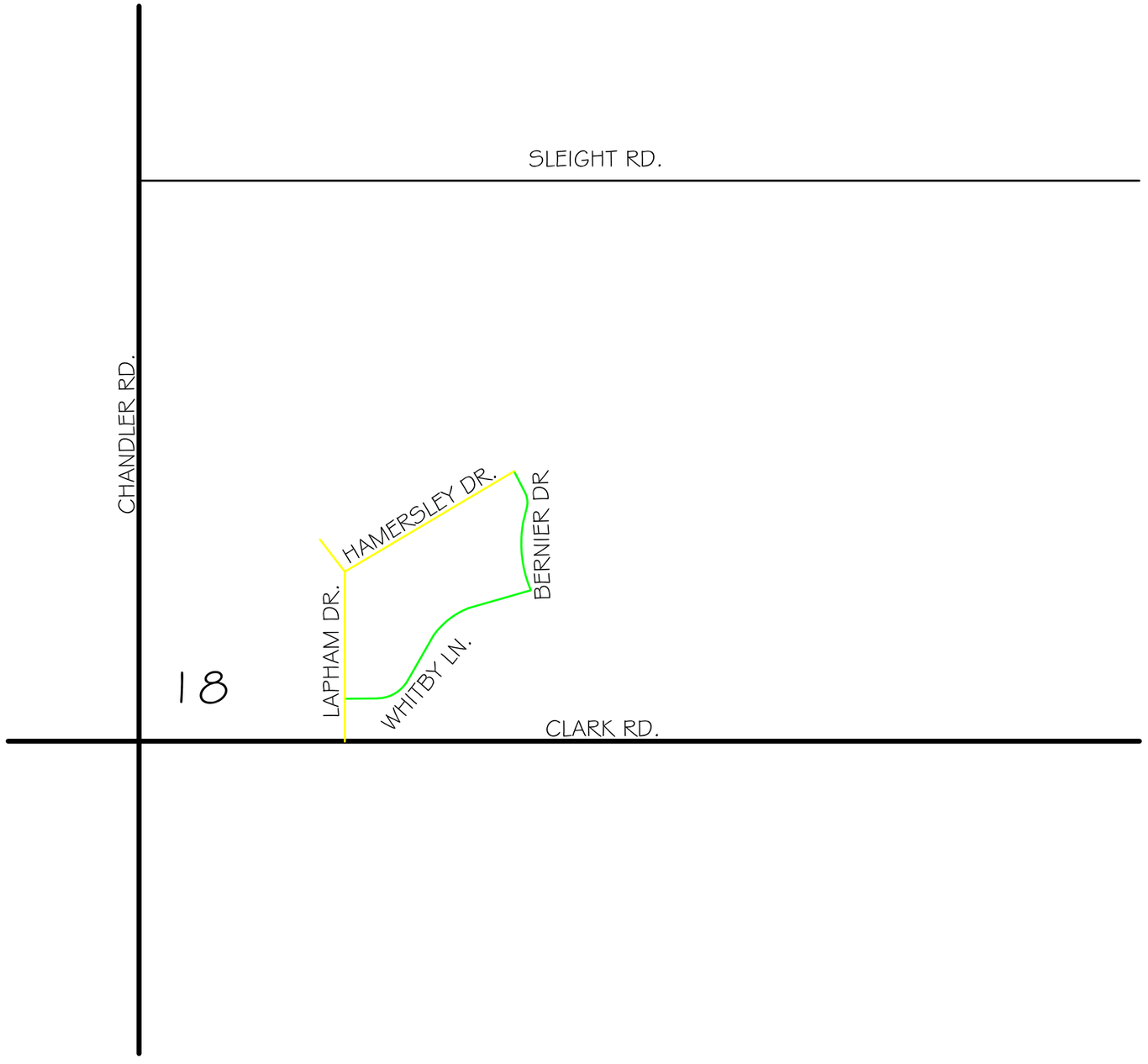
Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP BATH
SECTION 17 T. 5N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

BATH VILLAGE
NELSON SUB.
HUNTERS CROSSING

19-01-17



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 3505 EQUALS 0.66 MILES

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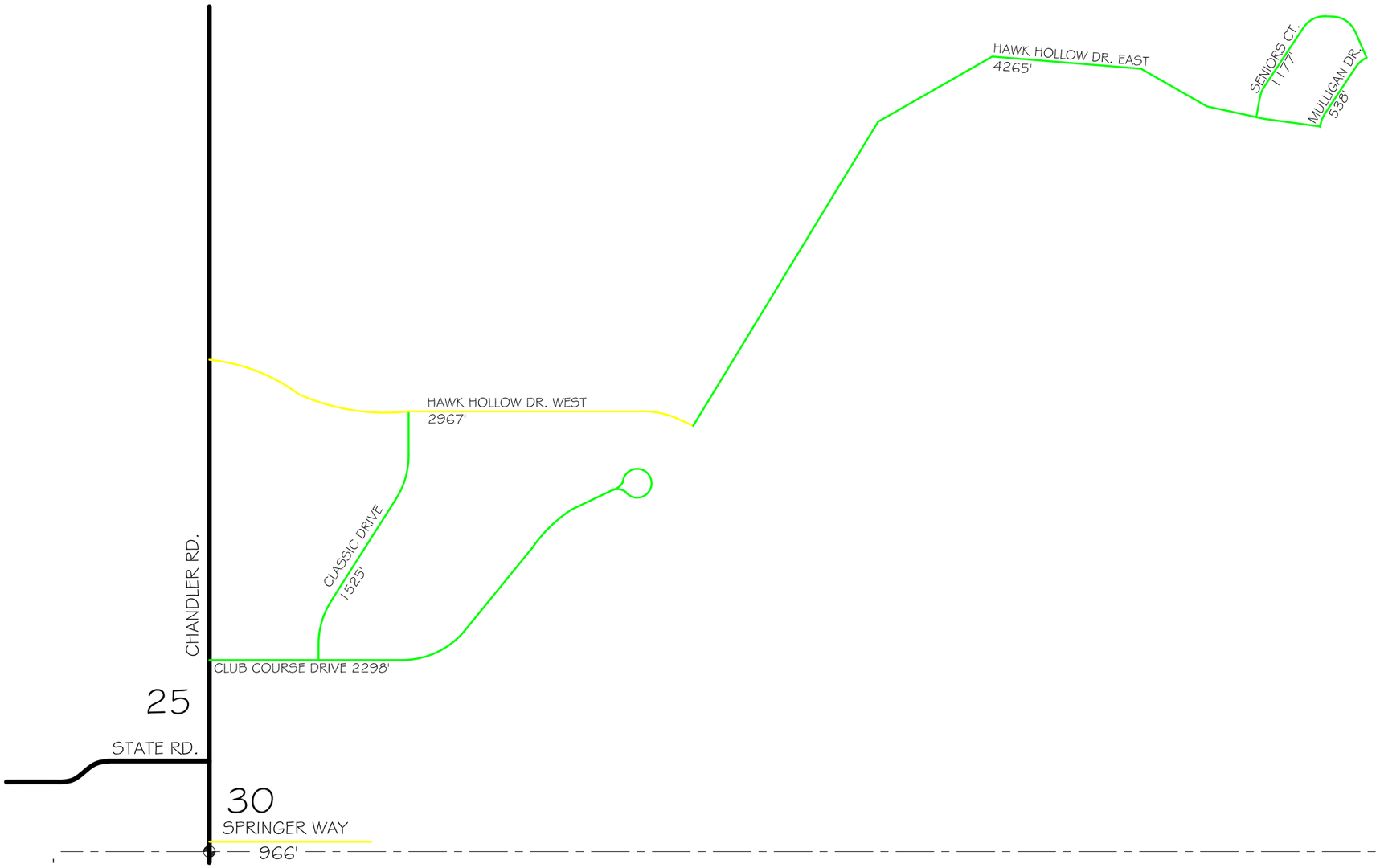
Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP BATH
SECTION 18 T. 5N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

CHANDLER EST.

19-01-18



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 13736 EQUALS 2.60 MILES

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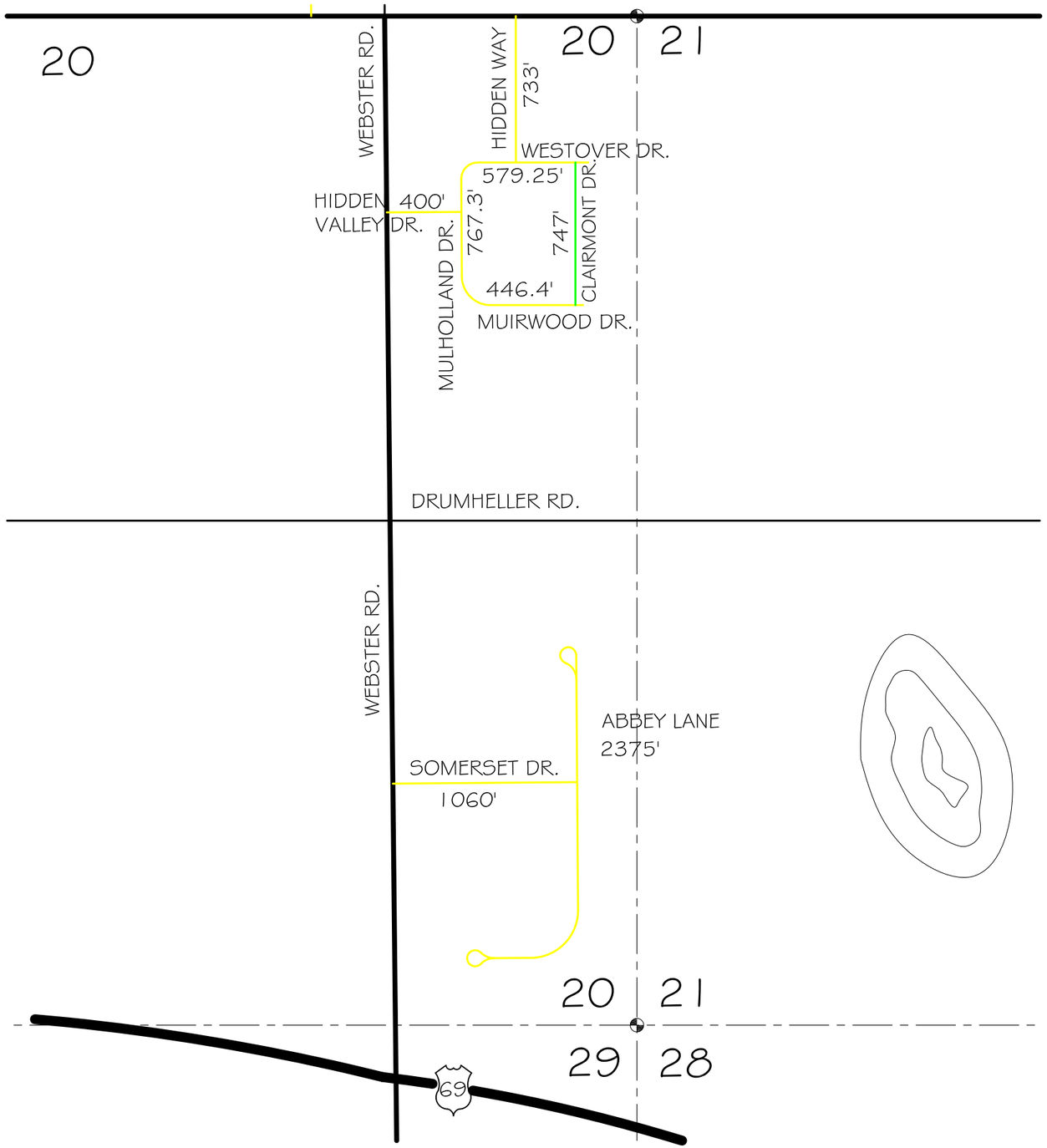
Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP BATH
SECTION 30 T. 5N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

HAWK HOLLOW
LANDINGS OF HAWK HOLLOW
HUNTERS RIDGE

19-01-19,20,29, & 30



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 7107.95 EQUALS 1.35 MILES

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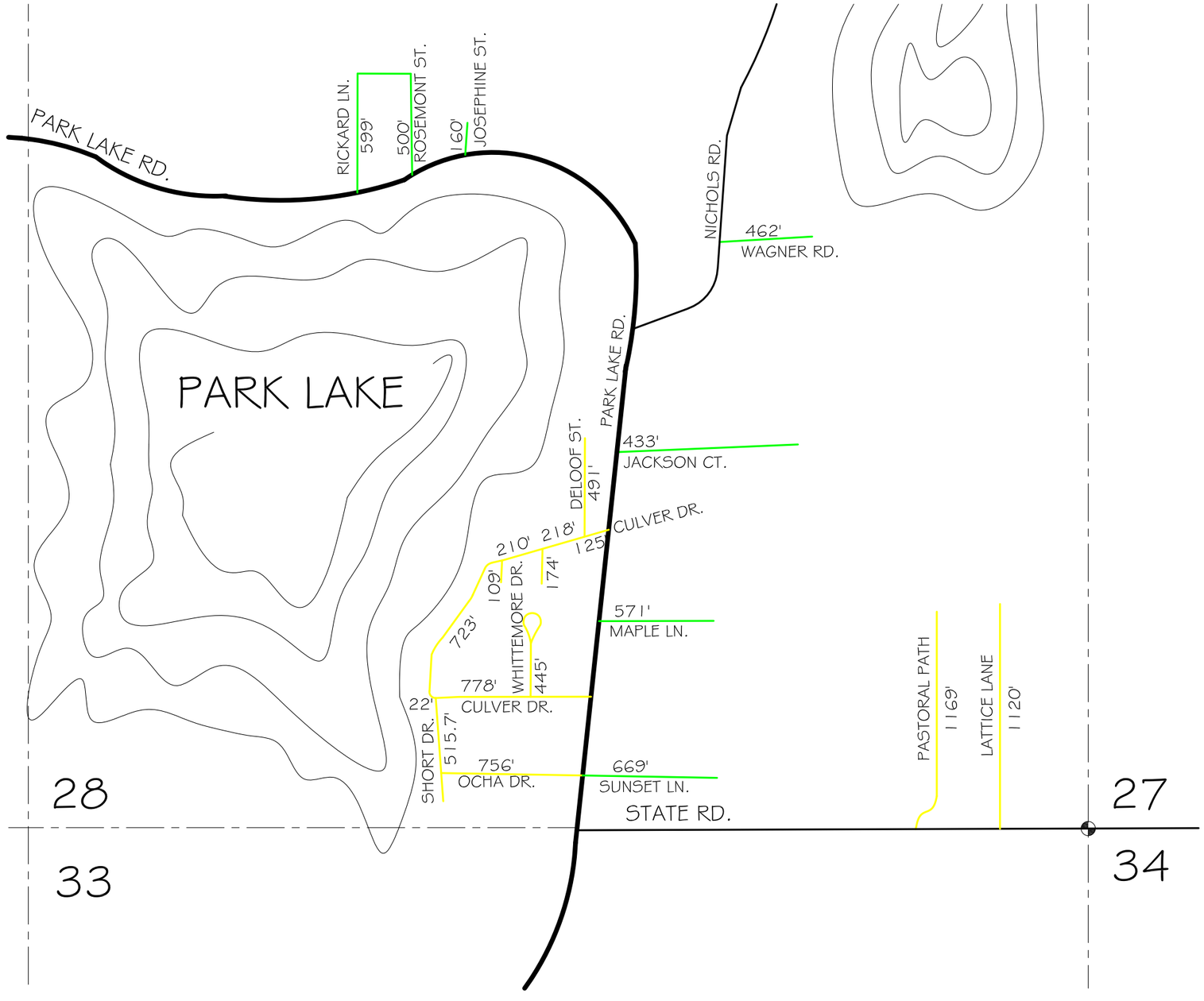
Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP BATH
SECTION 20 T. 5N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

SOMERSET PARK
HIDDEN VALLEY
HIDDEN WAY

19-01-20



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 10250 EQUALS 1.94 MILES

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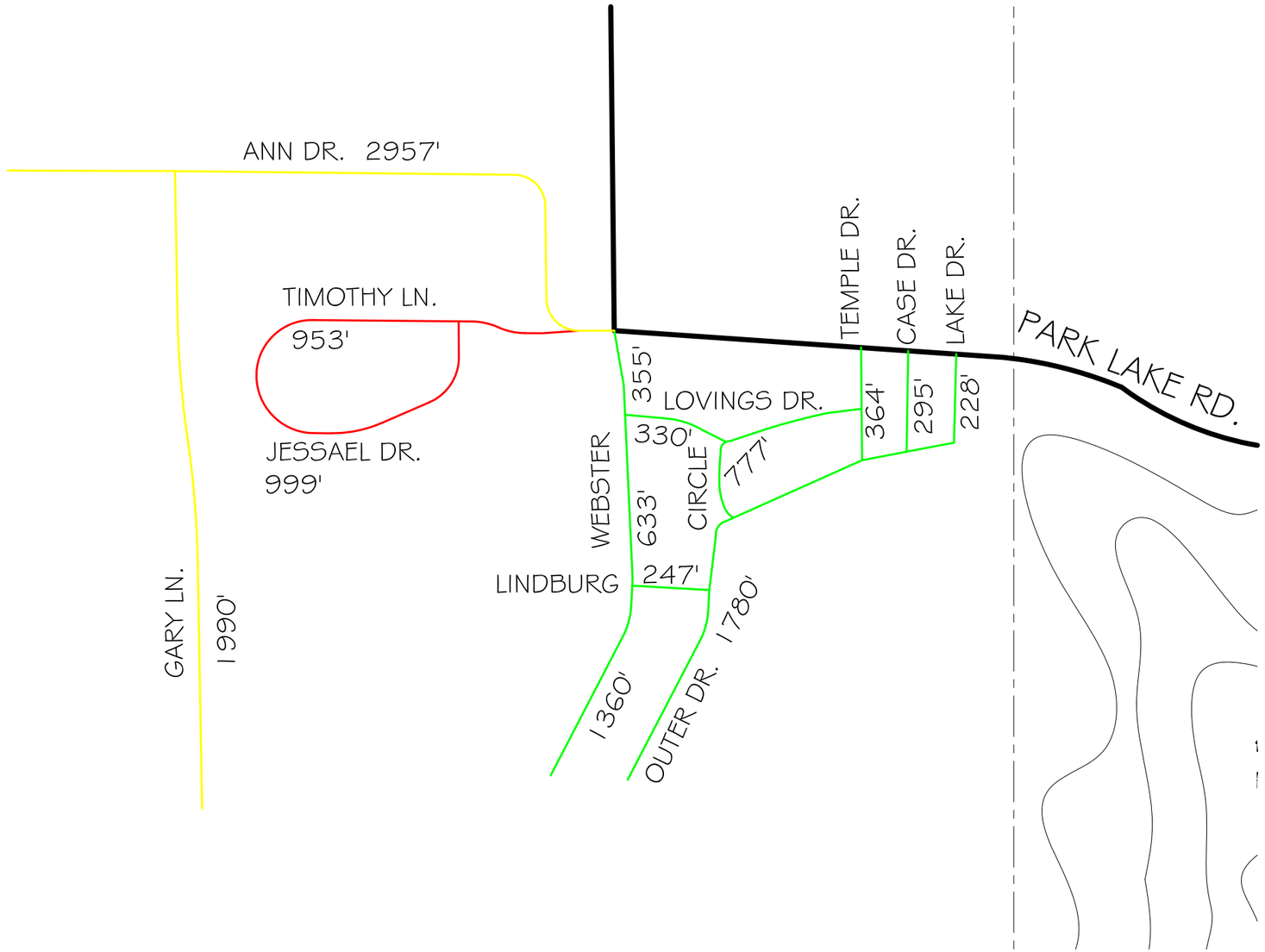
Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP BATH
SECTION 28 T. 5N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

SUPERVISOR'S PLAT NO. 1,3
RICKARD'S COTTAGE ALLOTMENT
SMITH'S SUB.
PARK VIEW
SILVER CREEK

19-01-28



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 13,268 EQUALS 2.51 MILES

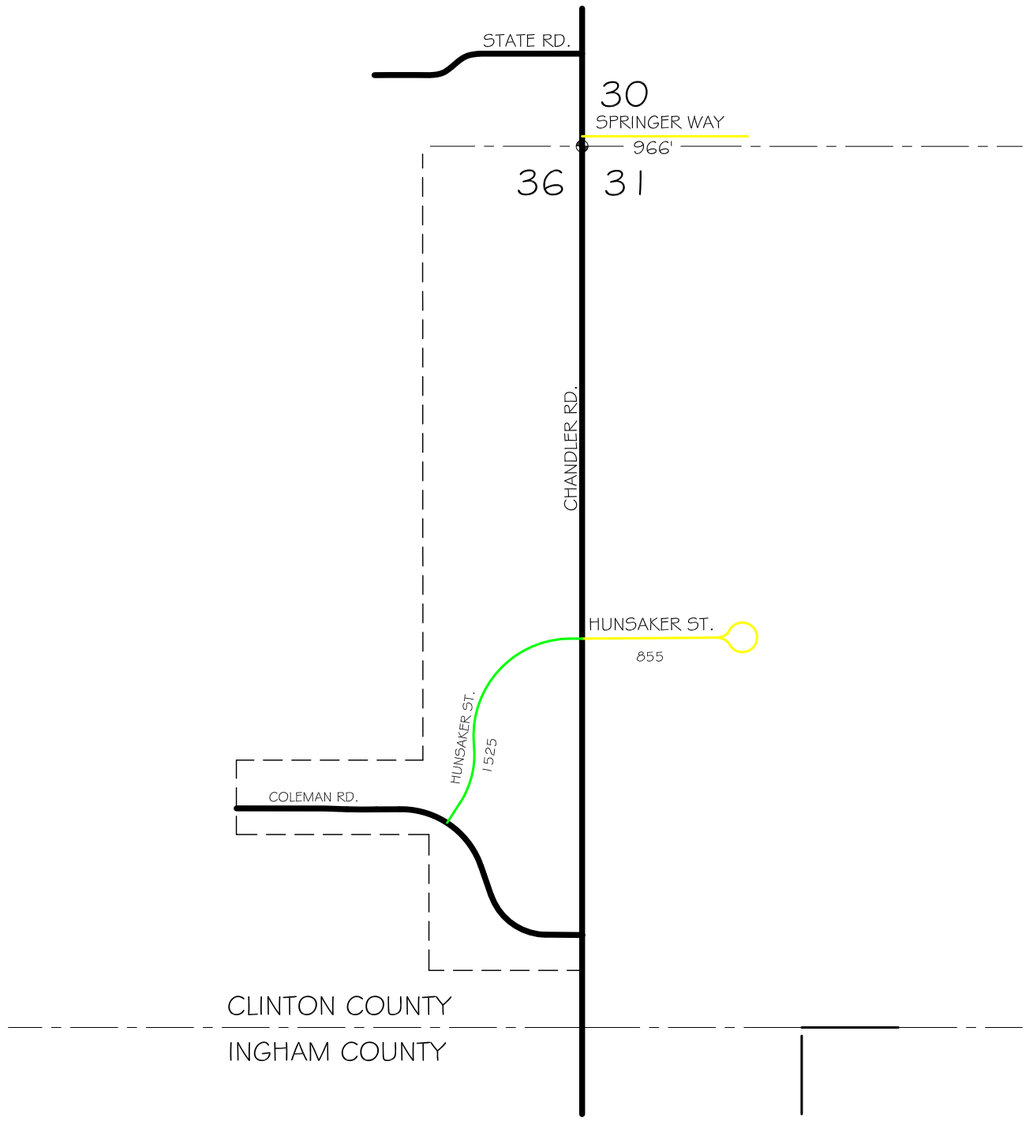
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP BATH
SECTION 29 T. 5N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

PARK LAKE ISLE
LOVINGS WEST SIDE
POLLYAQUA SHORES

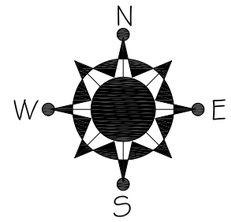
19-01-29



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 2380 EQUALS .45 MILES

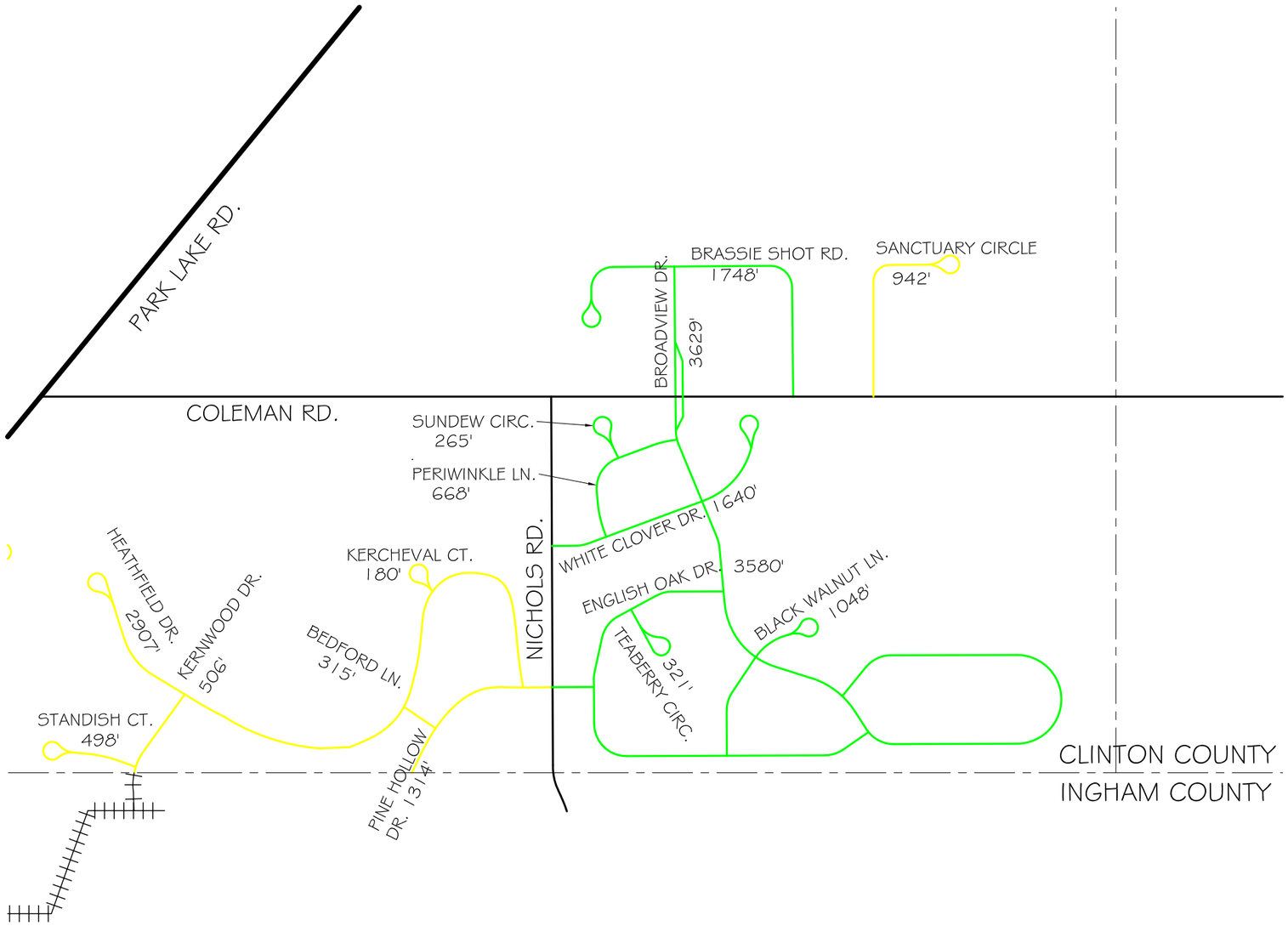


Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP BATH
SECTION 31 T. 5N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

SUNRISE COMMERCIAL COMMONS
HUNTERS RIDGE

19-01-31



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 19561 EQUALS 3.70 MILES

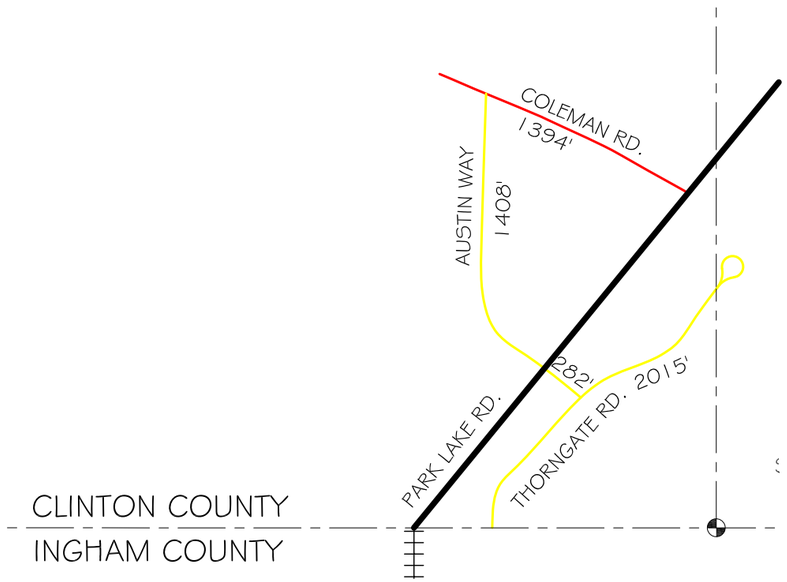
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP BATH
SECTION 33 T. 5N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

THE MEADOWS
MEADOW RIDGE ESTATES
WHITEHILL WOODS NORTH

19-01-32 & 33



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 5,099 EQUALS 0.97 MILES

N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP BATH
SECTION 32 T. 5N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

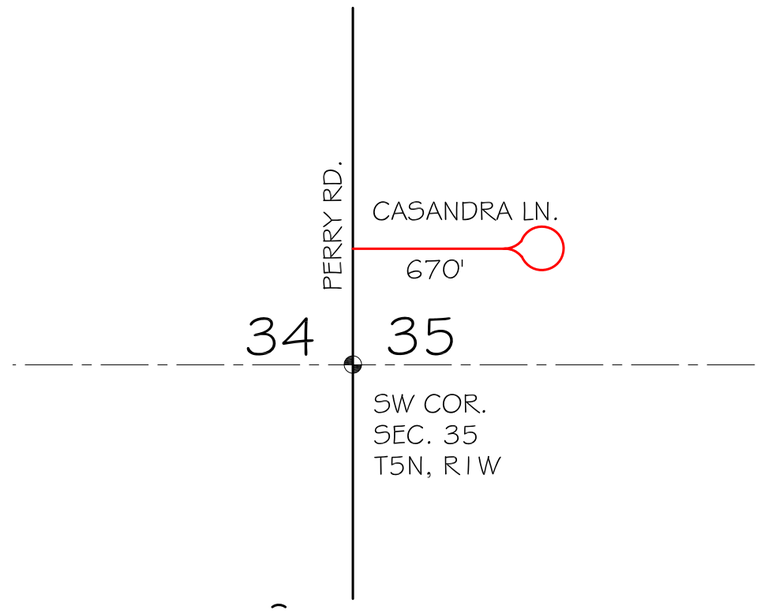
WHITEHILLS LAKES NORTH
CHATEAU IN THE PINES

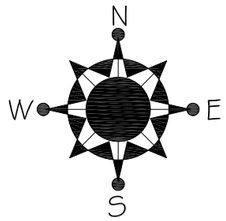
19-01-33

LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 670 EQUALS 0.13 MILES

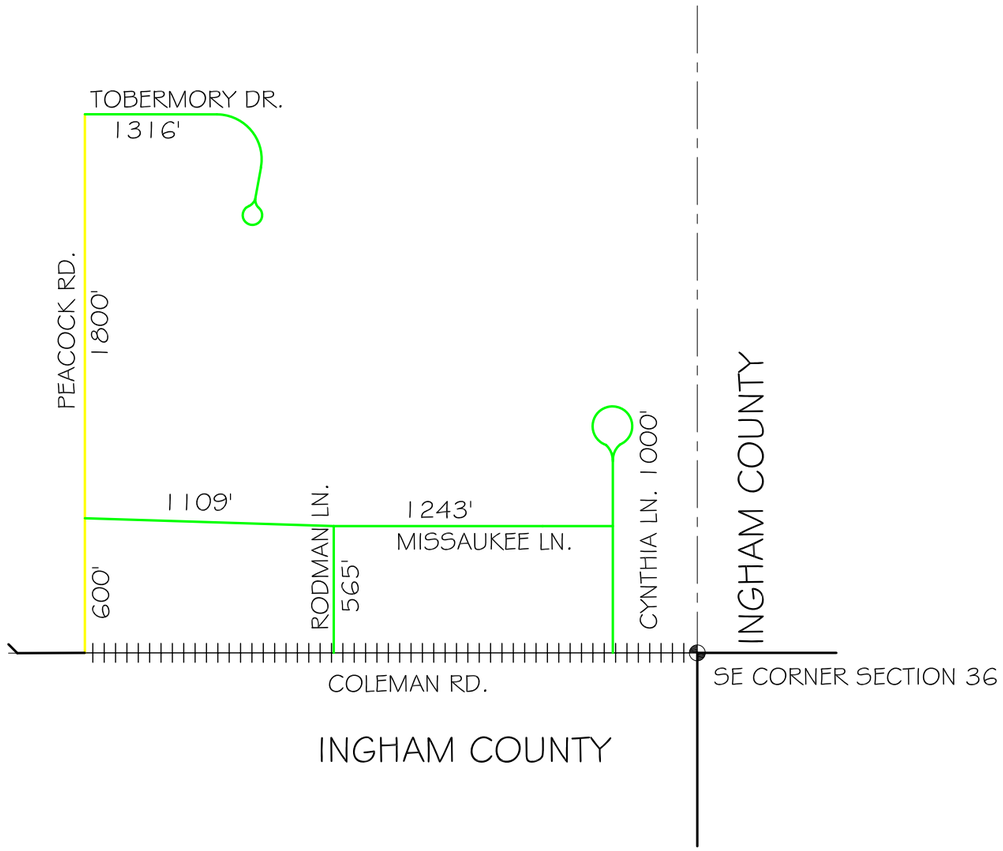




TOWNSHIP BATH
SECTION 35 T. 5N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

TYLER SUB.

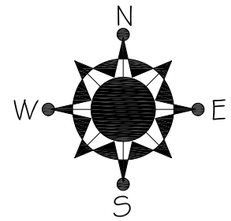
19-01-35



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 6317 EQUALS 1.20 MILES



Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP BATH
SECTION 36 T. 5N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

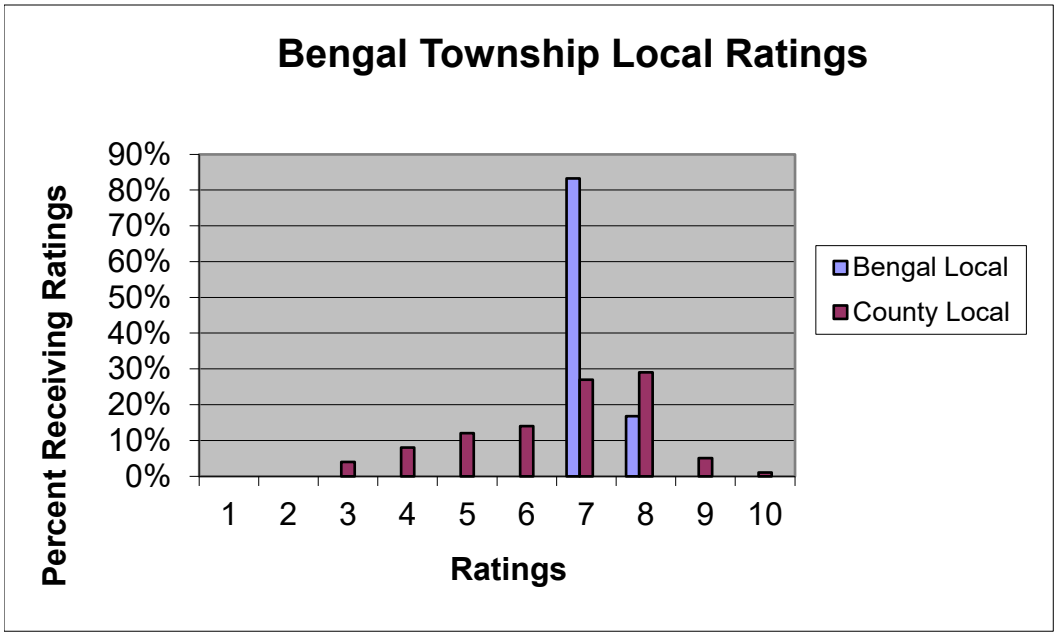
BONNIE MEADOWS ESTATES

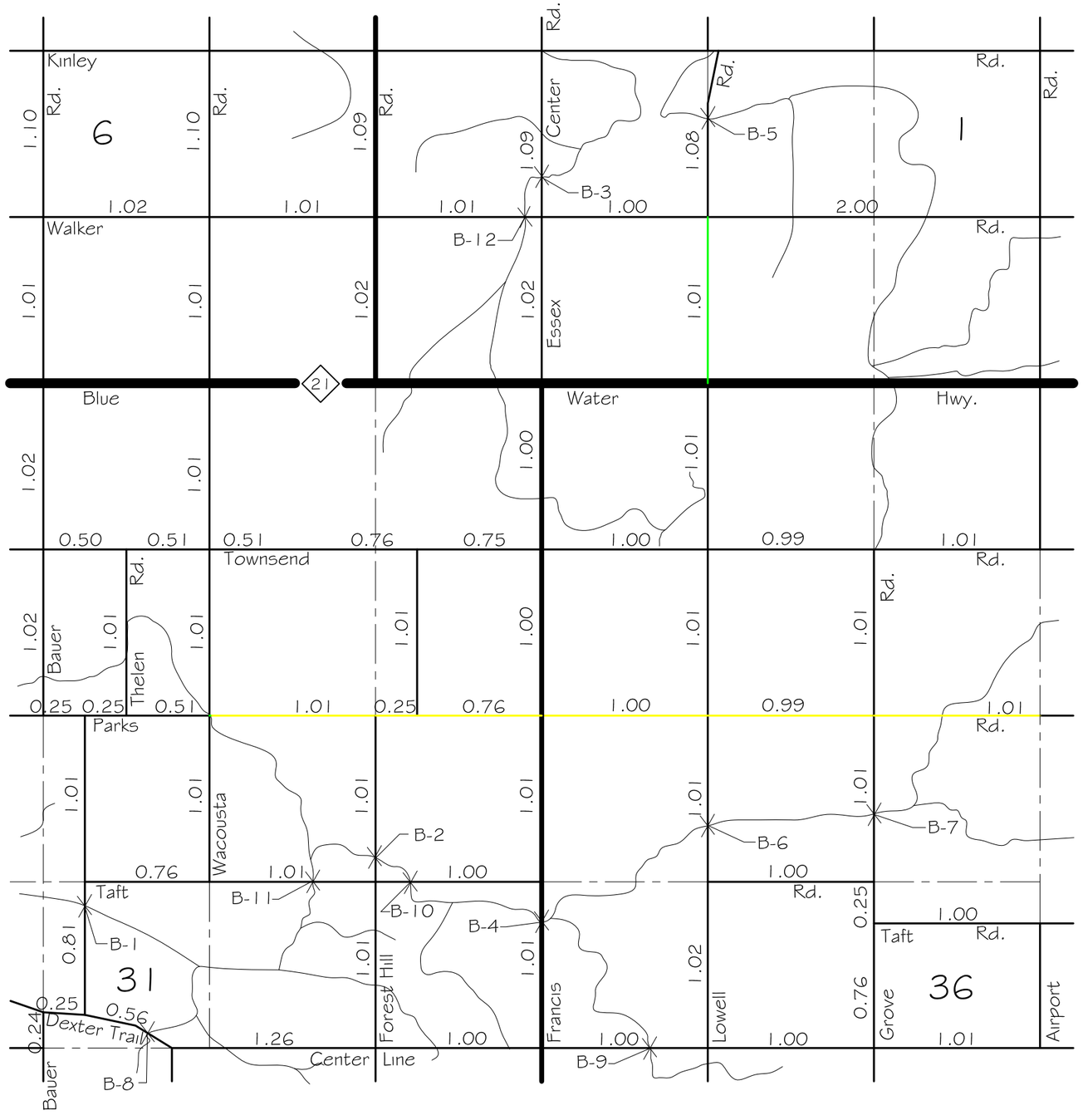
19-01-36

BENGAL TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	Bengal Township Rating Breakdown (Local Roads)	County Local Road Summary	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0	0%	0%	0%
3	0	0%	4%	0%
4	0	0%	8%	0%
5	0	0%	12%	0%
6	0	0%	14%	50%
7	5.02	83%	27%	0%
8	1.01	17%	29%	50%
9	0	0%	5%	0%
10	0	0%	1%	0%

Average Rating		7.17	6.64	7.00
	Change In Average Rating	**0.17**		





LEGEND

SECTION LINE

CORPORATE LIMITS

STATE TRUNKLINE

COUNTY PRIMARY

COUNTY LOCAL

ADJACENT COUNTY

CITY OR VILLAGE

STREET

PRIMARY ROAD SYSTEM IS 6.13 MILES

LOCAL ROAD SYSTEM IS 55.62 MILES

T. 7N R. 3W

Good 8-10

Fair 5-7

Poor 1-4

Scale 0 1/2 1 Mile

One Inch Equals 4000 Ft.

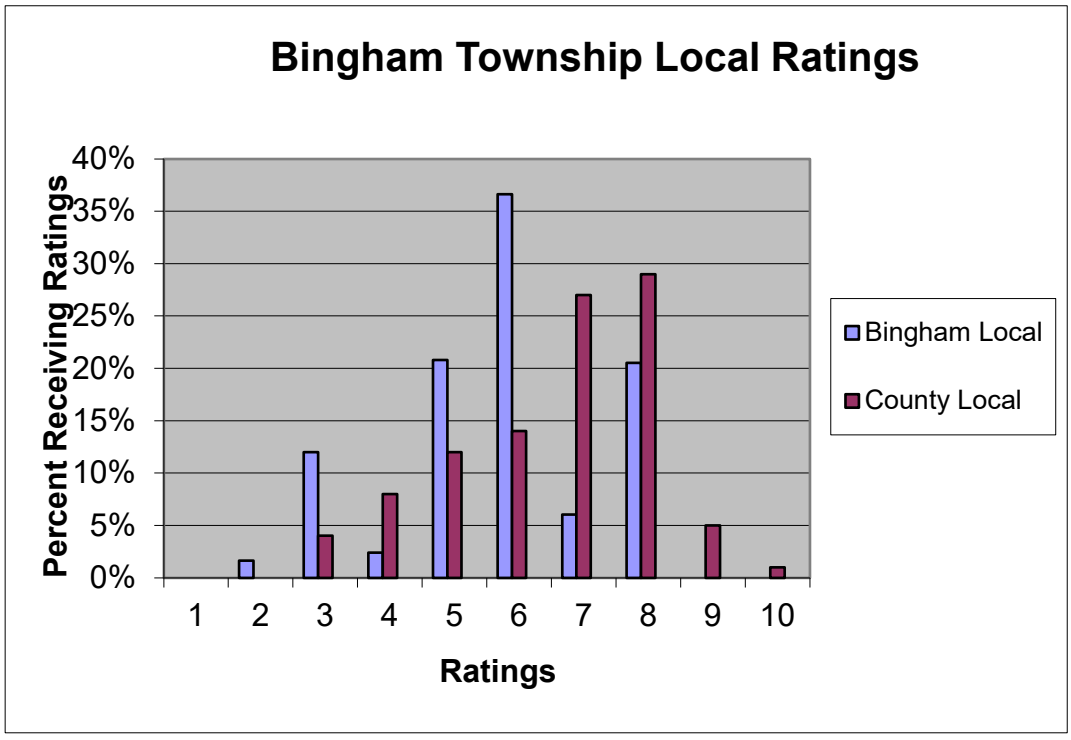
PREPARED BY
CLINTON COUNTY RD. COMM.

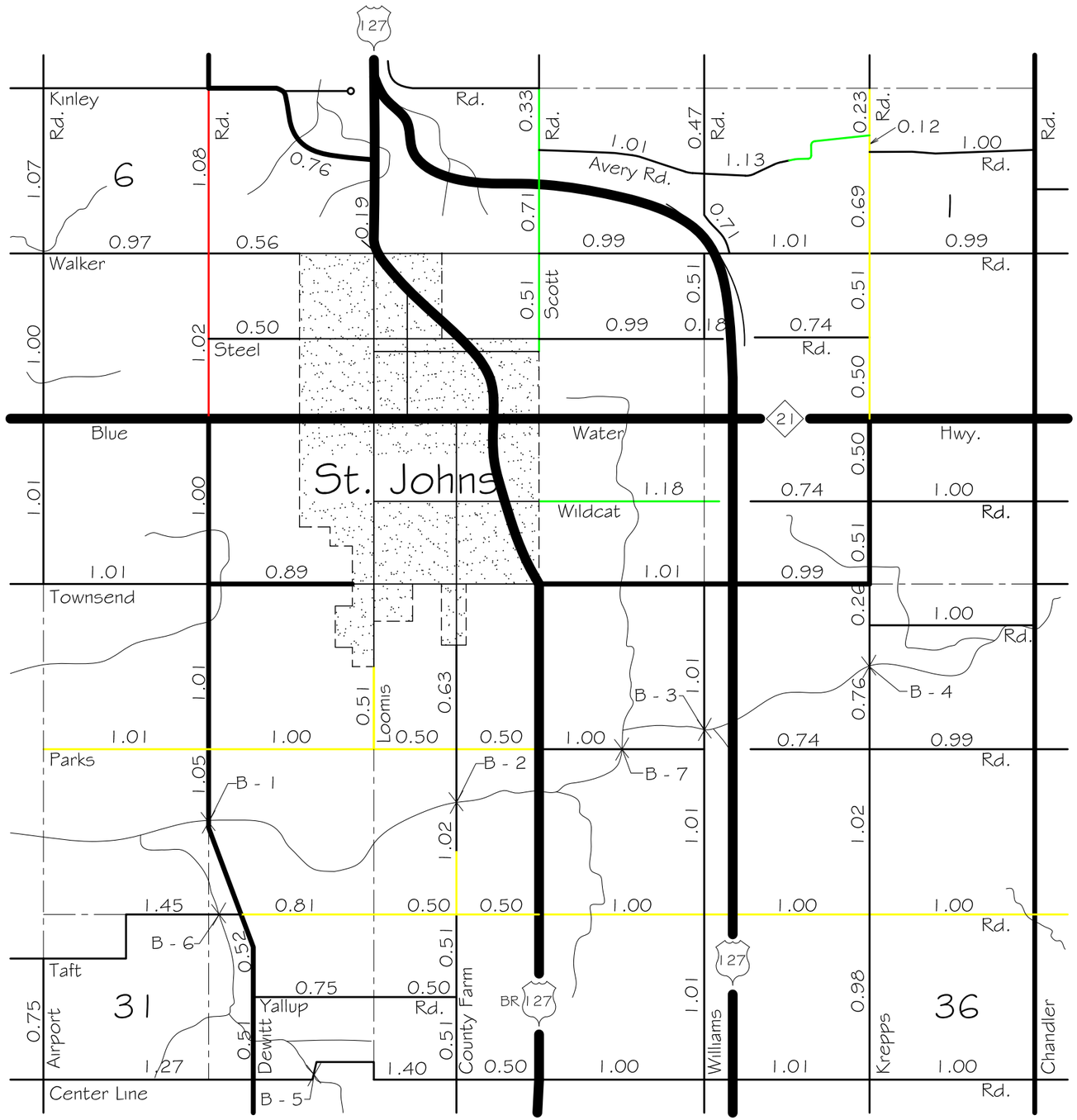
BENGAL TWP. 19-02

BINGHAM TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	Bingham Township Rating Breakdown (Local Roads)	County Local Road Breakdown	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0.33	2%	0%	2%
3	2.41	12%	4%	12%
4	0.48	2%	8%	2%
5	4.18	21%	12%	26%
6	7.36	37%	14%	40%
7	1.21	6%	27%	15%
8	4.12	21%	29%	4%
9	0	0%	5%	0%
10	0	0%	1%	0%

Average Rating		5.79	6.64	5.5
	Change In Average Rating	**0.29**		





LEGEND

SECTION LINE

CORPORATE LIMITS

STATE TRUNKLINE

COUNTY PRIMARY

COUNTY LOCAL

ADJACENT COUNTY

CITY OR VILLAGE

STREET

PRIMARY ROAD SYSTEM IS 8.94 MILES

LOCAL ROAD SYSTEM IS 55.70 MILES

T. 7N R. 2W

Good 8-10

Fair 5-7

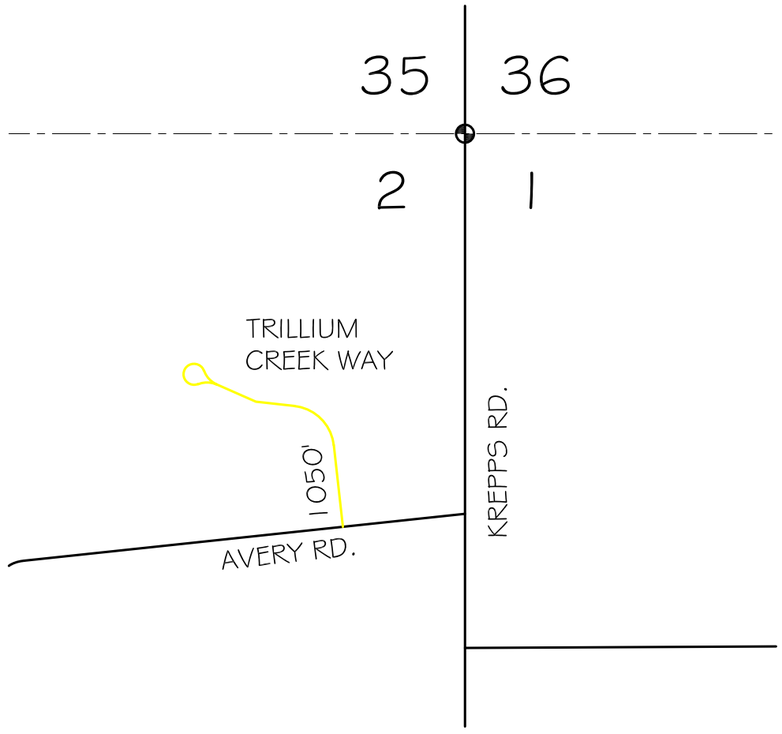
Poor 1-4

Scale 0 1/2 1 Mile

One Inch Equals 4000 Ft.

PREPARED BY
CLINTON COUNTY RD. COMM.

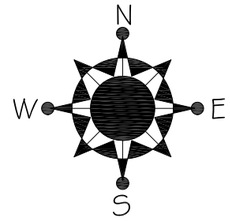
BINGHAM TWP. 19-03



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 1050 EQUALS 0.20 MILES

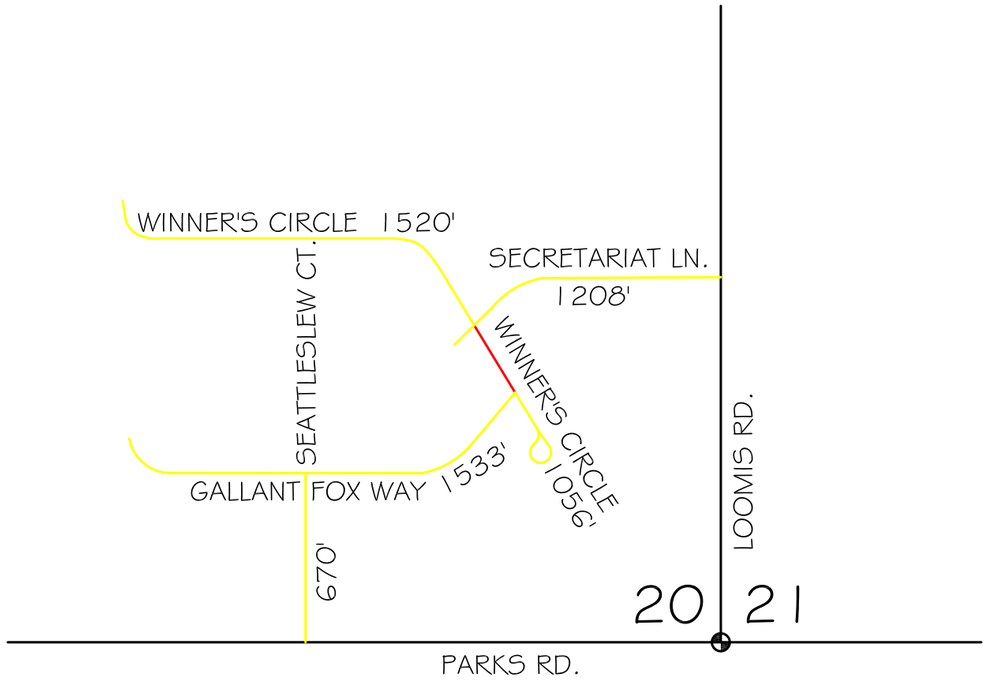


Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP BINGHAM
SECTION 02 T. 7N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

TRILLIUM CREEK

19-03-02



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 5986 EQUALS 1.14 MILES

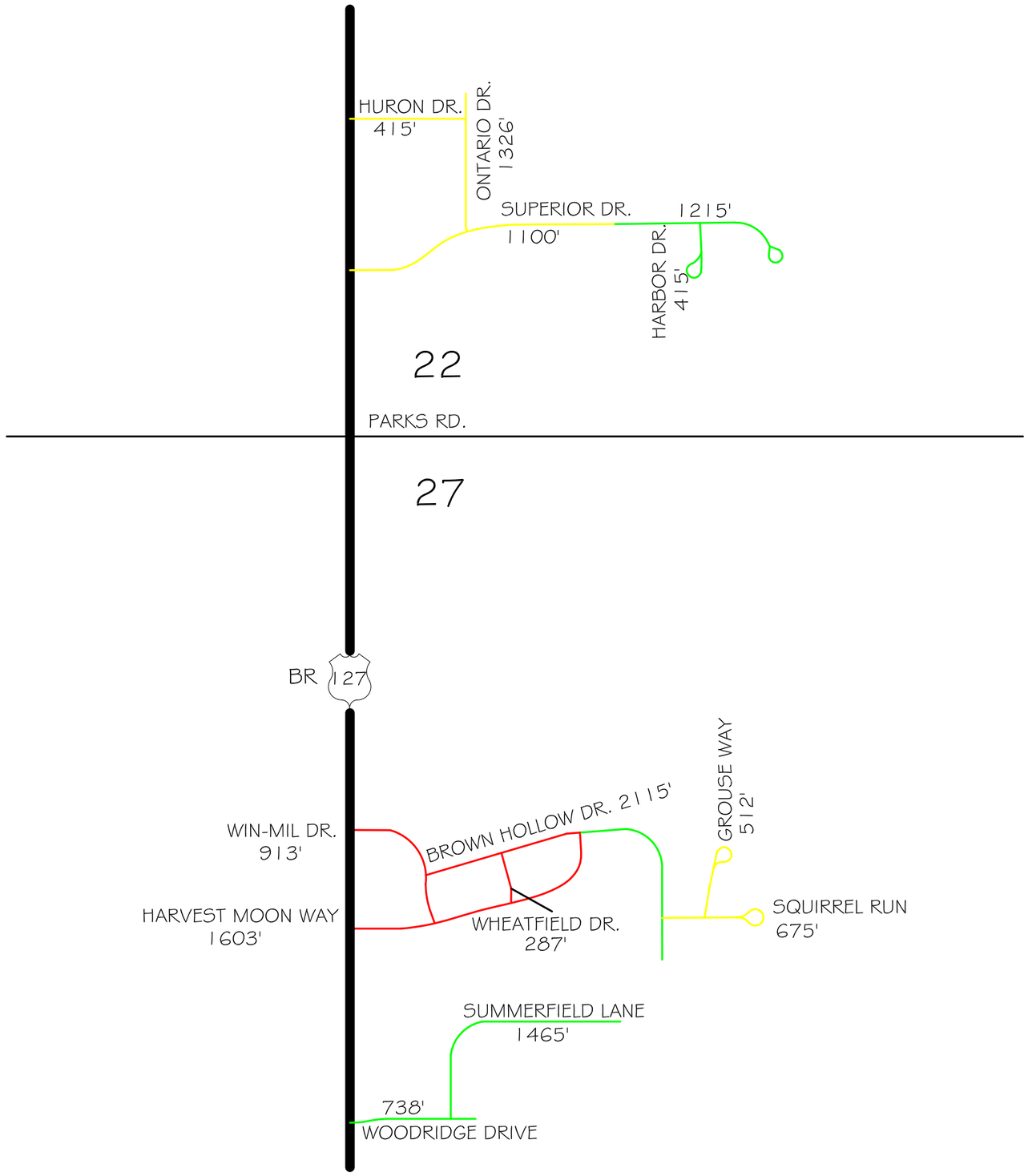
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP BINGHAM
SECTION 20 T. 7N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

BINGHAM FARMS

19-03-20



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 11149 EQUALS 2.11 MILES

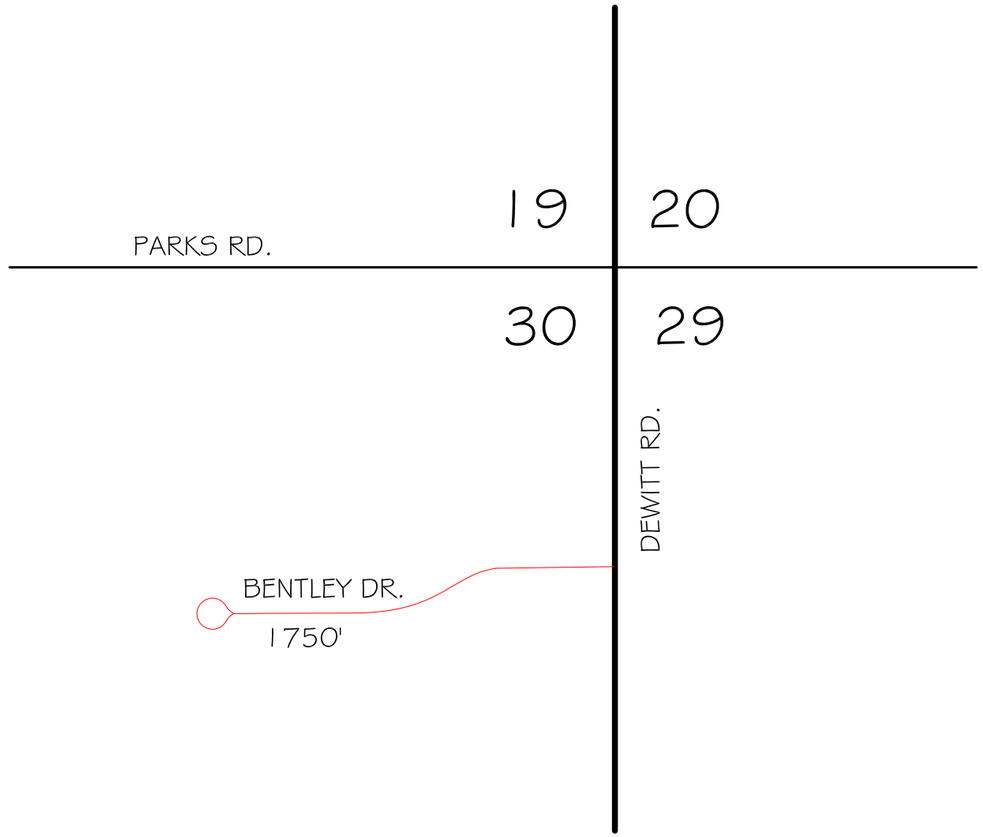
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP BINGHAM
SECTION 27,22 T. 7N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

WIN-MIL FARMS
BINGHAM COMMERCE PARK
WOODRIDGE

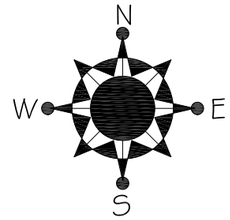
19-03-22 & 27



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 1750 EQUALS 0.33 MILES



TOWNSHIP BINGHAM
SECTION 30 T. 7N R. 2W
COUNTY CLINTON

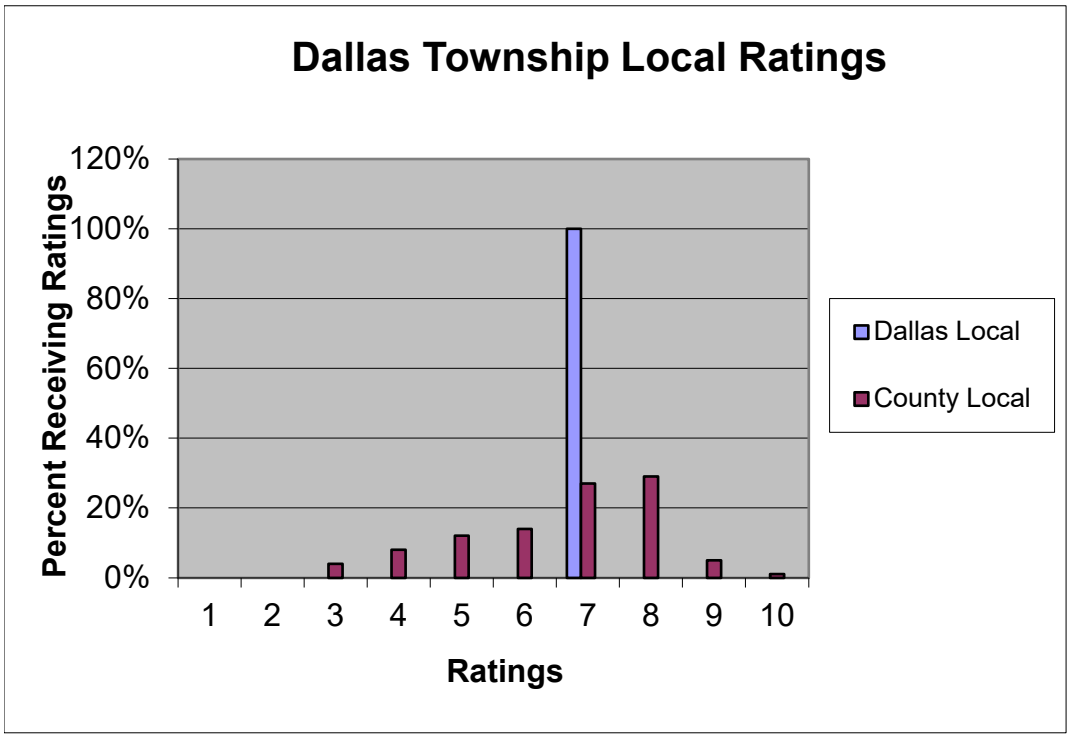
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

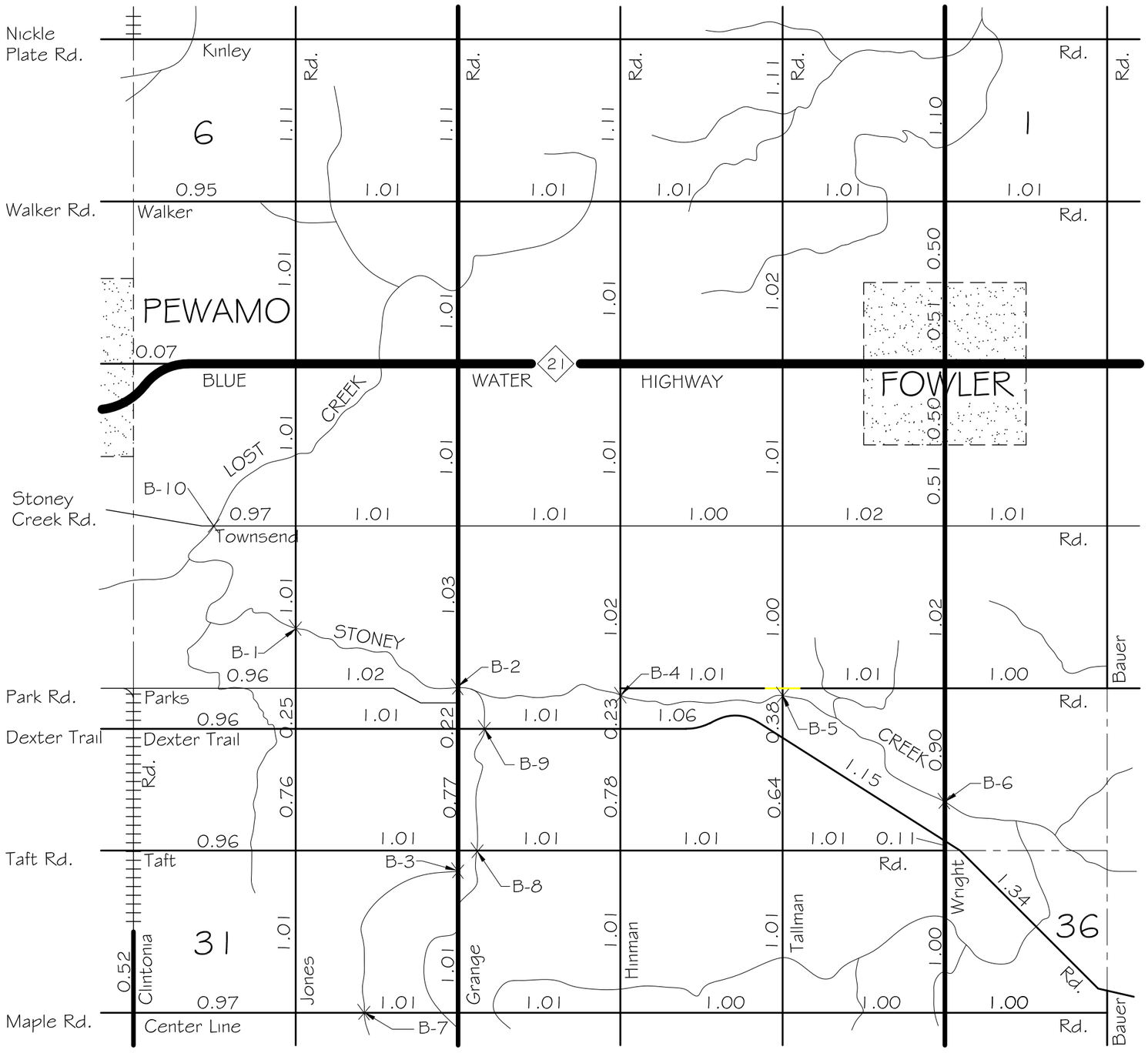
19-03-30

DALLAS TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	Dallas Township Rating Breakdown (Local Roads)	County Local Road Breakdown	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0	0%	0%	0%
3	0	0%	4%	0%
4	0	0%	8%	0%
5	0	0%	12%	0%
6	0	0%	14%	0%
7	0.14	100%	27%	0%
8	0	0%	29%	100%
9	0	0%	5%	0%
10	0	0%	1%	0%

Average Rating		7.00	6.64	8.00
	Change In Average Rating	**-1.00**		





LEGEND

SECTION LINE

CORPORATE LIMITS

STATE TRUNKLINE

COUNTY PRIMARY

COUNTY LOCAL

ADJACENT COUNTY

CITY OR VILLAGE

STREET

PRIMARY ROAD SYSTEM IS 12.83 MILES

LOCAL ROAD SYSTEM IS 53.11 MILES

T. 7W R. 4W

Good 8-10

Fair 5-7

Poor 1-4

Scale 0 1/2 1 Mile

One Inch Equals 4000 Ft.

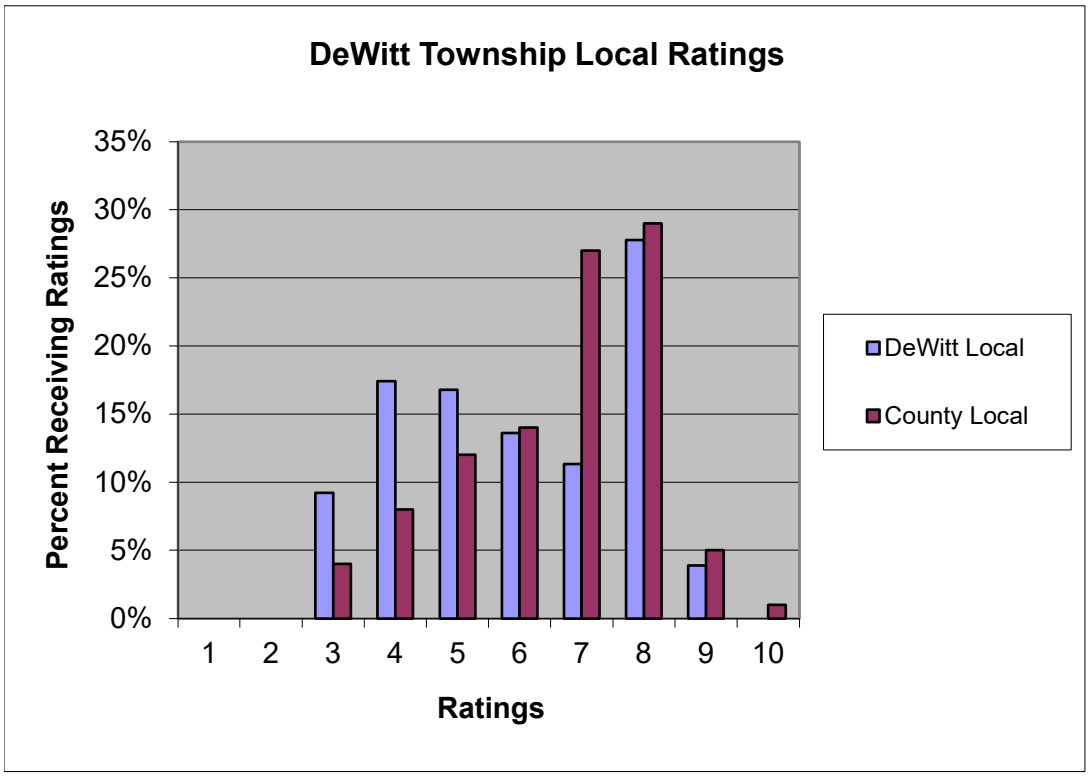
PREPARED BY
CLINTON COUNTY RD. COMM.

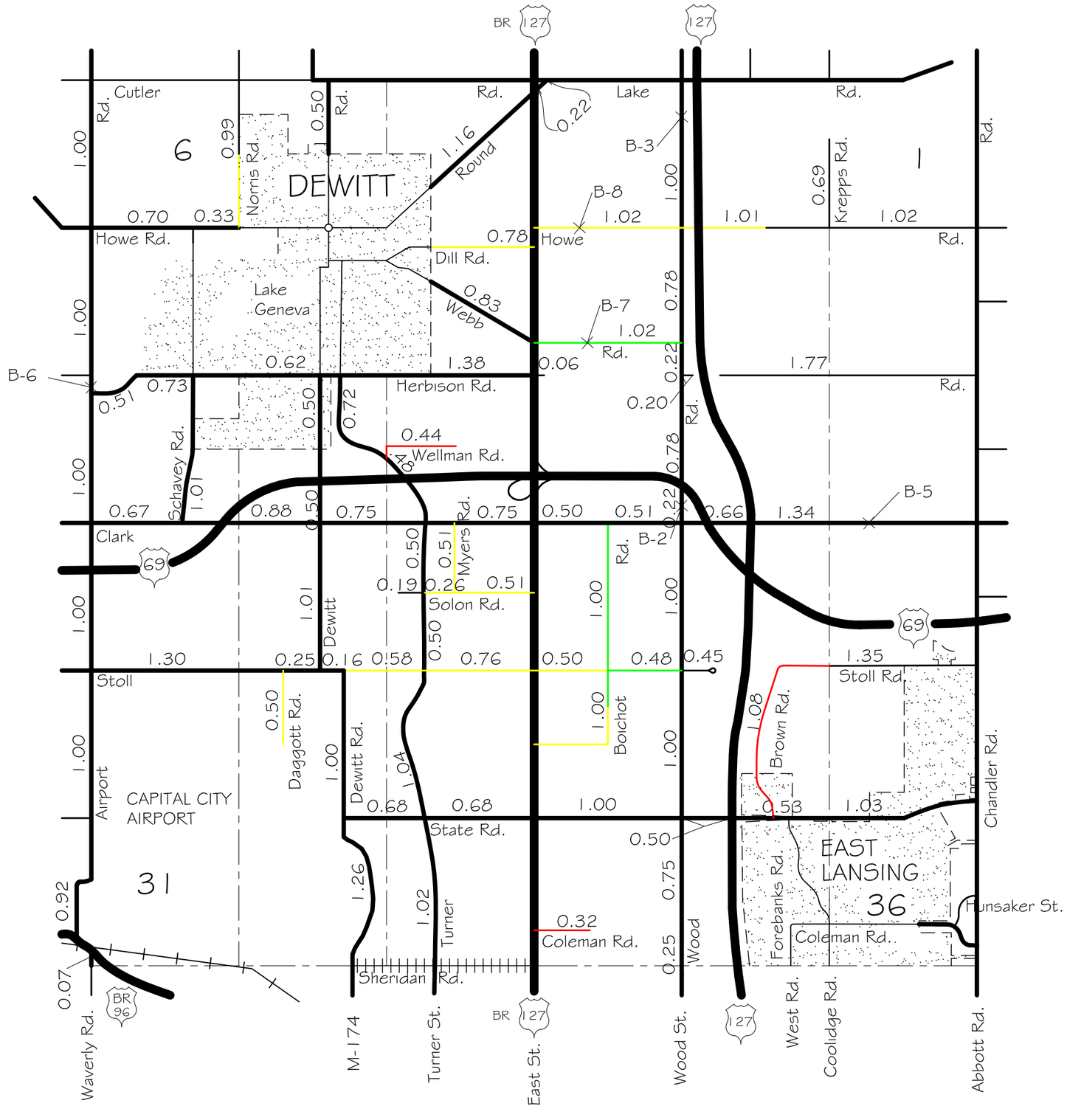
DALLAS TWP 19-04

DEWITT TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	DeWitt Township Rating Breakdown (Local Roads)	County Local Road Breakdown	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0	0%	0%	0%
3	5.02	9%	4%	10%
4	9.48	17%	8%	15%
5	9.13	17%	12%	20%
6	7.4	14%	14%	17%
7	6.16	11%	27%	9%
8	15.11	28%	29%	24%
9	2.12	4%	5%	5%
10	0	0%	1%	0%

Average Rating		5.99	6.64	5.93
	Change In Average Rating	**0.06**		





LEGEND

SECTION LINE

CORPORATE LIMITS

STATE TRUNKLINE

COUNTY PRIMARY

COUNTY LOCAL

ADJACENT COUNTY

CITY OR VILLAGE

STREET

PRIMARY ROAD SYSTEM IS 40.70 MILES

LOCAL ROAD SYSTEM IS 18.53 MILES

T. 5N R. 2W

Good 8-10

Fair 5-7

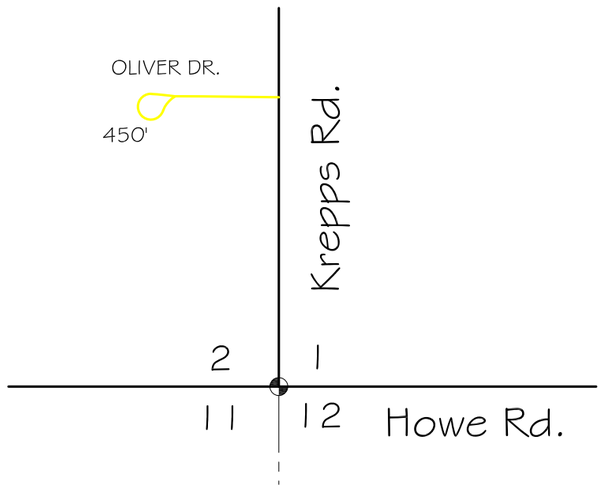
Poor 1-4

Scale 0 1/2 1 Mile

One Inch Equals 4000 Ft.

PREPARED BY
CLINTON COUNTY RD. COMM.

DEWITT 19-05



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 450 EQUALS 0.09 MILES

N
W E
S

Scale 0 600 1 200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 2 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

19-5-2

BR 127

LAKE RD.

ROUND

RIVER RD. 2218'

STONE RIVER DR. 1121'

WOOD RD.

WILDERNESS DR.
1180'

DEERWOOD CIRCLE
530'

HOWE RD.

DILL RD.

LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 3928 EQUALS 0.74 MILES

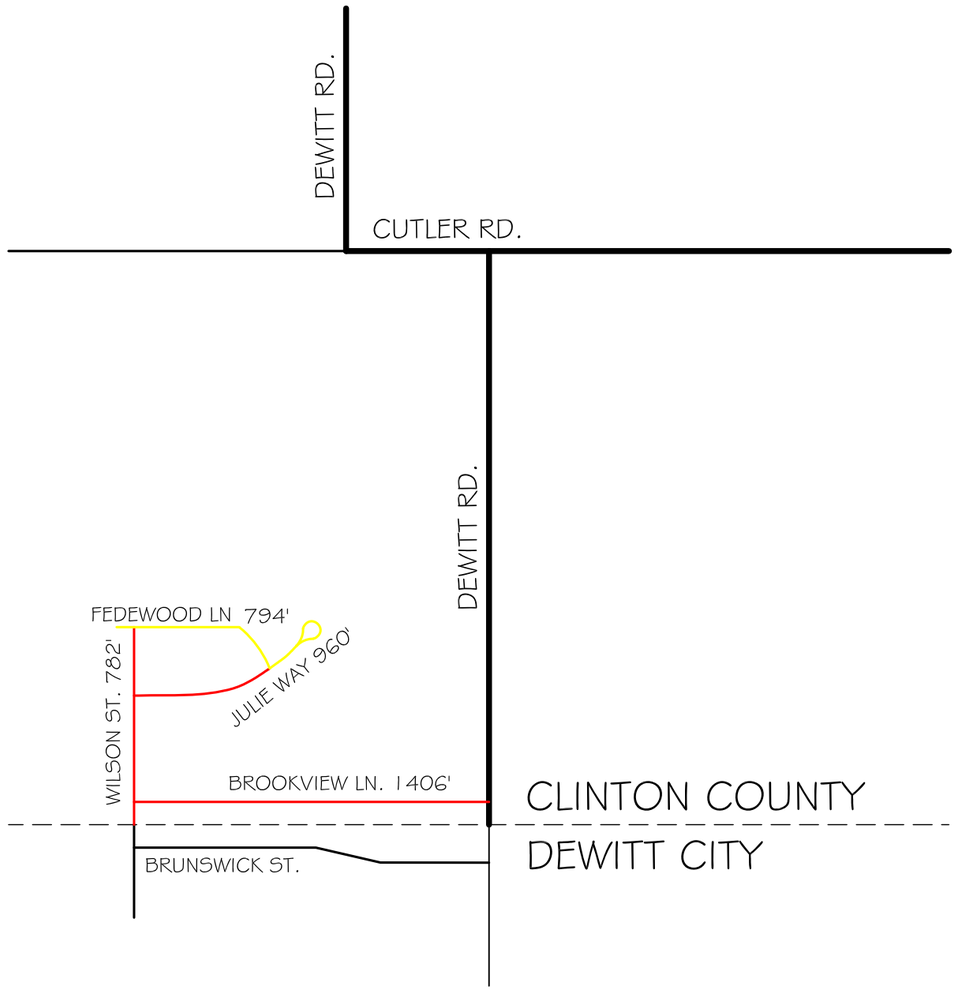
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 4 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

RIVERVIEW HEIGHTS
DEERWOOD CIRCLE
WILDERNESS DRIVE

19-5-4



LEGEND

SECTION LINE	— - — - —
CORPORATE LIMITS	— — — — — —
STATE TRUNKLINE	▬▬▬
COUNTY PRIMARY	▬▬
COUNTY LOCAL	──
ADJACENT COUNTY	╫╫╫╫╫╫╫╫╫╫╫╫
CITY OR VILLAGE	──
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 3942 EQUALS 0.75 MILES

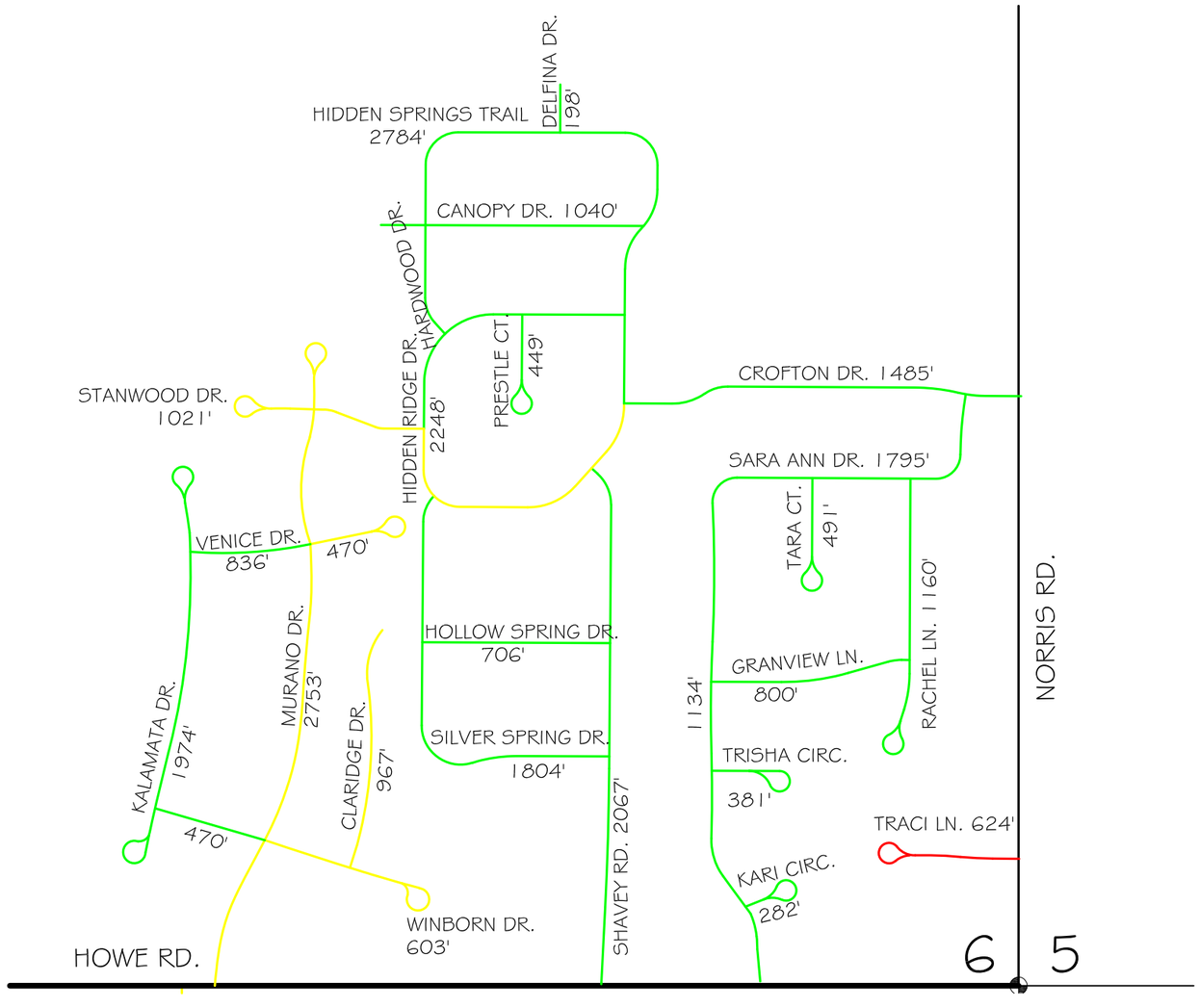
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 5 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

CREEPING BROOK ESTATES

19-5-5



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 28542 EQUALS 5.41 MILES

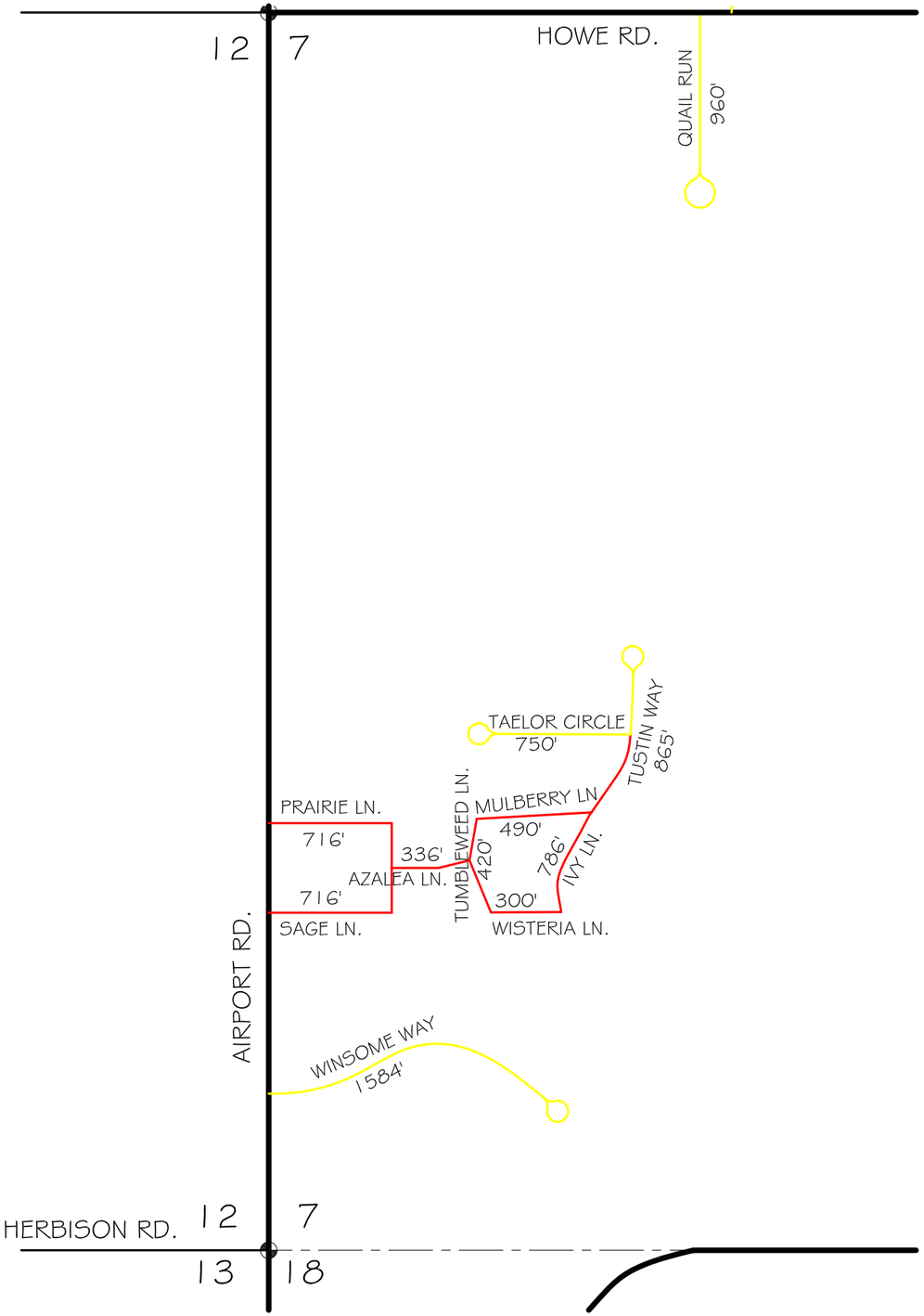
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 6 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

SPRINGBROOK HILLS
SPRINGBROOK HILLS EAST
CROWNER FARMS

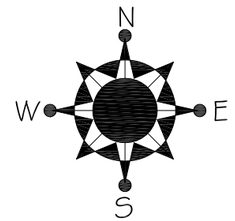
19-5-6



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 7923 EQUALS 1.50 MILES

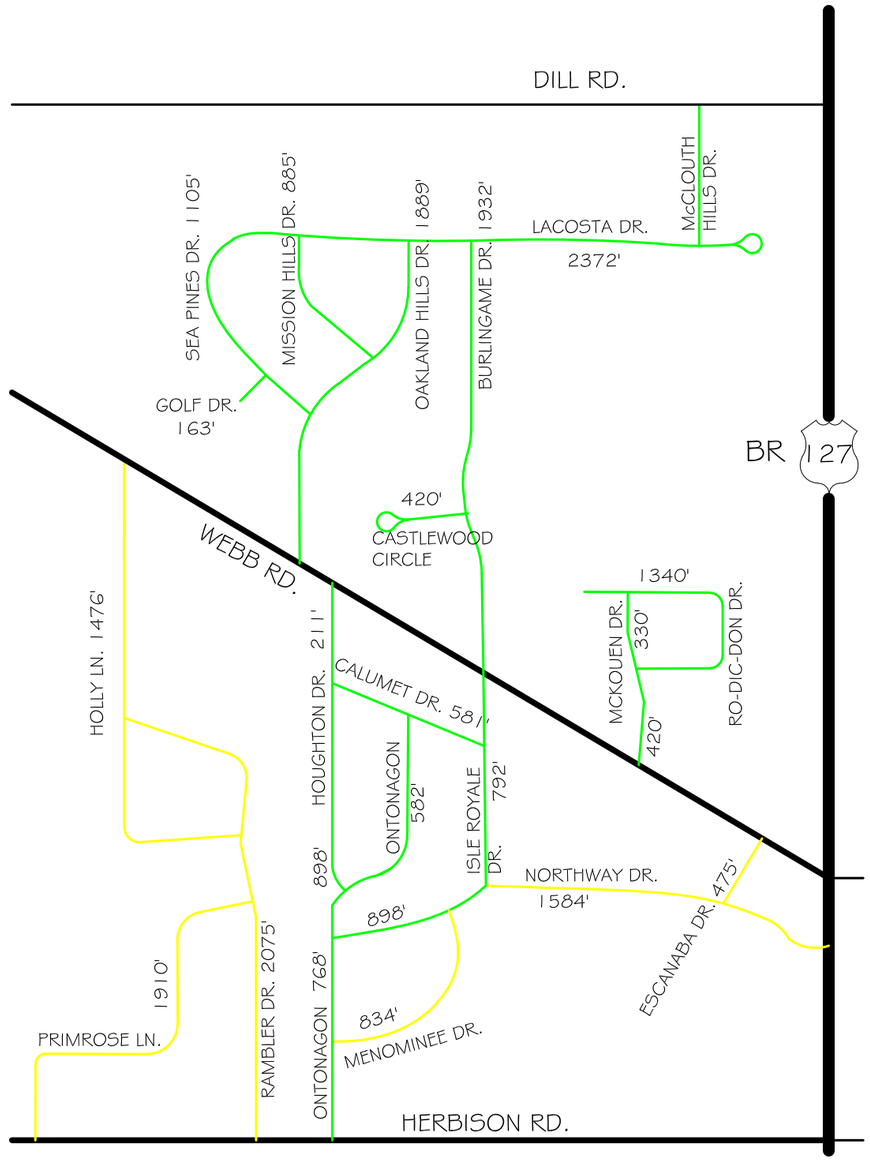


Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 7 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

WILLOW CREEK SUB.
QUAIL RUN SUB.
RIVERWALK ESTATES
LOCHINVAR ESTATES

19-5-7



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 24210 EQUALS 4.59 MILES

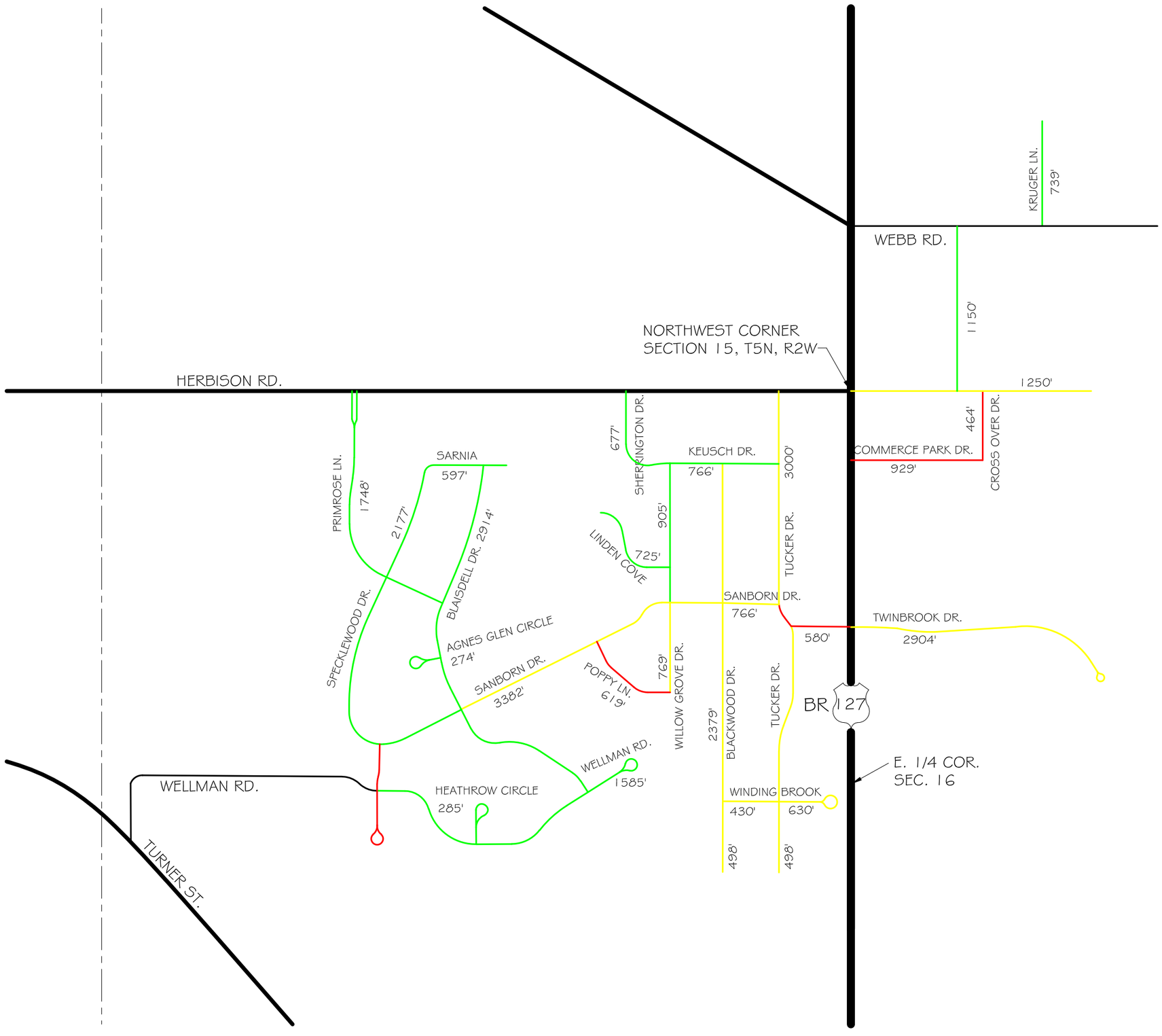
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 9 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

ROSE SUB.
RO-DIC-DON SUB.
OAKLAND HILLS ESTATES NO. 1
NORTHWAY HILLS

19-5-9



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 34570 EQUALS 6.55 MILES

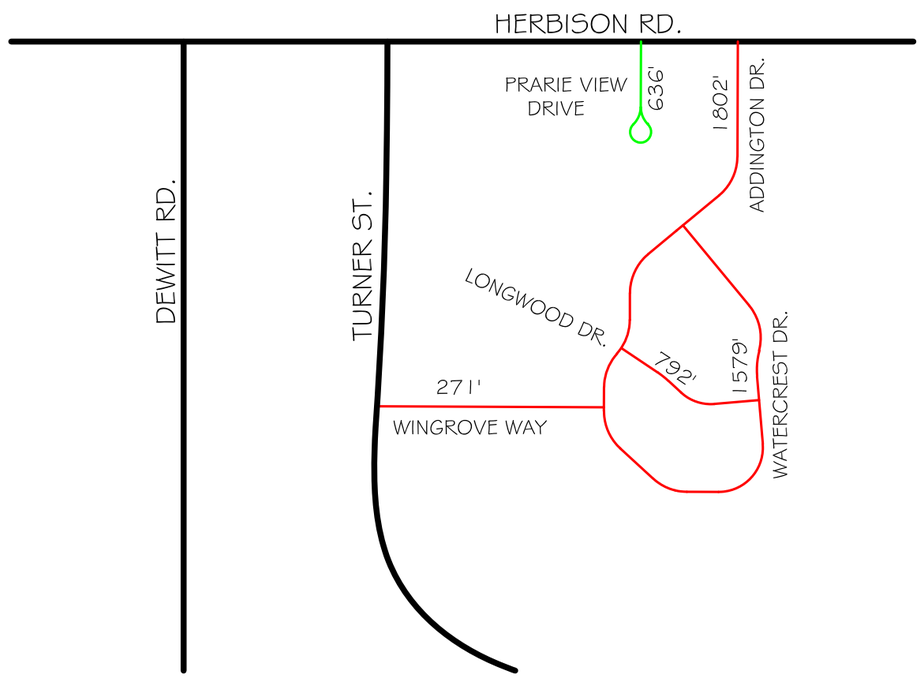
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 16, 15 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

WALNUT EST.
COMMERCE PARK DRIVE
SHERBROOKE SUB.
HERITAGE MEADOWS
HERITAGE GLEN
HERITAGE WOODS
HOPE

19-5-10, 15, & 16



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 4866 EQUALS 0.92 MILES

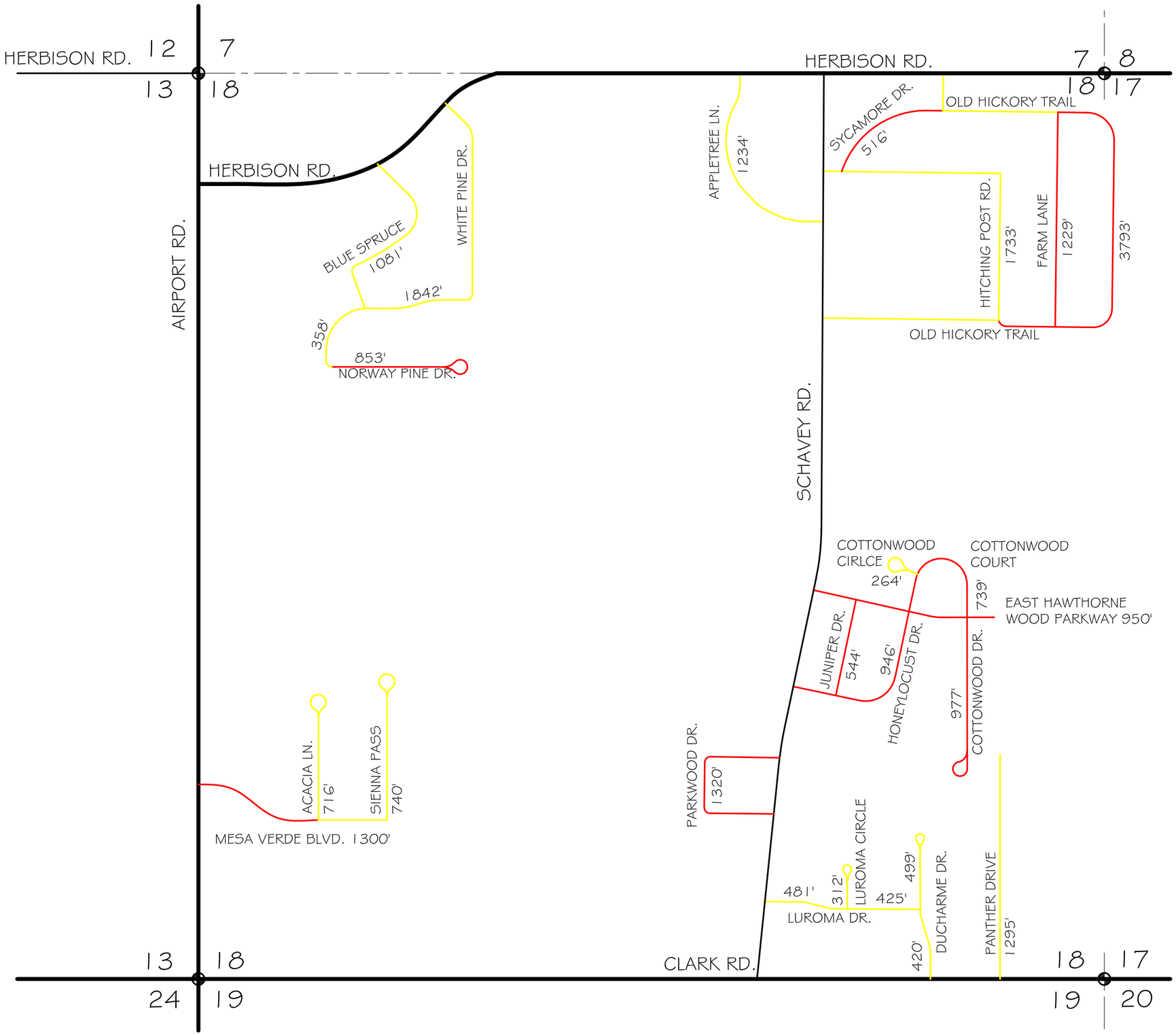
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 17 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

PRAIRIE VIEW SUB.
CREEK SIDE

19-5-17



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 24567 EQUALS 4.65 MILES

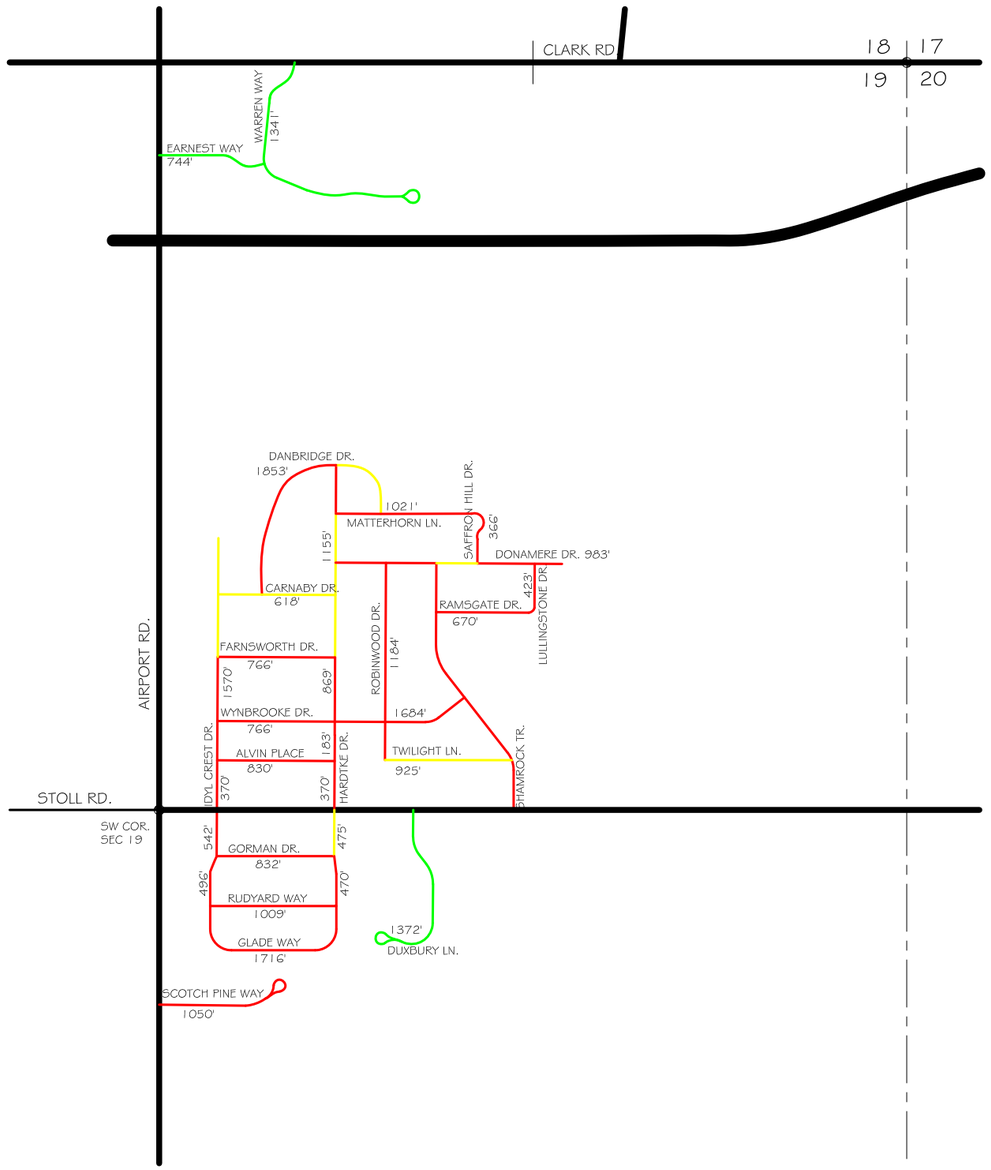
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 18 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

COUNTRY MEADOWS EST.
LUROMA PARK SUB.
HAWTHORNE WOODS EAST
LOOKING GLASS PINE SUB.

19-5-18



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 23983 EQUALS 4.54 MILES

N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 19, 30 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

IDLECREST SUB.
DUXBURY ESTATES
SAFFRON HILLS
WINDY RIDGE

19-5-19 & 30

LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 3502 EQUALS 0.66 MILES

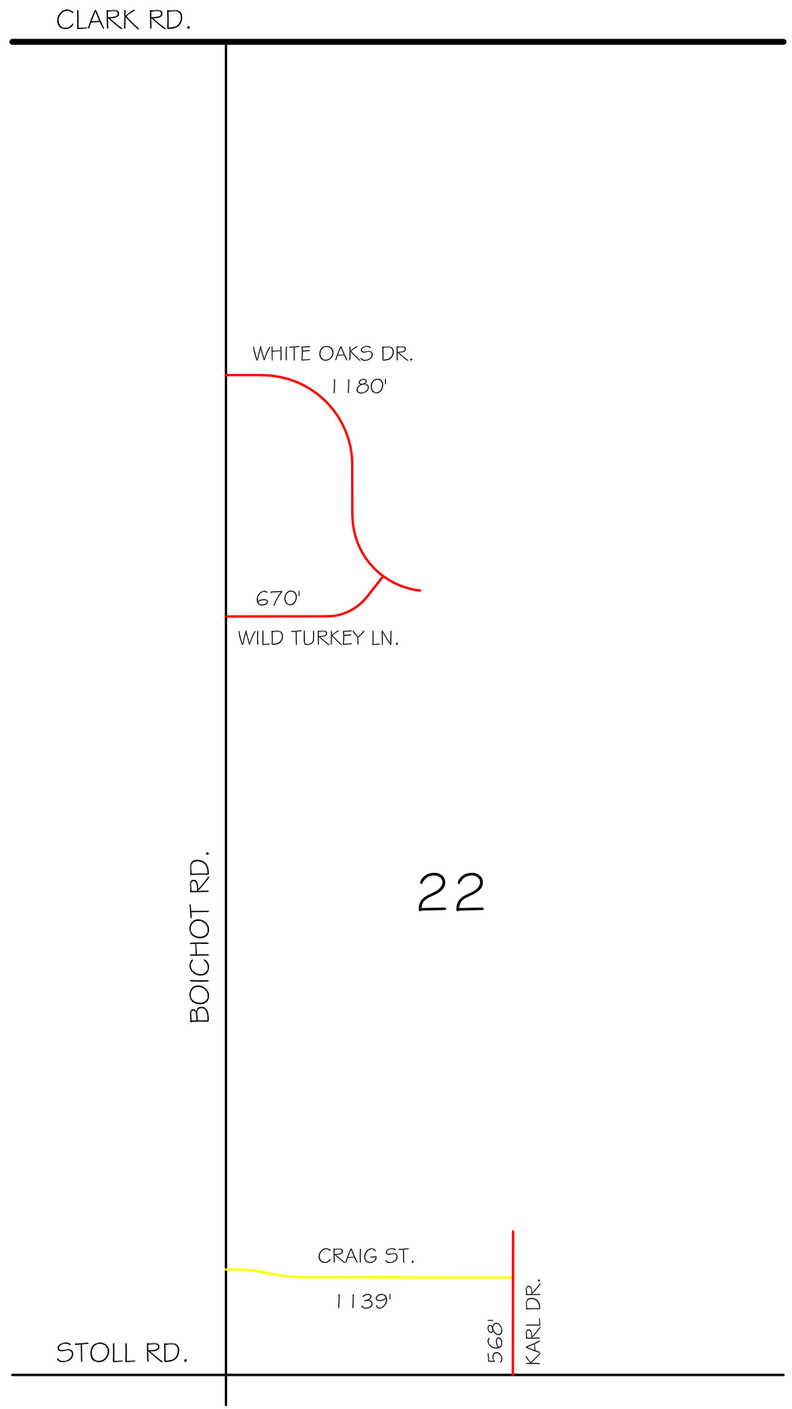
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 21 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

DELVIN SUB.
EVERETT SUB. NO. 1

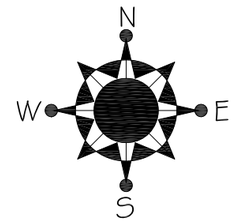
19-5-21



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 3557 EQUALS 0.67 MILES

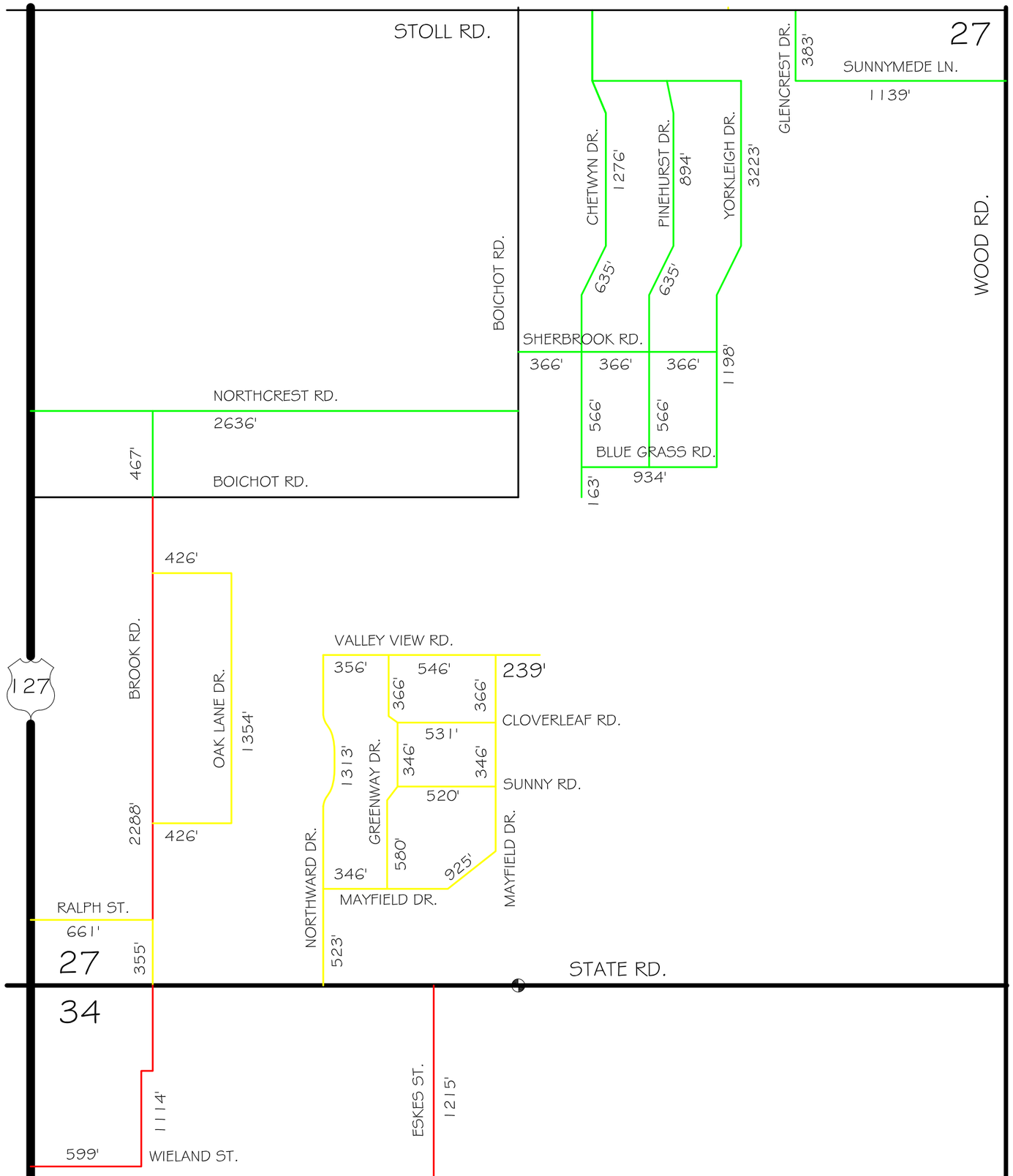


Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 22 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

WHITE OAKS SUB.
DON-DAL SUB.

19-5-22



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
SEC.-27 FEET 28626 EQUALS 5.42 MILES
SEC.-34 FEET 2928 EQUALS 0.55 MILES

N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 27-34 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

CLINTON VILLAGE #1,2,3
OAK LANE SUB.
BOICHOT ACRES

19-5-27 & 34

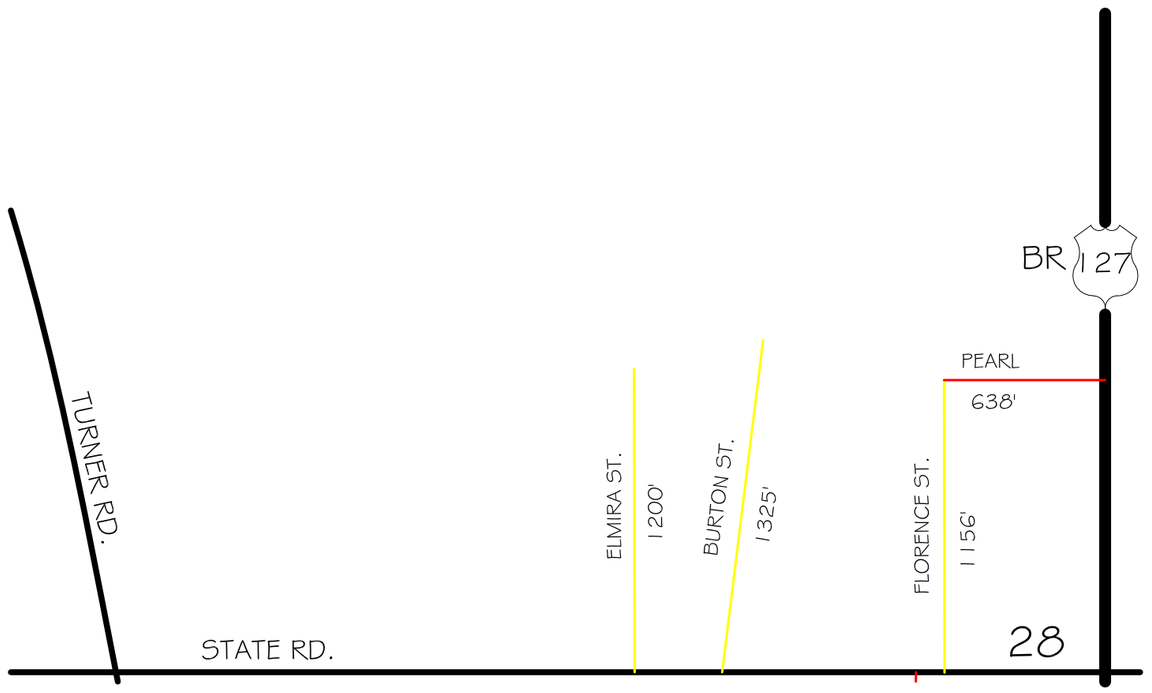
LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 4319 EQUALS 0.82 MILES

N
W E
S

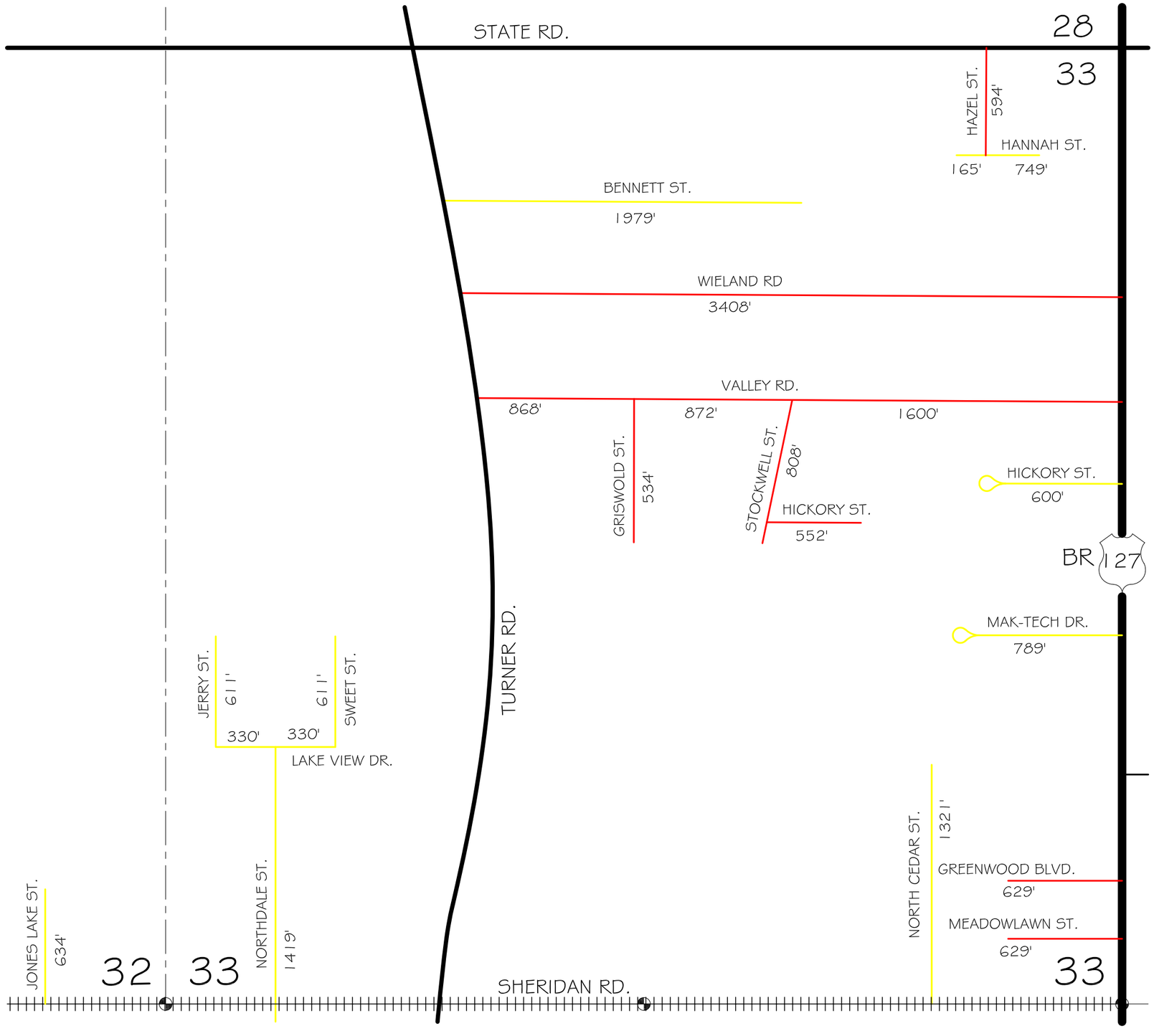
Scale 0 600 1200 FEET
One Inch Equals 600 Ft.



TOWNSHIP DEWITT
SECTION 28 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

BALLANTINE WEE FARMS
NORTH ROSEWOOD ACRES

19-5-28



LEGEND

- SECTION LINE
- CORPORATE LIMITS
- STATE TRUNKLINE
- COUNTY PRIMARY
- COUNTY LOCAL
- ADJACENT COUNTY
- CITY OR VILLAGE
- STREET

LOCAL ROAD SYSTEM TOTAL
FEET 20032 EQUALS 3.79 MILES

N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 33 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

AUTO PARK
NORTHDALE FARMS
VALLEY FARMS
LELANDS SUB.
BOPP'S SUB.
VAN PATTENS
MAK-TECH COMMERCIAL IND. PARK

19-5-32 & 33

28 | 27

33 | 34

STATE RD.

GRANGER MEADOWS LN. 6132'

127 BR

GLENN ST.
1153.4'

WOOD RD.

CLINTON COUNTY 34 | 35

INGHAM COUNTY

LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 7285.4 EQUALS 1.38 MILES

N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DEWITT
SECTION 35 T. 5N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

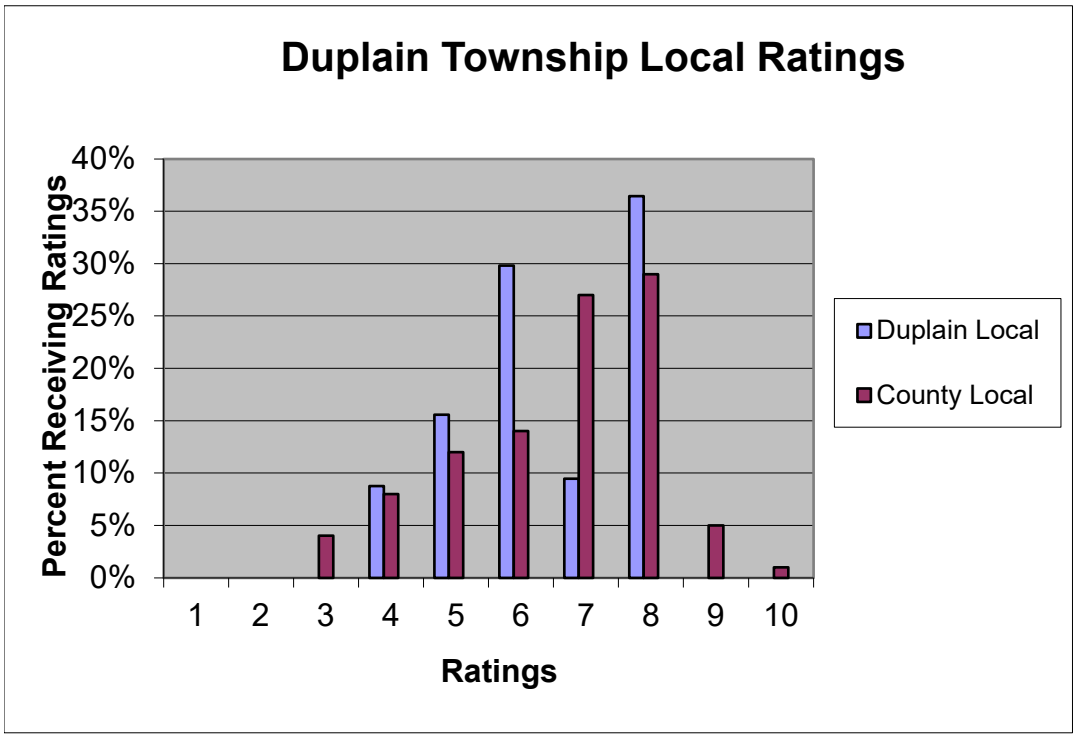
GLENN ST.
GRANGER MEADOWS

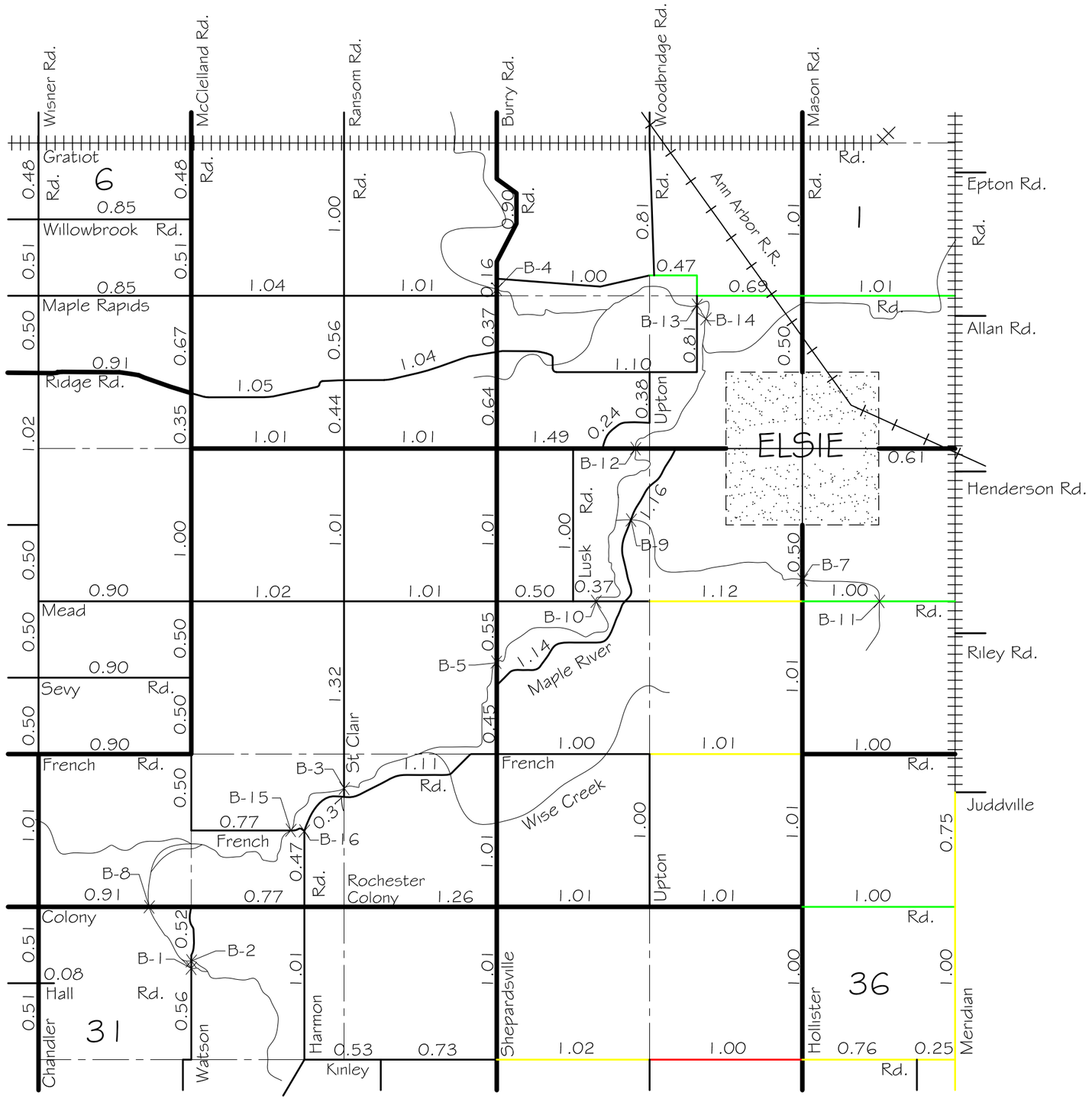
19-5-35

DUPLAIN TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	Duplain Township Rating Breakdown (Local Roads)	County Local Road Breakdown	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0	0%	0%	0%
3	0	0%	4%	10%
4	1	9%	8%	31%
5	1.78	16%	12%	10%
6	3.41	30%	14%	39%
7	1.08	9%	27%	11%
8	4.17	36%	29%	0%
9	0	0%	5%	0%
10	0	0%	1%	0%

Average Rating		6.49	6.64	5.12
	Change In Average Rating	**1.37**		





LEGEND

SECTION LINE

CORPORATE LIMITS

STATE TRUNKLINE

COUNTY PRIMARY

COUNTY LOCAL

ADJACENT COUNTY

CITY OR VILLAGE

STREET

PRIMARY ROAD SYSTEM IS 29.06 MILES

LOCAL ROAD SYSTEM IS 46.25 MILES

T. 8N R. 1W

Good 8-10

Fair 5-7

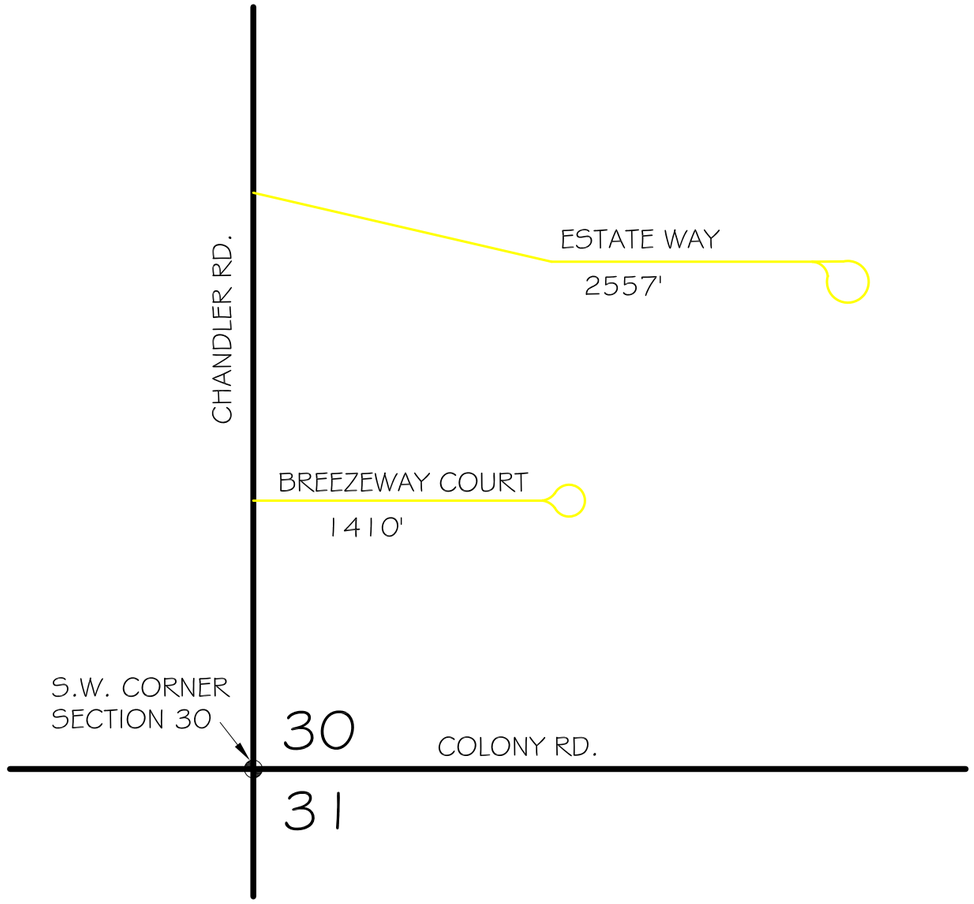
Poor 1-4

Scale 0 1/2 1 Mile

One Inch Equals 4000 Ft.

PREPARED BY
CLINTON COUNTY RD. COMM.

DUPLAIN TWP. 19-06



LEGEND

SECTION LINE	— - — - —
CORPORATE LIMITS	— — — — — — —
STATE TRUNKLINE	▬▬▬
COUNTY PRIMARY	▬▬
COUNTY LOCAL	▬
ADJACENT COUNTY	╫╫╫╫╫╫╫╫╫╫╫╫
CITY OR VILLAGE	▬▬▬▬▬▬
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 3967 EQUALS 0.75 MILES

N
W E
S

Scale 0 600 1 200 FEET
One Inch Equals 600 Ft.

TOWNSHIP DUPLAIN
SECTION 30 T. 8N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

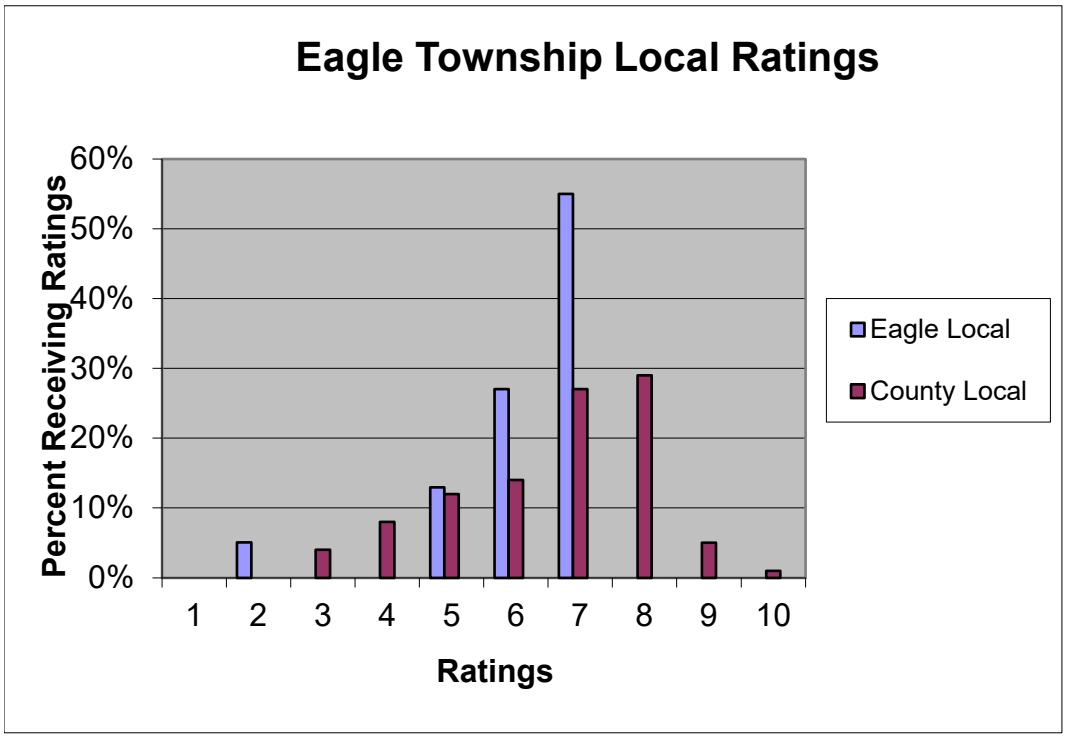
COLONY LAKES ESTATES

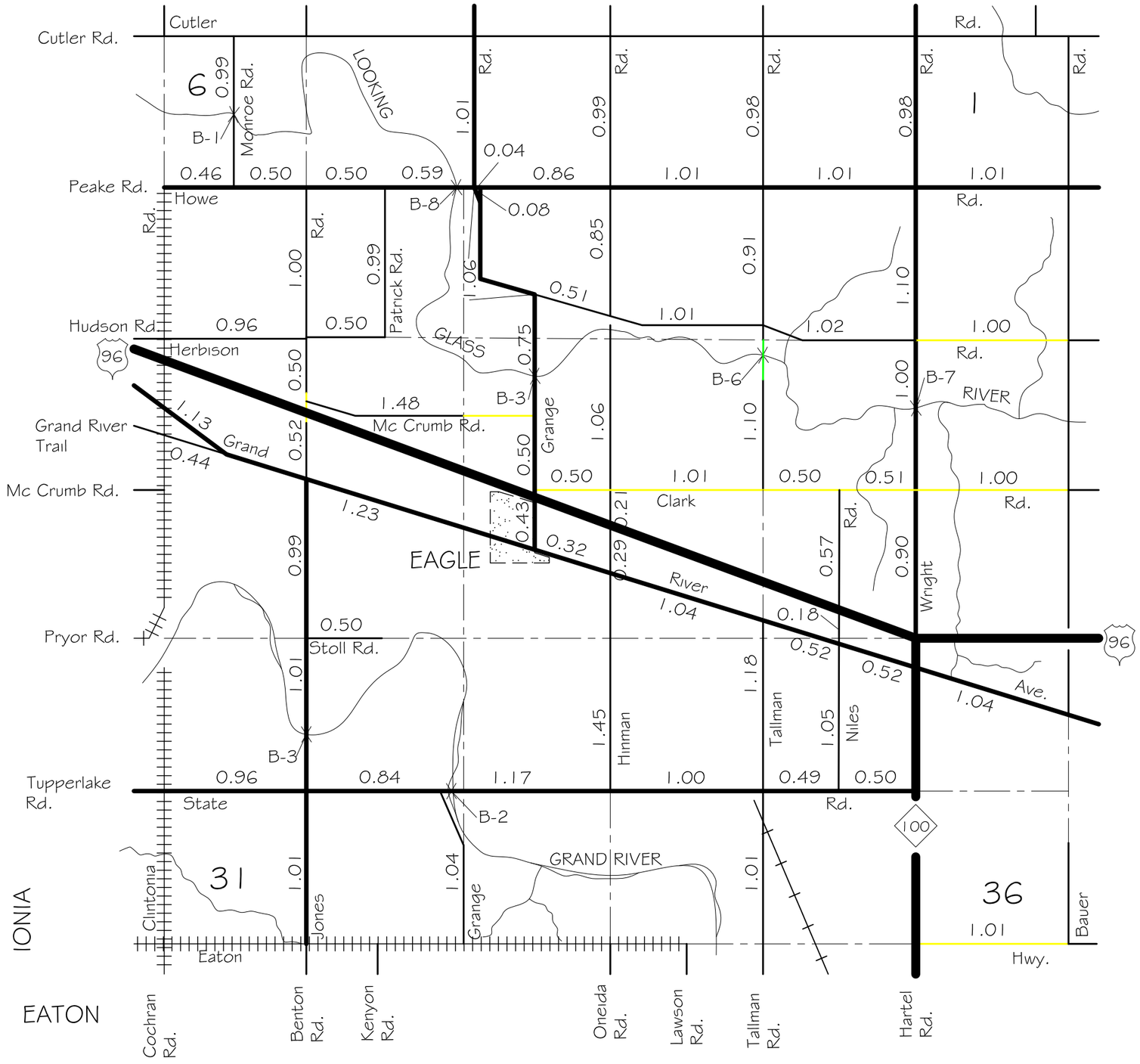
19-6-30

EAGLE TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	Eagle Township Rating Breakdown (Local Roads)	County Local Road Breakdown	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0.41	5%	0%	5%
3	0	0%	4%	0%
4	0	0%	8%	1%
5	1.05	13%	12%	13%
6	2.19	27%	14%	0%
7	4.46	55%	27%	60%
8	0	0%	29%	21%
9	0	0%	5%	0%
10	0	0%	1%	0%

Average Rating		6.22	6.64	6.68
	Change In Average Rating	**-0.46**		





LEGEND

- SECTION LINE
- CORPORATE LIMITS
- STATE TRUNKLINE
- COUNTY PRIMARY
- COUNTY LOCAL
- ADJACENT COUNTY
- CITY OR VILLAGE
- STREET

PRIMARY ROAD SYSTEM IS 27.47 MILES

LOCAL ROAD SYSTEM IS 28.82 MILES

T. 5N R. 4W

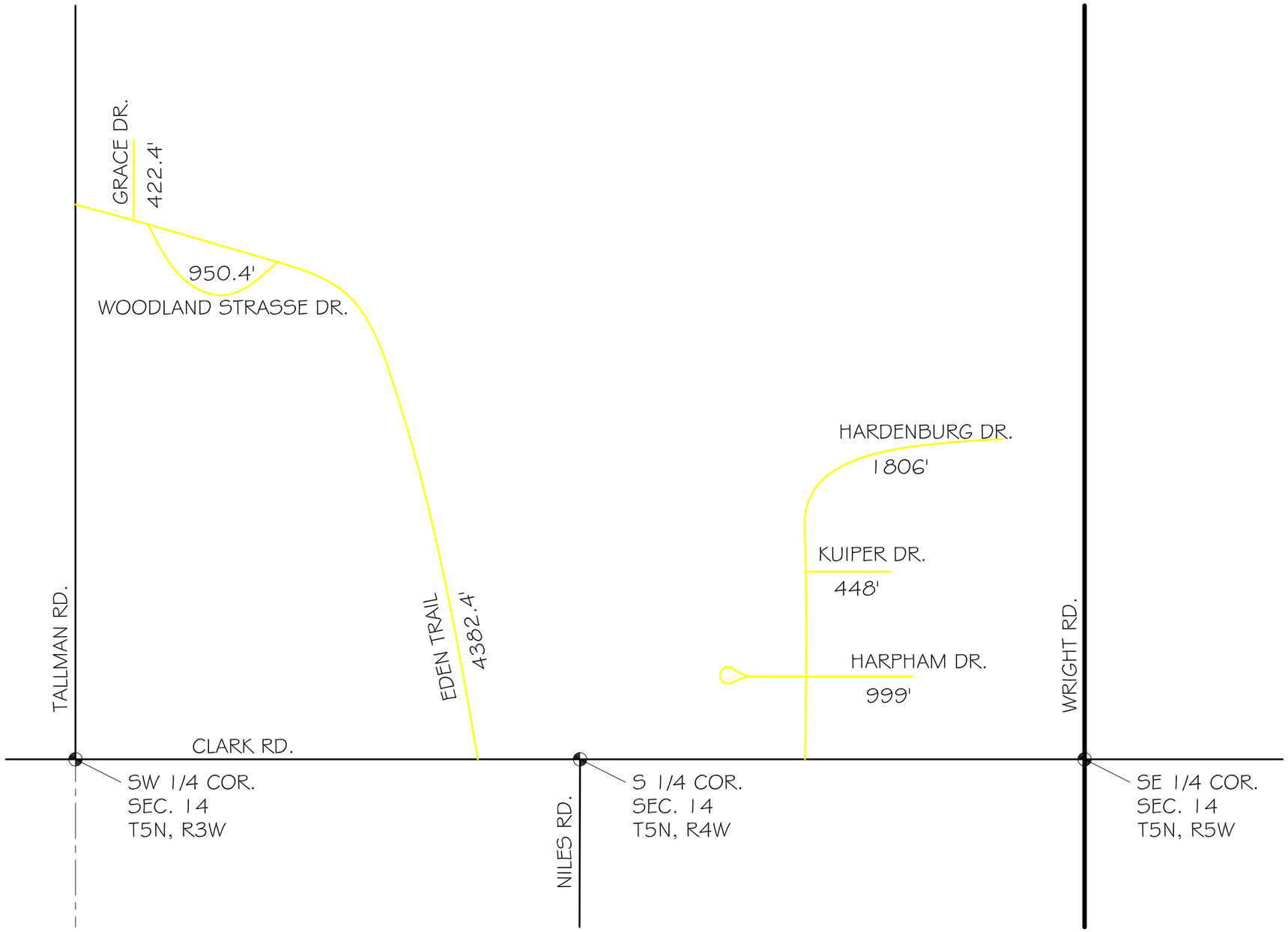
- Good 8-10
- Fair 5-7
- Poor 1-4

Scale 0 1/2 1 Mile

One Inch Equals 4000 Ft.

PREPARED BY
CLINTON COUNTY RD. COMM.

EAGLE TWP. 19-07



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 9008.2 EQUALS 1.71 MILES

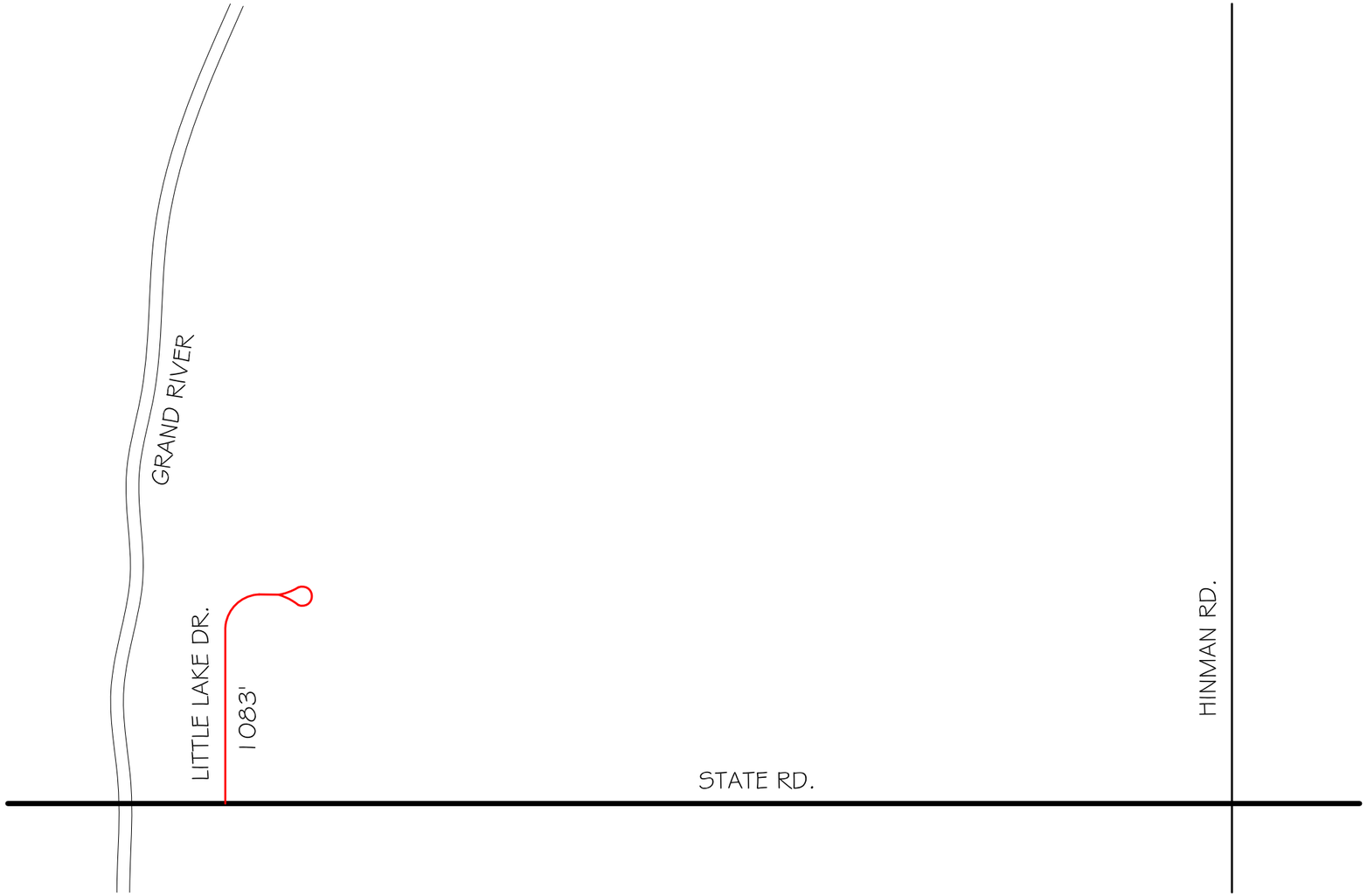
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP EAGLE
SECTION 14 T. 5N R. 4W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

WHISPERING WINDS
COVERT'S WOODLAND ACRES
RIVER RIDGE

19-7-14



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 1083 EQUALS 0.21 MILES

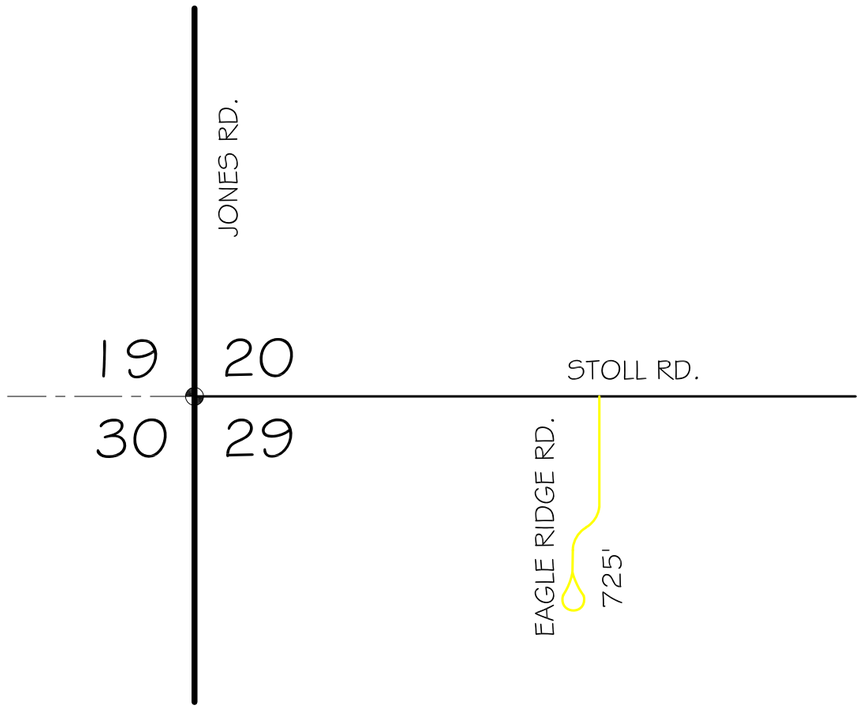
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP EAGLE
SECTION 28 T. 5N R. 4W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

LITTLE LAKE

19-7-28



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 725 EQUALS 0.14 MILES

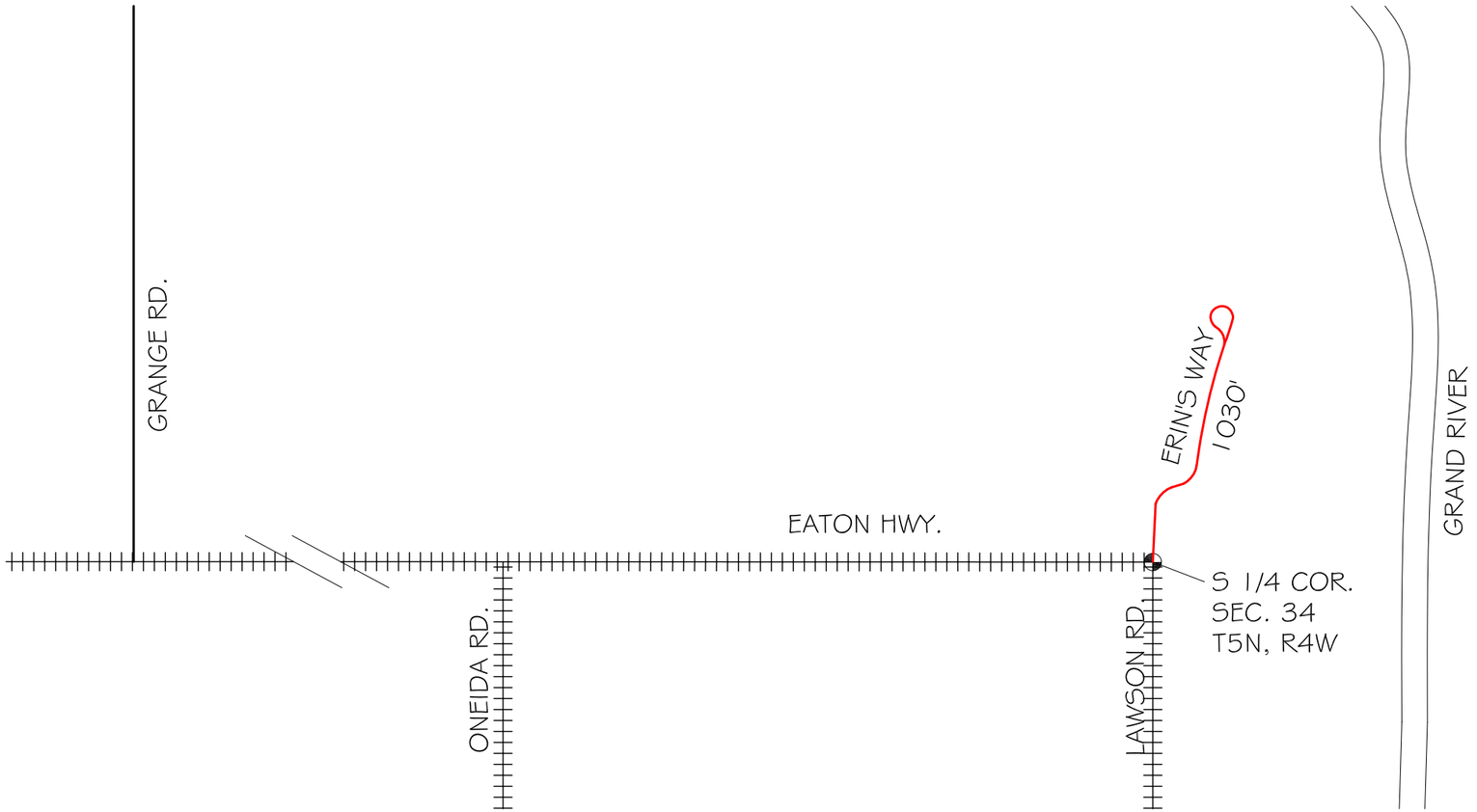
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP EAGLE
SECTION 29 T. 5N R. 4W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

TURKEY RIDGE ESTATES

19-7-29



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 1030 EQUALS 0.20 MILES

N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP EAGLE
SECTION 34 T. 5N R. 4W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

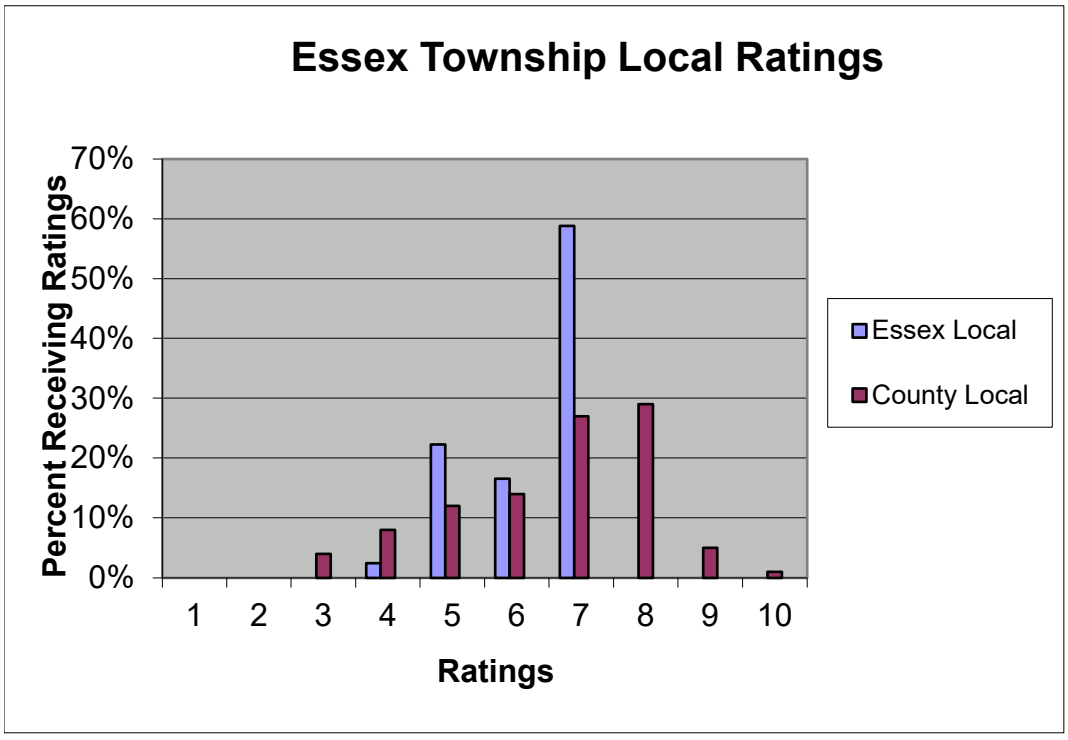
ERIN'S WAY

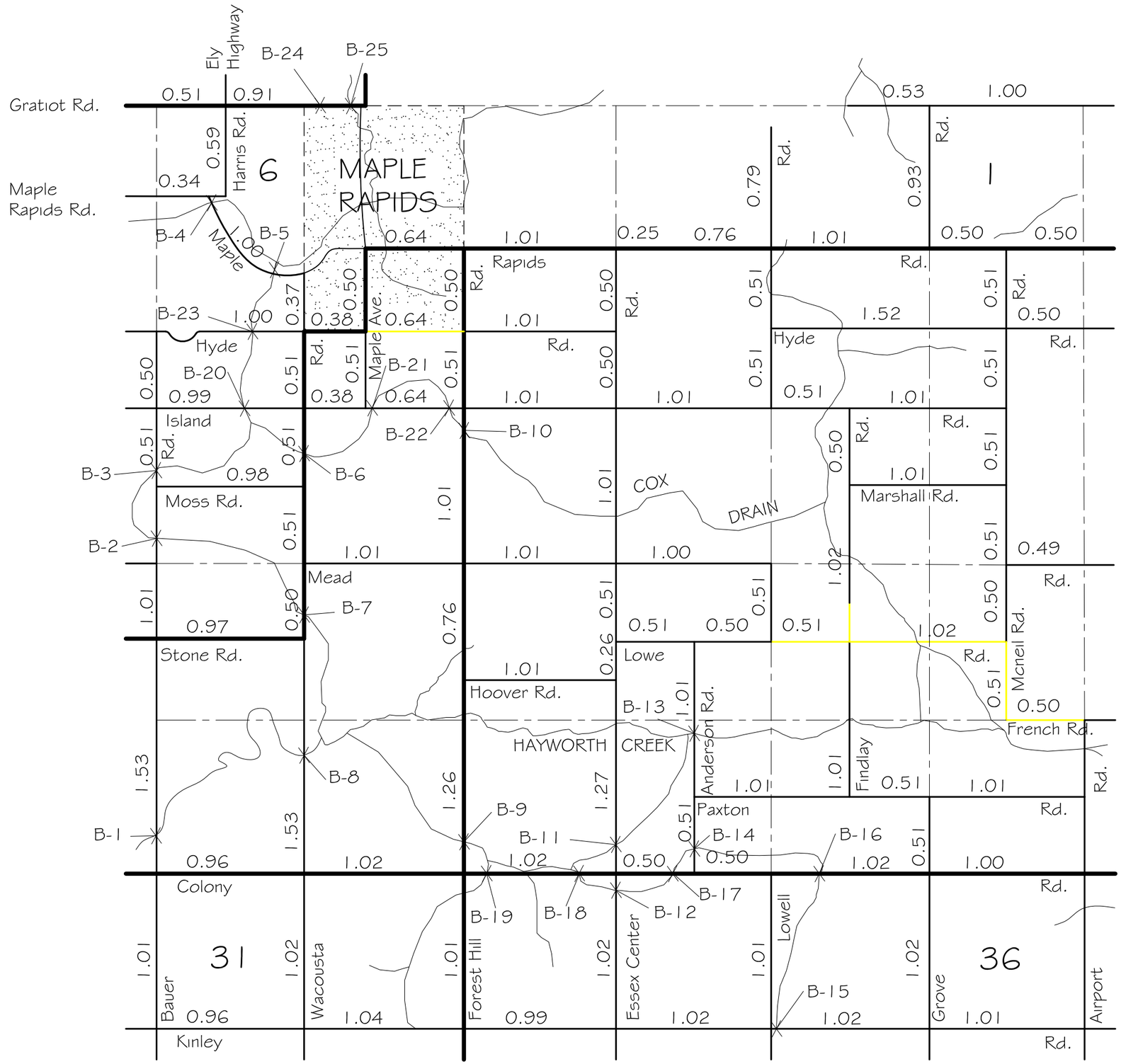
19-7-34

ESSEX TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	Essex Township Rating Breakdown (Local Roads)	County Local Road Breakdown	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0	0%	0%	0%
3	0	0%	4%	0%
4	0.11	2%	8%	0%
5	1.01	22%	12%	25%
6	0.75	17%	14%	17%
7	2.67	59%	27%	14%
8	0	0%	29%	45%
9	0	0%	5%	0%
10	0	0%	1%	0%

Average Rating		6.32	6.64	6.79
	Change In Average Rating	**-0.47**		





LEGEND

- SECTION LINE
- CORPORATE LIMITS
- STATE TRUNKLINE
- COUNTY PRIMARY
- COUNTY LOCAL
- ADJACENT COUNTY
- CITY OR VILLAGE
- STREET

PRIMARY ROAD SYSTEM IS 21.04 MILES

LOCAL ROAD SYSTEM IS 57.75 MILES

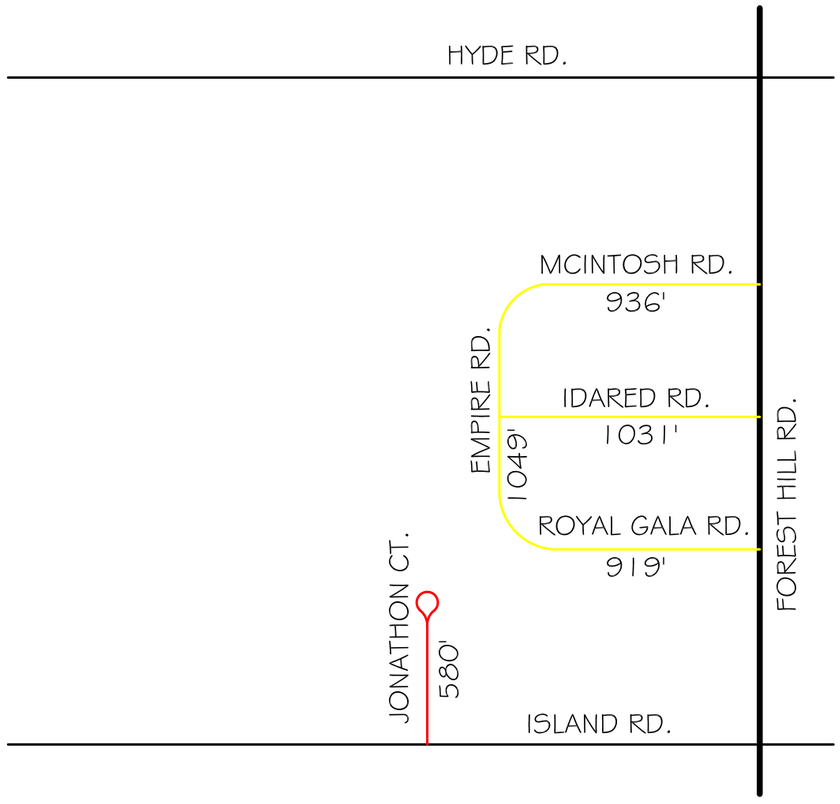
T. 8N R. 3W

- Good 8-10
- Fair 5-7
- Poor 1-4

Scale 0 1/2 1 Mile
One Inch Equals 4000 Ft.

PREPARED BY
CLINTON COUNTY RD. COMM.

ESSEX TWP. 19-08



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 4515 EQUALS 0.86 MILES

N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP ESSEX
SECTION 8 T. 8N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

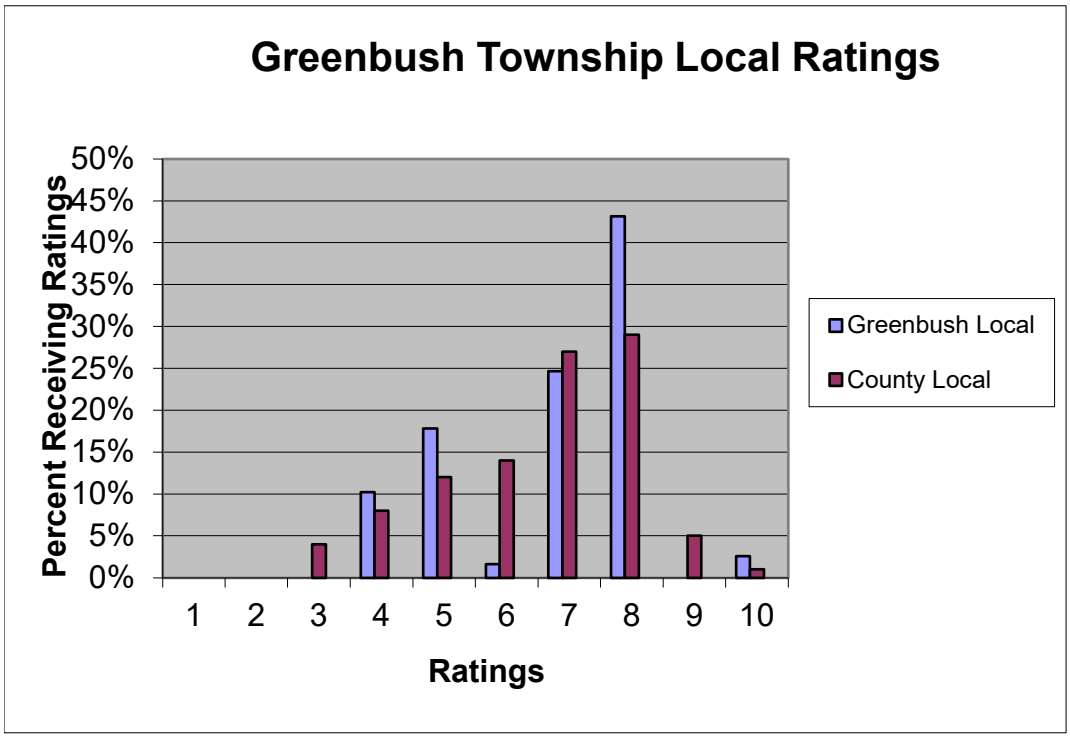
ORCHARD ESTATES

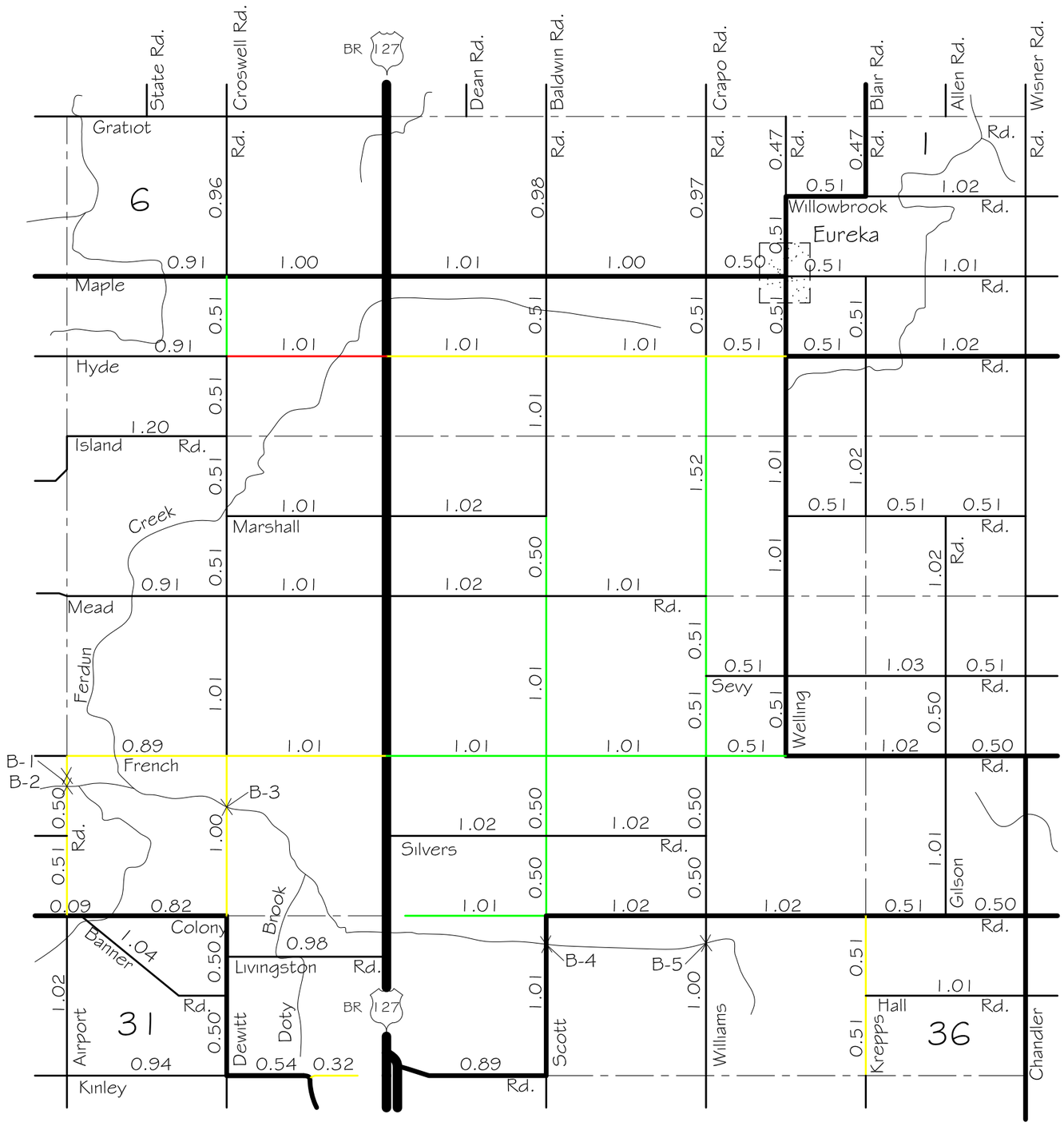
19-8-8

GREENBUSH TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	Greenbush Township Rating Breakdown (Local Roads)	County Local Road Breakdown	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0	0%	0%	0%
3	0	0%	4%	0%
4	2.03	10%	8%	23%
5	3.55	18%	12%	20%
6	0.32	2%	14%	3%
7	4.91	25%	27%	14%
8	8.59	43%	29%	33%
9	0	0%	5%	6%
10	0.51	3%	1%	0%

Average Rating		6.83	6.64	6.29
	Change In Average Rating	**0.54**		





LEGEND

SECTION LINE

CORPORATE LIMITS

STATE TRUNKLINE

COUNTY PRIMARY

COUNTY LOCAL

ADJACENT COUNTY

CITY OR VILLAGE

STREET

PRIMARY ROAD SYSTEM IS 18.51 MILES

LOCAL ROAD SYSTEM IS 55.94 MILES

T. 8N R. 2W

Good 8-10

Fair 5-7

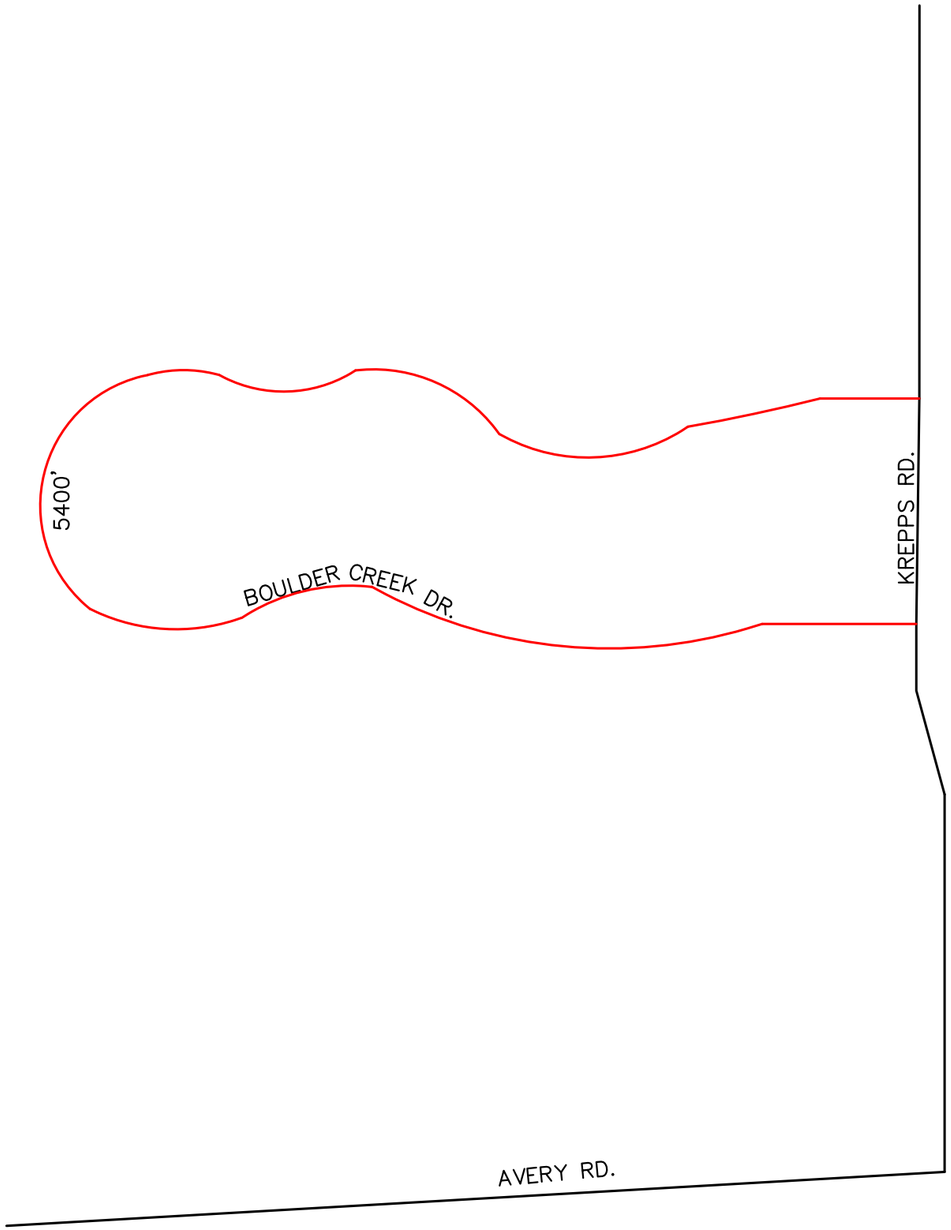
Poor 1-4

Scale 0 1/2 1 Mile

One Inch Equals 4000 Ft.

PREPARED BY
CLINTON COUNTY RD. COMM.

GREENBUSH 19-09



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 5400 EQUALS 1.02 MILES

N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

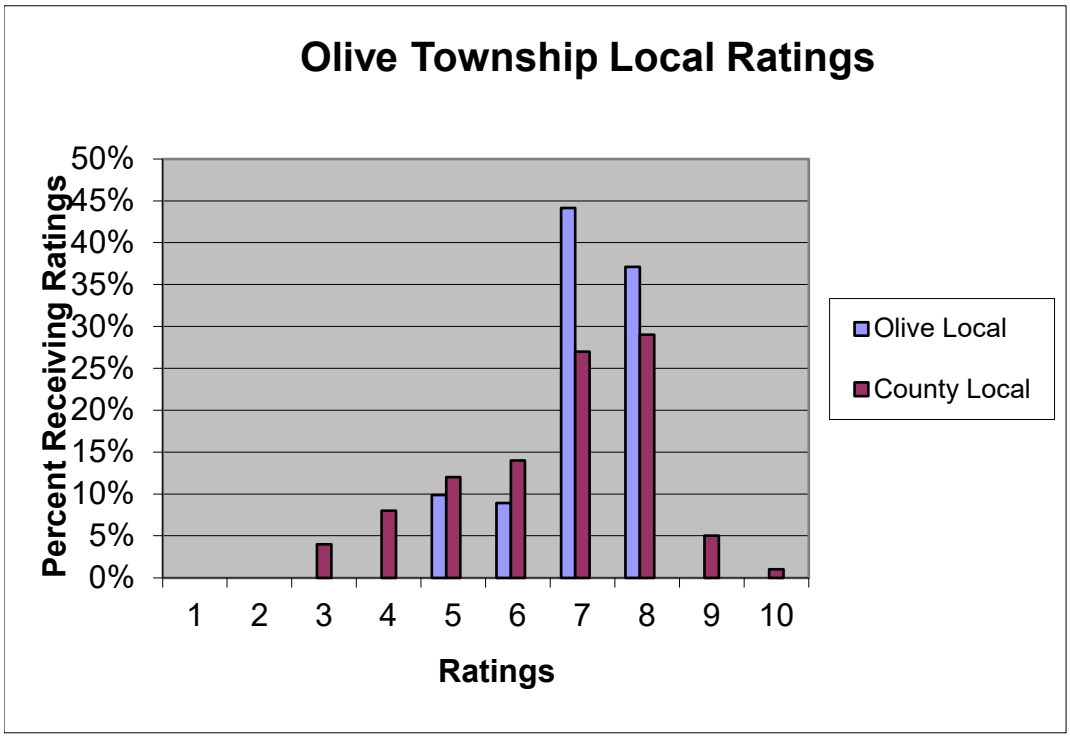
TOWNSHIP GREENBUSH
SECTION 35 T. 5N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

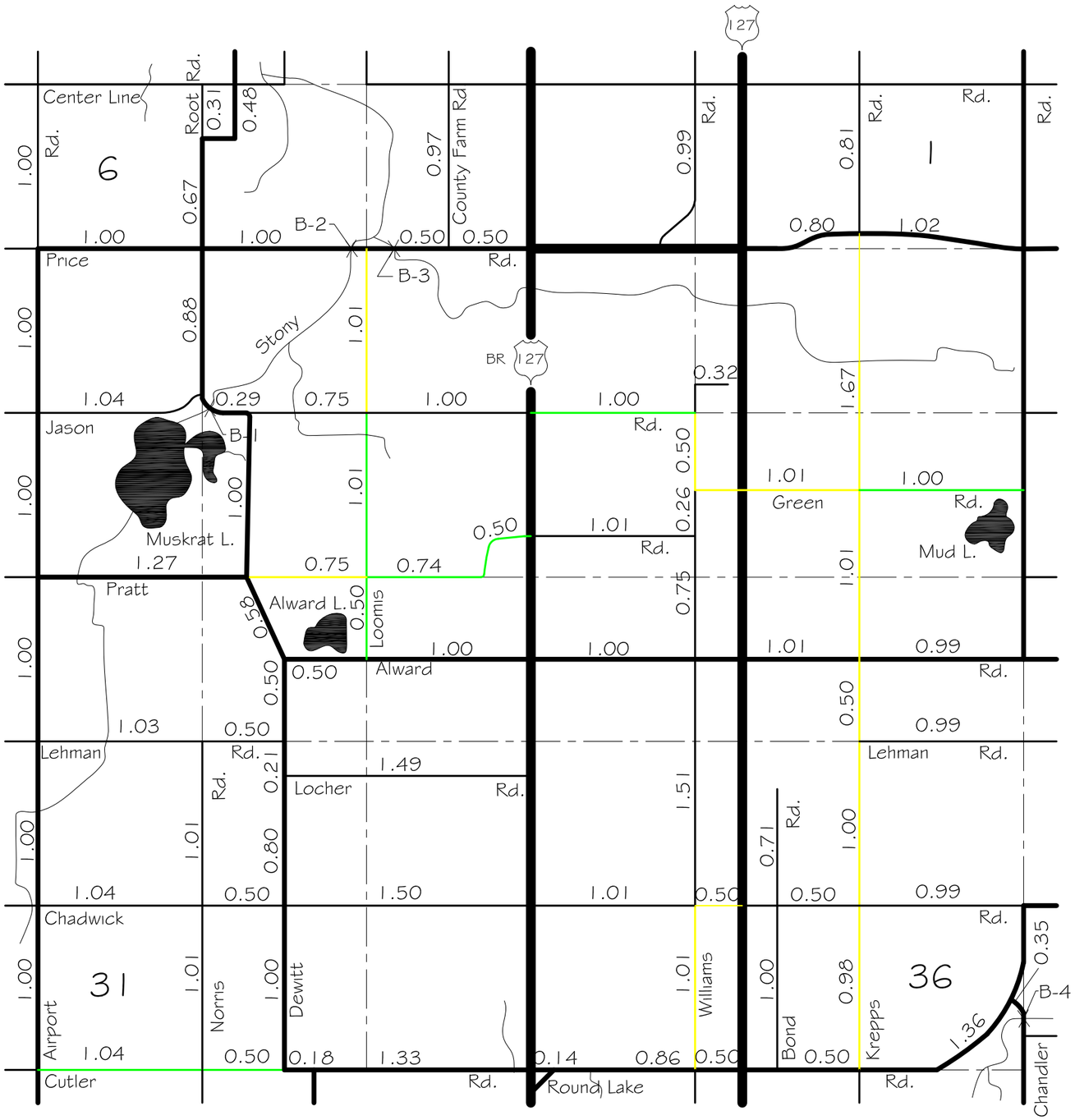
BOULDER CREEK

OLIVE TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	Olive Township Rating Breakdown (Local Roads)	County Local Road Breakdown	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0	0%	0%	0%
3	0	0%	4%	0%
4	0	0%	8%	0%
5	1.67	10%	12%	0%
6	1.51	9%	14%	35%
7	7.48	44%	27%	26%
8	6.29	37%	29%	40%
9	0	0%	5%	0%
10	0	0%	1%	0%

Average Rating		7.08	6.64	7.05
	Change In Average Rating	**0.03**		





LEGEND

SECTION LINE

CORPORATE LIMITS

STATE TRUNKLINE

COUNTY PRIMARY

COUNTY LOCAL

ADJACENT COUNTY

CITY OR VILLAGE

STREET

PRIMARY ROAD SYSTEM IS 27.36 MILES

LOCAL ROAD SYSTEM IS 40.29 MILES

T. 6N R. 2W

Good 8-10

Fair 5-7

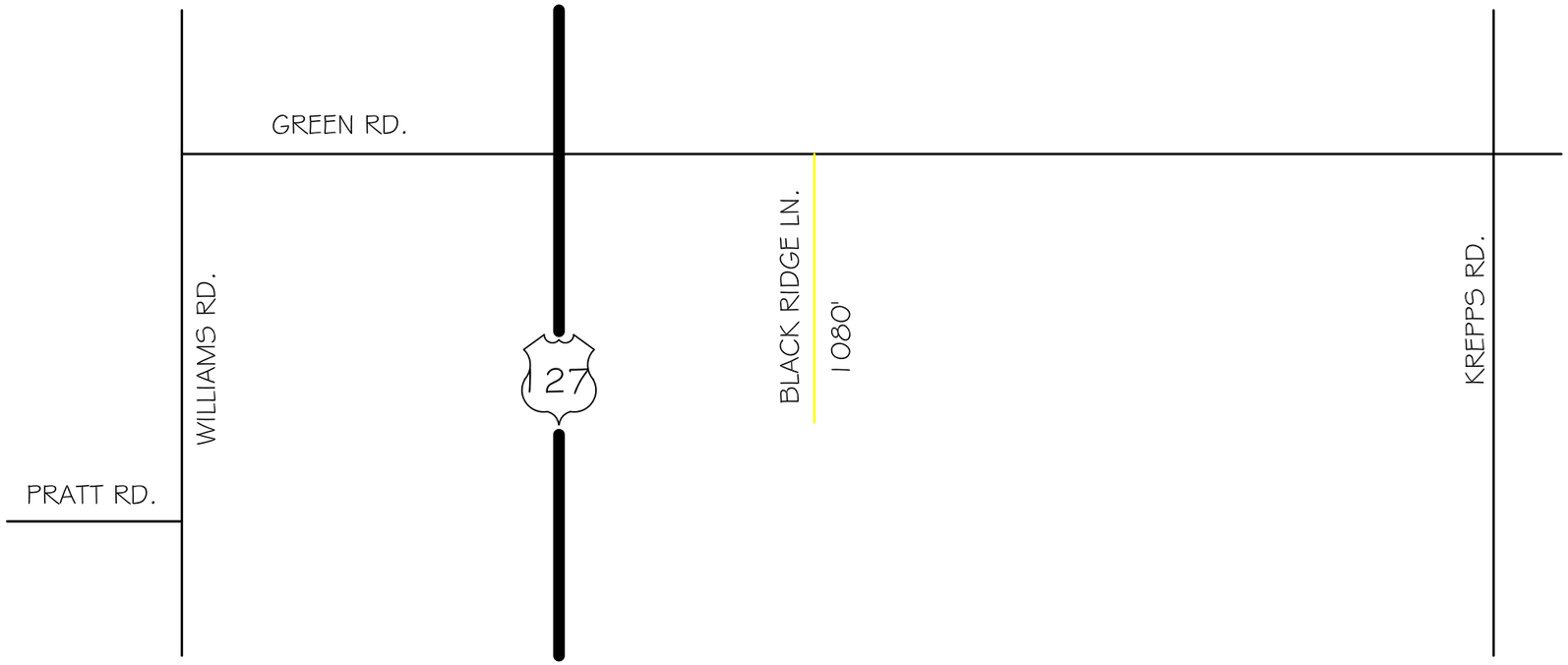
Poor 1-4

Scale 0 1/2 1 Mile

One Inch Equals 4000 Ft.

PREPARED BY
CLINTON COUNTY RD. COMM.

OLIVE 19-11



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 1080' EQUALS 0.20 MILES

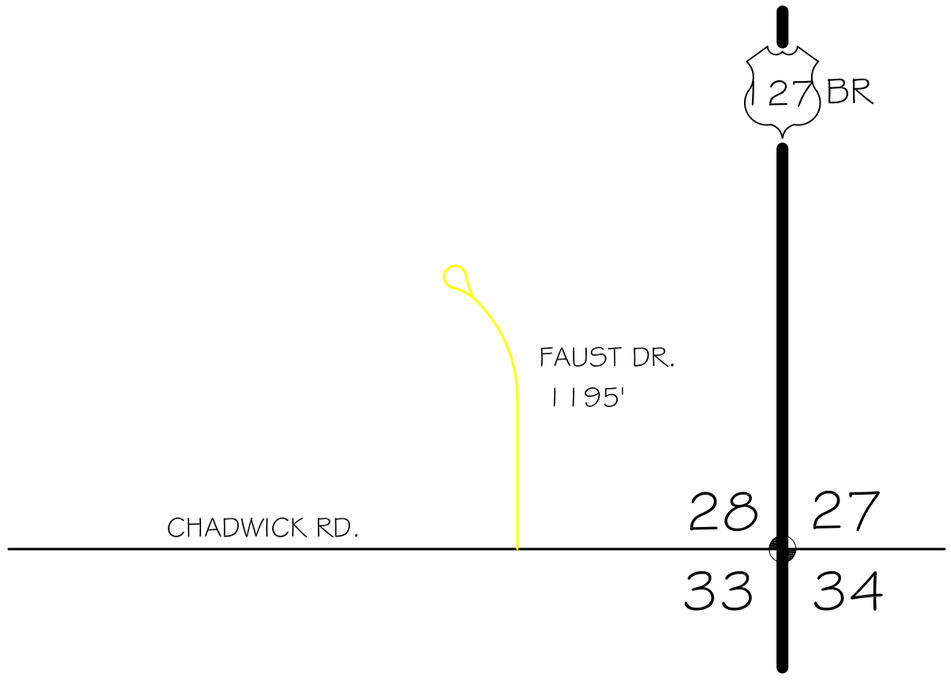
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP OLIVE
SECTION 14 T. 6N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

BLACK RIDGE ESTATES

19-11-14



LEGEND

SECTION LINE	— · — · —
CORPORATE LIMITS	— — — — —
STATE TRUNKLINE	▬▬▬
COUNTY PRIMARY	▬▬
COUNTY LOCAL	▬
ADJACENT COUNTY	╫╫╫╫╫╫╫╫╫╫╫╫
CITY OR VILLAGE	▬▬▬
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 1195' EQUALS 0.23 MILES

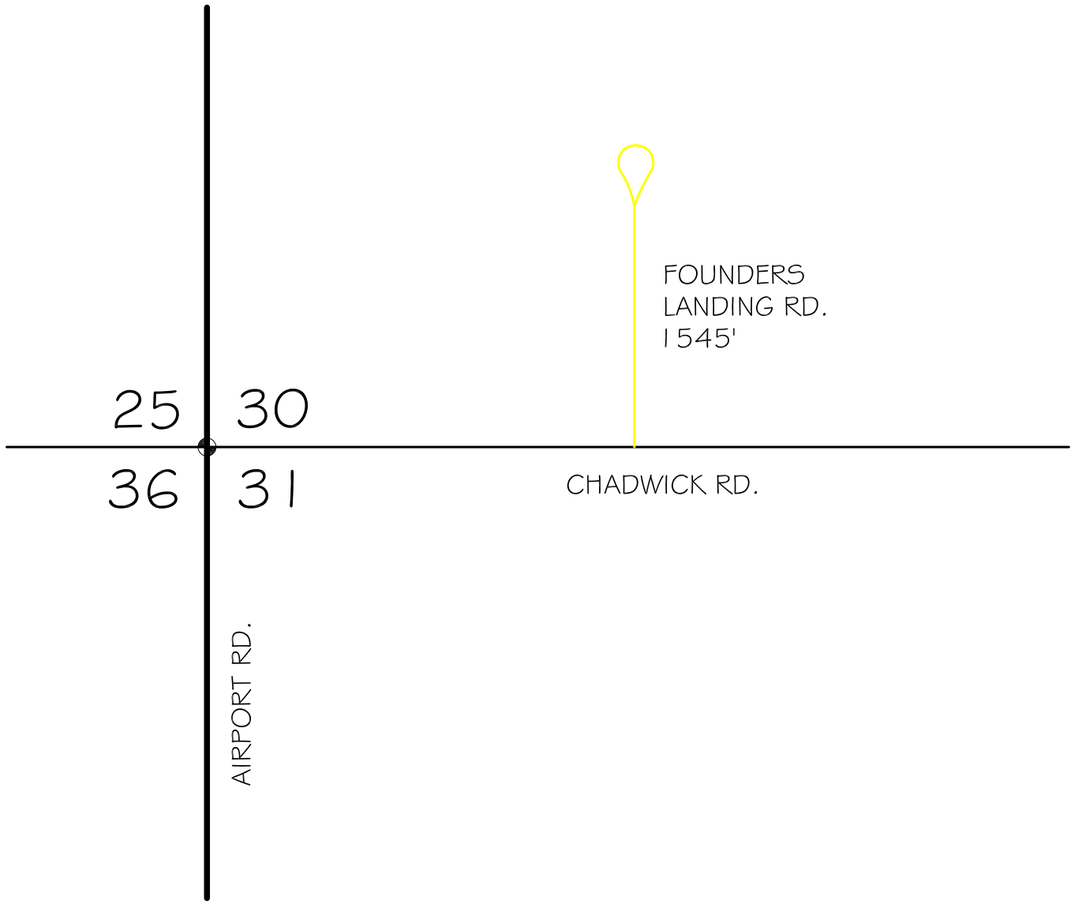
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP OLIVE
SECTION 28 T. 6N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

FAUST DRIVE

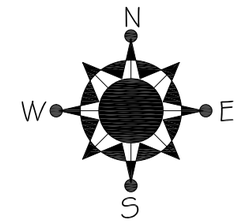
19-11-28

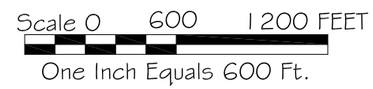


LEGEND

SECTION LINE	— - — - —
CORPORATE LIMITS	— — — — — —
STATE TRUNKLINE	▬▬▬
COUNTY PRIMARY	▬▬
COUNTY LOCAL	▬
ADJACENT COUNTY	╫╫╫╫╫╫╫╫╫╫╫╫
CITY OR VILLAGE	▬▬▬▬
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 1545' EQUALS 0.29 MILES





TOWNSHIP OLIVE
SECTION 30 T. 6N R. 2W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

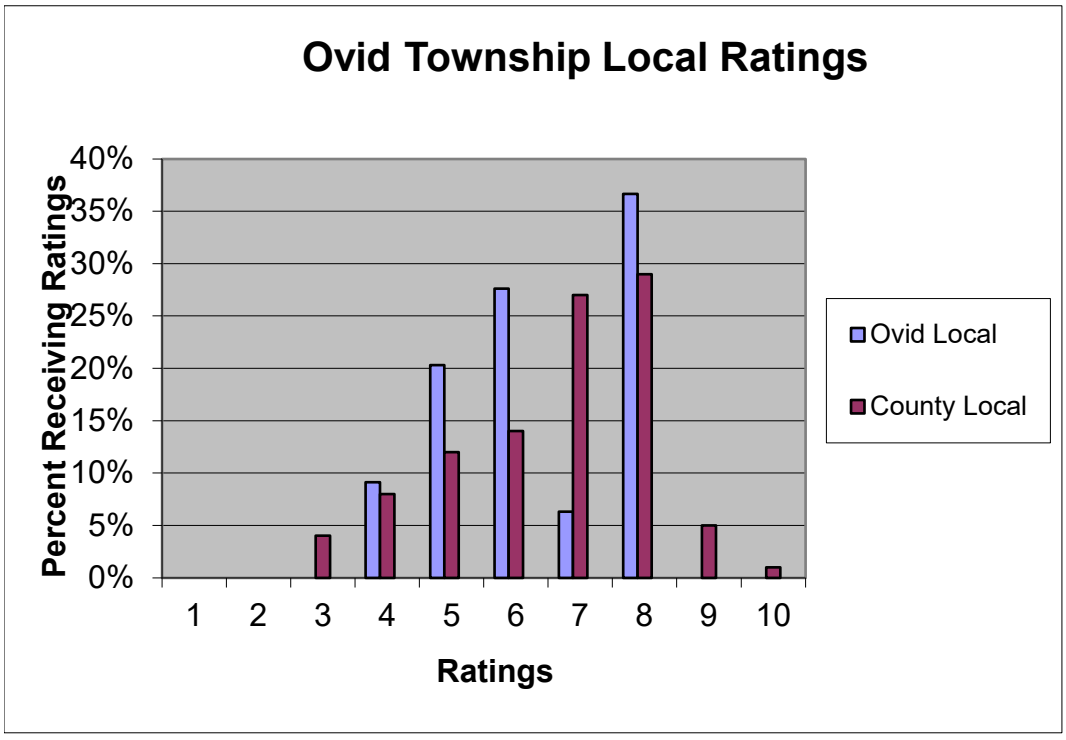
FOUNDERS LANDING

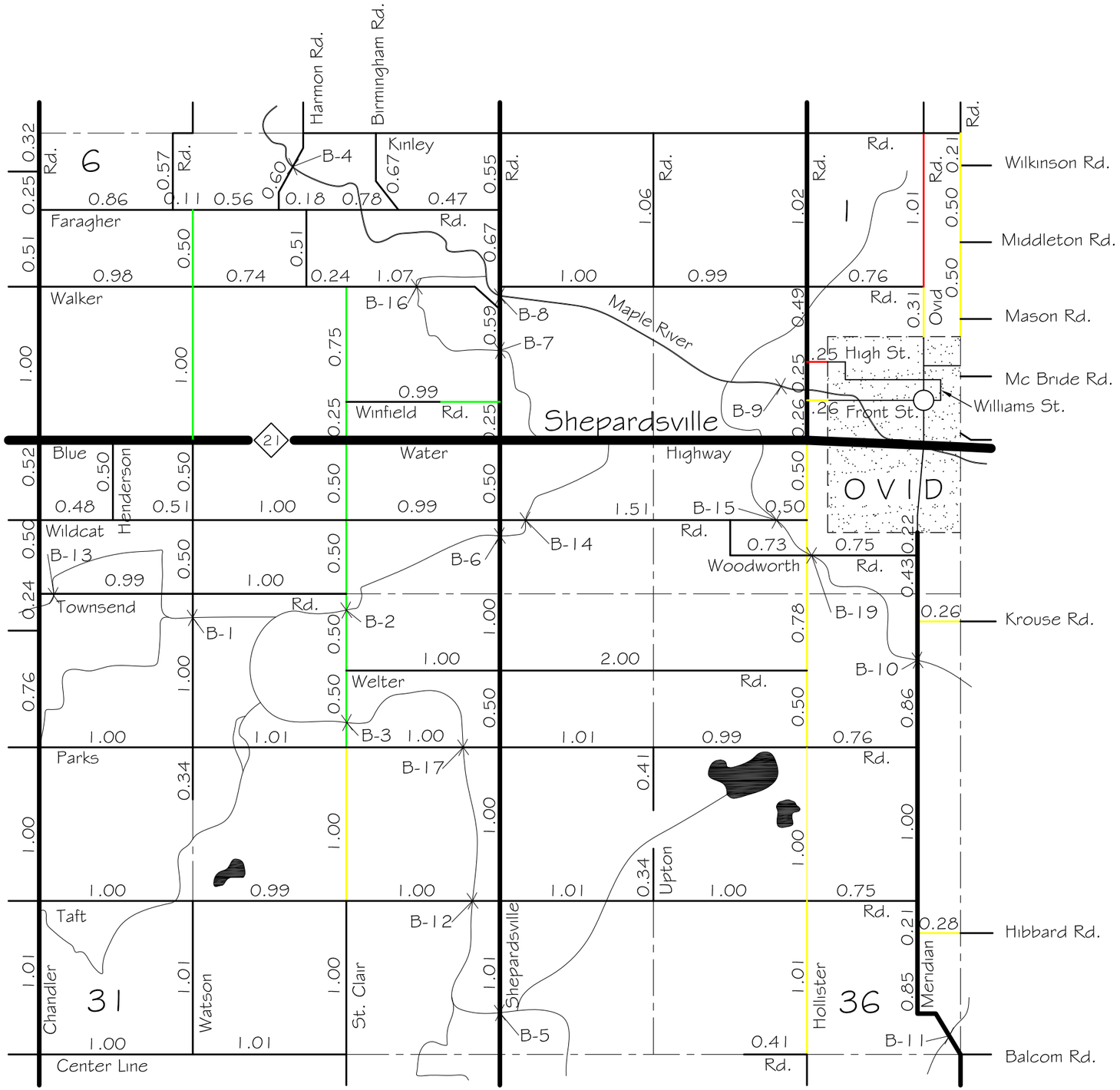
19-11-30

OVID TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	Ovid Township Rating Breakdown (Local Roads)	County Local Road Breakdown	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0	0%	0%	0%
3	0	0%	4%	8%
4	1.26	9%	8%	20%
5	2.8	20%	12%	23%
6	3.81	28%	14%	30%
7	0.87	6%	27%	13%
8	5.06	37%	29%	6%
9	0	0%	5%	0%
10	0	0%	1%	0%

Average Rating		6.41	6.64	5.40
	Change In Average Rating	**1.01**		





LEGEND

SECTION LINE

CORPORATE LIMITS

STATE TRUNKLINE

COUNTY PRIMARY

COUNTY LOCAL

ADJACENT COUNTY

CITY OR VILLAGE

STREET

PRIMARY ROAD SYSTEM IS 17.77 MILES

LOCAL ROAD SYSTEM IS 57.24 MILES

T. 7N R. 1W

Good 8-10

Fair 5-7

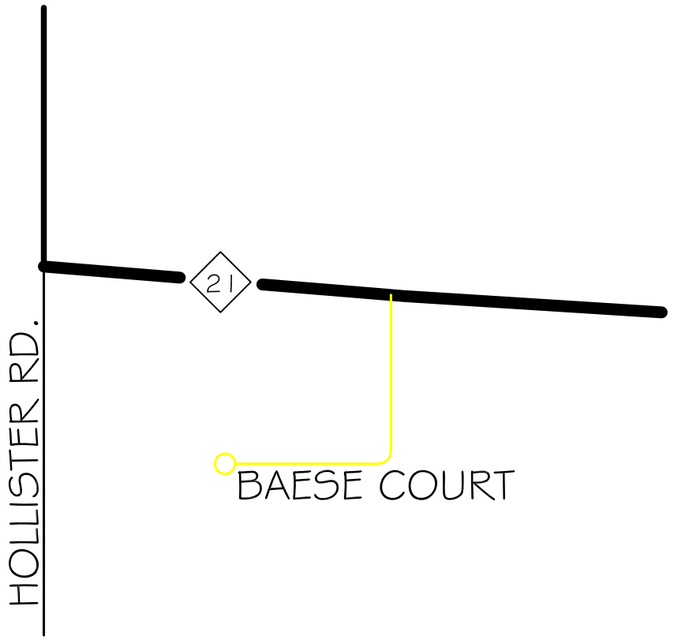
Poor 1-4

Scale 0 1/2 1 Mile

One Inch Equals 4000 Ft.

PREPARED BY
CLINTON COUNTY RD. COMM.

OVID 19-12



LEGEND

SECTION LINE

CORPORATE LIMITS

STATE TRUNKLINE

COUNTY PRIMARY

COUNTY LOCAL

ADJACENT COUNTY

CITY OR VILLAGE

STREET

PRIMARY ROAD SYSTEM TOTAL
FEET 740 EQUALS .14 MILES

N

W E

S

Scale 0 1/2 1 Mile

One Inch Equals 4000 Ft.

TOWNSHIP OVID

SECTION 20 T. 7N R. 2W

COUNTY CLINTON

PREPARED BY
CLINTON COUNTY ROAD COMMISSION

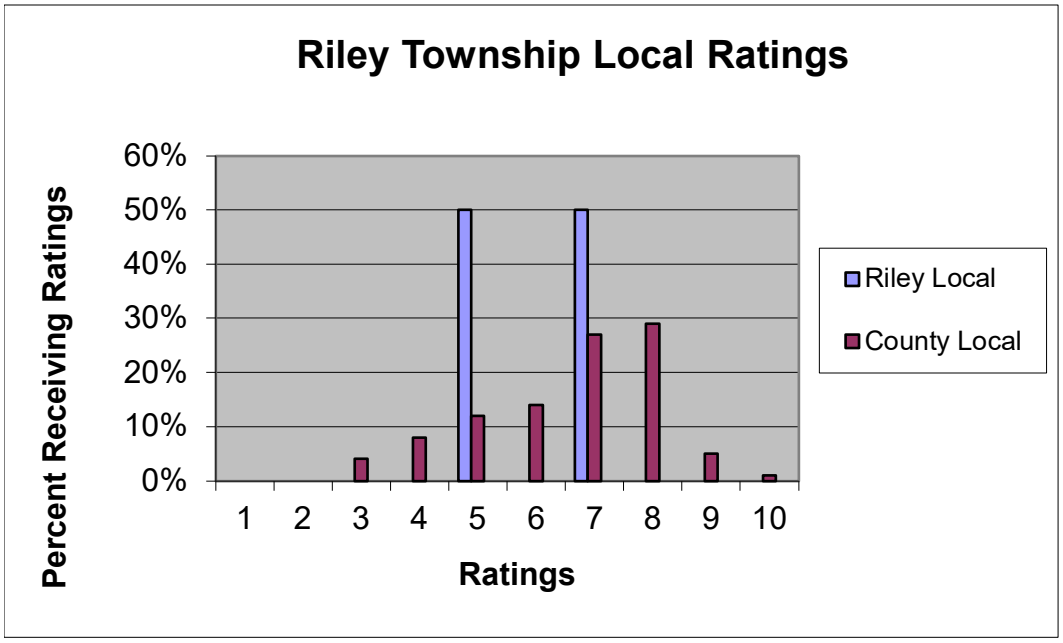
BAESE COURT

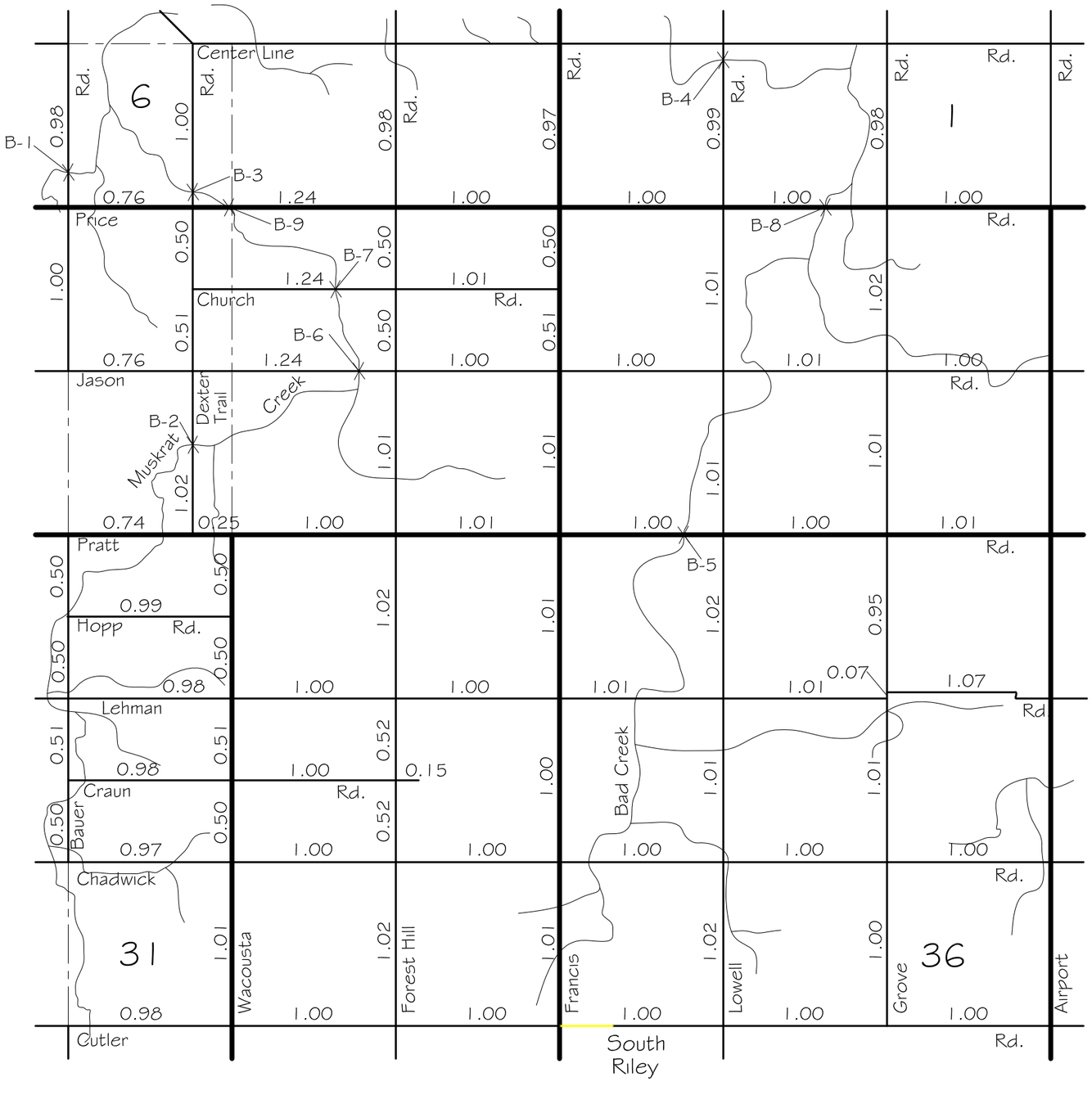
19-12-13

RILEY TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	Riley Township Rating Summary (Local Roads)	County Local Road Summary	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0	0%	0%	0%
3	0	0%	4%	0%
4	0	0%	8%	0%
5	0.18	50%	12%	50%
6	0	0%	14%	0%
7	0.18	50%	27%	0%
8	0	0%	29%	50%
9	0	0%	5%	0%
10	0	0%	1%	0%

Average Rating		6.00	6.64	6.50
	Change In Average Rating	**-0.50**		





LEGEND

SECTION LINE

CORPORATE LIMITS

STATE TRUNKLINE

COUNTY PRIMARY

COUNTY LOCAL

ADJACENT COUNTY

CITY OR VILLAGE

STREET

PRIMARY ROAD SYSTEM IS 21.04 MILES

LOCAL ROAD SYSTEM IS 54.59 MILES

T. 6N R. 3W

Good 8-10

Fair 5-7

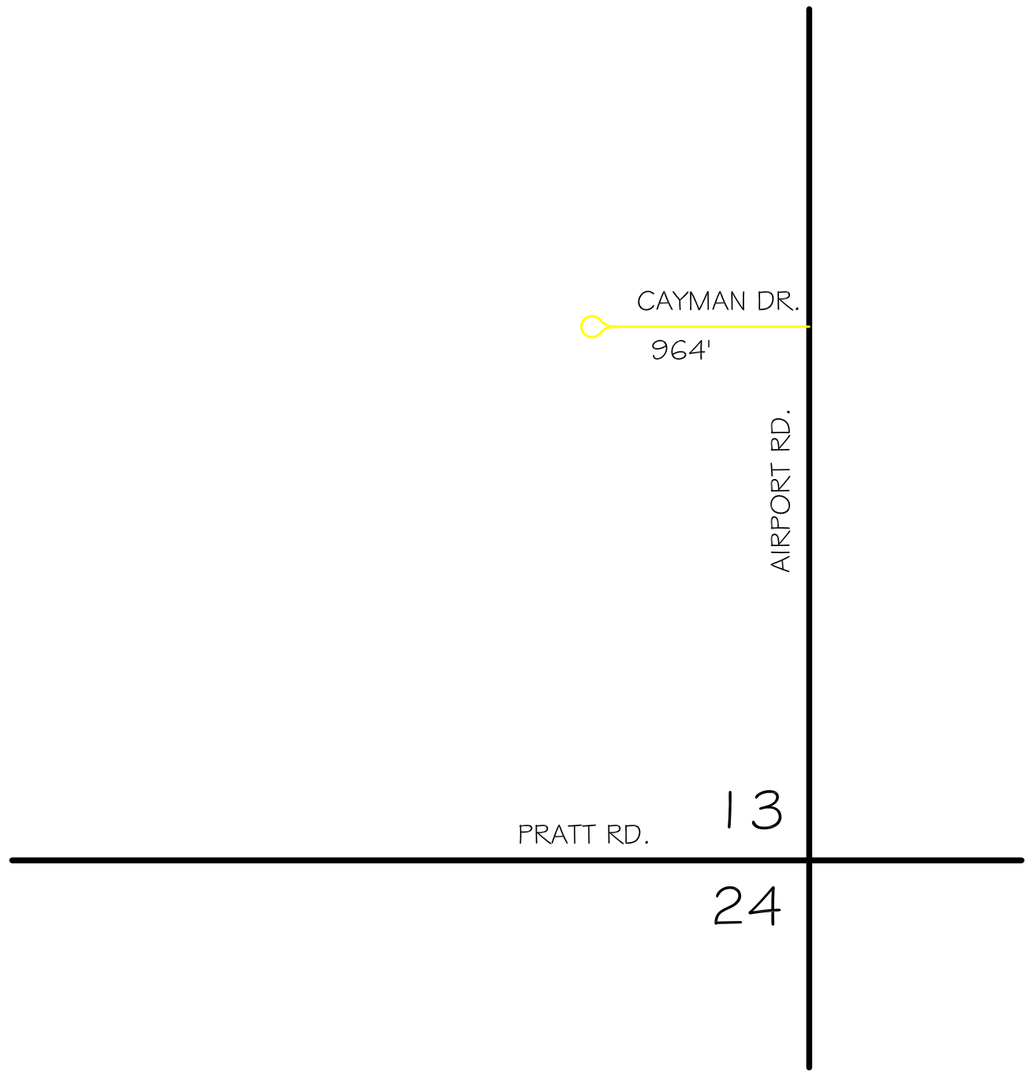
Poor 1-4

Scale 0 1/2 1 Mile

One Inch Equals 4000 Ft.

PREPARED BY
CLINTON COUNTY RD. COMM.

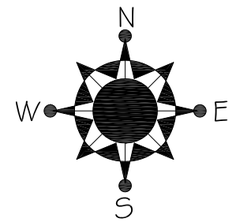
RILEY TWP. 19-13



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 964' EQUALS 0.18 MILES



Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

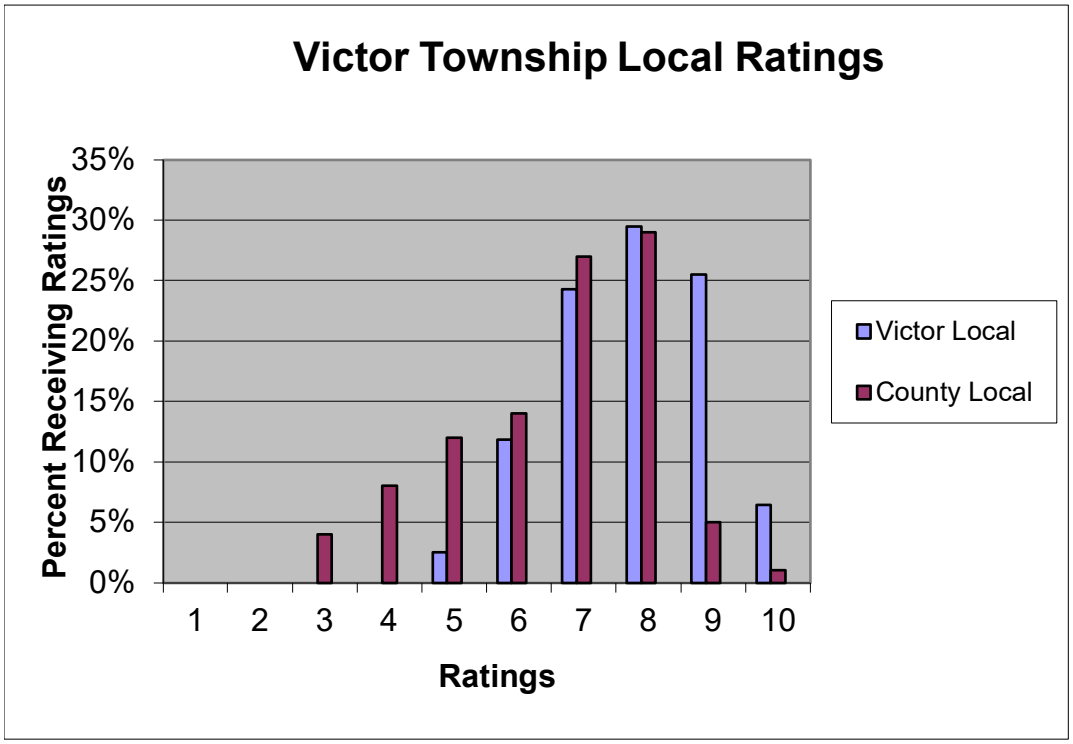
TOWNSHIP RILEY
SECTION 13 T. 6N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

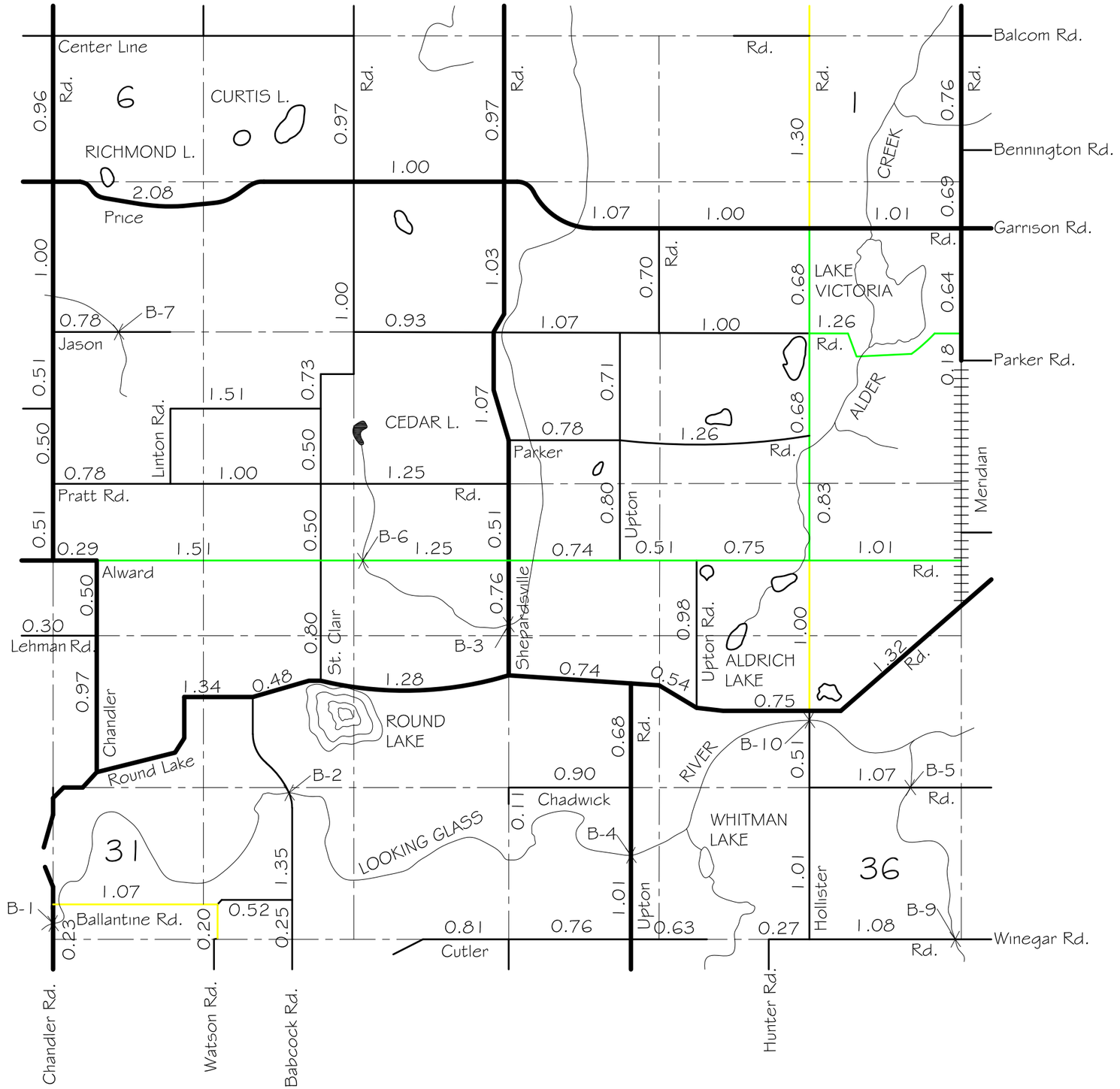
19-13-13

VICTOR TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	Victor Township Rating Breakdown (Local Roads)	County Local Road Breakdown	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0	0%	0%	0%
3	0	0%	4%	0%
4	0	0%	8%	7%
5	0.49	3%	12%	2%
6	2.3	12%	14%	12%
7	4.72	24%	27%	25%
8	5.74	29%	29%	37%
9	4.96	25%	5%	18%
10	1.25	6%	1%	0%

Average Rating		7.83	6.64	7.35
	Change In Average Rating	**0.48**		





LEGEND

SECTION LINE

CORPORATE LIMITS

STATE TRUNKLINE

COUNTY PRIMARY

COUNTY LOCAL

ADJACENT COUNTY

CITY OR VILLAGE

STREET

PRIMARY ROAD SYSTEM IS 26.90 MILES

LOCAL ROAD SYSTEM IS 40.71 MILES

T. 6N R. 1W

Good 8-10

Fair 5-7

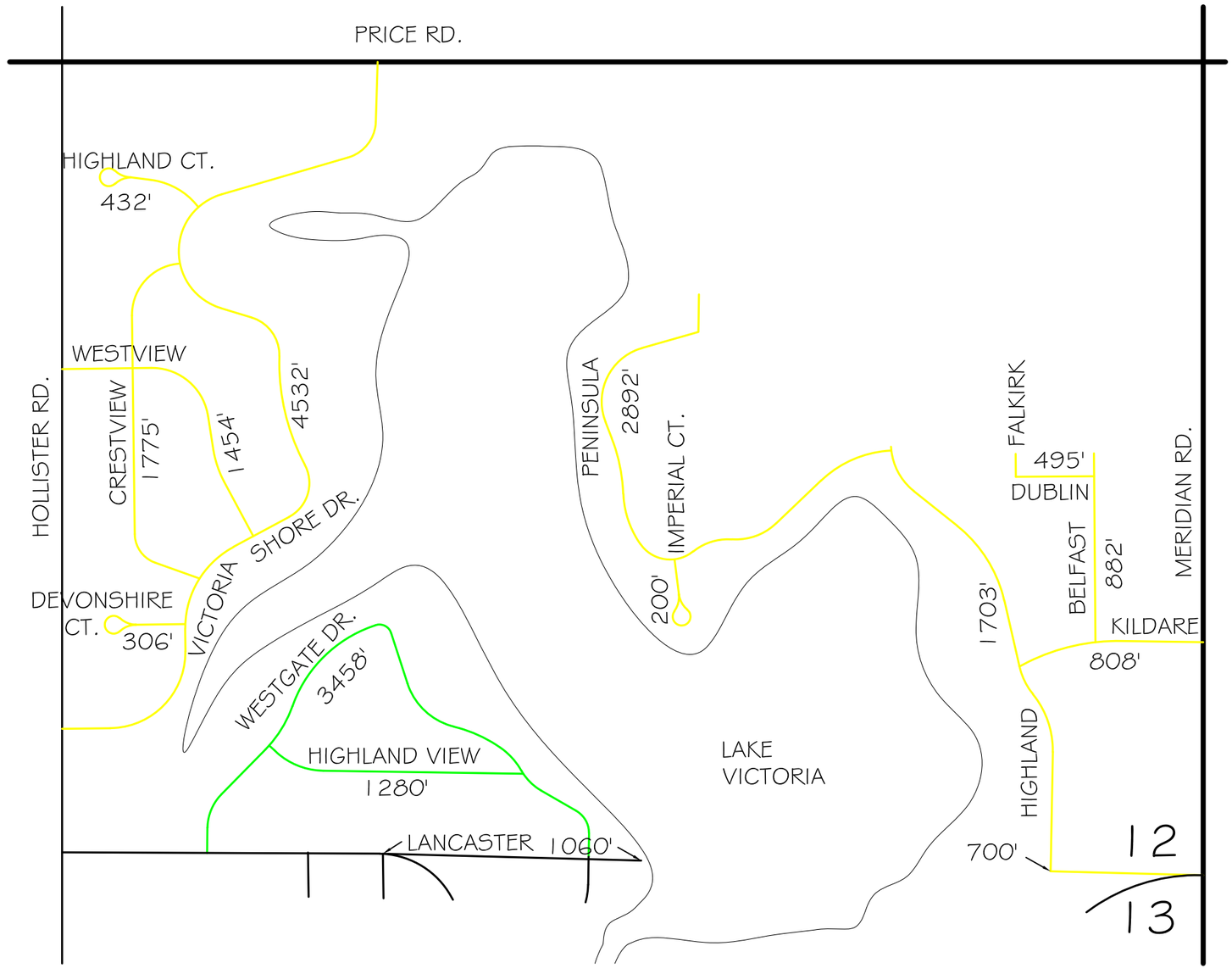
Poor 1-4

Scale 0 1/2 1 Mile

One Inch Equals 4000 Ft.

PREPARED BY
CLINTON COUNTY RD. COMM.

VICTOR TWP. 19-14



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 21977 EQUALS 4.16 MILES

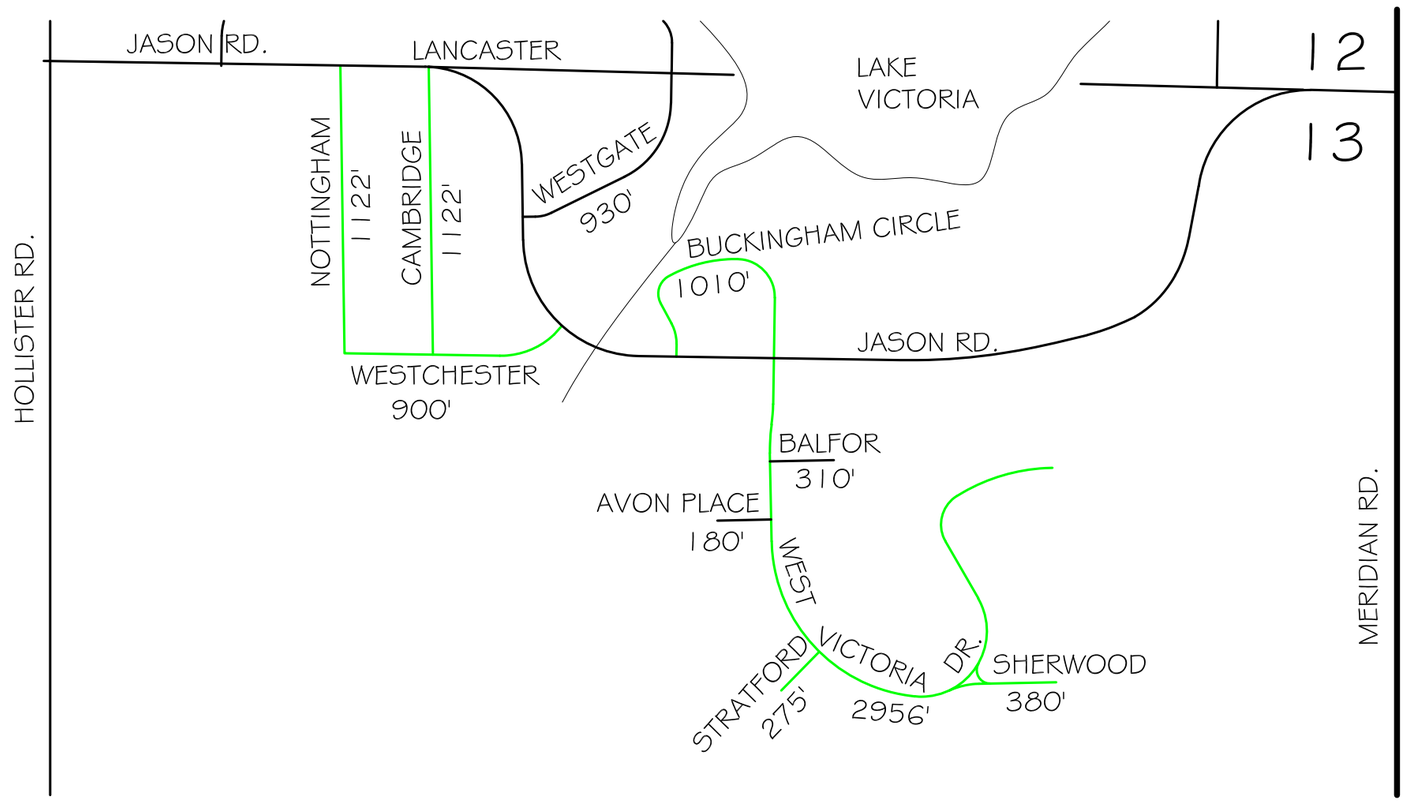
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP VICTOR
SECTION 12 T. 6N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

LAKE VICTORIA
IMPERIAL SHORES
HIGHLAND HILLS
VICTORIA HILLS
WESTCHESTER HEIGHTS

19-14-12



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 9185 EQUALS 1.74 MILES

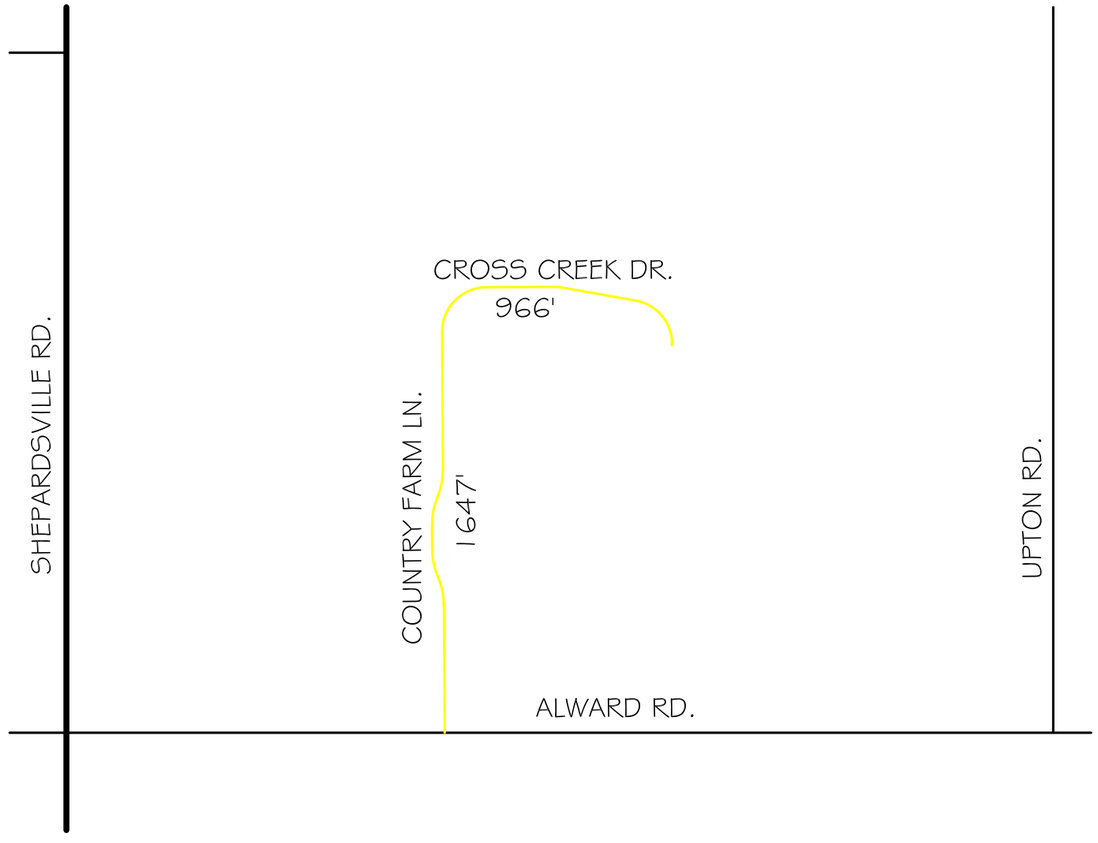
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP VICTOR
SECTION 13 T. 6N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

ROYAL SHORES SUB.

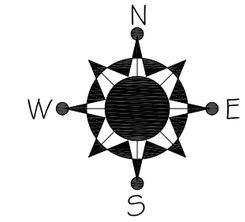
19-14-13



LEGEND

SECTION LINE	— · — · —
CORPORATE LIMITS	— — — — —
STATE TRUNKLINE	▬▬▬
COUNTY PRIMARY	▬▬
COUNTY LOCAL	▬
ADJACENT COUNTY	╫╫╫╫╫╫╫╫╫╫╫╫
CITY OR VILLAGE	▬▬▬
STREET	

LOCAL ROAD SYSTEM TOTAL
FEET 2613 EQUALS 0.49 MILES

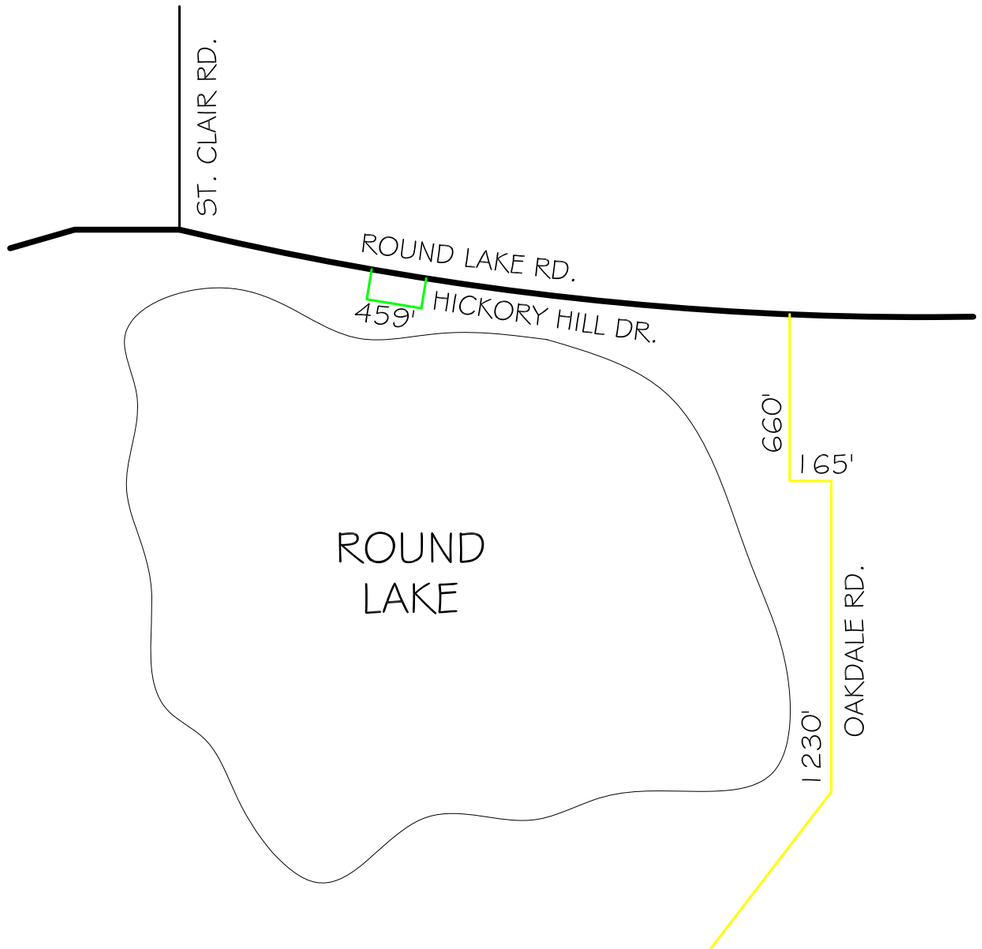


Scale 0 600 1 200 FEET
One Inch Equals 600 Ft.

TOWNSHIP VICTOR
SECTION 22 T. 6N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

COUNTRY FARM ESTATES

19-14-22



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 2514 EQUALS 0.48 MILES

N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP VICTOR
SECTION 28-29 T. 6N R. 1W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

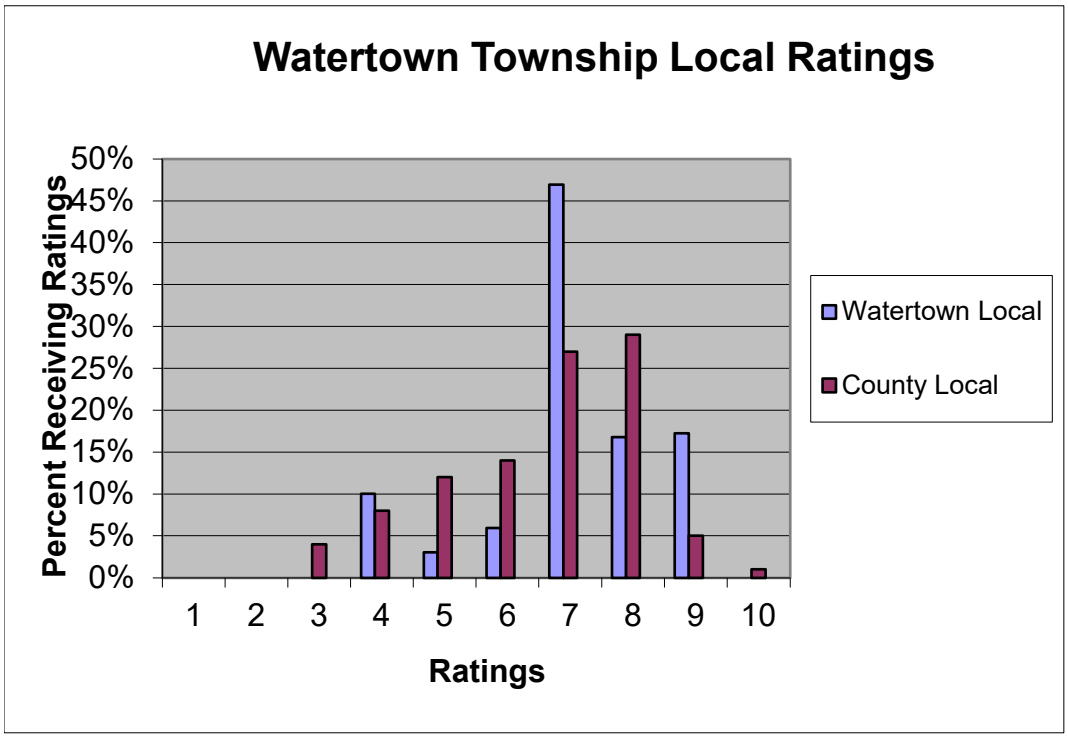
HICKORY HILL
OAK DALE PARK

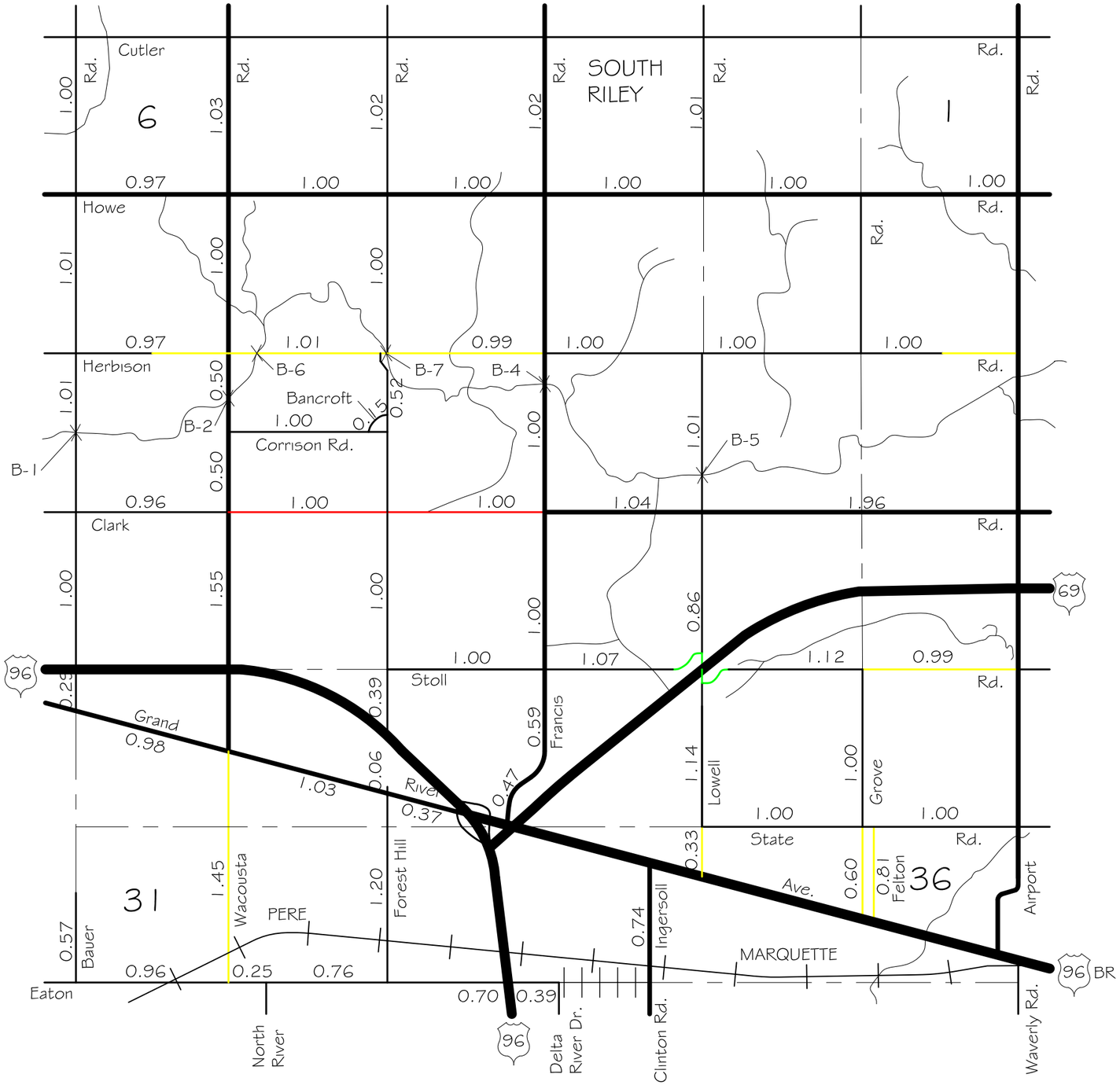
19-14-28 & 29

WATERTOWN TOWNSHIP 2023 RATINGS

Ratings	Miles of Local Roads Rated	Watertown Township Rating Breakdown (Local Roads)	County Local Road Breakdown	Miles of Local Roads Rated (2022)
1	0	0%	0%	0%
2	0	0%	0%	0%
3	0	0%	4%	2%
4	2.21	10%	8%	10%
5	0.67	3%	12%	4%
6	1.31	6%	14%	7%
7	10.34	47%	27%	28%
8	3.7	17%	29%	35%
9	3.8	17%	5%	14%
10	0	0%	1%	0%

Average Rating		7.09	6.64	7.13
	Change In Average Rating	**-0.04**		





LEGEND

SECTION LINE

CORPORATE LIMITS

STATE TRUNKLINE

COUNTY PRIMARY

COUNTY LOCAL

ADJACENT COUNTY

CITY OR VILLAGE

STREET

PRIMARY ROAD SYSTEM IS 21.75 MILES

LOCAL ROAD SYSTEM IS 39.11 MILES

T. 5N R. 3W

Good 8-10

Fair 5-7

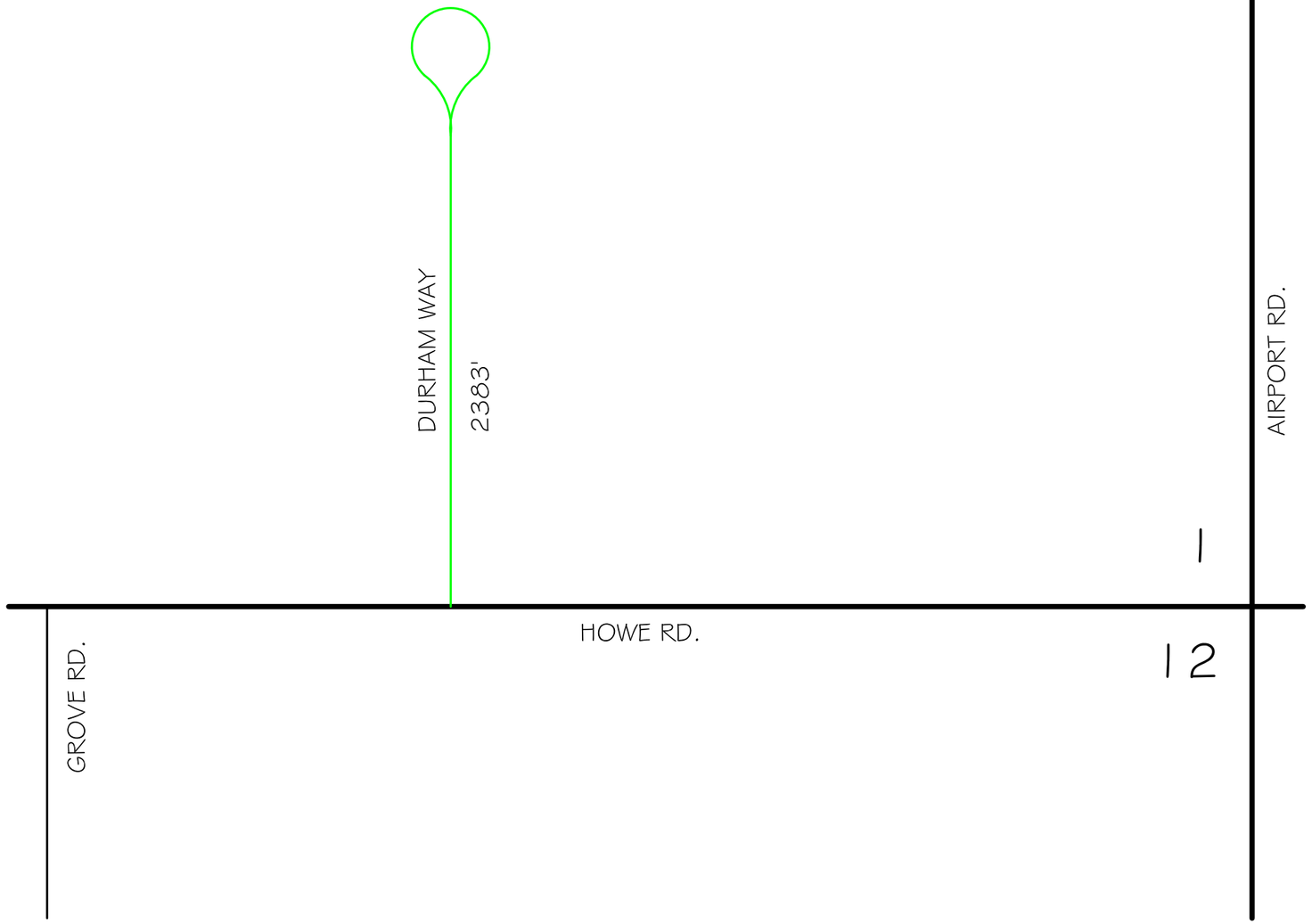
Poor 1-4

Scale 0 1/2 1 Mile

One Inch Equals 4000 Ft.

PREPARED BY
CLINTON COUNTY RD. COMM.

WATERTOWN 19-15



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 2383 EQUALS 0.45 MILES

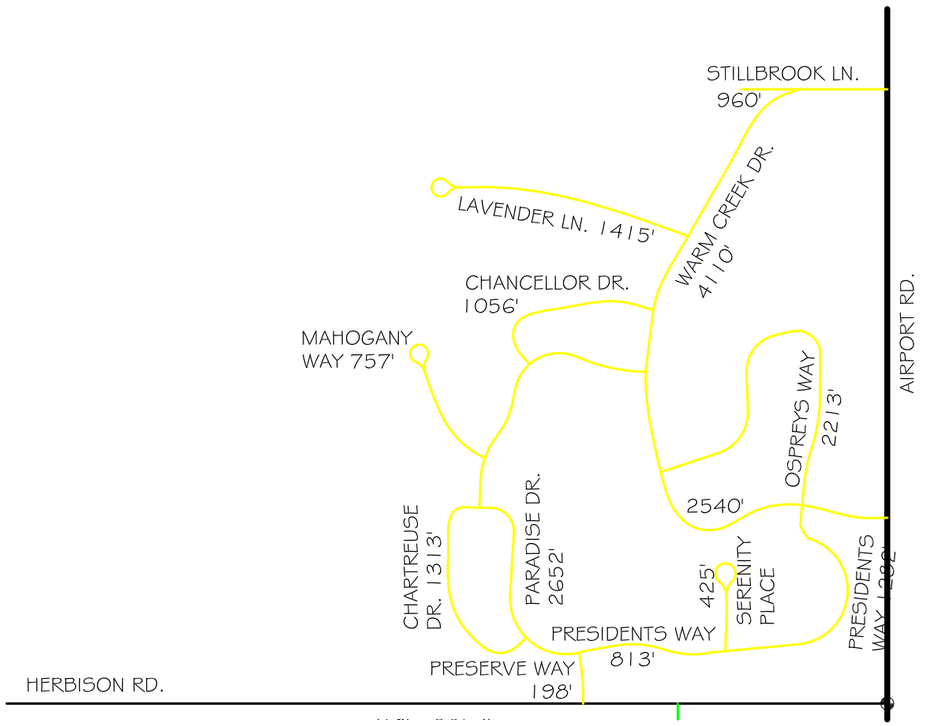
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP WATERTOWN
SECTION 1 T. 5N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

DURHAM ESTATES

19-15-1



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 17194 EQUALS 3.26 MILES

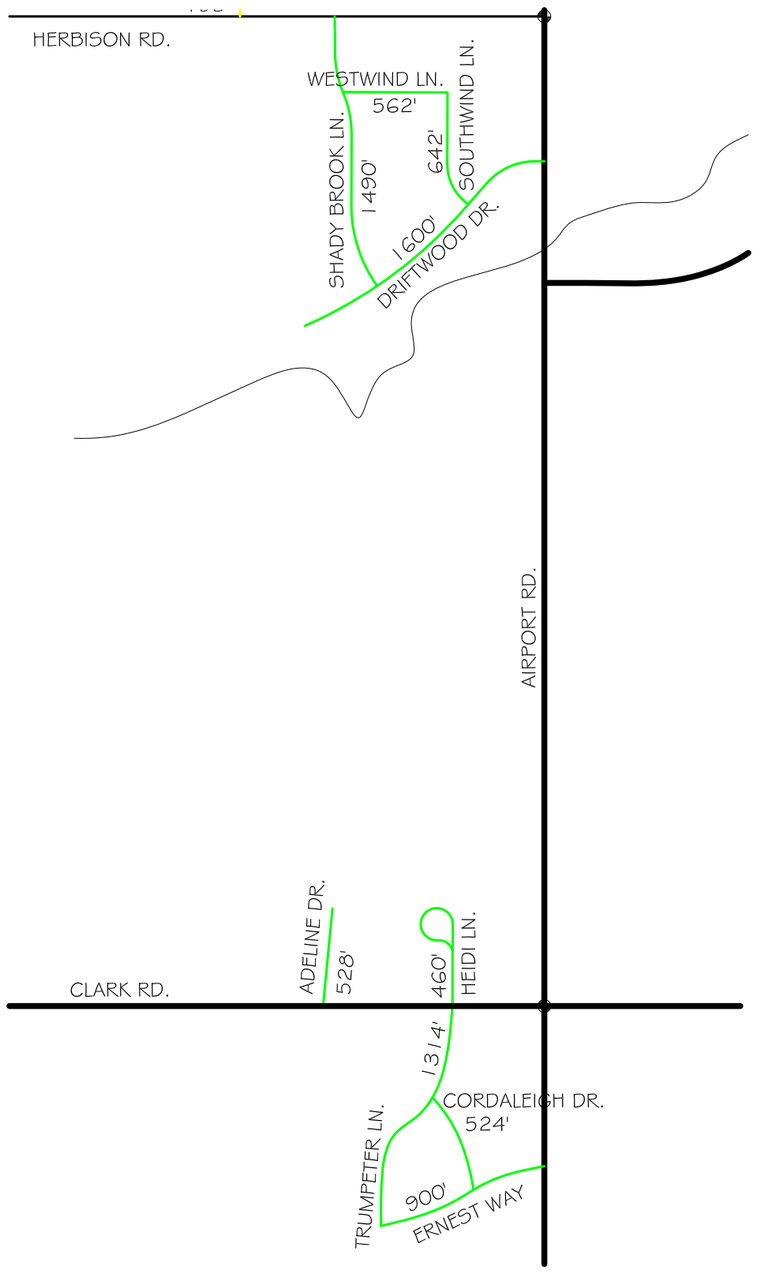
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP WATERTOWN
SECTION 12 T. 5N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

LAKESIDE PRESERVE

19-15-12



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 8020 EQUALS 1.52 MILES

N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP WATERTOWN
SECTION 13 T. 5N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

WESTWINDS SUB.
~~WATERTOWN-ON-THE-MEADOW~~
ROSEWOOD HILLS

19-15-13 & 24

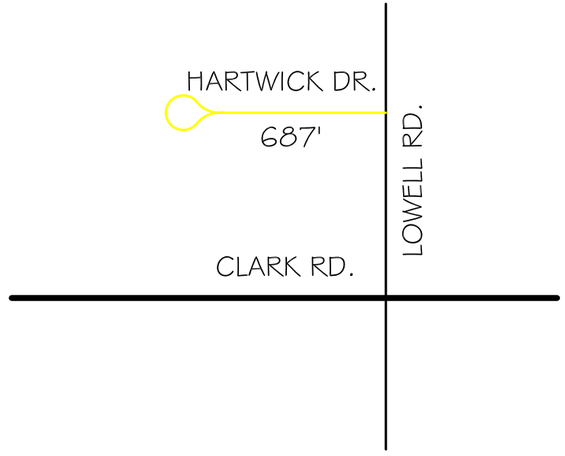
LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 687 EQUALS 0.13 MILES

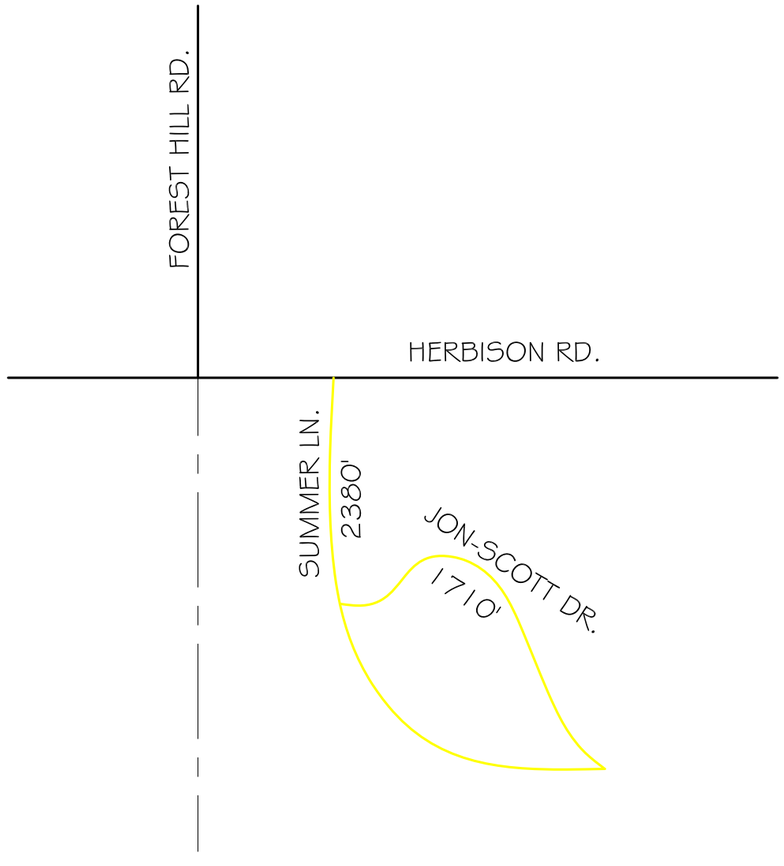
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.



TOWNSHIP WATERTOWN
SECTION 15 T. 5N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

19-15-15



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 4090 EQUALS 0.77 MILES

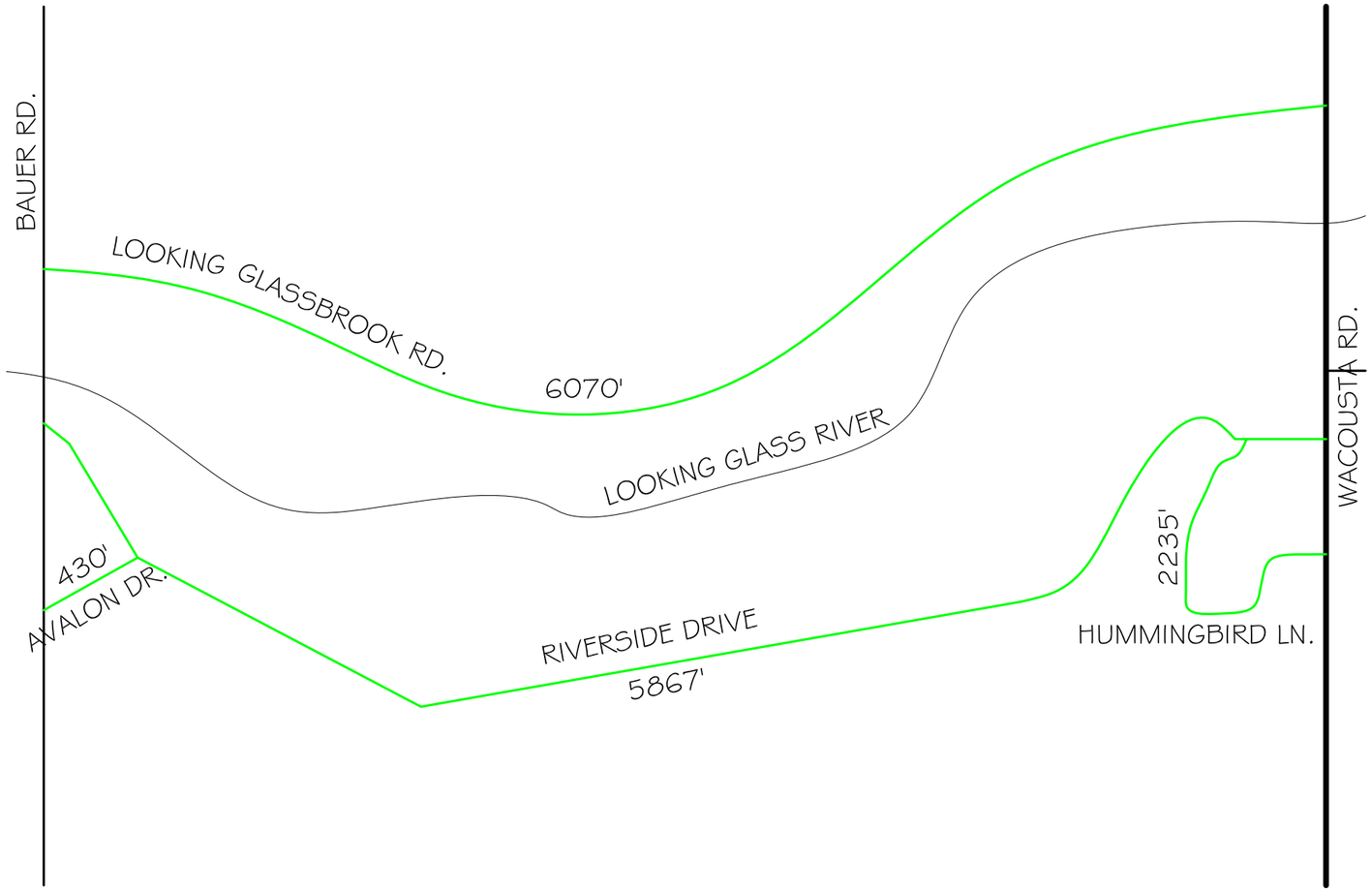
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP WATERTOWN
SECTION 16 T. 5N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

SUMMERLANE SUB.

19-15-16



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 14602 EQUALS 2.77 MILES

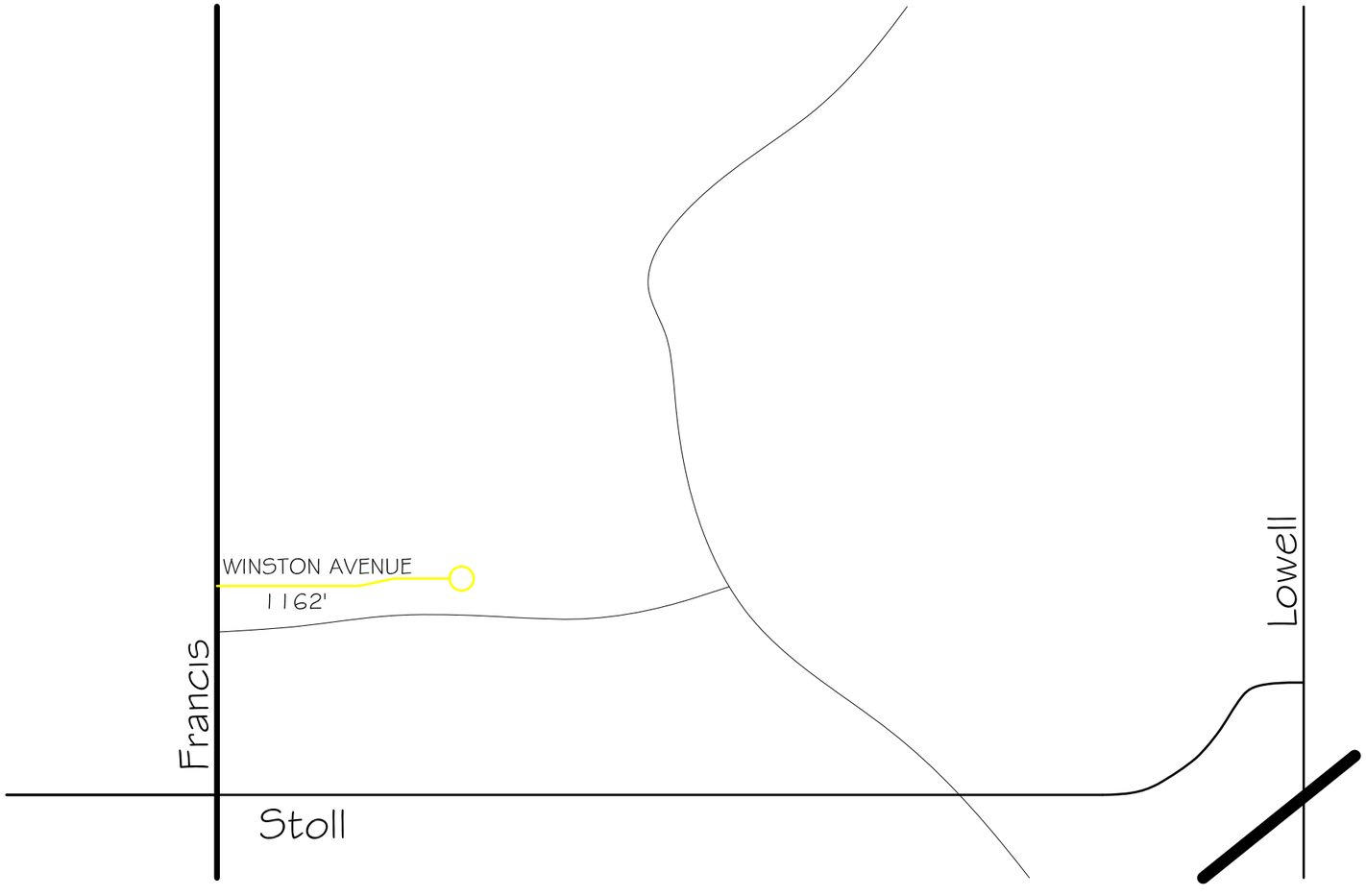
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP WATERTOWN
SECTION 18 T. 5N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

HAWTHORN HILLS SUB.
BROOKWOOD SUB.
ELMHURST SUB.
WATERFRONT FARMS

19-15-18



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 1162 EQUALS 0.22 MILES

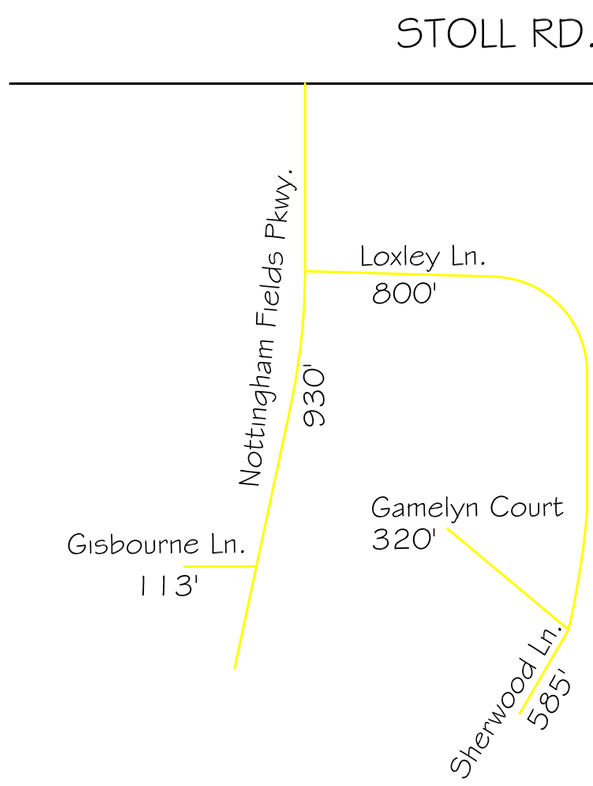
N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP WATERTOWN
SECTION 22 T. 5N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

WINSTON AVENUE

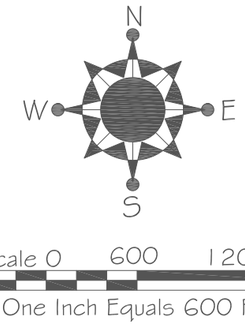
19-15-22



LEGEND

SECTION LINE	
CORPORATE LIMITS	
STATE TRUNKLINE	
COUNTY PRIMARY	
COUNTY LOCAL	
ADJACENT COUNTY	
CITY OR VILLAGE	
STREET	

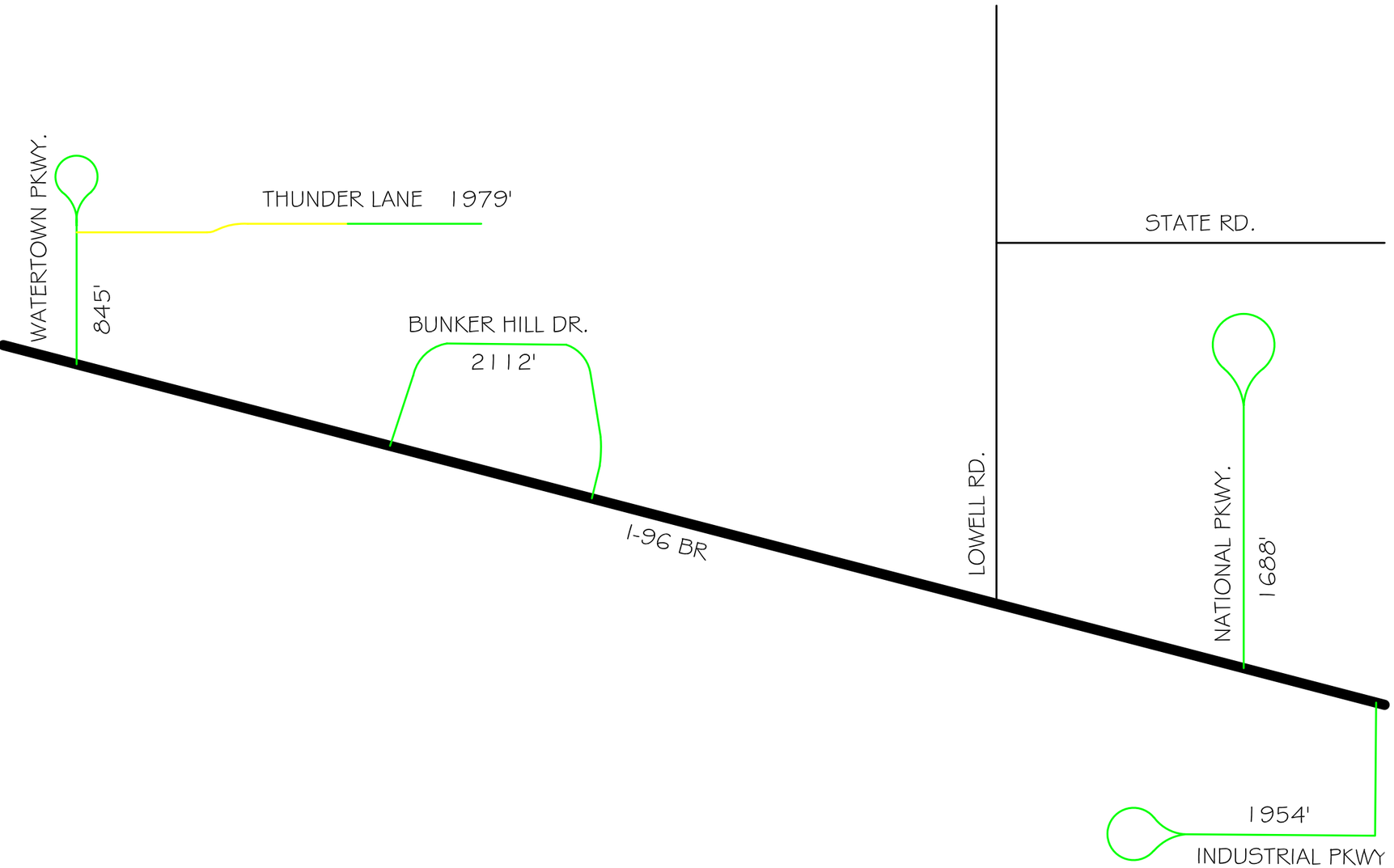
LOCAL ROAD SYSTEM TOTAL
FEET 2748 EQUALS 0.52 MILES



TOWNSHIP WATERTOWN
SECTION 25 T. 5N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

NOTTINGHAM FIELDS

19-15-25



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 8578 EQUALS 1.62 MILES

N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP WATERTOWN
SECTION 27, 33, 34, & 35 T. 5N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

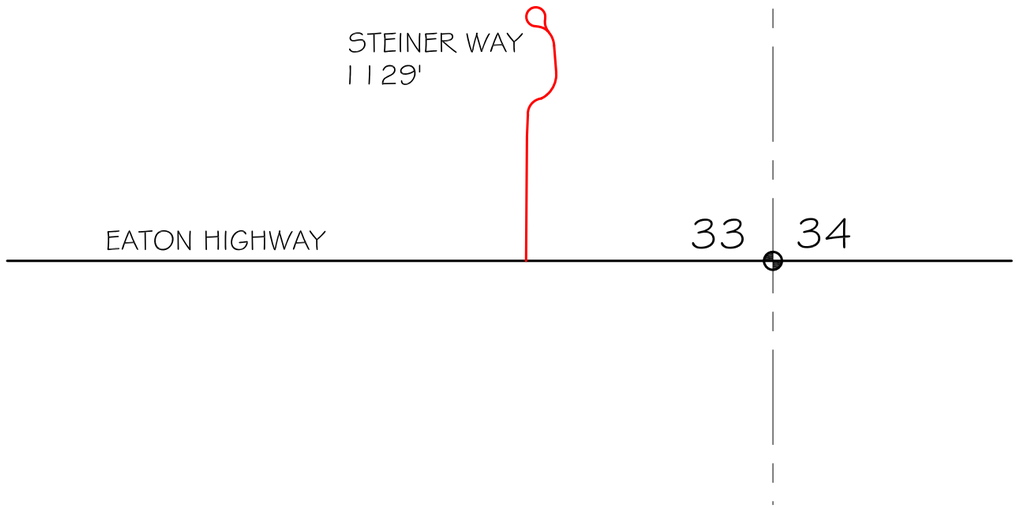
GREATER LANSING INDUSTRIAL PARK
BUNKER HILL ESTATES
DEER CREEK

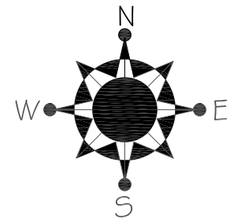
19-15-27,33,34,& 35

LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 1129 EQUALS 0.21 MILES

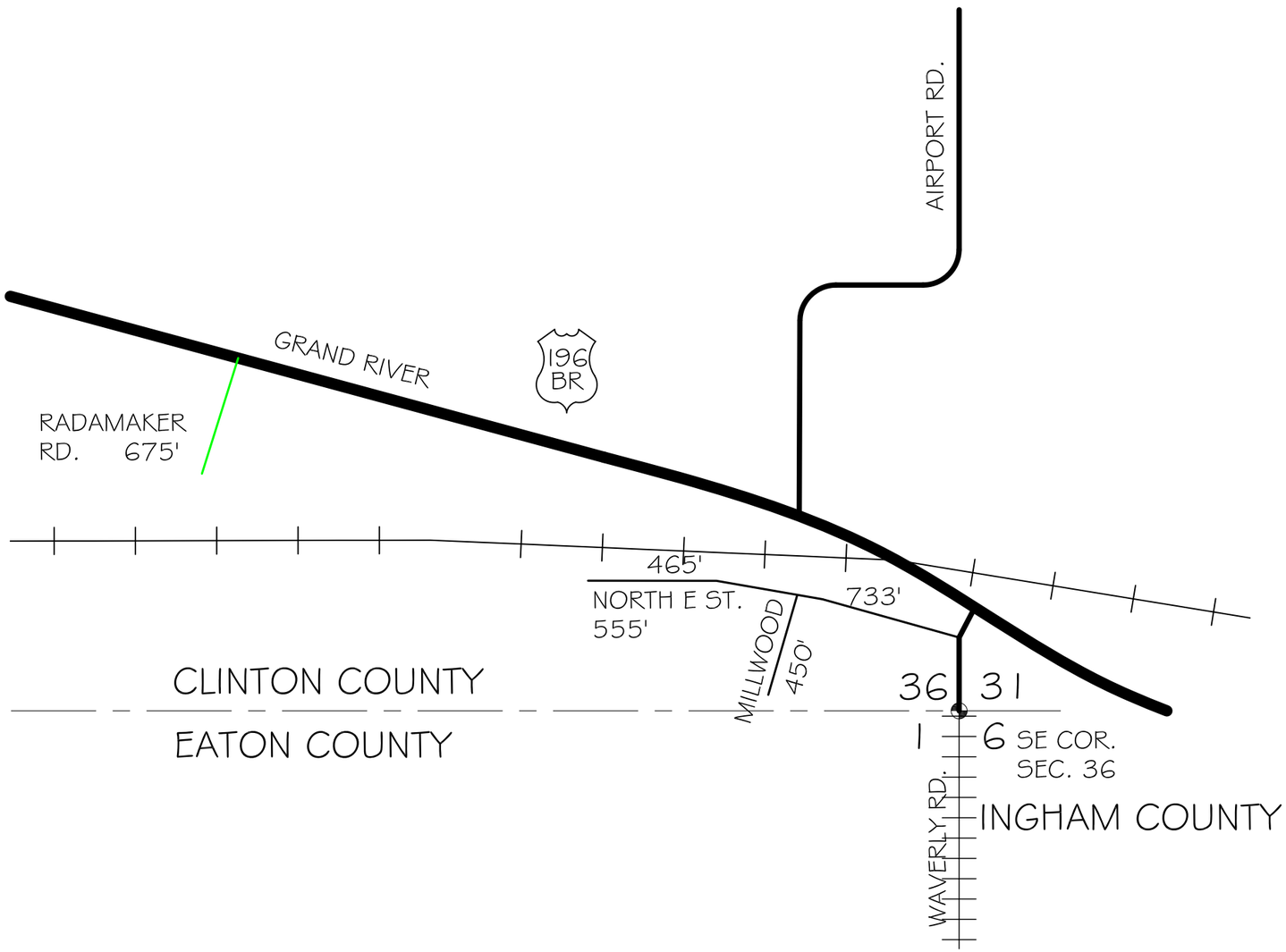




Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP WATERTOWN
SECTION 33 T. 5N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

19-15-33



LEGEND

SECTION LINE
CORPORATE LIMITS
STATE TRUNKLINE
COUNTY PRIMARY
COUNTY LOCAL
ADJACENT COUNTY
CITY OR VILLAGE
STREET

LOCAL ROAD SYSTEM TOTAL
FEET 2878 EQUALS 0.55 MILES

N
W E
S

Scale 0 600 1200 FEET
One Inch Equals 600 Ft.

TOWNSHIP WATERTOWN
SECTION 36 T. 5N R. 3W
COUNTY CLINTON
PREPARED BY
CLINTON COUNTY ROAD COMMISSION

FOX RUN IND. PARK

19-15-36

APPENDIX D

A Quick Check of Your Highway Network Health

By Larry Galehouse, Director, National Center for Pavement Preservation
and

Jim Sorenson, Team Leader, FHWA Office of Asset Management

Historically, many highway agency managers and administrators have tended to view their highway systems as simply a collection of projects. By viewing the network in this manner, there is a certain comfort derived from the ability to match pavement actions with their physical/functional needs. However, by only focusing on projects, opportunities for strategically managing entire road networks and asset needs are overlooked. While the "bottom up" approach is analytically possible, managing networks this way can be a daunting prospect. Instead, road agency administrators have tackled the network problem from the "top down" by allocating budgets and resources based on historical estimates of need. Implicit in this approach, is a belief that the allocated resources will be wisely used and prove adequate to achieve desirable network service levels.

Using a quick checkup tool, road agency managers and administrators can assess the needs of their network and other highway assets and determine the adequacy of their resource allocation effort. A quick checkup is readily available and can be usefully applied with minimum calculations.

It is essential to know whether present and planned program actions (reconstruction, rehabilitation, and preservation) will produce a net improvement in the condition of the network. However, before the effects of any planned actions on the highway network can be analyzed, some basic concepts should be considered.

Assume every lane-mile segment of road in the network was rated by the number of years remaining until the end of life (terminal condition). Remember that terminal condition does not mean a failed road. Rather, it is the level of deterioration that management has set as a minimum operating condition for that road or network. Consider the rated result of the current network condition as shown in Figure 1.

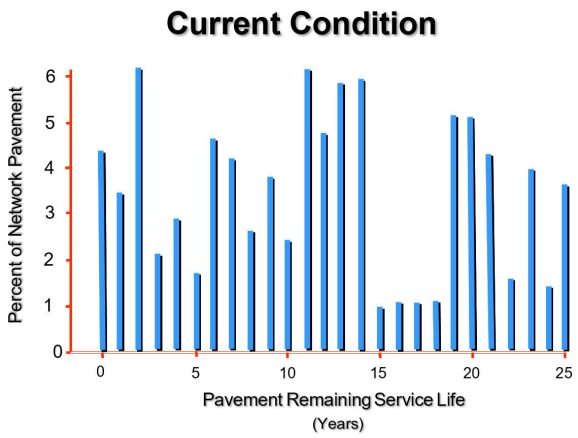


Figure 1 – Current Condition

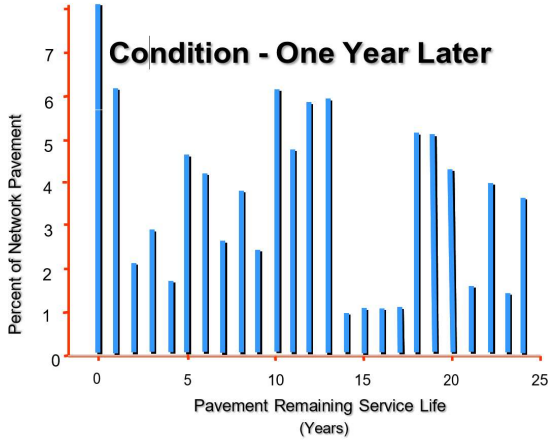


Figure 2 – Condition 1-Year Later

If no improvements are made for one year, then the number of years remaining until the end of life will decrease by one year for each road segment, except for those stacked at zero. The zero- stack will increase significantly because it maintains its previous balance and also becomes the recipient of those roads having previously been stacked with one year remaining. Thus, the entire network will age one year to the condition shown in Figure 2, with the net lane-miles in the zero stack raised from 4% to 8% of the network.

Some highway agencies still subscribe to the old practice of assigning their highest priorities to the reconstruction or rehabilitation of the worst roads. This practice of "worst first", i.e., continually addressing only those roads in the zero-stack, is a proven death spiral strategy because reconstruction and rehabilitation are the most expensive ways to maintain or restore serviceability. Rarely does sufficient funding exist to sustain such a strategy.

The measurable loss of pavement life can be thought of as the network's total lane-miles multiplied by 1 year, i.e., lane-mile-years. Consider the following quantitative illustration. Suppose your agency's highway network consisted of 4,356 lane-miles. Figure 3 shows that without intervention, it will lose 4,356 lane-mile-years per year.

Agency Highway Network = 4,356 lane miles

Each year the network will lose

4,356 lane-mile-years

Figure 3 – Network Lane Miles

To offset this amount of deterioration over the entire network, the agency would need to annually perform a quantity of work equal to the total number of lane-mile-years lost just to maintain the status quo. Performing work which produces fewer than 4,356 lane-mile-years would lessen the natural decline of the overall network, but still fall short of maintaining the

status quo. However, if the agency produces more than 4,356 lane-mile-years, it will improve the network.

In the following example, an agency can easily identify the effect of an annual program consisting of reconstruction, rehabilitation, and preservation projects on its network. This assessment involves knowing the only two components for reconstruction and rehabilitation projects: lane-miles and design life of each project fix. Figure 4 displays the agency's programmed activities for reconstruction and Figure 5 displays it for rehabilitation.

Reconstruction Evaluation

Projects this Year = 2

Project	Design Life	Lane Miles	Lane Mile Years	Lane Mile Cost	Total Cost
No. 1	25 yrs	22	550	$463,425	$10,195,350
No. 2	30 yrs	18	540	$556,110	$10,009,980
	Total	=	**1,090**		$20,205,330

Figure 4 - Reconstruction

Rehabilitation Evaluation

Projects this Year = 3

Project	Design Life	Lane Miles	Lane Mile Years	Lane Mile Cost	Total Cost
No. 10	18 yrs	22	396	$263,268	$5,791,896
No. 11	15 yrs	28	420	$219,390	$6,142,920
No. 12	12 yrs	32	384	$115,848	$3,707,136
	Total	=	**1,200**		$15,641,952

Figure 5 – Rehabilitation

When evaluating pavement preservation treatments in this analysis, it is appropriate to think in terms of "extended life" rather than design life. The term design life, as used in the reconstruction and rehabilitation tables, relates better to the new pavement's structural adequacy to handle repetitive loadings and environmental factors. This is not the goal of pavement preservation. Each type of treatment/repair has unique benefits that should be targeted to the specific mode of pavement deterioration. This means that life extension depends on factors such as type and severity of distress, traffic volume, environment, etc. Figure 6 exhibits the agency's programmed activities for preservation.

Preservation Evaluation

Project	Life Extension	Lane Miles	Lane Mile Years	Lane Mile Cost	Total Cost
No. 101	2 yrs	12	24	$2,562	$30,744
No. 102	3 yrs	22	66	$7,743	$170,346
No. 103	5 yrs	26	130	$13,980	$363,480
No. 104	7 yrs	16	112	$29,750	$476,000
No. 105	10 yrs	8	80	$54,410	$435,280
Total		=	**412**		$1,475,850

Figure 6 – Preservation

To satisfy the needs of its highway network, the agency must accomplish 4,356 lane-mile-years of work per year. The agency's program will derive 1,090 lane-mile-years from reconstruction, 1,200 lane-mile-years from rehabilitation, and 412 lane-mile-years from pavement preservation, for a total of 2,702 lane-mile-years. Thus, these programmed activities fall short of the minimum required to maintain the status quo, and hence would contribute to a net loss in network pavement condition of 1,653 lane-mile-years. The agency's programmed tally is shown in Figure 7.

Network Trend

Programmed Activity	Lane-Mile-Years	Total Cost
Reconstruction	1,090	$20,205,330
Rehabilitation	1,200	$15,641,952
Preservation	412	$1,475,850
Total	**2,702**	**$37,323,132**
Network Needs (Loss)	(-) 4,356	
Deficit =	**- 1,654**	

Figure 7 – Programmed Tally

This exercise can be performed for any pavement network to benchmark its current trend. Using this approach, it is possible to see how various long-term strategies could be devised and evaluated against a policy objective related to total-network condition.

Once the pavement network is benchmarked, an opportunity exists to correct any shortcomings in the programmed tally. A decision must first be made whether to improve the

network condition or just to maintain the status quo. This is a management decision and system goal.

Continuing with the previous example, a strategy will be proposed to prevent further network deterioration until additional funding is secured.

The first step is to modify the reconstruction and rehabilitation (R&R) programs. An agonizing decision must be made about which projects to defer, eliminate, or phase differently with multi- year activity. In Figure 8, reductions are made in the R&R programs to recover funds for less costly treatments in the pavement preservation program. The result of this decision recovered slightly over $6 million.

Program Modification

Programmed Activity	Lane-Mile-Years	Cost Savings
Reconstruction ***31 lane miles*** ~~(40 lane-miles)~~	***820*** ~~(1,090)~~	**$5,004,990**
Rehabilitation ***77 lane miles*** ~~(82 lane-miles)~~	***1,125*** ~~(1,200)~~	**$1,096,950**
Pavement Preservation (84 lane-miles)	(412)	**0**
Total =	***2,357*** **(2,702)**	**$6,101,940**

Figure 8 – Revised R & R Programs

Modifying the reconstruction and rehabilitation programs has reduced the number of lane-mile- years added to the network from 2,702 to 2,357 lane-mile-years. However, using less costly treatments elsewhere in the network to address roads in better condition will increase the number of lane-mile-years added to the network. A palette of pavement preservation treatments, or mix of fixes, is available to address the network needs at a much lower cost than traditional methods.

Preservation treatments are only suitable if the right treatment is used on the right road at the right time. In Figure 9, the added treatments used include concrete joint resealing, thin hot-mix asphalt (HMA) overlay (≤ 1.5”), microsurfacing, chip seal, and crack seal. By knowing the cost per lane-mile and the treatment life-extension, it is possible to create a new strategy (costing $36,781,144) that satisfies the network need. In this example, the agency saved in excess of $500,000 from traditional methods (costing $37,323,132), while erasing the 1,653 lane-mile-year deficit produced by the initial program tally. Network Strategy

Programmed Activity		Lane Mile Years	Total Cost
Reconstruction	(31 lane-miles)	820	$15,200,340
Rehabilitation	(77 lane-miles)	1,125	$14,545,002
Pavement Preservation	(84 lane-miles)	412	$1,475,850
Concrete Resealing	(4 years x 31 lane-miles)	124	$979,600
Thin HMA Overlay	(10 years x 16 lane-miles)	160	$870,560
Microsurfacing	(7 years x 44 lane-miles)	308	$1,309,000
Chip Seal	(5 years x 79 lane-miles)	395	$1,104,420
Crack Seal	(2 years x 506 lane-miles)	1,012	$1,296,372
	Total =	4,356	$36,781,144

Figure 9 – New Program Tally

In a real-world situation, the highway agency would program its budget to achieve the greatest impact on its network condition. Funds allocated for reconstruction and rehabilitation projects must be viewed as investments in the infrastructure. Conversely, funds directed for preservation projects must be regarded as protecting and preserving past infrastructure investments.

Integrating reconstruction, rehabilitation, and preservation in the proper proportions will substantially improve network conditions for the taxpayer while safeguarding the highway investment.

APPENDIX E: ROADSOFT NETWORK-LEVEL MODEL INPUTS AND OUTPUTS

APPENDIX F: MEETING MINUTES VERIFYING PLAN ACCEPTANCE BY GOVERNING BODY

CLINTON COUNTY
ROAD COMMISSION

January 22, 2024

To Whom it may Concern:

Following is an excerpt from the minutes of January 18, 2024, meeting of the Clinton County Board of Road Commissioners:

MOTION TO ADOPT THE CCRC TRANSPORATION ASSET MANAGEMENT PLAN

Motion to adopt the Clinton County Road Commission Transportation Asset Management Plan as submitted on December 31, 2023.

Move: Kevin Holt Second: Michael Frederick Motion: Passed

I hereby certify that the above is a true and correct copy of action taken by the Board of Clinton County Road Commissioners at its regular meeting held on January 18, 2024.

ATTEST:

Karla Gurski

Karla Gurski
Director of Finance/Clerk

3536 S. US Highway 27 / St. Johns, MI 48879 / Ph (989)224-3274 / Fax (989)224-4003
Website: www.ccrc-roads.com **Email: ccrc@ccrc-roads.com**

B. BRIDGE ASSET MANAGEMENT PLAN

An attached bridge asset management plan follows.

CLINTON COUNTY ROAD COMMISSION
2023 Bridge Asset Management Plan

A plan describing the CLINTON COUNTY ROAD COMMISSION's transportation assets and conditions

Prepared by:

Marc Trotter, P.E.
Director of Engineering
Clinton County Road Commission
ccrc@ccrc-road.com
989-224-3274

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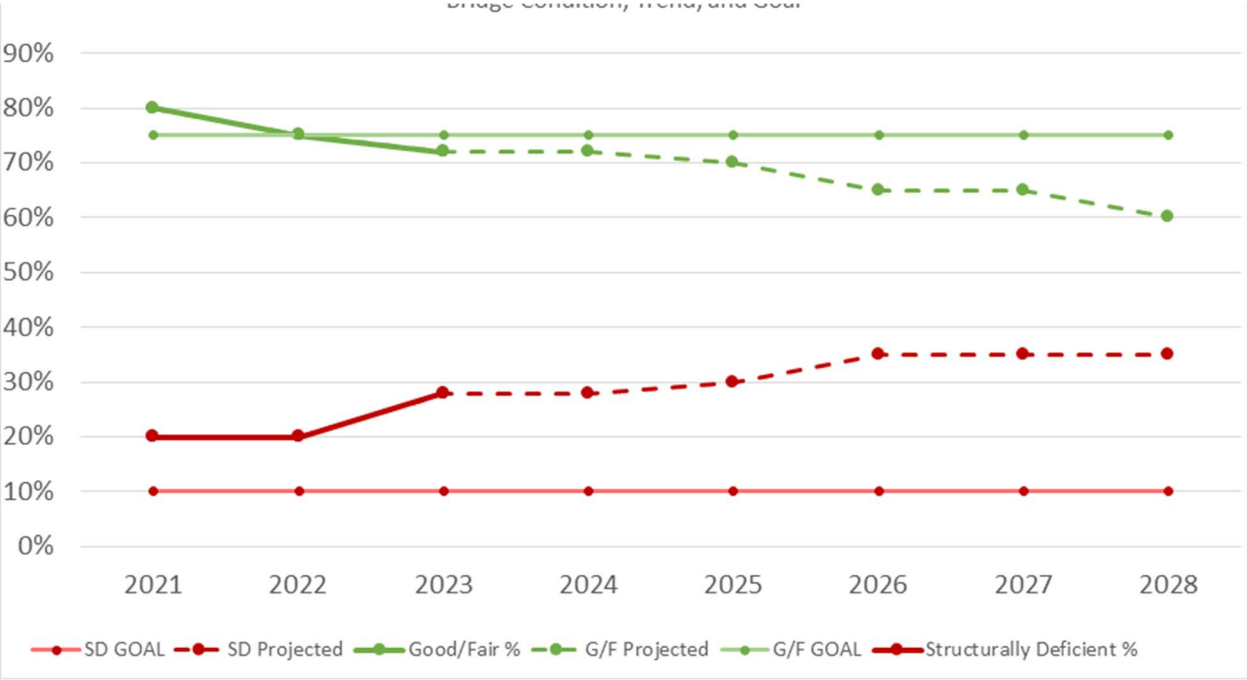
EXECUTIVE SUMMARY

As conduits for commerce and connections to vital services, bridges are among the most important assets in any community along with other assets like roads, culverts, traffic signs, traffic signals, and utilities that support and affect the road network. The CLINTON COUNTY ROAD COMMISSION's (CCRC) bridges, other road-related assets, and support systems are some of the most valuable and extensive public assets, all of which are paid for with taxes collected from ordinary citizens and businesses. The cost of building and maintaining bridges, their importance to society, and the investment made by taxpayers all place a high level of responsibility on local agencies to plan, build, and maintain the road and bridge network in an efficient and effective manner. This asset management plan is intended to report on how CCRC is meeting its obligations to maintain the bridges for which it is responsible.

This plan overviews CCRC's bridge assets and conditions and explains how CLINTON COUNTY ROAD COMMISSION works to maintain and improve the overall condition of those assets. These explanations can help answer:

- What kinds of bridge assets CCRC has in its jurisdiction and the different options for maintaining these assets.
- What tools and processes CCRC uses to track and manage bridge assets and funds.
- What condition CCRC's bridge assets are in compared to statewide averages.
- Why some bridge assets are in better condition than others and the path to maintaining and improving bridge asset conditions through proper planning and maintenance.
- How agency bridge assets are funded and where those funds come from.
- How funds are used and the costs incurred during CCRC's bridge assets' normal life cycle.
- What condition CCRC can expect of its bridge assets if those assets continue to be funded at the current funding levels
- How changes in funding levels can affect the overall condition of all of CCRC's bridge assets.

CCRC owns and/or manages 123 bridges. A summary of its historical and current bridge asset conditions, projected trends, and goals can be seen in the figure, below.



An asset management plan is required by Michigan Public Act 325 of 2018, and this document represents fulfillment of some of CCRC's obligations towards meeting these requirements. This asset management plan also helps demonstrate CCRC's responsible use of public funds by providing elected and appointed officials as well as the general public with inventory and condition information of CCRC's bridge assets, and gives taxpayers the information they need to make informed decisions about investing in essential transportation infrastructure.

INTRODUCTION

Asset management is defined by Public Act 325 of 2018 as “an ongoing process of maintaining, preserving, upgrading, and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment and investment to achieve established performance goals”. In other words, asset management is a process that uses data to manage and track assets, like roads and bridges, in a cost-effective manner using a combination of engineering and business principles. This process is endorsed by leaders in municipal planning and transportation infrastructure, including the Michigan Municipal League, County Road Association of Michigan, the Michigan Department of Transportation (MDOT), and the Federal Highway Administration (FHWA). The CLINTON COUNTY ROAD COMMISSION is supported in its use of asset management principles and processes by the Michigan Transportation Asset Management Council (TAMC), formed by the State of Michigan.

Asset management, in the context of this plan, ensures that public funds are spent as effectively as possible to maximize the condition of the bridges in CLINTON COUNTY ROAD COMMISSION’s road network. Asset management also provides a transparent decision-making process that allows the public to understand the technical and financial challenges of managing infrastructure with a limited budget.

The CLINTON COUNTY ROAD COMMISSION (CCRC) has adopted an “asset management” business process to overcome the challenges presented by having limited financial, staffing, and other resources while needing to meet safety standards and bridge users’ expectations. CCRC is responsible for maintaining and operating 123 bridges.

This 2023 plan outlines how CCRC determines its strategy to maintain and upgrade bridge asset condition given agency goals, priorities of its bridge users, and resources provided. An updated plan is to be released approximately every three years to reflect changes in bridge conditions, finances, and priorities.

Questions regarding the use or content of this plan should be directed to Marc Trotter P.E., Director of Engineering at 3536 S US HWY 27, ST JOHNS, MI 48879or at (989)-224-3274 and/or CCRC@CCRC-ROADS.COM. A copy of this plan can be accessed on our website at ccrc-roads.com.

Key terms used in this plan are defined in CCRC's comprehensive transportation asset management plan (also known as the "compliance plan") used for compliance with PA 325 or 2018.

Knowing the basic features of an asset class is a crucial starting point to understanding the rationale behind an asset management approach. The following primer provides an introduction to bridges.

Bridge Primer

Bridge Types

Bridges are structures that span 20 feet or more. These bridges can extend across one or multiple spans.

If culverts are placed side by side to form a span of 20 feet or more (for example, three 6-foot culverts with one-foot between each culvert), then this culvert system would be defined as a bridge. (Note: The Compliance Plan Appendix C contains a primer on culverts not defined as bridges.)

Figure 1: Girder bridge

Bridge types are classified based on two features: design and material.

The most common bridge design is the **girder system** (Figure 1). With this design, the bridge deck transfers vehicle loads to girders (or beams) that, in turn, transfer the load to the piers or abutments (see Figure 6).

Figure 2: Slab bridge

A similar design that lacks girders (or beams) is a **slab bridge** (Figure 2, and see Figure 6). A slab bridge transfers the vehicle load directly to the abutments and, if necessary, piers.

Truss bridges were once quite common and consist of a support structure that is created when structural members are connected at joints to form interconnected triangles (Figure 4). Structural members may consist of steel tubes or angles connected at joints with gusset plates.

Figure 3: Truss bridge

Another common bridge design in Michigan is the three-sided pre-cast box or arch bridge (Figure 4).

Michigan is also home to several unique bridge designs.

Adding another layer of complexity to bridge typing is the primary construction materials used (Figure 5). Bridges are generally constructed from concrete, steel, pre-stressed concrete, or timber. Some historical bridges or bridge components in Michigan may be constructed from stone or masonry.

Figure 4: Three-sided box bridge

Figure 5: Examples of common bridge construction materials used in Michigan

Bridge Condition

Michigan inspectors rate bridge condition on a 0-9 scale known as the National Bridge Inventory (NBI) rating scale (see Table for a summary of the NBI Rating scale). Elements of the bridge's superstructure, deck, and substructure receive a 9 if they are in excellent condition down to a 0 if they are in failed condition. A complete guide for Michigan bridge condition rating according to the NBI can be found in the MDOT Bridge Field Services' *Bridge Safety Inspection NBI Rating Guidelines* (https://www.michigan.gov/documents/mdot/BIR_Ratings_Guide_Combined_2017-10-30_606610_7.pdf).

Table 1: Summary of the NBI Rating Scale

NBI Rating	General Condition
9-7	Like new/good
6-5	Fair
4-3	Poor/serious
2-0	Critical/failed

Bridge Treatments

Replacement

Replacement work is typically performed when a bridge is in poor condition (NBI rating of 4 or less) and will improve the bridge to good condition (NBI rating of 7 or more). The Local Bridge Program, a part of MDOT's Local Agency Program, defines bridge replacement as full replacement, which removes the entire bridge (superstructure, deck, and substructure) before re-building a bridge at the same location (Figure 6). The decision to perform a total replacement over rehabilitation (see below) should be made based on a life-cycle cost analysis. Generally, replacement is selected if rehabilitation costs more than two-thirds of the cost of replacement. Replacement is generally the most expensive of the treatment options.

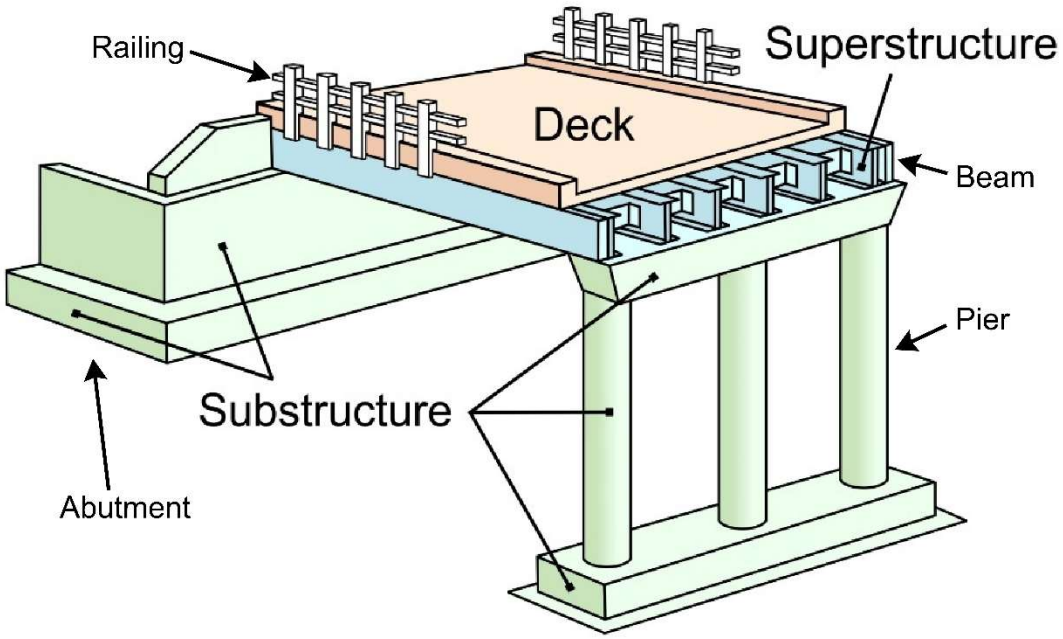


Figure 6: Diagram of basic elements of a bridge

Rehabilitation

Rehabilitation involves repairs that improve the existing condition and extend the service life of the structure and the riding surface. Most often, rehabilitation options are associated with bridges that have degraded beyond what can be fixed with preventive maintenance. Rehabilitation is typically performed on poor-rated elements (NBI rating of 4 or less) to improve them to fair or good condition (NBI rating of 5 or more). Rehabilitation can include superstructure replacement (removal and replacement of beams and deck) or deck replacement. While typically more expensive than general maintenance, rehabilitation treatments may be more cost-effective than replacing the entire structure.

- **Railing retrofit/replacement:** A railing retrofit or replacement either reinforces the existing railing or replaces it entirely (Figure 6). This rehabilitation is driven by a need for safety improvements on poor-rated railings or barriers (NBI rating less than 5).
- **Beam repair:** Beam repair corrects damage that has reduced beam strength (Figure 6). In the case of steel beams, it is performed if there is 25 percent or more of section loss in an area of the beam that affects load-carrying capacity. In the case of concrete beams, this is performed if there is 50 percent or more spalling (i.e., loss of material) at the ends of beams.
- **Substructure concrete patching and repair:** Patching and repairing the substructure is essential to keep a bridge in service. These rehabilitation efforts are performed when the abutments or piers are fair or poor (NBI rating of 5 or 4), or if spalling and delamination affect less than 30 percent of the bridge surface.

Preventive Maintenance

The Federal Highway Administration's (FHWA) *Bridge Preservation Guide* (2018) defines preventive maintenance as "a strategy of extending service life by applying cost-effective treatments to bridge elements…[that] retard future deterioration and avoid large expenses in bridge rehabilitation or replacements."

Preventive maintenance work is typically done on bridges rated fair (NBI rating of 5 or 6) in order to slow the rate of deterioration and keep them from falling into poor condition.

- **Concrete deck overlay:** A concrete deck overlay involves removing and replacing the driving surface. Typically, this is done when the deck surface is poor (NBI rating is less than 5) and the underneath portion of the deck is at least fair (NBI rating greater than 4). A shallow or deep concrete overlay may be performed depending on the condition of the bottom of the deck. The MDOT *Bridge Deck Preservation* matrices provide more detail on concrete deck overlays (see https://www.michigan.gov/mdot/0,4616,7-151-9625_24768_24773---,00.html).

- **Deck repairs:** Deck repairs include three common techniques: HMA overlay with or without waterproof membranes, concrete patching, deck sealing, crack sealing, and joint repair/replacement. An HMA overlay with an underlying waterproof membrane can be placed on bridge decks with a surface rating of fair or lower (NBI of 5 or less) and with deficiencies that cover between 15 and 30 percent of the deck surface and deck bottom. An HMA overlay without a waterproof membrane should be used on a bridge deck with a deck surface and deck bottom rating of serious condition or lower (NBI rating of 3 or less) and with deficiencies that cover greater than 30 percent of the deck surface and bottom; this is considered a temporary holdover to improve ride quality when a bridge deck is scheduled to undergo major rehabilitation within five years. All HMA overlays need to be accompanied by an updated load rating. Patching of the concrete on a bridge deck is done in response to an inspector's work recommendation or when the deck surface is in good, satisfactory, or fair condition (NBI rating of 7, 6, or 5) with minor delamination and spalling. To preserve a good bridge deck in good condition, a deck sealer can be used.

  Deck sealing should only be done when the bridge deck has surface rating of fair or better (NBI of 5 or more). Concrete sealers should only be used when the top and bottom surfaces of the deck are free from major deficiencies, cracks, and spalling. An epoxy overlay may be used when between 2 and 5 percent of the deck surface has delaminations and spalls, but these deficiencies must be repaired prior to the overlay. An epoxy overlay may also be used to repair an existing epoxy overlay. Concrete crack sealing is an option to maintain concrete in otherwise good condition that has visible cracks with the potential of reaching the steel reinforcement. Crack sealing may be performed on concrete with a surface rating of good, satisfactory, or fair (NBIS rating of 7, 6, or 5) with minor surface spalling and delamination; it may also be performed in response to a work recommendation by an inspector who has determined that the frequency and size of the cracks require sealing.

- **Steel bearing repair/replacement:** Rather than sitting directly on the piers, a bridge superstructure is separated from the piers by bearings. Bearings allow for a certain degree of movement due to temperature changes or other forces. Repairing or replacing the bearings is considered preventive maintenance. Girders and a deck in at least fair condition (NBI of 5 or higher) and bearings in poor condition (NBI rating of 4 or less) identifies candidates for this maintenance activity.
- **Painting:** Re-painting a bridge structure can either be done in totality or in part. Total re-painting is done in response to an inspector's work recommendation or when the paint condition is in serious condition (NBI rating of 3 or less). Partial re-painting can either consist of zone re-painting, which is a preventive maintenance technique, or spot re-painting, which is scheduled maintenance (see below). Zone re-painting is done when less than 15 percent of the paint in a smaller area, or zone, has failed while the rest of the bridge is in good or fair condition. It is also done if the paint condition is fair or poor (NBI rating of 5 or 4).
- **Channel improvements:** Occasionally, it is necessary to make improvements to the waterway that flows underneath the bridge. Such channel improvements are driven by an inspector's work recommendation based on a hydraulic analysis or to remove vegetation, debris, or sediment from the channel and banks (Figure 6).
- **Scour countermeasures:** An inspector's work recommendations or a hydraulic analysis may require scour countermeasures (see the *Risk Management* section of this plan for more information on scour). This is done when a structure is categorized as scour critical and is not scheduled for replacement or when NBI comments in abutment and pier ratings indicate the presence of scour holes.
- **Approach repaving:** A bridge's approach is the transition area between the roadway leading up to and away from the bridge and the bridge deck. Repaving the approach areas is performed in response to an inspector's work recommendation, when the pavement surface is in poor condition (NBI rating of 4 or less), or when the bridge deck is replaced or rehabilitated (e.g., concrete overlay).
- **Guardrail repair/replacement:** A guardrail is a safety feature on many roads and bridges that prevents or minimizes the effects of lane departure incidents. Keeping bridge guardrails in good condition is important. Repair or replacement of bridge guardrail should be done when a guardrail is missing or damaged, or when it needs a safety improvement.

Scheduled Maintenance

Scheduled maintenance activities are those activities or treatments that are regularly scheduled and intend to maintain serviceability while reducing the rate of deterioration.

- **Superstructure washing:** Washing the superstructure, or the main structure supporting the bridge, typically occurs in response to an inspector's work recommendation or when salt-

contaminated dirt and debris collected on the superstructure is causing corrosion or deterioration by trapping moisture.

- **Drainage system cleanout/repair:** Keeping a bridge's drainage system clean and in good working order allows the bridge to shed water effectively. An inspector's work recommendation may indicate drainage system cleanout/repair. Signs that a drainage system needs cleaning or repair include clogs and broken, deteriorated, or damaged drainage elements.
- **Spot painting:** Spot painting is a form of partial bridge painting. This scheduled maintenance technique involves painting a small portion of a bridge. Generally, this is done in response to an inspector's work recommendation and is used for zinc-based paint systems only.
- **Slope repair/reinforcement:** The terrain on either side of the bridge that slopes down toward the channel is called the slope. At times, it is necessary to repair the slope. Situations that call for slope repair include when the slope is degraded, when the slope has significant areas of distress or failure, when the slope has settled, or if the slope is in fair or poor condition (NBI rating of 5 or less). Other times, it is necessary to reinforce the slope. Reinforcement can be added by installing Riprap, which is a side-slope covering made of stones. Riprap protects the stability of side slopes of channel banks when erosion threatens the surface.
- **Vegetation control and debris removal:** Keeping the area around a bridge structure free of vegetation and debris safeguards the bridge structure from these potentially damaging forces. Removing or restricting vegetation around bridges prevents damage to the structure. Vegetation control is done in response to an inspector's work recommendation or when vegetation traps moisture on structural elements or is growing from joints or cracks. Debris in the water channel or in the bridge can also cause damage to the structure. Removing this debris is typically done in response to an inspector's work recommendation or when vegetation, debris, or sediment accumulates on the structure or channel.
- **Miscellaneous repairs:** These are uncategorized repairs in response to an inspector's work recommendation.

1. BRIDGE ASSETS

CCRC seeks to implement an asset management program for its bridge structures. This program balances the decision to perform reconstruction, rehabilitation, preventive maintenance, scheduled maintenance, or new construction, with CCRC's bridge funding in order to maximize the useful service life and to ensure the safety of the local bridges under its jurisdiction. In other words, CCRC's bridge asset management program aims to preserve and/or improve the condition of its local bridge network within the means of its financial resources.

Nonetheless, CCRC recognizes that limited funds are available for improving the bridge network. Since preservation strategies like preventive maintenance are generally a more effective use of these funds than costly alternative management strategies like major rehabilitation or replacement, CCRC seeks to identify those bridges that will benefit from a planned maintenance program while addressing those bridges that pose usability and/or safety concerns.

The three-fold goal of CCRC's asset management program is the preservation and safety of its bridge network, increase of its bridge assets' useful service life by extending of the time that bridges remain in good and fair condition, and reduction of future maintenance costs. To quantify this goal, CCRC specifically aims to have to have 75% or more of the agency's local bridges in fair to good condition and to have less than 10% classify as structurally deficient over its three-year plan.

Thus, CCRC's asset management plan objectives are:

- To establish the current condition of the county's bridges
- To develop a "mix of fixes" that will:
    - Program scheduled maintenance actions to impede deterioration of bridges in good condition
    - Implement selective corrective repairs or rehabilitation for degraded bridge elements order to restore functionality
    - Identify and program those eligible bridges in need of replacement
- To identify available funding sources, such as:

    - Dedicated county resources
    - County funding through Michigan's Local Bridge Program
    - Opportunities to obtain other funding
- To prioritize the programmed actions within available funding limitations
- To improve the condition of bridges currently rated poor (4 or lower) and preserve bridges currently rated fair (5) or higher in their current condition in order to extend their useful service life.

Inventory

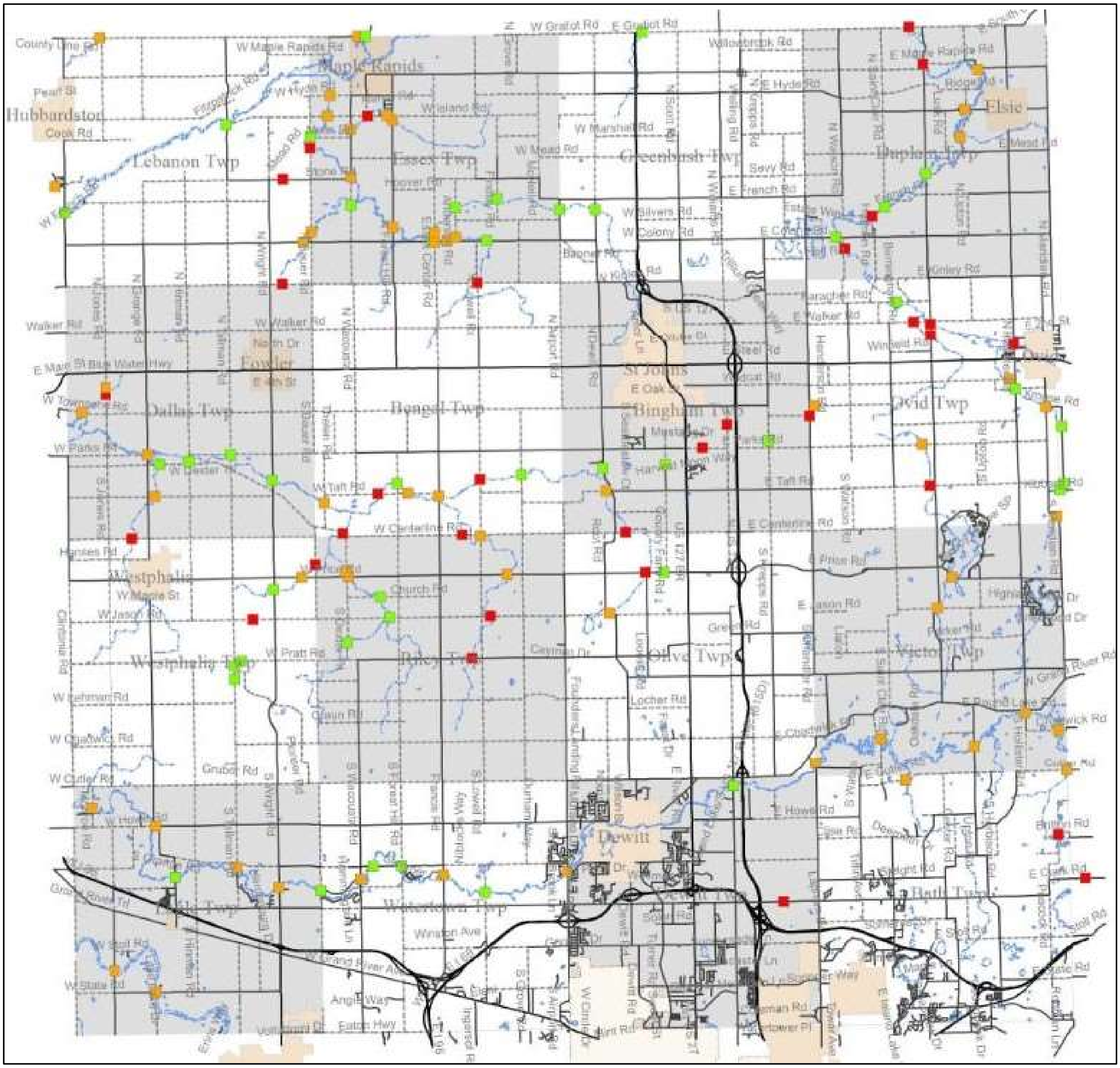
CCRC is responsible for 123 local bridges. Table 2 summarizes CCRC's bridge assets by type, sizes by bridge type, and condition by bridge type. Additional inventory data, condition ratings, and proposed preventive maintenance actions for each bridge are contained in the tables in Appendixes 3, 4, and 5. The bridge inventory data was obtained from MDOT MiBRIDGE and other sources, and the 2023 condition data and maintenance actions are taken from the inspector's summary report (see Appendix 2).

Types

Of the CCRC's 123 structures, 13 are concrete bridges, 17 are steel bridges, 91 are pre-stressed concrete bridges, and 2 are timber bridges.

Locations and Sizes

Figure 7 illustrates the locations of bridge assets owned by CCRC. Details about the locations and sizes of each individual asset can be found in CCRC's MiBRIDGE database. For more information, please refer to the agency contact listed in the *Introduction* of this bridge asset management plan.



Maple Rapids
Hubbardston
Lebanon Twp
Essex Twp
Greenbush Twp
Duplain Twp
Elsie
Fowler
St Johns
Dallas Twp
Bengal Twp
Bingham Twp
Ovid Twp
Ovid
Westphalia
Westphalia Twp
Riley Twp
Olive Twp
Victor Twp
DeWitt
Watertown Twp
Bath Twp
Eagle Twp

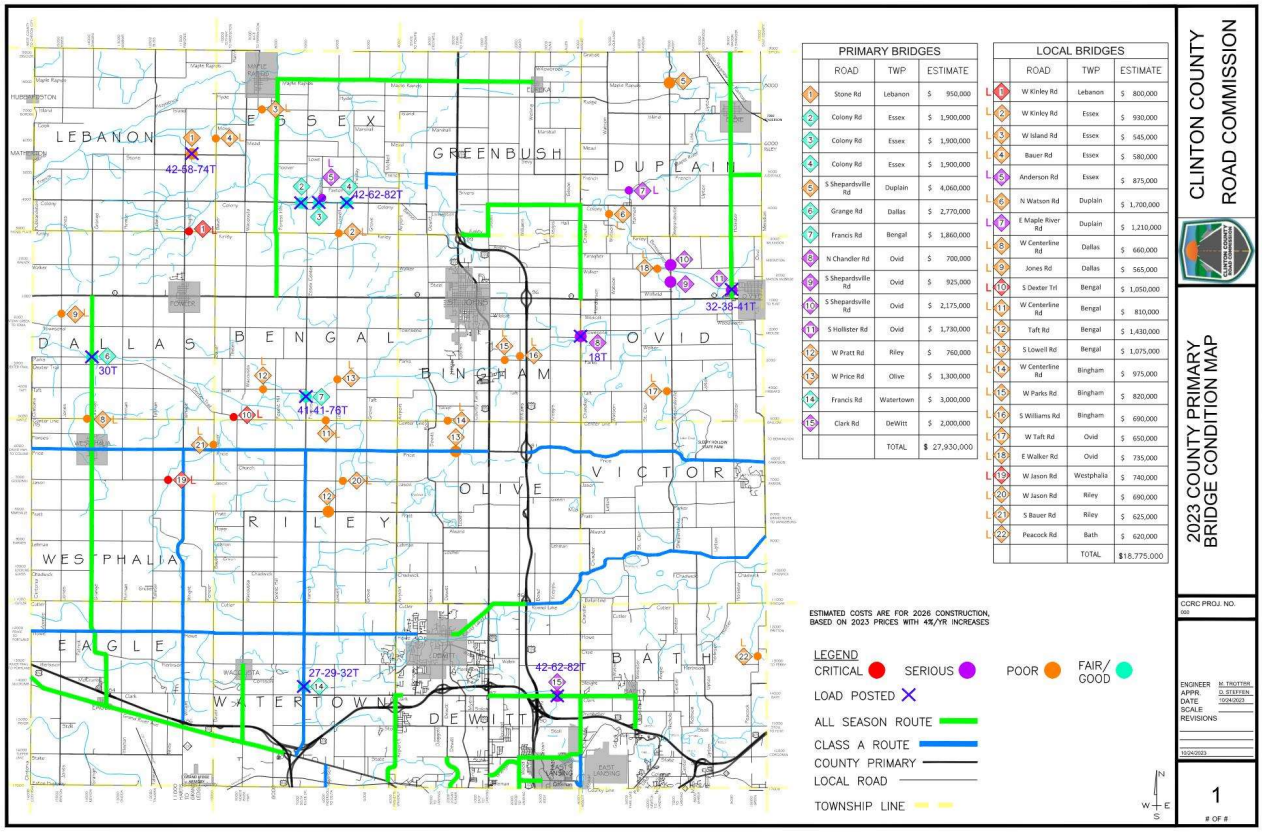


Figure 7: Map illustrating locations CCRC's of bridge assets

Condition

CCRC evaluates its bridges according to the National Bridge Inspection Standards rating scale, with a rating of 9 to 7 being like new to good condition, a rating of 6 and 5 being fair condition, and a rating of 4 or lower being poor or serious/critical condition. The current condition of CCRC's bridge network is 26 (21%) are good, 63 (51%) are fair, and 34 (28%) are poor or lower.

Another layer of classification of CCRC's bridge inventory classifies 34 (28%) bridges as structurally deficient, 11 (9) bridges as posted, and 3 (2) bridges as closed. Structurally deficient bridges are those with a deck, superstructure, substructure, and/or culvert rated as "poor" according to the NBI rating scale, with a load-carrying capacity significantly below design standards, or with a waterway that regularly overtops the bridge during floods. Posted bridges are those that have declined in condition to a point where a restriction is necessary for what would be considered a safe vehicular or traffic load passing over the bridge; designating a bridge as "posted" has no influence on its condition rating. Closed bridges are those that are closed to all traffic; closing a bridge is contingent upon its ability to carry a set minimum live load.

Table 2: Bridge Assets by Type: Inventory, Size, and Condition								
Bridge Type	Total Number of Bridges	Total Deck Area (sq ft)	Condition: Structurally Deficient, Posted, Closed			2023 Condition		
			Struct. Defic	Posted	Closed	Poor	Fair	Good
Concrete – Arch—thru	1	2,380	0	1	0	0	1	0
Concrete – Culvert	10	8,476	0	0	0	0	4	6
Concrete – Tee beam	2	1,221	2	2	0	2	0	0
Prestressed concrete – Box beam/girders—multiple	87	181,149	25	5	0	25	48	14
Prestressed concrete – Multistringer	3	15,913	0	0	0	0	2	1
Prestressed concrete – Tee beam	1	829	0	0	0	0	1	0
Steel – Box beam/girders—single/spread	2	10,221	0	0	0	0	0	2
Steel – Culvert	11	7,614	0	0	3	5	1	3
Steel – Multistringer	3	6,501	1	2	0	1	2	0
Steel – Truss—thru and pony	1	4,211	0	0	0	0	1	0
Timber – Slab	2	1,588	1	1	0	1	1	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
Total SD/Posted/Closed			**34**	**11**	**3**			
Total	**123**	**240,103**				**34**	**63**	**26**
Percentage (%)			**28%**	**9**	**2**	**28**	**51**	**21**

Statewide, MDOT's statistics for local agency bridges show that 14% are poor and 86% are good/fair, indicating that the CCRC has a greater percentage of poor bridges compared to the statewide average for local agencies. Correspondingly, CCRC has 72% of its bridges in fair/good condition versus the statewide

average of 86% for local agency bridges. Statewide, 97% of local agency bridge deck area classifies as structurally deficient compared to 28% of CCRC's bridge deck area.

Goals

The goal of CCRC's asset management program is the preservation and safety of its bridge network; it also aims to extend the period of time that bridges remain in good and fair condition, thereby increasing their useful service life and reducing future maintenance costs.

Specifically, this goal translates into long-range goals of having 75% of its bridges rated fair/good and having less than 10% classify as structurally deficient within 10 years. These goals are juxtaposed with the historic and current condition and the projected trend in Figure 8.

Several metrics will be used to assess the effectiveness of this asset management program. CCRC will monitor and report the annual change in the number of its bridges rated fair/good (5 or higher) and the annual change in the number of its bridges classified as structurally deficient.

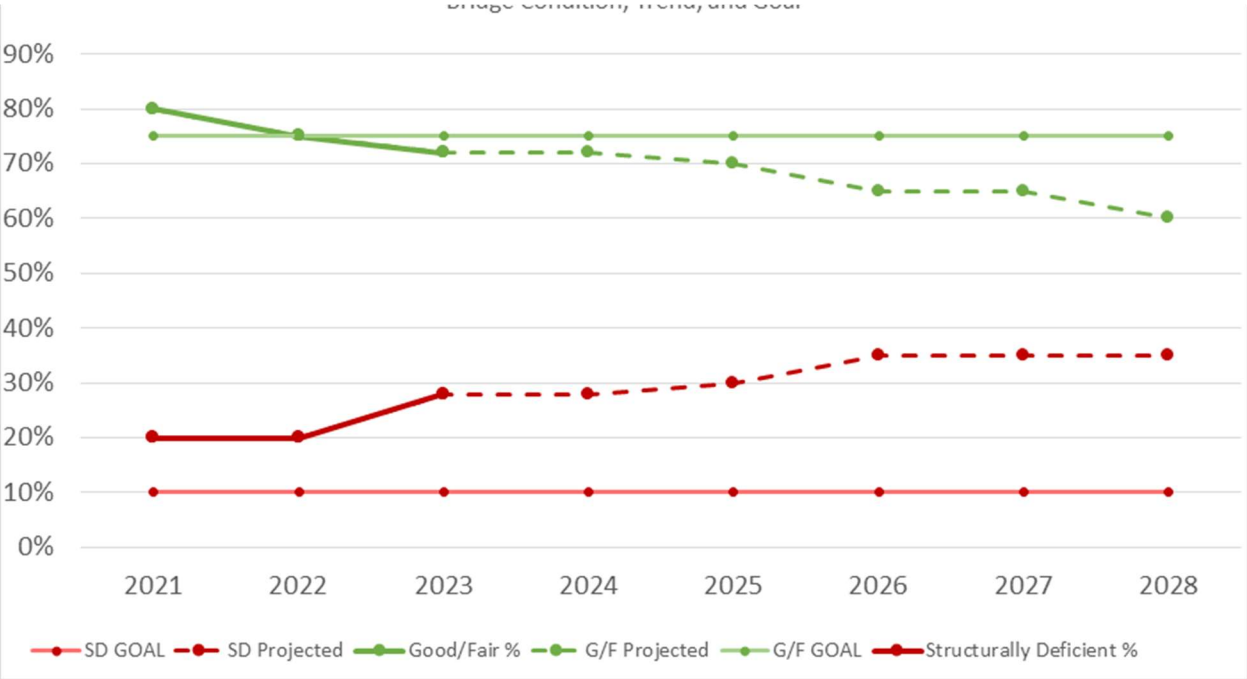

Figure 8: Progress tracking graph indicating CCRC's historic and current bridge conditions, projected trends, and goals.

Based on past inspection records and condition ratings, CCRC will establish a baseline of past performance by determining the average period of time that a bridge remains in good or fair condition. The performance measure will be the increased average amount of time a bridge is in the good or fair

condition status after implementation of the asset management strategy when compared to the baseline time before implementation.

Prioritization, Programmed/Funded Projects, and Planned Projects

Prioritization

CCRC's asset management program aims to address the structures of critical concern by targeting elements rated as being in poor condition and to improve and maintain the overall condition of the bridge network to good or fair condition through a "mix of fixes" strategy. Therefore, CCRC prioritizes bridges for projects by evaluating five factors and weighting them as follows: condition –25%, load capacity –25%, traffic –20%, safety –20%, and detour –10%. There are several components within each factor that are used to arrive at its score. Each project under consideration is scored, and its total score is then compared with other proposed project to establish a priority order.

CCRC annually reviews the current condition of each of the its bridges using the NBIS inspection data contained in the *MDOT Bridge Safety Inspection Report* and the inspector's work recommendations contained in MDOT's *Bridge Inspection Report*. The inspection inventory and condition data are consolidated in spreadsheet format for CCRC's bridges in Appendix 3. CCRC then determines management and preservation needs and corresponding actions for each bridge(Appendix 4) As well as inspection follow-up actions (Appendix 5). The management and preservation actions are selected in accordance with criteria contained in the *Summary of Preservation Criteria* table (below) and adapted to CCRC's specific bridge network.

Table 3: Summary of Preservation Criteria

Preservation Action	Bridge Selection Criteria	Expected Service Life
Replacement		
Total Replacement	• NBI rating of 3 or less [1] [2] • *OR* Cost of rehabilitation exceeds cost of replacement [1] • *OR* Bridge is scour critical with no counter-measures available [1]	70 years
Rehabilitation		
Superstructure Replacement	• NBI rating of 4 or less for the superstructure [1] [2] • *OR* Cost of superstructure and deck rehabilitation exceeds cost of replacement [1]	40 years [1]
Deck Replacement Epoxy Coated Steel Black Steel	• Use guidelines in MDOT's Bridge Deck Preservation Matrix [3] [4] • NBI rating of 4 or less for the deck surface and deck bottom [1] [2] • Deck bottom has more than 25% total area with deficiencies [1] • *OR* Replacement cost of deck is competitive with rehabilitation [1]	60+ years [3] [4]
Substructure Replacement (Full or Partial)	• NBI rating of 4 or less for abutments, piers, or pier cap [1] [2] • Has open vertical cracks, signs of differential settlement, or active movement [1] • Pontis rating of 3 or 5 for more than 30 percent of the substructure [1] [5]	40 years [1*]

Table 3: Summary of Preservation Criteria		
Preservation Action	**Bridge Selection Criteria**	**Expected Service Life**
	• *OR* Bridge is scour critical with no counter-measures available	
Steel Beam Repair	• More than 25% section loss in an area of the beam that affects load carrying capacity [1] • *OR* To correct impact damage that impairs beam strength [1]	40 years [1*]
Prestressed Concrete Beam Repair	• More than 5% spalling at ends of prestressed I-beams [1] • *OR* Impact damage that impairs beam strength or exposes prestressing strands [1]	40 years [1*]
Substructure Concrete Patching and Repair	• NBI rating of 5 or 4 for abutments or piers, and surface has less than 30% area spalled and delaminated [1] [2] • *OR* Pontis rating of 3 or 4 for the column or pile extension, pier wall, and/or abutment wall and surface has between 2% and 30% area with deficiencies [1] [5] • *OR* In response to inspector's work recommendation for substructure patching [1]	
Abutment Repair/Replacement	• NBI rating of 4 or less for the abutment [1] [2] • *OR* Has open vertical cracks, signs of differential settlement, or active movement	
Railing/Barrier Replacement	• NBI rating greater than 5 for the deck [1] [2] • NBI rating less than 5 for the railing with more than 30% total area having deficiencies [1] [2] • *OR* Pontis rating is 4 for railing [1] [5] • *OR* Safety improvement is needed [1]	
Culvert Repair/Replacement	• NBI rating of 4 or less for culvert or drainage outlet structure • *OR* Has open vertical cracks, signs of deformation, movement, or differential settlement	
Preventive Maintenance		
Shallow Concrete Deck Overlay	• NBI rating is 5 or less for deck surface, and deck surface has more than 15% area with deficiencies [1] [2] • NBI rating of 4 or 5 for deck bottom, and deck bottom has between 5% and 30% area with deficiencies [1] [2] • *OR* In response to inspector's work recommendation [1]	12 years
Deep Concrete Deck Overlay	• NBI rating of 5 or less for deck surface, and deck surface has more than 15% area with deficiencies [1] [2] • NBI deck bottom rating is 5 or 6, and deck bottom has less than 10% area with deficiencies [1] [2] • *OR* In response to inspector's work recommendation [1]	25 years
HMA Overlay with Waterproofing Membrane	• NBI rating of 5 or less for deck surface, and both deck surface and bottom have between 15% and 30% area with deficiencies [1] [2] • *OR* Bridge is in poor condition and will be replaced in the near future and the most cost-effective fix is HMA overlay [1]	
HMA Overlay Cap without Membrane	• Note: All HMA caps should have membranes unless scheduled for replacement within five years. • NBI rating of 3 or less for deck surface and deck bottom, and deck surface and deck bottom have more than 30% area with deficiencies. Temporary holdover to improve ride quality for a bridge in the five-year plan for rehab/replacement. [1] [2]	3 years

Table 3: Summary of Preservation Criteria		
Preservation Action	**Bridge Selection Criteria**	**Expected Service Life**
Concrete Deck Patching	• NBI rating of 5, 6, or 7 for deck surface, and deck surface has between 2% and 5% area with delamination and spalling [1] [2] • *OR* In response to inspector's work recommendation [1]	5 years
Steel Bearing Repair/Replacement	• NBI rating of 5 or more for superstructure and deck, and NBI rating 4 or less for bearing [2]	
Deck Joint Replacement	• Always include when doing deep or shallow concrete overlays [1] • NBI rating of 4 or less for joints [1] [2] • *OR* Joint leaking heavily [1] • *OR* In response to inspector's work recommendation for replacement [1]	
Pin and Hanger Replacement	• NBI rating of 4 or less for superstructure for pins and hangers [1] [2] • Pontis rating of 1, 2, or 3 for a frozen or deformed pin and hanger [1] [5] • *OR* Presence of excessive section loss, severe pack rust, or out-of-plane distortion [1]	15 years
Zone Repainting	• NBI rating of 5 or 4 for paint condition, and paint has 3% to 15% total area failing [1] [2] • *OR* During routine maintenance on beam ends or pins and hangers [1] • *OR* less than 15% of existing paint area has failed and remainder of paint system is in good or fair condition [1]	10 years
Complete Repainting	• NBI rating of 3 or less for paint condition [1] [2] • *OR* Painted steel beams that have greater than 15% of the existing paint area failing [1]	
Partial Repainting	• See Zone or Spot Painting	
Channel Improvements	• Removal of vegetation, debris, or sediment from channel and banks to improve channel flow • *OR* in response to inspector's work recommendation	
Scour Countermeasures	• Pontis scour rating of 2 or 3 and is not scheduled for replacement [1] [5] • OR NBI comments in abutment and pier ratings indicate presence of scour holes [1] [2]	

Approach Repaving	• Approach pavement relief joints should be included in all projects that contain a significant amount of concrete roadway (in excess of 1000' adjacent to the structure). The purpose is to alleviate the effects of pavement growth that may cause distress to the structure. Signs of pavement growth include:
	  ○ Abutment spalling under bearings [1]
	  ○ Beam end contact [1]
	  ○ Closed expansion joints and/or pin and hangers [1]
	  ○ Damaged railing and deck fascia at joints [1]
	  ○ Cracking in deck at reference line (45 degree angle) [1]	

Guard Rail Repair/Replacement	• Guard rail missing or damaged [2*] • *OR* Safety improvement is needed [2*]	
Scheduled Maintenance		

Table 3: Summary of Preservation Criteria		
Preservation Action	**Bridge Selection Criteria**	**Expected Service Life**
Superstructure Washing	• When salt contaminated dirt and debris collected on superstructure is causing corrosion or deterioration by trapping moisture [1] • *OR* Expansion or construction joints are to be replaced and the steel is not to be repainted [1] • *OR* Prior to a detailed replacement [1] • *OR* In response to inspector's work recommendation [1]	2 years
Drainage System Clean-Out/Repair	• When drainage system is clogged with debris [1] • *OR* Drainage elements are broken, deteriorated, or damaged [1] • *OR* NBI rating comments for drainage system indicate need for cleaning or repair [1] [2]	2 years
Spot Repainting	• For zinc-based paint systems only. Do not spot paint with lead-based paints. • Less than 5% of paint area has failed in isolated areas [1] • *OR* In response to inspector's work recommendation [1]	5 years
Slope Paving Repair	• NBI rating is 5 or less for slope protection [1] [2] • *OR* Slope is degraded or sloughed • *OR* Slope paving has significant areas of distress, failure, or has settled [1]	
Riprap Installation	• To protect surface when erosion threatens the stability of side slopes of channel banks	
Vegetation Control	• When vegetation traps moisture on structural elements [1] • *OR* Vegetation is growing from joints or cracks [1] • *OR* In response to inspector's work recommendation for brush cut [1]	1 year
Debris Removal	• When vegetation, debris, or sediment accumulates on the structure or in the channel • *OR* In response to inspectors work recommendation	1 year
Deck Joint Repair	• Do not repair compression joint seals, assembly joint seals, steel armor expansions joints, and block out expansion joints; these should always be replaced. [1] • NBI rating is 5 for joint [1] [2] • *OR* In response to inspector's work recommendation for repair [1]	
Concrete Sealing	• Top surface of pier or abutments are below deck joints and, when contaminated with salt, salt can collect on the surface [1] • *OR* Surface of the concrete has heavy salt exposure. Horizontal surfaces of substructure elements are directly below expansion joints [1]	
Concrete Crack Sealing	• Concrete is in good or fair condition, and cracks extend to the depth of the steel reinforcement [1] • *OR* NBI rating of 5, 6, or 7 for deck surface, and deck surface has between 2% and 5% area with deficiencies [1] [2] • *OR* Unsealed cracks exist that are narrow and/or less than 1/8" wide and spaced more than 8' apart [1] • *OR* In response to inspector's work recommendation [1]	5 years
Minor Concrete Patching	• Repair minor delaminations and spalling that cover less than 30% of the concrete substructure [1]	

Table 3: Summary of Preservation Criteria		
Preservation Action	**Bridge Selection Criteria**	**Expected Service Life**
	• *OR* NBI rating of 5 or 4 for abutments or piers, and comments indicate that their surface has less than 30% spalling or delamination [1] [2] • *OR* Pontis rating of 3 or 4 for the column or pile extension, pier wall and/or abutment wall, and surface has between 2% and 30% area with deficiencies [1] [5] • *OR* In response to inspector's work recommendation [1]	
HMA Surface Repair/Replacement	• HMA surface is in poor condition • *OR* In response to inspector's work recommendation	
Seal HMA Cracks/Joints	• HMA surface is in good or fair condition, and cracks extend to the surface of the underlying slab or sub course • *OR* In response to inspector's work recommendation	
Timber Repair	• NBI rating of 4 or less for substructure for timber members • *OR* To repair extensive rot, checking, or insect infestation	
Miscellaneous Repair	• Uncategorized repairs in response to inspector's work recommendation	
This table was produced by TransSystems and includes information from the following sources: [1] MDOT, *Project Scoping Manual*, MDOT, 2019. [2] MDOT, *MDOT NBI Rating Guidelines*, MDOT, 2017. [3] MDOT, *Bridge Deck Preservation Matrix - Decks with Uncoated "Black" Rebar*, MDOT, 2017. [4] MDOT, *Bridge Deck Preservation Matrix - Decks with Epoxy Coated Rebar*, 2017. [5] MDOT, *Pontis Bridge Inspection Manual*, MDOT, 2009. * From source with interpretation added.		

In terms of management and preservation actions, CCRC's asset management program uses a "mix of fixes" strategy that is made up of replacement, rehabilitation, preventive maintenance, and scheduled maintenance.

Replacement involves substantial changes to the existing structure, such as bridge deck replacement, superstructure replacement, or complete structure replacement, and is intended to improve critical or closed bridges to a good condition rating.

Rehabilitation is undertaken to extend the service life of existing bridges. The work will restore deficient bridges to a condition of structural or functional adequacy, and may include upgrading geometric features. Rehabilitation actions are intended to improve the poor or fair condition bridges to fair or good condition.

Preventive maintenance work will improve and extend the service life of fair bridges, and will be performed with the understanding that future rehabilitation or replacement projects will contain appropriate safety and geometric enhancements. Preventive maintenance projects are directed at limited bridge elements that are rated in fair condition with the intent of improving these elements to a good rating. Most preventive maintenance projects will be one-time actions in

response to a condition state need. Routine preventive work will be performed by the agency's in-house maintenance crews while larger, more complex work will be contracted.

CCRC's **scheduled maintenance** program is an integral part of the preservation plan, and is intended to extend the service life of fair and good structures by preserving the bridges in their current condition for a longer period of time. Scheduled maintenance is proactive and not necessarily condition driven. In-house maintenance crews will perform much of this work.

Certain of the severely degraded and structurally deficient bridges require replacement or major rehabilitation. Several of the remaining bridges require one-time preventive maintenance actions to repair defects and restore the structure to a higher condition rating. Most bridges are included in a scheduled maintenance plan with appropriate maintenance actions programmed for groups of bridges of similar material and type, bundled by location.

The replacement, rehabilitation, and preventive maintenance projects are generally eligible for funding under the local bridge program, and any requests for funding will be submitted with CLINTON COUNTY ROAD COMMISSION's annual applications.

To achieve its goals, a primary objective of CCRC's asset management program is improvement of five bridges rated poor (4 or lower) to a rating of fair (5) or higher within a three-year time period through management and/or preservation activities. The primary work activities that will be used to meet this improvement objective include replacement, rehabilitation, preventive maintenance, and scheduled maintenance.The work has been prioritized by considering each individual bridge's needs, its importance, the present costs of improvements, and the impact of deferral (i.e., cost increase due to increased degradation). Additionally, CCRC's asset management program incorporates preservation of bridges currently rated fair (5) or higher in their current condition in order to extend their useful service life. The primary work activities used to meet this preservation objective include preventive maintenance. A bridge-by-bridge preservation—or maintenance—plan is presented in the Appendix 4.

Programmed/Funded Projects

CCRC received $62,000 in total funding per year for the years 2023-2026. To achieve its goals, CCRC plans to spend $62,000 per year on preventive maintenance of bridges. CCRC plans to replace four bridges at a cost of $2,000,000. By performing the aforementioned preventive maintenance and replacement of bridge structures, CCRC will not meet its overall bridge network condition goals.

CCRC computes the estimated cost of each typical management and/or preservation action using unit prices in the latest *Bridge Repair Cost Estimate* spreadsheet contained in MDOT's *Local Bridge Program Call for Projects*. The cost of items of varying complexity, such as maintenance of traffic, staged construction, scour counter-measures, and so forth, are computed on a bridge-by-bridge basis. The cost estimates are reviewed and updated annually. A summary of the programmed/funded projects and investments can be found in Table 4, the Cost Projection table, below.

Planned Projects

CCRC identifies additional priority projects that remain unfunded. These are identified according to high, medium, and low priority in Table 4.

Table 4: Cost Projection Table

Strategy	2023	2024	2025	2026	2027	GAP
New						
SN	-	-	-	-	-	-
Subtotal	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
Replacement						
SN 1896	-	-	-	-	$1,873,000	-
1917	-	-	-	-	$2,319,000	-
1935	-	-	-	-	$765,000	-
1936	-	-	-	-	$1,820,000	-
1940	-	-	-	-	$1,446,000	-
Subtotal	*$0*	*$0*	*$0*	*$0*	*$8,223,000*	*$0*
Rehabilitation						
SN	-	-	-	-	-	-
Subtotal	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
Scheduled Maintenance						
SN	-	-	-	-	-	-
Subtotal	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
Preventive Maintenance						
1938	-	$64,000	-	-	-	-
Subtotal	*$0*	*$64,000*	*$0*	*$0*	*$0*	*$0*
Other - Culvert						
1945	-	$894,000	-	-	-	-
1997	-	$593,000	-	-	-	-
1934	-	$416,000	-	-	-	-
2023	-	-	$545,000	-	-	-
Subtotal	*$0*	*$1,903,000*	*$545,000*	*$0*	*$0*	*$0*

Gap Analysis

When CCRC compares its funding and its programmed/funded projects with all of its prioritized projects as shown in Table 4, CCRC believes it should be able to achieve some of its asset management goals for the period of this plan. For projects that it is unable to complete, CCRC will continue to monitor those bridge assets and take any necessary steps within its budget to prevent or mitigate a condition decline or a need to post or close the structure.

2. FINANCIAL RESOURCES

Anticipated Revenues

CCRC has programmed projects and/or has been granted funding from several sources including, but not limited to MDOT local aid, a county appropriation of monies for bridge preservation, and federal programs, for the purpose(s) of replacement, rehabilitation, preventive maintenance, and scheduled maintenance for the following bridge(s): 1934, 1938, 1945, 1997, and 2023. This funding is intended for use in the following funding year(s): 2024 - 2026.

CCRC applied for MDOT local-aid funding in 2023 for the purpose(s) of replacement, rehabilitation, preventive maintenance, and scheduled maintenance for the following bridge(s): 1917, 1896, 1940, and 1945. This funding would be intended for use in the following funding year(s): 2026

CCRC plans to prepare and submit applications for MDOT local-aid funding for the purpose(s) of replacement, rehabilitation, preventive maintenance, and scheduled maintenance for the following bridge(s): 1917, 1896, 1940, and 1945. This funding would be intended for use in the following funding year(s): 2027.

Any projects submitted to the local aid program that are not selected for funding will be added to the agency's program.

Anticipated Expenses

Scheduled maintenance activities and minor repairs that are not affiliated with any applications, grants, or other funded projects will be performed by the agency's in-house maintenance forces and funded through the agency's annual operating budget.

3. RISK MANAGEMENT

CCRC recognizes that the potential risks associated with bridges generally fall into several categories:

- Personal injury and property damage resulting from a bridge collapse or partial failure;
- Loss of access to a region or individual properties resulting from bridge closures, restricted load postings, or extended outages for rehabilitation and repair activities; and
- Delays, congestion, and inconvenience due to serviceability issues, such as poor quality riding surface, loose expansion joints, or missing expansion joints.

CCRC addresses these risks by implementing regular bridge inspections and a preservation strategy consisting of preventive maintenance.

CCRC administers the biennial inspection of its bridges in accordance with NBIS and MDOT requirements. The inspection reports document the condition of CCRC's bridges and evaluates them in order to identify new defects and monitor advancing deterioration. The summary inspection report in Appendix 1 identifies items needing follow-up, special inspection actions, and recommended bridge-by-bridge maintenance activities.

Bridges that are considered "scour critical" pose a risk to CCRC's road and bridge network. Scour is the depletion of sediment from around the foundation elements of a bridge commonly caused by fast-moving water. According to MDOT's *Michigan Structure Inventory and Appraisal Coding Guide*, a scour critical bridge is one that has unstable abutment(s) and/or pier(s) due to observed or potential (based on an evaluation study) scour. Bridges receiving a scour rating of 3 or less are considered scour critical. CCRC has scour critical bridges, which are listed in Table 5.

Table 5: Bridges that are Considered Scour Critical

Scour Critical Bridges	
Bridge Structure Number	**Scour Critical Rating**
1934	3
1943	3
1944	3
1945	3
1946	3
1947	3
1949	3
1951	3
1953	3
1955	3
1958	3
1960	3
1963	3
1965	3
1966	3
1969	3
1971	3
1972	3
1979	3
1980	3
1983	3
1986	3
1989	3
1990	3
2001	3
2003	3
2004	3
2009	3
2010	3
2014	3
2015	3

CCRC has posted or closed bridges that are critical to accessing entire areas or individual properties within its jurisdiction. These bridges are listed in Table 6.

Table 6: Posted or Close Bridges that are Critical Links

Posted/Closed Bridges that are Critical Links		
Bridge Structure Number	**P/K**	**Comments**
1896	P	ALL SEASON
1907	P	PRIMARY
1908	P	PRIMARY
1909	P	PRIMARY
1911	P	PRIMARY
1917	P	ALL SEASON
1926	P	PRIMARY - CLASS A
1927	P	PRIMARY
1934	P	PRIMARY
1940	P	ALL SEASON

The preservation strategy identifies actions in the operations and maintenance plan that are preventive or are responsive to specific bridge conditions. The actions are prioritized to correct critical structural safety and traffic issues first, and then to address other needs based on the operational importance of each bridge and the long-term preservation of the network. The inspection results serve as a basis for modifying and updating the operations and maintenance plan annually.

Appendix 1

Clinton County Road Commission 2023 Bridge Inspection Report Summary of Additional Inspection Recommendations

2017	Babcock Rd over Looking Glass River: 12 Month inspection frequency
2018	Hollister Rd over Looking Glass River: 12 Month inspection frequency
1986	Bauer Rd over Hayworth Creek: 12 Month inspection frequency
1955	Parks Rd over Spaulding Ext: 12 Month inspection frequency
1953	Centerline over Stony Creek: 12 Month inspection frequency
1947	Taft Rd over Stony Creek: 12 Month inspection frequency
1992	Anderson Rd over S Fork Hayworth: 12 Month inspection frequency
[#####]	[Name of road or drive] over [Name the feature intersected]: [Write a summary of additional inspection recommendations].

Appendix 2

Clinton County Road Commission 2023 Bridge Inspection Report Executive Summary

General Recommendations

SN 1899 PRATT ROAD over BAD CREEK: Fill large hole in front of SW wing ASAP and fix SW wing boards.

SN 1946 CENTER LINE ROAD over BAD CREEK: Grade out large gravel potholes both approaches ASAP.

SN 1947 TAFT ROAD over STONY CREEK: HMA wedge repair 9" min along entire west ref line ASAP.

SN 1949 BAUER ROAD over STONY CREEK: Wedge/pave 1" settlement at both ref lines. Crackseal 1/4" to 1/2" block cracking on deck and patch 1.5" deep midspan pothole. ASAP!

SN 1955 PARKS ROAD over SPAULDING EXTENSION: Repair SW shoulder fall away ASAP - threatening guardrail post embedment and shoulder. Fix NE approach slope 18" deep channel washout.

SN 1978 TALLMAN ROAD over LOOKING GLASS RIVER: Scrape railing openings of mounded dirt and moss ASAP. Fill hole developing around 1st post off bridge SE quad.

SN 2017 BABCOCK ROAD over LOOKING GLASS RIVER: Crackseal and patch joints and many 1/8" cracks on deck and approaches ASAP. Consider as a PM project (see below)

SN 2022 LOWELL ROAD over LOOKING GLASS RIVER: Remove dirt, moss, & vegetation trapped on top of lower chord of both trusses ASAP. The bottom chord web is horizontal and is not self cleaning – galvanizing will be compromised if debris is left to rot trapped on top of the bottom chord web.

SN 13138 CHURCH ROAD over MUSKRAT CREEK: Repair failing slopes around 4 bridge corners and wingwalls ASAP. Fill in south shoulder failure 3' diameter x 1' deep hole 32" in front of S rail near E ref line ASAP! The slopes are so steep that sheet piling may be what is needed there.

SN 1986 Bauer Rd/Hayworth – NE Wingwall spalling and horizontal movement has noticeably increased – please take a look at any options to halt the movement such as strapping.

SN 2007 Hollister Rd/Alder Ck – The 15” wide pavement retainer sitting on the ends of the culverts is disintegrating with its wire bar exposed. Chip out retainers and pour new ones.

SN 2021 Bauer Rd/Lg – the glulam timber bridge railing is starting to have deep checking almost to the point of delaminating. Something to monitor for a potential future rail replacement maybe 5 or 10 years down the road.

1981 Island Rd/Cox Drain – Pipes are usually ¾ full and bottom is not visible. Per our conversation, contract out a video inspection with underwater photos of the pipe.

Scraping and clearing of gutters we noticed that you were able to scrape and clear gutters on a few bridges – we recommend to accelerate that effort to prevent the trapping of water (some salted) from the heavy mud and vegetation on most of your bridge inventory which shortens life spans.

Log Jams against piers Consider removing large trees trapped against piers at low water levels (see column in work recs for bridges with log debris)

Increased Inspection Frequency The following structures have progressed from biannual to 12 month frequency:

2017 Babcock/LG, 2018 Hollister/LG, 1986 Bauer Rd/Hayworth Ck, 1955 Parks Rd/Spaulding Ext, 1953 Centerline Rd/Stony Ck, 1947 Taft Rd/Stony Ck, SN1992 Anderson Rd/S Fork Hayworth

Local Bridge Program Funding Potential Projects

2017 Babcock/Lookinglass: Deep spalling on the fascia beams is occurring at concentrated drainage locations & possibly combined with material failure. The pier expansion joint device does not extend full width causing lots of spalling. Beam patching could give the bridge many more years. Suggested PM project could include: Deep Hand Chipping, Deep, Patching Conc, C-L, HMA Mill and Fill including preformed waterproofing membrane, enw pier expansion joint device, and new approach HMA & base section to fix settlement.

1993 Findlay Rd/Hayworth – perfect project for an Epoxy Overlay of the bridge, approach slabs, & sleeper slabs to repair the premature cracking & halt any further cracking.

1940 Hollister Rd/Maple River. The east fascia beam has heavy corrosion & delamination, especially the top flange and top of web near midspan. MDOT's reach-all truck can be contracted free to be able to get a hands on view of the steel loss. Also, about 10" of HMA has been placed on the deck through the years to the top of the curbs – milling portions of the HMA & unearthing & paving the gutters with opening for the existing floor drains is recommended to substantially decrease dead load.

Multiple projects could be combined to HMA wedge approaches to fix settlements problems leading to spalling, etc.

SN 1947, 1948, & 1949 come to mind but many more could be added.

[Township or Other Division]

[#####] [Name of road or drive] over [Name the feature intersected]
Constructed: [YYYY] **Reconstructed:** [YYYY] **General Condition:** [Condition]
Description: [Write a description of the structure].
Recommendations: [Write a description of the recommendations for this structure].

Appendix 3

Inventory Data														Inspection Findings													Appraisal				
Bridge Type	Structure Number	Bridge ID	Facility Carried	Features Intersected	Primary or Secondary Route	StructureType Main Span (Item 43A - Material)	StructureType Main Span (Item43B)	Number of Main Span (Item 45)	Total Str Length(Item 49)	Year Built (Item 27)	Year Reconstr (Item 106)	ADT	Year of ADT	Inspection Date	Operational Status (Item 41)	Deck Rating (Item 58)	Deck Bottom Rating (Item XX)	SuperStr Rating (Item 59)	Substr Rating (Item 60)	Channel Rating (Item 61)	Culvert Rating (Item 62)	Surface Rating (Item 58A)	Paint Rtg	Exp Joint Rating (Item XX)	Other Joints	Structure Evaluation	Structurally Deficient	Sufficiency Rating	Section Loss	Scour Critical (Item 113)
Prestressed concrete – Box beam/girders—multiple	1895	1920000100 0B010	STATE ROAD	GRAND RIVER	Primary	5	5	4	248	1979	2012	875	2012	10/7/2022	A	7	N	8	6	6	N	7	N	7	7	F		90.9	N	5
Prestressed concrete – Box beam/girders—multiple	1896	1920000400 0B010	CLARK RD	BR OF LOOKING GLASS RIVR	Primary	5	5	1	50.9	1963		4198	2011	10/2/2023	P	3	N	3	6	6	N	6	N	N	N	P	Struct Def		3	5
Prestressed concrete – Box beam/girders—multiple	1897	1920000600 0B010	HOWE ROAD	LOOKING GLASS RIVER	Primary	5	5	3	149.9	1966		345	2011	10/7/2022	A	7	N	6	7	6	N	5	N	3	6	F		86.2	N	5
Concrete – Culvert	1898	1920001000 0B010	PRATT RD	MORRIS DRAIN	Primary	1	19	1	26.1	2015		107	2014	10/24/2023	A	N		N	N	7	8					G	Funct Obs			5
Timber – Slab	1899	1920001000 0B020	PRATT ROAD	BAD CREEK	Primary	7	1	1	20	1960		598	2011	10/20/2023	P	6	6	6	4	5	N	8	N	N	N	P	Struct Def		N	7
Prestressed concrete – Box beam/girders—multiple	1900	1920001100 0B010	PRICE RD	MORRIS DRAIN	Primary	5	5	1	55.8	1991		971	2011	10/17/2022	A	6	N	6	8	6	N	7	N	N	7	F		98.1	N	8
Prestressed concrete – Box beam/girders—multiple	1901	1920001100 0B020	PRICE RD	MUSKRAT CREEK	Primary	5	5	1	35.8	1987		1881	2011	10/17/2022	A	7	N	7	6	6	N	6	N	N	6	F		99	N	8
Prestressed concrete – Box beam/girders—multiple	1902	1920001100 0B030	PRICE RD	BAD CREEK	Primary	5	5	1	30.8	1928	1985	2115	2011	10/17/2022	A	6	N	6	5	5	N	7	N	N	N	F		83.3	N	5
Prestressed concrete – Box beam/girders—multiple	1903	1920001100 0B040	PRICE RD	STONY CREEK	Primary	5	5	1	30.8	1928	1985	2377	2011	10/17/2022	A	7	N	6	4	6	N	7	N	N	7	P	Struct Def	67.2	N	4
Prestressed concrete – Box beam/girders—multiple	1904	1920001100 0B050	PRICE ROAD	STONY CRK DRN	Primary	5	5	1	29.9	1980		2377	2011	10/17/2022	A	7	N	7	7	6	N	7	N	N	7	G		95.3	N	5
Timber – Slab	1905	1920001100 0B060	PRICE ROAD	LITTLE MAPLE RIVER	Primary	7	1	1	29.9	1992		1936	2011	10/5/2022	A	6	7	6	7	6	N	7	N	N	7	F		99	N	5
Prestressed concrete – Box beam/girders—multiple	1906	1920001200 0B010	COLONY ROAD	W. BR. HAYWORTH(PEET CR)	Primary	5	5	1	46.9	1995		1202	2011	10/13/2022	A	7	N	6	8	5	N	5	N	N	6	F		96.7	N	8
Prestressed concrete – Box beam/girders—multiple	1907	1920001200 0B020	COLONY ROAD	SO FORK HAYWORTH CREEK	Primary	5	5	1	50.9	1965		1593	2017	10/14/2022	P	7	N	6	7	6	N	7	N	N	7	F		78.4	N	5
Prestressed concrete – Box beam/girders—multiple	1908	1920001200 0B030	COLONY ROAD	S FORK HAYWORTH CRK	Primary	5	5	1	50.9	1965		1593	2017	10/14/2022	P	7	N	7	8	6	N	8	N	N	N	G		78.4	N	5
Prestressed concrete – Box beam/girders—multiple	1909	1920001200 0B040	COLONY ROAD	SO FORK OF HAYWORTH G.R.	Primary	5	5	1	50.9	1965		1593	2017	10/14/2022	P	7	N	7	7	6	N	7	N	N	N	G		78.4	N	5
Prestressed concrete – Box beam/girders—multiple	1910	1920001200 0B070	COLONY RD	MAPLE RIVER	Primary	5	5	1	122	2013		1292	2012	10/3/2023	A	7	N	7	8	8	N	7	N	8	7	G			N	8
Concrete – Tee beam	1911	1920001500 0B010	STONE ROAD	MAPLE RIVER DRAIN	Primary	1	4	1	24.9	1938	1984	505	2011	10/13/2022	P	6	6	5	4	5	N	6	N	N	N	P	Struct Def	47.9	N	5
Concrete – Culvert	1912	1920001600 0B010	GRATIOT ROAD	OVERFLOW PINE RIVER	Primary	1	19	1	22	1985		1157	2011	10/13/2022	A	N		N	N	6	6					F		96.1		5
Prestressed concrete – Box beam/girders—multiple	1913	1920001600 0B020	GRATIOT RD	PINE RIVER	Primary	5	5	2	82	1980		1157	2011	10/13/2022	A	7	N	7	7	6	N	6	N	6	7	G		87.5	N	5
Prestressed concrete – Box beam/girders—multiple	1914	1920001700 0B010	ISLAND ROAD	MAPLE RIVER	Primary	5	5	3	189	1966		1080	2018	10/2/2023	A	6	N	6	6	6	N	7	N	6	N	F			N	5
Steel – Box beam/girders—single/spread	1915	1920002200 0B010	TALLMAN ROAD	MAPLE RIVER	Primary	3	6	3	192.2	1969	2022	1263	2020	9/30/2022	A	9	9	9	7	6	N	9	9	8	9	G		88.6	3	5
Prestressed concrete – Box beam/girders—multiple	1916	1920002300 0B010	GRANGE ROAD	LOOKING GLASS RIVER	Primary	5	5	2	140.3	2008		2311	2011	10/7/2022	A	7	N	7	8	7	N	7	N	7	7	G		94.9	N	8
Concrete – Arch—thru	1917	1920002300 0B020	GRANGE ROAD	STONY CREEK	Primary	1	12	1	91.9	1916		1299	2011	10/13/2022	P	6	5	5	5	6	N	6	N	N	6	F	Funct Obs	45.4	N	5
Prestressed concrete – Box beam/girders—multiple	1918	1920002400 0B010	WRIGHT ROAD	LOOKING GLASS RIVER	Primary	5	5	3	165	1996		3658	2011	10/7/2022	A	7	N	6	7	7	N	6	N	6	7	F		92.1	N	5
Concrete – Culvert	1919	1920002400 0B020	WRIGHT ROAD	MORRIS DRAIN	Primary	1	19	1	20	2007		1026	2011	10/14/2022	A	N		N	N	6	8					G		99.7		5
Prestressed concrete – Box beam/girders—multiple	1920	1920002400 0B030	WRIGHT ROAD	STONY CREEK	Primary	5	5	1	94	2007		2096	2011	10/14/2022	A	7	N	7	8	7	N	7	N	7	N	G		99.4	N	8
Steel – Multistringer	1921	1920002500 0B010	WACOUSTA ROAD	LOOKING GLASS RIVER	Primary	3	2	2	90	1955		1821	2014	10/7/2022	A	7	7	5	7	6	N	8	8	7	8	F		71.6	1	5
Prestressed concrete – Multistringer	1922	1920002600 0B010	WACOUSTA ROAD	HAYWORTH DRAIN	Primary	5	2	1	104	1991		498	2011	10/13/2022	A	7	8	8	6	8	N	7	N	6	6	F		97.6	N	8
Prestressed concrete – Box beam/girders—multiple	1923	1920002600 0B020	WACOUSTA ROAD	COX DRAIN (BROWN'S CR)	Primary	5	5	1	37.7	1991		441	2011	10/13/2022	A	7	N	6	6	7	N	7	N	N	6	F		99.9	N	8
Prestressed concrete – Box beam/girders—multiple	1924	1920002700 0B010	FOREST HILL RD	HAYWORTH CREEK	Primary	5	5	2	86	1963	2020	1351	2010	10/14/2022	A	6	N	6	7	6	N	7	N	7	7	F	Funct Obs	74.6	N	5
Prestressed concrete – Box beam/girders—multiple	1925	1920002700 0B020	FOREST HILL ROAD	COX DRAIN	Primary	5	5	1	31.8	1968		1635	2011	10/14/2022	A	6	N	6	7	6	N	7	N	N	7	F		82.4	N	5
Prestressed concrete – Box beam/girders—multiple	1926	1920002800 0B010	FRANCIS ROAD	LOOKING GLASS RIVER	Primary	5	5	1	79.7	1986		3149	2011	10/7/2022	P	7	N	6	7	7	N	7	N	N	7	F		93.6	N	8
Steel – Multistringer	1927	1920002800 0B020	FRANCIS ROAD	STONY CREEK	Primary	3	2	1	52.8	1947		2031	2011	10/17/2022	P	7	7	5	5	7	N	8	8	N	N	F	Funct Obs	59.9	2	5
Prestressed concrete – Box beam/girders—multiple	1928	FRANCIS ROAD	STONY CREEK	LOOKING GLASS RIVER	Primary	5	5	1	111.9	1993		4115	2011	10/7/2022	A	8	N	6	7	6	N	7	N	N	7	F		95.8	N	5
Concrete – Culvert	1929	1920003100 0B010	DEWITT ROAD	STONY CREEK	Primary	1	19	1	25.9	1991		560	2011	10/17/2022	A	N		N	N	6	6					F		96.7		5
Prestressed concrete – Box beam/girders—multiple	1931	1920003100 0B030	DEWITT ROAD	SPAULDING DRAIN	Primary	5	5	1	48	2011		1823	2011	10/17/2023	A	7	N	6	7	7	N	7	N	6	N	F			N	8
Prestressed concrete – Box beam/girders—multiple	1932	1920003600 0B040	CHANDLER RD	LOOKING GLASS RIVER	Primary	5	5	2	92.8	1961		1954	2011	10/5/2022	A	7	N	6	6	6	N	7	N	4	7	F		76.7	N	5
Prestressed concrete – Box beam/girders—multiple	1933	1920003600 0B060	WOOD ROAD	LOOKING GLASS RIVER	Primary	5	5	3	126	1964		1632	2013	10/5/2022	A	7	N	7	7	5	N	7	N	7	7	G		82.4	N	5
Concrete – Tee beam	1934	1920003600 0B070	CHANDLER ROAD	STONY CREEK	Primary	1	4	1	20.3	1940		652	2011	10/2/2023	P	7	N	3	4	5	N	7	N	N	N	P	Struct Def		1	3
Prestressed concrete – Box beam/girders—multiple	1935	1920003900 0B010	SHEPARDSVILLE RD	MAPLE RIVER BRANCH	Primary	5	5	1	31.8	1928	1958	1083	2011	10/3/2023	A	3	N	3	5	6	N	6	N	N	N	P	Struct Def		N	5
Prestressed concrete – Box beam/girders—multiple	1936	1920003900 0B020	SHEPARDSVILLE RD	MAPLE RIVER	Primary	5	5	2	79.7	1958		1083	2011	10/3/2023	A	3	N	3	6	5	N	7	N	5	N	P	Struct Def		N	5
Prestressed concrete – Multistringer	1937	1920003900 0B030	SHEPARDSVILLE RD	MAPLE RIVER	Primary	5	2	2	179.8	1984		992	2011	10/4/2022	A	7	7	8	8	6	N	7	N	7	6	G		99.6	N	8
Prestressed concrete – Box beam/girders—multiple	1938	1920003900 0B040	SHEPARDSVILLE RD	MAPLE RIVER	Primary	5	5	3	158.8	1970		677	2011	10/4/2022	A	7	N	4	6	6	N	6	N	5	6	P	Struct Def	59.6	N	5
Prestressed concrete – Box beam/girders—multiple	1939	1920004100 0B010	UPTON ROAD	LOOKING GLASS RIVER	Primary	5	5	3	115.8	1963		1602	2011	10/5/2022	A	7	N	6	6	5	N	7	N	3	7	F		78.7	N	5
Steel – Multistringer	1940	1920004200 0B010	HOLLISTER ROAD	MAPLE RIVER	Primary	3	2	1	59.7	1948		2720	2010	10/2/2023	P	5	6	3	6	6	N	7	2	N	N	P	Struct Def		1	5
Prestressed concrete – Box beam/girders—multiple	1941	1920004300 0B010	MERIDIAN ROAD	ALDER CREEK	Primary	5	5	1	53.8	1992		1514	2011	10/5/2022	A	7	N	6	8	8	N	7	N	N	7	F		97.2	N	8
Prestressed concrete – Box beam/girders—multiple	1942	1920004300 0B020	MERIDIAN RD	ALDER CREEK	Primary	5	5	1	27.9	1979		1532	2011	10/5/2022	A	6	N	6	6	5	N	6	N	N	7	F		99.2	N	5
Prestressed concrete – Box beam/girders—multiple	1943	19301H00013B010	CUTLER ROAD	MUD CREEK	Secondary	5	5	1	24	1924	1983	161	2011	10/9/2023	A	6	N	6	5	5	N	6	N	N	N	F			N	3

APPENDIX A-1

Inventory Data														Inspection Findings															Appraisal				
Bridge Type	Structure Number	Bridge ID	Facility Carried	Features Intersected	Primary or Secondary Route	Structure Type Main Span (Item 43A - Material)	Structure Type Main Span (Item43B)	Number of Main Spans (Item 45)	Total Str Length(Item 49)	Year Built (Item 27)	Year Reconstr (Item 106)	ADT	Year of ADT	Inspection Date	Operational Status (Item 41)	Deck Rating (Item 58)	Deck Bottom Rating (Item XX)	SuperStr Rating (Item 59)	Substr Rating (Item 60)	Channel Rating (Item 61)	Culvert Rating (Item 62)	Surface Rating (Item 58A)	Paint Rtg	Exp Joint Rating (Item XX)	Other Joints	Structure Evaluation	Structurally Deficient	Sufficiency Rating	Section Loss	Scour Critical (Item 113)
Prestressed concrete – Box beam/girders—multiple	1944	19301H0002 4B010	PEACOCK ROAD	VERMILION CREEK	Secondary	5	5	1	26.9	1928	1995	152	2011	10/9/2023	A	6	N	6	4	4	N	5	N	N	N	P	Struct Def		N	3
Steel – Culvert	1945	19302H0000 1B010	DEXTER TRAIL	MUSKRAT CREEK	Secondary	3	19	2	33.8	1980		136	2016	10/17/2022	K	N		N	N	5	1					P	Struct Def	39.9		3
Prestressed concrete – Box beam/girders—multiple	1946	19302H0000 2B010	CENTER LINE ROAD	BAD CREEK	Secondary	5	5	1	33.8	1968		183	2011	10/18/2023	A	4	N	4	4	5	N	6	N	N	N	P	Struct Def		N	3
Prestressed concrete – Box beam/girders—multiple	1947	19302H0000 3B010	TAFT ROAD	STONY CREEK	Secondary	5	5	1	62	1920	1980	132	2011	10/18/2023	A	5	N	4	4	4	N	6	N	N	3	P	Struct Def		N	3
Prestressed concrete – Box beam/girders—multiple	1948	19302H0000 3B020	TAFT ROAD	STONY CREEK	Secondary	5	5	1	88.9	1985		144	2011	10/18/2023	A	6	N	6	7	6	N	5	N	N	N	F			N	5
Prestressed concrete – Box beam/girders—multiple	1949	19302H0000 8B010	BAUER ROAD	STONY CREEK	Secondary	5	5	1	79.7	1920	1983	65	2011	10/18/2023	A	6	N	6	5	4	N	5	N	N	N	F			N	3
Prestressed concrete – Box beam/girders—multiple	1950	19302H0001 1B010	FOREST HILL ROAD	STONY CREEK	Secondary	5	5	1	65.9	1986		80	1979	10/18/2023	A	7	N	6	6	6	N	5	N	N	5	F			N	5
Prestressed concrete – Box beam/girders—multiple	1951	19302H0001 3B010	LOWELL ROAD	STONY CREEK	Secondary	5	5	1	49.9	1922	1982	97	2011	10/18/2023	A	6	N	6	4	6	N	5	N	N	N	P	Struct Def		N	3
Prestressed concrete – Box beam/girders—multiple	1952	19302H0001 5B010	GROVE ROAD	STONY CREEK	Secondary	5	5	1	66	2018		234	2017	10/17/2022	A	7	N	8	8	8	N	7	N	7	8	G		99.9	N	8
Prestressed concrete – Box beam/girders—multiple	1953	19303H0000 1B010	CENTERLINE ROAD	STONY CREEK	Secondary	5	5	1	41	1922	1983	183	2011	10/17/2023	A	3	N	3	5	5	N	6	N	N	N	P	Struct Def		N	3
Prestressed concrete – Box beam/girders—multiple	1954	19303H0000 3B010	TAFT ROAD	STONY CREEK	Secondary	5	5	1	53.8	1996		131	2011	10/17/2023	A	6	N	5	8	6	N	7	N	6	N	F			N	8
Prestressed concrete – Box beam/girders—multiple	1955	19303H0000 5B010	PARKS ROAD	SPAULDING EXTENSION	Secondary	5	5	1	33.8	1924	1984	264	2011	10/17/2023	A	4	N	4	4	4	N	5	N	N	N	P	Struct Def		N	3
Prestressed concrete – Box beam/girders—multiple	1957	19303H0001 5B010	COUNTY FARM ROAD	SPAULDING EXTENSION	Secondary	5	5	1	52	2010		695	2005	10/17/2023	A	7	N	7	8	7	N	7	N	7	7	G			N	8
Prestressed concrete – Box beam/girders—multiple	1958	19303H0001 7B010	WILLIAMS ROAD	SPAULDING EXTENSION	Secondary	5	5	1	27.9	1924	1984	160	1979	10/17/2023	A	5	N	5	4	4	N	5	N	N	N	P	Struct Def		N	3
Steel – Culvert	1959	19303H0001 8B010	KREPPS ROAD	STONY CREEK	Secondary	3	19	1	11.8	1996		200	1996	10/2/2023	A	N		N	N	7	7					G				5
Prestressed concrete – Box beam/girders—multiple	1960	19304H0000 1B010	CENTER LINE ROAD	KLOECKNER CREEK	Secondary	5	5	1	27.9	1928	1985	230	2011	10/23/2023	A	6	N	5	4	5	N	5	N	N	N	P	Struct Def		N	3
Prestressed concrete – Box beam/girders—multiple	1961	19304H0000 2B010	TAFT ROAD	FULLER CREEK	Secondary	5	5	1	37.7	1922	1985	97	2011	10/23/2023	A	7	N	7	5	6	N	5	N	9	N	F			N	5
Prestressed concrete – Box beam/girders—multiple	1962	19304H0000 3B010	DEXTER TRAIL	FULLER CREEK	Secondary	5	5	1	45	2008		92	2011	10/23/2023	A	7	N	6	7	8	N	7	N	7	7	F			N	8
Prestressed concrete – Box beam/girders—multiple	1963	19304H0000 5B010	TOWNSEND ROAD	LOST CREEK	Secondary	5	5	1	28.9	1920	1987	138	2011	10/23/2023	A	6	N	6	5	5	N	6	N	N	N	F	Funct Obs		N	3
Prestressed concrete – Box beam/girders—multiple	1965	19304H0000 7B020	JONES ROAD	LOST CREEK	Secondary	5	5	1	22	1924	1984	86	2011	10/23/2023	A	6	N	6	4	5	N	6	N	N	N	P	Struct Def		N	3
Prestressed concrete – Box beam/girders—multiple	1966	19304H0000 7B030	JONES ROAD	WIEBER CREEK	Secondary	5	5	1	22	1924	1984	86	2011	10/23/2023	A	6	N	4	5	6	N	6	N	N	N	P	Struct Def		N	3
Prestressed concrete – Multistringer	1967	19304H0000 8B010	HINMAN ROAD	STONY CREEK	Secondary	5	2	2	129.9	1983		153	2011	10/23/2023	A	7	7	8	6	6	N	7	N	6	7	F			N	5
Prestressed concrete – Box beam/girders—multiple	1968	19304H0000 9B010	TALLMAN ROAD	STONY CREEK	Secondary	5	5	1	101.7	1999		87	2011	10/23/2023	A	7	N	6	7	6	N	7	N	7	N	F			N	8
Prestressed concrete – Box beam/girders—multiple	1969	19306H0000 5B010	MAPLE RIVER ROAD	WISE CREEK	Secondary	5	5	1	27.9	1910	1986	100	1979	10/2/2023	A	6	N	6	5	5	N	6	N	N	N	F	Funct Obs		N	3
Prestressed concrete – Box beam/girders—multiple	1971	19306H0001 4B010	WATSON ROAD	SE BRANCH OF MAPLE RIVER	Secondary	5	5	1	74.8	1914	1985	212	2011	10/3/2023	A	5	N	6	4	5	N	5	N	N	N	P	Struct Def		N	3
Prestressed concrete – Box beam/girders—multiple	1972	19306H0001 5B010	MAPLE RIVER ROAD	MAPLE RIVER	Secondary	5	5	1	51.8	1920	1982	100	1979	10/3/2023	A	5	N	5	3	4	N	6	N	N	N	P	Struct Def		N	3
Prestressed concrete – Box beam/girders—multiple	1973	19306H0001 6B010	ST CLAIR ROAD	MAPLE RIVER	Secondary	5	5	1	85	2014		117	2013	10/4/2022	A	8	N	8	8	8	N	7	N	N	7	G		89	N	8
Prestressed concrete – Box beam/girders—multiple	1975	19306H0001 8B010	UPTON ROAD	MAPLE RIVER BRANCH	Secondary	5	5	1	129.9	1994		162	1994	10/4/2023	A	7	N	6	7	8	N	7	N	7	6	F			N	8
Prestressed concrete – Box beam/girders—multiple	1976	19307H0000 7B010	MONROE ROAD	LOOKING GLASS RIVER	Secondary	5	5	2	157.5	2001		200	2002	10/11/2023	A	6	N	6	7	7	N	6	N	6	N	F			N	5
Prestressed concrete – Box beam/girders—multiple	1977	19307H0000 8B010	JONES ROAD	GRAND RIVER	Secondary	5	5	3	246.1	1998		1192	2011	10/24/2023	A	6	N	6	8	7	N	6	N	7	N	F			N	5
Prestressed concrete – Box beam/girders—multiple	1978	19307H0001 4B010	TALLMAN ROAD	LOOKING GLASS RIVER	Secondary	5	5	1	129.9	1996		359	2011	10/11/2023	A	7	N	6	7	8	N	7	N	5	7	F			N	8
Prestressed concrete – Box beam/girders—multiple	1979	19308H0000 1B010	KINLEY ROAD	S FORK OF HAYWORTH	Secondary	5	5	1	41	1890	1983	119	2011	10/16/2023	A	6	N	6	4	5	N	6	N	N	N	P	Struct Def		N	3
Prestressed concrete – Box beam/girders—multiple	1980	19308H0001 0B010	ISLAND ROAD	HAYWORTH CREEK	Secondary	5	5	1	59.7	1924	1984	180	1979	10/13/2023	A	5	N	5	5	5	N	5	N	N	N	F			N	3
Steel – Culvert	1981	19308H0001 0B020	ISLAND ROAD	COX DRAIN	Secondary	3	19	2	20	1981		180	1981	10/13/2023	A	N		N	N	6	4					P	Struct Def			8
Steel – Culvert	1982	19308H0001 0B030	ISLAND ROAD	COX DRAIN	Secondary	3	19	2	20	1981		180	1981	10/13/2023	A	N		N	N	5	6					F				5
Prestressed concrete – Box beam/girders—multiple	1983	19308H0001 1B010	HYDE ROAD	HAYWORTH CREEK	Secondary	5	5	1	59.7	1910	1983	102	2011	10/13/2023	A	6	N	6	5	5	N	6	N	N	N	F	Funct Obs			3
Prestressed concrete – Box beam/girders—multiple	1985	19308H0001 4B010	BAUER ROAD	PEET CREEK	Secondary	5	5	1	25.9	1970	1999	160	1979	10/13/2023	A	8	N	8	6	6	N	4	N	N	N	F			N	5
Prestressed concrete – Box beam/girders—multiple	1986	19308H0001 4B020	BAUER ROAD	HAYWORTH CREEK	Secondary	5	5	1	59.7	1906	1985	102	2011	10/13/2023	A	5	N	5	3	5	N	6	N	N	N	P	Struct Def		N	3
Prestressed concrete – Box beam/girders—multiple	1987	19308H0001 4B030	BAUER ROAD	HAYWORTH CREEK	Secondary	5	5	1	86	2004		173	2004	10/13/2023	A	8	N	6	7	8	N	7	N	7	7	F			N	8
Prestressed concrete – Box beam/girders—multiple	1988	19308H0001 5B010	WACOUSTA ROAD	PEET CREEK	Secondary	5	5	1	60	2007		441	2011	10/13/2023	A	7	N	6	8	8	N	6	N	7	7	F			N	8
Prestressed concrete – Box beam/girders—multiple	1989	19308H0001 7B010	ESSEX CENTER ROAD	S FORK OF HAYWORTH CREEK	Secondary	5	5	1	41	1920	1982	100	2011	10/16/2023	A	5	N	5	5	5	N	7	N	N	N	F			N	3
Prestressed concrete – Tee beam	1990	19308H0001 7B020	ESSEX CENTER ROAD	HAYWORTH CREEK	Secondary	5	4	1	37.7	1970		100	2011	10/16/2023	A	5	5	5	5	5	N	6	N	N	N	F			N	3
Prestressed concrete – Box beam/girders—multiple	1991	19308H0001 8B020	ANDERSON ROAD	HAYWORTH CREEK	Secondary	5	5	1	54	2011		94	2005	10/14/2022	A	8	N	8	7	7	N	7	N	N	7	G		100	N	8
Steel – Culvert	1992	19308H0001 8B010	ANDERSON ROAD	S FORK OF HAYWORTH CREEK	Secondary	3	19	2	23	1980		106	2011	10/11/2023	A	N		N	N	5	3					P	Struct Def			5
Prestressed concrete – Box beam/girders—multiple	1993	19308H0002 0B010	FINDLAY RD	HAYWORTH CREEK	Secondary	5	5	1	52	2015		140	2014	10/16/2023	A	7	N	8	7	7	N	7	N	7	7	G			N	8
Concrete – Culvert	1994	19309H0001 6B010	AIRPORT ROAD	HAYWORTH CREEK	Secondary	1	19	1	26.2	1988		193	2011	10/16/2023	A	N		N	N	6	6					F				5
Concrete – Culvert	1995	19309H0001 8B010	DEWITT ROAD	HAYWORTH CREEK	Secondary	1	19	1	28.2	1999		867	2011	10/16/2023	A	N		N	N	6	6					F				5
Steel – Culvert	1997	19310H0000 1B010	KINLEY ROAD	PEET CREEK	Secondary	3	19	2	22	1983		300	1979	10/11/2023	K	N		N	N	4	3					P	Struct Def			5
Steel – Culvert	1998	19310H0000 9B010	GRATIOT RD	FIFIELD CREEK	Secondary	3	19	2	22	1979		380	1979	10/13/2023	A	N		N	N	6	6					F				5

APPENDIX A-1

Inventory Data														Inspection Findings														Appraisal				
Bridge Type	Structure Number	Bridge ID	Facility Carried	Features Intersected	Primary or Secondary Route	Structure Type Main Span (Item 43A - Material)	Structure Type Main Span (Item43B)	Number of Main Spans (Item 45)	Total Str Length(Item 49)	Year Built (Item 27)	Year Reconstr (Item 106)	ADT	Year of ADT	Inspection Date	Operational Status (Item 41)	Deck Rating (Item 58)	Deck Bottom Rating (Item XX)	SuperStr Rating (Item 59)	Substr Rating (Item 60)	Channel Rating (Item 61)	Culvert Rating (Item 62)	Surface Rating (Item 58A)	Paint Rtg	Exp Joint Rating (Item XX)	Other Joints	Structure Evaluation	Structurally Deficient	Sufficiency Rating	Section Loss	Scour Critical (Item 113)
Prestressed concrete – Box beam/girders—multiple	2000	19312H00003B010	TAFT ROAD	MAPLE RIVER	Secondary	5	5	1	25.9	1924	1984	86	2004	10/4/2023	A	6	N	5	4	7	N	6	N	N	N	P	Struct Def		N	5
Prestressed concrete – Box beam/girders—multiple	2001	19312H00004B010	PARKS ROAD	MAPLE RIVER	Secondary	5	5	1	24	1920	1987	107	2004	10/4/2023	A	6	N	6	5	4	N	6	N	N	N	F	Funct Obs		N	3
Prestressed concrete – Box beam/girders—multiple	2002	19312H00007B010	TOWNSEND ROAD	STONY CREEK	Secondary	5	5	1	26.9	1912	1985	176	2004	10/2/2023	A	7	N	6	5	6	N	5	N	N	N	F	Funct Obs		N	5
Prestressed concrete – Box beam/girders—multiple	2003	19312H00010B020	WILDCAT ROAD	ALDER CREEK	Secondary	5	5	1	44.9	1926	1986	143	2011	10/4/2023	A	7	N	7	5	6	N	6	N	N	6	F			N	3
Prestressed concrete – Box beam/girders—multiple	2004	19312H00015B010	WALKER ROAD	MAPLE RIVER	Secondary	5	5	1	29.9	1986		133	2011	10/3/2023	A	7	N	6	4	5	N	6	N	N	N	P	Struct Def		N	3
Prestressed concrete – Box beam/girders—multiple	2005	19312H00016B010	FARAGHER ROAD	MAPLE RIVER	Secondary	5	5	2	77.8	1987		131	2004	10/3/2023	A	5	N	5	7	5	N	5	N	7	N	F			2	5
Concrete – Culvert	2007	19312H00027B010	HOLLISTER ROAD	ALDER CREEK	Secondary	1	19	1	34.6	1994		2020	2011	10/4/2023	A	N		N	N	6	7					G				5
Steel – Culvert	2008	19313H00006B010	JASON ROAD	MUSKRAT CREEK	Secondary	3	19	2	21.5	2012		140	1979	10/20/2023	A	N		N	N	6	8					G				5
Prestressed concrete – Box beam/girders—multiple	2009	19313H00006B020	JASON ROAD	BAD CREEK	Secondary	5	5	1	27.9	1920	1985	64	2011	10/20/2023	A	5	N	5	4	5	N	4	N	N	N	P	Struct Def		N	3
Prestressed concrete – Box beam/girders—multiple	2010	19313H00008B010	BAUER ROAD	MORRIS DRAIN	Secondary	5	5	1	24.9	1924	1985	47	2011	10/20/2023	A	6	N	6	4	4	N	6	N	N	N	P	Struct Def		N	3
Steel – Culvert	2011	19313H00009B010	DEXTER TRAIL	MUSKRAT CREEK	Secondary	3	19	2	22.5	2010		83	2011	10/20/2023	A	N		N	N	6	8					G				5
Prestressed concrete – Box beam/girders—multiple	2012	19313H00009B020	DEXTER TRAIL	MUSKRAT CREEK	Secondary	5	5	1	51.5	2002		73	2011	10/20/2023	A	6	N	5	8	8	N	6	N	N	7	F			N	8
Prestressed concrete – Box beam/girders—multiple	2013	19313H00011B010	LOWELL RD	BAD CREEK	Secondary	5	5	1	47	2007		97	2011	10/18/2023	A	8	N	6	7	8	N	7	N	7	N	F			N	8
Prestressed concrete – Box beam/girders—multiple	2014	19314H00002B010	CUTLER ROAD	VERMILION CREEK	Secondary	5	5	1	38.7	1970	2001	206	2011	10/9/2023	A	7	N	7	5	5	N	5	N	N	N	F			N	3
Prestressed concrete – Box beam/girders—multiple	2015	19314H00003B010	CHADWICK ROAD	VERMILION CREEK	Secondary	5	5	1	31.8	1924	1984	75	2011	10/9/2023	A	6	N	6	5	5	N	6	N	N	N	F			N	3
Steel – Culvert	2016	19314H00009B020	JASON ROAD	CEDAR LAKE DRAIN	Secondary	3	19	2	21	1982		133	2011	10/9/2023	A	N		N	N	6	6					F				5
Prestressed concrete – Box beam/girders—multiple	2017	19314H00012B010	BABCOCK ROAD	LOOKING GLASS RIVER	Secondary	5	5	2	96.8	1984		144	2011	10/9/2023	A	4	N	4	7	6	N	5	N	5	N	P	Struct Def		N	5
Prestressed concrete – Box beam/girders—multiple	2018	19314H00015B010	HOLLISTER ROAD	LOOKING GLASS RIVER	Secondary	5	5	2	87.9	1970		514	2011	10/9/2023	A	4	N	4	7	5	N	6	N	3	N	P	Struct Def		N	5
Prestressed concrete – Box beam/girders—multiple	2019	19315H00009B010	HERBISON ROAD	LOOKING GLASS RIVER	Secondary	5	5	1	115	2011		449	2009	10/7/2022	A	8	N	7	8	8	N	7	N	7	7	G		99.9	N	8
Steel – Box beam/girders—single/spread	2020	19315H00009B020	HERBISON ROAD	LOOKING GLASS RIVER	Secondary	3	6	2	104	1985	2022	545	2020	7/12/2022	A	7	9	9	7	8	N	7	9	8	9	G		99.8	3	5
Prestressed concrete – Box beam/girders—multiple	2021	19315H00011B010	BAUER ROAD	LOOKING GLASS RIVER	Secondary	5	5	1	120.1	2000		298	2011	10/11/2023	A	7	N	6	7	8	N	7	N	N	6	F			N	8
Steel – Truss—thru and pony	2022	19315H00014B010	LOWELL ROAD	LOOKING GLASS RIVER	Secondary	3	10	1	128	2006		100	2006	10/11/2023	A	7	6	6	7	7	N	7	7	4	N	F			2	8
Steel – Culvert	2023	19316H00006B010	JASON ROAD	MORRIS DRAIN	Secondary	3	19	2	23	1983		101	2011	10/20/2023	K	N		N	N	6	2					P	Struct Def			5
Concrete – Culvert	2024	19316H00011B010	TALLMAN ROAD	MORRIS DRAIN	Secondary	1	19	1	36	2011		102	2005	10/14/2022	A	N		N	N	7	8					G		97.5		8
Concrete – Culvert	2025	19316H00011B020	TALLMAN ROAD	MORRIS DRAIN	Secondary	1	19	1	22	2003		101	2011	10/24/2023	A	N		N	N	6	7					G				5
Concrete – Culvert	13138	19313H00007C010	CHURCH ROAD	MUSKRAT CREEK	Secondary	1	19	1	24	2021		100	2002	10/20/2023	A	N		N	N	6	7					G				8

Appendix 4

APPENDIX A-2

Inventory Data												Replacement				Rehabilitation											Proposed Preventive Maintenance									Proposed Scheduled Maintenance														
Bridge Type	Structure Number	Bridge ID	Facility Carried	Features Intersected	Structure Type Main Span (Item 43A - Material)	Structure Type Main Span (Item 43B)	Number of Main Span (Item 45)	Total Str Length (Item 49)	Total Str Width (Item 52)	Total Str (sq ft)	Total	Super-structure	Deck	Sub-structure	Deep Overlay	Shallow Overlay	HMA Overlay w/ Membrane	HMA Cap	Replace/Retrofit Railing	Steel Beam Repairs	P/S Conc Beam Repairs	Repair/Replace Culvert	Repair/Replace Retaining Wall	Geometric Upgrades	Patch Substruct Concrete	Repair/Replace Deck	Repair/Replace Steel Bearings	Complete Painting	Zone Painting	Epoxy Overlays	HMA Cap w/o Membrane	Concrete Deck Patching	Channel Improvements	Scour Counter Measures	Superstruc Washing	Concrete Surface Washing	Vegetation Control	Debris Removal	Clean Drainage System	Spot Painting	Repair/Replace HMA Surface	Seal HMA Cracks/Joints	Seal Concrete Cracks/Joints	Minor Concrete Patching	Timber Repairs	Repair/Replace Guardrails	Repave Approaches	Repair Slopes	Install RipRap
Prestressed concrete – Box beam/girders—multiple	1895	19200001000B010	STATE ROAD	GRAND RIVER	5	5	4	248	32	7936																																							
Prestressed concrete – Box beam/girders—multiple	1896	19200004000B010	CLARK RD	BR OF LOOKING GLASS RIVR	5	5	1	50.9	33.8	1720																																							
Prestressed concrete – Box beam/girders—multiple	1897	19200006000B010	HOWE ROAD	LOOKING GLASS RIVER	5	5	3	149.9	30.5	4572																																							
Concrete – Culvert	1898	19200010000B010	PRATT RD	MORRIS DRAIN	1	19	1	26.1	32.5	848																																							
Timber – Slab	1899	19200010000B020	PRATT ROAD	BAD CREEK	7	1	1	20	25.9	518																																							
Prestressed concrete – Box beam/girders—multiple	1900	19200011000B010	PRICE RD	MORRIS DRAIN	5	5	1	55.8	37.1	2070																																							
Prestressed concrete – Box beam/girders—multiple	1901	19200011000B020	PRICE RD	MUSKRAT CREEK	5	5	1	35.8	43.3	1550																																							
Prestressed concrete – Box beam/girders—multiple	1902	19200011000B030	PRICE RD	BAD CREEK	5	5	1	30.8	33.1	1019																																							
Prestressed concrete – Box beam/girders—multiple	1903	19200011000B040	PRICE RD	STONY CREEK	5	5	1	30.8	33.1	1019																																							
Prestressed concrete – Box beam/girders—multiple	1904	19200011000B050	PRICE ROAD	STONY CRK DRN	5	5	1	29.9	34.1	1020																																							
Timber – Slab	1905	19200011000B060	PRICE ROAD	LITTLE MAPLE RIVER	7	1	1	29.9	35.8	1070																																							
Prestressed concrete – Box beam/girders—multiple	1906	19200012000B010	COLONY ROAD	W. BR. HAYWORTH(PEET CR)	5	5	1	46.9	34.1	1599																																							
Prestressed concrete – Box beam/girders—multiple	1907	19200012000B020	COLONY ROAD	SO FORK HAYWORTH CREEK	5	5	1	50.9	30.8	1568																																							
Prestressed concrete – Box beam/girders—multiple	1908	19200012000B030	COLONY ROAD	S FORK HAYWORTH CRK	5	5	1	50.9	30.8	1568																																							
Prestressed concrete – Box beam/girders—multiple	1909	19200012000B040	COLONY ROAD	SO FORK OF HAYWORTH G.R.	5	5	1	50.9	30.8	1568																																							
Prestressed concrete – Box beam/girders—multiple	1910	19200012000B070	COLONY RD	MAPLE RIVER	5	5	1	122	33.8	4124																																							
Concrete – Tee beam	1911	19200015000B010	STONE ROAD	MAPLE RIVER DRAIN	1	4	1	24.9	27.9	695																																							
Concrete – Culvert	1912	19200016000B010	GRATIOT ROAD	OVERFLOW PINE RIVER	1	19	1	22		750																																							
Prestressed concrete – Box beam/girders—multiple	1913	19200016000B020	GRATIOT RD	PINE RIVER	5	5	2	82	31	2542																																							
Prestressed concrete – Box beam/girders—multiple	1914	19200017000B010	ISLAND ROAD	MAPLE RIVER	5	5	3	189	32.2	6086																																							
Steel – Box beam/girders—single/spread	1915	19200022000B010	TALLMAN ROAD	MAPLE RIVER	3	6	3	192.2	32.4	6227		x																																					
Prestressed concrete – Box beam/girders—multiple	1916	19200023000B010	GRANGE ROAD	LOOKING GLASS RIVER	5	5	2	140.3	34.5	4840																																							
Concrete – Arch—thru	1917	19200023000B020	GRANGE ROAD	STONY CREEK	1	12	1	91.9	25.9	2380																																							
Prestressed concrete – Box beam/girders—multiple	1918	19200024000B010	WRIGHT ROAD	LOOKING GLASS RIVER	5	5	3	165	43.6	7194																																							
Concrete – Culvert	1919	19200024000B020	WRIGHT ROAD	MORRIS DRAIN	1	19	1	20		644																																							
Prestressed concrete – Box beam/girders—multiple	1920	19200024000B030	WRIGHT ROAD	STONY CREEK	5	5	1	94	43.8	4117																																							
Steel – Multistringer	1921	19200025000B010	WACOUSTA ROAD	LOOKING GLASS RIVER	3	2	2	90	34.2	3078																																							
Prestressed concrete – Multistringer	1922	19200026000B010	WACOUSTA ROAD	HAYWORTH DRAIN	5	2	1	104	37.7	3921																																							
Prestressed concrete – Box beam/girders—multiple	1923	19200026000B020	WACOUSTA ROAD	COX DRAIN (BROWN'S CR)	5	5	1	37.7	34.1	1286																																							
Prestressed concrete – Box beam/girders—multiple	1924	19200027000B010	FOREST HILL RD	HAYWORTH CREEK	5	5	2	86	30.5	2623			x																																				
Prestressed concrete – Box beam/girders—multiple	1925	19200027000B020	FOREST HILL ROAD	COX DRAIN	5	5	1	31.8	30.5	970																																							
Prestressed concrete – Box beam/girders—multiple	1926	19200028000B010	FRANCIS ROAD	LOOKING GLASS RIVER	5	5	1	79.7	43.6	3475																																							
Steel – Multistringer	1927	19200028000B020	FRANCIS ROAD	STONY CREEK	3	2	1	52.8	29.2	1542							x																																
Prestressed concrete – Box beam/girders—multiple	1928	FRANCIS ROAD	STONY CREEK	LOOKING GLASS RIVER	5	5	1	111.9	49.5	5539						x																																	
Concrete – Culvert	1929	19200031000B010	DEWITT ROAD	STONY CREEK	1	19	1	25.9		883																																							
Prestressed concrete – Box beam/girders—multiple	1931	19200031000B030	DEWITT ROAD	SPAULDING DRAIN	5	5	1	48	41.5	1992																																							
Prestressed concrete – Box beam/girders—multiple	1932	19200036000B040	CHANDLER RD	LOOKING GLASS RIVER	5	5	2	92.8	30.8	2858																																							
Prestressed concrete – Box beam/girders—multiple	1933	19200036000B060	WOOD ROAD	LOOKING GLASS RIVER	5	5	3	126	30.8	3881																																							
Concrete – Tee beam	1934	19200036000B070	CHANDLER ROAD	STONY CREEK	1	4	1	20.3	25.9	526																																							
Prestressed concrete – Box beam/girders—multiple	1935	19200039000B010	SHEPARDSVILLE RD	MAPLE RIVER BRANCH	5	5	1	31.8	21	668																																							
Prestressed concrete – Box beam/girders—multiple	1936	19200039000B020	SHEPARDSVILLE RD	MAPLE RIVER	5	5	2	79.7	30.5	2431																																							
Prestressed concrete – Multistringer	1937	19200039000B030	SHEPARDSVILLE RD	MAPLE RIVER	5	2	2	179.8	43	7731																																							
Prestressed concrete – Box beam/girders—multiple	1938	19200039000B040	SHEPARDSVILLE RD	MAPLE RIVER	5	5	3	158.8	31.2	4955																																							
Prestressed concrete – Box beam/girders—multiple	1939	19200041000B010	UPTON ROAD	LOOKING GLASS RIVER	5	5	3	115.8	29.9	3462																																							
Steel – Multistringer	1940	19200042000B010	HOLLISTER ROAD	MAPLE RIVER	3	2	1	59.7	31.5	1881																																							
Prestressed concrete – Box beam/girders—multiple	1941	19200043000B010	MERIDIAN ROAD	ALDER CREEK	5	5	1	53.8	37.4	2012																																							
Prestressed concrete – Box beam/girders—multiple	1942	19200043000B020	MERIDIAN RD	ALDER CREEK	5	5	1	27.9	36.4	1016																																							
Prestressed concrete – Box beam/girders—multiple	1943	19301H00013B010	CUTLER ROAD	MUD CREEK	5	5	1	24	21	504																																							
Prestressed concrete – Box beam/girders—multiple	1944	19301H00024B010	PEACOCK ROAD	VERMILION CREEK	5	5	1	26.9	24.3	654																																							
Steel – Culvert	1945	19302H00001B010	DEXTER TRAIL	MUSKRAT CREEK	3	19	2	33.8		1011																																							
Prestressed concrete – Box beam/girders—multiple	1946	19302H00002B010	CENTER LINE ROAD	BAD CREEK	5	5	1	33.8	17.7	598																																							
Prestressed concrete – Box beam/girders—multiple	1947	19302H00003B010	TAFT ROAD	STONY CREEK	5	5	1	62	18	1116																																							
Prestressed concrete – Box beam/girders—multiple	1948	19302H00003B020	TAFT ROAD	STONY CREEK	5	5	1	88.9	24.3	2160																																							
Prestressed concrete – Box beam/girders—multiple	1949	19302H00008B010	BAUER ROAD	STONY CREEK	5	5	1	79.7	18	1435																																							
Prestressed concrete – Box beam/girders—multiple	1950	19302H00011B010	FOREST HILL ROAD	STONY CREEK	5	5	1	65.9	30.8	2030																																							
Prestressed concrete – Box beam/girders—multiple	1951	19302H00013B010	LOWELL ROAD	STONY CREEK	5	5	1	49.9	18	898																																							
Prestressed concrete – Box beam/girders—multiple	1952	19302H00015B010	GROVE ROAD	STONY CREEK	5	5	1	66	31.7	2092																																							
Prestressed concrete – Box beam/girders—multiple	1953	19303H00001B010	CENTERLINE ROAD	STONY CREEK	5	5	1	41	18	738																																							
Prestressed concrete – Box beam/girders—multiple	1954	19303H00003B010	TAFT ROAD	STONY CREEK	5	5	1	53.8	30.8	1657																																							
Prestressed concrete – Box beam/girders—multiple	1955	19303H00005B010	PARKS ROAD	SPAULDING EXTENSION	5	5	1	33.8	18	608																																							
Prestressed concrete – Box beam/girders—multiple	1957	19303H00015B010	COUNTY FARM ROAD	SPAULDING EXTENSION	5	5	1	52	31.1	1617																																							
Prestressed concrete – Box beam/girders—multiple	1958	19303H00017B010	WILLIAMS ROAD	SPAULDING EXTENSION	5	5	1	27.9	18	502																																							
Steel – Culvert	1959	19303H00018B010	KREPPS ROAD	STONY CREEK	3	19	1	11.8		283																																							
Prestressed concrete – Box beam/girders—multiple	1960	19304H00001B010	CENTER LINE ROAD	KLOECKNER CREEK	5	5	1	27.9	21	586																																							
Prestressed concrete – Box beam/girders—multiple	1961	19304H00002B010	TAFT ROAD	FULLER CREEK	5	5	1	37.7	18	679																																							
Prestressed concrete – Box beam/girders—multiple	1962	19304H00003B010	DEXTER TRAIL	FULLER CREEK	5	5	1	45	31.3	1409																																							
Prestressed concrete – Box beam/girders—multiple	1963	19304H00005B010	TOWNSEND ROAD	LOST CREEK	5	5	1	28.9	18	520																																							
Prestressed concrete – Box beam/girders—multiple	1965	19304H00007B020	JONES ROAD	LOST CREEK	5	5	1	22	18	396																																							
Prestressed concrete – Box beam/girders—multiple	1966	19304H00007B030	JONES ROAD	WIEBER CREEK	5	5	1	22	18	396																																							
Prestressed concrete – Multistringer	1967	19304H00008B010	HINMAN ROAD	STONY CREEK	5	2	2	129.9	32.8	4261																																							
Prestressed concrete – Box beam/girders—multiple	1968	19304H00009B010	TALLMAN ROAD	STONY CREEK	5	5	1	101.7	33.1	3366																																							
Prestressed concrete – Box beam/girders—multiple	1969	19306H00005B010	MAPLE RIVER ROAD	WISE CREEK	5	5	1	27.9	18	502																																							
Prestressed concrete – Box beam/girders—multiple	1971	19306H00014B010	WATSON ROAD	SE BRANCH OF MAPLE RIVER	5	5	1	74.8	18	1346																																							
Prestressed concrete – Box beam/girders—multiple	1972	19306H00015B010	MAPLE RIVER ROAD	MAPLE RIVER	5	5	1	51.8	18	932																																							
Prestressed concrete – Box beam/girders—multiple	1973	19306H00016B010	ST CLAIR ROAD	MAPLE RIVER	5	5	1	85	25.2	2142																																							
Prestressed concrete – Box beam/girders—multiple	1975	19306H00018B010	UPTON ROAD	MAPLE RIVER BRANCH	5	5	1	129.9	32.8	4261																																							
Prestressed concrete – Box beam/girders—multiple	1976	19307H00007B010	MONROE ROAD	LOOKING GLASS RIVER	5	5	2	157.5	33.1	5213																																							
Prestressed concrete – Box beam/girders—multiple	1977	19307H00008B010	JONES ROAD	GRAND RIVER	5	5	3	246.1	34.1	8392																																							
Prestressed concrete – Box beam/girders—multiple	1978	19307H00014B010	TALLMAN ROAD	LOOKING GLASS RIVER	5	5	1	129.9	32.8	4261																																							
Prestressed concrete – Box beam/girders—multiple	1979	19308H00001B010	KINLEY ROAD	S FORK OF HAYWORTH	5	5	1	41	21	861																																							
Prestressed concrete – Box beam/girders—multiple	1980	19308H00010B010	ISLAND ROAD	HAYWORTH CREEK	5	5	1	59.7	21	1254																																							
Steel – Culvert	1981	19308H00010B020	ISLAND ROAD	COX DRAIN	3	19	2	20		400																																							
Steel – Culvert	1982	19308H00010B030	ISLAND ROAD	COX DRAIN	3	19	2	20		400																																							
Prestressed concrete – Box beam/girders—multiple	1983	19308H00011B010	HYDE ROAD	HAYWORTH CREEK	5	5	1	59.7	18	1075																																							
Prestressed concrete – Box beam/girders—multiple	1985	19308H00014B010	BAUER ROAD	PEET CREEK	5	5	1	25.9	21.7	562																																							
Prestressed concrete – Box beam/girders—multiple	1986	19308H00014B020	BAUER ROAD	HAYWORTH CREEK	5	5	1	59.7	18	1075																																							
Prestressed concrete – Box beam/girders—multiple	1987	19308H00014B030	BAUER ROAD	HAYWORTH CREEK	5	5	1	86	31.1	2675																																							
Prestressed concrete – Box beam/girders—multiple	1988	19308H00015B010	WACOUSTA ROAD	PEET CREEK	5	5	1	60	31.5	1890																																							
Prestressed concrete – Box beam/girders—multiple	1989	19308H00017B010	ESSEX CENTER ROAD	S FORK OF HAYWORTH CREEK	5	5	1	41	21	861																																							
Prestressed concrete – Tee beam	1990	19308H00017B020	ESSEX CENTER ROAD	HAYWORTH CREEK	5	4	1	37.7	22	829																																							
Prestressed concrete – Box beam/girders—multiple	1991	19308H00018B020	ANDERSON ROAD	HAYWORTH CREEK	5	5	1	54	29	1566																																							
Steel – Culvert	1992	19308H00018B010	ANDERSON ROAD	S FORK OF HAYWORTH CREEK	3	19	2	23		784																																							
Prestressed concrete – Box beam/girders—multiple	1993	19308H00020B010	FINDLAY RD	HAYWORTH CREEK	5	5	1	52	31.7	1648																																							
Concrete – Culvert	1994	19309H00016B010	AIRPORT ROAD	HAYWORTH CREEK	1	19	1	26.2		893																																							
Concrete – Culvert	1995	19309H00018B010	DEWITT ROAD	HAYWORTH CREEK	1	19	1	28.2		787																																							
Steel – Culvert	1997	19310H00001B010	KINLEY ROAD	PEET CREEK	3	19	2	22		750																																							
Steel – Culvert	1998	19310H00009B010	GRATIOT RD	FIFIELD CREEK	3	19	2	22		750																																							
Prestressed concrete – Box beam/girders—multiple	2000	19312H00003B010	TAFT ROAD	MAPLE RIVER	5	5	1	25.9	18	466																																							
Prestressed concrete – Box beam/girders—multiple	2001	19312H00004B010	PARKS ROAD	MAPLE RIVER	5	5	1	24	18	432																																							
Prestressed concrete – Box beam/girders—multiple	2002	19312H00007B010	TOWNSEND ROAD	STONY CREEK	5	5	1	26.9	18	484																																							
Prestressed concrete – Box beam/girders—multiple	2003	19312H00010B020	WILDCAT ROAD	ALDER CREEK	5	5	1	44.9	21	943																																							
Prestressed concrete – Box beam/girders—multiple	2004	19312H00015B010	WALKER ROAD	MAPLE RIVER	5	5	1	29.9	18	538																																							
Prestressed concrete – Box beam/girders—multiple	2005	19312H00016B010	FARAGHER ROAD	MAPLE RIVER	5	5	2	77.8	30.8	2396																																							
Concrete – Culvert	2007	19312H00027B010	HOLLISTER ROAD	ALDER CREEK	1	19	1	34.6		1180																																							
Steel – Culvert	2008	19313H00006B010	JASON ROAD	MUSKRAT CREEK	3	19	2	21.5	58	1247																																							
Prestressed concrete – Box beam/girders—multiple	2009	19313H00006B020	JASON ROAD	BAD CREEK	5	5	1	27.9	21	586																																							
Prestressed concrete – Box beam/girders—multiple	2010	19313H00008B010	BAUER ROAD	MORRIS DRAIN	5	5	1	24.9	21	523																																							
Steel – Culvert	2011	19313H00009B010	DEXTER TRAIL	MUSKRAT CREEK	3	19	2	22.5		673																																							
Prestressed concrete – Box beam/girders—multiple	2012	19313H00009B020	DEXTER TRAIL	MUSKRAT CREEK	5	5	1	51.5	31.2	1607																																							
Prestressed concrete – Box beam/girders—multiple	2013	19313H00011B010	LOWELL RD	BAD CREEK	5	5	1	47	31.1	1462																																							
Prestressed concrete – Box beam/girders—multiple	2014	19314H00002B010	CUTLER ROAD	VERMILION CREEK	5	5	1	38.7	20	774																																							
Prestressed concrete – Box beam/girders—multiple	2015	19314H00003B010	CHADWICK ROAD	VERMILION CREEK	5	5	1	31.8	18	572																																							
Steel – Culvert	2016	19314H00009B020	JASON ROAD	CEDAR LAKE DRAIN	3	19	2	21		628																																							
Prestressed concrete – Box beam/girders—multiple	2017	19314H00012B010	BABCOCK ROAD	LOOKING GLASS RIVER	5	5	2	96.8	30.4	2943																																							
Prestressed concrete – Box beam/girders—multiple	2018	19314H00015B010	HOLLISTER ROAD	LOOKING GLASS RIVER	5	5	2	87.9	27.3	2400																																							
Prestressed concrete – Box beam/girders—multiple	2019	19315H00009B010	HERBISON ROAD	LOOKING GLASS RIVER	5	5	1	115	33	3795																																							
Steel – Box beam/girders—single/spread	2020	19315H00009B020	HERBISON ROAD	LOOKING GLASS RIVER	3	6	2	104	38.4	3994		x																																					
Prestressed concrete – Box beam/girders—multiple	2021	19315H00011B010	BAUER ROAD	LOOKING GLASS RIVER	5	5	1	120.1	28.9	3471																																							
Steel – Truss—thru and pony	2022	19315H00014B010	LOWELL ROAD	LOOKING GLASS RIVER	3	10	1	128	32.9	4211																																							
Steel – Culvert	2023	19316H00006B010	JASON ROAD	MORRIS DRAIN	3	19	2	23		688																																							
Concrete – Culvert	2024	19316H00011B010	TALLMAN ROAD	MORRIS DRAIN	1	19	1	36	30.8	1109																																							
Concrete – Culvert	2025	19316H00011B020	TALLMAN ROAD	MORRIS DRAIN	1	19	1	22		614																																							
Concrete – Culvert	13138	19313H00007C010	CHURCH ROAD	MUSKRAT CREEK	1	19	1	24		768	x																																						

Appendix 5

APPENDIX A-3																			
Inventory Data											Inspection Items								
Bridge Type	Structure Number	Bridge ID	Facility Carried	Features Intersected	Structure Type Main Span (Item 43A - Material)	Structure Type Main Span (Item 43B)	Number of Main Span (Item 45)	Total Str Length (Item 49)	Total Str Width (Item 52)	Total Str (sq ft)	Initial Inspection	In Depth Steel Inspection	Pin and Hanger Inspection	Diving Inspection	Provide Monitoring	Review Scour Criticality	Load Rating	Update SIA
Prestressed concrete – Box beam/girders—multiple	**1895**	19200001000B010	STATE ROAD	GRAND RIVER	5	5	4	248	32	7936	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1896**	19200004000B010	CLARK RD	BR OF LOOKING GLASS RIVR	5	5	1	50.9	33.8	1720	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1897**	19200006000B010	HOWE ROAD	LOOKING GLASS RIVER	5	5	3	149.9	30.5	4572	x						x	x
Concrete – Culvert	**1898**	19200010000B010	PRATT RD	MORRIS DRAIN	1	19	1	26.1	32.5	848	x						x	x
Timber – Slab	**1899**	19200010000B020	PRATT ROAD	BAD CREEK	7	1	1	20	25.9	518	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1900**	19200011000B010	PRICE RD	MORRIS DRAIN	5	5	1	55.8	37.1	2070	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1901**	19200011000B020	PRICE RD	MUSKRAT CREEK	5	5	1	35.8	43.3	1550	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1902**	19200011000B030	PRICE RD	BAD CREEK	5	5	1	30.8	33.1	1019	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1903**	19200011000B040	PRICE RD	STONY CREEK	5	5	1	30.8	33.1	1019	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1904**	19200011000B050	PRICE ROAD	STONY CRK DRN	5	5	1	29.9	34.1	1020	x						x	x
Timber – Slab	**1905**	19200011000B060	PRICE ROAD	LITTLE MAPLE RIVER	7	1	1	29.9	35.8	1070	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1906**	19200012000B010	COLONY ROAD	W. BR. HAYWORTH(PEET CR)	5	5	1	46.9	34.1	1599	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1907**	19200012000B020	COLONY ROAD	SO FORK HAYWORTH CREEK	5	5	1	50.9	30.8	1568	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1908**	19200012000B030	COLONY ROAD	S FORK HAYWORTH CRK	5	5	1	50.9	30.8	1568	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1909**	19200012000B040	COLONY ROAD	SO FORK OF HAYWORTH G.R.	5	5	1	50.9	30.8	1568	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1910**	19200012000B070	COLONY RD	MAPLE RIVER	5	5	1	122	33.8	4124	x						x	x
Concrete – Tee beam	**1911**	19200015000B010	STONE ROAD	MAPLE RIVER DRAIN	1	4	1	24.9	27.9	695	x						x	x
Concrete – Culvert	**1912**	19200016000B010	GRATIOT ROAD	OVERFLOW PINE RIVER	1	19	1	22		750	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1913**	19200016000B020	GRATIOT RD	PINE RIVER	5	5	2	82	31	2542	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1914**	19200017000B010	ISLAND ROAD	MAPLE RIVER	5	5	3	189	32.2	6086	x						x	x
Steel – Box beam/girders—single/spread	**1915**	19200022000B010	TALLMAN ROAD	MAPLE RIVER	3	6	3	192.2	32.4	6227	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1916**	19200023000B010	GRANGE ROAD	LOOKING GLASS RIVER	5	5	2	140.3	34.5	4840	x						x	x
Concrete – Arch—thru	**1917**	19200023000B020	GRANGE ROAD	STONY CREEK	1	12	1	91.9	25.9	2380	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1918**	19200024000B010	WRIGHT ROAD	LOOKING GLASS RIVER	5	5	3	165	43.6	7194	x						x	x
Concrete – Culvert	**1919**	19200024000B020	WRIGHT ROAD	MORRIS DRAIN	1	19	1	20		644	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1920**	19200024000B030	WRIGHT ROAD	STONY CREEK	5	5	1	94	43.8	4117	x						x	x
Steel – Multistringer	**1921**	19200025000B010	WACOUSTA ROAD	LOOKING GLASS RIVER	3	2	2	90	34.2	3078	x						x	x
Prestressed concrete – Multistringer	**1922**	19200026000B010	WACOUSTA ROAD	HAYWORTH DRAIN	5	2	1	104	37.7	3921	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1923**	19200026000B020	WACOUSTA ROAD	COX DRAIN (BROWN'S CR)	5	5	1	37.7	34.1	1286	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1924**	19200027000B010	FOREST HILL RD	HAYWORTH CREEK	5	5	2	86	30.5	2623	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1925**	19200027000B020	FOREST HILL ROAD	COX DRAIN	5	5	1	31.8	30.5	970	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1926**	19200028000B010	FRANCIS ROAD	LOOKING GLASS RIVER	5	5	1	79.7	43.6	3475	x						x	x
Steel – Multistringer	**1927**	19200028000B020	FRANCIS ROAD	STONY CREEK	3	2	1	52.8	29.2	1542	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1928**	FRANCIS ROAD	STONY CREEK	LOOKING GLASS RIVER	5	5	1	111.9	49.5	5539	x						x	x
Concrete – Culvert	**1929**	19200031000B010	DEWITT ROAD	STONY CREEK	1	19	1	25.9		883	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1931**	19200031000B030	DEWITT ROAD	SPAULDING DRAIN	5	5	1	48	41.5	1992	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1932**	19200036000B040	CHANDLER RD	LOOKING GLASS RIVER	5	5	2	92.8	30.8	2858	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1933**	19200036000B060	WOOD ROAD	LOOKING GLASS RIVER	5	5	3	126	30.8	3881	x						x	x
Concrete – Tee beam	**1934**	19200036000B070	CHANDLER ROAD	STONY CREEK	1	4	1	20.3	25.9	526	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1935**	19200039000B010	SHEPARDSVILLE RD	MAPLE RIVER BRANCH	5	5	1	31.8	21	668	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1936**	19200039000B020	SHEPARDSVILLE RD	MAPLE RIVER	5	5	2	79.7	30.5	2431	x						x	x
Prestressed concrete – Multistringer	**1937**	19200039000B030	SHEPARDSVILLE RD	MAPLE RIVER	5	2	2	179.8	43	7731	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1938**	19200039000B040	SHEPARDSVILLE RD	MAPLE RIVER	5	5	3	158.8	31.2	4955	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1939**	19200041000B010	UPTON ROAD	LOOKING GLASS RIVER	5	5	3	115.8	29.9	3462	x						x	x
Steel – Multistringer	**1940**	19200042000B010	HOLLISTER ROAD	MAPLE RIVER	3	2	1	59.7	31.5	1881	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1941**	19200043000B010	MERIDIAN ROAD	ALDER CREEK	5	5	1	53.8	37.4	2012	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1942**	19200043000B020	MERIDIAN RD	ALDER CREEK	5	5	1	27.9	36.4	1016	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1943**	19301H00013B010	CUTLER ROAD	MUD CREEK	5	5	1	24	21	504	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1944**	19301H00024B010	PEACOCK ROAD	VERMILION CREEK	5	5	1	26.9	24.3	654	x						x	x
Steel – Culvert	**1945**	19302H00001B010	DEXTER TRAIL	MUSKRAT CREEK	3	19	2	33.8		1011	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1946**	19302H00002B010	CENTER LINE ROAD	BAD CREEK	5	5	1	33.8	17.7	598	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1947**	19302H00003B010	TAFT ROAD	STONY CREEK	5	5	1	62	18	1116	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1948**	19302H00003B020	TAFT ROAD	STONY CREEK	5	5	1	88.9	24.3	2160	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1949**	19302H00008B010	BAUER ROAD	STONY CREEK	5	5	1	79.7	18	1435	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1950**	19302H00011B010	FOREST HILL ROAD	STONY CREEK	5	5	1	65.9	30.8	2030	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1951**	19302H00013B010	LOWELL ROAD	STONY CREEK	5	5	1	49.9	18	898	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1952**	19302H00015B010	GROVE ROAD	STONY CREEK	5	5	1	66	31.7	2092	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1953**	19303H00001B010	CENTERLINE ROAD	STONY CREEK	5	5	1	41	18	738	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1954**	19303H00003B010	TAFT ROAD	STONY CREEK	5	5	1	53.8	30.8	1657	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1955**	19303H00005B010	PARKS ROAD	SPAULDING EXTENSION	5	5	1	33.8	18	608	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1957**	19303H00015B010	COUNTY FARM ROAD	SPAULDING EXTENSION	5	5	1	52	31.1	1617	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1958**	19303H00017B010	WILLIAMS ROAD	SPAULDING EXTENSION	5	5	1	27.9	18	502	x						x	x
Steel – Culvert	**1959**	19303H00018B010	KREPPS ROAD	STONY CREEK	3	19	1	11.8		283	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1960**	19304H00001B010	CENTER LINE ROAD	KLOECKNER CREEK	5	5	1	27.9	21	586	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1961**	19304H00002B010	TAFT ROAD	FULLER CREEK	5	5	1	37.7	18	679	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1962**	19304H00003B010	DEXTER TRAIL	FULLER CREEK	5	5	1	45	31.3	1409	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1963**	19304H00005B010	TOWNSEND ROAD	LOST CREEK	5	5	1	28.9	18	520	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1965**	19304H00007B020	JONES ROAD	LOST CREEK	5	5	1	22	18	396	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1966**	19304H00007B030	JONES ROAD	WIEBER CREEK	5	5	1	22	18	396	x						x	x
Prestressed concrete – Multistringer	**1967**	19304H00008B010	HINMAN ROAD	STONY CREEK	5	2	2	129.9	32.8	4261	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1968**	19304H00009B010	TALLMAN ROAD	STONY CREEK	5	5	1	101.7	33.1	3366	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1969**	19306H00005B010	MAPLE RIVER ROAD	WISE CREEK	5	5	1	27.9	18	502	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1971**	19306H00014B010	WATSON ROAD	SE BRANCH OF MAPLE RIVER	5	5	1	74.8	18	1346	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1972**	19306H00015B010	MAPLE RIVER ROAD	MAPLE RIVER	5	5	1	51.8	18	932	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1973**	19306H00016B010	ST CLAIR ROAD	MAPLE RIVER	5	5	1	85	25.2	2142	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1975**	19306H00018B010	UPTON ROAD	MAPLE RIVER BRANCH	5	5	1	129.9	32.8	4261	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1976**	19307H00007B010	MONROE ROAD	LOOKING GLASS RIVER	5	5	2	157.5	33.1	5213	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1977**	19307H00008B010	JONES ROAD	GRAND RIVER	5	5	3	246.1	34.1	8392	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1978**	19307H00014B010	TALLMAN ROAD	LOOKING GLASS RIVER	5	5	1	129.9	32.8	4261	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1979**	19308H00001B010	KINLEY ROAD	S FORK OF HAYWORTH	5	5	1	41	21	861	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1980**	19308H00010B010	ISLAND ROAD	HAYWORTH CREEK	5	5	1	59.7	21	1254	x						x	x

Steel – Culvert	**1981**	19308H00010B020	ISLAND ROAD	COX DRAIN	3	19	2	20		400	x						x	x
Steel – Culvert	**1982**	19308H00010B030	ISLAND ROAD	COX DRAIN	3	19	2	20		400	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1983**	19308H00011B010	HYDE ROAD	HAYWORTH CREEK	5	5	1	59.7	18	1075	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1985**	19308H00014B010	BAUER ROAD	PEET CREEK	5	5	1	25.9	21.7	562	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1986**	19308H00014B020	BAUER ROAD	HAYWORTH CREEK	5	5	1	59.7	18	1075	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1987**	19308H00014B030	BAUER ROAD	HAYWORTH CREEK	5	5	1	86	31.1	2675	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1988**	19308H00015B010	WACOUSTA ROAD	PEET CREEK	5	5	1	60	31.5	1890	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1989**	19308H00017B010	ESSEX CENTER ROAD	S FORK OF HAYWORTH CREEK	5	5	1	41	21	861	x						x	x
Prestressed concrete – Tee beam	**1990**	19308H00017B020	ESSEX CENTER ROAD	HAYWORTH CREEK	5	4	1	37.7	22	829	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1991**	19308H00018B020	ANDERSON ROAD	HAYWORTH CREEK	5	5	1	54	29	1566	x						x	x
Steel – Culvert	**1992**	19308H00018B010	ANDERSON ROAD	S FORK OF HAYWORTH CREEK	3	19	2	23		784	x						x	x
Prestressed concrete – Box beam/girders—multiple	**1993**	19308H00020B010	FINDLAY RD	HAYWORTH CREEK	5	5	1	52	31.7	1648	x						x	x
Concrete – Culvert	**1994**	19309H00016B010	AIRPORT ROAD	HAYWORTH CREEK	1	19	1	26.2		893	x						x	x
Concrete – Culvert	**1995**	19309H00018B010	DEWITT ROAD	HAYWORTH CREEK	1	19	1	28.2		787	x						x	x
Steel – Culvert	**1997**	19310H00001B010	KINLEY ROAD	PEET CREEK	3	19	2	22		750	x						x	x
Steel – Culvert	**1998**	19310H00009B010	GRATIOT RD	FIFIELD CREEK	3	19	2	22		750	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2000**	19312H00003B010	TAFT ROAD	MAPLE RIVER	5	5	1	25.9	18	466	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2001**	19312H00004B010	PARKS ROAD	MAPLE RIVER	5	5	1	24	18	432	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2002**	19312H00007B010	TOWNSEND ROAD	STONY CREEK	5	5	1	26.9	18	484	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2003**	19312H00010B020	WILDCAT ROAD	ALDER CREEK	5	5	1	44.9	21	943	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2004**	19312H00015B010	WALKER ROAD	MAPLE RIVER	5	5	1	29.9	18	538	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2005**	19312H00016B010	FARAGHER ROAD	MAPLE RIVER	5	5	2	77.8	30.8	2396	x						x	x
Concrete – Culvert	**2007**	19312H00027B010	HOLLISTER ROAD	ALDER CREEK	1	19	1	34.6		1180	x						x	x
Steel – Culvert	**2008**	19313H00006B010	JASON ROAD	MUSKRAT CREEK	3	19	2	21.5	58	1247	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2009**	19313H00006B020	JASON ROAD	BAD CREEK	5	5	1	27.9	21	586	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2010**	19313H00008B010	BAUER ROAD	MORRIS DRAIN	5	5	1	24.9	21	523	x						x	x
Steel – Culvert	**2011**	19313H00009B010	DEXTER TRAIL	MUSKRAT CREEK	3	19	2	22.5		673	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2012**	19313H00009B020	DEXTER TRAIL	MUSKRAT CREEK	5	5	1	51.5	31.2	1607	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2013**	19313H00011B010	LOWELL RD	BAD CREEK	5	5	1	47	31.1	1462	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2014**	19314H00002B010	CUTLER ROAD	VERMILION CREEK	5	5	1	38.7	20	774	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2015**	19314H00003B010	CHADWICK ROAD	VERMILION CREEK	5	5	1	31.8	18	572	x						x	x
Steel – Culvert	**2016**	19314H00009B020	JASON ROAD	CEDAR LAKE DRAIN	3	19	2	21		628	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2017**	19314H00012B010	BABCOCK ROAD	LOOKING GLASS RIVER	5	5	2	96.8	30.4	2943	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2018**	19314H00015B010	HOLLISTER ROAD	LOOKING GLASS RIVER	5	5	2	87.9	27.3	2400	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2019**	19315H00009B010	HERBISON ROAD	LOOKING GLASS RIVER	5	5	1	115	33	3795	x						x	x
Steel – Box beam/girders—single/spread	**2020**	19315H00009B020	HERBISON ROAD	LOOKING GLASS RIVER	3	6	2	104	38.4	3994	x						x	x
Prestressed concrete – Box beam/girders—multiple	**2021**	19315H00011B010	BAUER ROAD	LOOKING GLASS RIVER	5	5	1	120.1	28.9	3471	x						x	x
Steel – Truss—thru and pony	**2022**	19315H00014B010	LOWELL ROAD	LOOKING GLASS RIVER	3	10	1	128	32.9	4211	x						x	x
Steel – Culvert	**2023**	19316H00006B010	JASON ROAD	MORRIS DRAIN	3	19	2	23		688	x						x	x
Concrete – Culvert	**2024**	19316H00011B010	TALLMAN ROAD	MORRIS DRAIN	1	19	1	36	30.8	1109	x						x	x
Concrete – Culvert	**2025**	19316H00011B020	TALLMAN ROAD	MORRIS DRAIN	1	19	1	22		614	x						x	x
Concrete – Culvert	**13138**	19313H00007C010	CHURCH ROAD	MUSKRAT CREEK	1	19	1	24		768	x						x	x

C. CULVERT ASSET MANAGEMENT PLAN SUPPLEMENT

Culvert Primer

Culverts are structures that lie underneath roads, enabling water to flow from one side of the roadway to the other (Figure C-1 and Figure C-2). The important distinguishing factor between a culvert and a bridge is the size. Culverts are considered anything under 20 feet while bridges, according to the Federal Highway Administration, are 20 feet or more. While similar in function to storm sewers, culverts differ from storm sewers in that culverts are open on both ends, are constructed as straight-line conduits, and lack intermediate drainage structures like manholes and catch basins. Culverts are critical to the service life of a road because of the important role they play in keeping the pavement layers well drained and free from the forces of water building up on one side of the roadway.

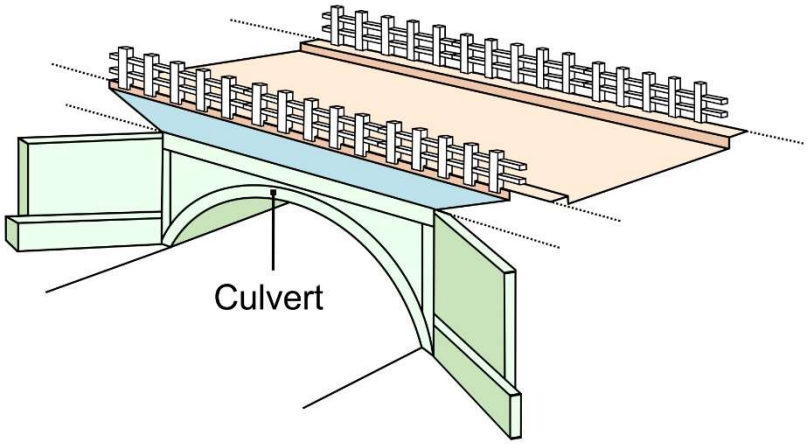

Figure C-1: Diagram of a culvert structure

Figure C-2: Examples of culverts. Culverts allow water to pass under the roadway (left), they are straight-line conduits with no intermediate drainage structures (middle), and they come in various materials (left: metal; middle and right: concrete) and shapes (left: arch; middle: round; right: box).

Culvert Types

Michigan conducted its first pilot data collection on local agency culverts in the state in 2018. Of almost 50,000 culverts inventoried as part of the state-wide pilot project, the material type used for constructing culverts ranged from (in order of predominance) corrugated steel, concrete, plastic, aluminum, and masonry/tile, to timber materials. The shapes of the culverts were (in order of predominance) circular, pipe arch, arch, rectangular, horizontal ellipse, or box. The diameter for the majority of culverts ranged from less than 12 inches to 24 inches; a portion, however, ranged from 30 inches to more than 48 inches.

Culvert Condition

Several culvert condition assessment practices exist. The FHWA has an evaluation method in its 1986 *Culvert Inspection Manual*. In conjunction with descriptions and details in the Ohio Department of Transportation's 2017 *Culvert Inspection Manual* and Wisconsin DOT's *Bridge Inspection Field Manual*, the FHWA method served as the method for evaluating Michigan culverts in the pilot. In 2018, Michigan local agencies participated in a culvert pilot data collection, gathering inventory and condition data; full detail on the condition assessment system used in the data collection can be found in Appendix G of the final report (https://www.michigan.gov/documents/tamc/TAMC_2018_Culvert_Pilot_Report_Complete_634795_7.pdf).

The Michigan culvert pilot data collection used a 1 through 10 rating system, where 10 is considered a new culvert with no deterioration or distress and 1 is considered total failure. Each of the different culvert material types requires the assessment of features unique to that material type, including structural deterioration, invert deterioration, section deformation, blockage(s) and scour. Corrugated metal pipe, concrete pipe, plastic pipe, and masonry culverts require an additional assessment of joints and seams. Slab abutment culverts require an additional assessment of the concrete abutment and the masonry abutment. Assessment of timber culverts only relied on blockage(s) and scour. The assessments come together to generate condition rating categories of good (rated as 10, 9, or 8), fair (rated as 7 or 6), poor (rated as 5 or 4), or failed (rated as 3, 2, or 1).

Culvert Treatments

The *MDOT Drainage Manual* addresses culvert design and treatments. Of most importance to the longevity of culverts is regular cleaning to prevent clogs. More extensive treatments may include re-positioning the pipe to improve its grade and lining a culvert to achieve more service life after structural deterioration has begun.

D. TRAFFIC SIGNALS ASSET MANAGEMENT PLAN SUPPLEMENT

Traffic Signals Primer

Types

Electronic traffic control devices come in a large array of configurations, which include case signs (e.g., keep right/left, no right/left turn, reversible lanes), controllers, detection (e.g., cameras, push buttons), flashing beacons, interconnects (e.g., DSL, fire station, phone line, radio), pedestrian heads (e.g., hand-man), and traffic signals. This asset management plan is only concerned with traffic signals (Figure D-1) as a functioning unit and does not consider other electronic traffic control devices.

Figure D-1: Example of traffic signals

Condition

Traffic signal assessment considers the functioning of basic tests on a pass/fail basis. These tests include battery backup testing, components testing, conflict monitor testing, radio testing, and underground detection.

Treatments

Traffic signals are maintained in accordance with the *Michigan Manual on Uniform Traffic Control Devices*. Maintenance of traffic signals includes regular maintenance of all components, cleaning and servicing to prevent undue failures, immediate maintenance in the case of emergency calls, and provision of stand-by equipment. Timing changes are restricted to authorized personnel only.

E. GLOSSARY & ACRONYMS

Glossary

Alligator cracking: Cracking of the surface layer of an asphalt pavement that creates a pattern of interconnected cracks resembling alligator hide. This is often due to overloading a pavement, sub-base failure, or poor drainage.[5]

Asset management: A process that uses data to manage and track road assets in a cost-effective manner using a combination of engineering and business principles. Public Act 325 of 2018 provides a legal definition: "an ongoing process of maintaining, preserving, upgrading, and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment and investment to achieve established performance goals".[6]

Biennial inspection: Inspection of an agency's bridges every other year, which happens in accordance with National Bridge Inspection Standards and Michigan Department of Transportation requirements.

Bridge inspection program: A program implemented by a local agency to inspect the bridges within its jurisdiction systematically in order to ensure proper functioning and structural soundness.

Capital preventative maintenance: Also known as CPM, a planned set of cost-effective treatments to address of fair-rated infrastructure before the structural integrity of the system has been severely impacted. These treatments aim to slow deterioration and to maintain or improve the functional condition of the system without significantly increasing the structural capacity. Light capital preventive maintenance is a set of treatments designed to seal isolated areas of the pavement from water, such as crack and joint sealing, to protect and restore pavement surface from oxidation with limited surface thickness material, such as fog seal; generally, application of a light CPM treatment does not provide a corresponding increase in a segment's PASER score. Heavy capital preventive maintenance is a set of surface treatments designed to protect pavement from water intrusion or environmental weathering without adding significant structural strength, such as slurry seal, chip seal, or thin (less than 1.5-inch) overlays for bituminous surfaces or patching or partial-depth (less than 1/3 of pavement depth) repair for concrete surfaces.

Chip seal: An asphalt pavement treatment method consisting of, first, spraying liquid asphalt onto the old pavement surface and, then, a single layer of small stone chips spread onto the wet asphalt layer.

City major: A road classification, defined in Michigan Public Act 51, that encompasses the generally more important roads in a city or village. City major roads are designated by a municipality's governing body and are subject to approval by the State Transportation Commission. These roads do not include roads under the jurisdiction of a county road commission or trunkline highways.

City minor: A road classification, defined in Michigan Public Act 51, that encompasses the generally less important roads in a city or village. These roads include all city or village roads that are not city major road and do not include roads under the jurisdiction of a county road commission.

[5] https://en.wikipedia.org/wiki/Crocodile_cracking
[6] Inventory-based Rating System for Gravel Roads: Training Manual

Composite pavement: A pavement consisting of concrete and asphalt layers. Typically, composite pavements are old concrete pavements that were overlaid with HMA in order to gain more service life.

Concrete joint resealing: Resealing the joints of a concrete pavement with a flexible sealant to prevent moisture and debris from entering the joints. When debris becomes lodged inside a joint, it inhibits proper movement of the pavement and leads to joint deterioration and spalling.

Concrete pavement: Also known as rigid pavement, a pavement made from portland cement concrete. Concrete pavement has an average service life of 30 years and typically does not require as much periodic maintenance as HMA.

Cost per lane mile: Associated cost of construction, measured on a per lane, per mile basis. Also see *lane-mile segment*.

County local: A road classification, defined in Michigan Public Act 51, that encompasses the generally less important and low-traffic roads in a county. This includes all county roads that are not classified as county primary roads.

County primary: A road classification, defined in Michigan Public Act 51, that encompasses the generally more important and high-traffic roads in a county. County primary roads are designated by board members of the county road commissions and are subject to approval by the State Transportation Commission.

CPM: See *Capital preventive maintenance*.

Crack and seat: A concrete pavement treatment method that involves breaking old concrete pavement into small chunks and leaving the broken pavement in place to provide a base for a new surface. This provides a new wear surface that resists water infiltration and helps prevent damaged concrete from reflecting up to the new surface.

Crack seal: A pavement treatment method for both asphalt and concrete pavements that fills cracks with asphalt materials, which seals out water and debris and slows down the deterioration of the pavement. Crack seal may encompass the term “crack filling”.

Crush and shape: An asphalt pavement treatment method that involves pulverizing the existing asphalt pavement and base and then reshaping the road surface to correct imperfections in the road’s profile. Often, a layer of gravel is added along with a new wearing surface such as an HMA overlay or chip seal.

Crust: A very tightly compacted surface on an unpaved road that sheds water with ease but takes time to be created.

Culvert: A pipe or structure used under a roadway that allows cross-road drainage while allowing traffic to pass without being impeded; culverts span up to 20 feet.[7]

Dowel bar retrofit repair: A concrete pavement treatment method that involves cutting slots in a cracked concrete slab, inserting steel bars into the slots, and placing concrete to cover the new bars and fill the slots. It aims to reinforce cracks in a concrete pavement.

[7] Adapted from Inventory-based Rating System for Gravel Roads: Training Manual

Dust control: A gravel road surface treatment method that involves spraying chloride or other chemicals on the gravel surface to reduce dust loss, aggregate loss, and maintenance. This is a relatively short-term fix that helps create a crusted surface.

Expansion joint: Joints in a bridge that allow for slight expansion and contraction changes in response to temperature. Expansion joints prevent the build up of excessive pressure, which can cause structural damage to the bridge.

Federal Highway Administration: Also known as FHWA, this is an agency within the U.S. Department of Transportation that supports state and local governments in the design, construction, and maintenance of the nation's highway system.[8]

Federal-aid network: Portion of road network that is comprised of federal-aid routes. According to Title 23 of the United States Code, federal-aid-eligible roads are "highways on the federal-aid highways systems and all other public roads not classified as local roads or rural minor collectors".[9] Roads that are part of the federal-aid network are eligible for federal gas-tax monies.

FHWA: See *Federal Highway Administration*.

Flexible pavement: See *hot-mix asphalt pavement*.

Fog seal: An asphalt pavement treatment method that involves spraying a liquid asphalt coating onto the entire pavement surface to fill hairline cracks and prevent damage from sunlight and oxidation. This method works best for good to very good pavements.

Full-depth concrete repair: A concrete pavement treatment method that involves removing sections of damaged concrete pavement and replacing it with new concrete of the same dimensions in order to restore the riding surface, delay water infiltration, restore load transfer from one slab to the next, and eliminate the need to perform costly temporary patching.

Geographic divides: Areas where a geographic feature (e.g., river, lake, mountain) limits crossing points of the feature.

Grants: Competitive funding gained through an application process and targeted at a specific project type to accomplish a specific purpose. Grants can be provided both on the federal and state level and often make up part of the funds that a transportation agency receives.

Gravel surfacing: A low-cost, easy-to-maintain road surface made from aggregate and fines.

Heavy capital preventive maintenance: See *Capital preventive maintenance*.

HMA: See *hot-mix asphalt pavement*.

Hot-mix asphalt overlay: Also known as HMA overlay, this a surface treatment that involves layering new asphalt over an existing pavement, either asphalt or concrete. It creates a new wearing surface for traffic and to seal the pavement from water, debris, and sunlight damage, and it often adds significant structural strength.

Hot-mix asphalt pavement: Also known as HMA pavement, this type of asphalt creates a flexible pavement composed of aggregates, asphalt binder, and air voids. HMA is heated for placement and

[8] Federal Highway Administration webpage https://www.fhwa.dot.gov/
[9] Inventory-based Rating System for Gravel Roads: Training Manual

compaction at high temperatures. HMA is less expensive to construct than concrete pavement, however it requires frequent maintenance activities and generally lasts 18 years before major rehabilitation is necessary. HMA makes up the vast majority of local-agency-owned pavements.

IBR: See *IBR element*, *IBR number*, and/or *Inventory-based Rating System™*.

IBR element: A feature used in the IBR System™ for assessing the condition of roads. The system relies on assessing three elements: surface width, drainage adequacy, and structural adequacy.[10]

IBR number: The 1-10 rating determined from assessments of the weighted IBR elements. The weighting relates each element to the intensity road work needed to improve or enhance the IBR element category.[11]

Interstate highway system: The road system owned and operated by each state consisting of routes that cross between states, make travel easier and faster. The interstate roads are denoted by the prefix "I" or "U.S." and then a number, where odd routes run north-south and even routes run east-west. Examples are I-75 or U.S. 2.[12]

Inventory-based Rating System™: Also known as the IBR System™, a rating system designed to assess the capabilities of gravel and unpaved roads to support intended traffic volumes and types year round. It assesses roads based on how three IBR elements, or features—surface width, drainage adequacy, and structural adequacy—compare to a baseline, or "good", road.[13]

Investment Reporting Tool: Also known as IRT, a web-based system used to manage the process for submitting required items to the Michigan Transportation Asset Management Council. Required items include planned and completed maintenance and construction activity for roads and bridges and comprehensive asset management plans.

IRT: See *Investment Reporting Tool*.

Jurisdiction: Administrative power of an entity to make decisions for something. In Michigan, the three levels of jurisdiction classification for transportation assets are state highways, county roads, and city and village streets. State highways are under the jurisdiction of the Michigan Department of Transportation, county roads are under the jurisdiction of the road commission for the county in which the roads are located, and city and village streets are under the jurisdiction of the municipality in which the roads are located.

Jurisdictional borders: Borders between two road-owning-agency jurisdictions, or where the roads owned by one agency turn into roads owned by another agency. Examples of jurisdictional borders are township or county lines.

Lane-mile segment: A segment of road that is measured by multiplying the centerline miles of a roadway by the number of lanes present.

Lane-mile-years: A network's total lane-miles multiplied by one year; a method to quantify the measurable loss of pavement life.

[10] Inventory-based Rating System for Gravel Roads: Training Manual
[11] Inventory-based Rating System for Gravel Roads: Training Manual
[12] https://www.fhwa.dot.gov/interstate/faq.cfm#question3
[13] Adapted from Inventory-based Rating System for Gravel Roads: Training Manual

Light capital preventive maintenance: See *Capital preventive maintenance*.

Limited access areas: Areas—typically remote areas—serviced by few or seasonal roads that require long detours routes if servicing roads are closed.

Main access to key commercial districts: Areas where large number or large size business will be significantly impacted if a road is unavailable.

Maintenance grading: A surface treatment method for unpaved roads that involves re-grading the road to remove isolated potholes, washboarding, and ruts, and then restoring the compacted crust layer.

MDOT: See *Michigan Department of Transportation*.

MDOT's Local Bridge Program Call for Projects: A call for project proposals for replacement, rehabilitation, and/or preventive maintenance of local bridges that, if granted, receives bridge funding from the Michigan Department of Transportation. The Call for Projects is made by the Local Bridge Program.

MGF: See *Michigan Geographic Framework*.

Michigan Department of Transportation: Also known as MDOT, this is the state of Michigan's department of transportation, which oversees roads and bridges owned by the state or federal government in Michigan.

Michigan Geographic Framework: Also known as MGF, this is the state of Michigan's official digital base map that contains location and road information necessary to conduct state business. The Michigan Department of Transportation uses the MGF to link transportation assets to a physical location.

Michigan Public Act 51 of 1951: Also known as PA 51, this is a Michigan legislative act that served as the foundation for establishing a road funding structure by creating transportation funding distribution methods and means. It has been amended many times.[14]

Michigan Public Act 325 of 2018: Also known as PA 325, this legislation modified PA 51 of 1951 in regards to asset management in Michigan, specifically 1) re-designating the TAMC under Michigan Infrastructure Council (MIC); 2) promoting and overseeing the implementation of recommendations from the regional infrastructure asset management pilot program; 3) requiring local road three-year asset management plans beginning October 1, 2020; 4) adding asset classes that impact system performance, safety or risk management, including culverts and signals; 5) allowing MDOT to withhold funds if no asset management plan submitted; and 6) prohibiting shifting finds from a country primary to a county local, or from a city major to a city minor if no progress toward achieving the condition goals described in its asset plan.[15]

Michigan Public Act 499 of 2002: Also known as PA 499, this legislation requires road projects for the upcoming three years to be reported to the TAMC.

Michigan Transportation Asset Management Council: Also known as the TAMC, a council comprised of professionals from county road commissions, cities, a county commissioner, a township official, regional and metropolitan planning organizations, and state transportation department personnel. The

[14] Inventory-based Rating System for Gravel Roads: Training Manual
[15] Inventory-based Rating System for Gravel Roads: Training Manual

council reports directly to the Michigan Infrastructure Council.[16] The TAMC provides resources and support to Michigan's road-owning agencies, and serves as a liaison in data collection requirements between agencies and the state.

Michigan Transportation Fund: Also known as MTF, this is a source of transportation funding supported by vehicle registration fees and the state's per-gallon gas tax.

Microsurface treatment: An asphalt pavement treatment method that involves applying modified liquid asphalt, small stones, water, and portland cement for the purpose of protecting a pavement from damage caused by water and sunlight.

Mill and hot-mix asphalt overlay: Also known as a mill and HMA overlay, this is a surface treatment that involves the removal of the top layer of pavement by milling and the replacement of the removed layer with a new HMA layer.

Mix-of-fixes: A strategy of maintaining roads and bridges that includes generally prioritizes the spending of money on routine maintenance and capital preventive maintenance treatments to impede deterioration and then, as money is available, performing reconstruction and rehabilitation.

MTF: See *Michigan Transportation Fund*.

National Bridge Inspection Standards: Also known as NBIS, standards created by the Federal Highway Administration to locate and evaluate existing bridge deficiencies in the federal-aid highway system to ensure the safety of the traveling public. The standards define the proper safety for inspection and evaluation of all highway bridges.[17]

National Center for Pavement Preservation: Also known as the NCPP, a center that offers education, research, and outreach in current and innovative pavement preservation practices. This collaborative effort of government, industry, and academia entities was established at Michigan State University.

National Functional Class: Also known as NFC, a federal grouping system for public roads that classifies roads according to the type of service that the road is intended to provide.

National highway system: Also known as NHS, this is a network of roads that includes the interstate highway system and other major roads managed by state and local agencies that serve major airports, marine, rail, pipelines, truck terminals, railway stations, military bases, and other strategic facilities.

NBIS: See *National Bridge Inspection Standards*.

NCPP: See *National Center for Pavement Preservation*.

NCPP Quick Check: A system created by the National Center for Pavement Preservation that works under the premise that a one-mile road segment loses one year of life each year that it is not treated with a maintenance, rehabilitation, or reconstruction project.

NFC: See *National Functional Class*.

Non-trunkline: A local road intended to be used over short distances but not recommended for long-distance travel.

[16] Inventory-based Rating System for Gravel Roads: Training Manual
[17] https://www.fhwa.dot.gov/bridge/nbis/

Other funds: Expenditures for equipment, capital outlay, debt principal payment, interest expense, contributions to adjacent governmental units, principal, interest and bank fees, and miscellaneous for cities and villages.

PA: See *Michigan Public Act 51*, *Michigan Public Act 325*, and/or *Michigan Public Act 499*.

Partial-depth concrete repair: A concrete pavement treatment method that involves removing spalled or delaminated areas of concrete pavement, usually near joints and cracks, and replacing with new concrete. This is done to provide a new wearing surface in isolated areas, to slow down water infiltration, and to help delay further freeze-thaw damage.

PASER: See *Pavement Surface Evaluation and Rating system*.

Pavement reconstruction: A complete removal of the old pavement and base and construction of an entirely new road. This is the most expensive rehabilitation of the roadway and also the most disruptive to traffic patterns.

Pavement Surface Evaluation and Rating system: Also known as the PASER system, the PASER system rates surface condition on a 1-10 scale, where 10 is a brand new road with no defects, 5 is a road with distress but that is structurally sound and requires only preventative maintenance, and 1 is a road with extensive surface and structural distresses that is in need of total reconstruction. This system provides a simple, efficient, and consistent method for evaluating the condition of paved roads.[18]

Pothole: A defect in a road that produces a localized depression.[19]

Preventive maintenance: Planned treatments to an existing asset to prevent deterioration and maintain functional condition. This can be a more effective use of funds than the costly alternative of major rehabilitation or replacement.

Proactive preventive maintenance: Also known as PPM, a method of performing capital preventive maintenance treatments very early in a pavement's life, often before it exhibits signs of pavement defect.

Public Act 51: See *Michigan Public Act 51 of 1951*

Public Act 325: See *Michigan Public Act 325 of 2018*

Public Act 499: See *Michigan Public Act 499 of 2002*

Reconstruction and rehabilitation programs: Programs intended to reconstruct and rehabilitate a road.

Restricted load postings: A restriction enacted on a bridge structure when is incapable of transporting a state's legal vehicle loads.

Rights-of-way ownership: The owning of the right-of-way, which is the land over which a road or bridge travels. In order to build a road, road agencies must own the right-of-way or get permission to build on it.

Rigid pavement: See *concrete pavement*.

[18] Adapted from Inventory-based Rating System for Gravel Roads: Training Manual
[19] Inventory-based Rating System for Gravel Roads: Training Manual

Road infrastructure: An agency's road network and assets necessary to make it function, such as traffic signage and ditches.

Road: The area consisting of the roadway (i.e., the travelled way or the portion of the road on which vehicles are intended to drive), shoulders, ditches, and areas of the right of way containing signage.[20]

Roadsoft: An asset management software suit that enables agencies to manage road and bridge related infrastructure. The software provides tools for collecting, storing, and analyzing data associated with transportation infrastructure. Built on an optimum combination of database engine and GIS mapping tools, Roadsoft provides a quick, smooth user experience and almost unlimited data handling capabilities.[21]

Ruts/rutting: Deformation of a road that usually forms as a permanent depression concentrated under the wheel path parallel to the direction of travel.[22]

Scheduled maintenance: Low-cost, day-to-day activities applied to bridges on a scheduled basis that mitigates deterioration.[23]

Sealcoat pavement: A gravel road that has been sealed with a thin asphalt binder coating that has stone chips spread on top.

Service life: Time from when a road or treatment is first constructed to when it reaches a point where the distresses present change from age-related to structural-related (also known as the critical distress point).[24]

Slurry seal: An asphalt pavement treatment method that involves applying liquid asphalt, small stones, water, and portland cement in a very thin layer with the purpose of protecting an existing pavement from being damaged by water and sunlight.

Structural improvement: Pavement treatment that adds strength to the pavement. Roads requiring structural improvement exhibit alligator cracking and rutting and are considered poor by the TAMC definitions for condition.

Subsurface infrastructure: Infrastructure maintained by local agencies that reside underground, for example, drinking water distribution systems, wastewater collection systems, and storm sewer systems.

TAMC: See *Michigan Transportation Asset Management Council*.

TAMC pavement condition dashboard: Website for viewing graphs of pavement and bridge conditions, traffic and miles travelled, safety statistics, maintenance activities, and financial data for Michigan's cities and villages, counties, and regions, as well as the state of Michigan.

TAMC's good/fair/poor condition classes: Classification of road conditions defined by the Michigan Transportation Asset Management Council based on bin ranges of PASER scores and similarities in defects and treatment options. Good roads have PASER scores of 8, 9, or 10, have very few defects, and require minimal maintenance. Fair roads have PASER scores of 5, 6, or 7, have good structural support but a deteriorating surface, and can be maintained with CPM treatments. Poor roads have PASER scores

[20] Inventory-based Rating System for Gravel Roads: Training Manual
[21] Inventory-based Rating System for Gravel Roads: Training Manual
[22] Paving Class Glossary
[23] Inventory-based Rating System for Gravel Roads: Training Manual
[24] Inventory-based Rating System for Gravel Roads: Training Manual

of 1, 2, 3, or 4, exhibit evidence that the underlying structure is failing, such as alligator cracking and rutting. These roads must be rehabilitated with treatments like heavy overlay, crush and shape, or total reconstruction.

Tax millages: Local tax implemented to supplement an agency's budget, such as road funding.

Thin hot-mix asphalt overlay: Application of a thin layer of hot-mix asphalt on an existing road to re-seal the road and protect it from damage caused by water. This also improves the ride quality and provides a smoother, uniform appearance that improves visibility of pavement markings.[25]

Transportation infrastructure: All of the elements that work together to make the surface transportation system function including roads, bridges, culverts, traffic signals, and signage.

Trigger: When a PASER score gives insight to the preferred timeline of a project for applying the correct treatment at the correct time.

Trunkline abbreviations: The prefixes *M-*, *I-*, and *US* indicate roads in Michigan that are part of the state trunkline system, the Interstate system, and the US Highway system. These roads consist of anything from 10-lane urban freeways to two-lane rural highways and even one non-motorized highway; they cover 9,668 centerline miles. Most of the roads are maintained by MDOT.

Trunkline bridges: Bridge present on a trunkline road, which typically connects cities or other strategic places and is the recommended rout for long-distance travel.[26]

Trunkline maintenance funds: Expenditures under a maintenance agreement with MDOT for maintenance activities performed on MDOT trunkline routes.

Trunkline: Major road that typically connects cities or other strategic places and is the recommended route for long-distance travel.[27]

Washboarding: Ripples in the road surface that are perpendicular to the direction of travel.[28]

Wedge/patch sealcoat treatment: An asphalt pavement treatment method that involves correcting the damage frequently found at the edge of a pavement by installing a narrow, 2- to 6-foot-wide wedge along the entire outside edge of a lane and layering with HMA. This extends the life of an HMA pavement or chip seal overlay by adding strength to significantly settled areas of the pavement.

Worst-first strategy: Asset management strategy that treats only the problems, often addressing the worst problems first, and ignoring preventive maintenance. This strategy is the opposite of the "mix of fixes" strategy. An example of a worst-first approach would be purchasing a new automobile, never changing the oil, and waiting till the engine fails to address any deterioration of the car.

List of Acronyms

CPM: capital preventive maintenance

[25] [second sentence] http://www.kentcountyroads.net/road-work/road-treatments/ultra-thin-overlay
[26] https://en.wikipedia.org/wiki/Trunk_road
[27] https://en.wikipedia.org/wiki/Trunk_road
[28] Inventory-based Rating System for Gravel Roads: Training Manual

FHWA: Federal Highway Administration

HMA: hot-mix asphalt

I: trunkline abbreviation for routes on the Interstate system

IBR: Inventory-based Rating

M: trunkline abbreviation for Michigan state highways

MDOT: Michigan Department of Transportation

MTF: Michigan Transportation Fund

NBIS: National Bridge Inspection Standards

NCPP: National Center for Pavement Preservation

NHS: National Highway System

PA 51: Michigan Public Act 51 of 1951

PASER: Pavement Surface Evaluation and Rating

R&R: reconstruction and rehabilitation programs

TAMC: (Michigan) Transportation Asset Management Council

US: trunkline abbreviation for routes on the US Highway system