Section **7.0**

THOROUGHFARE PLAN

THOROUGHFARE PLAN

INTRODUCTION

A transportation system provides a means to move people and goods among various geographical areas. Because transportation has a significant impact on economic conditions, environmental quality, energy consumption, land development, and the overall quality of life in a community, it is critical that future transportation needs and problems be anticipated and reflected in the Master Plan process.

The interrelationship between transportation and other community functions can be further described by examining the many purposes and functions of roadways. The primary purpose of roadways is to move goods and people. Roads and their associated rights-of-way also provide locations for public utilities including water, sanitary sewer, storm sewer, gas, electrical power, and telephone lines. Public services such as police, fire, and emergency rescue rely on the safe and adequate provision of roadways. Streets and rights-of-way also provide opportunities for landscaping, community entryway features, and non-motorized transportation such as sidewalks and bike paths.

In many communities, there is a historical significance to the arrangement of streets, and the street pattern impacts the character of the community. The layout of Riley Township was influenced by the Ordinance of 1785 (Northwest Ordinance), which established a land survey. The area was divided into congressional townships 6 miles square in size. Each township contained 36 square miles, which are called sections.

The establishment of townships and sections not only made land identification easier, but it also provided a logical system for the provision of roadways along section lines. Major East- West mile roads include Bordman Road and Masters Road, and major North-South mile roads include Riley Center and Kinney (M-19).

PLANNING CONCEPTS

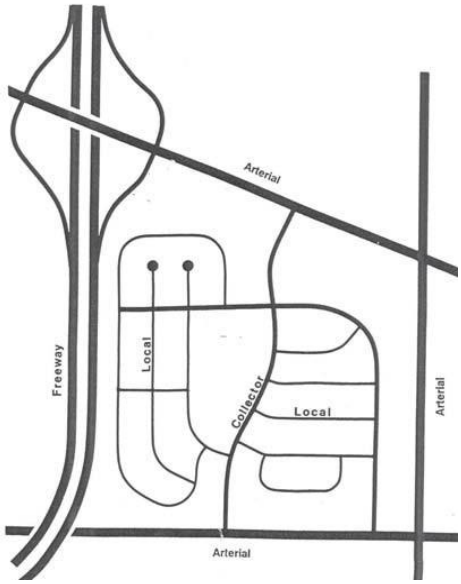
Functional Classification of Roads

On average, 80% of travel occurs on about 20% of the roads. This is because roadways have different functions. Some roads are designed to carry through traffic while others are designed to carry local traffic. In order to set priorities for funding and improvements to roads, transportation planners established a road classification system.

The distinction between roads that carry local and through traffic is made because of the substantially different kind of design required to serve both types of traffic. The overall traffic circulation system with both local and through streets must be carefully integrated in order to function successfully. The four basic types of roads in Riley Township are freeways, major roads, collectors, and local streets.

Freeways

A freeway is designed to handle large volumes of traffic moving at high speeds over long distances or between urban areas. Experience has shown that this demand often cannot be met by the addition of lanes to existing major thoroughfares. Hence, the provision of a freeway often is the only answer to the problem of overburdened thoroughfares. Its capacity is increased greatly by the elimination of all at-grade intersections and all driveway cuts for frontage access. Points of entrance and exit are carefully controlled to maximize roadway capacities. I-69 is the only freeway in the Township.



Major Roadways

Major roads are the backbone of the 1 mile grid system. They provide continuity from one township/ city to another, and they can carry long trips when a freeway alternative is not provided. In fact, some major roads resemble mini-freeways by providing a wide median strip, partially-controlled access, and 6 or 8 through lanes.

Major roads are intended to serve through traffic volumes while providing some access to abutting properties and minor intersecting roads. It is this dual function that often leads to congestion and traffic accidents because of turning vehicles conflicting with or impeding through traffic. These problems can sometimes be minimized in business districts by the use of service drives and/or internal connections between individual businesses that allow an overall reduction in the number of driveway connections to the major road.

Major roads in the Township include the following: Burt, Dunn, Hill, Masters, Lambs, Hough, Smiths Creek, Bordman, Miller, Riley Center, Eagling, Braidwood, Kinney/Burnell (M-19), Stapleton, and Belle River.

Collector Roads

The collector road system provides land access and traffic circulation within residential areas, commercial and industrial areas. The purpose of a collector road is to collect vehicles from the local streets and distribute them to either local destinations or to a major roadway. Collectors can also provide internal circulation and access to non-residential areas such as industrial parks and major shopping centers. Collector roads in Riley Township are often found at the midpoint between mile roads. Examples include the following: Calvin, Tibbets, Hunt, Burgess, Gilbert, Griffin, Cowhy, Reeves, Sparling, Alpine, Minor, Stinson, Cornwell, and Kinney (South of M-19). Reeves, which is on the one-mile grid, does not function as an arterial because of its short length; it can be upgraded to arterial status once it is extended South through the Township.

Local or Minor Roads

The sole function of local roads is to provide access to adjacent land. These roads make up a small percentage of total road mileage of the Township, but this will likely change if subdivision development increases. They will, however, always carry a small portion of the vehicle miles of travel. Local neighborhood roads and industrial district service drives should provide access to collector roads or to longer distance through routes, but in such a manner that through traffic is not encouraged to use the minor or local roads as a shortcut route.

The graphic on the previous page illustrates the general classification system of roads. Map 14 illustrates the functional classification of roads within Riley Township.

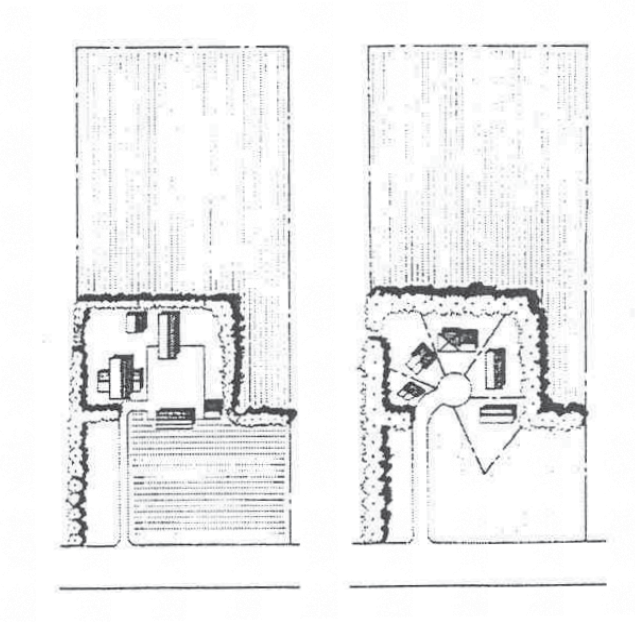
ACCESS MANAGEMENT

The proper functioning of roads is significantly impacted by the access provided to a residence, business, or other establishment from the roadway. By reducing the number and properly designing the points at which vehicles enter and leave the roadway, the capacity of the roadway is preserved and improvements such as additional lanes can often be postponed or avoided. Proper access design will also help to make the roadways safer by eliminating some of the problems which can lead to accidents.

Shared Access

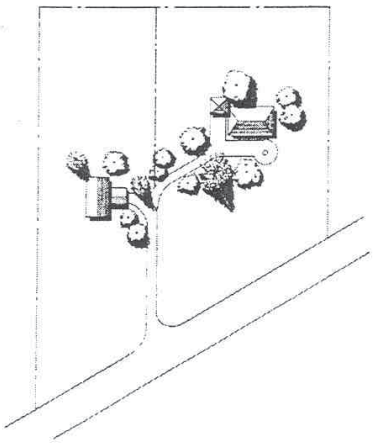
Residential and non-residential uses alike can benefit from shared access. As the residential and non-residential examples illustrate, reducing the number of individual driveways improves the control of traffic entering the road network while also reducing the number of points of conflict where accidents often occur.

The drawing to the right illustrates how a traditional farmstead can be developed into five new residential lots without increasing the number of driveways. The agricultural land behind the site is preserved and the view from the roadway would remain largely unchanged. This is an appropriate design that maintains rural character and the capacity of the road.



In general, it is more critical to provide shared access for non-residential uses. The higher volume of traffic and the greater number of access points typically requested for non-residential land uses makes it even more important to reduce the number of access

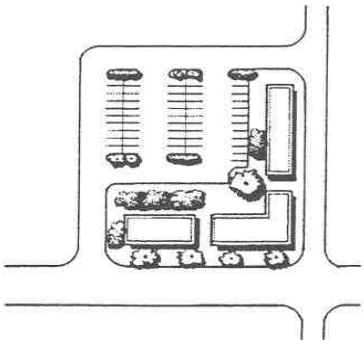
points. If more driveways are added than is necessary, roadway capacity will be reduced, particularly near intersections. The graphic to the right illustrates how a commercial/office area can reduce the number of access points. If shared access is not feasible, internal service roads and/or internal parking lot connections between uses should be provided.



Reducing the number of access points in commercial and industrial areas can also eliminate points of conflict and allow traffic on the roadway to move more smoothly.

Individual businesses, each with their own access, reduce overall road capacity. Parking at the rear, with potential future connections to neighboring sites, reduces the need for additional driveways onto the highway.

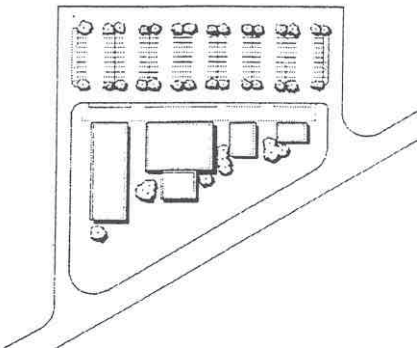
The spacing of driveways is also critical, particularly in more intensive, non-residential areas. Proper driveway spacing should be considered for access points that are on the same side of the road and across the roadway. Driveways that are too close to one another decrease the efficiency of the roadway and increase the potential for accidents. These problems are caused by the overall volume of through traffic on the roadway, and the vehicles which are entering and exiting that roadway.



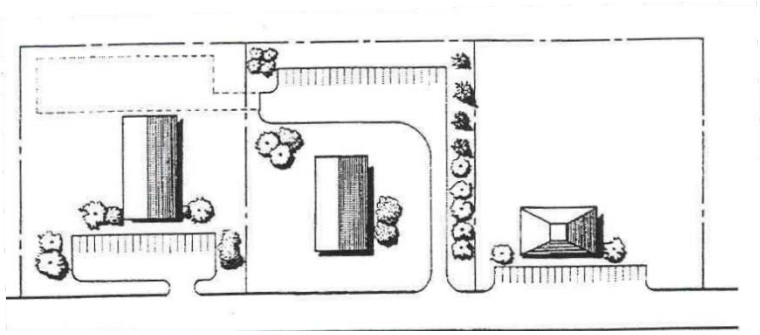
Shared Drives with Adequate Separation from the Intersection

Parking at Rear

Encouraging business parking at the rear is most useful in establishing a particular character for a business area. In combination with internal connections, shared access, and service drives, however, it can also play a role in improving the function and preserving capacity on the adjoining highway.



Parking at the rear improves the roadway view of the site.



Shared parking at rear improves function and enhances architectural appearance of the Township's business areas.

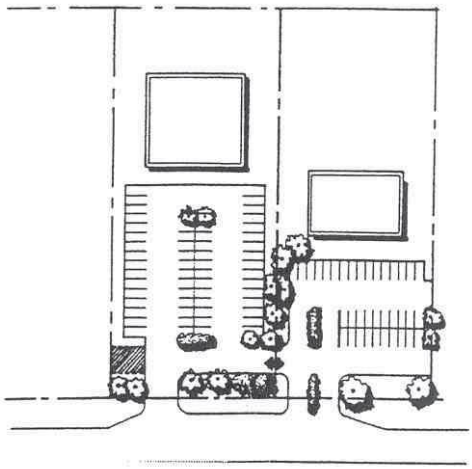
Service Drives
An access control solution that is particularly effective in commercial and office areas is the use of service drives. These can often be implemented in stages as adjoining developments are constructed. The dedication of reciprocal easements for ingress and egress or separate rights-of-way is required to provide physical connection and rights for traffic circulation.

Driveway Design
The flow of traffic can be improved by assuring proper driveway and intersection design. Driveways should be designed with adequate width, turning radius, and depth to permit automobiles and large trucks to enter and exit a site safely and efficiently.

Land uses which generate a high volume of traffic may warrant the construction of deceleration and acceleration lanes adjacent to driveways and intersections. Left turn passing lanes or center left turn lanes may also be necessary to ensure safety and efficient traffic flow. Traffic impact studies can help determine whether or not such improvements are necessary. In general, traffic impact studies are recommended whenever a proposed land use will generate more than 1,000 vehicle trips per day and/or more than 100 vehicle trips within the morning (e.g., 7 a.m. - 9 a.m.) or evening (4 p.m. - 6 p.m.) peak hour.

Finally, restricting turning movements at a driveway or intersection is often warranted due to traffic volumes or poor spacing of proposed access points to existing driveways and/or intersections. For example, when an existing driveway is too close to an intersection, it is possible to improve the access and safety by restricting turning movements to right turns in and out of the site.

Internal Connections
Internal connections alone do not necessarily result in fewer driveways onto the highway. They do, however, reduce the need for shoppers to re-enter the road network when moving from one business to another in the same linear development. When used properly, they can provide sufficient justification for regulating the number of driveways allowed for each business. The graphic to the right, illustrates how an internal service drive can make access between adjacent sites more efficient.



Internal service drive between businesses

TRAFFIC VOLUMES, CAPACITIES, AND ROAD NETWORK

TRAFFIC VOLUMES AND CAPACITIES

A good thoroughfare plan can only be prepared after a study of existing traffic conditions is complete. The highest volume roads in the Township are the two State roads: I-69 and M-19. In 2000, the freeway carried approximately 14,600 to 15,500 vehicles per day (Average Annual Daily Traffic-AADT). If I-69 were to approach gridlock, each lane would have a maximum functional capacity of approximately 16,000 vehicles per day (Level of Service E). The maximum per lane volume acceptable to most agencies is approximately 15,000 vehicles per day (Level of Service D). Therefore, at a level of Service D, I-69 has a capacity of approximately 60,000 vehicles per day. I-69 is able to adequately serve the community in its existing condition.

M-19 is a two-lane State highway. A 2000 count on M-19, just North of Memphis, indicates that it carried approximately 7,800 vehicles per day (AADT). M-19 has a maximum capacity of approximately 19,000 vehicles per day (Level of Service E). The maximum acceptable volume is 11,200 vehicles per day (Level of Service D). Consequently, there is adequate capacity for future growth.

Hill Road, west of M-19, had a traffic count completed in May of 1992. There were 297 cars that traveled this section of roadway during a 24-hour period. This was the only traffic count that was done for a county road since the previous Thoroughfare Plan was adopted in 1990.

The only other continuous paved roads in the Township are Riley Center, Bordman, and Belle River. These roads are carrying less than 2,600 vehicles per day. Given that a standard capacity for a two-lane road is about 14,000 vehicles per day, these roads have significant capacity available for future growth.

Existing Road Network

Most of the Township's roads are unpaved. As of the 2040 Long Range Transportation Plan, these roads were generally carrying fewer than 1,000 vehicles per day, which is low. The ability of these roads to carry high volumes of traffic depends on how well they are maintained by the County Road Commission.

Map 13 also identifies some thoroughfare problem areas. These problem areas can be defined under three categories:

- off-set intersections
- skewed intersections with angles less than 90 degrees or unusual configurations
- unimproved roads not capable of supporting through traffic

As the Township reviews plans by the St. Clair County Road Commission or developers for new road work, they should identify these problem areas and try to work toward satisfactory improvements. In addition, if the State legislature enacts enabling legislation permitting municipalities to require off- site improvements from developers, the Township should attempt to resolve these problems when the opportunity presents itself.

TRAFFIC ACCIDENTS AND HAZARD AREAS

This section includes a general examination of traffic accident causes, factors that influence traffic safety, and traffic accident trends and conditions in Riley Township.

Causes of Traffic Accidents and Factors that Influence Safety

Roadway design, driver behavior, and weather conditions may all be contributing factors to the cause of an accident. The most frequent cause of traffic accidents is attributed to improper driving. Excessive speed, failure to yield the right-of-way, and following too closely are the principal types of improper driving behavior that lead to accidents. Alcohol and other drugs were reported to be a factor in over one-half of the fatal traffic accidents in the United States.

The impact of weather on traffic accidents may seem significant because a high number of traffic accidents can occur during a short period of time; however, over one-half of total traffic accidents take place when pavement is dry.

The general characteristics of traffic accidents vary significantly in urban and rural areas. Approximately one-quarter of all rural accidents take place at intersections versus about one- half for urban areas. Although more accidents take place in urban areas, accidents in rural areas are more severe; the severity is primarily due to higher rural speeds.

The impact of congestion becomes apparent when examining the relationship between increased traffic volumes and accident frequency. Studies have shown that accident rates increase with increasing volume to a certain point, and then the accident rate drops as congestion and volumes increase. The peak in one study was found to be 650 vehicles per hour on California highways; another study of two-lane rural roads showed similar results with a peak at about 8,000 vehicles per day.

Roadway design and safety features also impact accident rates. Several roadway design and safety features are discussed below.

Lane Width. The effect of roadway width on traffic accidents generally increases as vehicle speeds increase. One study showed that widening 240 miles of highway from nine-foot wide lanes to 11-foot wide lanes reduced accidents by 21% on low-volume roads and 47% on high volume roads.

Highway Shoulders. Studies have shown that accident rates decrease with increasing shoulder width. This is primarily due to the fact that motorists traveling on roads with wide shoulders have a stable area to use if they cross the outer pavement edge.

Horizontal Curves. Curves in roadway pavement increase the possibility of traffic accidents. The most frequent accident type is skidding.

Vertical Alignment. A change in pavement elevation can also have an impact on accident rates. Long, steep grades and steep grade/horizontal curve combinations can greatly increase the frequency of accidents.

Intersections. The design, location, number of approaches, traffic controls and vehicular volume of an intersection influence the number and type of accidents that will occur at a given intersection. For example, an intersection with 3 approaches is generally safer than 1 with 4 approaches because of the reduced number of conflicting movements. The sight distance for the motorists approaching the intersection is also a critical variable.

Speed. The speed at which vehicles travel must reflect an appropriate response to existing road and traffic conditions in order to minimize the frequency and severity of accidents. High speeds are often safer than slow speeds on roads designed for high speed travel, provided road and weather conditions are good. However, high speeds can both increase the severity of accidents and decrease the frequency of accidents.

Other Factors. Other factors that influence speed and safety include night lighting, railroad crossings, pedestrian crossing, interchanges, and median designs. A comprehensive discussion of all these factors is beyond the scope of this report. However, the general discussion above has been included to provide the reader with some background on the cause of traffic accidents and factors influencing safety before examining accident data within Riley Township.

TRAFFIC ACCIDENT DATA AND TRENDS

Traffic accident data collected by the Southeast Michigan Council of Governments (SEMCOG) provides insight into traffic accident locations within the Township. Map 12 on the following page indicates traffic accidents that occurred in Riley Township in 2014.

It is important to note that, in general, the higher the road volume the more accidents occur. These accident totals are fairly low and not likely to place any Riley Township intersections noted above on a high accident ranking for the County. See Table 18.

MAP 12

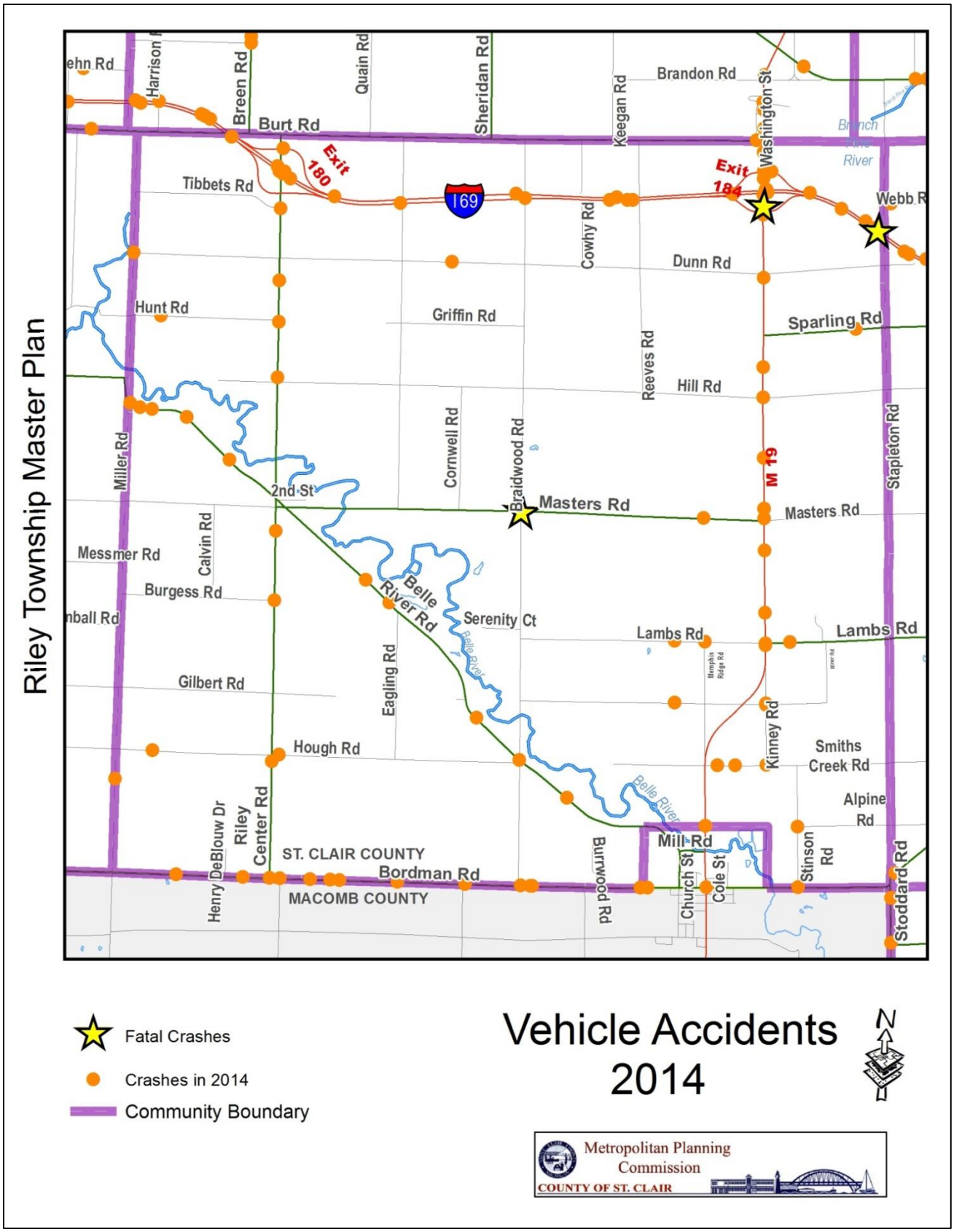

Riley Township Master Plan
Burt Rd
Tibbets Rd
Exit 180
I69
Exit 184
Washington St
Brandon Rd
Keegan Rd
Sheridan Rd
Quain Rd
Breen Rd
Harrison
Cowhy Rd
Dunn Rd
Webb R
Hunt Rd
Griffin Rd
Sparling Rd
Reeves Rd
Hill Rd
Cornwell Rd
Braidwood Rd
M 19
Stapleton Rd
Miller Rd
2nd St
Masters Rd
Masters Rd
Calvin Rd
Messmer Rd
Burgess Rd
Belle River Rd
Serenity Ct
Lambs Rd
Lambs Rd
Eagling Rd
Gilbert Rd
Kinney Rd
Hough Rd
Smiths Creek Rd
Alpine Rd
Riley Center Rd
Henry DeBlouw Dr
ST. CLAIR COUNTY
Bordman Rd
MACOMB COUNTY
Burnwood Rd
Mill Rd
Church St
Cole St
Stinson Rd
Stoddard Rd
Fatal Crashes
Crashes in 2014
Community Boundary
Vehicle Accidents
2014
N
Metropolitan Planning Commission
COUNTY OF ST. CLAIR

TABLE 18: RILEY TOWNSHIP HIGH CRASH INTERSECTION SUMMARY, 2010-2014

Rank			Number of Crashes						
Local Rank	County Rank	Intersection	2010	2011	2012	2013	2014	5-Year Total	Annual Average 2010 - 2014
1	331	Bordman Rd @ Riley Center Rd	2	1	1	1	2	7	1.4
2	454	Kinney Rd @ Dunn Rd	1	1	1	2	0	5	1
3	454	Kinney Rd @ Hill Rd	2	1	0	0	2	5	1
4	454	Riley Center Rd @ Hill Rd	2	1	2	0	0	5	1
5	454	Memphis Ridge Rd @ Smiths Creek Rd	1	1	1	2	0	5	1
6	564	Bordman Rd @ Cryderman Rd	2	1	0	0	1	4	0.8
7	726	Breen Rd @ Burt Rd	1	0	1	1	0	3	0.6
8	726	E I 69 @ E I 69/Kinney Ramp	0	1	0	2	0	3	0.6
9	726	Kinney Rd @ Masters Rd	0	0	2	0	1	3	0.6
10	726	Riley Center Rd @ Hunt Rd	0	2	0	0	1	3	0.6
11	726	Kinney/W I 69 Ramp @ Kinney Rd	0	0	0	1	2	3	0.6
12	726	E I 69/Riley Center Ramp @ Riley Center Rd	0	0	2	1	0	3	0.6
13	726	Gilbert Rd @ Kinney Rd	0	0	1	0	2	3	0.6
14	726	Kinney Rd @ Lambs Rd	0	0	1	0	2	3	0.6
15	726	W I 69 @ I 69 Crossover	2	1	0	0	0	3	0.6

PRIVATE ROADS

Riley Township does not allow private roads. All new roads must meet St. Clair County Road Commission specifications and be adopted into the St. Clair County Road system.

COMMUNITY CHARACTER/SIGNAGE

As discussed earlier, road system rights-of-way can provide opportunities for the placement of community entryway features.

Incorporating welcome signs at the main entrance points to the community will inform the public that they have entered Riley Township. Developing a Township "theme" can serve as a basis for the sign design, which will create an identity for Riley. Consequently, Riley could be distinguished from neighboring areas, which will help to establish a sense of community in the Township. Appropriate locations for signage would be the two freeway interchanges, I-69 at M-19 and I-69 at Riley Center Road. M-19 north of Bordman Road past the City of Memphis would be appropriate as well. In order to preserve the rural character of the Township, the signs should be compatible with the surroundings. A monument-style sign, as shown below, should be considered. Monument signs are less likely to obstruct a driver's view of the roadway or distract the driver. Such signs should be made of materials which can blend in with the countryside. Adding landscaping around the sign will also help to establish the rural "feel."

THOROUGHFARE PLAN

Map 14 on the following page shows the Thoroughfare Plan for Riley Township.

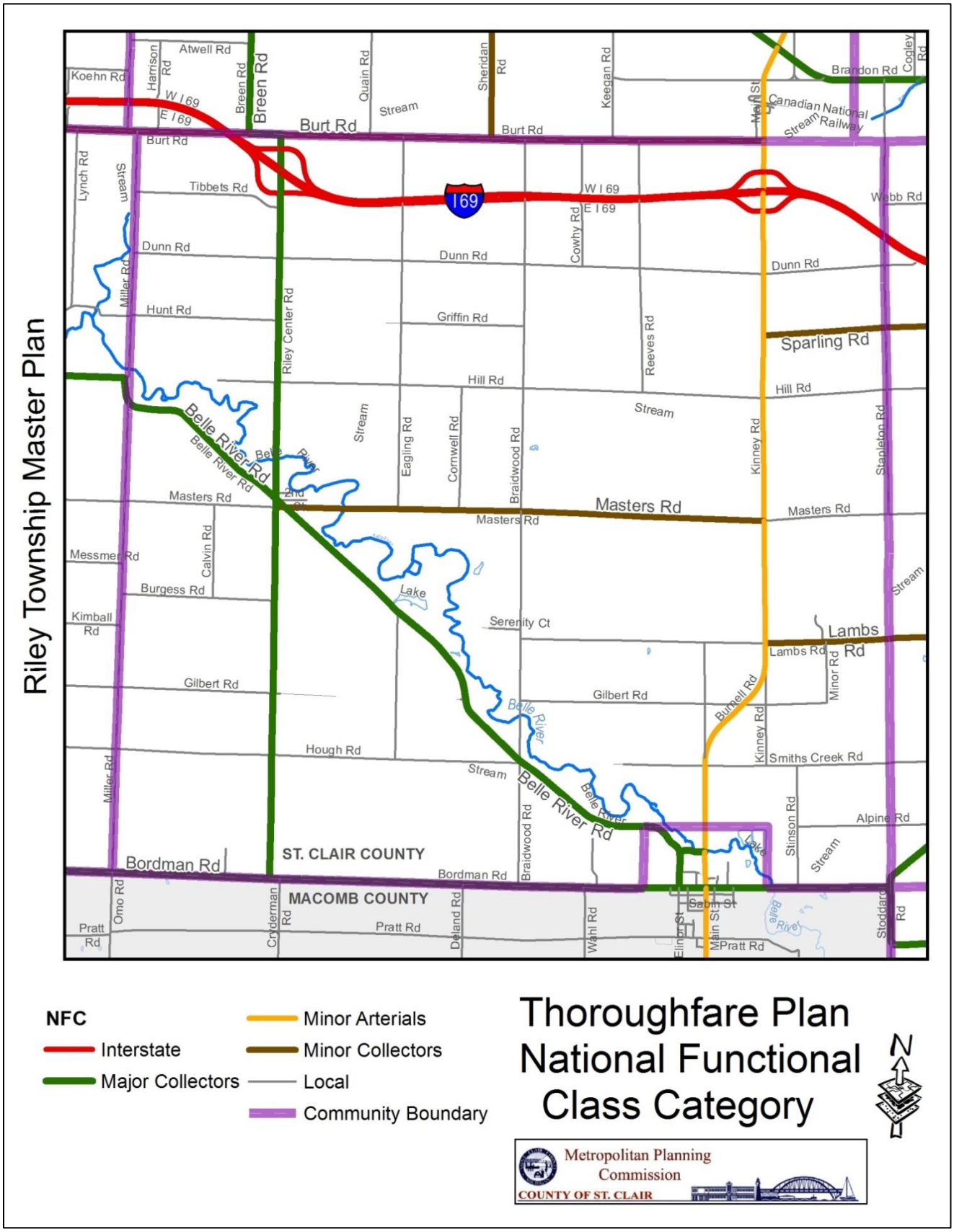
The road network is classified primarily according to whether or not the road is on the one mile road grid. Many roadway extensions in the future will be limited by the presence of the Belle River.

If new subdivisions or site condominium developments occur in the Township, the need for additional collector roads will have to be addressed. Also, the impact of the development on the existing roadways would have to be reviewed as well. These studies would be conducted at the time of development review.

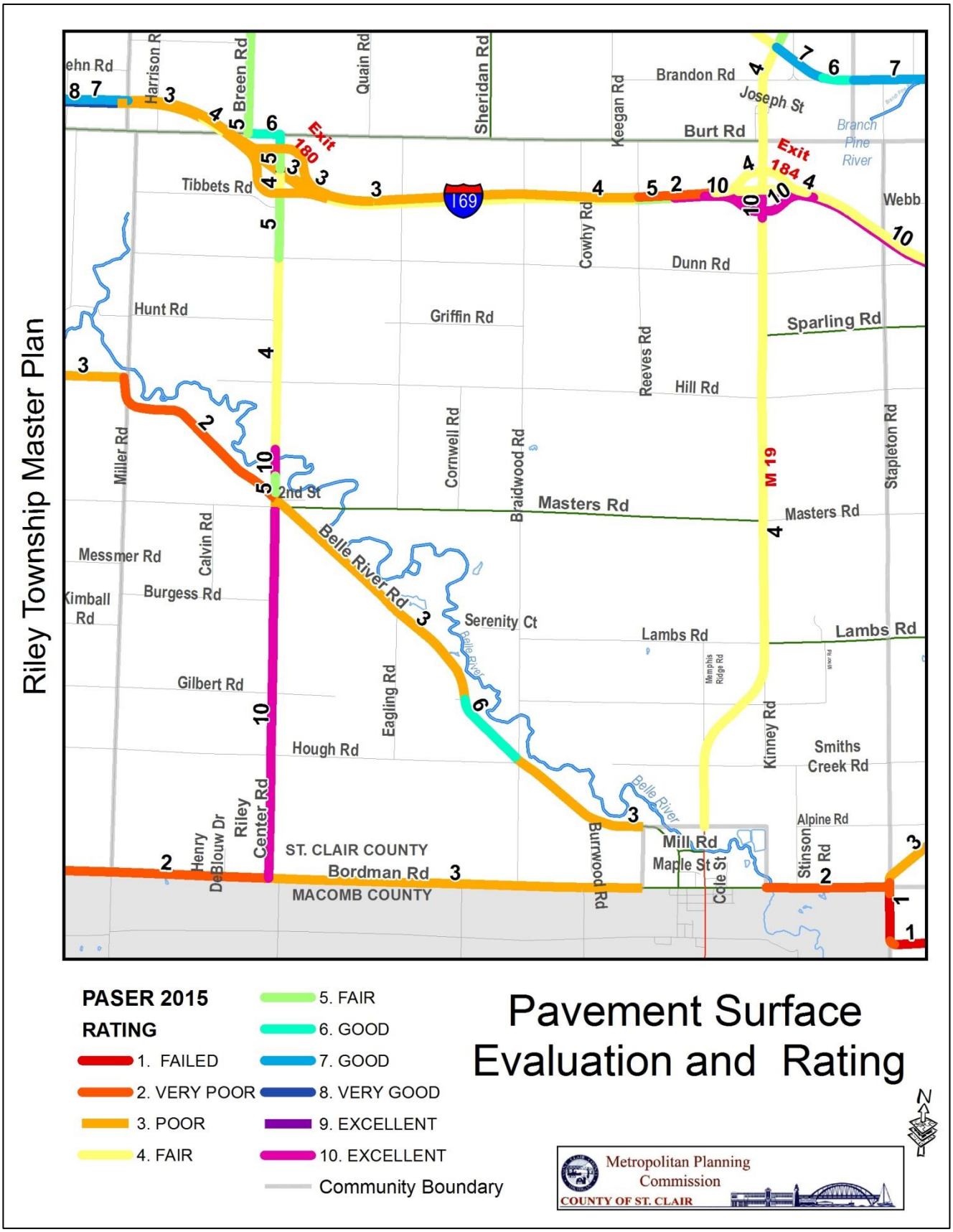
PAVEMENT SURFACE EVALUATION AND RATING (PASER)

Each year, the St. Clair County Metropolitan Planning Commission (MPC) performs a visual inspection to evaluate pavement surface conditions on 50% of the federal-aid roads in St. Clair County. The next year, the same pavement evaluation is performed for the other 50% that was not done the previous year. Typically, PASER evaluates pavement distress in asphalt and concrete roads. For asphalt roads, the rating team looks at surface defects, surface deformation, cracks, patches and potholes. For concrete roads, the rating team evaluates joints, pavement cracks, pavement deformation (such as settlement or heave, utility repairs, patching, etc.), and surface defects (such as polishing, spalling, shallow reinforcing, etc.). In reviewing various defects, it is important to consider both the severity and extent. Typically, a defect will begin slowly and gradually become more severe. Rating the roads helps communities and road agencies manage road maintenance in an effective and fiscally responsible manner. Map 14 shows the PASER ratings for federal-aid roads in Riley Township in 2015.

MAP 13


Riley Township Master Plan
Koehn Rd
Harrison Rd
Atwell Rd
W I 69
E I 69
Breen Rd
Quain Rd
Stream
Sheridan Rd
Keegan Rd
Brandon Rd
Cogley Rd
Canadian National Railway
Burt Rd
Lynch Rd
Tibbets Rd
I 69
Webb Rd
Cowhy Rd
Dunn Rd
Miller Rd
Hunt Rd
Riley Center Rd
Griffin Rd
Reeves Rd
Sparling Rd
Hill Rd
Belle River Rd
Eagling Rd
Cornwell Rd
Braidwood Rd
Kinney Rd
Stapleton Rd
Masters Rd
2nd St
Calvin Rd
Messmer Rd
Burgess Rd
Lake
Kimball Rd
Serenity Ct
Lambs Rd
Minor Rd
Gilbert Rd
Burnell Rd
Hough Rd
Smiths Creek Rd
Stinson Rd
Alpine Rd
ST. CLAIR COUNTY
Bordman Rd
MACOMB COUNTY
Omo Rd
Cryderman Rd
Pratt Rd
Deland Rd
Wahl Rd
Elinor St
Sabin St
Main St
Stoddard Rd
NFC
Interstate
Major Collectors
Minor Arterials
Minor Collectors
Local
Community Boundary
Thoroughfare Plan
National Functional
Class Category
N
Metropolitan Planning Commission
COUNTY OF ST. CLAIR

MAP 14


Riley Township Master Plan
Harrison Rd
Breen Rd
Quain Rd
Sheridan Rd
Keegan Rd
Brandon Rd
Joseph St
Burt Rd
Branch Pine River
Exit 180
Exit 184
Tibbets Rd
169
Webb
Cowhy Rd
Dunn Rd
Hunt Rd
Griffin Rd
Sparling Rd
Reeves Rd
Hill Rd
Miller Rd
Cornwell Rd
Braidwood Rd
M 19
Stapleton Rd
2nd St
Masters Rd
Calvin Rd
Messmer Rd
Belle River Rd
Kimball Rd
Burgess Rd
Serenity Ct
Lambs Rd
Gilbert Rd
Eagling Rd
Memphis Ridge Rd
Kinney Rd
Hough Rd
Smiths Creek Rd
Belle River
Alpine Rd
Henry
DeBlouw Dr
Riley Center Rd
ST. CLAIR COUNTY
Bordman Rd
MACOMB COUNTY
Burwood Rd
Mill Rd
Maple St
Cole St
Stinson Rd
PASER 2015 RATING
1. FAILED
2. VERY POOR
3. POOR
4. FAIR
5. FAIR
6. GOOD
7. GOOD
8. VERY GOOD
9. EXCELLENT
10. EXCELLENT
Community Boundary
Pavement Surface Evaluation and Rating
N
Metropolitan Planning Commission
COUNTY OF ST. CLAIR