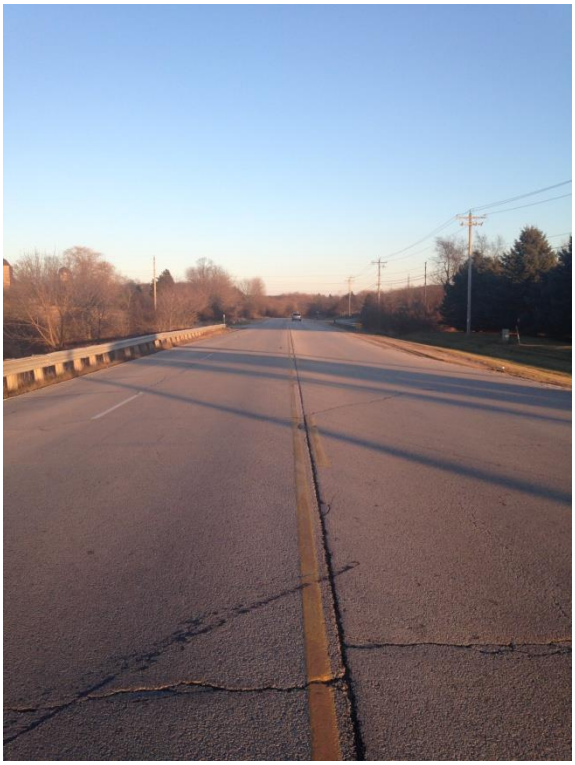
US Highway 18
Access Management Vision

West Waukesha County Line to CTH TT



Wisconsin Department of Transportation

Village of Summit

Village of Dousman

Town of Ottawa

Town of Genesee

Village of Wales

Town of Delafield

City of Waukesha

Waukesha County

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WIS 18 Corridor Management Vision

West Waukesha County Line to CTH TT

Section 1 Introduction

The principles of access management have been under-utilized on most American roadways. Transportation authorities and local communities have the ability to improve safety and efficiency on our highways and local streets by planning for future access locations. Many of these principles and techniques are discussed in this report.

"Access management" refers to the design, implementation and management of entry and exit points (i.e., driveways, entrances or exits) between roadways and adjacent properties. These entry and exit points can be managed by careful planning regarding their location, the types of turning movements allowed, and if appropriate, medians that provide or prohibit access to the driveways. Developing and implementing effective access management strategies that promote or improve safety requires considering the location of driveways in the context of current and future access needs, current and future intersection operations, and mobility for pedestrians and bicyclists.

While we constantly improve our streets and highways with better designs and safety features, Access Management tools and strategies are sometimes overlooked and overruled. This is unfortunate, since Access Management may provide the greatest opportunity to improve traffic safety and efficiency along new and existing roadways.

Research in the last 50 years has consistently shown that Access Management increases roadway safety. As outlined in the *Access Management Manual* of the Transportation Research Board (TRB), the reduction of traffic conflict points, higher design standards for access points, and increased awareness/response time for drivers has improved safety on the nation's highways and arterials. Four key observations have come to the forefront:

- Increasing the number of access points on a roadway will increase its crash rate
- Roads with medians are safer than undivided roads, or roads with two-way left-turn lanes (TWLTL)
- It is safer for vehicles to make a U-turn and a right turn, than to make a direct left turn into or from a driveway
- Medians also improve pedestrian safety

The purpose of this US 18 Access Management Vision is to provide the Wisconsin Department of Transportation (WisDOT) and the local units of government a shared, long-range access management vision of the corridor. The Vision is used as a comprehensive and collaborative tool to evaluate future access requests as development and redevelopment occurs adjacent to US 18.

The Vision also provides a guide for local officials to plan the optimum location for developments of differing type, scale, and traffic generation.

Transportation systems must balance the needs of efficient arterial corridors and provide safe access to local land uses and developments. Access management techniques are used increasingly across the nation and in Wisconsin by both state and local units of government in an effort to preserve and prolong safe and efficient traffic operations on the existing highway system.

WisDOT initiated this Vision because of US 18's importance to the regional network as well as the local users and communities which it serves. US 18 is classified as a minor arterial from the West Waukesha County Line to Utica Road and a principal arterial from Utica Road to County TT. US 18 carries traffic volumes that range from 2,700 – 12,400 vehicles per day. The corridor acts as the main east/west artery in this area and connects the communities of Summit, Dousman, Ottawa, Genesee, Wales, Delafield and Waukesha. Anticipated pressures for future development and projected increases in traffic volumes for US 18, as well as the construction of the West Waukesha Bypass, drive the need for developing a long range access vision.

The overall goal of the Access Management Vision is to provide recommendations for long-term access and traffic needs along the corridor. It is anticipated that continued, long-term implementation of the Vision will meet the demands of future travel patterns and sustain an economically attractive area long into the future.

The US 18 Vision includes this report and the access management maps shown in Appendix A.

1.1 Corridor Overview

The US 18 consists of 182 miles of an east-west highway that is an integral part of the State of Wisconsin's highway system. The roadway extends from Prairie Du Chien, Wisconsin east to Lincoln Memorial Drive in downtown Milwaukee. From Prairie Du Chien heading west the highway continues through Iowa, South Dakota, and into Wyoming where it reaches its terminus in Orin, Wyoming at Interstate 25.

1.2 Vision Limits

The limits of this Corridor Vision are from the West Waukesha County Line to County TT in the City of Waukesha, a distance of approximately thirteen and a half (13.5) miles.

The Vision's influence area extends roughly a 1 mile north and south of the corridor for a total corridor width of approximately two miles. Existing properties, driveways, local roads, known developments, environmental corridors, and long-range land use plans have been considered in the development of this Vision.

Figure 1 - Corridor Location

1.3 Vision Stakeholders

The Department of Transportation began the US 18 Access Management Vision effort in March of 2015 in collaboration with Waukesha County and local municipalities on the corridor. Below is a list of the participating jurisdictions and staff involved with the vision:

Village of Summit

Henry Elling Village Administrator/Zoning Administrator

Village of Dousman

Bruce Kanewski Village Planner
Jack Nissen Village Board President

Town of Ottawa

Richard Arrowood Town Chairman

Town of Genesee

Jeff Herrmann Planning Administrator

Village of Wales

Jeffery Flaws Village President
John Meyer Village Trustee

Town of Delafield

Tim Barbeau Head Engineer

City of Waukesha

Jeff Fortin Community Development Specialist

Waukesha County

Jason Fruth Planning & Zoning Manager

In addition the following Wisconsin Department of Transportation staff are involved in the ongoing development and review of this Access Management Plan:

WisDOT

Aaron Michelson, AICP	Urban and Regional Planner
James Schumacher	Engineer, Corridor Studies
Alex Valley	Engineer, Corridor Studies
Deb Tarnow, P.E.	Engineer, Corridor Studies
Robert Elkin, P.E.	Planning Supervisor

1.4 Current Jurisdiction

US 18 is under WisDOT jurisdiction. The project corridor lies within the limits of the Village of Summit, the Village of Dousman, the Town of Ottawa, the Town of Genesee, the Village of Wales, the Town of Delafield, and the City of Waukesha in Waukesha County.

1.5 New Access and Access Modification Approval Process

New access or changes in use or type of access on US 18 are considered by WisDOT on a case-by-case basis through WisDOT's permitting process. Permits are issued by WisDOT's Permit Coordinators with input from WisDOT's Development Request Team and the local community.

1.6 Project Input Process

Throughout the process numerous meetings will be held with the various municipalities along the US 18 Corridor to discuss the Access Management Plan. The details of each of these meetings are as follows:

Advisory Committee Meeting – March 24, 2015

- Introduction of Access Management concepts and principles
- Access Management Vision and process defined
- 1st Draft of Access Management Plan provided for review

Section 2 Purpose and Need

The purpose of this US 18 Corridor Vision is to enhance safety, function, and extend the life of the two lane facility as long as possible. As a major traffic route, this highway represents a significant community investment, and contributes to the public health, safety, and welfare of the community and travelers through the community. This route provides access to jobs, schools, facilitates delivery of emergency services, supports the movement of goods and services, and enhances economic development. Furthermore, this corridor serves as the first impression of the community for visitors and the traveling public.

The purpose of this vision is to manage vehicular access along US 18. To achieve this goal, the US 18 Access Management Vision was undertaken to develop a collaborative long-range plan for the corridor. Specifically, the Vision addresses the following issues:

- Corridor growth and development pressures
- Increasing traffic, safety, and operational issues
- Improved intergovernmental cooperation
- Common long-range corridor vision

To address these needs, the Access Management Vision's purpose includes strategies and recommendations to:

- Manage existing access
- Manage new access due to new or redeveloped changes in land use
- Manage traffic safely and efficiently as growth occurs
- Plan a supportive local road network
- Improve coordination between WisDOT and local units of government

Without access management, the function and character of major roadway corridors can deteriorate rapidly. Failure to manage access is associated with the following adverse social, economic, and environmental impacts:

- An increase in vehicular crashes
- More collisions involving pedestrians and cyclists
- Accelerated reduction in roadway efficiency, increase in delays
- More cut-through traffic in residential areas due to overburdened arterials
- Homes and businesses adversely affected by a continuous cycle of widening roads
- Increased commute times, fuel consumption, and vehicular emissions as numerous driveways and traffic signals intensify congestion and delays along major roads

Not only is inadequate access management costly for government agencies and the public, but it also adversely affects corridor businesses. Over time, closely spaced and poorly designed driveways make it more difficult for customers to enter and exit businesses safely. Access to corner businesses may be blocked by queuing traffic. Newer businesses seek out locations that are more attractive and have fewer access and congestion problems. Customers begin to patronize businesses with safer, more convenient access design. Gradually the older developed areas begin to deteriorate because of access and aesthetic problems, and investment moves to newer, better-managed corridors.

2.1 Corridor Growth and Development Pressures

2.1.1 Existing Land Use

Moving west to east along the corridor the surrounding land uses can be described as low density residential along the shore of Golden Lake within the Village of Summit, developed low density suburban land uses in the Dousman, Wales and Waukesha areas, and rural areas in between. See Appendix A for the Existing Land Use maps from the jurisdictions.

West Waukesha County Line to WIS 67

As US 18 enters the Village of Summit on the western Waukesha County border the existing land uses are rural and agricultural in nature up until the intersection of US 18 and Golden Lake Lane. East of Golden Lake Lane, the existing land use is mainly single family residential with primary access to the properties off of US 18. Just south of Golden Lake, there is a boat landing located on the north side of US 18 that utilizes a parking lot on the south side of the road. A crosswalk at the boat landing allows pedestrians to cross the roadway from the parking lot to access Golden Lake.

East of the boat landing, single family residential properties continue to be located on the south side of the roadway with primary access off of US 18. At the intersection with County BB, there is a commercial property on the north side of the roadway which has access to both US 18 and County BB. To the east of County BB there are additional single-family residential properties on both the north and south sides of US 18 with the existing land uses transitioning back to rural/agricultural.

Crossing the Bark River and heading east towards Main Street in the Village of Dousman, the land uses eventually transition to single-family residential properties with driveway access to US 18. The single-family residential properties are mixed in with occasional agricultural land use and additional non-residential properties including a church, a bank, and a Masonic Center are also located along the roadway on the west side of WIS 67. There are also a church and an assisted living facility on the northwest and southwest corners of the intersection of US 18 and WIS 67, respectively.

WIS 67 to WIS 83

Past the WIS 67 intersection to the east and into the Village of Summit single-family residential homes are located to the north of US 18, and land uses south of US 18 are more rural/agricultural in nature. Starting at the intersection of US 18 and WIS 67 the Glacial Drumlin State Trail runs directly parallel to US 18 for about 0.75 miles before veering off to the south just to the east of South Opengate Court. Continuing east, single-family residential land uses are present on both sides of the roadway with non-residential uses mixed in at regular intervals. The residential and non-residential land uses are provided access on the public side streets as well as US 18 throughout the sections of corridor in the Village of Summit, the Town of Ottawa and into the

Town of Genesee. Non-residential uses include a church, an office building, industrial type uses, and a restaurant. Agricultural land uses are mixed in as well with the residential and non-residential uses throughout this stretch. In the Village of Wales, commercial/retail uses with access to US 18 are located on both sides of the roadway. An existing roundabout is located at the intersection of US 18 at Blackwood Drive and a newly constructed roundabout is also located at the intersection of US 18 at WIS 83; both are located within the Village of Wales.

WIS 83 to County TT

Continuing east from the intersection of US 18 and WIS 83, non-residential land uses line both sides of the roadway including commercial/retail uses on the north side of the roadway and the Kettle Moraine High School on the south side. To the east of East Oak Crest Drive, the existing land uses transition back to residential uses on both sides of the roadway for about a quarter of a mile. To the east of the residential area, land uses transition back to agricultural within the Town of Delafield. While this area consists of primarily agricultural land uses, the occasional single-family residential land use with access to US 18 is present within the Town of Delafield up to County G. To the east of County G, mainly residential land uses in the form of subdivisions start to be present on both sides of the roadway heading into the City of Waukesha and up to County TT, where commercial/retail land uses are present at the intersection with US 18.

2.1.2 Future Land Use

The respective comprehensive plans include the following land use recommendations for the towns and municipalities along the study corridor. Refer to the land use maps in Appendix B for more information. The future land use depicted on the vision maps is derived from the Multi-Jurisdictional Comprehensive Plan for Waukesha County 2035; this plan was generated by SEWRPC.

West Waukesha County Line to WIS 67

In the Village of Summit on the western Waukesha County border the future land use (FLU) from the Summit Comprehensive Plan indicates lower density Single-Family Residential land use in the Golden Lake area. This reflects the preservation of the current housing located along the lakeshore. Single-Family Residential FLU is also located along the corridor into the Village of Dousman, where moderate growth is expected to occur within the planning timeframe of year 2020. Immediately to the west of the Village of Dousman, Agricultural FLU designations are present which indicate the preservation of lands as agricultural in nature. Single-Family Residential FLU is present in this area as well, reflecting minimal change from what is in existence today. Along the US 18 corridor in the Village of Dousman, a mixture of FLU designations can be found on both the north and south side of the roadway. The mixture of FLU designations include Large-Lot Single Family/Agricultural, Medium-Lot Single Family, Mixed-Use Residential and Low-Density Multi-Family. Some of these FLUs reflect the current land use, which indicates the preservation of existing conditions, while in other areas along the corridor, the Village of

Dousman is anticipating new growth within the planning timeframe of year 2025. Institutional and High-Density Multi-Family FLU designated properties are located in the northwest and southwest corners of the intersection of US 18 and WIS 67, reflecting what is today being preserved into the future.

Village of Dousman staff are currently working on a Neighborhood Plan for the US 18 corridor from Gramling Lane to Main Street in order to help guide future decisions of land use, zoning, utility extensions, and site design for this section of the corridor. The ultimate goal is for the Village of Dousman to incorporate the Neighborhood Plan into the overall Comprehensive Plan for the Village.

WIS 67 to WIS 83

In the northeast and southeast corners of the intersection of WIS 67 and US 18, the Village of Dousman FLU Map indicates that Business type FLUs are anticipated, while the Waukesha County FLU Map (as shown on the Vision Maps) indicates that the properties in the northeast corner of the intersection will remain as Suburban Density Residential. Along the corridor towards the Town of Ottawa and Town of Genesee the FLU are Large-lot Single-Family Residential/Agricultural, much of which exists today on the north side of the corridor. Properties to the south of US 18 in this area show differing FLU designations. The Waukesha County FLU Map indicates that these properties to the south are planned for Governmental/Institutional uses, while the Village of Summit FLU Map anticipates that these lands will remain Agricultural in nature within their planning timeframe. The properties located to the south of US 18 and west of County C in the Town of Ottawa are anticipated to remain as Agricultural within the 2035 planning timeframe. East of County C, a mixture of commercial, mixed use and industrial land uses are present or anticipated along the corridor according to the Town of Genesee and Waukesha County FLU maps. And just west of the Village of Wales, the areas to both the north and south of US 18 will remain as or develop into suburban and low-density residential. The Village of Wales FLU Map, with a year 2030 planning timeframe, indicates the development of Planned Commercial Center uses, much of which are present today near the intersection of US 18 and WIS 83.

WIS 83 to County TT

East of the WIS 83 intersection, the FLU Map for the Village of Wales shows Planned Commercial Center land uses at both the northeast and southeast corners of the intersection. This represents the preservation of land uses that are present today. Further to the east on the south side of the US 18 corridor, multi-family residential units are currently under development, which is consistent with the FLU designation for the property. Directly to the east of the multi-family residential units is the Kettle Moraine High School on the south side of US 18 (Governmental and Institutional FLU) and additional Planned Commercial Center FLU on the north side of US 18, the majority of which are existing land uses. On the eastern reaches of the Village of Wales, additional Planned Commercial Center FLU is present on the north side of the US 18 corridor and Single-Family Residential FLU (all of which are existing structures) are located to the south.

Heading towards County G within the Town of Delafield the FLU designations on the Waukesha County FLU Map, with a year 2035 planning timeframe, indicate that much of these lands are anticipated to remain rural/agricultural in nature, with the potential for Large-Lot Single Family Residential in the future. The existing single-family homes will also be preserved along this section of the corridor. The FLU designation for the property at the northeast corner of the intersection of US 18 and Brandybrook Road is Governmental & Institutional, and a Kettle Moraine School District building is anticipated at this location in the future. From County G to the existing Oakmont Subdivision along the US 18 corridor, the Waukesha County FLU Map anticipates that the corridor will remain rural/agricultural in nature with pockets of existing residential development. The City of Waukesha FLU Map anticipates slightly different future development along the corridor from County G to the current City of Waukesha border. According to the City of Waukesha FLU map, this area is anticipated to develop as Low-Density Residential on the western portion, and a mixture of Low and Medium-Density Residential on the eastern portion near the future West Waukesha Bypass (currently County TT). The City of Waukesha FLU map also indicates the retention of existing commercial developments at the intersection of US 18 and County TT.

Anticipating significant amounts of residential development will occur along the US 18 corridor with the construction of the West Waukesha Bypass, a Land Use Analysis was completed for the properties located within the affected area along US 18. The borders for the analysis were County G to the west, County TT to the east, Northview Road to the north, and Madison Street to the south. This Land Use Analysis was utilized to anticipate buildout of this area and how this development might affect traffic volumes along the US 18 corridor. As a result of this analysis, it is anticipated that by the year 2045, an Annual Average Daily Traffic count (AADT) of 16900 vehicles will travel the section of US 18 west of the intersection with the West Waukesha Bypass.

SEWRPC 2035 Regional Transportation Plan

As the Southeast region's official metropolitan planning organization, SEWRPC prepares an advisory plan to guide transportation planning decisions. This plan, completed in 2006 and updated in 2010, makes the following recommendation for US 18 in Waukesha County:

- Reserve right of way to accommodate future improvement of additional lanes from WIS 83 to County TT.

At the time of this report's completion (2015), WisDOT does not currently have a capacity expansion project on US 18 (West Waukesha County Line to County TT) programmed at this time. WisDOT desires to maintain US 18 as two lanes for as long as possible and recognizes that access management is an important means to accomplishing that goal.

2.1.3 Population Trends and Projections

Historical population data from the US census was gathered to identify actual trends in population in the communities surrounding the corridor. In the 20 years from 1990 to 2010 the municipalities and Waukesha County all experienced an increase in population. The Village of Dousman's population during this time grew by over 80%. This is a rather large number when compared to population growth of Waukesha County as a whole, indicating that the Village of Dousman has experienced substantial growth during this time frame. Increasing numbers of residents is a good indicator that traffic volumes and development increases have or will occur in these areas in the future.

Table 1 - Population Growth 1990 - 2010

Municipality	1990 population (US Census)	2000 population (US Census)	2010 population (US Census)	Actual % change (1990 – 2010)
Waukesha County	304,715	360,767	389,891	27.95%
Village of Summit	4,003	4,999	4,674	16.76%
Village of Dousman	1,277	1,584	2,302	80.27%
Town of Ottawa	2,988	3,758	3,859	29.15%
Town of Genesee	5,986	7,284	7,340	22.62%
Village of Wales	2,471	2,523	2,549	3.16%
Town of Delafield	5,735	7,820	8,400	46.47%
City of Waukesha	56,958	64,825	70,718	24.16%

According to the Wisconsin Department of Administration's most recent population projections, between 2010 and 2040, the communities along the US 18 Corridor are all expected to continue to increase in population, with the Village of Dousman projected to have the largest % increase at 40.31%, and the City of Waukesha projected to see the largest overall increase in population at 10,632 additional residents. Waukesha County as a whole is expected to see a 16.88% increase in population with 65,829 new residents by the year 2040. Due to the continued projected increase in population along the US 18 Corridor over the next 25 years, this corridor will become an increasingly important link to this areas traffic flow.

Table 2 - Population Projections 2010 – 2040

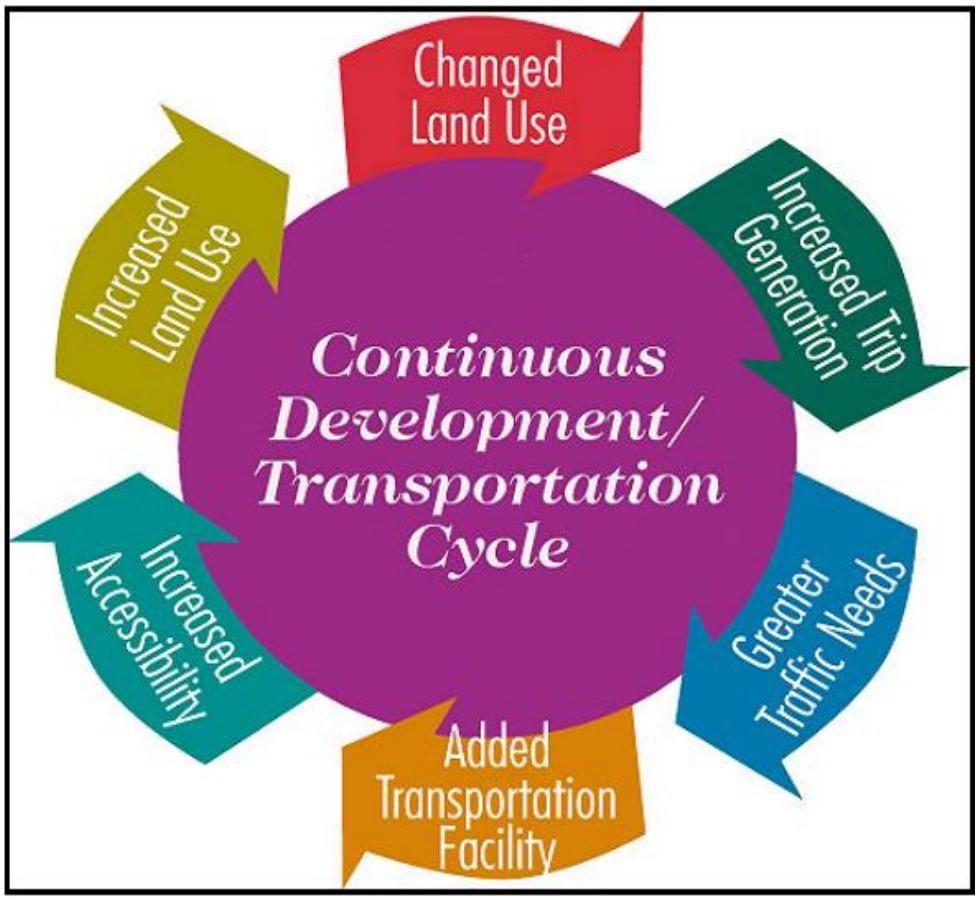
Municipality	2010 Population (US Census)	2020 Population Projection (DOA)	2030 Population Projection (DOA)	2040 Population Projection (DOA)	Projected Total Change 2010-2040	Projected % Change 2010 - 2040
Waukesha County	389,891	414,820	451,470	455,720	65,829	16.88%
Village of Summit	4,674	4,990	5,450	5,525	851	18.21%
Village of Dousman	2,302	2,600	3,025	3,230	928	40.31%
Town of Ottawa	3,859	4,080	4,405	4,415	556	14.41%
Town of Genesee	7,340	7,585	8,025	7,895	555	7.56%
Village of Wales	2,549	2,600	2,695	2,595	46	1.80%
Town of Delafield	8,400	8,510	9,010	8,875	475	5.65%
City of Waukesha	70,718	74,800	81,000	81,350	10,632	15.03%

2.1.4 Land Use and Transportation

Future developments will compete with existing land uses for the same transportation facilities and demand access for their users. Some types of land uses, more specifically residential subdivisions and large employment centers, generate significant peak hour traffic and can influence neighboring land uses and transportation characteristics. The site selection of these types of facilities requires careful consideration of future traffic signal placement and traffic progression along US 18. Figure 2 shows the continuous cause and effect relationship between land use and transportation.

The interrelated nature of changing land use, development, and transportation systems is an important relationship, that if properly understood and planned for, can have positive outcomes for communities and transportation authorities at large. It is also important to understand the interrelated effects to preserve the public's investment in transportation systems and public infrastructure projects. The consequences of poor planning and communication can often result in expensive and untimely construction projects.

Figure 2 - Land Use & Transportation Relationship



2.2 Increasing Traffic, Safety Concerns, and Operations

2.2.1 Increasing Traffic

Traffic counts on US 18 have increased on all seven corridor segments since 1981. Background growth in traffic volumes is something that can typically be expected on most state highways. As the population and development in the area continues to increase at relatively fast pace so will traffic volumes. These increasing volumes of traffic will have the greatest effect on the corridors operations and levels of safety. Development and Redevelopment can be significant causes of this increased traffic. Access decisions made during a period of growth and redevelopment are extremely important for preserving the operations and safety on US 18.

Table 3 - Traffic Volumes (Reported in Annual Average Daily Traffic – AADT)

Segment	1982	1991	1997	2006	2012	% change 1982 to 2012
West Waukesha County Line to Utica Road	1890	2010	3050	2300	2600	37.57%
Utica Road to Whitaker Lane	3220	3920	5300	5600	5980	85.71%
Whitaker Lane to County C (South)	3590	5120	6700	7400	8100	125.63%
County C (South) to Mickle Road	4250	7380	9000	10300	10100	137.65%
Mickle Road to Oak Crest Drive	4370	6630	10800	9400	9800	124.26%
Oak Crest Drive to County G	3975	5630	6200	5800	6800	71.07%
County G to County TT	4090	6080	6500	6900	7850	91.93%

*Average for roadway segments

2.2.2 Safety Concerns

The rate of crashes occurring along a corridor is directly related to the frequency, location, and type of access points along said corridor. Other contributing factors include travel speed, road geometrics, and driver errors.

The US 18 corridor is divided into seven (7) segments based on the 2014 surrounding land use and average number of vehicles that travel each segment daily. The State of Wisconsin establishes several statewide average crash rates based on land use and roadway characteristics. This allows WisDOT to compare of the crash statistics along a given corridor to similar corridors throughout the state.

The US 18 corridor crash rates for years 2008 through 2012 are summarized in Table 3. The comparable statewide crash rates (crashes per one-hundred million vehicle miles traveled) are shown in the table. All of the US 18 segment crash rates exceeded the statewide average crash rates for similar corridors.

Table 4 - 2008-2012 Segment Crash Rates

Segment Limits	Segment Length	Total Crashes	2012 AADT	Segment Crash Rate	Statewide Crash Rate	% above Statewide Crash Rate
West Waukesha County Line to Utica Road	3.12	15	3230	101.3	78	29.87%
Utica Road to Whitaker Lane	1.41	40	6470	259.1	71	264.93%
Whitaker Lane to County C (South)	1.84	36	8880	132.4	75	76.53%
County C (South) to Mickle Road	1.56	45	11407	156.5	75	108.67%
Mickle Road to Oak Crest Drive	1.10	111	11735	564.2	75	652.27%
Oak Crest Drive to County G	2.53	37	7297	117.8	71	65.92%
County G to County TT	1.99	40	8270	139.4	71	96.34%

Crash rate is represented as the number of crashes per one-hundred million vehicle miles traveled
AADT = Average Annual Daily Traffic (vehicles traveling on the roadway per day)

2.2.3 Access Points and Safety

Each access point creates potential conflicts between through traffic and traffic using that access point. Each conflict point is a potential crash. There is a relationship between the number of crashes and the number of access points according to a study conducted by the Federal Highway Administration (see Figure 3). According to the study, as the number of access points increase along a highway, the rates of crashes also increase. Furthermore, poorly located access either too close to intersections or inadequately spaced from other access points contributes to more crashes. The data in Table 5 demonstrates the relationship between the number of access points per mile and the crash rate for each segment. Note how the crash rate increases as the number of access points per mile increase.

Figure 3 - Relationship between Access Points and Crash Rates

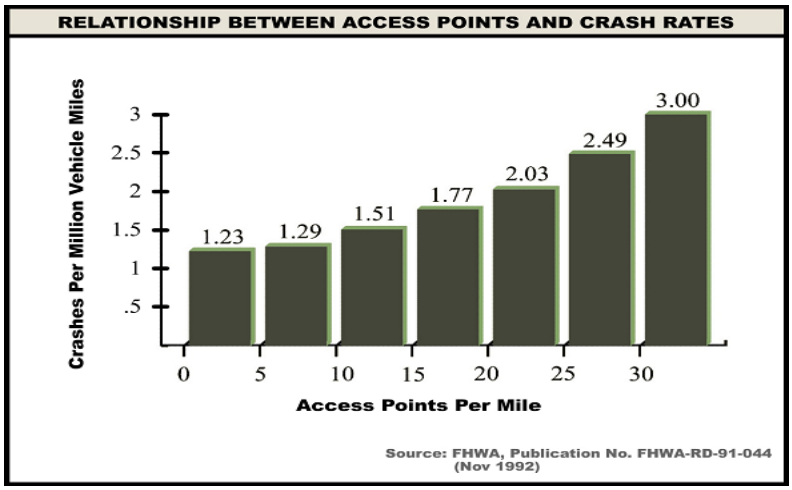


Table 5 - 2013 Access Points

Segment	Length (mi)	2014 Access Points (includes Public Roads)	2014 Access Points Per Mile	2008 – 2012 Crash Rate
West Waukesha County Line to Utica Road	3.12	56	17.95	81.6
Utica Road to Whitaker Lane	1.41	22	15.60	240.3
Whitaker Lane to County C (South)	1.84	21	11.41	120.7
County C (South) to Mickle Road	1.56	18	11.54	138.6
Mickle Road to Oak Crest Drive	1.10	25	22.73	471.2
Oak Crest Drive to County G	2.53	44	17.39	109.8
County G to County TT	1.99	35	17.59	133.2

Crash rate = the number of crashes per one-hundred million vehicle miles traveled

2.2.4 Conflict Points

Figure 4 shows the introduction of nine conflict points for every driveway or public roadway introduced on a 2-lane roadway. Conflict points can be further broken down into three categories: merge, diverge, and crossing. Merging and diverging conflict points are areas where designated vehicle movements meet at less abrupt angle versus a crossing conflict point. Crossing conflict points are considered to be the most dangerous and in general account for some of the more sever vehicle crashes out of the three types of conflicts.

Figure 4 - Two Lane Roadway with One Driveway (9 conflict points)

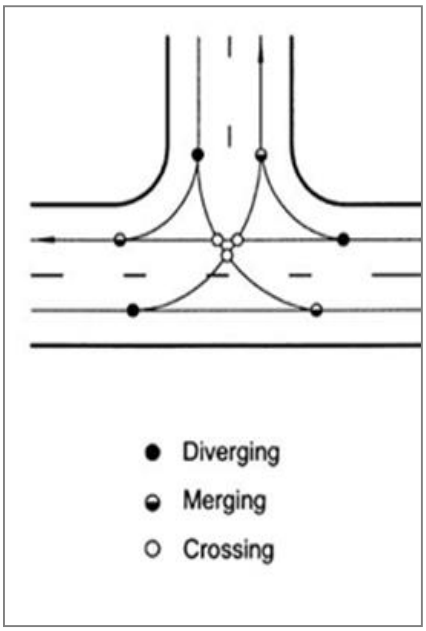
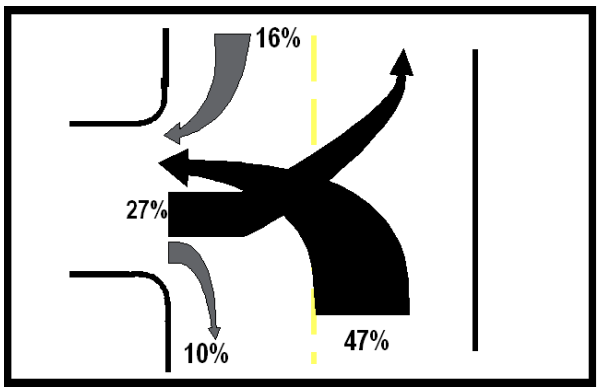


Figure 5 shows the percentage of driveway crashes per type of movement or conflict point for a 2-lane roadway. Nearly half of all crashes occur when drivers stop in the live through lane to turn left into a driveway. Over a quarter of the crashes occur while maneuvering the left turn out of a driveway.

Figure 5 - Percent of Driveway Crashes by Turn Movement



2.2.5 Operations

Congestion (user delay) and safety issues (number of crashes) will increase with an increase in traffic volumes along a corridor without proper improvements to the highway. Additionally, driver frustration and perception that the roadway is "difficult to drive" also increases. Drivers may consider changing their "destination" to seek more convenient, faster or safer routes to obtain the same services. In addition to longer commute times, congested highways result in higher fuel consumption and pollutants.

Congestion also affects the efficiency of most commercial businesses. Delay and inconvenience to customers and deliveries adversely affects most businesses' operations. Poor management of traffic congestion on the transportation network causes a decline in the economic vitality of the area and attractiveness to new developments. Existing businesses that are dependent on vehicular traffic may choose to relocate to higher quality transportation facilities.

Section 3 Access Management Techniques and Strategies

It is anticipated that elements of the Vision would be implemented ***incrementally*** as land uses and access needs change, or when improvements are made to the roadway.

Coordinated implementation of the techniques and strategies described in this document is the key component to the overall success of the Vision. Some recommendations, such as providing alternate routes for circulation, or allowing temporary access to side roads may fall under multiple local jurisdictions.

There are four primary areas of focus for the strategies included within the Vision:

- Location of existing and potential future signalized intersections for traffic progression
- Location of un-signalized intersections

- Private access to US 18
- Supporting local network for circulation and arterial support

3.1 Signalized Intersections and Traffic Progression

Closely spaced or irregularly spaced traffic signals on arterial roadways result in frequent stops, unnecessary delay, increased fuel consumption, excessive vehicular emissions, and high crash rates. Several studies have found that the number of crashes and crash rates increases as the frequency of traffic signals increases. Alternatively, long and uniform signal spacing allows timing plans that can efficiently accommodate varying traffic conditions during peak and off-peak periods as well as adaptive control systems.

Variables involved in the planning, design, and operation of signalized arterial roadways are reflected in the relationship between speed, cycle length, progression efficiency, and signal spacing. A key objective of access management is to balance these three elements to yield maximum progression bandwidths in both travel directions at desired travel speeds. Several studies over the past decades have shown that fewer signals at uniform signal spacing improve traffic flow and reduce delay. A uniform signal spacing of ½ mile provides for efficient signal progression along major suburban arterials. Table 6 shows general guidelines for access spacing and allowable methods for access control based upon the access type. The FHWA Technical Summary document "Access Management in the Vicinity of Intersections" is located in Appendix C and provides guidelines for applying access management principles at intersections along a highway corridor.

Table 6 - General Access Control Criteria

	Access Control Method			
	Signal	**Full Median Opening**	**Directional Median Opening**	**Closed Median**
Generalized Spacing Distance	1/2 Mile	1/4 Mile	1/8 Mile	None
Access Type				
Single-Use Private Driveway	No	No	No	Allowable
Shared Private Driveway with Cross Access	No	No	Allowable	Allowable
Private Road	No	No	Allowable	Allowable
Public Street that ends in Cul-de-Sac	No	No	Allowable	Allowable
Public Street—Local	No	Allowable	Allowable	Allowable
Public Street – Collector	Allowable	Allowable	Allowable	No
Public Street – Arterial	Allowable	Allowable	No	No

*Access Point Minimum distance from the *functional area* of a *median opening* is 200 ft.
*Access Point Minimum distance from the *functional area* of an *intersection* is 500 ft.

3.2 Un-Signalized Intersections and Medians

The optimum location for un-signalized intersections is one-quarter mile on suburban roads or a half mile on rural roads between signalized intersections. This spacing allows for the proper development of the intersection influence area that includes the storage bays for each turning movement.

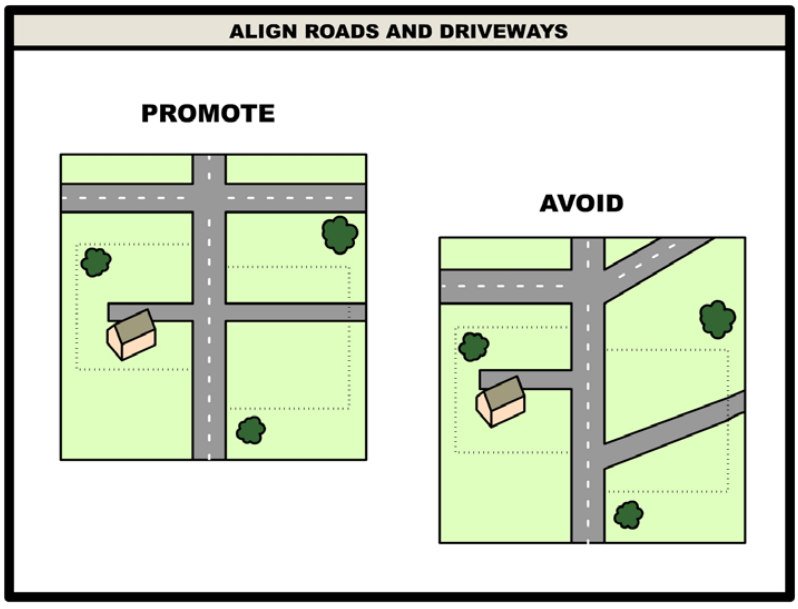
A four-legged intersection is more desirable than offset T-type intersections because all movements can be accommodated at one location more efficiently than at two closely spaced locations. As traffic increases, the offset T-type intersections experience a higher risk of crashes because of inadequate storage and taper lengths for cars making turns. For this reason, as traffic increases on US 18, the only option available may be to limit these intersections to right-in/right-out movements if operational or safety problems arise.

Strategies to address intersections with public streets include:

- Realign offset T-type intersections if possible
- Relocate existing local road connections to optimum spacing guidelines where possible
- Locate new local road connections at optimum spacing guidelines
- Require cross access easements for all properties between intersection locations

Figure 6 shows desired intersection and driveway alignment.

Figure 6 – Align Roads and Driveways



3.3 Private Access

Existing access to US 18 would remain unchanged unless safety becomes an issue or until such time when redevelopment takes place or existing properties are converted to a different use.

Direct access to US 18 should be minimized for the following reasons:

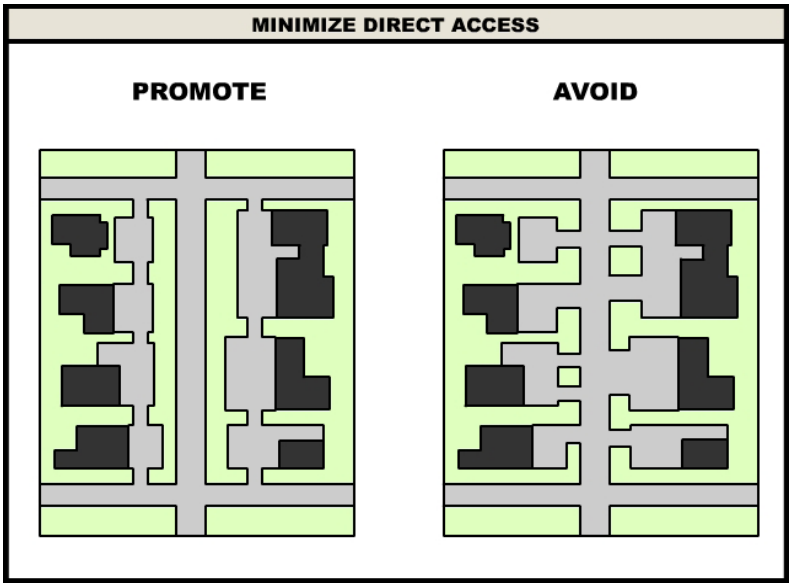
- Narrow lot sizes result in closely spaced driveways; large lot sizes often request multiple driveways.
- Median openings may not be allowed at driveways if the facility is expanded and medians are constructed.
- For 2-lane operation, a driver needs to stop in a live lane of traffic making through traffic stop and wait behind the turning vehicle or illegally use the shoulder to pass until the left turn into the driveway is maneuvered. This inconsistency in vehicle speeds can contribute to the number of crashes along a corridor.

Strategies to address numerous access points along US 18 include:

- Remove excess driveways for lots with multiple access points.
- Relocate driveways to increase spacing or to lower functionally classified roadways.
- Consolidate driveways for combined lots
- Promote shared driveways between lots of similar uses
- Require cross access easements to enable multiple properties to use the same driveway. Local communities should require this during the site review process. Even if the parcels are not continuous and a backage or frontage connection cannot be built, a cross access easement designates space for a future road as the corridor fills in.

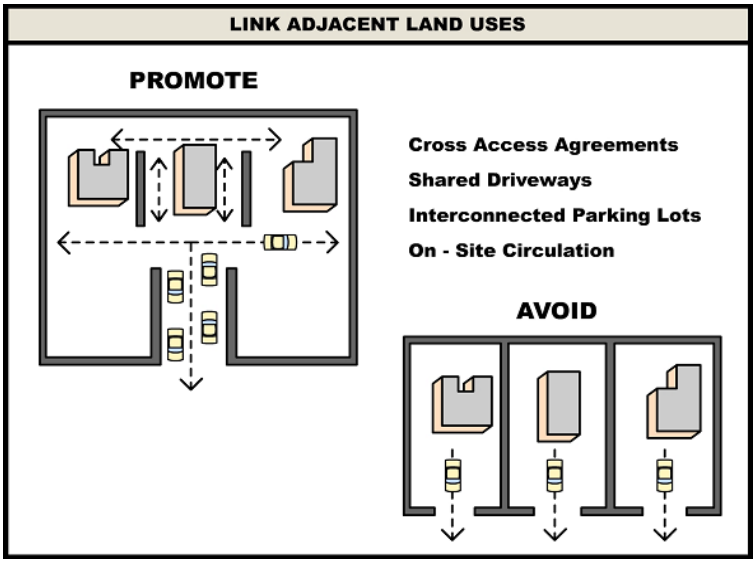
As shown in Figure 7, driveways could be relocated and moved onto local side roads. Access to the state highway would be limited to intersections with public streets. The reduction in the number of direct access points allows more efficient use of the roadway and promotes greater separation of intersections.

Figure 7 - Minimize Direct Access



In the case of shared-access or cross-access agreements, multiple parcels share a common access point. Access to each property is achieved through an interconnected parking lot system or other method of on-site circulation (see Figure 8). This solution reduces the need for direct access driveways if the creation of new local roads is not possible. Site planning that encourages good site circulation and parcel interconnection improves highway mobility by reducing conflicts between vehicles accessing adjacent land uses and through traffic. Site planning is the responsibility of local communities through their review and approval process.

Figure 8 - Link Adjacent Land Uses



Driveways located close to an intersection can pose safety and operational issues for the intersection (see Figure 9). These driveways should be relocated further from the intersection where possible to eliminate conflicts between vehicles entering the intersection and those using the driveway. These driveways can pose safety hazards from vehicles making left turns into the driveways too close to the intersection. In addition, it may be difficult for drivers to determine if a vehicle is entering the intersection to execute a turn, or if the vehicle is entering the driveway. For vehicles wishing to exit from a driveway that is too close to the intersection, they often must track several movements within the intersection to determine a safe opportunity to make a left-turn out of the driveway.

Figure 9 - Proper Driveway Location

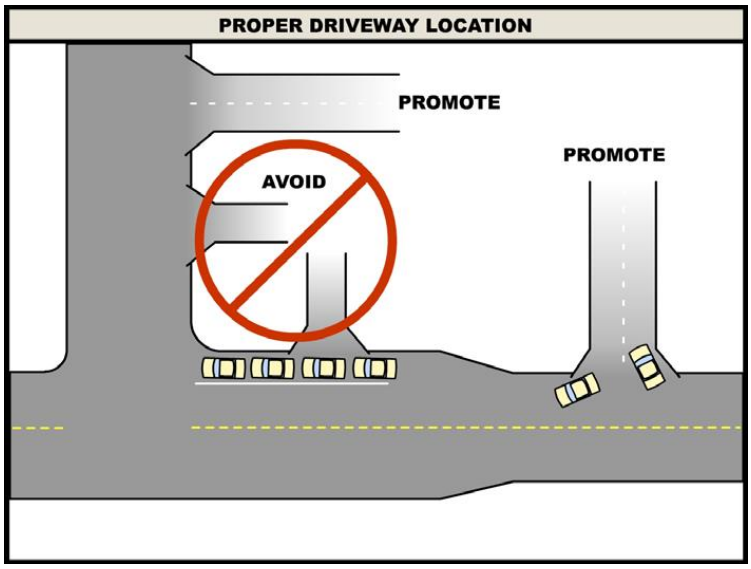
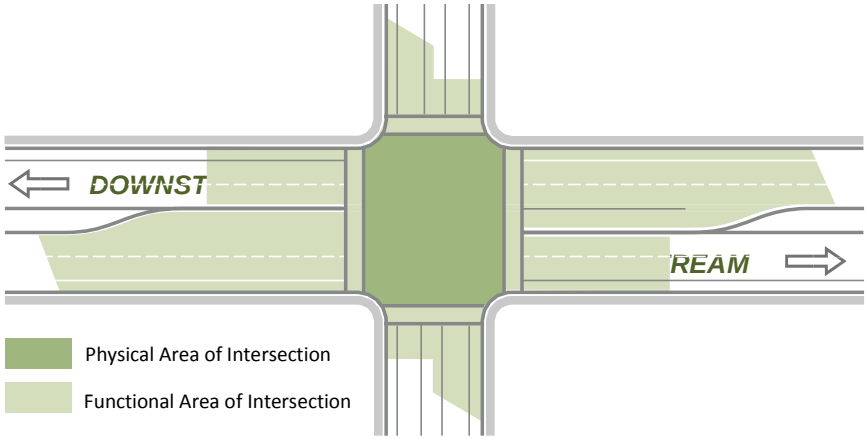


Figure 10 - Functional and Physical Areas of an Intersection

Figure 10 provides a schematic representation of functional area of an intersection. The functional area of an intersection is the critical area where motorists are responding to the intersection, decelerating, and maneuvering into the appropriate lane to stop or complete a turn. Access connections too close to intersections can cause



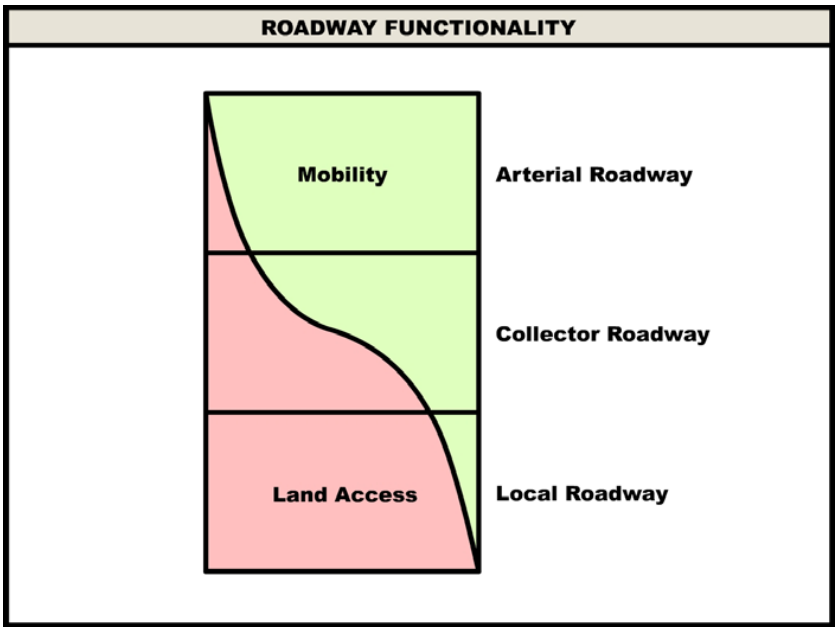
serious traffic conflicts that impair the function of the affected facilities. Drivers need sufficient time to address one potential set of conflicts before facing another. The functional area of an intersection includes areas upstream and downstream of the intersection.

3.4 Local Circulation

The transportation system is designed to accommodate existing land uses. As investments are made to develop and redevelop land, investments should be made to the transportation infrastructure to support the new land uses.

A local transportation system should feature a variety of different types of roads (local, collector, and arterial) to serve the local land uses as well as complete a balanced transportation system. There are three primary functions that roadways perform: providing mobility, providing access, or acting as a transition between roadways that provide access and those that provide mobility (see Figure 11).

Figure 11 - Roadway Functionality



Roadways that prioritize mobility are classified as arterial roadways. Ideally, these roadways have minimal direct access and operate at higher speeds for mobility (45 mph or greater). Officially, US 18 is classified as a principal arterial.

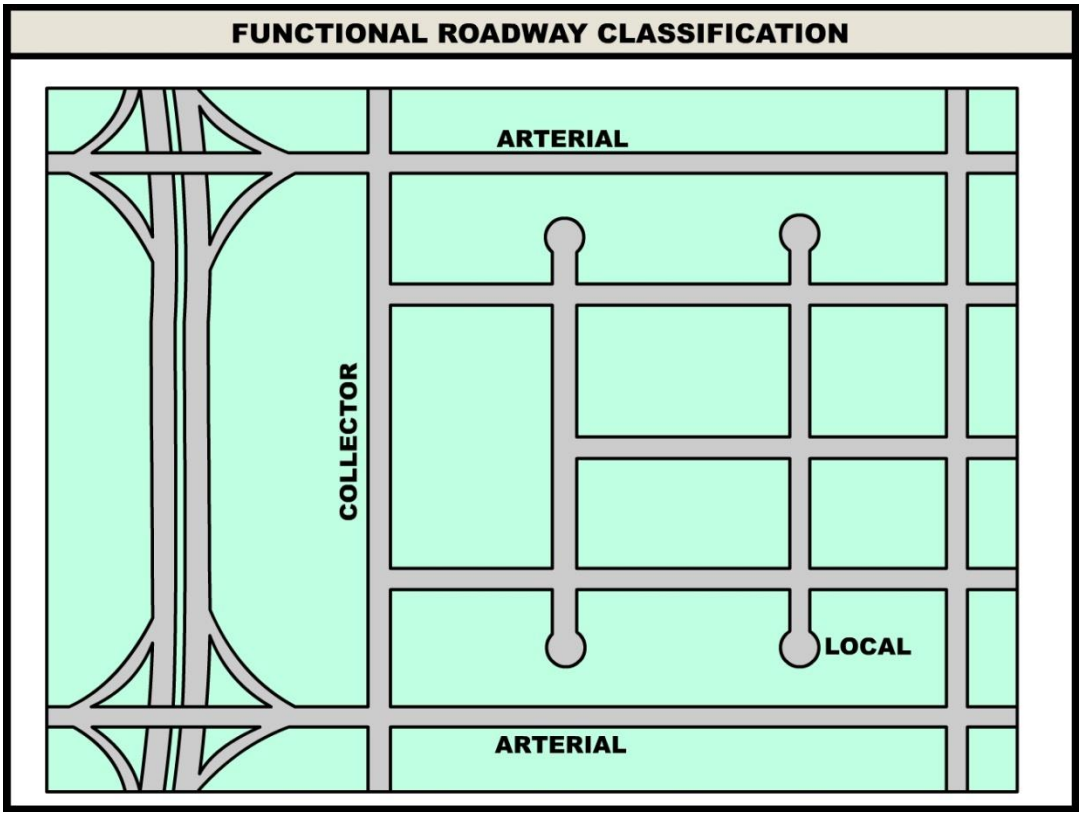
Roadways that provide the transitional function between land accessibility and mobility are classified as collector roadways. These roadways allow more access than arterials and operate at lower speeds than arterials (35 to 40 mph).

Roadways that prioritize the local access are classified as local roadways. These roadways allow access to adjacent properties and operate at low speeds (25 to 30 mph).

The most effective transportation network needs to satisfy both functions and thereby needs to have all three types of roadways for the system to operate efficiently and safely long into the future.

If a network does not include each type of roadway, then the roadway network will not operate as intended and degraded operations will prevail. Once traffic operations are degraded, it is often difficult and costly to make improvements to the corridor. Safety and driver frustration issues increase as periods of congestion become more common.

Figure 12 - Functional Roadway Classification



As Figure 12 above shows, US 18 should operate as an arterial roadway allowing minimal access and traffic operation at high speeds of 45 to 55 mph. Therefore, the consideration where possible to plan and develop a local road network will satisfy future land use changes and compliment the collector and arterial system already in place in the corridor.

A local road system also provides alternative routes for greater accessibility to land use in the region. The recommendations pertaining to local circulation recognize that this issue lies outside of WisDOT jurisdiction and falls under local community jurisdiction. The local road network recommendations in this plan are meant to show a range of possibilities for local communities. Implementation may vary, but the overarching goal is to provide parallel routes that prioritize local access and removes traffic from US 18.

The local circulation routes presented in this Vision fall under one of two strategies:

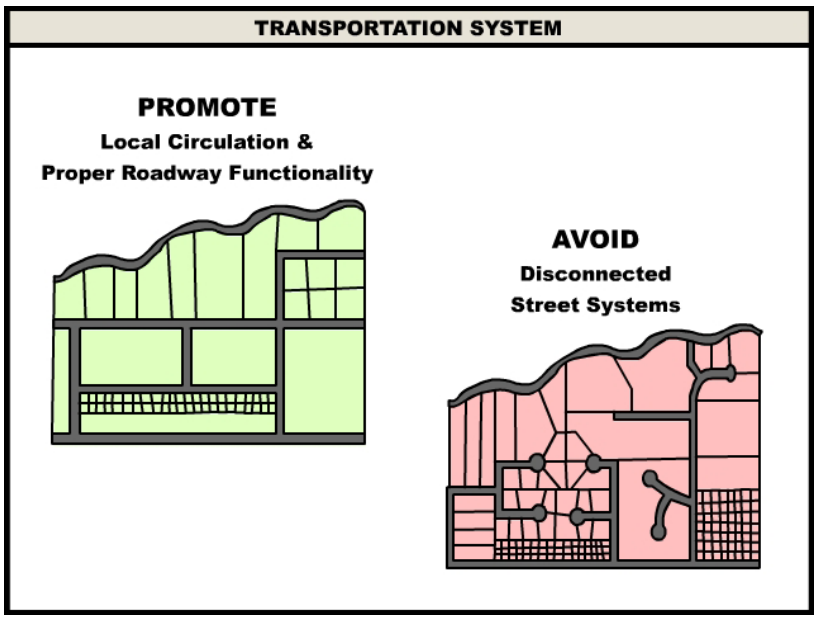
- The Local Road Connections intersecting with US 18 are ***location specific***. These connections are shown in their recommended locations on the Vision.

- Local Road Connections parallel to or not intersecting with US 18 shown on the Vision are ***conceptual*** recommendations rather than location-specific. For example, local circulation that provides parallel connectivity for short trips should be provided if possible. However, the exact method (cross-access agreement or new public road) and the exact location of those routes need to be determined by the respective local unit of government if and when development occurs.

The benefits of providing a complete local transportation system include:

- Creating an alternative to US 18 for local trips enabling US 18 to function as an arterial roadway.
- Opportunities to relocate existing driveways to lower function roadways as land develops or converts to a higher use (see Figure 13).
- Multiple choices for vehicles, bikes, and pedestrians to get from one destination to another.
- Implementation of an interconnected local transportation system enhances the ability of emergency responders to access crashes during peak traffic periods (see Figure 12, Transportation System).

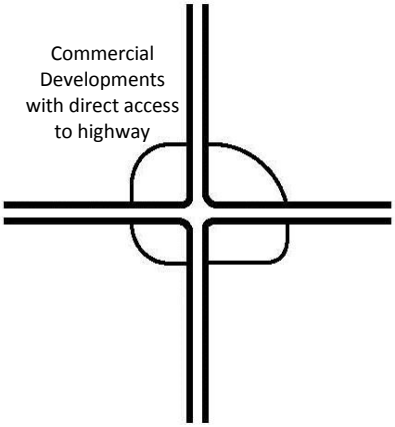
Figure 13 - Transportation System



In summary, minimizing the number of curb cuts, consolidating driveways, and coordinating internal site circulation and parking among businesses results in a and more functional and safer corridor. Using these techniques will protect the investment of existing businesses, the public investment in the roadway, and can help attract new investment into the area. The exhibits in the Appendix B visually map where these access management techniques should be considered on the US 18 corridor.

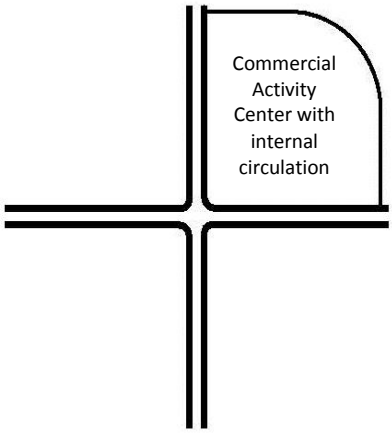
3.5 Activity Centers vs. Strip Development

Access management objectives can be achieved through land use strategies that discourage strip development and promote clustering of land uses in activity centers with unified access and internal circulation systems. Activity centers internalize access to retail and service activity off of arterial roadways and can be integrated into the surrounding local street system. They also preserve the functional area of roadway intersections by allowing for increased corner clearance of access connections. Focusing services and shops into centers, rather than strips, also supports walking, bicycling, and transit use and reduce the number of short local trips on arterial roadways. A key consideration in planning for commercial activity centers is to provide enough land area and depth for sufficient corner clearance and a unified access and circulation plan.



Avoid

- Limited frontage on each street (500' wide parcels at intersections preferred)
- Inadequate depth for internal circulation
- Limited flexibility in site design that prevents locating access points beyond intersection influence area and cross access
- Numerous access drives in close proximity throughout the corridor



Preferred

- More Highway Frontage to locate driveway beyond intersection influence area
- More depth of circulations system
- More flexibility in site design
- Fewer access problems at intersection

Section 4 Intergovernmental Coordination

Successful implementation of this Access Management Vision is dependent upon intergovernmental commitment to the "common vision" and coordination. Each has its own role.

WisDOT has permitting authority to remove, to relocate, or to adjust any access or median opening if deemed unsafe to the transportation facility.

The local communities have permit authority to review and approve planned land use, re-developments, and new developments. By permit authority, local communities will also have the ability to require cross-access easements and shared driveway conditions.

Both the local communities who control land use and WisDOT, who is responsible for WIS 18, need to work together to establish and maintain a safe, efficient, and economically viable corridor long into the future.

The key to success is for each stakeholder to review the Vision when a development request or access request is received; and for stakeholders to come to an intergovernmental agreement for any adjustments to the Vision. The maps for the overall Access Management Vision for the US 18 Corridor are located in Appendix B.

4.1 Memorandum of Understanding

The signing of the "Memorandum of Understanding" acknowledges the participation of all communities in the development of the Vision and signifies a "good faith partnership" to work together as future land use, access, and transportation decisions need to be made along US 18. WisDOT would like to again emphasize that the intent of this Access Vision is not to encourage or discourage development projects but to better plan future access locations to ensure the safe and efficient operations along the corridor long into the future.

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Memorandum of Understanding

RE: US 18 Access Management Vision **April 2016**

The purpose of the US 18 Access Management Vision is to provide WisDOT and the local units of government a unified, long-range access management vision of the corridor. The Vision's intent is to be used as a comprehensive and collaborative tool for evaluation of future access requests as development and redevelopment occurs adjacent to US 18. The Vision will also provide a guide to local officials to determine the optimum location for developments of differing type, scale and traffic generation.

The Access Management Vision includes strategies and recommendations to:

- Managing existing access
- Managing new access due to new or changing land use
- Managing traffic safety and efficiently as traffic growth occurs
- Planning a supportive local road network
- Improving coordination and cooperation between WisDOT and local units of government

The Vision's development was a result of a collaborative effort with the local communities and counties listed below:

Village of Summit	Village of Dousman
Town of Ottawa	Town of Genesee
Village of Wales	Town of Delafield
City of Waukesha	Waukesha County

By signing this document, your community is agreeing to partner with WisDOT and the other local units of government to implement this Vision whenever possible as future opportunities arise.

_____	_____
Name Village of Summit Title Date	Name Village of Dousman Title Date
_____	_____
Name Town of Ottawa Title Date	Name Town of Genesee Title Date
_____	_____
Name Village of Wales Title Date	Name Town of Delafield Title Date
_____	_____
Name City of Waukesha Title Date	Name Waukesha County Title Date

_____

Name WisDOT Title Date

Appendix A - Municipal Land Use Maps from Comprehensive Plans

The following Land Use maps were reviewed in the development of the Access Management Vision Plan and maps:

- Village of Summit Future Land Use Map
- Village of Dousman Existing Land Use Map
- Village of Dousman Future Land Use Map
- Town of Ottawa Future Land Use Map
- Town of Genesee Existing Land Use Map
- Town of Genesee Future Land Use Map
- Village of Wales Existing Land Use Map
- Village of Wales Future Land Use Map
- Town of Delafield Future Land Use Map
- City of Waukesha Existing Land Use Map
- City of Waukesha Future Land Use Map
- Waukesha County Existing Land Use Map
- Waukesha County Future Land Use Map

Appendix B - Vision Maps

The maps contain the vision for access on US 18 and apply the access management principles explained in this report to the existing highway. The recommendations take into account future land use as found in SEWRPC's Waukesha County 2035 Land Use Plan as well as the Land Use maps from the various jurisdictions along the corridor. Recommendations include the following:

- Opportunities to consolidate/remove driveways during development and redevelopment
- Locations where all future access should be located off of the supporting local road system
- Locations where existing roadways should be cul-de-sac-ed or have their access removed to promote better intersection spacing to US 18 as traffic volumes increase in the future.
- Locations of potential future signals or other types of intersection controls - should they meet warrants.
- Conceptual local road network recommendations for, if, and when development occurs. Please note that these local roads are conceptual in nature. They simply serve to illustrate various ways that local roads can provide access to local land uses with minimal direct access onto US 18. The specific alignments of the conceptual connections are not considered to be static.

Appendix C - FHWA Access Management in the Vicinity of Intersections Technical Summary