RECOMMENDED YEAR 2050 REGIONAL LAND USE AND TRANSPORTATION SYSTEM PLAN

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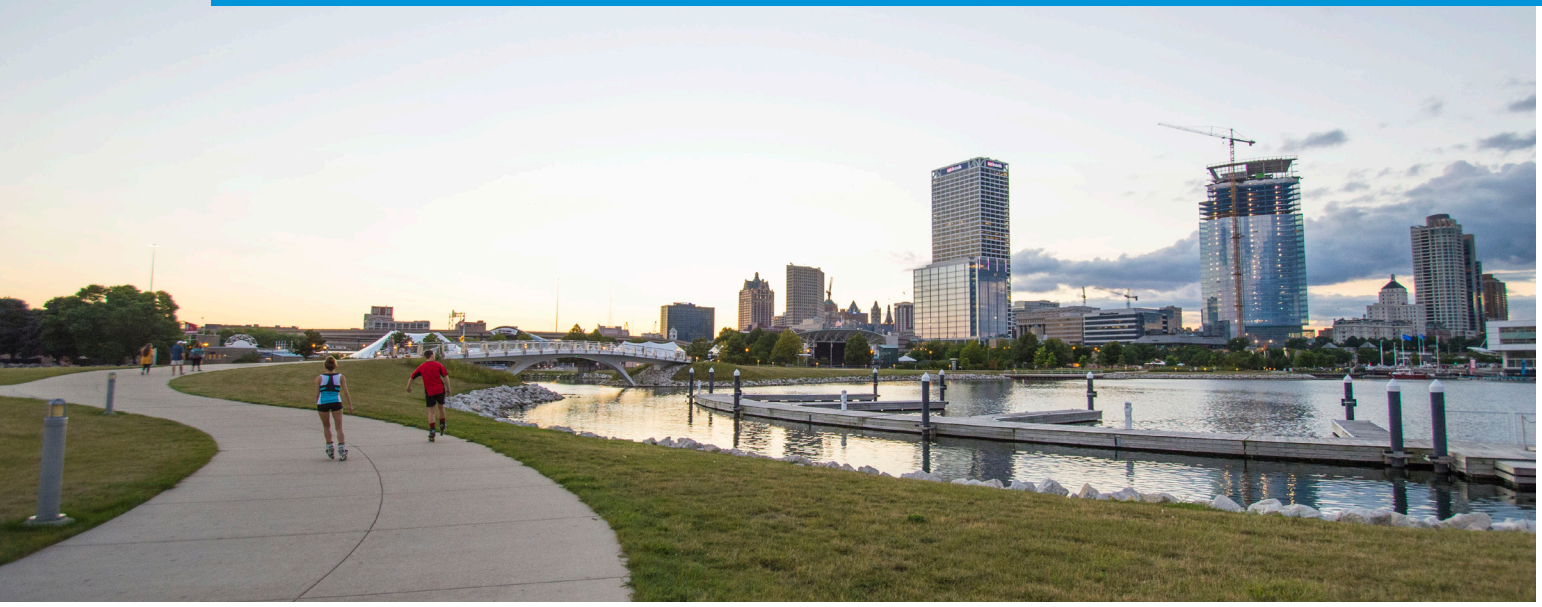


Credit: SEWRPC Staff

1.1 INTRODUCTION

Southeastern Wisconsin has reached a pivotal point in its development. A major shift is occurring in the Region's development and growth. In order to grow jobs in the future, the Region will need to attract new residents for the first time in decades, putting Southeastern Wisconsin in direct competition with other metro areas. If the Region does not compete strongly to attract needed workers, economic growth may not be expected to occur. VISION 2050 makes recommendations for land use and transportation that will improve quality of life throughout the Region and make the Region more competitive over the next several decades.

This volume of the VISION 2050 plan report presents the recommended year 2050 regional land use and transportation system plan for Southeastern Wisconsin (hereafter referred to simply as "VISION 2050"). VISION 2050 recommends:

- Encouraging sustainable and cost-effective growth
- Preserving the Region's most productive farmland and primary environmental corridors, which encompass the best remaining features of the Region's natural landscape
- Encouraging more compact development, ranging from high-density transit-oriented development to traditional neighborhoods with homes within walking distance of parks, schools, and businesses
- Significantly improving and expanding public transit, including adding rapid transit and commuter rail, and improving and expanding local and express transit services to support compact growth and enhance the attractiveness and accessibility of the Region

- Enhancing the Region's bicycle and pedestrian network to improve access to activity centers, neighborhoods, and other destinations
- Keeping existing major streets in a state of good repair and efficiently using the capacity of existing streets and highways
- Strategically adding capacity on highly congested roadways, incorporating "complete streets" roadway design concepts to provide safe and convenient travel for all, and addressing key issues related to moving goods into and through the Region

Groundwork for Vision and Plan Development
Volume I of the plan report includes information on the existing and historical land use and transportation system in the Region, analyses of that information—including an analysis of progress in the implementation of the previous generation regional plans (year 2035)—and forecasts of future needs for resources, land, and transportation based on the data. This information is vital in establishing a basis for preparing a technically sound plan.

Developing the Vision and Plan
Volume II documents the process used to prepare VISION 2050, including the extensive public outreach conducted as part of each step in the process. The process began by engaging residents in visioning for the future, which involved a variety of activities and surveys. The result was an initial vision comprised of a set of VISION 2050 Guiding Statements, which generally describe the desired future direction of growth and change in the Region with respect to land and transportation system development. The feedback obtained from initial visioning activities led into a scenario planning effort. This step involved comparing a series of five conceptual land use and transportation scenarios, including a baseline scenario representing a continuation of current trends and additional scenarios representing a range of possible futures for land use and transportation that could achieve the initial vision. Following public input on the scenarios, a series of three detailed land use and transportation alternatives were prepared and thoroughly evaluated and compared using 50 criteria based on the Guiding Statements developed earlier in the process. The public input on these detailed alternatives guided the development of a preliminary recommended regional land use and transportation system plan. The Preliminary Recommeded Plan was thoroughly evaluated, and was the focus of the final round of public input for VISION 2050.

The VISION 2050 Plan
VISION 2050, as presented in this chapter, includes refinement to the Preliminary Plan based on consideration of public input on the Preliminary Plan, as well as input from the Commission's Advisory Committees on Regional Land Use Planning and Regional Transportation System Planning, Environmental Justice Task Force, Jurisdictional Highway Planning Committees in each county, and VISION 2050 task forces on key areas of interest.[1]

VISION 2050 includes a recommended land use development pattern and transportation system, together representing a desired future vision for the Region. It was developed to achieve the plan objectives documented in Chapter 3 of Volume II of this report. These plan objectives were developed

[1] *The Preliminary Recommended Plan is set forth in Chapter 4 of Volume II of this report, and its evaluation is set forth in Appendix H. The refinements that were made to the Preliminary Recommended Plan are discussed in Part IV of Chapter 4 of Volume II.*

based on the Guiding Statements produced as part of the initial visioning activities described previously.

Part I of this chapter describes the VISION 2050 recommendations for land use, including the recommended land use development pattern. Part II describes the recommendations for transportation, including the recommended transportation system. Design guidelines that provide additional direction for select land use and transportation recommendations are referenced within the chapter. Land use design guidelines are presented in Appendix K of this volume. Transportation design guidelines will be published in a separate document following the completion of VISION 2050. Part II also compares existing and reasonably expected costs and revenues for the recommended transportation system, which results in identification of a funding gap and the need to identify the funded portion of the recommended transportation system. This funded portion is referred to as the "Fiscally Constrained Transportation Plan (FCTP)," and is presented in Chapter 2 of this volume. The FCTP includes all of the transportation elements of VISION 2050 except for the public transit element, which cannot be implemeted within expected funds due to a gap in funding. Should funding become available for any transit improvements recommended in VISION 2050, the FCTP would be amended to include those improvements. An equitable access analysis of the FCTP is presented in Appendix N of this volume.

1.2 PART I: RECOMMENDED LAND USE COMPONENT

Areawide land use planning is necessary in a growing Region with seven counties and almost 150 cities, villages, and towns where physical and economic development issues transcend political boundaries. While the Region includes only 5 percent of Wisconsin's total area, it accounts for over one-third of the State's population, jobs, and wealth. Geographically, the Region is located in a good position for continued growth and development. The Region is bounded on the east by Lake Michigan, which provides a unique, substantial, and high quality water supply; is an unparalleled recreation resource; and is an integral part of a major international transportation network. It is bounded on the south by the rapidly expanding metropolitan region of northeastern Illinois and is bounded on the west and north by the fertile agricultural and desirable recreation areas found in the rest of Wisconsin. In addition, many of the most important industrial areas and heaviest population concentrations in the Midwest are within 250 miles of the Region.

The Region of 2050 will be different than the Region of today due to its potential for continued growth and development. It is expected there will be about 369,000 additional residents and about 229,000 additional jobs, which will require an in-migration of population and workers. This anticipated growth will create demand for land and improved transportation facilities, and increase pressure on the Region's natural resources.

The land use component of VISION 2050 presents a development pattern and recommendations that accommodate projected growth in regional population, households, and employment in a sustainable manner consistent with VISION 2050 plan objectives through a focus on compact development. The compact development recommended under VISION 2050 ranges from high-density development such as transit-oriented development (TOD), to neighborhoods in smaller communities with housing within easy walking distance of neighborhood amenities such as parks, schools, and businesses.

This range of development is recommended because it has a number of benefits, including:

- Minimizing impacts on natural and agricultural resources
- Minimizing impacts to water resources and air quality
- Positioning the Region to attract potential workers and employers
- Maximizing redevelopment in areas with existing infrastructure
- Minimizing the cost of infrastructure and public services
- Meeting the needs of the Region's aging population
- Walkable neighborhoods that encourage active lifestyles and a sense of community
- Reducing the distance needed to travel between destinations
- A variety of housing options near employment
- Supporting public transit connections between housing and employment
- Increasing racial and economic integration throughout the Region2

VISION 2050 recognizes the impact of market forces on the location, intensity, and character of future urban development. It also recognizes the important role of communities in development decisions, and encourages communities to act on the land use recommendations presented in VISION 2050 to make the Region an attractive place for all current and future residents and businesses.

Description of Land Use Component

The land use component of VISION 2050 recommends focusing development within planned urban service areas, preserving environmentally significant lands, and preserving highly productive agricultural lands. Existing local comprehensive plans, input from local planning officials, committed developments, and input from VISION 2050 public outreach activities were considered in allocating increases in regional population, households, employment, and associated land uses to develop the land use component of VISION 2050.

Figure 1.1 Illustrates the land use categories to which population, households, and employment were allocated under VISION 2050 (more detailed descriptions are included in Chapter 3 of Volume II).

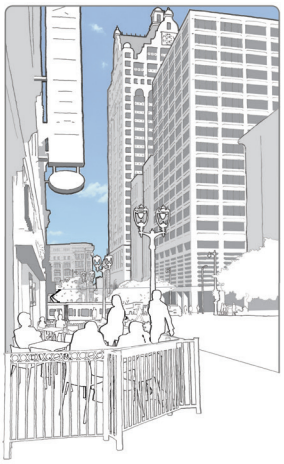
Map 1.1 presents the land use development pattern recommended under VISION 2050. Tables 1.1 and 1.2 provide information regarding existing and recommended land use. Actual and planned population, households, and employment by county and sub-area are presented in Table 1.3 (the sub-areas are shown on Map 1.2).

VISION 2050 is intended to provide a guide, or overall framework, for future land use within the Region. Implementation of the following plan recommendations ultimately relies on the actions of local, county, State, and Federal agencies and units of government in conjunction with the private sector. Detailed design guidelines that serve to facilitate implementation of the recommendations are presented in Appendix K of this volume.

[2] *An equity analysis of the VISION 2050 land use component is presented in Appendix M of this volume.*

Figure 1.1
VISION 2050 Land Use Categories

The recommended VISION 2050 land use pattern was developed by allocating new households and employment envisioned for the Region under the Commission's year 2050 growth projections to a series of seven land use categories that represent a variety of development densities and mixes of uses.



MIXED-USE CITY CENTER
Mix of very high density offices, businesses, and housing found in the most densely populated areas of the Region

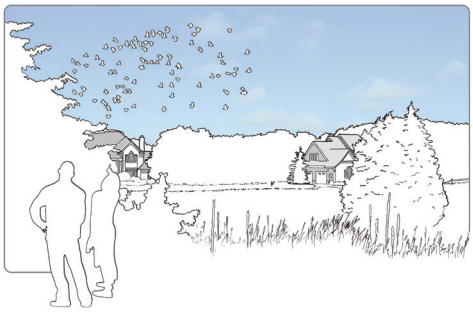
MIXED-USE TRADITIONAL NEIGHBORHOOD
Mix of high-density housing, businesses, and offices found in densely populated areas

SMALL LOT TRADITIONAL NEIGHBORHOOD (showing lots of about 7,000 square feet)
Mix of housing types and businesses with single-family homes on lots of ¼-acre or less found within and at the edges of cities and villages

MEDIUM LOT NEIGHBORHOOD (showing lots of about 15,000 square feet)
Primarily single-family homes on ¼- to ½-acre lots found at the edges of cities and villages

LARGE LOT NEIGHBORHOOD (showing lots of about ½ acre)
Primarily single-family homes on ½-acre to one-acre lots found at the edges of cities and villages and scattered outside cities and villages

LARGE LOT EXURBAN (showing lots of about 1.5 acres)
Single-family homes at an overall density of one home per 1.5 to five acres scattered outside cities and villages



RURAL ESTATE (showing a cluster subdivision with one-acre lots)
Single-family homes at an overall density of one home per five acres scattered outside cities and villages

Map 1.1
Land Use Development Pattern: VISION 2050

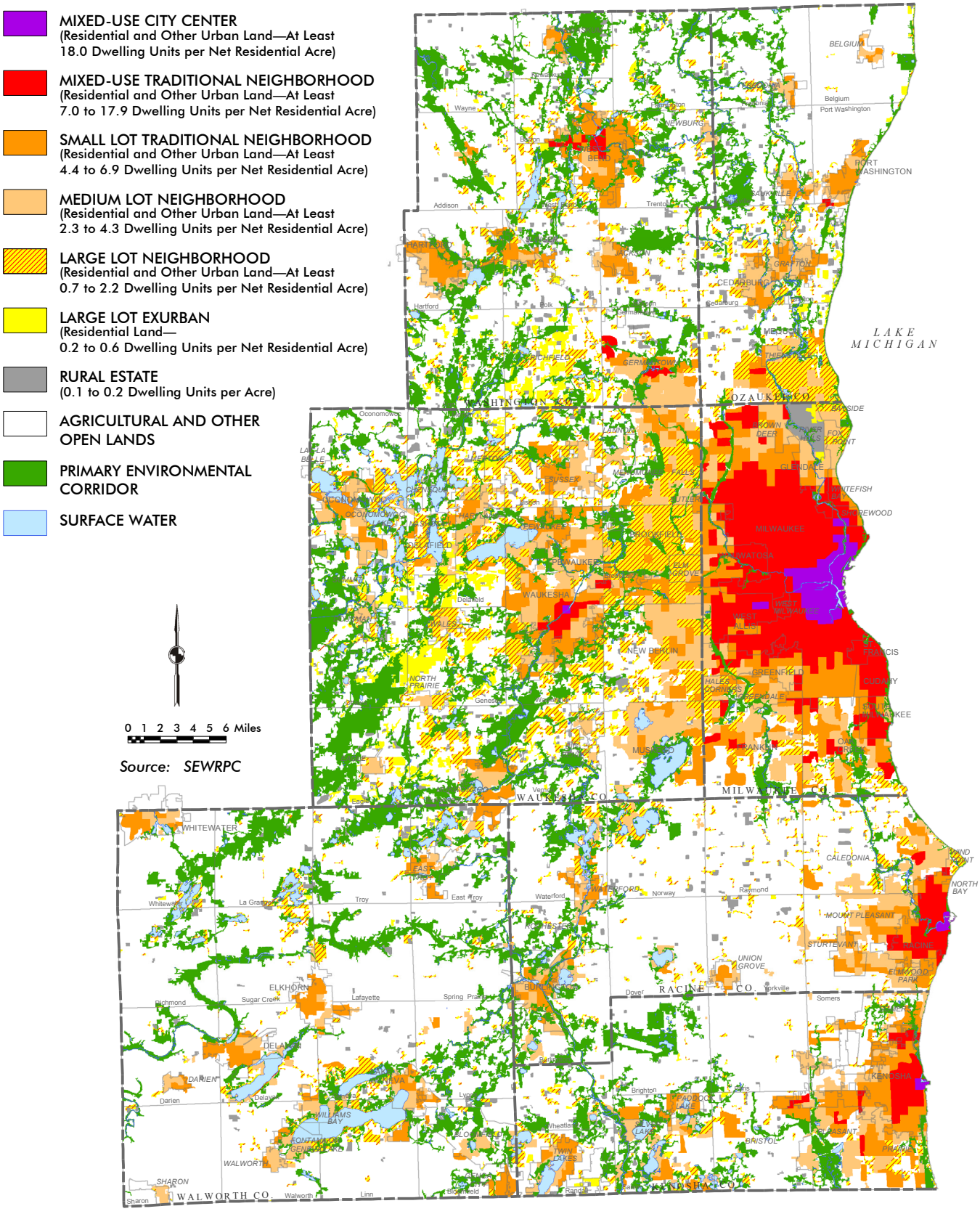


Table 1.1
Existing and Planned Land Use in the Region: 2010 and 2050

Land Use	Existing 2010		Planned Increment		Planned 2050	
	Square Miles	Percent of Total	Square Miles	Percent of Total	Square Miles	Percent of Total
Developed Land						
Residential						
Mixed-Use City Center[a]	3.1	0.1	0.3	9.7	3.4	0.1
Mixed-Use Traditional Neighborhood[b]	45.8	1.7	3.1	6.8	48.9	1.8
Small Lot Traditional Neighborhood[c]	41.6	1.5	34.3	82.5	75.9	2.8
Medium Lot Neighborhood[d]	88.2	3.3	6.4	7.3	94.6	3.5
Large Lot Neighborhood[e]	160.5	6.0	4.7	2.9	165.2	6.1
Large Lot Exurban[f]	31.9	1.2	2.7	8.5	34.6	1.3
Rural Estate[g]	29.9	1.1	7.5	25.1	37.4	1.4
Residential Subtotal	400.9	14.9	59.0	14.7	459.9	17.1
Commercial	35.6	1.3	13.6	38.1	49.2	1.8
Industrial	35.2	1.3	8.0	22.7	43.2	1.6
Transportation, Communication, and Utilities	213.8	8.0	12.4	5.8	226.2	8.4
Governmental and Institutional	37.0	1.4	1.7	4.6	38.7	1.4
Recreational[h]	56.0	2.1	6.7	11.9	62.7	2.3
Unused Urban	46.0	1.7	-21.2	-46.7	24.8	0.9
Urban Subtotal	824.5	30.7	80.2	9.7	904.7	33.6
Undeveloped Land						
Agricultural[i]	1,155.5	43.0	-58.4	-5.1	1,097.1	40.9
Natural Resource Areas						
Surface Water	84.7	3.1	0.0	0.0	84.7	3.1
Wetlands	315.2	11.7	0.0	0.0	315.2	11.7
Woodlands	191.4	7.1	0.0	0.0	191.4	7.1
Natural Resource Areas Subtotal	591.3	21.9	0.0	0.0	591.3	21.9
Unused and Other Open Land[J]	118.5	4.4	-21.8	-18.4	96.7	3.6
Nonurban Subtotal	1,865.2	69.3	-80.2	-4.3	1,785.0	66.4
Total	2,689.7	100.0	0.0	0.0	2,689.7	100.0

Note: Off-street parking area is included with the associated use.

[a] *18.0 or more dwelling units per net residential acre.*

[b] *7.0-17.9 dwelling units per net residential acre.*

[c] *4.4-6.9 dwelling units per net residential acre.*

[d] *2.3-4.3 dwelling units per net residential acre.*

[e] *0.7-2.2 dwelling units per net residential acre.*

[f] *0.2-0.6 dwelling units per net residential acre.*

[g] *No more than 0.2 dwelling unist per acre. The Rural Estate area assumes there would be one acre of developed homesite area per dwelling, the remainder of the area being retained in open space.*

[h] *Includes only intensive use recreational land.*

[i] *Includes farmed wetlands.*

[J] *Includes landfills and mineral extraction sites.*

Source: SEWRPC

Table 1.2
Existing and Planned Land Use in the Region by County: 2010 and 2050

	Kenosha County (square miles)			Milwaukee County (square miles)			Ozaukee County (square miles)			Racine County (square miles)		
Land Use	2010	Increment	2050	2010	Increment	2050	2010	Increment	2050	2010	Increment	2050
Developed Land												
Residential												
Mixed-Use City Center[a]	0.1	0.0	0.1	2.8	0.2	3.0	0.0	0.0	0.0	0.2	0.0[b]	0.2
Mixed-Use Traditional Neighborhood[c]	2.8	0.9	3.8	37.7	1.2	38.9	0.0	0.1	0.1	3.8	0.2	4.0
Small Lot Traditional Neighborhood[d]	4.8	7.7	12.5	12.8	2.3	15.2	2.2	2.2	4.4	4.4	4.1	8.5
Medium Lot Neighborhood[e]	10.1	0.7	10.7	16.3	0.2	16.6	6.9	0.2	7.0	12.9	0.4	13.2
Large Lot Neighborhood[f]	10.4	0.4	10.8	9.0	0.1	9.1	16.2	0.9	17.1	15.7	0.4	16.1
Large Lot Exurban[g]	1.0	0.3	1.3	1.0	0.0	1.0	2.6	0.5	3.1	0.2	0.2	0.4
Rural Estate[h]	3.2	0.6	3.9	1.4	0.0	1.4	3.6	0.8	4.3	4.6	1.2	5.8
Residential Subtotal	32.4	10.7	43.1	81.0	4.1	85.1	31.5	4.6	36.0	41.8	6.4	48.2
Commercial	2.7	1.4	4.0	12.3	1.9	14.2	1.8	1.0	2.9	3.6	1.6	5.2
Industrial	2.9	1.5	4.5	11.2	0.6	11.9	2.0	1.2	3.1	4.3	1.4	5.7
Transportation, Communication, and Utilities	19.4	2.9	22.3	53.2	0.6	53.7	15.9	0.9	16.9	22.7	1.6	24.3
Governmental and Institutional	3.2	0.5	3.7	13.4	0.0	13.4	2.1	0.1	2.2	3.9	0.1	4.1
Recreational[i]	5.9	1.4	7.3	12.3	0.2	12.5	4.1	0.4	4.5	5.3	0.9	6.2
Unused Urban	4.5	-3.1	1.4	14.7	-4.5	10.2	3.0	-1.6	1.4	5.8	-2.7	3.1
Urban Subtotal	71.1	15.2	86.3	198.1	3.0	201.1	60.4	6.6	67.0	87.4	9.3	96.7
Undeveloped Land												
Agricultural[j]	136.6	-11.7	124.9	15.6	-1.6	14.0	118.2	-4.6	113.6	180.7	-6.7	174.0
Natural Resource Areas												
Surface Water	8.8	0.0	8.8	2.4	0.0	2.4	4.1	0.0	4.1	9.4	0.0	9.4
Wetlands	28.9	0.0	28.9	11.6	0.0	11.6	30.8	0.0	30.8	29.8	0.0	29.8
Woodlands	15.9	0.0	15.9	7.4	0.0	7.4	11.4	0.0	11.4	19.6	0.0	19.6
Natural Resource Areas Subtotal	53.7	0.0	53.7	21.4	0.0	21.4	46.3	0.0	46.3	58.7	0.0	58.7
Unused and Other Open Land[k]	17.1	-3.5	13.5	7.5	-1.3	6.2	10.6	-2.0	8.6	13.8	-2.6	11.2
Nonurban Subtotal	207.4	-15.2	192.1	44.6	-3.0	41.6	175.1	-6.6	168.4	253.2	-9.3	243.9
Total	278.4	0.0	278.4	242.7	0.0	242.7	235.4	0.0	235.4	340.6	0.0	340.6

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Table 1.2 (Continued)

Land Use	Walworth County (square miles)			Washington County (square miles)			Waukesha County (square miles)			Region (square miles)		
	2010	Increment	2050	2010	Increment	2050	2010	Increment	2050	2010	Increment	2050
Developed Land												
Residential												
Mixed-Use City Center[a]	0.0	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0.1	3.1	0.3	3.4
Mixed-Use Traditional Neighborhood[c]	0.0	0.0	0.0	0.6	0.5	1.1	0.9	0.1	1.0	45.8	3.1	48.9
Small Lot Traditional Neighborhood[d]	2.9	4.6	7.4	4.6	5.2	9.7	10.0	8.2	18.1	41.6	34.3	75.9
Medium Lot Neighborhood[e]	9.0	1.2	10.2	7.1	0.5	7.6	25.9	3.3	29.3	88.2	6.4	94.6
Large Lot Neighborhood[f]	16.3	0.6	16.9	19.9	0.2	20.2	72.9	2.1	75.0	160.5	4.7	165.2
Large Lot Exurban[g]	0.9	0.0	0.9	8.3	1.1	9.4	18.0	0.6	18.6	31.9	2.7	34.6
Rural Estate[h]	7.2	1.2	8.4	6.6	2.0	8.6	3.3	1.7	5.0	29.9	7.5	37.4
Residential Subtotal	36.3	7.6	43.9	47.0	9.5	56.5	131.0	16.0	147.0	400.9	59.0	459.9
Commercial	2.4	1.5	3.9	2.7	1.6	4.3	10.2	4.6	14.7	35.6	13.6	49.2
Industrial	2.5	0.5	3.0	2.9	1.1	4.1	9.3	1.6	11.0	35.2	8.0	43.2
Transportation, Communication, and Utilities	26.1	1.6	27.7	26.3	1.8	28.0	50.4	3.1	53.5	213.8	12.4	226.2
Governmental and Institutional	2.9	0.2	3.1	2.7	0.2	3.0	8.8	0.7	9.5	37.0	1.7	38.7
Recreational[i]	7.3	1.1	8.4	6.5	0.4	6.9	14.7	2.2	16.9	56.0	6.7	62.7
Unused Urban	3.4	-1.7	1.7	3.1	-1.8	1.3	11.1	-5.8	5.3	46.0	-21.2	24.8
Urban Subtotal	80.9	10.7	91.6	91.2	12.9	104.1	235.4	22.5	257.9	824.5	80.2	904.7
Undeveloped Land												
Agricultural[j]	352.6	-8.2	344.4	203.0	-8.8	194.2	148.8	-16.7	132.1	1,155.5	-58.4	1,097.1
Natural Resource Areas												
Surface Water	23.7	0.0	23.7	8.0	0.0	8.0	28.2	0.0	28.2	84.7	0.0	84.7
Wetlands	51.4	0.0	51.4	72.7	0.0	72.7	89.9	0.0	89.9	315.2	0.0	315.2
Woodlands	51.8	0.0	51.8	37.6	0.0	37.6	47.7	0.0	47.7	191.4	0.0	191.4
Natural Resource Areas Subtotal	127.0	0.0	127.0	118.3	0.0	118.3	165.8	0.0	165.8	591.3	0.0	591.3
Unused and Other Open Land[k]	16.0	-2.5	13.5	23.0	-4.0	19.0	30.5	-5.8	24.7	118.5	-21.8	96.7
Nonurban Subtotal	495.5	-10.7	484.9	344.3	-12.9	331.4	345.1	-22.5	322.6	1,865.2	-80.2	1,785.0
Total	576.5	0.0	576.5	435.6	0.0	435.6	580.5	0.0	580.5	2,689.7	0.0	2,689.7

Note: Off-street parking area is included with the associated use.

[a] *18.0 or more dwelling units per net residential acre.*

[b] *Less than 0.05 square miles.*

[c] *7.0-17.9 dwelling units per net residential acre.*

[d] *4.4-6.9 dwelling units per net residential acre.*

[e] *2.3-4.3 dwelling units per net residential acre.*

[f] *0.7-2.2 dwelling units per net residential acre.*

[g] *0.2-0.6 dwelling units per net residential acre.*

[h] *No more than 0.2 dwelling units per acre. The Rural Estate area assumes there would be one acre of developed homesite area per dwelling, the remainder of the area being retained in open space.*

[i] *Includes only intensive use recreational land.*

[j] *Includes farmed wetlands.*

[k] *Includes landfills and mineral extraction sites.*

Source: SEWRPC

Table 1.3
Existing and Planned 2050 Population, Households, and Employment

County	Planning Analysis Area	Population		Households		Employment	
		Existing (2010)	Planned (2050)	Existing (2010)	Planned (2050)	Existing (2010)	Planned (2050)
Ozaukee	1	7,990	9,690	3,000	3,810	2,840	5,300
	2	18,680	22,790	7,650	9,680	11,350	17,140
	3	32,870	43,180	13,170	17,790	16,560	21,700
	4	26,860	33,440	10,400	13,220	21,750	25,160
	Subtotal	86,400	109,100	34,200	44,500	52,500	69,300
Washington	5	9,070	11,430	3,440	4,620	2,370	2,590
	6	44,380	62,670	17,750	26,710	21,670	28,760
	7	5,660	7,470	2,080	2,710	2,550	2,720
	8	10,830	15,240	4,320	6,220	3,640	5,050
	9	26,890	36,140	10,580	14,710	15,830	22,970
	10	20,000	29,920	7,860	13,050	14,230	21,320
	11	15,050	17,630	5,580	6,280	3,610	3,990
	Subtotal	131,900	180,500	51,600	74,300	63,900	87,400
Milwaukee	12	65,460	66,520	28,430	29,690	43,700	44,780
	13	58,540	60,630	22,350	24,120	38,460	40,080
	14	228,370	230,340	84,810	88,560	68,860	75,100
	15	76,170	85,930	34,660	39,620	44,550	49,140
	16	11,230	18,910	4,940	8,190	72,980	82,510
	17	91,110	94,290	31,200	33,830	54,310	59,700
	18	118,120	117,550	47,710	49,070	53,280	57,070
	19	48,360	58,320	21,340	26,130	56,910	60,980
	20	69,990	71,250	31,180	32,640	48,530	51,490
	21	59,930	63,170	26,850	28,990	28,850	30,520
	22	49,070	51,780	21,760	23,580	22,420	23,870
	23	34,820	48,450	14,200	20,950	23,310	29,110
	24	36,580	44,760	14,180	19,330	19,240	23,350
	Subtotal	947,700	1,011,900	383,600	424,700	575,400	627,700
Waukesha	25	38,580	49,550	15,940	20,850	41,250	46,350
	26	49,620	58,600	19,610	23,390	55,690	65,780
	27	39,590	43,990	16,290	18,890	27,150	34,040
	28	24,140	34,580	9,070	14,060	7,730	13,970
	29	23,020	34,000	8,520	13,630	9,420	14,930
	30	20,160	28,370	8,790	12,580	29,030	34,760
	31	80,000	92,430	31,750	38,290	48,480	57,070
	32	67,440	85,040	25,450	33,450	35,050	47,350
	33	35,800	41,710	13,120	16,050	12,160	20,830
	34	11,550	13,130	4,120	4,710	2,930	3,320
	Subtotal	389,900	481,400	152,700	195,900	268,900	338,400
Racine	35	74,170	76,970	28,620	30,720	37,510	39,520
	36	65,010	84,290	25,790	36,790	25,100	40,330
	37	39,260	46,170	14,490	17,740	15,120	19,270
	38	16,970	20,270	6,750	8,550	10,570	13,180
	Subtotal	195,400	227,700	75,700	93,800	88,300	112,300
Kenosha	39	97,410	112,430	36,710	43,380	45,160	51,340
	40	30,520	58,020	11,420	24,050	17,950	30,090
	41	38,500	67,550	14,520	27,970	11,790	19,870
	Subtotal	166,400	238,000	62,600	95,400	74,900	101,300
Walworth	42	15,040	22,120	5,840	9,130	4,600	6,890
	43	22,170	26,250	8,460	10,910	10,660	12,390
	44	65,020	92,230	25,400	38,860	37,450	50,020
	Subtotal	102,200	140,600	39,700	58,900	52,700	69,300
Region	Total	2,019,900	2,389,200	800,100	987,500	1,176,600	1,405,700

Note: The existing population, household, and employment data presented by planning analysis area in this table is approximated by quarter section, and may differ slightly from data presented in other chapters of this report.

Source: SEWRPC

Map 1.2
VISION 2050 Planning Analysis Areas

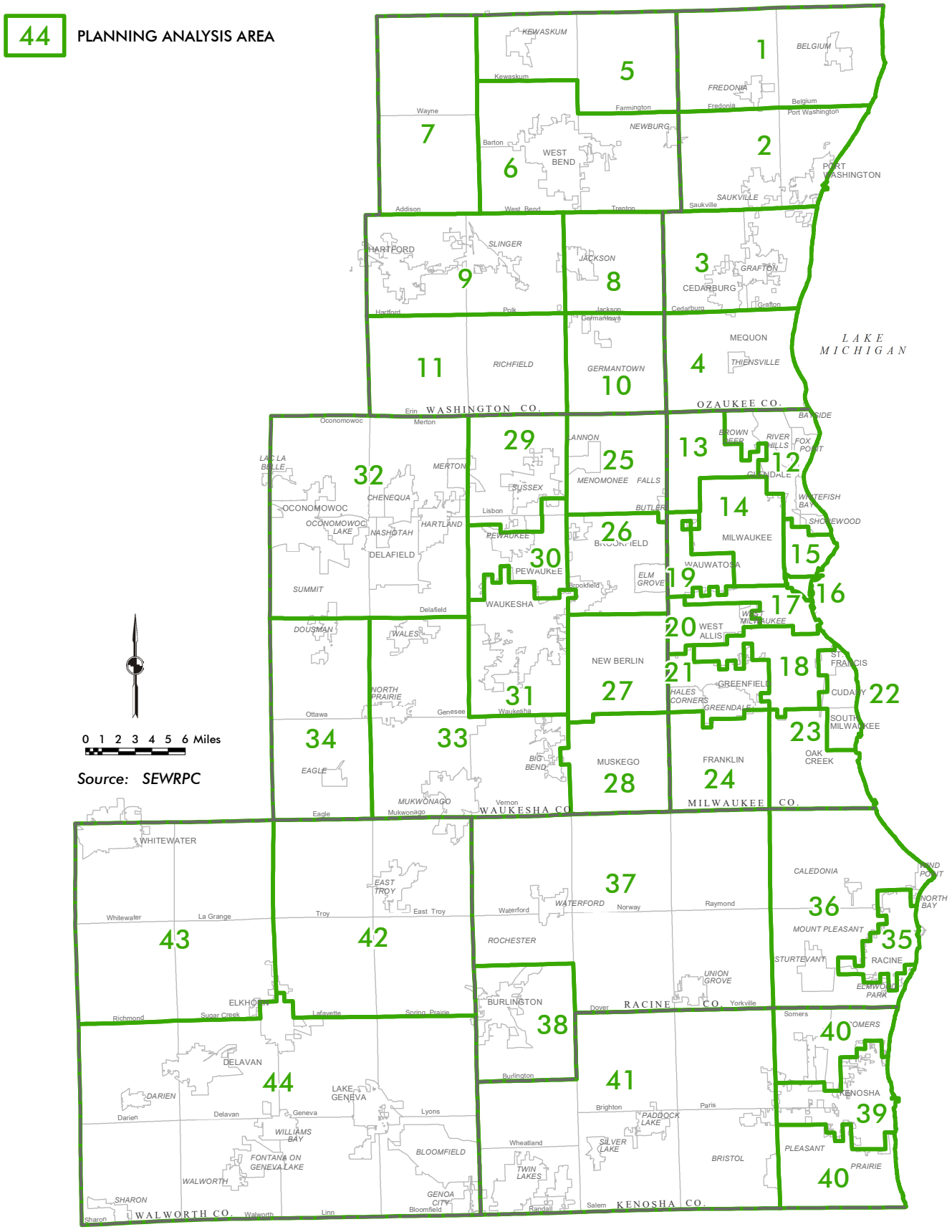

Table 1.4
Forecast Growth in the Region: 2050

	County	Existing (2010)	Intermediate Forecast (2050)	Plan (2050)
Population	Kenosha	166,400	238,000	238,000
	Milwaukee	947,700	976,700	1,011,900
	Ozaukee	86,400	109,100	109,100
	Racine	195,400	227,700	227,700
	Walworth	102,200	140,600	140,600
	Washington	131,900	180,500	180,500
	Waukesha	389,900	481,400	481,400
	Region	2,019,900	2,354,000	2,389,200
Households	Kenosha	62,600	95,400	95,400
	Milwaukee	383,600	409,600	424,700
	Ozaukee	34,200	44,500	44,500
	Racine	75,700	93,800	93,800
	Walworth	39,700	58,900	58,900
	Washington	51,600	74,300	74,300
	Waukesha	152,700	195,900	195,900
	Region	800,100	972,400	987,500
Employment	Kenosha	74,900	101,300	101,300
	Milwaukee	575,400	608,900	627,700
	Ozaukee	52,500	69,300	69,300
	Racine	88,300	112,300	112,300
	Walworth	52,700	69,300	69,300
	Washington	63,900	87,400	87,400
	Waukesha	268,900	338,400	338,400
	Region	1,176,600	1,386,900	1,405,700

Source: U.S. Bureau of the Census and SEWRPC

Population, Household, and Employment Projections

The Commission prepared population, household, and employment projections for the period 2010 to 2050 at the beginning of the VISION 2050 process.[3] As in previous projection efforts, a range of projections were prepared for VISION 2050. This range includes high, intermediate, and low population, household, and employment levels. The high and low projections are intended to provide a range of levels that could conceivably be achieved under significantly higher or lower, but plausible, growth scenarios for the Region. The intermediate projections are considered the most likely to be achieved for the Region. Population would increase from 2,020,000 in 2010 to 2,354,000 in 2050 under the intermediate projection, an increase of 16.5 percent. Households would increase from 800,100 in 2010 to 972,400 in 2050 (21.5 percent increase) and employment would increase from 1,176,600 in 2010 to 1,386,900 in 2050 (17.9 percent increase).

The VISION 2050 land use component has incorporated the eight rapid transit lines and four commuter rail lines recommended in the VISION 2050 transportation component. Consistent with experience nationwide and as envisioned during previous stages of the VISION 2050 process, high-density, TOD would be expected to occur within walking distance of the stations on the rapid transit and commuter rail lines. As a result, total forecast regional population growth from 2010 to 2050 was increased under VISION 2050 from 16.5 percent to 18.3 percent, household growth from 21.5 percent to 23.4 percent, and employment growth from 17.9 percent to 19.4 to account for anticipated growth in the station areas and to maintain the intermediate-growth forecast for portions of the Region outside those station areas. Table 1.4 presents existing, intermediate forecast, and revised forecast population, household, and employment levels by county.

[3] *Projections are discussed in further detail in Chapter 6 of Volume I.*

Residential Development within Urban Service Areas

VISION 2050 recommends focusing residential development within urban service areas that typically include public sanitary sewer and water supply service, parks, schools, and shopping areas. Residential development would occur largely as infill, redevelopment, and new development under the Small Lot Traditional Neighborhood, Mixed-Use Traditional Neighborhood, and Mixed-Use City Center land use categories as shown on Map 1.1. About 96 percent of new households would be located within urban service areas.

➤ Recommendation 1.1: Develop urban service areas with a mix of housing types and land uses

A mix of housing types and land uses would be possible under the Small Lot Traditional Neighborhood, Mixed-Use Traditional Neighborhood, and Mixed-Use City Center land use categories. VISION 2050 recommends that local governments in urban service areas include these land use categories in their comprehensive plans as shown on Map 1.1. The community's zoning and land division ordinances should be consistent with its comprehensive plan. This would allow for the development of multi-family housing and single-family homes on smaller lots (one-quarter acre or less) that tend to be more affordable to a wider-range of households than single-family homes on larger lots. This would also encourage the development and redevelopment of walkable neighborhoods by allowing housing in proximity to a mix of uses, such as parks, schools, and businesses.

➤ Recommendation 1.2: Focus TOD near rapid transit and commuter rail stations

VISION 2050 recommends TOD in areas surrounding rapid transit and commuter rail stations recommended under the transportation component of VISION 2050. Rapid transit and commuter rail are described in more detail under Recommendations 2.1 and 2.2, respectively. Residential development within TODs should occur largely in multi-family buildings or buildings with a mix of uses such as commercial-retail space on the ground floor and dwellings on upper floors. Some buildings may have a mix of commercial-retail space on the ground floor with office space on upper floors. Public plazas, parks, and other governmental and institutional uses may also be incorporated into TOD. Streets and sidewalks within TODs should provide convenient and safe access for walking and bicycling to the transit station.

A Transit-Oriented Development
Source: SEWRPC

TOD is a focus of VISION 2050 because it supports healthy communities, mobility, and revitalization of urban areas. Despite these benefits, concern regarding the potential for gentrification and displacement of low-income households was expressed during VISION 2050 public outreach activities. Table 1.5 includes strategies for mixed-income housing in TODs. Local governments with recommended rapid transit or commuter rail stations should incorporate these strategies into their land use policies. TOD design guidelines are included in Appendix K.

Table 1.5
Mixed-Income Housing Strategies for TOD

Strategy	Description
Density Bonus	A density bonus is a flexible zoning regulation that allows additional residential units beyond the maximum for which a parcel is zoned in exchange for providing or preserving affordable housing units. Several local governments in the Region have adopted planned unit development (PUD) ordinances that allow for increased density as an incentive to provide public amenities. Local governments with rapid transit or commuter rail stations should develop density bonus programs or update existing PUD regulations to allow for increased density as an incentive for mixed-income housing.
Parking Regulations	Reducing the amount of required parking can lower construction costs for residential projects, and possibly be used as an incentive for including affordable housing units. A Transit Cooperative Research Program review of TOD case studies[a] found that personal vehicle trip generation was lower and transit use was higher than average for residents of TODs with high quality transit service. The study found that the parking-to-housing-unit ratios could be lowered as much as 50 percent in TODs that have good transit connectivity to major employment centers. Lower parking ratios could result in an increase of 20 to 33 percent in the number of housing units and lower total construction costs, even with the additional units. Local governments should review parking-to-housing-unit ratio requirements for residential buildings, and consider alternatives such as shared parking with other uses in station areas.
Public/Private Partnerships	Public/private partnerships can be used as an incentive for developing mixed-income housing TOD through a number of options. Tax increment financing (TIF) can be used to publicly fund infrastructure such as parks, parking structures, and streetscape elements to encourage development. In addition, local governments can streamline rezoning and permitting processes. Land assembly and brownfields may also be issues within urban centers. Local governments can assist developers with land assembly and obtaining brownfield mitigation grants.
Targeted Funding	Government funding for affordable housing could be targeted to areas with rapid transit and commuter rail stations to encourage mixed-income TOD. An example would be to create a scoring category for the State (WHEDA) Qualified Allocation Plan that would provide an incentive to locate Low-Income Housing Tax Credit (LIHTC) developments in station areas.

[a] *Transit Cooperative Research Program Report 128.*

Source: SEWRPC

➤ Recommendation 1.3: Focus new urban development in areas that can be efficiently served by essential municipal facilities and services

VISION 2050 is a systems level plan that includes generalized boundaries for urban service areas, which are shown on Map 1.3.[4] Urban service areas include public sanitary sewer service. In addition, they typically include public water supply, parks, schools, and shopping areas. Urban services can be extended and provided to compact development in a more efficient and cost-effective manner than to lower-density development. Local government land use policies should allow development as recommended under Recommendation 1.1 to facilitate efficient and cost-effective provision of services to urban development. It is recommended that local governments consider limiting new development in the Medium Lot Neighborhood[5] and Large Lot Neighborhood[6] land use categories to existing vacant lots, as infill development in existing neighborhoods with similar residential densities, or where commitments have been made to such development through approved subdivision plats or certified survey maps.

Residential Development Outside Urban Service Areas

VISION 2050 recommends residential development outside urban service areas occur in the Rural Estate land use category using cluster subdivision design. About 4 percent of new households would be located outside urban service areas.

[4] *Table 1.6 presents area and population served with public sanitary sewer and water in 2010 and recommended to be served under VISION 2050.*

[5] *Primarily single-family homes on quarter- to half-acre lots.*

[6] *Primarily single-family homes on one-acre lots.*

Map 1.3
Planned Public Sanitary Sewer and Water Supply Service Areas: VISION 2050

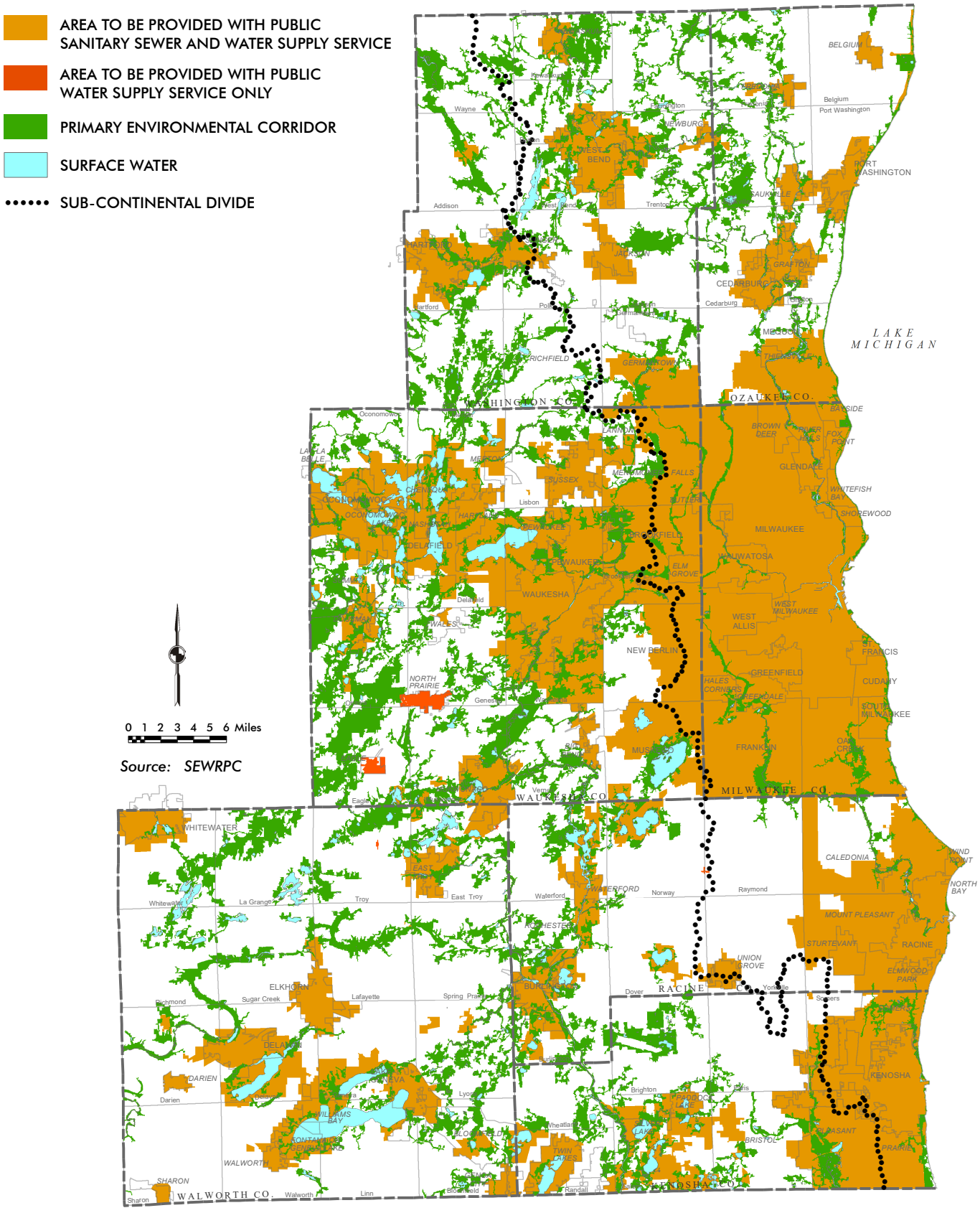

Table 1.6
Area and Population Served by Public Sanitary Sewer and Public Water: 2010 and 2050

		Area				Population			
		2010		2050		2010		2050	
	County	Square Miles	Percent	Square Miles	Percent	Population	Percent	Population	Percent
Public Sanitary Sewer	Kenosha	45.8	16.5	63.2	22.7	150,200	90.3	227,500	95.6
	Milwaukee	198.7	81.9	206.1	84.9	947,000	99.9	1,011,900	100.0
	Ozaukee	33.3	14.1	40.2	17.1	67,800	78.5	94,500	86.6
	Racine	57.0	16.7	67.5	19.8	176,100	90.1	210,200	92.3
	Walworth	30.3	5.3	40.8	7.1	70,500	69.0	111,500	79.3
	Washington	29.1	6.7	40.4	9.3	84,300	63.9	130,900	72.5
	Waukesha	130.3	22.4	154.1	26.5	301,100	77.2	425,600	88.4
	Region	524.5	19.5	612.3	22.8	1,797,000	89.0	2,212,100	92.6
Public Water	Kenosha	34.7	12.5	52.1	18.7	125,800	75.6	190,800	80.2
	Milwaukee	187.3	77.2	194.7	80.2	938,400	99.0	1,011,900	100.0
	Ozaukee	23.4	9.9	30.3	12.9	55,800	64.6	79,800	73.1
	Racine	44.3	13.0	54.8	16.1	154,900	79.3	182,400	80.1
	Walworth	24.4	4.2	34.9	6.1	63,400	62.0	100,800	71.7
	Washington	27.1	6.2	38.4	8.8	80,100	60.7	125,200	69.4
	Waukesha	102.6	17.7	126.4	21.8	261,500	67.1	374,900	77.9
	Region	443.8	16.5	531.6	19.8	1,679,900	83.2	2,065,800	86.5

Source: SEWRPC

➤ Recommendation 1.4: Use cluster subdivision design in residential development outside urban service areas

VISION 2050 recommends that the demand for homes in an open space setting be accommodated on a limited basis through Rural Estate development where there would be no more than one home per five acres. Residential development at this density can accommodate future demand for living in an open space setting while minimizing impacts on the natural resource and agricultural base, maintaining rural character, and avoiding excessive demands on rural public facility and service systems, especially when cluster subdivision design is used. Local and county government land use policies should allow cluster subdivision design with no more than one acre of residential land (house and yard area) for each dwelling while maintaining an overall density of one home per five acres. Design guidelines to implement cluster subdivision design are included in Appendix K.

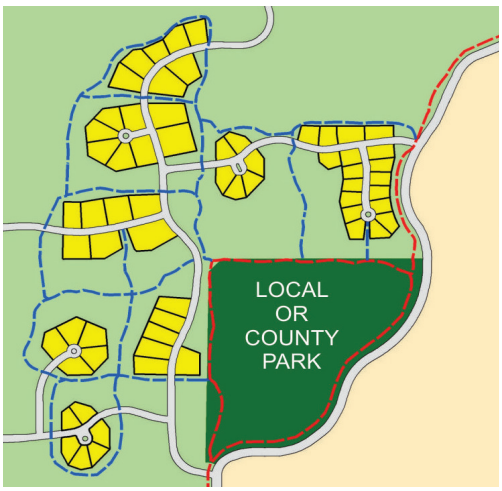

Illustration of Cluster Subdivision Design
Source: SEWRPC

➤ Recommendation 1.5: Limit low-density development outside urban service areas

Large Lot Neighborhood and Large Lot Exurban[7] residential development outside urban service areas is neither truly urban nor rural in character. Development of this nature generally precludes the provision of centralized

[7] *Single-family homes on one and a half-acre to just under five-acre lots.*

sewer and water supply service and other urban amenities. VISION 2050 does recognize existing commitments to this type of development even though such development is not consistent with VISION 2050 objectives. This results in a small portion of the planned households in the Region allocated to accommodate Large Lot Neighborhood and Large Lot Exurban development outside urban service areas where there are approved subdivision plats and certified survey maps. VISION 2050 recommends that local and county government land use policies limit Large Lot Neighborhood and Large Lot Exurban development beyond urban service areas to commitments to such development made during the VISION 2050 planning process. VISION 2050 also recommends limiting other development beyond urban service areas to highway-oriented business, utility, and recreational uses.

Commercial and Industrial Land

VISION 2050 recommends focusing new commercial and industrial development within urban service areas as infill, redevelopment, and new development.

➤ **Recommendation 1.6: Provide a mix of housing types near employment-supporting land uses**

Commercial land and business parks should be developed in mixed-use settings where compatible, or near a mix of housing types to avoid job-worker mismatches. Local government land use policies should allow a mix of housing types and land uses as recommended under Recommendations 1.1 and 1.2 to promote accessibility between housing and jobs.

➤ **Recommendation 1.7: Encourage and accommodate economic growth**

Major economic activity centers are defined as areas containing concentrations of commercial and/or industrial land with at least 3,500 employees or 2,000 retail employees. A total of 61 centers have been identified that have either reached major center status or are anticipated to by 2050 based on existing employment and input from local governments (see Map 1.4). VISION 2050 recommends continued development of major economic activity centers to encourage economic growth, including a focus on developing and redeveloping long-established major centers. In addition, local government land use policies should allow a mix of housing types as recommended under Recommendations 1.1 and 1.2 near major economic activity centers to promote accessibility between housing and jobs.

Governmental and Institutional Land

VISION 2050 recommends that new governmental and institutional developments, such as schools and libraries, be provided to meet the needs of the Region's planned population. VISION 2050 also envisions a system of major governmental and institutional centers throughout the Region, including: county courthouses and administrative offices, State and Federal office buildings, medical complexes,[8] universities,[9] technical colleges, and major cultural centers. These major centers are shown on Map 1.5.

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[8] *Includes medical centers with 600 or more beds.*

[9] *Includes institutions with accredited bachelor's degree programs that have a total enrollment of 4,500 or more students.*

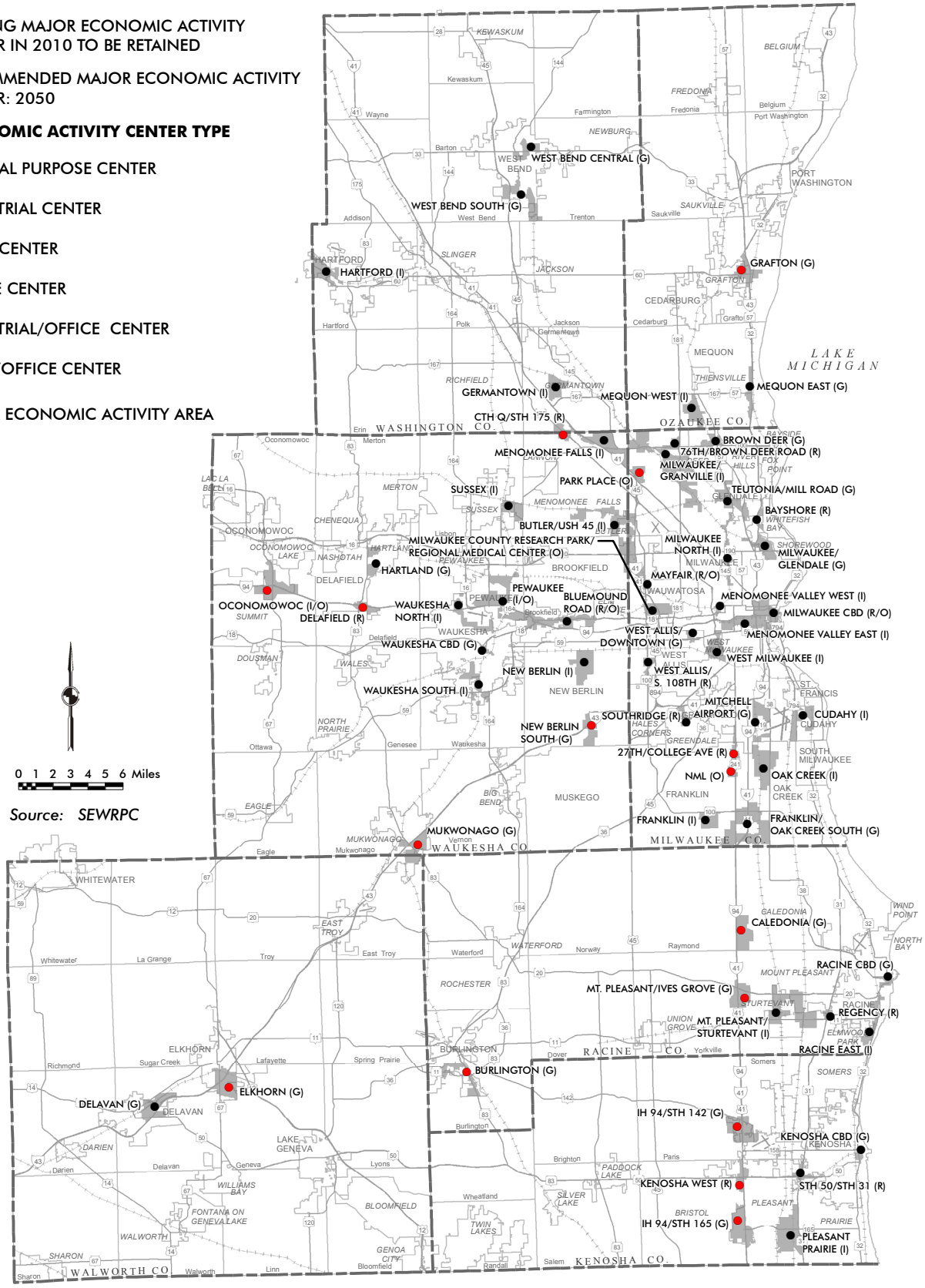
Map 1.4
Major Economic Activity Centers: VISION 2050

- ● EXISTING MAJOR ECONOMIC ACTIVITY CENTER IN 2010 TO BE RETAINED
- ● RECOMMENDED MAJOR ECONOMIC ACTIVITY CENTER: 2050

MAJOR ECONOMIC ACTIVITY CENTER TYPE

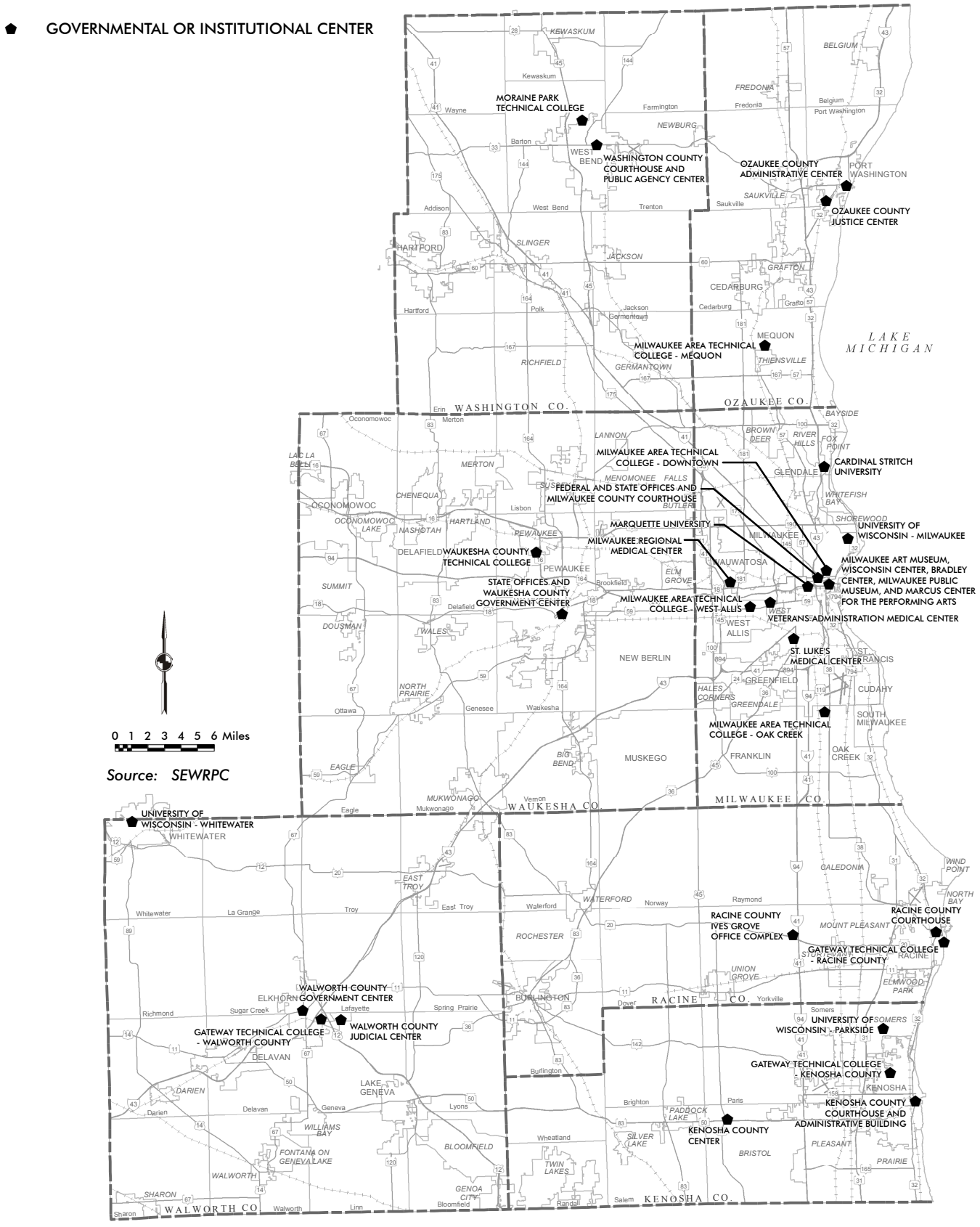
G	GENERAL PURPOSE CENTER
I	INDUSTRIAL CENTER
R	RETAIL CENTER
O	OFFICE CENTER
I/O	INDUSTRIAL/OFFICE CENTER
R/O	RETAIL/OFFICE CENTER

MAJOR ECONOMIC ACTIVITY AREA



Source: SEWRPC

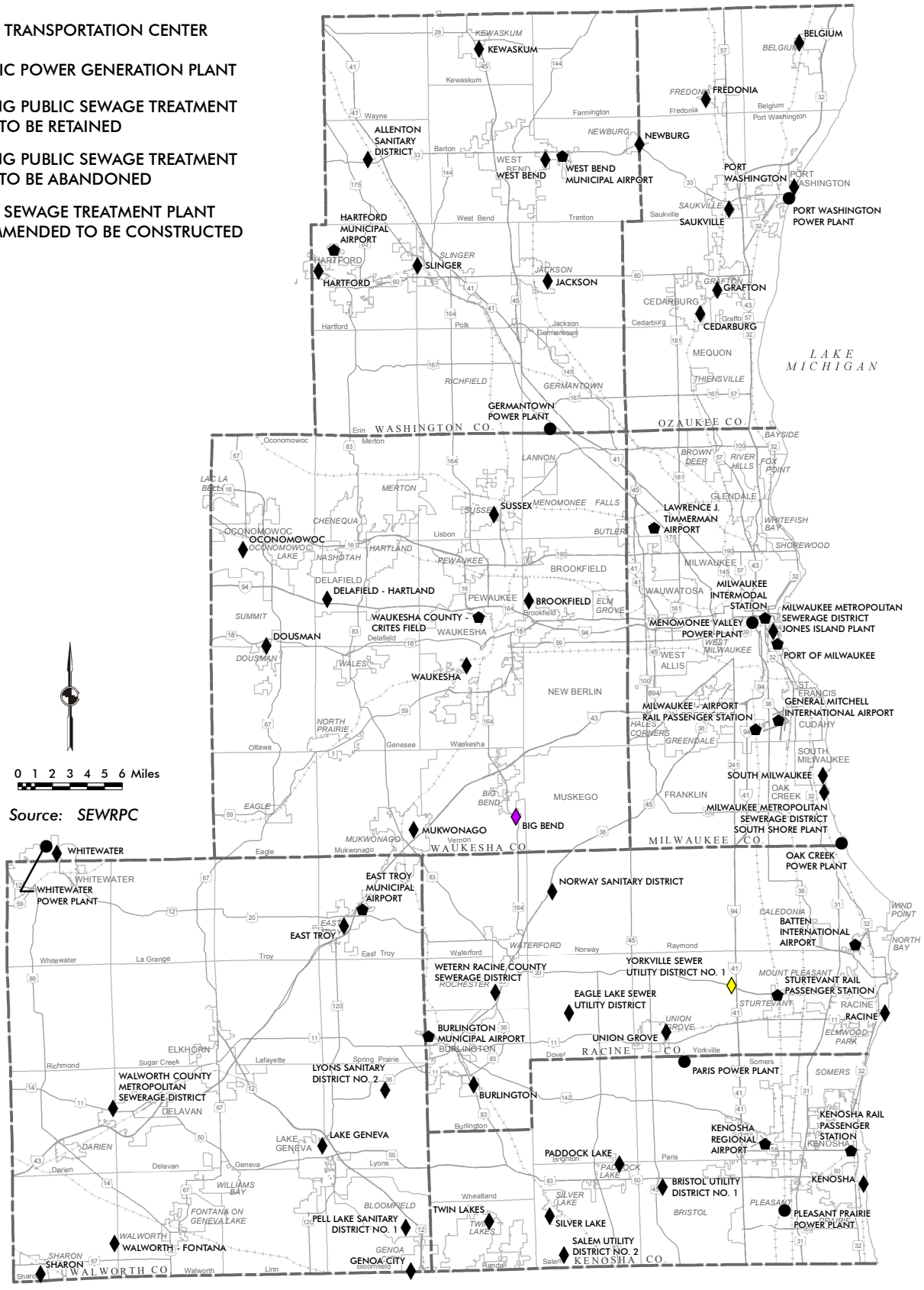
Map 1.5
Major Governmental and Institutional Centers: VISION 2050



Source: SEWRPC

Map 1.6
Major Transportation and Utility Centers: VISION 2050

- MAJOR TRANSPORTATION CENTER
- ELECTRIC POWER GENERATION PLANT
- EXISTING PUBLIC SEWAGE TREATMENT PLANT TO BE RETAINED
- EXISTING PUBLIC SEWAGE TREATMENT PLANT TO BE ABANDONED
- PUBLIC SEWAGE TREATMENT PLANT RECOMMENDED TO BE CONSTRUCTED



➤ **Recommendation 1.8: Provide new governmental and institutional developments in mixed-use settings**

VISION 2050 recommends that new governmental and institutional uses occur in mixed-use settings to the greatest extent possible to be accessible to the greatest number of residents possible.

Transportation, Communication, and Utility Land

VISION 2050 envisions that land devoted to transportation, communication, and utilities will increase due to land needed for streets and highways, airport expansions, and utility facilities. Major transportation and utility centers envisioned under VISION 2050 are shown on Map 1.6.

Recreational Land

VISION 2050 recommends an expansion of recreational land based on park site acquisition and development proposals set forth in county and local park and open space plans and the neighborhood parks attributable to new urban development. VISION 2050 also envisions a system of 32 major parks of regional size and significance as shown on Map 1.7.[10] Major parks have an area of at least 250 acres and provide opportunities for a variety of resource-oriented outdoor recreational activities. Map 1.7 also shows major special-use outdoor recreation and nature study sites.[11]

➤ **Recommendation 1.9: Provide neighborhood parks in developing residential areas**

VISION 2050 recommends reserving land for parks as new residential neighborhoods are developed within urban service areas (design guidelines are included in Appendix K).

Environmentally Significant Land

VISION 2050 recommends minimizing the impacts of new development on environmentally significant lands. New urban development should avoid environmentally significant lands, particularly primary environmental corridors. To the extent possible, new urban development should also avoid secondary environmental corridors and isolated natural resource areas. In addition, to the extent possible, new development should attempt to preserve other wetlands, woodlands, natural areas, critical species habitat sites, and park and open space sites outside environmental corridors.[12]

➤ **Recommendation 1.10: Preserve primary environmental corridors**

The most important elements of the natural resource base of the Region, including the best remaining woodlands, wetlands, prairies, wildlife habitat, surface water and associated shorelands and floodplains, park and open space sites, scenic views, and natural areas and critical species habitat sites, occur in linear patterns in the landscape termed environmental corridors. The most important of these have been identified as primary environmental corridors, which are at least two miles long,

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[10] The sites in Milwaukee County identified as "Lake Michigan North" and "Lake Michigan South" on Map 1.7 refer to clusters of parks along the Lake Michigan shoreline. Lake Michigan North includes Back Bay, Juneau, Lake, McKinley, O'Donnell, and Veterans County Parks; Bradford Beach; and Lakeshore State Park. Lake Michigan South includes Bay View, Grant, Sheridan, South Shore, and Warnimont County Parks.

[11] Major nature sites are public or private sites, other than sites identified as regional park sites, that are at least 100 acres in size and that have, or are proposed to have, an indoor interpretive nature center.

[12] The different types of environmentally significant lands are defined in Chapter 2 of Volume I and the design guidelines presented in Appendix K.

Map 1.7
Major Outdoor Recreation Centers: VISION 2050

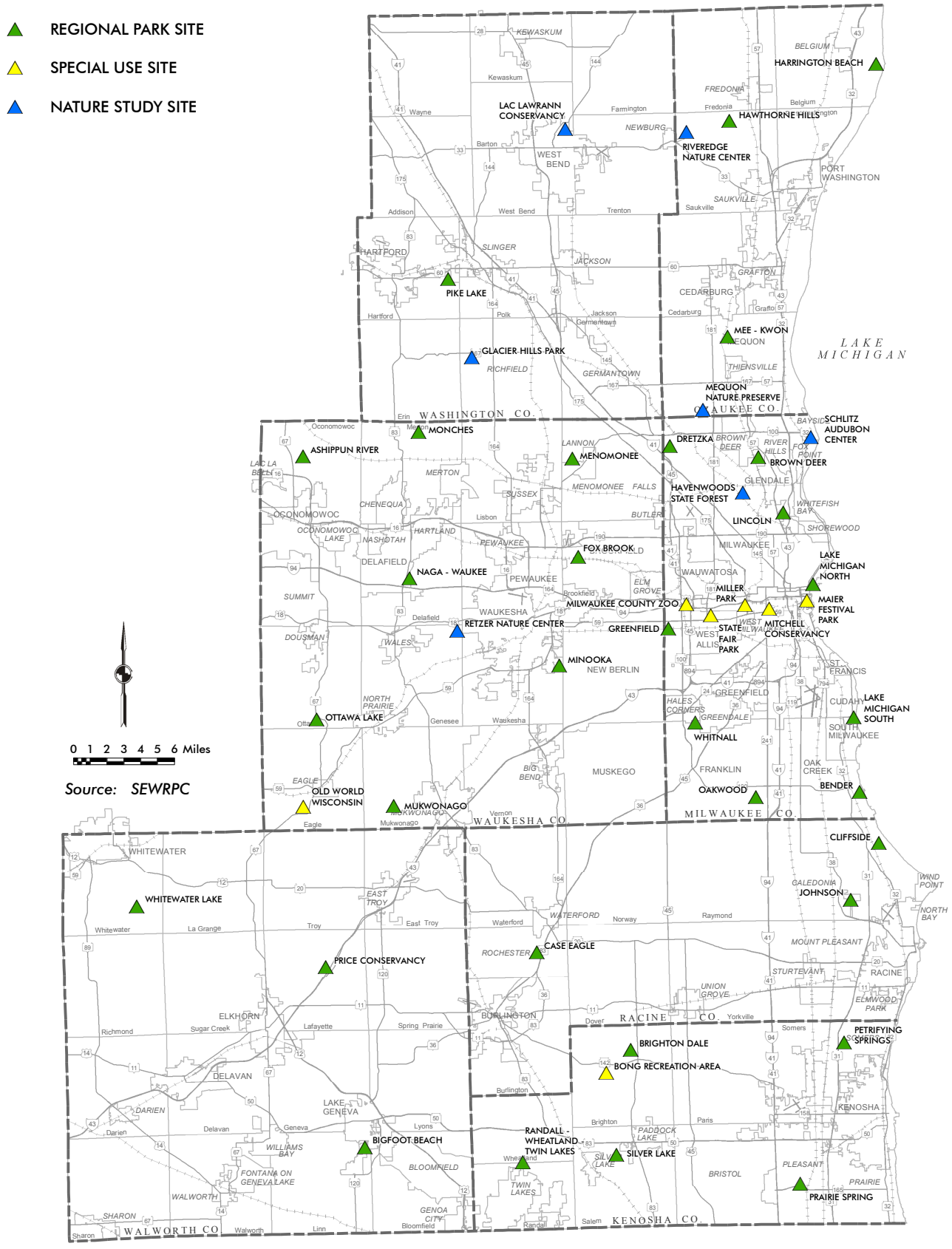

Table 1.7
Existing and Planned Environmental Corridors and Isolated Natural Resource Areas in the Region: 2010 and 2050

	County	2010		Planned Increment		2050	
		Square Miles	Percent of Total	Square Miles	Percent of Total	Square Miles	Percent of Total
Primary Environmental Corridors	Kenosha	45.1	9.3	1.9	4.2	47.0	9.5
	Milwaukee	15.5	3.2	2.2	14.2	17.7	3.6
	Ozaukee	33.8	7.0	0.2	0.6	34.0	6.9
	Racine	36.9	7.6	1.2	3.3	38.1	7.7
	Walworth	106.3	22.0	-1.0	-0.9	105.3	21.4
	Washington	97.6	20.2	1.4	1.4	99.0	20.1
	Waukesha	148.8	30.7	3.3	2.2	152.1	30.8
	Region	484.0	100.0	9.2	1.9	493.2	100.0
Secondary Environmental Corridors	Kenosha	10.6	13.4	0.4	3.8	11.0	13.7
	Milwaukee	5.7	7.2	-0.6	-10.5	5.1	6.3
	Ozaukee	8.4	10.6	0.6	7.1	9.0	11.2
	Racine	11.2	14.2	1.0	8.9	12.2	15.1
	Walworth	14.8	18.8	-0.1	-0.7	14.7	18.3
	Washington	16.2	20.5	0.3	1.9	16.5	20.5
	Waukesha	12.1	15.3	-0.1	-0.8	12.0	14.9
	Region	79.0	100.0	1.5	1.9	80.5	100.0
Isolated Natural Resource Areas	Kenosha	6.5	9.3	--	--	6.5	9.4
	Milwaukee	3.7	5.3	-0.1	-2.7	3.6	5.2
	Ozaukee	6.3	9.1	-0.2	-3.2	6.1	8.8
	Racine	13.2	19.0	0.2	1.5	13.4	19.3
	Walworth	14.4	20.7	0.3	2.1	14.7	21.2
	Washington	11.3	16.2	-0.1	-0.9	11.2	16.2
	Waukesha	14.2	20.4	-0.4	-2.8	13.8	19.9
	Region	69.6	100.0	-0.3	-0.4	69.3	100.00

Source: SEWRPC

200 feet wide, and 400 acres in size. They are typically located along major stream valleys, along the Lake Michigan shoreline, or around major lakes. VISION 2050 recommends limiting development within the primary environmental corridors to essential transportation and utility facilities and compatible outdoor recreation facilities. Rural Estate residential development in upland corridors could also occur. Cluster subdivision design should be used if such development does occur (design guidelines are discussed in Chapter 3 of this volume and Appendix K). Local and county government land use polices, including comprehensive plans and land use ordinances, should incorporate this recommendation and related design guidelines. Planned primary environmental corridors are shown on Map 1.1 and existing primary environmental corridors are shown on Map 2.22 in Chapter 2 of Volume I. Table 1.7 shows that planned primary environmental corridors would encompass 493 square miles in 2050, which is an increase of about 2 percent over the existing area (2010).[13]

[13] *Primary environmental corridor delineations include certain farmed floodplains and other lands that are expected to revert to more natural conditions over time, eventually becoming part of the adjacent environmental corridors as envisioned in local sewer service area plans and local and county comprehensive plans. The delineation of primary environmental corridors was modified on Map 1.1 to reflect re-establishment of natural resource features resulting from such restorations. VISION 2050 also supports planned efforts to restore other farmland and open space to more natural conditions that result in the re-establishment of wetlands, woodlands, prairies, grasslands, and forest interiors.*

➤ Recommendation 1.11: Preserve secondary environmental corridors and isolated natural resource areas

Other concentrations of natural resources have been identified as secondary environmental corridors or isolated natural resources areas. Secondary environmental corridors contain a variety of resource features and are at least one mile long and 100 acres in area. Isolated natural resource areas are concentrations of natural resources of at least five acres in size that have been separated from the environmental corridor network by urban or agricultural use. Existing secondary environmental corridors and isolated natural resource areas are shown on Map 2.22 in Chapter 2 of Volume I. It is recommended that local governments consider preserving secondary environmental corridors as natural, open space; or as drainage ways, stormwater detention or retention areas, or as local parks or recreation trails in developing areas. It is also recommended that local governments consider preserving isolated natural resource areas in natural open uses insofar as practicable, including incorporation as parks, protected open space, or for use as stormwater detention or retention areas where appropriate, as determined in local plans.

➤ Recommendation 1.12: Preserve natural areas and critical species habitat sites

A comprehensive inventory of the Region's natural areas and critical species habitat sites[14] was conducted as part of the regional natural areas and critical species habitat protection and management plan. The vast majority of natural areas and critical species habitat sites are located within environmental corridors and isolated natural resource areas. VISION 2050 recommends preserving all identified natural areas and critical species habitat sites.

Agricultural Land

VISION 2050 recommends minimizing the impacts of new development on productive agricultural land, including highly productive Class I and II soils (prime agricultural land) as classified by the U.S. Natural Resources Conservation Service. Some Class I and II farmland located in the vicinity of existing urban service areas may be converted to urban use as a result of planned expansion of those urban service areas to accommodate efficient regional growth. Also, as previously discussed, a small amount of residential development is anticipated outside planned urban service areas. A total of 1,097 square miles would remain in agricultural use under VISION 2050, which is 95 percent of the existing area.

➤ Recommendation 1.13: Preserve productive agricultural land

VISION 2050 recommends a compact urban development pattern that would minimize the conversion of agricultural land to urban uses, including prime agricultural lands and other productive agricultural lands. Local and county government land use policies should incorporate VISION 2050 recommendations, which include:

- A compact development pattern for urban service areas
- Cluster subdivision design to minimize the impact of Rural Estate development on agricultural land

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[14] *Natural areas are tracts of land or water that contain plant and animal communities believed to be representative of the pre-European settlement landscape. Critical species habitat sites are other areas that support endangered, threatened, or rare plant or animal species.*

- Limiting Large Lot Neighborhood and Large Lot Exurban development beyond urban service areas to commitments to such development made during the VISION 2050 planning process

➤ Recommendation 1.14: Protect productive agricultural land through farmland preservation plans

The Wisconsin Farmland Preservation law (Chapter 91 of the *Wisconsin Statues*) requires counties to update their farmland preservation plans as one of the conditions for continued landowner participation in the Farmland Preservation tax credit program. Kenosha, Ozaukee, Racine, Walworth, Washington, and Waukesha Counties have prepared and adopted farmland preservation plans that have been certified by the Wisconsin Department of Agriculture, Trade, and Consumer Protection. Each plan identifies land to preserve for agricultural and agricultural-related uses, which is shown on Map 3.7 in Chapter 3 of Volume I. Farmland preservation areas may not include any areas that are planned for nonagricultural development within 15 years after the date the plan is adopted. Farmland preservation areas must be placed in a farmland preservation zoning district that is consistent with the farmland preservation plan. VISION 2050 recommends continued agricultural use in these areas. Therefore, no incremental development was allocated to farmland preservation areas identified in county farmland preservation plans outside planned urban service areas under VISION 2050.

➤ Recommendation 1.15: Develop a regional food system

VISION 2050 recognizes the relationship between the Region's urban centers and agricultural resources. The compact development pattern recommended by VISION 2050 would help to preserve agricultural land. In addition, the Region's urban centers provide a market for agricultural products from the Region. VISION 2050 also recognizes the need to make healthy foods accessible in all areas of the Region. A number of census tracts in the Region with concentrations of low-income households are "food deserts," which the U.S. Department of Agriculture defines as an area where residents are more than one mile from a large supermarket or grocery store.[15] VISION 2050 recommends developing a regional food system that connects food producers, distributors, and consumers to ensure access to healthy foods throughout the entire Region. In addition to encouraging supermarkets and grocery stores near residential areas, local government land use policies should consider allowing urban agriculture, such as community gardens on vacant lots and vertical farming. Local governments should also support farmers markets as an alternative source of healthy foods. There are a number of organizations in the Region that could partner with local governments to better connect food production, distribution, and land use policy.

Water Supply

The residential, commercial, industrial, institutional, and agricultural land uses in the Region rely on two major sources of water supply: surface water supply primarily from Lake Michigan, and groundwater supplied from both deep and shallow aquifer systems. Groundwater is susceptible to depletion in quantity and deterioration in quality as a result of urban and rural development, and diversion of Lake Michigan water west of the subcontinental divide that bisects the Region is constrained by the Great Lakes Compact. The Commission recognizes the relationship between land

[15] *At least 500 people or 33 percent of the census tract's population must reside more than one mile from a supermarket or large grocery store in an urban area and 10 miles in a rural area.*

use planning and water supply and has prepared and adopted a regional water supply plan in response.

The year 2035 regional land use plan served as the basis for the regional water supply plan. It was indicated at the beginning of the water supply planning effort that the land use plan would be amended if water resource constraints were identified due to the development pattern recommended under the land use plan. The water supply planning effort found that water supply would not be a limiting factor within the Region with respect to the recommended development pattern either east or west of the subcontinental divide. The water supply plan also found that implementation of the recommended development pattern would have benefits, such as preserving areas with high groundwater recharge potential. This is due to the focus of the year 2035 land use plan on infill, redevelopment, and compact development within planned urban service areas. It should be noted that the forecast population under the year 2035 plan of 2,276,000 residents is about 95 percent of the forecast population under VISION 2050 (2,389,200 residents) and the forecast employment under the year 2035 plan of 1,368,300 jobs is about 97 percent of the forecast employment under VISION 2050 (1,405,700 jobs). Therefore, the regional water supply plan conclusion that water supply would not be a limiting factor within the Region with respect to the development pattern recommended under the year 2035 regional land use plan also applies to VISION 2050.

- **Recommendation 1.16: Preserve areas with high groundwater recharge potential**

  VISION 2050 land use recommendations carry forward the focus on infill, redevelopment, and compact development within planned urban service areas embodied in the year 2035 regional land use plan. The VISION 2050 development pattern would result in about 96 percent of areas with high or very high groundwater recharge potential remaining in open space or agricultural use. Areas with high or very high groundwater recharge potential are shown on Map 2.19 in Chapter 2 of Volume I. Design guidelines for areas with high groundwater charge potential are included in Appendix K.

Sustainable Land Use

Sustainable land use concepts relate to arranging land uses and site features to protect natural resources, and avoid converting productive agricultural land and other rural areas to urban use. VISION 2050 recommendations embody sustainable land use concepts through higher-density, mixed-use development/redevelopment in compact urban service areas. In addition to preserving natural and agricultural resources, compact, mixed-use development promotes healthy communities through opportunities for more travel by transit, walking, and bicycling. Compact development is also more energy efficient and results in less greenhouse gas emissions than lower density development. In addition, the cost of extending and maintaining sewer pipes, water mains, and local roads, and providing fire protection, school transportation, and solid waste collection all decrease as density increases.

- **Recommendation 1.17: Manage stormwater through compact development and sustainable development practices**

  The compact development pattern recommended by VISION 2050 would minimize impervious surface coverage of new development in the Region. Additional sustainable development measures can be used to increase stormwater infiltration and reduce negative impacts on water quality,

such as green roofs, porous pavement, rain gardens, and biofiltration and infiltration facilities. VISION 2050 recommends that local and county governments incorporate the VISION 2050 land use recommendations into their land use policies to minimize the amount of impervious surface in the Region. Local and county governments should also encourage sustainable development practices, which are described in the design guidelines included in Appendix K.

➤ **Recommendation 1.18: Target brownfield sites for redevelopment**
VISION 2050 recommends that local governments target brownfield sites for cleanup and redevelopment as a key element in planning for the revitalization of urban areas. Tools such as Tax Increment Financing (TIF) and State and Federal brownfield remediation grants and loans may assist in these efforts.

1.3 PART II: RECOMMENDED TRANSPORTATION COMPONENT

The transportation component of VISION 2050 includes the following six elements: public transit, bicycle and pedestrian, transportation systems management, travel demand management, arterial streets and highways, and freight transportation. Each element is described below, including specific plan recommendations. A financial analysis of the VISION 2050 transportation component is also described below, including identification of anticipated funding gaps related to implementing plan recommendations and potential revenue sources to achieve the full plan.

The transportation component largely satifies the federal metropolitan are transportation planning requirements under the Fixing America's Surface Transportation Act (FAST Act). Requirements that are not satisfied will be met through additional work to be completed following the completion of VISION 2050.[16]

Description of Public Transit Element
The public transit element of VISION 2050 recommends a significant improvement and expansion of public transit in Southeastern Wisconsin, including four commuter rail lines, eight rapid transit lines, and significantly expanded local bus, express bus, commuter bus, and shared-ride taxi services. Map 1.8 displays the routes and areas served by the various components of the recommended transit element. Altogether, service on the regional transit system would be increased from service levels existing in 2014 by about 117 percent measured in terms of revenue transit vehicle-hours of service provided, from about 4,750 vehicle-hours of service on an average weekday in the year 2014 to 10,310 vehicle-hours of service in the year 2050 (see Table 1.8). The recommended service improvements and expansion include expansion of service area and hours, and significant improvements in the frequency of service. Table 1.9 shows the span of service hours and frequencies under VISION 2050.

The recommended expansion of public transit discussed in the following pages would have significant costs to the Region's taxpayers, and is not recommended without due consideration of the increased public revenue that would be required to build and operate this investment. However, the

[16] *Following VISION 2050, the Commission staff will work with US DOT staff to ensure that performance management requirements in the FAST Act are fully addressed, as well as prepare updated congestion management process in accordance with FAST Act*

Figure 1.2
Transportation System Definitions

The recommended VISION 2050 transportation system is comprised of different types of transportation investment, with some of the key types defined and illustrated below.

Local Transit
Lower-speed routes with closely spaced stops, primarily with buses (or streetcars) operating over arterial and collector streets and in mixed traffic (could also be shared-ride taxi)

Express Transit
Limited-stop, higher-speed routes, with buses operating in mixed traffic or in reserved street lanes and stops typically spaced every ½ to one mile

Rapid Transit
Either bus rapid transit (BRT) or light rail transit lines, with vehicles operating in exclusive lanes and using signal priority or preemption, and stations typically spaced every ½ to one mile

Commuter Transit
Longer-distance routes or lines, with either buses operating on freeways or rail vehicles operating in a rail corridor (i.e. commuter rail) and stops or stations typically spaced every three to five miles

On-street Bicycle Facility
Accommodations for bicycles provided on surface arterial streets, with either standard facilities (bicycle lanes, paved shoulders, and widened outside travel lanes) or enhanced facilities

Off-street Bicycle Path
Separate from motor vehicle traffic and typically developed in former railway rights-of-way and parkway corridors

Enhanced Bicycle Facility
On-street bicycle facilities that go beyond the standard facilities to provide a comfort level similar to off-street paths, with examples including protected bicycle lanes, buffered bicycle lanes, raised bicycle lanes, and a separate path within a road's right-of-way

Surface (or Standard) Arterial Street
Major streets with primarily at-grade intersections that may also provide direct access through driveways

Freeway
Divided arterial highway with full access control and grade separations (over- and under-passes) at all interchanges, providing the highest degree of mobility

Rapid Transit in Portland
Source: SEWRPC staff

Off-street Bicycle Path in Ozaukee County
Source: Wisconsin Bike Federation

Enhanced Bicycle Facility in Washington, D.C.
Source: Stewart Eastep

Freeway in Milwaukee
Source: SEWRPC

Surface Arterial Street in Racine
Source: SEWRPC

Map 1.8
Transit Services: VISION 2050

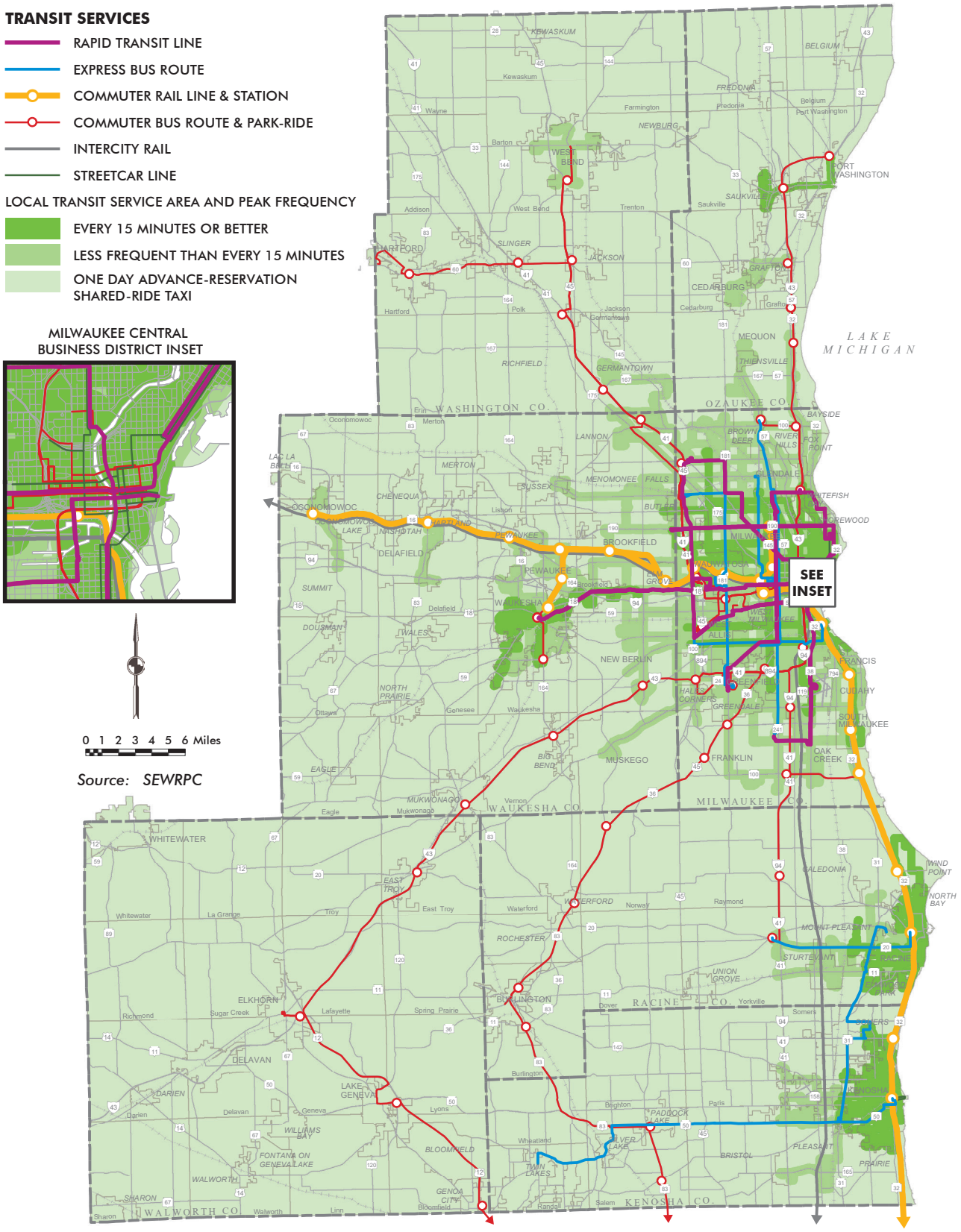


Table 1.8
Fixed-Route Public Transit Service Levels: VISION 2050

Average Weekday Transit Service Characteristics	Existing (2014)	Plan (2050)
Revenue Vehicle-Hours		
Rapid Transit	- -	1,170
Commuter Rail	0	190
Commuter Bus	270	990
Express Bus	500	830
Local Transit	3,980	7,130
Total	4,750	10,310
Revenue Vehicle-Miles		
Rapid Transit	- -	23,500
Commuter Rail	100	8,200
Commuter Bus	5,800	24,300
Express Bus	6,300	12,100
Local Transit	48,200	84,100
Total	60,400	152,200

Source: SEWRPC

significant improvement and expansion of public transit is essential for Southeastern Wisconsin's future for many reasons:

- Public transit expands traffic carrying capacity in the Region's heavily traveled corridors and densely developed activity centers, helping to mitigate congestion in crowded corridors. Rapid transit (either bus rapid transit or light rail) provides a reliable alternative to driving on congested roadways, with consistent travel times and minimal wait times.

- Fixed-guideway transit investment can guide development by focusing jobs and housing around its stations, leading to more compact, walkable neighborhoods that encourage active transportation and improve public health.

- The Region-wide transit system recommended under VISION 2050 (including shared-ride taxi service in rural parts of the Region) would assist residents across Southeastern Wisconsin in aging in place, without needing to move from their home as their ability to drive declines. As Chapter 2 of Volume I notes, there will be a significant increase in the proportion of the Region's population aged 75 and older in the near future.

- For the 1 in 10 households in the Region without access to a car, transit is vital to providing access to jobs, healthcare, education, and other daily needs. Although many of the Region's jobs are currently accessible via transit, the lack of fast, frequent transit service in much of the Region limits access to a large number of the Region's jobs due to excessive travel time. Approximately 1,342,000 (or 56 percent of the Region's year 2050 population) of the Region's residents would be able to use transit to reach 10,000 jobs or more in less than 30 minutes under VISION 2050, compared to 499,000 (or 22 percent) under the Trend.[17]

- In addition to providing access to daily needs for households without a car, a robust transit system can provide employers with access to a

[17] *VISION 2050 is compared to a "Trend" alternative future, under which the transportation system and land use development and funding trends of the last approximately 15 years are projected to continue to the year 2050.*

Table 1.9
Transit Service Hours and Frequency: VISION 2050

Service Type	Existing (2015)		Plan (2050)	
	Service Hours	Service Headways	Service Hours	Service Headways
Rapid Transit	Weekdays No service Weekends No service	Weekdays No service Weekends No service	Weekdays Up to 24 hours a day Weekends Up to 24 hours a day	Weekdays 8 – 15 minutes Weekends 10 – 15 minutes
Commuter Rail	Weekdays 6 a.m. – 2 a.m. Weekends 7 a.m. – 2 a.m.	Weekdays 30 – 360 minutes Weekends 60 – 480 minutes	Weekdays 6 a.m. – 2 a.m. Weekends 7 a.m. – 2 a.m.	Weekdays 15 – 30 minutes Weekends 15 – 60 minutes
Commuter Bus	Weekdays 5 a.m. - 10 a.m. 12 p.m. – 8 p.m. many services peak direction only Weekends 8 am – 11 p.m. KRM Bus only	Weekdays 10 – 225 minutes, many services peak direction only Weekends 90 – 240 minutes, KRM Bus only	Weekdays 4 a.m. – 11 p.m. both directions Weekends 7 a.m. – 11 p.m. both directions	Weekdays 10 – 60 minutes both directions Weekends 30 – 120 minutes both directions
Express Bus Milwaukee County	Weekdays 4 a.m. – 2 a.m. Weekends 5 a.m. – 2 a.m.	Weekdays 10 – 35 minutes Weekends 20 – 45 minutes	Weekdays 4 a.m. – 2 a.m. Weekends 5 a.m. – 2 a.m.	Weekdays 10 – 15 minutes Weekends 12 – 15 minutes
Kenosha and Racine Counties	Weekdays 6 a.m. – 7 p.m. Weekends No Service	Weekdays 60 – 75 minutes Weekends No Service	Weekdays 5 a.m. – 12 a.m. Weekends 5 a.m. – 12 a.m.	Weekdays 15 – 60 minutes Weekends 30 – 60 minutes
Local Transit Milwaukee County	Weekdays 4 a.m. – 2 a.m. Weekends 5 a.m. – 2 a.m.	Weekdays 10 – 70 minutes Weekends 12 – 100 minutes	Weekdays Up to 24 hours a day Weekends Up to 24 hours a day	Weekdays 10 – 60 minutes Weekends 12 – 60 minutes
Remainder of Region	Weekdays 6 a.m. – 10 p.m. Weekends 6 a.m. – 10 p.m.	Weekdays 30 – 60 minutes Weekends 30 – 60 minutes	Weekdays 5 a.m. – 12 a.m. Weekends 5 a.m. – 12 a.m.	Weekdays 15 – 60 minutes Weekends 30 – 60 minutes

Source: SEWRPC

larger labor force, increasing the number of available candidates for job openings.

- Other than Milwaukee, only five out of 39 metropolitan areas with more than 1.5 million residents in the United States (Cincinnati, Columbus, Detroit, Indianapolis, and San Antonio) do not have light rail, bus rapid transit, or commuter rail. Although transit alone does not turn a struggling metro area into a successful one, it is one of the amenities expected of an economically competitive city.

- Replacing a car with transit use would save an average Southeastern Wisconsin household about $4,500 per year, money that can be saved or spent on other goods. By 2050, providing the recommended transit system would result in $144 million being saved annually by the Region's residents compared to the Trend.

- In dense areas, parking garages can be a significant part of the cost of a development, with each space costing an average of $20,000 to $25,000 to build. Providing fast and frequent transit service has been shown to decrease the demand for parking, allowing communities to reduce or eliminate parking requirements, developers to build fewer spaces, and commercial and residential tenants to pay less.

- Fast, frequent transit service also reduces the need for multi-car garages to be built for single-family homes in dense urban areas, allowing for more green space and larger yards without increasing lot size.

- Although the effect is expected to be somewhat limited, carbon emissions from transportation are expected to be 2 percent less under VISION 2050 than the Trend, due to the recommended transit system attracting travelers out of their cars and the recommended compact land development pattern reducing the distance between destinations.

- An expansive transit system can provide economic resiliency. Should the Region experience greater economic success than currently predicted, the increase in congestion caused by a growing workforce could have significant negative impacts without a reliable alternative to driving. Similarly, should fuel prices rise dramatically before alternative methods of powering cars and trucks are more mainstream, the negative impacts on the Region's residents and its economy would be significant without a robust transit system to provide an alternative to driving.

Achieving these benefits for the Region will require additional revenue, likely from an increase in local taxes, such as a sales tax, and also would be most easily implemented by a regional transit agency to construct, manage, and operate the recommended transit system, although a regional transit agency is not required to achieve VISION 2050. This is discussed further in the Financial Analysis section of this chapter.

➤ Recommendation 2.1: Develop a rapid transit network

VISION 2050 recommends eight rapid transit corridors (either bus rapid transit or light rail), with dedicated transit lanes and transit signal priority or preemption. Stations would be spaced every one-half to one mile and would include off-board fare payment, real-time information screens, and raised platforms. Service would be provided every 15 minutes or better for nearly the entire day, with service being provided 24 hours a day in some corridors. Fares would be identical to that of local fixed-route and express bus services. The intent of the recommended rapid transit services is to provide travel times that are similar to the travel time of an automobile using parallel arterial street and highway facilities during congested peak periods. The eight bus rapid transit or light rail corridors recommended are shown in purple on Map 1.8 and would travel:

A Bus Rapid Transit Vehicle
Source: Greater Cleveland Regional Transit Authority

- From downtown Waukesha to downtown Milwaukee via the Milwaukee Regional Medical Center, predominately on E. Main St., W. Blue Mound Rd., and Wisconsin Ave.;

A Light Rail Transit Vehicle
Source: MetroTransit

- From Bayshore Town Center in Glendale to downtown Milwaukee via the University of Wisconsin-Milwaukee, predominately on N. Oakland Ave., N. Prospect Ave., and N. Farwell Ave.;

- From the Park Place complex on the northwest edge of Milwaukee to downtown Milwaukee, predominately on W. Fond Du Lac Ave.;

- From the retail centers located around the intersection of S. 108th St. and Cleveland Ave. in West Allis to downtown Milwaukee, predominately on W. National Ave.;

- From Northwestern Mutual's Franklin Campus on S. 27th St. to downtown Milwaukee via General Mitchell International Airport, predominately along S. Howell Ave. and S. 1st. St.;

- From Bayshore Town Center in Glendale to Southridge Mall in Greendale, predominately on 27th St. and W. Forest Home Ave.;

- From the Park Place Complex on the northwest edge of Milwaukee to the retail centers located around the intersection of S. 108th St. and Cleveland Ave. in West Allis via Mayfair Mall, predominately on N. Mayfair Rd. and South 108th St. (STH 100); and

- From Shoppers World of Brookfield to the University of Wisconsin-Milwaukee, predominately on Capitol Dr.

➤ Recommendation 2.2: Develop commuter rail corridors and improve and expand commuter bus services

VISION 2050 recommends four commuter rail lines and a significant improvement and expansion of existing commuter bus services. Both types of commuter services would provide frequent service, with service every 15 minutes in the peak in both directions and every 30 to 60 minutes in both directions at other times. Commuter bus services would be extended to serve new areas, and existing services would run in both directions throughout the day. Fares would start at the same level as local, express, and rapid services, and would increase with travel distance. Map 1.8 shows the recommended commuter bus services in red (with park-ride lots served by commuter bus identified by the circles) and commuter rail services in orange (with station locations identified by the circles). The recommended commuter services would generally have stops or stations at least two miles apart, and are intended to provide travel times that are competitive or better than cars over longer travel distances.

- **Commuter Rail Service** – The commuter rail corridors recommended by VISION 2050 would connect Kenosha, Racine, Milwaukee, Wauwatosa, Brookfield, Waukesha, Oconomowoc, and communities in between by making upgrades to existing freight rail corridors to allow passenger rail at speeds of up to 79 miles per hour, providing a fast service connecting many of the larger population centers in the Region with vehicles similar to the shown below. In addition to the four corridors recommended by VISION 2050, there are a number of other freight rail corridors in the Region that could be utilized for commuter rail, should an entity be interested in pursuing their development. These additional corridors are not included in VISION 2050 because they are forecast to have markedly lower ridership than the four corridors recommended by VISION 2050, but are shown on Map 1.9 as an acknowledgment that they could be pursued in the future.

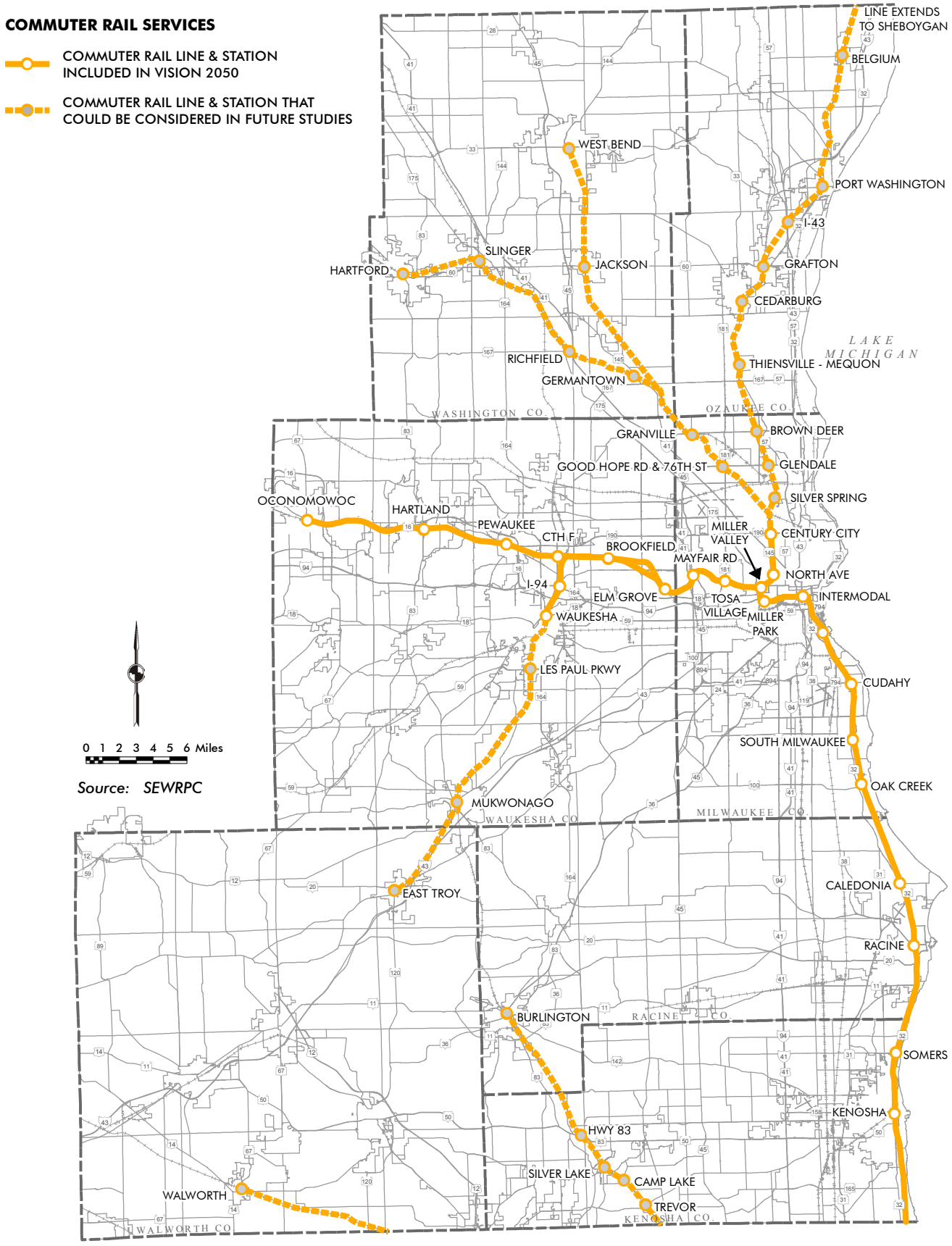
A Commuter Rail Vehicle
Source: SEWRPC Staff

- **Commuter Bus Service** – The commuter bus services recommended by VISION 2050 mostly provide radial service connecting communities of the Region with downtown Milwaukee. A few services also provide connections between communities or existing park-ride lots and the recommended commuter rail services, including connections between communities in Walworth, Racine, and Kenosha Counties and Metra commuter rail services in northeastern Illinois. Wherever there is sufficient shoulder width, transit operators are encouraged to work with the Wisconsin Department of Transportation (WisDOT) to permit buses to travel on highway shoulders whenever regular travel lanes are congested, which would assist commuter bus services in achieving travel times that are competitive with cars (known as bus-on-shoulder operations, and discussed further under Recommendation 4.1 of the transportation systems management element).

➤ Recommendation 2.3: Improve existing express bus service and add service in new corridors

VISION 2050 recommends additional express bus services in the Region, and improvements to the existing express bus services that would not be replaced by rapid transit lines. In the Milwaukee area, the express route serving 27th Street would be extended north to Brown Deer Road and south to Northwestern Mutual's Franklin Campus, and both that route and the express route serving Sherman Boulevard would see increased frequency. Additional express routes would be added on 76th Street and Oklahoma Avenue in Milwaukee County, traveling from the Ives Groves Park-Ride to the Corinne Reid-Owens Transit Center in Racine, traveling from Twin Lakes to the Metra Station in Kenosha County, and connecting the western part of the City of Racine to the western part of the City of Kenosha. Stops would be spaced at least one-half mile apart, and therefore the services would provide better travel times than local bus routes. Express services in Milwaukee County would come at least every 15 minutes nearly the entire day, and services in Kenosha and Racine Counties would come every 15 minutes during the peak and every 30

Map 1.9
Potential Extensions of the Commuter Rail Network: VISION 2050



minutes at other times. Fares would be identical to those charged for rapid and local fixed-route services.

➤ Recommendation 2.4: Increase the frequency and expand the service area of local transit

VISION 2050 recommends an expansion of local transit service, including improving the frequency and expanding the service area of local bus services, expanding streetcar service, extending shared-ride taxi service to any areas of the Region without local bus service, and continuing to provide paratransit service in areas served by local bus service. Map 1.8 shows the area served by local transit services of different types, with the shared-ride taxi service area shaded the lightest green, followed by areas served by less frequent local fixed-route bus service the next shade darker, and then areas served by frequent local fixed-route bus service the darkest shade of green. Streetcar service is shown as a dark green line. The paratransit service area is not shown, but paratransit service would be provided wherever the accessible shared-ride taxi service would not be available.

- **Local Bus Service** – The recommended expansion of local bus service focuses on developing new transit services to suburban employment centers, new services connecting businesses and residents to nearby commuter and rapid services, and improving the frequency of local transit service in corridors and areas not served by rapid and express service. When compared to the existing transit services provided in the Region, Map 1.8 demonstrates both the expansion of local service and the improved frequency of existing local services. Fares for local bus services are recommended to be identical to those charged for rapid and express services.

- **Streetcar Service** – The recommended expansion of streetcar service within Milwaukee is represented by the lines shown on Map 1.8. The City of Milwaukee is currently constructing an initial line connecting the Milwaukee Intermodal Station to the Historic Third Ward, East Town, and the Lower East Side, and designing extensions to connect the system to the Lakefront and to the site of the new Bucks Arena. The transit system recommended by VISION 2050 includes further extensions that have been identified for implementation over the next decade by the City, including connections to the University of Wisconsin-Milwaukee and neighborhoods adjacent to downtown Milwaukee.

- **Shared-Ride Taxi Service** – VISION 2050 recommends expanding accessible shared-ride taxi service across much of the Region, wherever local fixed-route transit service is unavailable. The recommended service would be 24-hour advance reservation, requiring riders to call a day ahead of their planned journey to schedule a ride, and would provide rides to all members of the general public who have a journey with one end outside the service area of local fixed-route bus or streetcar service. Service is recommended to be available as early as 5 a.m. and as late as 2 a.m., depending on the day of the week, and fares are recommended to be as low as those charged for local fixed-route, express, and rapid transit services for shorter journeys, with longer journeys charged a premium similar to those on commuter services.

- **Paratransit Service** – VISION 2050 recommends that paratransit service be provided consistent with the Federal Americans with Disabilities Act (ADA) of 1990. Under ADA provisions, all transit vehicles

that provide conventional fixed-route transit service must be accessible to people with disabilities, including those using wheelchairs. All public entities operating fixed-route transit systems must provide paratransit service to people with disabilities who are unable to use fixed-route transit services consistent with Federally specified eligibility and service requirements. The complementary paratransit service must serve any person with a permanent or temporary disability who is unable independently to board, ride, or disembark from an accessible vehicle used to provide fixed-route transit service; who is capable of using an accessible vehicle, but one is not available for the desired trip; or who is unable to travel to or from the boarding or disembarking location of the fixed-route transit service. The recommended paratransit service would be available during the same hours as the local, express, and rapid fixed-route transit services, and be provided to eligible persons on a 24-hour advance reservation basis. Fares on paratransit are Federally required to be no more than twice the amount charged for local fixed-route services.

➤ Recommendation 2.5: Improve intercity transit services and expand the destinations served

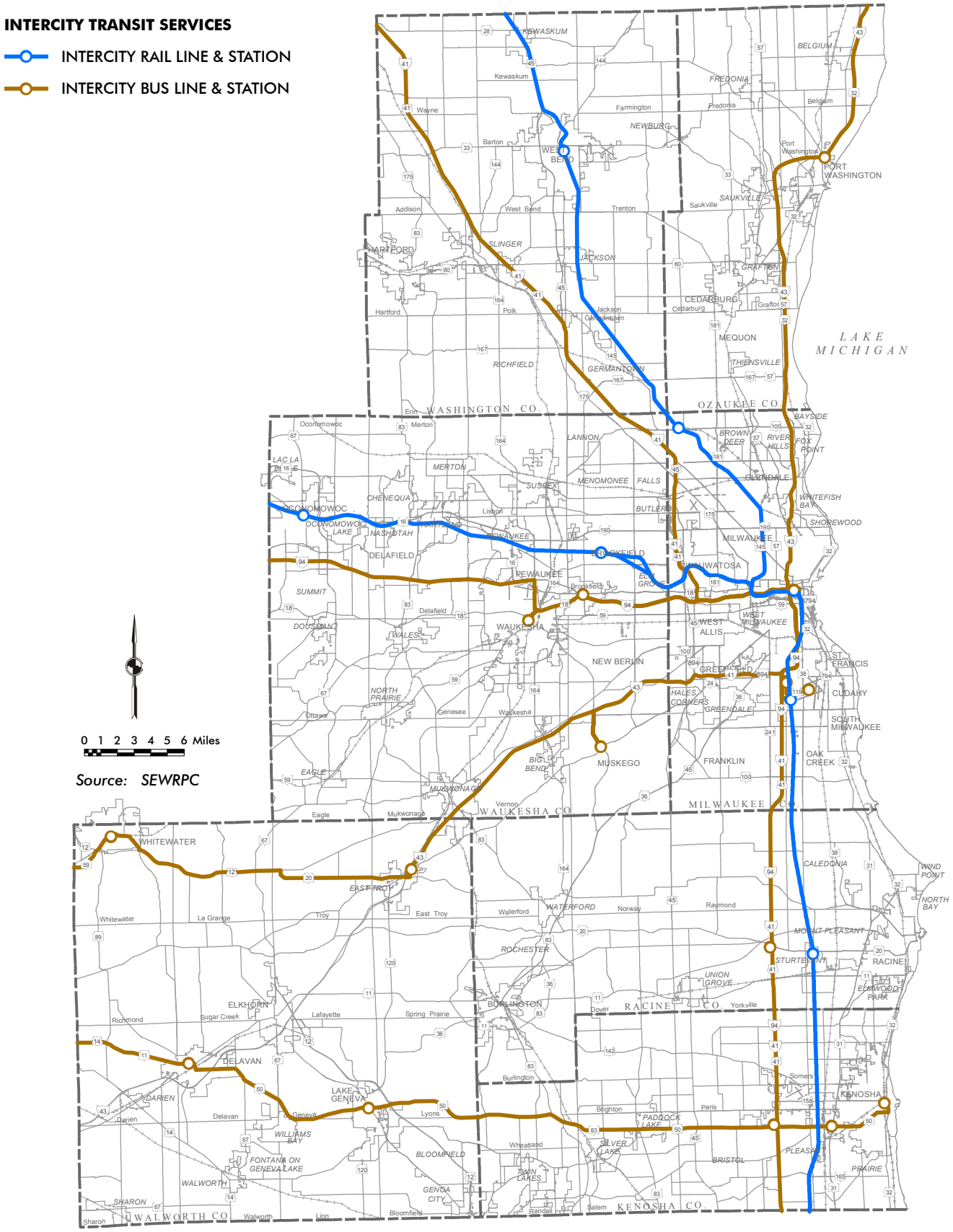
Intercity rail and bus services provide transit connections between the Region and destinations outside Southeastern Wisconsin. Because the primary focus of intercity transit services is to connect communities within the Region to communities in other parts of the State and the remainder of the Midwest, the Commission uses long-range plans completed by WisDOT as the basis of the Commission's recommendations for intercity transit services. VISION 2050 recommends that the number of intercity bus services be expanded and that existing services be enhanced with increased service frequencies. Two new intercity rail lines are recommended, one connecting Chicago to Minneapolis and St. Paul via Milwaukee and Madison, and another connecting Chicago to Green Bay via Milwaukee and the Fox Valley. Both services would be operated as extensions of the existing Amtrak Hiawatha service from Chicago, and all three lines would operate at speeds up to 110 miles per hour. Map 1.10 shows the segments of the intercity services recommended by WisDOT that are within the Region, and the stations that would be served within the Region.

An Intercity Passenger Rail Vehicle
Source: Michael Kolanowski

➤ Recommendation 2.6: Implement "transit-first" designs on urban streets

VISION 2050 recommends that transit operators work with local governments during the reconstruction of a roadway to include transit-first features on the roadway when it carries rapid, express, or major local transit routes, including transit signal priority systems, dedicated lanes for transit, and "bus bulbs" at significant transit stops. Transit signal priority systems could also be added when existing signals along a roadway are

Map 1.10
Intercity Transit Services: VISION 2050



being modified. More detail on these recommended improvements is included in the transportation design guidelines.

- **Transit Signal Priority Systems** – Transit signal priority systems allow a transit vehicle to modify the normal traffic signal operation as it approaches the intersection to reduce the travel time delay associated with traffic signals; either by shortening red lights (see "Red Truncation" below) or extending green lights(see "Green Extension" below). Transit signal priority systems work best when queue jump lanes or dedicated transit lanes are also provided. VISION 2050 recommends implementing transit signal priority systems along all rapid, express, and major local transit routes.

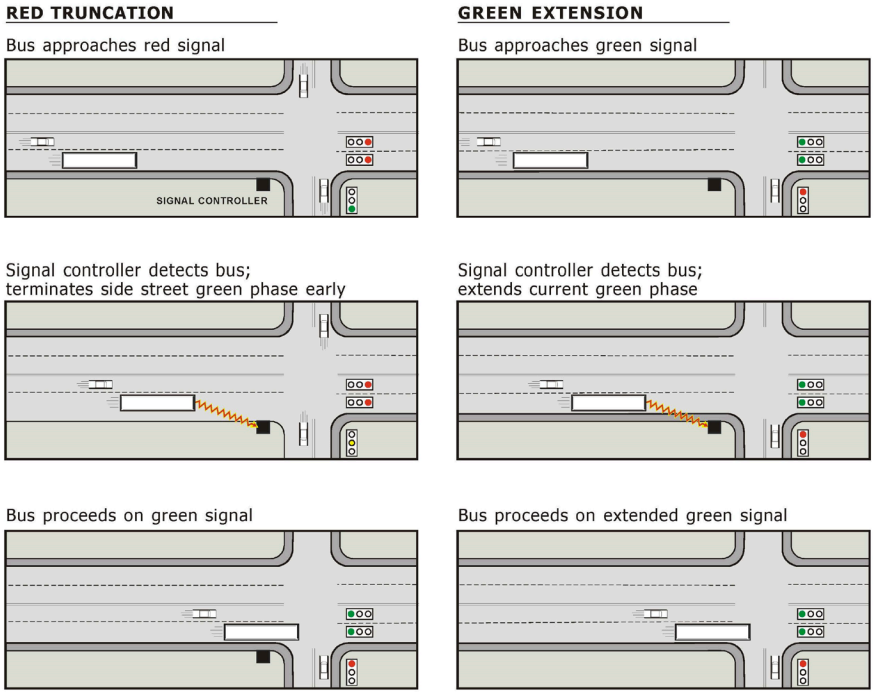


Illustration of a Transit Signal Priority System
Source: Transit Capacity and Quality of Service Manual 3rd Edition

- **Dedicated Transit Lanes** – Dedicated lanes allow transit vehicles to bypass vehicle queues at traffic signals. Dedicated lanes along congested arterial streets and highways can reduce transit travel times and improve transit travel time reliability during peak travel periods. Such lanes are currently provided along Bluemound Road in Waukesha County. Keep lanes may be provided via auxiliary lanes, or where right-of-way is constrained, through peak-period, peak-direction curb-lane parking restrictions. VISION 2050 recommends expanding the use of dedicated lanes along all rapid transit routes. Dedicated bus lanes could also be considered to improve express and major local transit routes.

- **Bus Bulbs** – Bus bulbs provide additional space for waiting passengers, provide room to implement many of the enhancements listed in Recommendation 2.7, allow for additional on-street parking by removing the approach or departure space needed for a standard bus stop, and increase transit travel speeds by eliminating the need for a

bus to weave in and out of traffic to serve a stop. In addition to bus bulbs, the reconstruction of a roadway should consider other transit-friendly elements, including providing enhanced pedestrian accommodations (discussed further under Recommendation 3.5). These accommodations, which can include highly visible crosswalks and curb extensions and pedestrian median islands to reduce crossing distances at intersections, should be considered for increasing pedestrian safety near transit stations and stops.

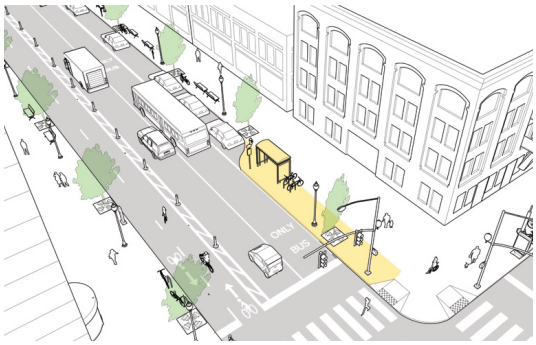


Illustration of a Bus Bulb (in Yellow)
Source: NACTO

➤ Recommendation 2.7: Enhance stops, stations, and park-ride facilities with state-of-the-art amenities

VISION 2050 recommends that transit operators, business improvement districts, neighborhood associations, and municipalities coordinate to significantly enhance local bus stops and park-ride facilities, particularly those with significant boardings. These enhancements include improved information on bus stop signs and polls, shelters at more stop locations, accessible paths to and from all stops, real-time information screens, radiant heating, and raised platforms for boarding. For park-ride facilities, these stop enhancements should also include bike lockers. More detail on these recommended improvements is included in the design guidelines.

➤ Recommendation 2.8: Accommodate bicycles on all fixed-route transit vehicles

VISION 2050 recommends that all fixed-route transit vehicles in the Region be able to accommodate bicycles, either on a rack on the front of the bus for local buses, or onboard rapid transit and commuter transit vehicles.

➤ Recommendation 2.9: Implement programs to improve access to suburban employment centers

Recommendations 2.1 through 2.5 recommend a robust and expansive transit system, one that will take time to develop and construct. In addition, even once the full recommended transit system is completed, there will be some smaller suburban employment centers that will not be served by fixed-route transit, and others that will be served but may not currently be designed to accommodate pedestrians, making the "last-mile" journey from the bus stop to a place of employment difficult. For these reasons, VISION 2050 recommends a series of programs be considered to improve access to suburban employment centers.

- **Vanpool Programs** – Vanpool programs allow multiple individuals to carpool to work on a larger scale. They generally work well in situations where at least five employees of one or more businesses located near each other all commute from approximately the same area, and the distance between work and home is relatively long. Vanpools should be considered in Southeastern Wisconsin where a specific journey from a population center to an employment center is not served with a relatively easy trip via the fixed-route transit system.

- **Network Transportation Companies** – Network transportation companies, such as Uber or Lyft, provide on-demand taxi service accessed by users via a smartphone app. These companies could connect individuals to employment opportunities not served by transit that are relatively close to—but beyond walking distance of—a rapid, commuter, or express transit line. Network transportation companies could be used in these instances to fill a gap in the transit network by providing on-demand rides to complete the last segment of a transit rider's journey to work. If multiple transit riders have the same destination, most network transportation companies offer services that allow individuals to split a fare, reducing costs for each rider.

- **Pedestrian Facility Enhancements** – Many suburban office and industrial parks do not have continuous sidewalks along both sides of a road, marked cross walks at intersections, or sidewalks from the road to a business's front door. These gaps in the pedestrian network can make completing a journey to work difficult for a transit rider. VISION 2050 recommends that transit operators and municipalities work with business park associations and large employers to ensure that an accessible sidewalk network is provided between bus stops and businesses' front doors.

- **Job Access Programs** – As previously mentioned, even at its full build out, the recommended fixed-route transit system will not provide access to every job within the Region. In some instances, it may not be reasonable for an individual to take transit or another alternative mode to work, and a private automobile may be required. To address this, VISION 2050 recommends that all levels of government support job access programs, including driver's license recovery programs and low-interest vehicle loan programs for low-income individuals, to assist low-income individuals in accessing job opportunities.

➤ Recommendation 2.10: Provide information to promote transit use

VISION 2050 recommends a range of activities to be undertaken by transit agencies in the Region to promote transit use and enhance the quality of transit service, including real-time and trip planning transit information and transit marketing. Promoting transit use and enhancing the quality of service would increase its desirability, attracting new transit users and encouraging residents to use public transit more often.

- **Real-Time and Trip Planning Transit Information** – Real-time transit information—such as transit vehicle arrival and departure times and maps that display where vehicles are located in real time—make transit services more attractive by addressing rider uncertainties and reducing perceived wait times. MCTS implemented real-time information on all of its routes in 2015, allowing transit riders to track bus locations and bus stop arrival times using the MCTS website and mobile devices. VISION 2050 recommends widespread provision of real-time information for all transit operators at transit centers, transit stops, on websites, and on mobile devices. Additionally, transit operators should continue to provide real-time information and up-to-date routing data to companies that include such information in their mapping applications.

- **Joint Marketing and Research among Transit Operators** – The Region's transit operators would collectively benefit through joint marketing and research efforts. VISION 2050 recommends that transit

agencies collaborate to advertise their respective services and conduct joint research involving emerging technologies that would enhance transit service, including innovative fare payment systems that facilitate intersystem transfers (discussed under Recommendation 2.11).

➤ Recommendation 2.11: Implement a universal fare system and free transfers across all transit operators

As transit operators invest in new fare systems across the Region, VISION 2050 recommends that operators coordinate to use the same fare system. This would require significant cross-agency coordination on accounting and procurement, but could offer large benefits to the public by allowing riders to more easily use multiple transit services to complete a journey. Many other metropolitan areas across North America with multiple transit operators have achieved a universal fare system as part of a region-wide adoption of a smart card fare system similar to the MCTS M-Card. Either as part of adopting a universal fare system or as a separate initiative, operators are encouraged to make transfers between services free, with no rider paying more than the cost of one trip on the most expensive transit service used during a journey.

➤ Recommendation 2.12: Consider implementation of proof-of-payment on heavily-used transit services

One of the significant causes of delays that make travel times on local transit services uncompetitive with the automobile is the amount of time a bus spends at stops, waiting for passengers to pay their fare and board (known as "dwell time"). One method of significantly reducing dwell times on transit services where more than four or five riders board at a stop is to allow people to board the bus at any door, and validate their paper ticket or tap their fare card at a reader placed a few steps inside the bus. Using multiple doors allows multiple passengers to load in significantly less time, and placing the card reader or ticket validator further inside the bus allows the buses doors to close and the vehicle to begin moving before all passengers have paid. This concept is called "proof-of-payment" because it relies on occasional checks by transit system staff to ensure that riders have paid their fare, and has been shown to measurably increase the speed of buses where it has been implemented, including on certain bus routes in Los Angeles and on all bus routes in San Francisco. VISION 2050 recommends that transit operators in the Region, particularly MCTS, study the possibility of implementing proof-of-payment on some or all transit routes.

➤ Recommendation 2.13: Promote and expand transit pricing programs

VISION 2050 recommends building on existing transit pricing programs conducted by the Region's transit operators. Transit pricing programs involve a number of strategies that promote transit ridership, thus increasing transit use and reducing traffic volume and congestion, by providing discounted fares and providing more flexibility and accessibility for transit riders. These strategies include college and university transit pass programs and employer transit pass programs.

- **College and University Transit Pass Programs** – College and university transit pass programs provide unlimited transit use to students through a reduced fee included in student tuition and fees. MCTS has implemented a transit pass program at six area colleges and universities. This program encourages students to use transit instead of driving a personal vehicle to class, reducing the amount

of traffic and congestion particularly near campuses. Reducing the amount of vehicular traffic also improves pedestrian and bicycle safety around college and university campuses. VISION 2050 recommends expanding the MCTS college and university transit pass programs to include additional colleges and universities and establishing similar programs for other transit systems in the Region.

- **Employer Transit Pass Programs** – Employer transit pass programs involve a partnership between transit operators and employers that provide discounted transit passes—annual, monthly, or weekly—to employees. Employer transit pass programs provide employees a safe and easy commute to work and help employers attract and retain employees. MCTS has implemented the Commuter Value Program, which provides transit passes to employers at a reduced fee, allowing those employers to offer discounted transit passes to their employees. VISION 2050 recommends expanding existing employer transit pass programs such as the MCTS Commuter Value Program and encourages other transit operators to negotiate annual or monthly fees with individual employers to provide discounted transit passes to employees.

➤ **Recommendation 2.14: Expand "guaranteed ride home" programs**
A guaranteed ride home program provides a free ride home to transit users in cases of emergencies, unplanned overtime, or other unexpected issues. The guaranteed ride home program is currently offered to MCTS Commuter Value Program members and Washington County Commuter Express riders. VISION 2050 recommends expanding the guaranteed ride home program to include other transit operators.

Description of Bicycle and Pedestrian Element
The ability to support biking and walking is an important component of improving quality of life and achieving healthy, vibrant communities. While the Region has a colder climate and the proportion of residents that currently travel by bicycle is small, improving the bicycling and walking environment can have numerous benefits to the Region's residents. As the alternatives evaluation presented in Appendix G of Volume II showed, well-connected infrastructure and a development pattern that provides a mix of uses within short distances make it easier to bike and walk. This encourages people to incorporate active travel into their daily routine, which can improve their health and reduce their healthcare costs. It is also important to integrate bicycle and pedestrian travel and public transit travel, which often begins and ends by either biking or walking. Recognizing the benefits of encouraging active transportation, the bicycle and pedestrian facilities element of VISION 2050 recommends a well-connected bicycle and pedestrian network that improves access to activity centers, neighborhoods, and other destinations in the Region. The element seeks to encourage bicycle and pedestrian travel as a safe, attractive alternative to driving.

Bicycle recommendations for VISION 2050 include providing on-street bicycle accommodations on the arterial street and highway system (non-freeways), expanding the off-street bicycle path system, implementing enhanced bicycle facilities in key regional corridors, and expanding bike share program implementation. As shown in Table 1.10, VISION 2050 recommends approximately 3,027 miles of standard on-street bicycle accommodations, 363 miles of enhanced bicycle facilities, and 709 miles of off-street bicycle paths. Map 1.11 shows the recommended bicycle network, which identifies on-street bicycle facilities, potential corridors for enhanced

Table 1.10
Miles of Bicycle Facilities: VISION 2050

Bicycle Facility	Estimated Mileages	
	Existing (2015)	Plan (2050)
On-street Accommodations		
Standard	814.7	3,026.8
Enhanced	71.8	363.2
Off-Street Paths	299.2	708.8

Source: SEWRPC

bicycle facilities, off-street bicycle paths, and nonarterial street connections to the off-street bicycle network.

VISION 2050 also includes recommendations for the location, design, and construction of pedestrian facilities. VISION 2050 further recommends that local communities develop bicycle and pedestrian plans to supplement the regional plan.

➤ **Recommendation 3.1: Expand the on-street bicycle network as the surface arterial system is resurfaced and reconstructed**

VISION 2050 recommends that as the existing surface arterial street system of about 3,300 miles is resurfaced and reconstructed segment-by-segment, bicycle accommodation be considered and implemented, if feasible, through bicycle lanes, paved shoulders, widened outside travel lanes, or enhanced bicycle facilities.[18] Bicycles are prohibited from using freeway facilities by State law.[19] It also recommends that bicycle accommodation be considered and implemented on newly constructed surface arterials. Enhanced bicycle facilities are defined as bicycle facilities on or along an arterial that go beyond the standard bicycle lane, paved shoulder, or widened outside travel lane. Enhanced bicycle facility examples include the protected bicycle lane, separate path within the road right-of-way, buffered bicycle lane, and raised bicycle lane.

The surface arterial street system of the Region provides a network of direct travel routes serving virtually all travel origins and destinations within Southeastern Wisconsin. Arterial streets and highways—particularly those with high-speed traffic or heavy volumes of truck or transit vehicle traffic—require one of the standard or enhanced bicycle improvements described in the above paragraph in order to safely accommodate bicycle travel. VISION 2050 considers providing one type of bicycle facility to be sufficient to accommodate bicycles on an arterial. In other words, if a separate path is provided adjacent to an arterial, bicycle lanes or another type of bicycle facility may not be necessary to accommodate bicycles on that arterial. Land access and collector streets, because of low traffic volumes and speeds, should be capable of accommodating bicycle travel with no special accommodation for bicycle travel.

[18] There may be locations on arterials in urban environments where on-street bicycle accommodations may not be feasible. For example, on Brady Street in the City of Milwaukee, the right-of-way is restricted by two traffic lanes and two parking lanes. In these instances, nearby nonarterial streets may be considered sufficient for accommodating bicycle travel rather than implementing an accommodation on the arterial.

[19] The Hoan Bridge in Milwaukee is part of a freeway facility (IH 794) and, therefore, does not include a bicycle accommodation under VISION 2050. Should State law change to allow bicycles on the Hoan Bridge, or the Hoan Bridge not be designated a freeway, bicycle accommodation should be considered.

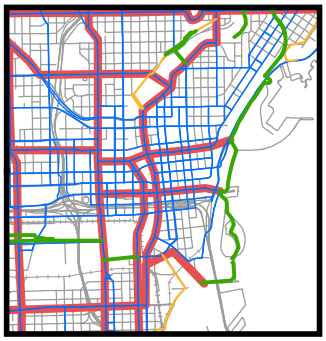
Map 1.11
Bicycle Network: VISION 2050

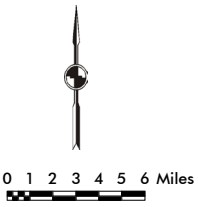
BICYCLE FACILITIES

- OFF-STREET BICYCLE PATH
- ARTERIAL STREET OR HIGHWAY WITH BICYCLE ACCOMMODATION (IF FEASIBLE)
- NONARTERIAL STREET CONNECTION TO OFF-STREET BICYCLE NETWORK
- RECOMMENDED CORRIDOR FOR ENHANCED BICYCLE FACILITY[a]

[a] *Corridor would include an enhanced bicycle facility—such as a protected bike lane, a separate path within the road right-of-way, or a buffered bike lane—located on or along an arterial or, alternatively, a neighborhood greenway on a nearby parallel nonarterial.*

MILWAUKEE CENTRAL BUSINESS DISTRICT INSET





Source: SEWRPC

In addition to accommodating bicycles on arterials, VISION 2050 encourages bicycle travel through intersections be appropriately accommodated. Specific guidance on the location, design, and maintenance of on-street bicycle facilities, including treatment of bicycle facilities at intersections, are presented in the transportation design guidelines.

➤ Recommendation 3.2: Expand the off-street bicycle path system to provide a well-connected regional network

VISION 2050 recommends that a system of off-street bicycle paths be provided between the Kenosha, Milwaukee, Racine, and West Bend urbanized areas and the cities and villages within the Region with a population of 5,000 or more located outside these four urbanized areas. These off-street bicycle paths would primarily be located in natural resource and utility corridors and are intended to provide reasonably direct connections between the Region's urbanized and small urban areas on safe and aesthetically attractive routes with separation from motor vehicle traffic. Some on-street bicycle connections would be required to connect segments of this system of off-street paths. These connections, if provided over surface arterials, would include some type of bicycle accommodation—bicycle lanes, paved shoulders, widened outside travel lanes, enhanced bicycle facilities, or separate parallel bicycle paths. If provided over a nonarterial collector or land access street, they may not require special accommodation.

Bicycle connectivity under VISION 2050 would be improved through the construction of on- and off-street bicycle improvements to address gaps in the regional bicycle network. Gaps include those between cities and villages with populations of 5,000 or more where on- or off-street bicycle facilities either do not exist or only exist in intermittent segments. They also include those between two off-street path segments where a viable connection could be made by constructing either an on- or off-street bicycle facility between the path segments. Bicycle connectivity ensures that bicyclists have direct routes to destinations and reduces out-of-direction travel. An evaluation of bicycle connectivity and an analysis of gaps in the Region's on- and off-street network is presented in Appendix H.

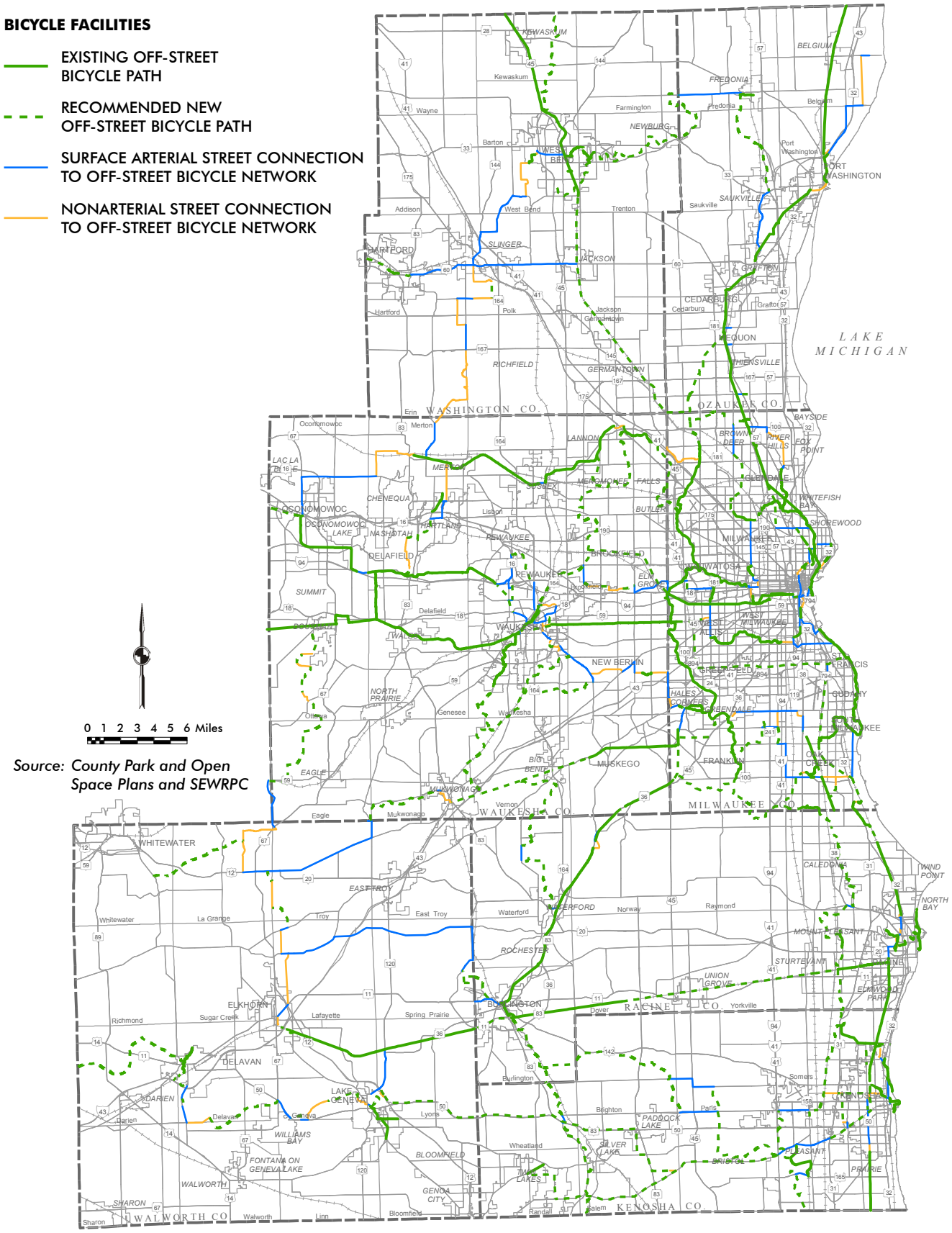
Map 1.12 shows the regional off-street bicycle path system, which includes existing and recommended paths as well as surface arterial and nonarterial connections to the path system. VISION 2050 envisions expanding the existing 299 miles of off-street paths to approximately 709 miles of off-street paths.

In addition to providing off-street paths and on-street connections to paths, VISION 2050 encourages off-street paths be appropriately marked through an intersecting street. Specific guidance on the location, design, and maintenance of off-street bicycle paths, including treatment of off-street paths when intersecting with streets, is presented in the design guidelines.

➤ Recommendation 3.3: Implement enhanced bicycle facilities in key regional corridors

VISION 2050 recommends a network of enhanced bicycle facility corridors through the Kenosha, Milwaukee, and Racine urbanized areas that would connect multiple communities, serve important regional destinations, and link segments of the off-street bicycle path system. Enhanced bicycle facilities—such as protected, buffered, and raised bicycle lanes

Map 1.12
Off-Street Bicycle Path System: VISION 2050



and separate paths within a road right-of-way—are bicycle facilities on or along an arterial that go beyond the standard bicycle lane, paved shoulder, or widened outside travel lane. They are meant to improve safety, define bicycle space on roadways, and provide clear corridors for bicycle usage. These corridors would be about two blocks in either direction of an arterial street or highway and would either involve implementing an enhanced bicycle facility on or along the arterial street or implementing a neighborhood greenway ("bike boulevard") on a parallel nonarterial, which is a low-speed street optimized for bicycle traffic. VISION 2050 recommends a network of 363 miles of enhanced bicycle facility corridors that would link multiple communities throughout Kenosha, Milwaukee, Ozaukee, Racine, and Waukesha Counties. Specific guidance on the design and implementation of enhanced bicycle facilities is presented in the design guidelines.

A Protected Bike Lane
Source: People for Bikes

Particular consideration should be given to enhancing the treatment of existing and recommended enhanced bicycle facilities at intersections. Dashed white lines for protected, buffered, and raised bicycle lanes should be used through intersections to clearly define space and the intended path for bicycles. Colored pavement between the dashed lines can further make these facilities visible in the intersection. In addition, a separate path within a road right-of-way should be brought into the functional area of the intersection to increase the visibility of bicyclists. Further guidance on intersection treatments for enhanced bicycle facilities is presented in the design guidelines.

The continued implementation of on-street bicycle accommodations, particularly enhanced bicycle facilities, can improve the level of comfort experienced by bicyclists. Appendix H of Volume II includes an evaluation of the safety and comfort of streets based on factors that include presence of a bicycle facility, traffic volumes and traffic speeds, surrounding land use, and parking turnover rates, all of which can either encourage or deter a bicyclist to use that roadway. The existing arterial street network has about 800 miles of arterial streets with high levels of bicycle comfort. Under VISION 2050, there would be approximately 1,900 miles of arterial streets with high levels of bicycle comfort due to the increase in on-street bicycle accommodations and the implementation of enhanced bicycle facilities in key regional corridors.

➤ Recommendation 3.4: Expand bike share program implementation

Bike share programs provide residents and visitors with options to use bicycles for short trips within and between downtown areas and adjacent neighborhoods. They offer opportunities for people to use a bicycle from designated stations for the purpose of traveling to and from home, work, or school, running errands, or for social activities. Bike share users often register for this service and pay an annual or monthly membership fee, although many programs also offer single or multi-day ride options for the service. Bike share has been shown to be effective at providing a

travel option for short trips and for reducing trips by automobile. It can also function as a feeder service to transit systems, which often encourages an increase in trips using both of these modes.

A Bike Share Station
Source: Bublr Bikes

VISION 2050 recommends the expansion of bike share program implementation to encourage bicycling as a viable mode of travel for short distance trips. Bike share is currently operated in the City of Milwaukee, with plans to expand to additional locations in the City and to other communities. Bike share programs can reduce the number of vehicle trips and are often most effective in serving high density areas with a mix of residential and commercial uses. Bike share programs can attract people who would not typically consider riding a bicycle—short-distance commuters, people running errands, and tourists—as well as those who prefer to commute via bicycle without maintaining and securing their own bicycle.

➤ Recommendation 3.5: Provide pedestrian facilities that facilitate safe, efficient, and accessible pedestrian travel

VISION 2050 recommends that sidewalks be provided along streets and highways in areas of existing or planned urban development based on identified criteria presented in the design guidelines; that gaps in the pedestrian network be addressed through neighborhood connections to regional off-street bicycle paths, transit, and major destinations; that sidewalks be designed and constructed using widths and clearances appropriate for the levels of pedestrian and vehicular traffic in any given area; and that terraces or buffered areas be provided, where feasible, between sidewalks and streets for enhancing the pedestrian environment. VISION 2050 further encourages making efforts to maximize pedestrian safety at street crossings (specific guidance is presented in the design guidelines), including:

- The timing of walk signal phases;
- The construction of pedestrian median islands in wide, heavily traveled, or otherwise hazardous roadways;
- The construction of curb extensions ("bulb-outs") that narrow the crossing distance for pedestrians at intersections; and
- Implementing speed bumps, raised crosswalks, and raised intersections to slow traffic and increase the visibility of pedestrians.

VISION 2050 also emphasizes that all pedestrian facilities be designed and constructed in accordance with the Federal Americans with Disabilities Act (ADA) and its implementing regulations. The ADA requires all pedestrian facilities that access public and commercial buildings and services to accommodate people with disabilities. Consistent with ADA requirements, VISION 2050 encourages communities with 50 or more employees to maintain updated ADA transition plans, which evaluate and

plan for physical improvements to address accessibility for people with disabilities. Specific guidance on the location and design of pedestrian facilities, including relevant ADA requirements and appropriate regulations, is presented in the design guidelines.

VISION 2050 also recommends the development of walkable neighborhoods for the health and vibrancy of communities in the Region. Walkability refers to the ease by which people can walk in an area to various destinations such as schools, parks, retail services, and employment. Walkability can be increased through compact development patterns that have a number of destinations that are within walking distance. Sidewalks with good accessibility provide a safe place for people to reach these destinations and a well-connected network of sidewalks and bicycle facilities can encourage residents to walk or bike rather than drive. Under VISION 2050, approximately 844,000 residents would live in walkable areas compared to approximately 702,600 residents who currently live in walkable areas.

➤ **Recommendation 3.6: Prepare local community bicycle and pedestrian plans**

VISION 2050 recommends that local units of government prepare community bicycle and pedestrian plans to supplement the regional plan. The local plans should provide for facilities to accommodate bicycle and pedestrian travel within neighborhoods, providing for convenient travel between residential areas and shopping centers, schools, parks, and transit stops within or adjacent to the neighborhood. Local communities should also consider developing pedestrian safety action plans for improving pedestrian safety through street redesign and other engineering countermeasures. Implementation of Safe Routes to School programs by local communities and school districts should be encouraged in their local planning efforts to further address bicycle and pedestrian safety near schools. In addition, local units of government should encourage more compact and walkable development patterns through local land use policies in order to facilitate safe and efficient pedestrian and bicycle travel.

Description of Transportation Systems Management Element

Transportation systems management (TSM) involves managing and operating existing transportation facilities to maximize their carrying capacity and travel efficiency. TSM recommendations for VISION 2050 relate to freeway traffic management, surface arterial street and highway traffic management, and major activity center parking management and guidance. The specific TSM measures within each of the three categories collectively would be expected to result in a more efficient and safer transportation system.

Freeway Traffic Management

Freeway traffic management strategies include measures that improve the operational control, advisory information, and incident management on the regional freeway system. Some of these measures are currently in use in Southeastern Wisconsin and are recommended to be expanded and enhanced. Several newer technologies also provide potential opportunities, and certain measures not currently used in the Region are recommended to be considered for future implementation. Essential to implementing freeway traffic management measures is the State Traffic Operations Center (STOC) in the City of Milwaukee, from which all freeway segments in the Milwaukee area are monitored, freeway operational control and advisory information is determined, and incident management detection and confirmation is

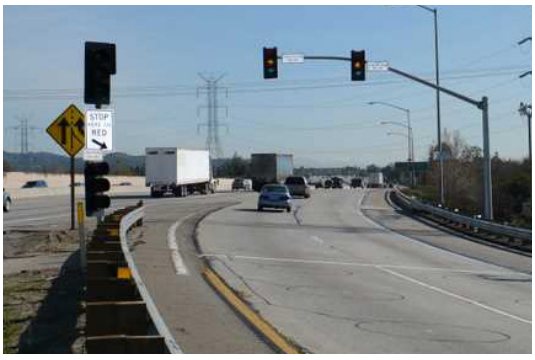
conducted. Freeway traffic management measures are described below, along with recommendations related to specific measures.

➤ Recommendation 4.1: Implement freeway operational control measures

VISION 2050 recommends measures to improve freeway operation—both during average weekday peak traffic periods and during minor and major incidents—through monitoring of freeway operating conditions and control of traffic travelling on and entering the freeway. This would include expanding and enhancing current operational control measures, such as traffic detectors and freeway on-ramp meters, and as well considering measures that are not currently in use, or not in widespread use, such as ramp meter control strategies, lane use control, speed limit control, part-time shoulder use, junction control, and truck restrictions.

- **Traffic Detectors** – Traffic detectors measure the speed, volume, and density of freeway traffic, and are used in operational control as well as advisory information and incident management. Traffic detectors have been implemented at about one-half mile intervals on the freeways in Milwaukee County and on IH 94 in Waukesha County, and at about one- to two-mile intervals on IH 94 in Kenosha and Racine Counties. The data collected from these detectors are monitored by the STOC to detect freeway system travel speed and time, traffic congestion, traffic flow breakdowns, and incidents. Freeway ramp meter traffic entry rates could be modified based upon the traffic volume and congestion indicated by the traffic detectors. Travel information on traffic congestion and delays are provided to freeway system users through the WisDOT website and on variable message signs. Traffic speeds and congestion indicated by traffic detectors could instantaneously identify the presence of a freeway incident. VISION 2050 recommends that existing freeway system traffic detectors be maintained, and that traffic detectors be installed on the freeway system as it is reconstructed throughout the Region at one-half mile intervals. The only exceptions for installing detectors on freeway segments may be those segments with current and expected future traffic volumes that would be substantially less than freeway traffic carrying design capacity, including IH 43 north of STH 57 in Ozaukee County, USH 45 north of the Richfield Interchange and IH 41 north of STH 60 in Washington County, and IH 43 and USH 12 in Walworth County.

- **Ramp Meters** – Ramp meters are traffic signals located on freeway entrance ramps used to control the rate of vehicles entering onto a freeway segment by breaking up platoons, or groups, of cars to achieve a more efficient operation of the adjacent freeway segment and the downstream freeway system. To encourage ridesharing and transit use, preferential access for high-occupancy vehicles (HOV) is provided at ramp meter locations



A Ramp Meter
Source: Caltrans

to allow the HOVs to bypass traffic waiting at a ramp-metering signal. There are currently about 121 freeway on-ramps in the Milwaukee area equipped with ramp meters. Buses and HOVs receive preferential access at 51 of the 121 on-ramp-meter locations. VISION 2050 recommends that ramp meters be installed on all freeway on-ramps in the Region as the freeway system is reconstructed, with HOV preferential access provided at metered ramps (dependent on right-of-way and on-ramp geometric constraints), particularly those which would be used by existing and planned public transit. The only exception for ramp meter installation may be those freeway segments identified above that would be expected to carry current and future traffic volumes well below their design capacity.

- **Active Traffic Management** – In addition to the freeway operation and control measures widely utilized within the Region's freeway system, VISION 2050 recommends that active traffic management (ATM) strategies not currently in use, or not in widespread use, on the Region's more heavily travelled freeways be considered for future implementation to improve their operation conditions. ATM strategies allow the dynamic operation of the freeway system based upon freeway system traffic volume, speeds, and congestion resulting during peak hour traffic, traffic incidents, and inclement weather. ATM would include strategies for managing both the traffic travelling on the freeway and the traffic entering and exiting the freeway. ATM strategies include ramp meter control, lane control, speed limit control, part-time shoulder use, junction control, truck restrictions, queue control, and dynamic rerouting. These strategies can be employed concurrently, and operated through advanced traffic management software, to more effectively manage the most heavily travelled freeways. The following provides a description of each of these types of ATM strategies.

    - **Ramp Meter Control** – Ramp meter control strategies are implemented to control the release rates of vehicles onto a freeway segment. Release rates may be determined by a "pretimed" rate or, preferably, based upon adjacent freeway system traffic volume and congestion. A successful ramp meter control strategy minimizes total travel delay on the freeway system, or along a particular freeway corridor, while providing equitable average and maximum delays at each ramp meter and avoiding the extension of vehicle queues onto surface streets. This may necessitate expanding freeway on-ramps to ensure sufficient storage space for queued vehicles, which should be considered and addressed during the reconstruction of the regional freeway system. Coordination with signals on arterial streets providing access to ramps with controlled meters may be necessary to avoid backups on the ramps and "flushing," or emptying, of the queues onto the freeway system.

    - **Lane Use Control** – Lane use control strategies utilize overhead variable message signs—such as intelligent lane control signals (ILCS) shown in the adjacent photograph—to inform motorists of lane closures, allowing them to safely merge into adjoining lanes. This strategy may also be used to close lanes in sections of freeway without an adequate shoulder to allow emergency vehicles to more quickly reach incident locations. Lane use control with an ILCS system could also be used in conjunction with the part-time shoulder use strategy (described below) by indicating when the shoulders would be available for use by through traffic. ILCS are typically spaced

about one-half mile apart to allow at least one ILCS to be visible to motorists at all times. WisDOT has implemented a lane use control system at the entrance to the Mitchell Interchange tunnel for northbound IH 94 traffic traveling west on IH 894 to advise motorists of any incidents or lane closures in the tunnel that would not be visible to approaching drivers. Based on the cost to construct and maintain ILCS technology, the strategy may only be practical for implementation in the most heavily traveled freeway corridors or sections of freeways without adequate shoulder.

Land Use Control Signals
Source: WSP / Parsons Brinckerhoff

- **Speed Limit Control** – Speed limit control, or speed harmonization, strategies utilize ILCS—often in conjunction with lane use control strategies—to allow the adjustment of the speed limit based on current traffic volumes, operating speeds, roadway surface conditions, and/or weather conditions. The speed limits for the segments of freeway upstream of slower or congested traffic can be lowered to provide a more gradual deceleration between free-flowing traffic and congested traffic, which can reduce the number and severity of rear-end crashes. The adjusted speed limits can be either enforceable or advisory to motorists.

- **Part-Time Shoulder Use** – Part-time shoulder use is a quick and inexpensive way to address capacity issues on the regional freeway system by allowing motorists to travel on shoulder lanes in times of congestion and reduced travel speeds during peak periods or in instances of traffic incidents or special events. Implementation may be limited to transit use as bus-on-shoulder (BOS)—increasing the reliability of transit service in congested corridors and encouraging increased transit use by the public—or as an HOV lane—encouraging motorists to carpool. It may be necessary to construct emergency refuge areas at frequent intervals along the portions of freeway shoulder where use as a through lane is permitted, as vehicles would not be able to use the shoulder for refuge purposes during its use as a through lane.

Bus-on-shoulder
Source: Minnesota Department of Transportation

- **Junction Control** – Junction control dynamically changes the lanes used by traffic approaching or leading from an interchange using signs and lighted pavement markers. This measure is useful

at entrance ramps that experience high enough demand (at certain times of the day or prior to or following special events) that the traffic on the adjacent freeway segment does not provide sufficient gaps for merging vehicles. It is also useful for exit ramps where long queues back onto the mainline freeway. Junction control can be used to indicate the availability during peak times of part-time shoulder use, which can be utilized to provide additional ramp capacity.

Dynamic message sign displays a junction control activated (left) and not activated (right)
Source: Caltrans

- **Dynamic Truck Restrictions** – Dynamic truck restrictions limit truck traffic to a particular lane or set of lanes, typically the rightmost lanes, during peak travel periods. This strategy restricts the movement of trucks and enables passenger cars and light trucks to flow more freely without the disruption of a truck changing lanes or impeding traffic. Dynamic truck restrictions, which can also include buses and vehicles towing trailers, may increase left lane travel speeds and stabilize traffic flow during peak travel periods.

- **Queue Warning** – Queue warning is a strategy that involves alerting motorists of upcoming slower speeds and congestion utilizing variable message signs and flashing lights. This strategy is intended to allow motorists sufficient time to more gradually decelerate between free-flowing traffic and congested traffic, which can reduce the number and severity of rear-end crashes. A queue warning system could also use infrastructure-to-vehicle (I2V) or vehicle-to-vehicle (V2V) technology to detect existing queues and send the queue information directly to vehicles equipped with such technology.

- **Dynamic Rerouting** – This strategy involves providing motorists with appropriate alternate arterial routes—freeway or surface arterials—when a segment of freeway is experiencing extremely congested conditions. The alternate routes are determined based on current traffic conditions along nearby arterial routes. Information on the alternative routes could be provided through the 511 Wisconsin traveler information website and system, through variable message signs on the freeway, and via the media. Similar to the queue warning systems, dynamic rerouting could also use I2V technology to send rerouting information directly to vehicle equipped with such technology.

➤ Recommendation 4.2: Implement advisory information measures for the Region's freeway system

VISION 2050 recommends expanding and enhancing advisory information measures that provide real-time advisory information on current travel conditions to motorists.

- **Variable Message Sign (VMS)** – A VMS is a permanent or portable device used by the STOC to display dynamic messages providing real-time information to motorists about downstream freeway traffic conditions such as current travel times, lane and ramp closures, and

where travel delays begin and end. It is also used to display AMBER Alerts in the event of a child abduction, as well as other similar alerts. VMS is currently deployed at 31 locations along the freeway system, and at 19 locations on surface arterials that connect with the freeway system. VISION 2050 recommends that VMS be provided on the entire freeway system as it is reconstructed, and on surface arterials leading to the most heavily used freeway system on-ramps. As I2V technology becomes more advanced and has more widespread use, perhaps the use of VMS technology, which has a higher cost to employ, will no longer be necessary.

A Variable Message Sign
Source: WisDOT

- **WisDOT Traveler Information Website** – The 511 Wisconsin traveler information website (www.511Wi.gov) provides up-to-date information about traffic conditions using data collected from freeway system traffic detectors. The information provided on the website includes color-coded maps depicting the level of freeway traffic congestion, travel times and delays, locations of confirmed incidents, trucker information, winter road conditions, and views of traffic from a closed-circuit television (CCTV) camera network. In addition, the website includes information on current and upcoming construction projects. In 2015, WisDOT also launched a free 511 Wisconsin smart phone application, which allows users to receive instant notifications of traffic alerts. In addition, WisDOT currently provides traffic and construction related announcements through social media sites, such as Twitter and Facebook. In conjunction with its website, WisDOT is currently deploying a statewide 511 traveler information system, which allows the public to dial "511" and receive automated messages about current travel conditions along their desired route through a series of predetermined automated menus. VISION 2050 recommends that WisDOT continue to improve its website and "511" system for providing advisory information to motorists. Some of these improvements could include crowd-sourcing of road and travel conditions, development of a hands-free mobile phone application, and addition of roundabout, park-ride, rest area, and more truck information, such as inclusion of a truck parking information system.

- **Highway Advisory Radio (HAR)** – HAR is a system of low-power radio transmitters licensed for State use that transmit prerecorded messages concerning ongoing highway construction projects, traffic conditions during special events, and AMBER Alerts. HAR systems are generally very localized and directed to motorists at a specific location along a specific route. Currently, there are 14 HAR site locations with 18 flashing signs located on IH 94 in Kenosha, Milwaukee, Racine, and Waukesha Counties, on IH 43 in Ozaukee and Milwaukee Counties, and on IH 41/USH 45 in Milwaukee and Washington Counties. VISION 2050 recommends that WisDOT continue to utilize the HAR system as deemed necessary.

- **Dynamic Route Planning** – Emerging technologies continue to make traffic data readily available to the public, allowing motorists to access real-time traffic information via computer, mobile device, and in-car navigation systems. There is also an increasing number of private crowd-sourced traffic information providers, such as Waze, which rely on users providing current traffic conditions. Based on this information, the traffic information provider can dynamically make route suggestions to motorists. VISION 2050 recommends that WisDOT and local governments consider future partnerships, particularly the Connected Citizens Program with Waze, to enable the exchange of traffic information and data. WisDOT and local governments can benefit from such a partnership by receiving real-time traffic condition information, such as traffic incidents, congestion, road conditions, and hazards. In turn, traffic information providers can use information shared openly by WisDOT and local governments, such as scheduled road closures and current construction projects, to better inform motorists of current traffic conditions. Currently, users of the traffic data provided by WisDOT and third-party providers is typically done through smart phones and GPS units. It is expected that over the next few years automobile manufacturers will expand the capability of accessing traffic information through direct connections to the internet in the automobiles that they produce.

➤ Recommendation 4.3: Implement incident management measures for the freeway system

VISION 2050 recommends expanding and enhancing incident management measures that detect, confirm, and remove as quickly as possible incidents on the freeway system, and on freeway system shoulders, including accidents, debris, and stopped vehicles. Measures that enhance incident management include freeway service patrols, CCTV, freeway location reference markers, crash investigation sites, ramp closure devices, and alternate route designations. Critical to incident management is the Traffic Incident Management Enhancement (TIME) Program sponsored by WisDOT, which brings together and coordinates transportation engineering, law enforcement, emergency responders, tow and recovery, and other freeway system operational interests at monthly meetings to improve and enhance freeway incident management and safety. Incident management of the freeway system could also be enhanced by expanding the STOC to include on-site safety, media, and maintenance personnel. As well, WisDOT could expand the development and use of predetermined strategies to manage traffic on the freeway and adjacent arterial highways, particularly during incidents, called Integrated Corridor Management (ICM). These strategies are currently being deployed as part of the Zoo Interchange reconstruction project.

- **CCTV Cameras** – CCTV cameras provide live video images to WisDOT and the Milwaukee County Sheriff's Department, which allow for the rapid confirmation of congested areas and the presence of an incident, and the determination of the appropriate response to the incident. Currently, there are 159 CCTV cameras on most of the Region's heavily traveled freeways, along with 46 CCTV cameras on surface arterials parallel and connecting with the freeway system primarily located in Milwaukee County. VISION 2050 recommends that the CCTV camera network be provided on the entire regional freeway system as it is reconstructed, with the possible exception of the freeway segments identified previously that carry existing and future traffic volumes well below their design capacity.

- **Enhanced Reference Markers** – Enhanced reference markers assist motorists in identifying specific locations along a freeway segment when reporting incidents. These markers are typically small signs provided at one-tenth mile intervals along the freeway system that typically display the highway shield and mile marker. Enhanced reference markers are currently provided in Milwaukee County in the freeway median at each one-tenth mile on IH 41/USH 45 from the Zoo Interchange to the Milwaukee-Waukesha County line, and on IH 94 from the Mitchell Interchange to the Illinois-Wisconsin State line, including the freeway segments of IH 94 in Kenosha and Racine Counties. VISION 2050 recommends that freeway location reference markers be provided on the entire regional freeway system.

- **Freeway Service Patrols** – Freeway service patrols consist of specially equipped vehicles designed to assist disabled motorists and assist in clearance of incidents. Freeway service patrol vehicles may be equipped to provide limited towing assistance, as well as minor services such as fuel, oil, water, and minor mechanical repairs. Freeway service patrols are currently operating in Milwaukee County and as part of freeway construction projects. VISION 2050 recommends expanding freeway service patrol to serve the entire regional freeway system, and providing greater coverage including all-day weekday and weekend service, evening service, and increased vehicle coverage of one vehicle per 12 to 15 miles of freeway. An exception would be the freeway segments identified previously that carry existing and future traffic volumes well below their design capacity.

A Freeway Service Patrol Vehicle
Source: WisDOT

- **Ramp Closure Devices** – Ramp closure devices allow for the closure of freeway on-ramps during major traffic incidents, inclement weather, or special events. They allow law enforcement and public works vehicles to be deployed to incident locations as needed, without requiring the use of these vehicles to block access to freeway ramps. Ramp closure devices are currently deployed at interchanges on IH 94 in Kenosha, Milwaukee, Racine, and Waukesha Counties, on IH 43 in Milwaukee, Walworth, and Waukesha Counties, and on IH 794 and IH 894 in Milwaukee County.

A Ramp Closure Device
Source: WisDOT

VISION 2050 recommends that WisDOT expand implementation of ramp closure devices throughout Southeastern Wisconsin.

- **Crash Investigation Sites** – Crash investigation sites are designated safe zones for distressed motorists to relocate to if they are involved in an incident on the freeway. Currently, there are 32 crash investigation sites on the Region's freeway system with 24 of the 32 sites in Milwaukee County. VISION 2050 recommends that WisDOT evaluate the extent of use and attendant benefits of existing crash investigation sites, and consider expansion as needed to serve the entire regional freeway system.

- **Alternative Routes** – Alternate route designations are clearly marked and signed surface arterial streets and highways that provide a secondary route to be used by motorists during major freeway incidents, ramp closures, or during times of extreme congestion. VISION 2050 recommends that WisDOT and the Regional Planning Commission, together with the concerned and affected local governments, continue to examine potential designation of alternate routes.

- **Law Enforcement Freeway Refuge Site** – A law enforcement freeway refuge site is a location along the freeway mainline where law enforcement vehicles can park to monitor traffic and respond to traffic incidents. These sites are particularly desirable along segments of freeway without an adequate shoulder, which require law enforcement vehicles to continuously circulate on these segments of freeway. VISION 2050 recommends that WisDOT consider installing law enforcement freeway refuge sites at appropriate locations along the freeway system.

Surface Arterial Street and Highway Traffic Management

Surface arterial street and highway traffic management strategies are measures that improve the operation and management of the regional surface arterial street and highway network. Some of these measures are currently in use in the Region and are recommended to be expanded and enhanced. Surface arterial street and highway traffic management measures are described below, along with recommendations related to specific measures, including advisory information, traffic signal coordination, intersection traffic engineering improvements, curb-lane parking restrictions, and access management.

➤ **Recommendation 4.4: Improve and expand coordinated traffic signal systems**

Coordinated traffic signal systems provide efficient progression of traffic along arterial streets and highways, reducing travel time delay and increasing reliability, and allowing motorists to travel through multiple signalized intersections without stopping. There are several coordination system types, including:

- Time-based coordination relies on devices within each traffic signal controller to accurately keep time, with signal coordination based on a prescribed signal timing plan programmed into each individual traffic signal controller.

- Interconnected pre-timed coordination is based on the remote communication (i.e. hard wiring or radio connection) between each individual traffic signal controller and a master traffic signal controller.

- Traffic responsive system are interconnected systems of traffic signals that respond to information provided by traffic detectors over several cycles—or minutes—to determine appropriate traffic signal cycle lengths and phasing.

- Real-time adaptive systems use technology that allows the adjustment of green times and signal cycle lengths on a real-time basis as data are gathered and evaluated along the corridor.

- Central computer control systems are based on a central computer facility that receives and analyzes traffic information provided by traffic detectors, and develops appropriate signal cycle lengths, offsets, and phasing. The system then communicates this information to the individual traffic signal controllers.

In the Region, coordinated traffic signal systems currently range from systems comprising two traffic signals to systems comprising 100 traffic signals. Approximately 1,200 of the 1,700 traffic signals in the Region, or about 71 percent, are currently part of a coordinated signal system. VISION 2050 recommends that Commission staff work with State and local governments to document existing and planned arterial street and highway system traffic signals and traffic signal systems, and develop recommendations (including prioritization) for improvement and expansion of coordinated signal systems. The intent is to identify signal coordination corridors that should receive high priority for Federal and State funding, such as FHWA Congestion Mitigation and Air Quality (CMAQ) Improvement Program funds. VISION 2050 also recommends the preparation and implementation of coordinated traffic signal plans along all surface arterial street and highway routes in the Region that have traffic signals located at one-half mile or less spacing. This measure also recommends that agencies coordinate their efforts so that motorists do not experience unnecessary stops or delays due to changes in individual traffic signal jurisdiction authority.

➤ Recommendation 4.5: Improve arterial street and highway traffic flow at intersections

Intersection improvements increase travel efficiency and improve safety along arterial streets and highways through improvements such as improving the type of traffic control deployed at the intersection (two- or four-way stop control, roundabouts, or signalization); improving signal timing at individual signalized intersections; adding right- and/or left-turn lanes; or improving bicycle and pedestrian accommodation through an intersection (e.g. pavement markings and leading pedestrian intervals at signalized intersections). VISION 2050 recommends that State and local governments aggressively consider and implement individual arterial street and highway intersection improvements. VISION 2050 also recommends that State, county, and municipal governments each prepare a prioritized short-range (two- to six-year) program of arterial street and highway intersection improvements under their jurisdiction, and review and update the programs every two to five years. VISION 2050 further recommends that Commission staff work with State, county, and municipal governments at their request to prepare such programs for arterial street and highway intersections, identifying the need for improvement, and recommended improvements.

➤ Recommendation 4.6: Expand curb-lane parking restrictions

Curb-lane parking restrictions improve traffic flow and operation by restricting on-street parking during peak traffic periods and operating

the curb parking lanes as through traffic lanes. This measure provides an alternative to the expansion of highway capacity through roadway widenings and new construction. VISION 2050 recommends that State and local governments consider implementation of curb-lane parking restrictions as needed during peak traffic periods in the peak traffic direction along segments of roadway expected by the year 2050 to operate under congested conditions and where there may be the ability to utilize the existing parking lane as a traffic lane. It is recognized that curb-lane parking restrictions may not be feasible in commercial areas where parking is essential to the businesses, such as along Greenfield Avenue in the City of West Allis and North Avenue in the City of Wauwatosa. It may also not be possible to restrict parking for use as a traffic lane along roadway corridors identified for enhanced bicycle accommodations. In such corridors, the level of bicycle accommodation and the ability to prohibit parking for use as a traffic lane, would be determined as part of the preliminary engineering for the reconstruction of the roadway. In addition, it may not be possible to restrict parking for use as a traffic lane along segments of roadway where bus rapid transit service is recommended to operate in a dedicated lane. Map 1.13 shows the potential curb-lane parking restrictions that could be considered as needed during peak traffic periods along segments of roadway expected by the year 2050 to operate under congested conditions and where there may be the ability to utilize the existing parking lane as a traffic lane.

➤ Recommendation 4.7: Develop and adopt access management standards

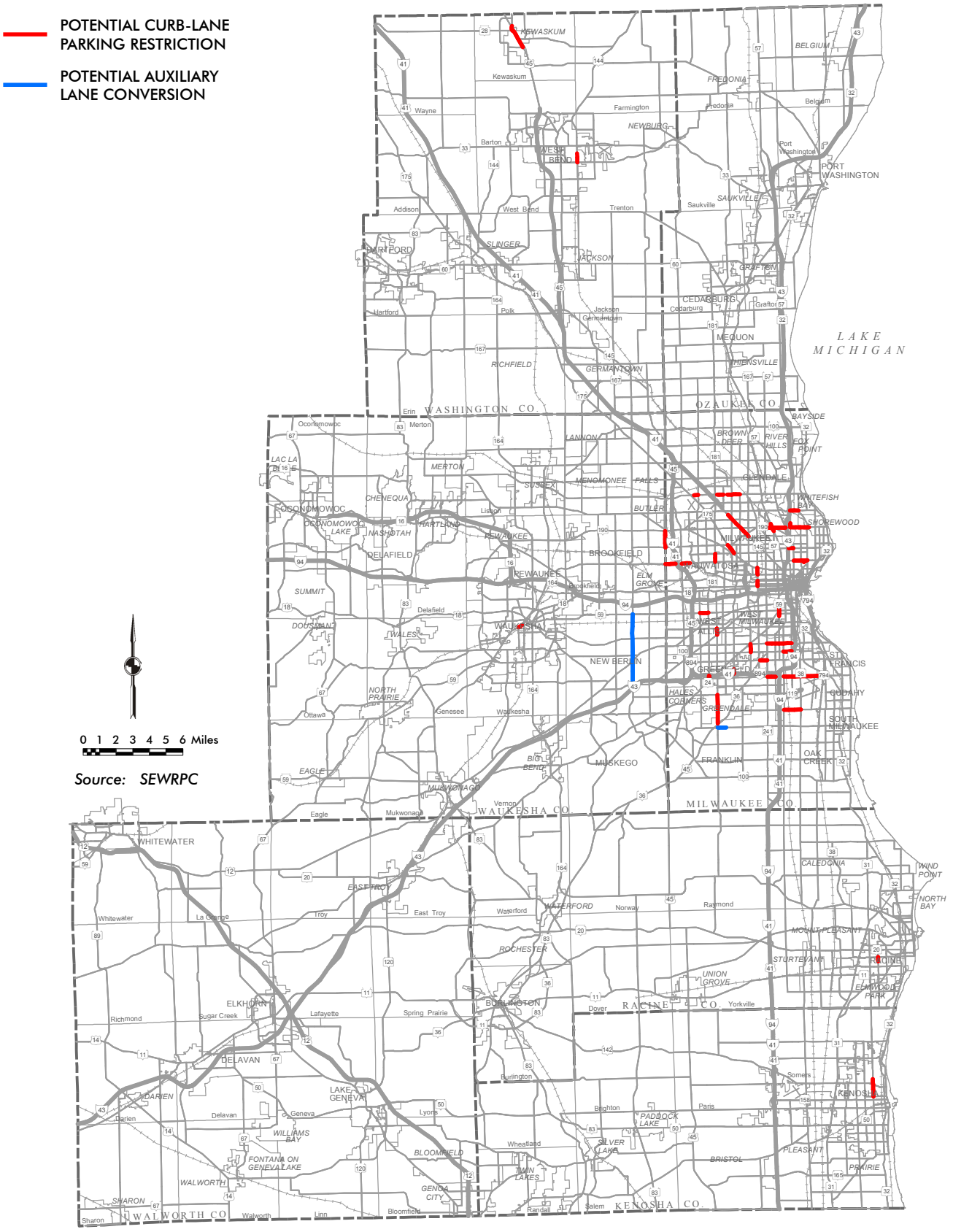
Developing access management standards for the location, spacing, and operation of driveways (residential and commercial), median openings, and street connections improves transportation systems operations by providing full use of the roadway capacity and reducing the number of conflicts that can result in crashes. VISION 2050 recommends that State and local governments continue to adopt and employ access management standards as development takes place along arterials under their jurisdiction and prepare and implement access management plans along arterials that currently are developed and violate these access management standards. A set of recommended access standards is included in the design guidelines.

➤ Recommendation 4.8: Enhance advisory information for surface arterial streets and highways

Similar to advisory information measures for the regional freeway system, advisory information measures for surface arterials involves providing real-time information of existing conditions, particularly delays and major incidents, to encourage more informed travel decisions and a more efficient transportation system. VISION 2050 recommends improving and expanding advisory information measures, including expanding data provided on the 511 Wisconsin website concerning freeway travel to include surface arterials and implementing VMS, including hybrid variable/static travel time signs (as shown in the picture above). Hybrid travel time signs provide motorists

A Hybrid Variable/Static Travel Time Sign
Source: SEWRPC

Map 1.13
Location of Potential Curb-Lane Parking Restrictions and Auxiliary Lane Conversions on Arterial Streets and Highways: VISION 2050



with travel times for alternate parallel routes to the same destination, with the times updated in real-time. The availability of travel time information allows motorists to choose the quickest route to their destination. The travel time provided can be based on data collected by traffic detectors installed along the routes. In addition, Bluetooth sensors can be installed that detect any device emitting a Bluetooth signal to estimate travel speeds along the alternative route. Hybrid travel time signs have been implemented as part of the Zoo Interchange reconstruction project, with data being provided to the signs by Bluetooth sensors installed along the surface arterial routes. The signs and Bluetooth sensors were installed along portions of Bluemound Road (USH 18), Greenfield Avenue (STH 59), and Mayfair Road/108th Street (STH 100).

➤ Recommendation 4.9: Expand the use of emergency vehicle preemption

Emergency vehicle preemption allows emergency vehicles to intervene in the normal operation of traffic signals to either change the traffic signal to the green phase or to hold the green phase for the approach from which the emergency vehicle is oriented. Some governmental units in the Region have implemented emergency vehicle preemption on some or all of the traffic signals under their jurisdictional authority. VISION 2050 recommends expanding the use of emergency vehicle preemption at traffic signals in Southeastern Wisconsin.

Major Activity Center Parking

VISION 2050 recommends strategies to improve parking around major activity centers that allow motorists to find available parking quickly, reducing traffic volume and congestion, and attendant air pollutant emissions and fuel consumption. Measures to improve parking around major activity centers include a parking management and guidance system and demand-responsive pricing.

➤ Recommendation 4.10: Implement parking management and guidance systems in major activity centers

VISION 2050 recommends reducing the traffic circulation of motorists seeking parking in major activity centers through the implementation of parking management and guidance systems. A current initiative supporting this recommendation is the City of Milwaukee Advance Parking Guidance System, for which the City completed the first phase in late June 2014. This system provides motorists with real-time parking information around downtown Milwaukee with variable and static message signs located at various locations on major freeway ramps and arterial roadways. The message signs display the address of a participating parking structure, the travel direction of the parking structure, and the

A Parking Guidance Sign
Source: City of Milwaukee

number of parking spots that are available in the parking structure. These data could also be made accessible to the public via smartphone by the local municipalities or a third party provider.

- **Recommendation 4.11: Implement demand-responsive pricing for parking in major activity centers**

  Demand-responsive pricing for parking adjusts the price for on-street parking, parking lots, and parking garages in major activity centers. The price for parking can be adjusted throughout the day based on the parking demand in the area so that at least one parking space is available most of the time. Motorists find demand-responsive pricing information online and through smartphone apps that help drivers find parking easier and faster. This strategy can improve parking availability and reduce traffic congestion. VISION 2050 recommends that demand-responsive pricing for parking be considered for future implementation in major activity centers.

Regional Transportation Operations Plan

The current regional transportation operations plan (RTOP), completed in 2012, is a five-year program identifying candidate corridor and intersection TSM projects prioritized for implementation and funding, particularly with respect to FHWA CMAQ Program funding.

- **Recommendation 4.12: Review and update regional transportation operations plan**

  VISION 2050 recommends that Commission staff work with State, county, and municipal governments to review and update the RTOP every four years, with the next update to occur following adoption of VISION 2050. The purpose of the update to the RTOP is to identify additional candidate corridor and intersection TSM projects, and to identify the projects that would have priority for Federal and State funding, such as Federal CMAQ Program funds. During the development of VISION 2050, counties and municipal governments identified roadway corridors and intersections potentially having traffic flow issues, as shown on Table 1.11. VISION 2050 recommends that these corridors and intersections be considered as part of the next review and update to the RTOP, programmed to be completed in 2016.

Description of Travel Demand Management Element

Travel demand management (TDM) refers to a series of measures or strategies intended to reduce personal and vehicular travel or to shift such travel to alternative times and routes, allowing for more efficient use of the existing capacity of the transportation system. The general intent of such measures is to reduce traffic volume and congestion, and attendant air pollutant emissions and fuel consumption. To be effective, these measures should be technically and politically feasible; integrated with public transit, bicycle and pedestrian, and arterial street and highway improvements; and combined into coherent packages so that a variety of measures are implemented. VISION 2050 recommends TDM measures, including HOV preferential treatment, park-ride lots, personal vehicle pricing, TDM promotion, and detailed site-specific neighborhood and major activity center land use plans. It should be noted that there is an inherent overlap between the TDM and public transit elements of VISION 2050, and the transit element recommends a number of additional measures that would reduce personal and vehicular travel beyond those included in the TDM element.

Table 1.11
Isolated Intersections and Roadway Corridors Identified as Having Potential Traffic Flow Issues by County and Local Municipal Governments: VISION 2050

County	Location
Milwaukee	• E. Layton Avenue (CTH Y) between S. 27th St. (STH 241) and S. Pennsylvania Avenue
Ozaukee	• Intersection of STH 57 and CTH A/CTH H • Intersection of STH 33 and CTH I • Intersection of STH 57 and Jay Road • Intersection of CTH W and STH 167 • Intersection of N. Port Washington Road (CTH W) and W. Mequon Road (STH 167) • Intersection of N. Port Washington Road (CTH W) and Highland Road
Walworth	• Intersection of USH 12 and CTH ES • Intersection of USH 12 and CTH A • Intersection of STH 89 and CTH A • Intersection of STH 50 at IH 43 • Intersection of South Road and USH 12[a]
Washington	• Intersection of Division Road (CTH G) and Fond Du Lac Avenue (STH 145) • Intersection of IH 41 southbound off ramp and STH 60 • Intersection of IH 41 southbound off ramp and STH 33
Waukesha	• Intersection of E. Ottawa Avenue (CTH Z) and Summit Avenue (STH 67) • Intersection of Summit Avenue (STH 67) and CTH D • Intersection of S. Moorland Road (CTH O) and W. Cleveland Avenue (CTH D) • Intersection of S. Moorland Road (CTH O) and W. National Avenue (CTH ES) • Intersection of S. Moorland Road (CTH O) and W. Beloit Avenue (CTH I) • Intersection of S. Moorland Road (CTH O) and W. Grange Avenue • Intersection of Pilgrim Road (CTH YY) and Silver Spring Drive (CTH VV) • Intersection of Pilgrim Road (CTH YY) and W. Good Hope Road (CTH W) • Intersection of Lynndale Road (CTH JK) and Ryan Road (CTH KF) • Intersection of Pewaukee Road (STH 164) and Capitol Drive (STH 190) • Intersections of Redford Boulevard (CTH F) with IH 94 ramps • Intersection of Redford Boulevard (CTH F) and Watertown Road (CTH M) • Intersection of Watertown Road (CTH M) and North Avenue (CTH M) • Intersection of Plain View Road and Town Line Road (CTH V) • Intersection of Waukesha Avenue (STH 74) and Silver Spring Drive (CTH VV) • Intersection of Lisbon Road (CTH K) and Duplainville Road • Intersection of Lisbon Road (CTH K) and Redford Boulevard (STH 74)

[a] *Identified based on a proposed development near the intersection anticipated to generate traffic that would potentially require improvement to the intersection.*

Source: SEWRPC

➤ Recommendation 5.1: Enhance the preferential treatment for high-occupancy vehicles

VISION 2050 recommends continuing and enhancing the preferential treatment for transit vehicles, vanpools, and carpools on the existing arterial street and highway system. Providing preferential treatment for transit vehicles reduces transit travel times and improves transit travel time reliability, making public transportation more competitive with personal vehicle use. Measures to improve preferential treatment for HOV include the provision of HOV queue bypass lanes at metered freeway on-ramps, and preferential carpool and vanpool parking. Additional measures include transit signal priority systems and reserved bus lanes along congested surface arterial streets and highways, which are discussed further in Recommendation 2.6 of the transit element.

- **HOV Queue Bypass Lanes** – HOV queue bypass lanes allow transit vehicles or vehicles with multiple passengers to bypass single-occupancy vehicle queues at metered freeway on-ramps, providing reduced travel time incentives to carpools, vanpools, and transit vehicles. The provision of HOV queue bypass lanes at metered freeway on-ramps exists at 51 of the 121 metered freeway on-ramp locations

on the Region's freeway system. VISION 2050 recommends providing HOV bypass lanes at metered freeway on-ramps within the Region, particularly at on-ramps near park-ride facilities and at on-ramps that would be used by existing and planned public transit, dependent on right-of-way and on-ramp geometric design constraints.

- **Preferential Carpool and Vanpool Parking** – Preferential carpool and vanpool parking involves employers providing free/subsidized parking or preferential parking for employees who carpool or vanpool to their employment site. This measure can reduce vehicle trips by encouraging ridesharing among employees. VISION 2050 encourages employers to provide free/subsidized parking or preferential parking for employees who carpool or vanpool to the employment site.

➤ Recommendation 5.2: Expand the network of park-ride lots

To promote carpooling and the resultant more efficient use of the Region's transportation system, VISION 2050 recommends expanding the network of park-ride lots. Park-ride lots should be located along all major routes at their major intersections and interchanges where sufficient demand may warrant provision of an off-street parking facility. Map 1.14 shows the recommended system of park-ride lots, including existing park-ride lots and those recommended to be served by transit.

➤ Recommendation 5.3: Price personal vehicle travel at its true cost

VISION 2050 recommends that a larger percentage of the full costs of construction, maintenance, and operation of street and highway facilities and services and parking facilities and services be borne by the users of the system, with strategies including cash-out of employer-paid parking, road pricing, and parking pricing. These measures can result in a reduction in total vehicle-miles of travel (VMT).

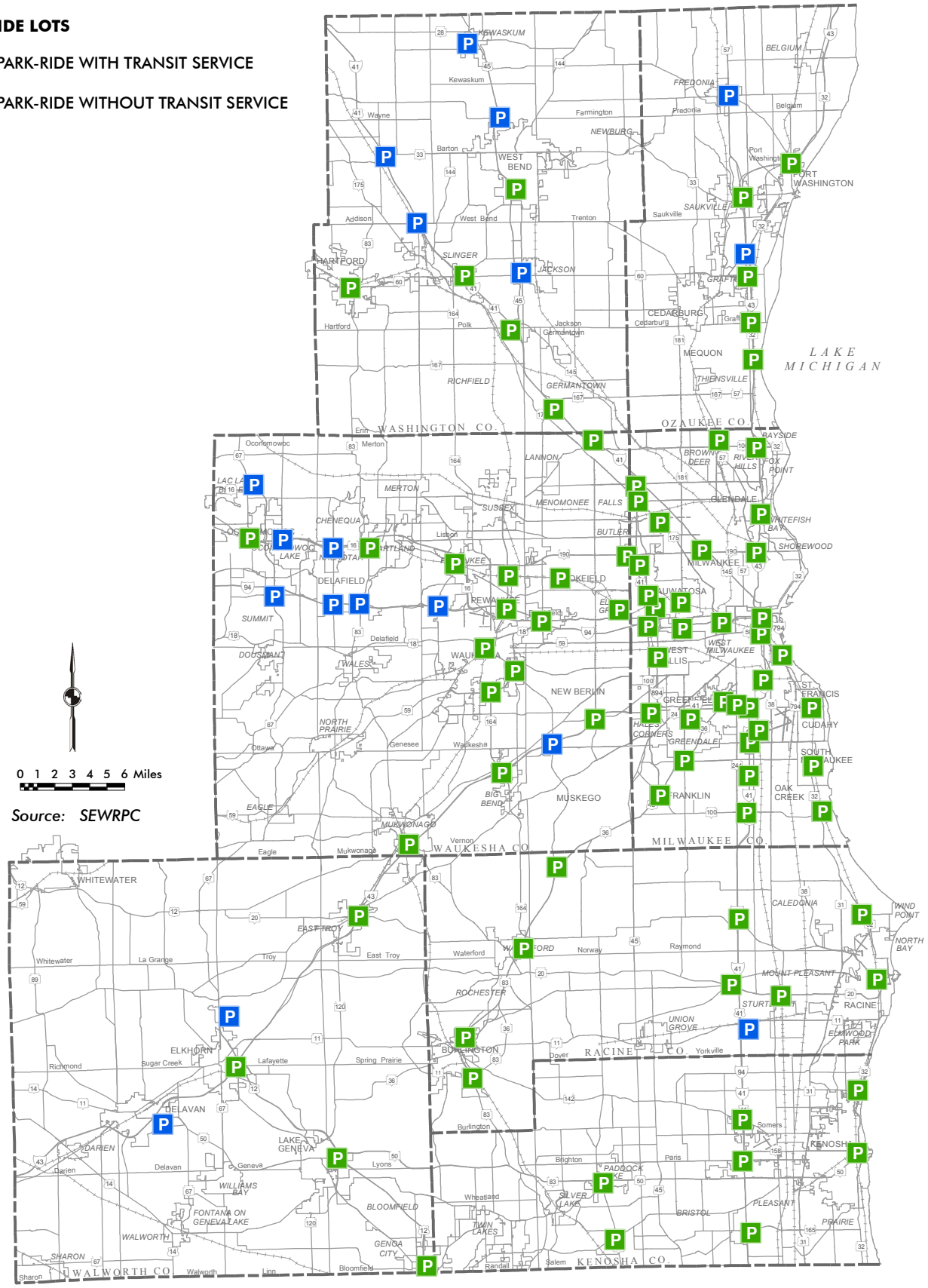
- **Cash-out of Employee-Paid Parking** – Cash-out employee-paid parking encourages employers currently providing free/subsidized parking to charge their employees the market value of parking. Employers could offset the additional cost of parking through cash payment or salary increases to employees. This measure would potentially reduce vehicle-trips and VMT through the increased use of transit, ridesharing, walking, and bicycling, as some employees may "pocket" the cash payment or salary increase. Employers could also subsidize all, or a portion of, the parking costs for employees who carpool or vanpool to the employment site to further encourage ride-sharing. VISION 2050 supports employers implementing cash-out of employee-paid parking and subsidizing all, or a portion of, the parking costs for employees who carpool or vanpool to the employment site.

- **Road Pricing Strategies** – Road pricing involves charging user fees to pay the costs of construction, maintenance, and operation of street and highway facilities and services. Current user fees primarily include Federal and State motor fuel taxes and vehicle registration fees. Federal and State motor fuel taxes have not been increased within the last decade, and there is substantial opposition at the Federal and State level to increase the current motor fuel tax rates. Additionally, technological advances, such as increased fuel efficiency and alternative fuels have the potential to reduce the ability of the current motor fuel tax system to equitably pay for the costs of constructing, maintaining, and operating the arterial street and highway facilities. There is merit in having the users of the transportation system pay the actual costs

Map 1.14
Park-Ride Lots: VISION 2050

PARK-RIDE LOTS

- P — PARK-RIDE WITH TRANSIT SERVICE
- P — PARK-RIDE WITHOUT TRANSIT SERVICE



Source: SEWRPC

of the transportation system, and as travel behavior is affected by the cost of travel, user fees can encourage the use of alternative modes of travel, lessening the number of vehicles, and potentially the amount of congestion, on the arterial street and highway network. VISION 2050 supports the user fee concept, including potential increases in motor fuel taxes and consideration of alternative user fees that either supplement or replace the motor fuel tax system. Alternative user fees that should be considered include a VMT fee, tolling, and/or congestion pricing.

- **VMT Fee** – A VMT fee is a road pricing measure that imposes a fee on a motorist based on the total distance they drive over a specified period of time. A distance-based fee would encourage residents to drive less, potentially reducing total VMT, traffic volumes, and congestion. This strategy also provides a more equitable means of paying for the costs of the construction, maintenance, and operation of the transportation system as motorists would pay for their actual use of the transportation system, as opposed to paying based on the amount of fuel purchased, which is affected by the fuel efficiency of their vehicle, as a proxy for the amount their vehicle uses the transportation system. Studies and pilot projects across the country suggest that VMT fees could potentially replace or supplement Federal and State motor fuel taxes. Implementing a VMT fee utilizing technologies such as a GPS unit or an in-vehicle device that would collect mileage data have faced obstacles due to technology uncertainty, privacy concerns, and cost implementation issues. However, low technological options, such as incorporating odometer readings during the annual vehicle registration process, are also possible. In 2013, the Wisconsin Transportation Finance and Policy Commission, a state task force appointed by the Governor, recommended incorporating a VMT fee with the annual registration fee, but the proposal was not considered by the State Legislature.

- **Tolling** – Tolling requires a motorist to pay a fee to use a particular highway facility. Requiring motorists to pay for the facilities they use would provide additional funds to cover the costs of construction, maintenance, and operation of those facilities, and may result in residents choosing alternative modes of transportation. Federal law currently prohibits the implementation of tolls on Federal-aid highways.

- **Congestion pricing** – Congestion pricing is a user fee for an express lane or highway facility that adjusts based on the time of day and level of congestion. Applying economic supply and demand methodology, the user fee for the express lane or highway facility increases during times of high traffic

Congestion Pricing Example
Source: Minnesota Department of Transportation

volume and congestion, and decreases during times of low traffic volume and no congestion. Effective express lane congestion pricing ensures free flowing traffic in the toll lanes, efficiently moving vehicles through a congested corridor as well as providing additional revenue for the construction, maintenance, and operation of the transportation system. Effective highway facility congestion pricing encourages travelers to shift to alternative modes of transportation particularly during peak travel times, or encourages motorists to seek alternative routes or change the time of their travel, potentially reducing congestion on the highway facility.

- **Parking Pricing Strategies** – Parking pricing strategies involve charging user fees for commercial and residential parking facilities. The availability of free parking encourages driving while the cost associated with maintaining parking facilities is paid by everyone, including those who do not drive, through higher prices on merchandise, food, and rent. Imposing a user fee on parking encourages individuals to use alternatives to the automobile to travel to entertainment and retail establishments and also encourages residents to reduce the number of vehicles they own. A user fee for parking also places more of the costs associated with maintaining parking facilities onto those who use them. VISION 2050 supports the implementation and expansion of parking pricing strategies.

➤ Recommendation 5.4: Promote travel demand management

VISION 2050 recommends a region-wide program to aggressively promote transit use, bicycle use, ridesharing, pedestrian travel, telecommuting, and work-time rescheduling, including compressed work weeks. The program would include education, marketing, and promotion elements aimed at encouraging alternatives to drive-alone personal vehicle travel. VISION 2050 further recommends expanding programs and services that provide residents in Southeastern Wisconsin the opportunity to reduce personal vehicle ownership and vehicular travel, which include car sharing services and a live near your work program.

- **Car Sharing Services** – Car sharing services provide an option for travelers who rely primarily on public transit and non-motorized transportation, but at times need a vehicle for special trips such as grocery shopping or trips to rural areas. Typically, a privately owned vehicle entails fixed costs—such as insurance or a car loan—that an owner must pay regardless of the amount they drive, while car sharing services allow drivers to pay per trip. Car sharing services reduce the need for households to own a personal vehicle and reduce a household's VMT because users would only drive when necessary, rather than out of convenience. Local governments can enhance car sharing services by providing dedicated on-street parking spots exclusively for car sharing vehicles at strategic locations. Zipcar, an existing car sharing service in

A Car Sharing Service
Source: City of Milwaukee

the City of Milwaukee, has several stations located across Downtown, the Lower East Side, and the campuses of the University of Wisconsin-Milwaukee and Marquette University. VISION 2050 recommends expanding the car sharing services where appropriate in Southeastern Wisconsin.

- **Live Near Your Work Program** – Live near your work programs provide down payment assistance, location efficient mortgages, and rent subsidies for people who buy or rent a home near their employer. Encouraging residents to live near their work reduces VMT and increases transit use. Several Milwaukee area companies participate in an employer-assisted housing program that provides assistance to employees who seek home ownership. These types of programs can be designed to encourage homeownership close to work. VISION 2050 recommends expanding programs similar to the employer-assisted housing program to encourage employees to live near their work.

➤ Recommendation 5.5: Facilitate transit, bicycle, and pedestrian movement in local land use plans and zoning

VISION 2050 recommends that local governments facilitate transit, bicycle, and pedestrian movement as they prepare and implement detailed, site-specific neighborhood and major activity center land use plans. The design and layout of neighborhoods and major activity centers heavily influence residents' transportation choices. Land use strategies recommended under the land use component of VISION 2050 promote transit, bicycle, and pedestrian movement and involve mixed-use and high density development and changes in parking regulations.

- **Neighborhood Plans** – Mixed-use and higher density neighborhoods can facilitate bicycling and walking by reducing vehicle dependency. Neighborhoods with employment, shopping, parks, and other entertainment options nearby provide the opportunity for residents to reach their destinations without a vehicle. Many local governments in Southeastern Wisconsin have recognized, in their planning and land use regulations, the need for improved internal circulation and transit access in addition to the desirability of mixed land uses and higher development densities. Neighborhood plans that incorporate these aspects, which encourage using alternative modes of transportation, can be achieved through zoning, official mapping, subdivision control, site plan review, and site permitting measures. TOD, as described under the land use component of VISION 2050, involves the development of multi-family buildings and buildings with mixed-use development surrounding rapid transit and commuter rail stations. Neighborhood development around transit stations increases the transit accessibility to a number of destinations such as jobs and entertainment, increasing the desirability and attractiveness of transit and reducing vehicle dependency. TOD also provides convenient and safe access for walking and bicycling.

- **Limit Parking Availability** – A particular strategy that can encourage using alternative modes of transportation in urban areas is to limit the availability of parking in mixed-use and high-density developments. Limiting parking availability while providing the necessary amenities and services that promote transit use, bicycling, and walking would decrease the likelihood that people will drive and increase the likelihood that people will use public transportation, bike, or walk to and from an area. Many local governments have zoning ordinances

that require the provision of a minimum number of parking spaces for residential developments (e.g. based on the number of apartment units) and for commercial developments (e.g. based on store square footage), which tends to encourage personal vehicle use. VISION 2050 recommends local governments in urban areas consider removing minimum parking requirements from their zoning ordinances.

Description of Arterial Streets and Highways Element

Arterial streets and highways are that portion of the total street and highway system principally intended to provide travel mobility, serving the through movement of traffic and providing transportation service between major subareas of a region and also through the region. Access to abutting property may be a secondary function of some types of arterial streets and highways, but the primary function of arterial streets and highways is traffic movement. Together, the arterial streets should form an integrated, areawide system. Arterials are typically spaced about one-half mile apart in Mixed-Use City Center areas, one-half mile apart in Mixed-Use Traditional Neighborhood areas, one-half mile to one mile apart in Small Lot Traditional Neighborhood areas (depending on area density), one mile apart in Medium Lot Neighborhood areas, two miles apart in Large Lot Neighborhood areas, and more than two miles apart in Large Lot Exurban and Rural Estate areas.

The arterial street and highway system under VISION 2050 totals 3,670.0 route-miles. Approximately 91 percent, or 3,326.1 of these route-miles, are recommended to be resurfaced and reconstructed to their existing traffic carrying capacity. Approximately 268.8 route-miles, or about 7 percent of the year 2050 arterial street and highway system, are recommended for capacity expansion through widening to provide additional through traffic lanes. Approximately 75.1 route-miles, or about 2 percent of the total arterial street mileage, are recommended for capacity expansion through the construction of new arterial facilities. Of the total of about 343.9 route-miles of planned arterial capacity expansion, about 76.6 route-miles, or 22 percent, are part of a committed project—currently underway or recommended as part of a completed or nearly completed preliminary engineering study. Table 1.12 and Maps 1.15 through 1.21 display the arterial streets and highways element of VISION 2050.

VISION 2050 does not make any recommendation with respect to whether the remaining 10.2 route-miles of IH 43 between Howard Avenue and Silver Spring Drive, when reconstructed, should be reconstructed with or without additional traffic lanes. VISION 2050 recommends that preliminary engineering conducted for the reconstruction of this segment of IH 43 should include the consideration of alternatives for rebuilding the freeway with additional lanes and rebuilding it with the existing number of lanes. The decision of how this segment of IH 43 would be reconstructed would be determined through preliminary engineering and an environmental impact study conducted by WisDOT. During preliminary engineering, WisDOT would consider and evaluate a number of alternatives, including rebuild as is, various options of rebuilding to modern design standards, compromises to rebuilding to modern design standards, rebuilding with additional lanes, and rebuilding with the existing number of lanes. Only at the conclusion of preliminary engineering would a determination be made as to how this segment of IH 43 freeway would be reconstructed. Following the conclusion of the preliminary engineering for the reconstruction, VISION 2050 would be amended to reflect the decision made as to how IH 43 between Howard Avenue and Silver Spring Drive would be reconstructed. Any construction along this segment of IH 43 prior to preliminary engineering—such as bridge

Table 1.12
Arterial Street and Highway System Preservation, Improvement, and Expansion by Arterial Facility Type by County: VISION 2050

County	Arterial Facility Type	System Preservation (miles)	System Improvement (miles)	System Expansion (miles)	Total Miles
Kenosha	Freeway	8.5	3.5	0.0	12.0
	Surface Arterial	318.0	31.2	4.7	353.9
	Subtotal	326.5	34.7	4.7	365.9
Milwaukee	Freeway	29.6	38.2	0.0	67.8
	Surface Arterial	719.3	11.3	7.0	737.6
	Subtotal	748.9	49.5	7.0	805.4
Ozaukee	Freeway	13.3	14.2	0.0	27.5
	Surface Arterial	262.4	18.5	4.0	284.9
	Subtotal	275.7	32.7	4.0	312.4
Racine	Freeway	0.0	12.0	0.0	12.0
	Surface Arterial	413.2	11.1	12.6	436.9
	Subtotal	413.2	23.1	12.6	448.9
Walworth	Freeway	49.8	4.8[a]	12.4	67.0[a]
	Surface Arterial	409.2	4.3	10.3	423.8
	Subtotal	459.0	9.1	22.7	490.8
Washington	Freeway	35.8	6.4	0.0	42.2
	Surface Arterial	388.8	8.7	16.9	414.4
	Subtotal	424.6	15.1	16.9	456.6
Waukesha	Freeway	32.4	26.4	0.0	58.8
	Surface Arterial	645.8	78.2	7.2	731.2
	Subtotal	678.2	104.6	7.2	790.0
Region	Freeway	169.4	105.5[b]	12.4	287.3[b]
	Surface Arterial	3,156.7	163.3	62.7	3,382.7
	Total	3,326.1	268.8	75.1	3,670.0

[a] *Represents the conversion of approximately 4.8 miles of the USH 12 Whitewater bypass, currently a two traffic lane surface arterial to a four traffic lane freeway.*

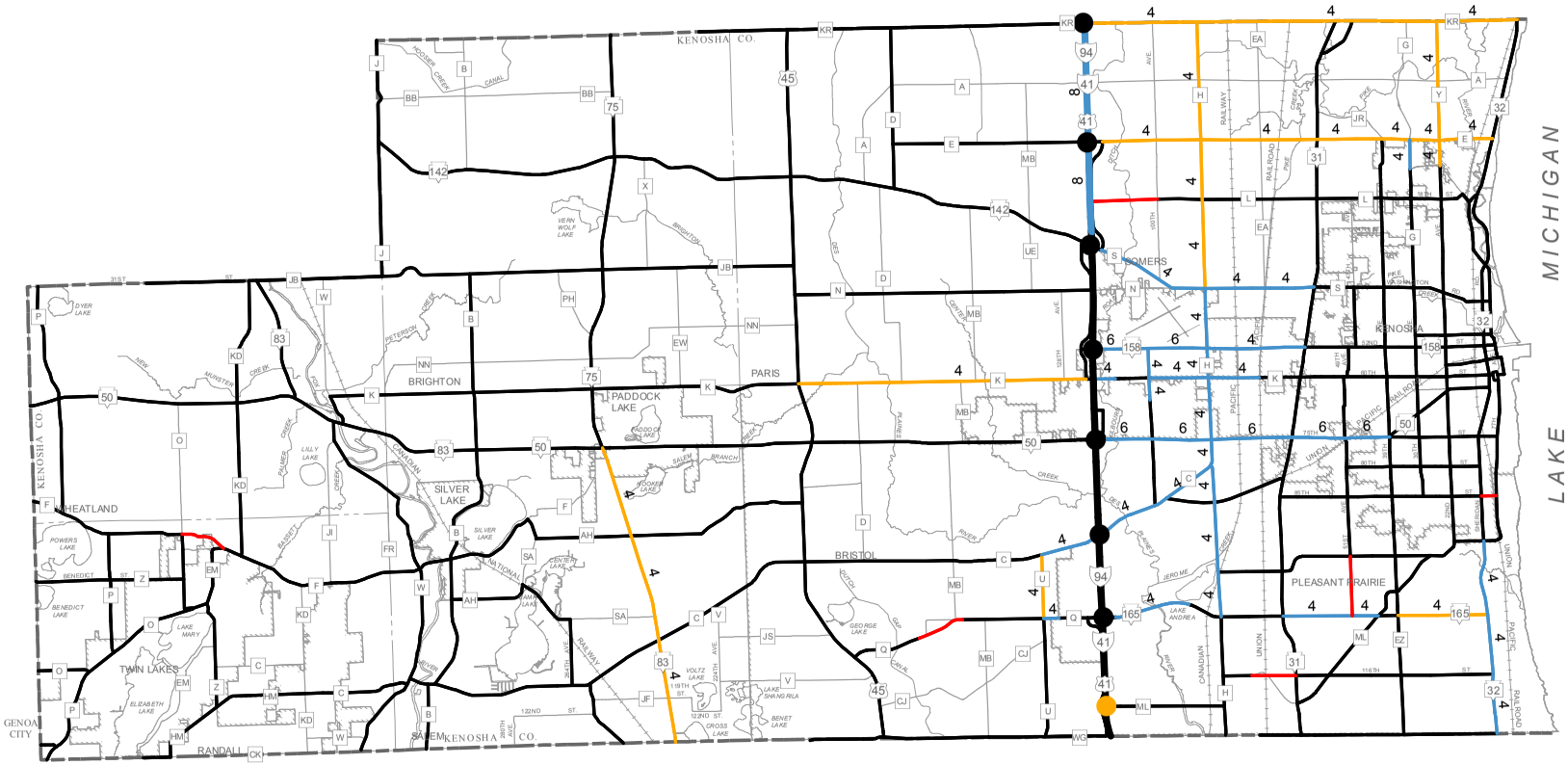
[b] *Includes the widening of approximately 100.7 miles of the existing 2015 regional freeway system, and the conversion of about 4.8 miles of the USH 12 Whitewater bypass, currently a two traffic lane surface arterial to a four traffic lane freeway.*

Source: SEWRPC

reconstruction—should fully preserve and accommodate the future option of rebuilding the freeway with additional lanes.

The arterial system capacity expansion recommended in VISION 2050 represents about an 8 percent expansion in arterial system lane-miles over the next 34 years. The year 2050 arterial street and highway system is designed to service the expected increase in VMT in the Region of 23 percent by the year 2050 (even with a near doubling of transit and a more compact development pattern recommended under VISION 2050). The system is designed to address the forecast year 2050 congestion that may be expected, even if all the other elements of VISION 2050 are fully implemented, including land use, public transit, transportation systems management, and bicycle and pedestrian facilities. Implementation of the year 2050 arterial system would be expected to result in overall traffic congestion, travel time delay, and average trip times to be essentially maintained at, or modestly improved from, current levels. In addition, access by automobile to major activity centers (such as retail centers, major parks, universities, and health care providers) and regional destinations (such as General Mitchell International Airport and the Milwaukee Regional Medical Center) would be expected to remain about the same by the year

Map 1.15
Functional Improvements to the Arterial Street and Highway System in Kenosha County: VISION 2050



ARTERIAL STREET OR HIGHWAY

- NEW
- WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY
- RESERVE RIGHT-OF-WAY TO ACCOMMODATE FUTURE IMPROVEMENT (ADDITIONAL LANES OR NEW FACILITY)
- RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY
- 4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

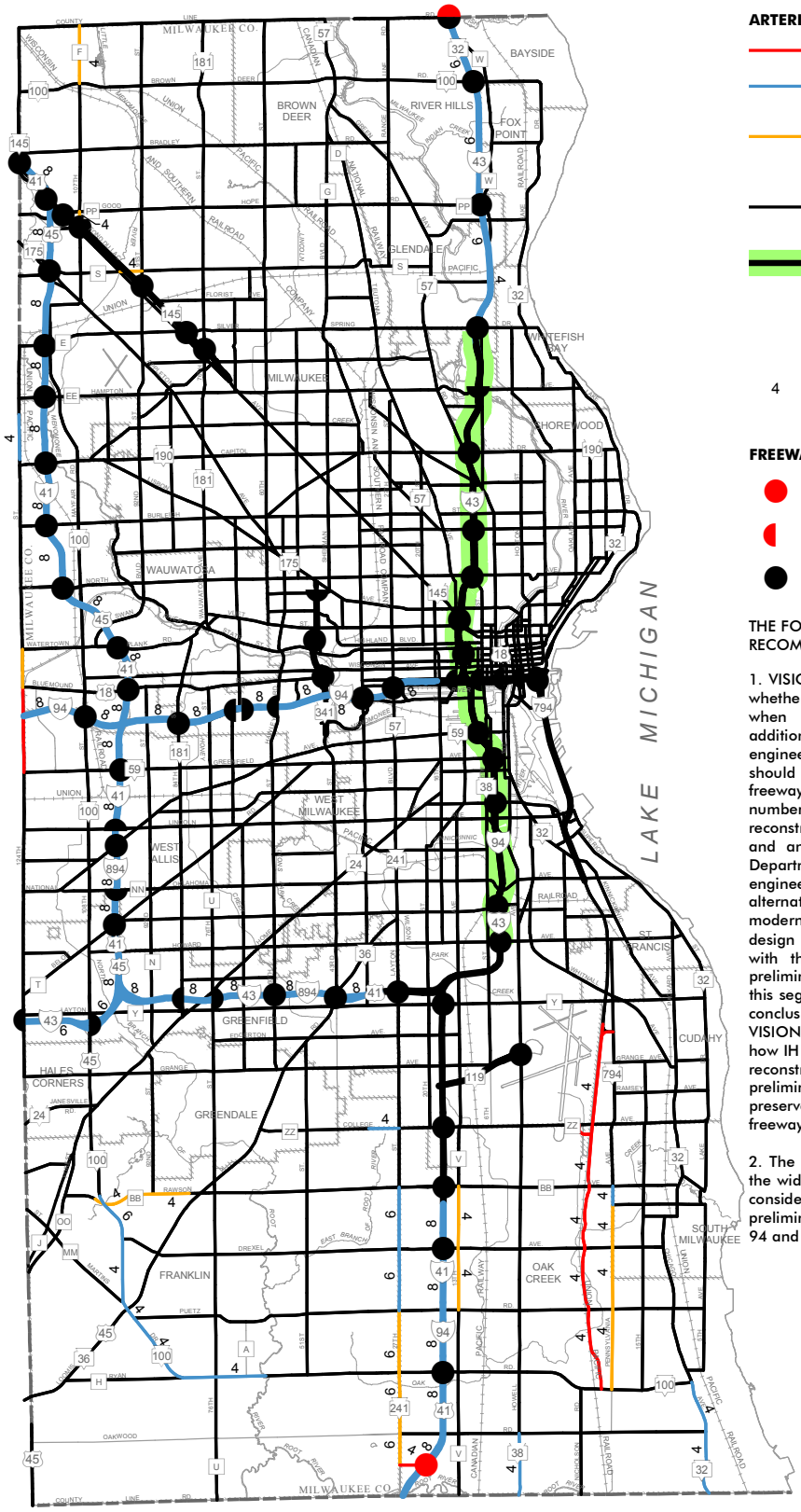
FREEWAY INTERCHANGE

- EXISTING
- RESERVE RIGHT-OF-WAY TO ACCOMMODATE FUTURE IMPROVEMENT (POTENTIAL NEW INTERCHANGE)

0 1 2 3 Miles

Source: SEWRPC

Map 1.16
Functional Improvements to the Arterial Street and Highway System in Milwaukee County: VISION 2050



ARTERIAL STREET OR HIGHWAY

- NEW
- WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY
- RESERVE RIGHT-OF-WAY TO ACCOMMODATE FUTURE IMPROVEMENT (ADDITIONAL LANES OR NEW FACILITY)
- RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY
- NO RECOMMENDATION WITH RESPECT TO WHETHER THIS SEGMENT OF IH 43 SHOULD BE RECONSTRUCTED WITH OR WITHOUT ADDITIONAL LANES. DETERMINATION AS TO WHETHER IT WOULD BE RECONSTRUCTED WITH OR WITHOUT ADDITIONAL LANES TO BE MADE DURING PRELIMINARY ENGINEERING. (SEE NOTE 1 BELOW)
- 4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

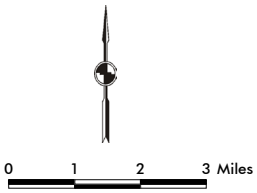
FREEWAY INTERCHANGE

- NEW
- HALF NEW
- EXISTING

THE FOLLOWING NOTES SUPPLEMENT THE RECOMMENDATIONS PORTRAYED ON THIS MAP:

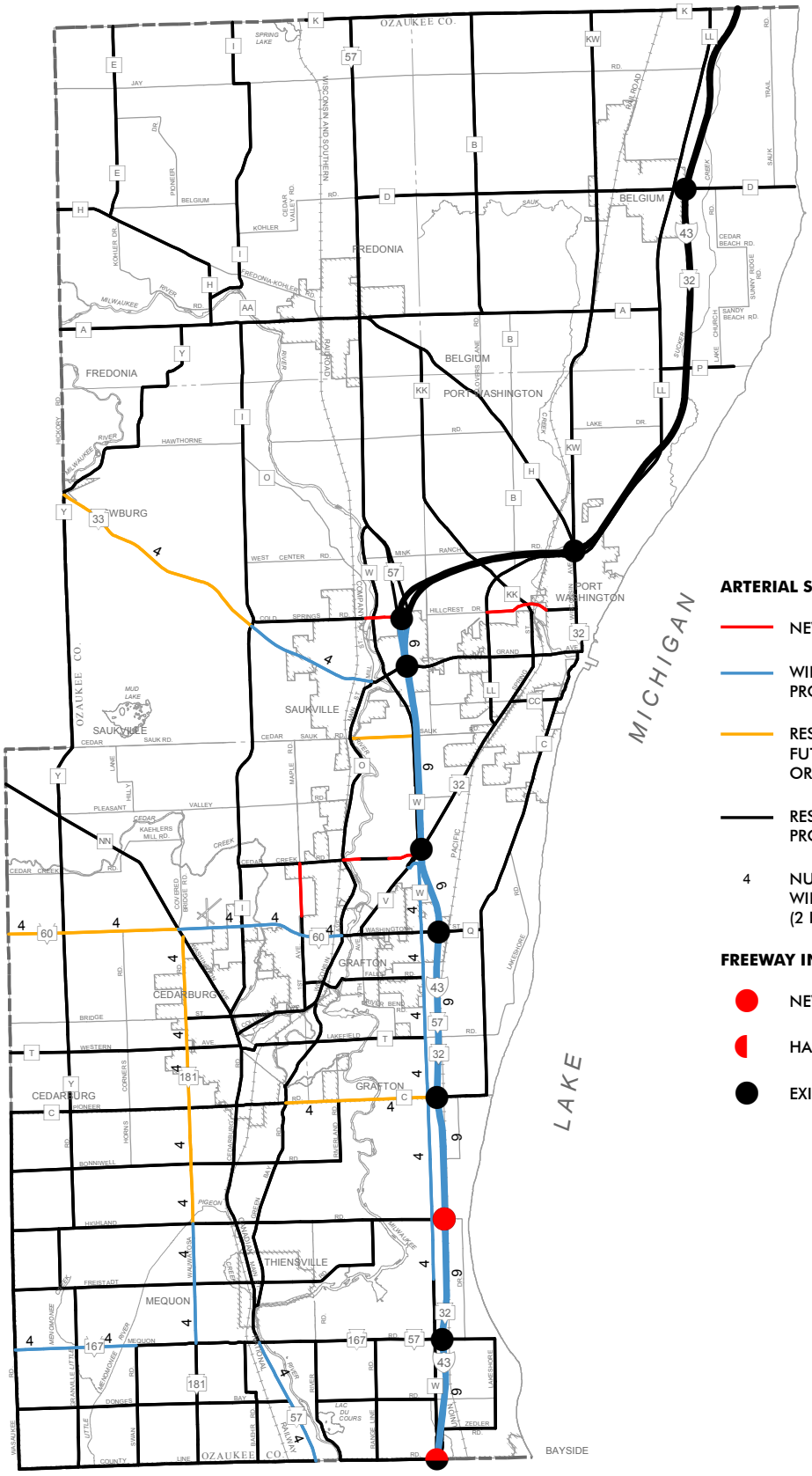
1. VISION 2050 does not make any recommendation with respect to whether IH 43 between Howard Avenue and Silver Spring Drive, when reconstructed, should be reconstructed with or without additional traffic lanes. VISION 2050 recommends that preliminary engineering conducted for the reconstruction of this segment of IH 43 should include the consideration of alternatives for rebuilding the freeway with additional lanes and rebuilding it with the existing number of lanes. The decision of how this segment of IH 43 would be reconstructed would be determined through preliminary engineering and an environmental impact study conducted by the Wisconsin Department of Transportation (WisDOT). During preliminary engineering, WisDOT would consider and evaluate a number of alternatives, including rebuild as is, various options of rebuilding to modern design standards, compromises to rebuilding to modern design standards, rebuilding with additional lanes, and rebuilding with the existing number of lanes. Only at the conclusion of preliminary engineering would a determination be made as to how this segment of IH 43 freeway would be reconstructed. Following the conclusion of the preliminary engineering for the reconstruction, VISION 2050 would be amended to reflect the decision made as to how IH 43 between Howard Avenue and Silver Spring Drive would be reconstructed. Any construction along this segment of IH 43 prior to preliminary engineering—such as bridge reconstruction—should fully preserve and accommodate the future option of rebuilding the freeway with additional lanes.

2. The Cities of Milwaukee and Wauwatosa expressed opposition to the widening of IH 94 between 70th Street and 16th Street, which is considered a committed project as WisDOT has nearly completed preliminary engineering for the reconstruction of this segment of IH 94 and their preferred alternative includes its widening.



Source: SEWRPC

Map 1.17
Functional Improvements to the Arterial Street and Highway System in Ozaukee County: VISION 2050



ARTERIAL STREET OR HIGHWAY

- NEW
- WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY
- RESERVE RIGHT-OF-WAY TO ACCOMMODATE FUTURE IMPROVEMENT (ADDITIONAL LANES OR NEW FACILITY)
- RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY
- 4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

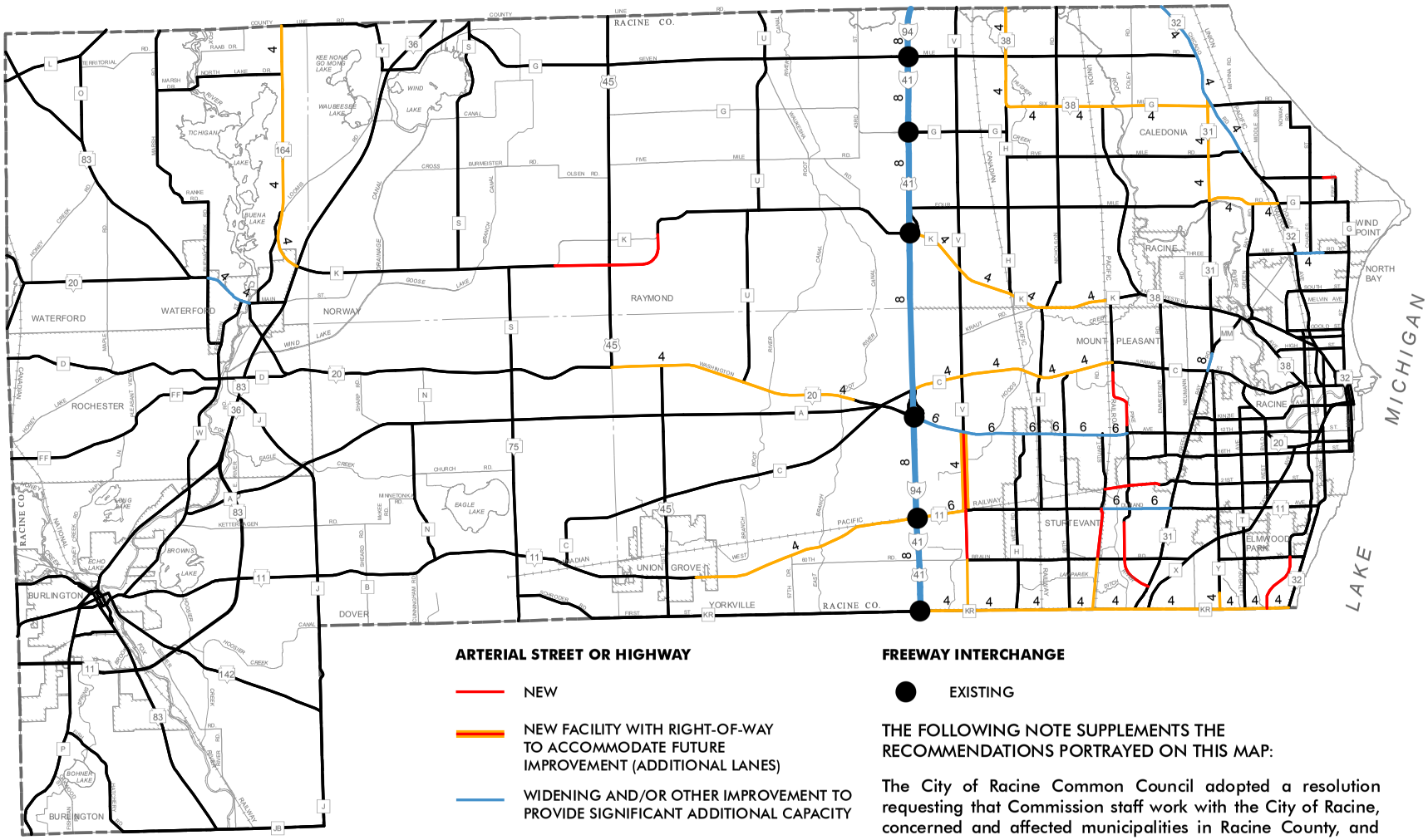
FREEWAY INTERCHANGE

- NEW
- HALF NEW
- EXISTING

0 1 2 3 Miles

Source: SEWRPC

Map 1.18
Functional Improvements to the Arterial Street and Highway System in Racine County: VISION 2050



Source: SEWRPC

ARTERIAL STREET OR HIGHWAY

- NEW
- NEW FACILITY WITH RIGHT-OF-WAY TO ACCOMMODATE FUTURE IMPROVEMENT (ADDITIONAL LANES)
- WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY
- RESERVE RIGHT-OF-WAY TO ACCOMMODATE FUTURE IMPROVEMENT (ADDITIONAL LANES OR NEW FACILITY)
- RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY
- 4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

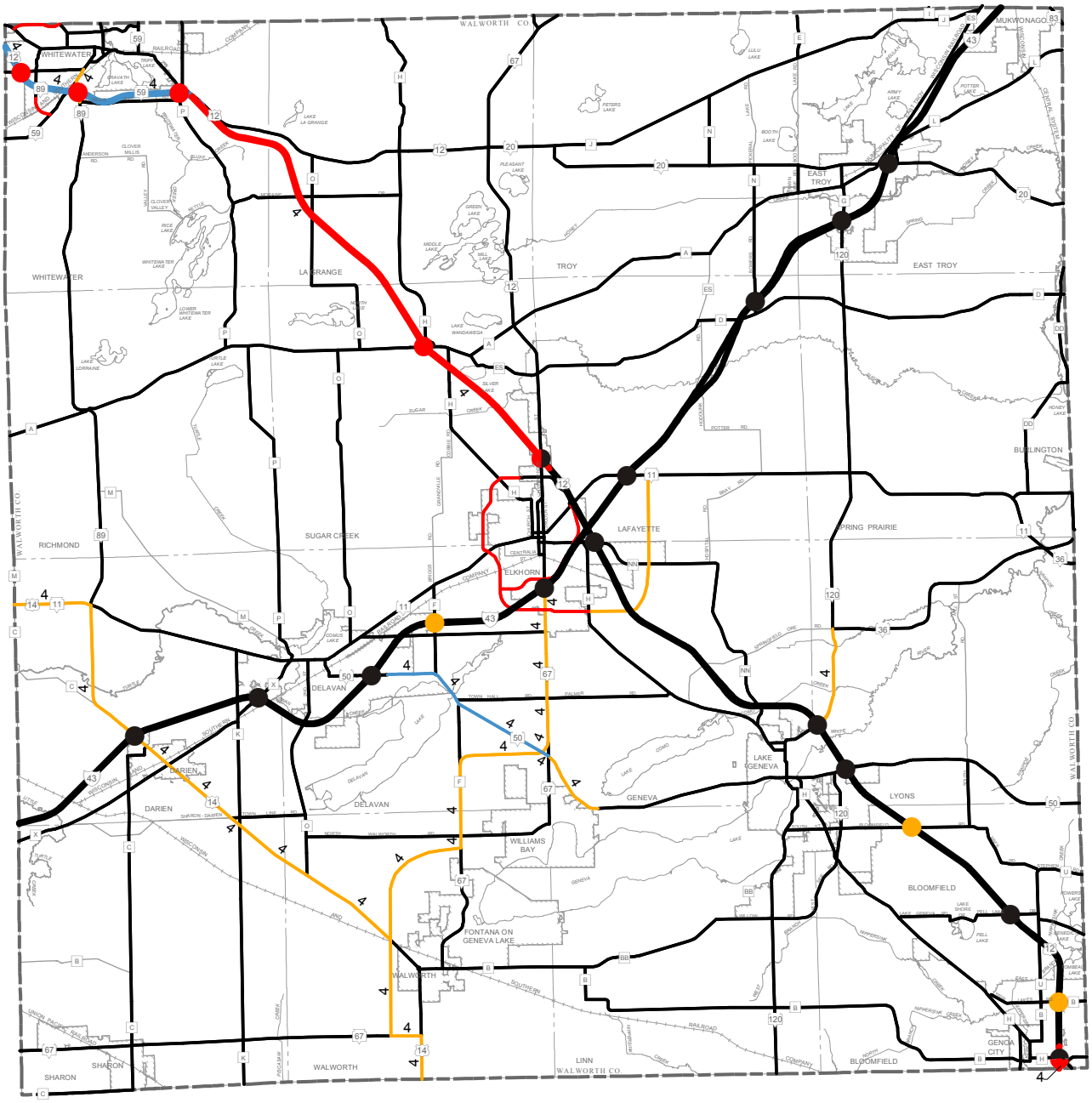
FREEWAY INTERCHANGE

- EXISTING

THE FOLLOWING NOTE SUPPLEMENTS THE RECOMMENDATIONS PORTRAYED ON THIS MAP:

The City of Racine Common Council adopted a resolution requesting that Commission staff work with the City of Racine, concerned and affected municipalities in Racine County, and Racine County to consider ways to improve highway access to the City of Racine from IH 94. Following the completion of VISION 2050, Commission staff will work with affected local units of government and the Wisconsin Department of Transportation to identify potential recommended improvements along three routes between IH 94 and the City of Racine: STH20/STH32, CTH K/STH 38, and CTH KR/STH 32. Any additional functional improvements identified would be amended into the plan.

Map 1.19
Functional Improvements to the Arterial Street and Highway System in Walworth County: VISION 2050



ARTERIAL STREET OR HIGHWAY

- NEW
- WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY
- RESERVE RIGHT-OF-WAY TO ACCOMMODATE FUTURE IMPROVEMENT (ADDITIONAL LANES OR NEW FACILITY)
- RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY
- 4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

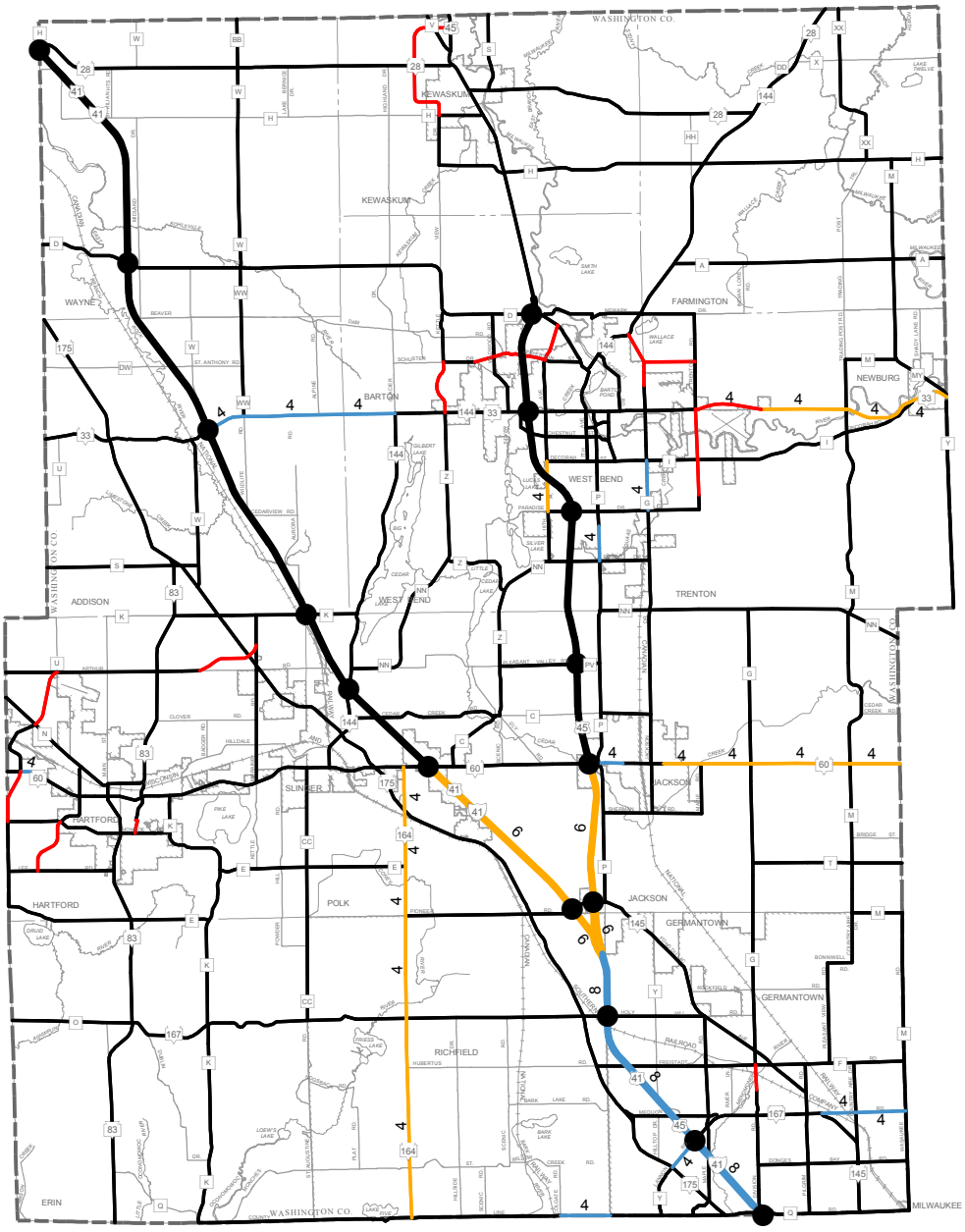
FREEWAY INTERCHANGE

- NEW
- HALF NEW
- EXISTING
- RESERVE RIGHT-OF-WAY TO ACCOMMODATE FUTURE IMPROVEMENT (POTENTIAL NEW INTERCHANGE)

0 1 2 3 Miles

Source: SEWRPC

Map 1.20
Functional Improvements to the Arterial Street and Highway System in Washington County: VISION 2050



ARTERIAL STREET OR HIGHWAY

- NEW
- WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY
- RESERVE RIGHT-OF-WAY TO ACCOMMODATE FUTURE IMPROVEMENT (ADDITIONAL LANES OR NEW FACILITY)
- RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY
- 4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

FREEWAY INTERCHANGE

- EXISTING

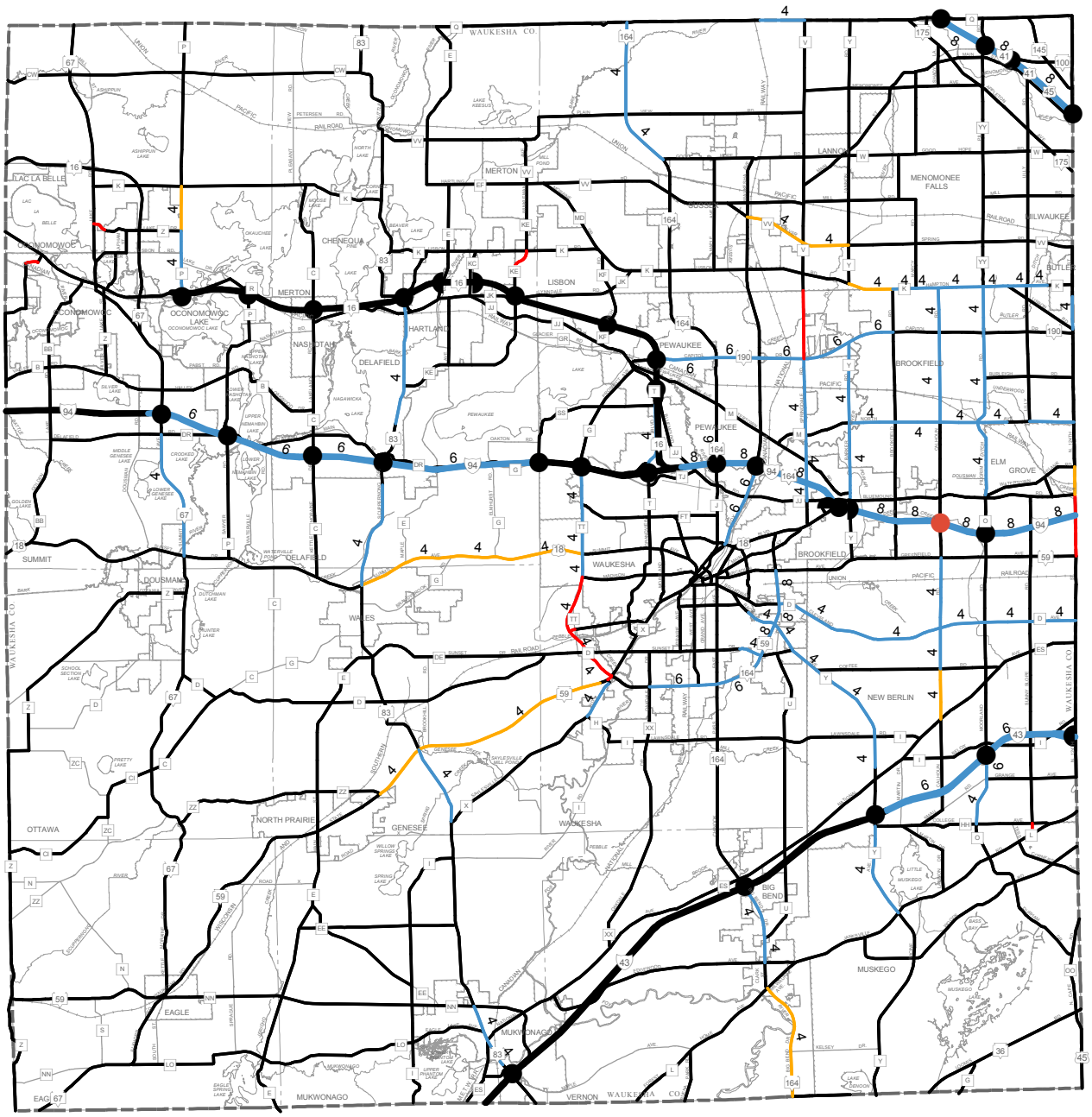
THE FOLLOWING NOTE SUPPLEMENTS THE RECOMMENDATIONS PORTRAYED ON THIS MAP:

Commission staff was asked by Washington County to evaluate alternative east-west arterial reliever routes north of the City of Hartford and Village of Slinger, and potential improvements to STH 60 between the west county line and IH 41. The study is expected to be completed beyond the completion of VISION 2050. Should the results of this study differ from what is shown on this map, VISION 2050 will be amended to reflect the results of the study.

0 1 2 3 Miles

Source: SEWRPC

Map 1.21
Functional Improvements to the Arterial Street and Highway System in Waukesha County: VISION 2050



ARTERIAL STREET OR HIGHWAY

- NEW
- WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY
- RESERVE RIGHT-OF-WAY TO ACCOMMODATE FUTURE IMPROVEMENT (ADDITIONAL LANES OR NEW FACILITY)
- RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY
- 4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

FREEWAY INTERCHANGE

- NEW
- HALF NEW
- EXISTING

0 1 2 3 Miles

Source: SEWRPC

2050 for the Region's population. Implementation of the year 2050 arterial street and highway system would be expected to improve overall safety and maintain the condition of the pavement and bridges along the planned arterial system.

➤ Recommendation 6.1: Keep the Region's arterial street and highway system in a state of good repair

VISION 2050 recommends that the condition of all 3,600 miles of the roadways that are part of the Region's existing arterial street and highway system be preserved to maintain their ability to effectively carry higher levels of people and goods. Preserving the condition of the Region's arterial streets and highways—including pavement, bridges, and all other infrastructure in the roadway right-of-way[20]—is critical to provide for safe and efficient travel throughout the Region. As they carry a higher level of people and goods each day, preserving the condition of the arterial streets and highways is important for achieving a high standard of living for the Region's residents and giving the Region a competitive edge in terms of retaining and attracting businesses.

Roadways and bridges have a long life before they need to be replaced or reconstructed (typically 50-60 years for highways and 50-75 years for bridges). However, because of vehicular use (particularly by trucks) and changing weather conditions (freeze/thaw cycle in winters and hot summers), the roadways and bridges deteriorate over time. As the comfort and safety of drivers can be affected when these facilities reach a critical point of deterioration, it is necessary to improve the condition of roadways and bridges, along with other highway infrastructure, through routine maintenance, periodic rehabilitation, and reconstruction.[21] VISION 2050 recommends that the condition of roadway pavements and bridges be maintained at least to its current level through the year 2050. Specifically, it recommends maintaining or increasing the current proportion of pavement that is in "good" condition (about 55 percent), and maintaining or reducing the current proportion of pavement in "bad" condition (about 11 percent), during the life of the plan. Similarly, it recommends maintaining or increasing the current proportion of bridges that have a sufficiency rating of 80 or more (about 71 percent), and maintaining or reducing the current proportion of bridges with a sufficiency rating less than 50 (about 5 percent), during the life of the plan.

- **Asset Management Plans** – As available Federal, State, and local funding is limited, it is important that the timing and choice of rehabilitation and timing of reconstruction/replacement of various roadway features (pavement, bridges, and other roadway infrastructure) be done consistent with their life cycle in order to utilize the available funding effectively. Thus, sound asset management practices are necessary to effectively utilize the limited funding resources. With respect to pavement, this means focusing more on less costly maintenance work and rehabilitations as needed to maximize pavement life, and thus avoiding substantial pavement deterioration and costly premature pavement reconstruction. To assist in managing the condition of their roadways, many States and local

[20] *Other highway infrastructure within the roadway right-of-way would include traffic signals, lighting, signs, culverts, storm sewers, and tunnels.*

[21] *Rehabilitation for highways typically includes resurfacing (removing and overlaying a layer of the pavement) and reconditioning (resurfacing plus spot base repairs. The first rehabilitation typically occurs 20 to 30 years following a roadway's construction or reconstruction, with two subsequent rehabilitations occurring every 8 to 18 years.*

governments have developed asset management plans that include strategies for monitoring the condition of the roadway features and for implementing cost effective maintenance and rehabilitation activities. Since the Moving Ahead for Progress in the 21st Century Act (MAP-21) was enacted in 2012, WisDOT is required to develop and implement an asset management plan for the pavement and bridges of the roadways on the National Highway System (NHS) within the State. FHWA has not yet finalized the requirements for States in developing these asset management plans. When the Federal requirements are finalized, WisDOT will have one year to complete their asset management plan. VISION 2050 recommends that WisDOT's Federally required asset management plan also include the state trunk highways that are not on the NHS. VISION 2050 also recommends that local governments within the Region develop and implement asset management plans for the arterial and nonarterial roadways under their jurisdiction. This would be particularly important for local governments that maintain a large system of arterial and nonarterial roadways.

➤ Recommendation 6.2: Incorporate "complete streets" concepts for arterial streets and highways

Complete streets is a roadway design concept related to providing for the safe and convenient travel of all roadway users (of all ages and abilities) travelling by various modes (walking, bicycling, transit, or automobile) within the roadway right-of-way. Complete street features can be implemented to encourage walking and bicycling and the use of transit as alternatives to travel by automobile. VISION 2050 recommends that complete street concepts be considered as part of the reconstruction of existing surface arterial roadways and the construction of new surface arterial roadways. In the interim, VISION 2050 recommends that suitable existing arterial roadways with sufficient roadway surface width be considered at the time of their resurfacing for providing a partial implementation of complete streets, such as adding bicycle lanes or widened travel shoulders. Additionally, reducing the number of travel lanes should be considered on multi-lane roadways that have existing and future traffic volumes that do not require the current number of travel lanes. Reducing travel lanes in these situations can improve pedestrian safety and comfort by shortening crossing distances at intersections. Details on complete street improvements are presented as part of the design guidelines.

While the purpose of complete streets is to provide for the safe and convenient travel for all users on the roadway, the level of complete street features implemented for a particular roadway would be dependent on the types of land use adjacent to the roadway (urban, suburban, or rural), the prevalence of each type of user, and the desire of the community in which the roadway is located. In urban areas, complete street features can be added to support and enhance adjacent mixed-use developments. Along arterials where transit service is provided, complete street features can include providing safe and accessible transit stops for transit users within the roadway right-of-way, as described under Recommendations 2.6 and 2.7. Accommodations, such as sidewalks and bicycle lanes, can also be implemented to enhance bicycle and pedestrian safety. In addition, accommodations can be provided within the roadway right-of-way of lower speed arterial roadways that enhance the adjacent mixed-use developments. This can include providing aesthetic features, like plantings and trees, and more practical features, like bike racks, benches, and tables and chairs. Where sidewalk space is limited, such

features can be temporarily provided by utilizing some of the existing parking stalls, or sections of unused or underused roadway. With respect to rural areas, providing a complete street can involve the provision of wide paved shoulders or a separate multi-use path. More details about the provision of bicycle and pedestrian accommodations can be found under Recommendations 3.1, 3.3, and 3.5.

➤ Recommendation 6.3: Expand arterial capacity to address residual congestion

VISION 2050 recommends approximately 268.8 route-miles be widened to provide additional through traffic lanes, representing about 7 percent of the total VISION 2050 arterial street and highway system mileage, including 100.7 miles of existing freeways. These recommended widenings are shown as blue lines on Maps 1.15 through 1.21. In addition, VISION 2050 recommends 75.1 route-miles of new arterial facilities, representing about 2 percent of the total year 2050 arterial street mileage. Of the total of about 343.9 route-miles of planned arterial capacity expansion, about 76.6 route-miles, or 22 percent, are part of a committed project—currently underway or recommended as part of a completed or nearly completed preliminary engineering study. These highway improvements are recommended to address the residual congestion that may not be expected to be alleviated by recommended land use, systems management, demand management, bicycle and pedestrian facilities, and public transit measures. In addition, many of the recommended new arterial facilities are recommended to provide a grid of arterial streets and highways at the appropriate spacing as the planned urban areas of the Region develop to the year 2050.

Each arterial street and highway project would need to undergo preliminary engineering and environmental studies by the responsible State, county, or municipal government prior to implementation. The preliminary engineering and environmental studies will consider alternative alignments and impacts, including a no-build option, and final decisions as to whether and how a planned project will proceed to implementation will be made by the responsible State, county, or municipal government at the conclusion of preliminary engineering.

- **Freeways** – VISION 2050 recommends the widening of 100.7 miles of existing freeways with an additional lane in each direction at the time of their reconstruction and the conversion of the 4.8 mile USH 12 bypass of Whitewater to a four-lane freeway.

  VISION 2050 does not make any recommendation with respect to whether the 10.2 miles of IH 43 between Howard Avenue and Silver Spring Drive, when reconstructed, should be reconstructed with or without additional traffic lanes. VISION 2050 recommends that preliminary engineering conducted for the reconstruction of this segment of IH 43 should include the consideration of alternatives for rebuilding the freeway with additional lanes and building it with the existing number of lanes. The decision of how this segment of IH 43 would be reconstructed would be determined by WisDOT through preliminary engineering and an environmental impact study. Any construction along this segment of IH 43 prior to preliminary engineering—such as bridge reconstruction—should fully preserve and accommodate the future option of rebuilding the freeway with additional lanes.

Currently, 29.8 miles of freeway widening are being constructed as part of the project to reconstruct the Zoo Interchange and IH 94 between the Mitchell Interchange and STH 142. In addition, the preliminary engineering and environmental impact studies have been completed or nearly completed for 17.2 miles of freeway reconstruction including widening as part of the reconstruction of IH 94 between 70th Street and 16th Street in Milwaukee County and IH 43 between Silver Spring Drive and STH 60. Thus, of the recommended 105.5 miles of freeway capacity expansion through reconstruction including widening of an additional lane in each direction, 47.0 miles or 45 percent may be considered as committed projects. The remaining 58.5 miles of recommended freeway widening, as well as the 10.2 miles of freeway in Milwaukee County of IH 43 between Howard Avenue and Silver Spring Drive, will undergo preliminary engineering and environmental impact study by WisDOT. During preliminary engineering for the reconstruction of these segments of freeway, alternatives will be considered, including rebuild-as-is, various options of rebuilding to modern design standards, compromises to rebuilding to modern design standards, rebuilding with additional lanes, and rebuilding with the existing number of lanes. Only at the conclusion of the preliminary engineering would a determination be made as to how these freeways would be reconstructed.

- **Freeway Interchanges** – On the existing freeway system, VISION 2050 recommends two new freeway interchanges (IH 94 with Calhoun Road and IH 43 with Highland Road). VISION 2050 also recommends the conversion of two half interchanges to full interchanges (IH 94 with S. 27th Street and IH 43 with County Line Road) and the conversion of a full interchange to a half interchange (IH 94 with Hawley Road). The conversions of these interchanges were part of WisDOT's preferred alternatives for the reconstruction of IH 94 between the Wisconsin-Illinois State line and the Mitchell Interchange, IH 94 between 70th Street and 16th Street, and IH 43 between Silver Spring Drive and STH 60. In addition, VISION 2050 identifies four potential new future interchanges for consideration (CTH ML with IH 94, CTH B with USH 12, Bloomfield Road with USH 12, and CTH F with IH 43) and recommends that action be taken by local governments to preserve the potential necessary right-of-way to assure that the future development of these interchanges is not precluded. Should the concerned local governments take the next step of participating with WisDOT in the conduct of a preliminary engineering study of the interchange, and the preliminary engineering conclude with a recommendation to construct the interchange, the Commission, upon the request of the concerned local governments and the WisDOT, would take action to amend VISION 2050 to recommend the construction of the interchange.

➤ Recommendation 6.4: Avoid, minimize, or mitigate environmental impacts of arterial capacity expansion

VISION 2050 recommends that transportation system improvement impacts to natural resource areas (such as primary environmental corridor and wetland) be avoided. Should impacts to these areas be found to be unavoidable through preliminary engineering and environmental impact study, VISION 2050 recommends that impacts to such areas be minimized and, if required, mitigated. Arterial street and highway capacity expansion has been developed through the VISION 2050 planning process to avoid, if at all possible, impacts to environmentally sensitive resources. The regional transportation planning process first considers land use

and transportation alternatives other than arterial street and highway improvements. Arterial street and highway capacity expansion is then considered only to address the residual traffic volume and congestion that would not be addressed by these other land use and transportation measures, such as expanded public transit. Also, the Commission has developed and maintains extensive databases of the location and quality of environmentally sensitive resources in the Region. During the plan development process, efforts were made by the Commission staff to consider arterial improvements and conceptual alignments that avoid, to the extent possible, impacts on environmentally sensitive resources.

- **Avoidance and Minimization of Environmental Impacts** – During the preliminary engineering and environmental studies of arterial street and highway projects with potential impacts to environmentally sensitive resources, it is expected that efforts to avoid or minimize any adverse impacts through consideration of design alternatives will be exhausted. During preliminary engineering and environmental studies, consideration should be given to alternate alignments and cross-sections designed specifically to minimize unavoidable impacts to environmentally sensitive resources. To further minimize impacts, consideration should be given to the use of alternative design features such as construction of a bridge over wetlands rather than a roadway on fill even if they significantly increase project costs. Another technique that should be considered to minimize impacts would be to seek exceptions to design standards that would reduce the roadway cross-section through the impacted area, or to include sustainable storm water management practices such as bioswales and retention systems when possible.

- **Mitigation of Environmental Impacts** – Where environmentally sensitive resources will be unavoidably impacted, and for which mitigation is compensatory, efforts should focus on the preferred means of mitigation as identified by the regulatory agencies.[22] Types of mitigation typically considered include enhancement of the remaining adjacent environmentally sensitive resources that will not be impacted as part of the arterial street and highway project, re-creation of the impacted environmentally sensitive resources, creation of new environmentally sensitive resources, or the acquisition and utilization of mitigation bank credits. Potential mitigation sites could include areas within or adjacent to primary environmental corridors, secondary environmental corridors, and isolated natural resource areas, mitigation bank sites, and areas identified in SEWRPC Planning

[22] *Established Federal and/or State policy and guidelines exist with respect to compensatory mitigation of certain environmentally sensitive resources. With respect to wetlands, all wetland compensatory mitigation efforts must meet the requirements of Section 404 of the Clean Water Act including the United States Environmental Protection Agency 404(b)(1) Guidelines (40 CFR Part 230) and the Federal Mitigation Rule (33 CFR Part 332), Section 10 of the Rivers and Harbors Act, Section 281.36 of the Wisconsin State Statutes, Chapter NR 350 of the Wisconsin Administrative Code, 2011 State of Wisconsin Act 118, and for Wisconsin Department of Transportation projects compensatory mitigation efforts must meet the requirements of the cooperative agreement between the Wisconsin Departments of Natural Resources and Transportation. The Wisconsin Department of Natural Resources, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and U.S. Fish and Wildlife Service have jointly developed specific guidelines for required compensatory mitigation for permitted wetland loss in Wisconsin. The document, dated August 2013, is entitled, Guidelines for Wetland Compensatory Mitigation in Wisconsin.*

Report No. 42, *A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin*.

➤ Recommendation 6.5: Address safety needs on the arterial street and highway network

The occurrence of crashes can have a negative effect on the Region as they contribute to overall transportation costs; increase public costs for police, emergency medical, and other social services; and cause nonrecurring congestion on the highway system. In addition, vehicular crashes take a heavy toll in life, property damage, and human suffering. Vehicular crashes occur due to one or a combination of the following factors: human error, vehicle failure, and roadway/environmental conditions. VISION 2050 recommends that Federal, State, and local governments, and the Commission, work to:

- **Minimize total traffic crashes on the arterial street and highway system** – The implementation of each element of VISION 2050 should minimize the number of total traffic crashes on the arterial street and highway system. For example, the recommended improvement and expansion of public transit and bicycle and pedestrian facilities and the implementation of recommended TDM measures should reduce the growth in vehicle travel, conflicts, and crashes and encourage increased travel on safer facilities and services. Also, the recommended reconstruction of the freeway system with additional traffic lanes should reduce traffic congestion and related traffic crashes. While VMT may be expected to increase by 25 percent by the year 2050, total vehicular crashes are estimated to increase by only 16 to 22 percent with full implementation of all elements of VISION 2050.

  With respect to highways, strategies that can reduce the number of crashes should be considered for roadways identified as having excessive crashes as part of a safety assessment or during preliminary engineering for their reconstruction or rehabilitation. These strategies can include modifying roadway and roadside elements (such as increasing lane width, adding/widening paved shoulders, installing side barricades, and removing fixed objects along the roadside), improving horizontal and vertical grades, modifying intersections (such as improving signal timing and adding turn lanes), adding/modifying signage and pavement markings, and controlling access. In some cases, the rate of crashes may be reduced by adding capacity along a surface arterial, such as reconstruction of an urban two-lane arterial that exceeds its design capacity with a divided roadway. With respect to freeways, strategies to reduce the number of crashes could also include removing ramp entrances and exits on the left side of the freeway, increasing the distance between ramp terminals, and increasing entrance ramp length. Adding capacity on heavily congested freeways can also be expected to reduce crash rates.

- **Minimize total traffic crashes, along with crashes involving fatalities and serious injuries, on the arterial street and highway system** – There are many factors that can affect the severity of a crash, including human factors (age and vulnerability of drivers/passengers, seat belt/helmet use, speed of vehicle, sobriety of driver), vehicle factors (safety features), and roadway/environmental factors (weather conditions, pavement condition, grade, presence of roadside features). Implementation of the recommendations of the State's Strategic Highway Safety Plan (SHSP) by the State and local

governments would assist in the reduction of crashes involving fatalities and serious injuries.[23] While implementation of the SHSP would be expected to reduce overall crashes, the types of crashes emphasized in the SHSP would, in particular, address the types of crashes involving a higher proportion of fatalities and serious injuries, such as intersection crashes, speed-related crashes, head-on and roadway departure crashes, crashes involving pedestrians and bicyclists, alcohol/drug-related crashes, and crashes involving the driver or passengers not wearing a seatbelt.

- **Minimize bicycle and pedestrian related crashes** – While the number of reported vehicular crashes involving either a bicycle or a pedestrian accounted for only 3 percent of all vehicular crashes in the Region, they were involved in about 18 percent of vehicular crashes resulting in a fatality or serious injury. VISION 2050 promotes the improvement of bicycle and pedestrian safety by recommending implementation of increased safe and convenient accommodations for bicycle and pedestrian traffic. Specifically, VISION 2050 recommends that as arterial roadways in the Region are reconstructed and resurfaced, bicycle accommodation be considered and implemented, as described in Recommendation 3.1. In addition, VISION 2050 recommends, under Recommendation 3.2, the expansion of a system of off-street bicycle paths largely constructed in natural resource and utility corridors. VISION 2050 also recommends a network of enhanced bicycle facility corridors through the Kenosha, Milwaukee, and Racine urbanized areas, as described under Recommendation 3.3. These corridors, in particular, would be expected to reduce bicycle-related crashes on higher speed, higher volume arterial streets and highways within the three urbanized areas through separating bicyclists from automobiles (either through accommodations along the roadway or by use of parallel nonarterials). With respect to pedestrian safety, VISION 2050 recommends sidewalks be provided in areas of existing or planned urban development, and encourages making efforts to maximize pedestrian safety at street crossings in these locations, as described in Recommendation 3.5.

- **Reduce conflicts between automobiles and public transit vehicles** – VISION 2050 recommends expanding the use of dedicated transit lanes along rapid, express, and major local transit routes, as described in Recommendation 2.6. The dedicated transit lanes could be provided via auxiliary lanes, or where right-of-way is constrained through peak-period, peak-direction curb-lane parking restrictions. These lanes are intended to reduce travel times and improve transit travel time reliability during times of congestion, but can also reduce the conflicts between automobiles and public transit vehicles by allowing transit vehicles to stop without interrupting the flow of traffic.

- **Reduce vehicle traffic conflicts** – VISION 2050 recommends that traffic engineering measures and access management standards be considered to reduce vehicle traffic conflicts, including freeway modernization, congestion mitigation, and implementation of alternative intersection types.

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[23] The most recent SHSP was completed in September 2014 for the years 2014-2016, which can be found at http://wisconsindot.gov/Documents/doing-bus/local-gov/astnce-pgms/highway/hwy-safety.pdf.

- **Freeway modernization** – It is anticipated that the segment-by-segment reconstruction of the regional freeway system would continue during the time period of VISION 2050. The regional freeway system was originally built in the 1950's, 1960's, and 1970's, and is approaching the end of its useful life. Over the last few decades, there have been significant advances in freeway design, as a result of research and experience in freeway operations. The existing freeway system has many deficiencies in design—left-hand exits and entrances, lack of shoulders, service interchanges spaced too close to freeway-to-freeway interchanges, and multi-point exits. VISION 2050 recommends that the freeway system be reconstructed to modern design standards, addressing the design deficiencies of the existing freeway system and improving travel safety.

- **Congestion mitigation** – Portions of the freeway system in the Region, particularly in Milwaukee and Waukesha Counties, currently experience severe congestion, and are projected to experience substantially increased congestion, for periods of the day, even if all elements of VISION 2050 are implemented, including improved land use, travel demand and systems management, and improved and expanded public transit. The rate of overall crashes is greater on the segments of congested freeway (typically 2 to 7 times higher). In particular, rear-end crash rates (which make up about 40 percent of total freeway crashes) are 5 to 20 times higher on congested freeway segments with the highest rates on the most severely congested freeway segments. While it would be expected that freeway modernization would reduce sideswipe crashes, it would not be expected to significantly reduce the number of rear-end crashes, which appear to be more of a result of freeway congestion. Thus, the freeway widenings recommended under Recommendation 6.3 would be expected to result in improved travel safety by reducing congestion, and associated rear-end crashes.

- **Alternative intersections** – VISION 2050 recommends that alternative intersection types that reduce the number of vehicle-to-vehicle conflicts be considered, particularly for high-volume intersections. While VISION 2050 does not identify the specific type of intersection that should be implemented at each intersection, it recommends that alternative intersection types be considered during the preliminary engineering conducted for the reconstruction of the intersection. Roundabouts are one example of an alternative intersection type that are increasingly being implemented throughout the Region. While a roundabout is not ideal for every intersection location, when properly designed and located, roundabouts have been found to be effective in reducing the number of crashes, and particularly the severity of crashes. Other intersection types utilized around the country that could be considered on the Region's arterial system include displaced left-turns, median U-turns, restricted crossing U-turns (including J-turn intersections), and quadrant roadways (currently proposed by WisDOT for the intersection of STH 50 and STH 31 in Kenosha County).

- **Access management** – Developing and implementing access management standards, as recommended in Recommendation

4.7, along arterial streets and highways would be expected to reduce the number of conflicts that can result in vehicular crashes. A set of recommended access management standards are included in the design guidelines.

- **Regional Safety Implementation Plan** – VISION 2050 recommends that the Commission, working with WisDOT and local governments, develop a Regional Safety Implementation Plan (RSIP) that will identify a list of intersections and corridors along the Region's arterial streets and highways with the most severe crash rates in each county. These intersections and corridors would be prioritized based on the nature of the crashes and frequency of the crashes resulting in fatalities and serious injuries. This prioritization could be used by the State and local governments to identify intersections and corridors for further, more detailed safety studies and the identification and prioritization of projects for Federal and State Highway Safety Improvement (HSIP) funds. The study would also identify a list of corrective measures to reduce the number and severity of crashes.

➤ Recommendation 6.6: Address security needs related to the arterial street and highway system

Ongoing efforts to prevent and respond to attacks affecting the arterial street and highway system encompass a wide range of Federal, State, and local programs, measures, and initiatives. It is expected that Federal and State agencies will continue to refine transportation security measures over the upcoming years, and work toward closer cooperation, coordination, and integration of tasks at all levels of government in an effort to provide secure transportation networks and facilities throughout the United States. Although the Commission does not currently have a direct role in Federal and State Transportation Security policy decisions and implementation, in the future, the Commission will continue to maintain a supportive regional role for transportation security planning. As the regional Metropolitan Planning Organization, the Commission will work to coordinate activities with local, State, and Federal agencies and officials in order to provide a regional forum on security issues, and will continue to provide a high level of support for existing and ongoing transportation security measures.

The Commission will also monitor and assist WisDOT in implementing the security recommendations in its long-range transportation plan entitled Connections 2030.[24] The action items in that plan that involve Commission efforts include coordinating border county evacuation plans with Illinois, supporting the development of the transportation element of the National Response Framework, coordinating evacuation plans for Wisconsin's 12 largest communities, studying the needs of essential freight movement, developing the Wisconsin Airport Security Plan, offering security planning assistance to local transit agencies, and developing local plans that can be integrated into statewide emergency relief and disaster preparedness plans, strategies, and policies.

VISION 2050 recommends that the State and local governments in the Region continue to work with the Federal government and the Commission to address the security needs related to the arterial street and highway system:

[24] *Wisconsin Department of Transportation, Connections 2030 Long-Range Multimodal Transportation Plan, October 2009.*

- **Conduct periodic vulnerability assessments and monitor and strengthen vulnerable infrastructure** – The State has completed a vulnerability assessment of critical transportation infrastructure in Wisconsin, with guidance from the Federal government. The assessment, included in Connections 2030, identified transportation facilities in Wisconsin that have the potential to significantly disrupt the State's transportation system, should they lose functionality. Regularly updating this assessment, strengthening identified vulnerable transportation facilities, and regularly monitoring identified facilities would reduce the risk of disruptions to the Region's arterial street and highway system.

- **Develop and maintain county and local government all hazards mitigation plans** – The counties and local governments in the Region have prepared, or are in the process of preparing, all hazards mitigation plans. These plans fulfill requirements set forth by the Wisconsin Division of Emergency Management (WEM), and the Federal Emergency Management Agency (FEMA). The plans use an "All Hazards Approach" recommended by WEM and FEMA, giving appropriate consideration to such hazards as flooding; lakeshore bluff and dam failure episodes; severe weather conditions, including wind storms, tornadoes, periods of extreme heat or cold, and winter storms; terrorism; civil disorder; urban fire or mass casualty; and hazardous material situations. At the request of Kenosha County, Racine County, Washington County, and the City of Milwaukee, the Commission has prepared, and periodically updates, or is in the process of preparing their hazard mitigation plans. Milwaukee, Ozaukee, Walworth, and Waukesha Counties have prepared their hazard mitigation plans. Ensuring that all of Southeastern Wisconsin is included in an up-to-date all hazards mitigation plan would help reduce the risk of disruptions to the Region's arterial street and highway system.

- **Maintain a resilient regional arterial street and highway network** – Implementing the capacity expansion improvements recommended in the arterial streets and highways element of VISION 2050 would result in a more resilient regional arterial street and highway network that would more effectively move people and goods on alternative routes should a portion of the network be disrupted.

- **Increasing transportation system resiliency to flooding** – Identifying streets, highways, and other transportation facilities (e.g. bus stops and park-ride lots) that are susceptible to flooding, and identifying adjacent roadway facilities that could serve as alternative routes when flooding occurs, would help the Region's transportation system become more resilient with respect to the projected increase in frequency of large storm events. VISION 2050 recommends that the Commission staff initiate a study to identify transportation facilities in low-lying areas (e.g. within 100-year flood plains) and identify potential improvements that would help the regional transportation system become more resilient to flooding.

- **Evacuation routes** – The Commission recognizes WisDOT security-related transportation policies and planning efforts in Southeastern Wisconsin, including the Emergency Transportation Operations Plan, downtown Milwaukee evacuation routes, and emergency alternate routes to IH 94 in Waukesha County. The Commission will work with WisDOT to ensure that these policies are adhered to and continually updated to achieve proper implementation in the Region.

Description of Freight Transportation Element

The movement of freight is essential for maintaining and growing Southeastern Wisconsin's economy. Truck, rail, water, and air modes of transportation bring raw materials to the Region's manufacturers, and they carry finished goods to domestic and international markets. The Region's freight transportation system is used by the U.S. Postal Service and express parcel service providers, and it supports commerce in the Region by providing for the movement of goods that stock the Region's retail stores. The Region's freight transportation system also supports the movement of building materials needed to construct and maintain the Region's homes and businesses as well as the transportation system itself. In 2015, approximately 138 million tons of domestic and international cargo valued at about $206 billion (2015 dollars) were shipped to, from, and within the Milwaukee-Racine-Waukesha Combined Statistical Area (CSA).[25] This cargo was transported using a variety of modes, including: truck (81 percent of all shipments by weight and 79 percent by value); rail (8 percent by weight and 2 percent by value); water (4 percent by weight and 0.2 percent by value); air (less than 0.1 percent by weight and 0.5 percent by value); multiple modes and mail (2 percent by weight and 16 percent by value); pipeline (3 percent by weight and 1 percent by value); and other/unknown (1 percent by weight and 2 percent by value).[26]

VISION 2050 recommends a multimodal freight transportation system designed to provide for the efficient and safe movement of raw materials and finished products to, from, and within Southeastern Wisconsin. To achieve this goal, VISION 2050 recommends improvements to the Region's transportation infrastructure as well as intergovernmental cooperation and other actions to preserve key transportation corridors, address regulatory inefficiencies, meet trucking industry workforce needs, and increase transportation safety and security.

➤ Recommendation 7.1: Accommodate truck traffic on the regional highway freight network

Freight shipments in Southeastern Wisconsin—including shipments involving ships, airplanes, and trains—rely heavily on trucks using the Region's arterial street and highway system. In particular, the movement of freight depends in large part on trucks using the regional freight network—arterial streets and highways in the Region intended to carry a higher percentage of truck traffic. The regional highway freight network is based on the National Highway System as well as the State's designated routes for long trucks (see Map 1.22). Higher levels of congestion and the presence of bottlenecks on the regional highway freight network can result in increased shipping delays and higher shipping costs, negatively impacting businesses and manufacturers in the Region. VISION 2050 recommends implementing the capacity expansion improvements recommended in the arterial streets and highways element, which would address existing and forecast future traffic congestion on the regional freight network.

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[25] *Office of Freight Management and Operations, Federal Highway Administration, Freight Analysis Framework (FAF) Version 3.5, accessed August 2015. The Milwaukee-Racine-Waukesha Combined Statistical Area consists of Dodge, Jefferson, Milwaukee, Ozaukee, Racine, Walworth, and Waukesha Counties.*

[26] *Ibid.*

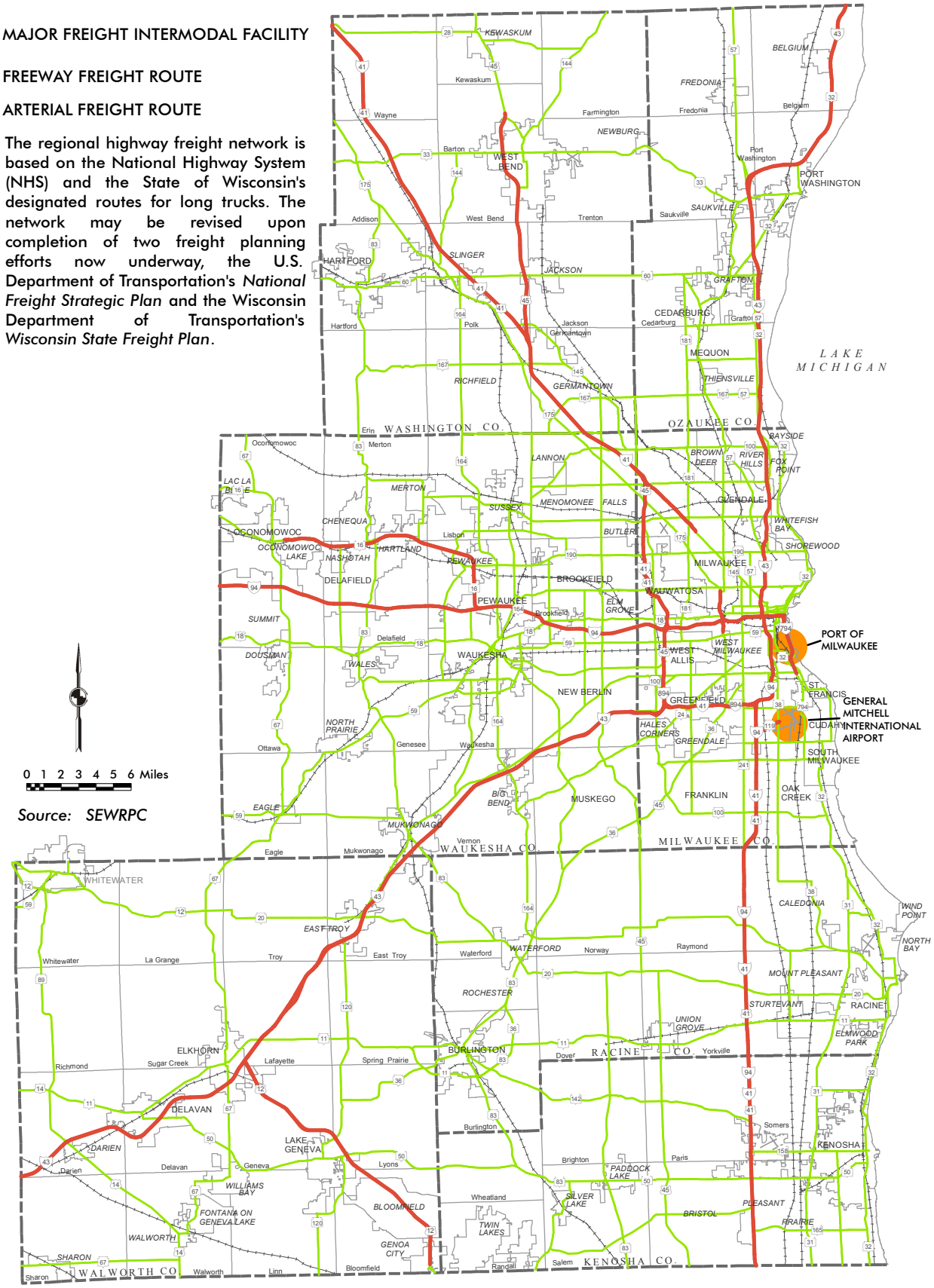
Map 1.22
Regional Highway Freight Network: 2015

MAJOR FREIGHT INTERMODAL FACILITY

FREEWAY FREIGHT ROUTE

ARTERIAL FREIGHT ROUTE

Note: The regional highway freight network is based on the National Highway System (NHS) and the State of Wisconsin's designated routes for long trucks. The network may be revised upon completion of two freight planning efforts now underway, the U.S. Department of Transportation's *National Freight Strategic Plan* and the Wisconsin Department of Transportation's *Wisconsin State Freight Plan*.



Source: SEWRPC

➤ Recommendation 7.2: Accommodate oversize/overweight shipments to, from, and within Southeastern Wisconsin

An Oversize/Overweight Shipment
Source: Port of Milwaukee

Unusually large or heavy goods shipped within or through the Region require that specific oversize/overweight (OSOW) truck routes be used. These routes may consist of streets and highways under State, county, or local jurisdiction. In some cases the movement of OSOW shipments may require following a circuitous route to avoid physical restrictions such as low bridges or temporarily changing infrastructure along the shipment's route—such as raising utility wires or moving traffic signals. While OSOW shipments constitute only a small percentage of all truck shipments in the Region, they include high-value goods—including exports of locally manufactured products to other countries—that are important to the Region's economy. VISION 2050 recommends that State and local governments work with the Commission and local manufacturers, shippers, and utilities to improve the accommodation of OSOW shipments on the Region's arterial street and highway network. The following are specific actions recommended to improve the accommodation of OSOW shipments:

- **Study past OSOW truck shipments in the Region** – Document and analyze the types of goods that were shipped, the origins and destinations of the shipments, the dimensions (height, width, and length) and weights of the shipments, the OSOW routes used, and the geometric envelopes (height and width) of the OSOW routes.

- **Delineate a regional OSOW truck route network** – Identify OSOW truck routes—including routes serving the Port of Milwaukee and routes serving origins and destinations outside the Region—and their associated geometric envelopes and weight restrictions that would meet the needs of manufacturers and shippers in the Region.

- **Identify OSOW truck route infrastructure needs** – Document existing physical impediments to OSOW shipments on the delineated regional OSOW truck route network (e.g. low bridge clearances, low-hanging utility wires, or median barriers) and identify the infrastructure improvements to address the impediments. As an example, a potential need that has been identified involves meeting a minimum height standard of 23 feet for utility wires on all established OSOW routes accommodating high and wide shipments.

- **Preserve OSOW truck routes** – Identify potential intergovernmental agreements or changes to *State Statutes*, *State Administrative Code*, or municipal ordinances that would aid in the preservation of the geometric envelopes and weight restrictions on the delineated OSOW truck route network.

➤ Recommendation 7.3: Pursue development of a new truck-rail intermodal facility in or near Southeastern Wisconsin

A Truck-Rail Intermodal Facility
Source: Canadian Pacific Railway

In many cases freight shipments between Southeastern Wisconsin and other states or countries are most effectively transported using more than one mode of transportation. These intermodal shipments often use trucks for the shorter portion of the trip and rail for the longer portion of the trip. Currently, the truck-rail intermodal facilities—where shipments are interchanged between trucks and freight trains—closest to Southeastern Wisconsin are located in the Chicago area, where intermodal shipments sometimes experience significant congestion-related delays. Locating such a facility in or near Southeastern Wisconsin could provide transportation benefits to the Region's manufacturers and shippers, including lower shipping costs. VISION 2050 recommends that local governments, the Commission, local manufacturers and shippers, freight railroads, and the State work together to pursue development of a new truck-rail intermodal facility in or near Southeastern Wisconsin.

- **Assess the feasibility of developing a new truck-rail intermodal facility** – Conduct a study on the feasibility of developing a new truck-rail intermodal facility in or near Southeastern Wisconsin. Such a study could include identifying potential locations for developing a new facility, surveying local manufacturers and shippers regarding their interest in using a new facility, and working with the freight railroads to determine their interest and needs related to developing an intermodal facility.

- **Support private sector efforts to develop a new truck-rail intermodal facility** – Work with businesses seeking to develop a new truck-rail intermodal facility in or near Southeastern Wisconsin. Support could include identifying and implementing functional improvements to the Region's arterial street and highway system to provide adequate access to the facility.

➤ Recommendation 7.4: Develop truck size and weight regulations in Wisconsin consistent with neighboring states

Inefficient movement of goods by truck between the Region and neighboring states can result from differences in truck size and weight regulations between Wisconsin and neighboring states (e.g. a truck may not be able to be fully loaded due to a neighboring state's lower weight restrictions). VISION 2050 recommends that the State work with neighboring states and FHWA to develop truck size and weight regulations that are consistent across state lines.

➤ Recommendation 7.5: Construct the Muskego Yard bypass

Canadian Pacific Railway (CP) freight trains travelling through downtown Milwaukee currently pass through the Milwaukee Intermodal Station (MIS). The station is a stop for Amtrak's Hiawatha Service and Empire Builder intercity passenger trains. It would also be a stop for commuter rail service

under VISION 2050 and for expanded intercity passenger rail service under the State's long-range state rail plan.[27] Upgrading track and signaling through CP's Muskego Yard, which passes through the Menomonee Valley south of MIS, would allow freight trains travelling through downtown Milwaukee to bypass the station. This would benefit the station's ability to accommodate additional commuter rail and intercity passenger rail service, and it would improve safety and reduce delays to both freight and passenger trains traveling through Milwaukee. As such, VISION 2050 recommends that the City and County of Milwaukee, the Commission, and the State work with CP to construct the Muskego Yard bypass.

➤ Recommendation 7.6: Address the potential need for truck drivers in Southeastern Wisconsin

The trucking industry expects to experience a nationwide, significant shortage of qualified truck drivers in the near future, primarily due to increasing demand for shipping goods by truck in conjunction with the impending retirement of a large number of current truck drivers. VISION 2050 recommends that workforce development agencies and technical colleges in Southeastern Wisconsin monitor the trucking industry's need for qualified drivers in the Region and work with the trucking industry to help address potential driver shortages. This could be done through raising the awareness of truck driving as a career opportunity and through the development of truck driver training opportunities.

➤ Recommendation 7.7: Address safety needs related to freight transportation

Crashes involving freight transportation negatively impact the well-being of Southeastern Wisconsin's residents as well as its economy. VISION 2050 recommends that Federal, State and local governments, the Commission, and private freight carriers continue to work to:

- **Minimize total traffic crashes on the regional highway freight network** – Implementing the capacity expansion improvements recommended in the arterial streets and highways element would address existing and forecast future traffic congestion and reduce total crashes on the regional highway freight network.

- **Implement Positive Train Control (PTC) systems** – Completing installation of PTC systems on major rail lines in the Region, as required by Federal law, would reduce the risk of train derailments and train-to-train collisions.

- **Reduce conflicts involving trucks** – Implementing the recommendations in the public transit element of VISION 2050 has the potential to reduce conflicts between trucks and automobiles by reducing the number of trips made by automobiles and by providing exclusive right-of-way for certain rapid transit routes. Implementing the recommendations in the bicycle and pedestrian element has the potential to reduce conflicts between trucks and bicycles and pedestrians by providing additional off-street bicycle and pedestrian facilities (including bicycle/pedestrian paths and sidewalks) and expanded and enhanced on-street bicycle facilities.

- **Reduce conflicts involving freight trains** – Improving rail crossing infrastructure in the Region would reduce the risk of collisions

[27] *The Wisconsin Department of Transportation, Wisconsin Rail Plan 2030, March 2014.*

between freight trains and motor vehicles, bicycles, and pedestrians. Improvements could include upgrading rail crossings to include visual and audible warning devices and/or gates, installing separate visual and audible warning devices and/or gates for bicyclists and pedestrians, reconstructing roads to improve crossing geometrics (e.g. to improve sight lines), or closing rail crossings and consolidating traffic on adjacent roads. Implementing the recommendations in the public transit element of VISION 2050 has the potential to reduce conflicts between freight trains and automobiles by reducing the number of trips made by automobiles. This would include implementing infrastructure improvements necessary for commuter trains to operate on existing freight rail lines without negatively affecting freight train operations.

➤ Recommendation 7.8: Address security needs related to freight transportation

Ongoing efforts to prevent and respond to attacks affecting freight shipped by truck, train, ship, and airplane encompass a wide range of Federal, State, and local programs, measures, or initiatives. VISION 2050 recommends that the State and local governments continue to work with the Federal government, the Commission, and private freight carriers and businesses to address security needs related to freight transportation, including:

- **Conduct periodic vulnerability assessments and monitor and strengthen vulnerable infrastructure** – The State has completed a vulnerability assessment of critical transportation infrastructure in Wisconsin, with guidance from the Federal government. The assessment identified transportation facilities in Wisconsin that have the potential to significantly disrupt the State's transportation system, should they lose functionality.[28] Regularly updating this assessment, strengthening identified vulnerable transportation facilities, and regularly monitoring identified facilities would reduce the risk of disruptions to the Region's freight transportation system.

- **Develop and maintain county and/or local government all hazards mitigation plans** – Several counties and local governments in the Region have prepared, or are in the process of preparing, all hazards mitigation plans. These plans identify potential hazards—which can include terrorism and civil disorder—and strategies for preventing and responding to incidents. Ensuring that all of Southeastern Wisconsin is included in an up-to-date all hazards mitigation plan would help reduce the risk of disruptions to the Region's freight transportation system.

- **Maintain a resilient regional highway freight network** – Implementing the capacity expansion improvements recommended in the arterial streets and highways element would result in a more resilient regional highway freight network that would more effectively accommodate truck movements on alternative routes should a portion of the network be disrupted.

- **Study the needs of essential freight movement** – Studying and recommending strategies for ensuring that shipments of essential freight—such as food and fuel—can travel to, from, and within the Region during prolonged security incidents, as recommended by

[28] *The Wisconsin Department of Transportation, Connections 2030 Long-Range Multimodal Transportation Plan, October 2009.*

the State's long-range transportation plan,[29] would help the Region recover from incidents as well as support efforts to respond to incidents in other parts of the country.

➤ **Recommendation 7.9: Support efforts in areas outside the Region that improve freight movement to and from the Region**

Freight transportation issues in neighboring metro areas and states—such as highway and rail congestion in the Chicago area—can negatively impact the Region's manufacturers and shippers. In some cases neighboring metro areas, states, the Federal government, and/or private sector freight transportation providers have initiated efforts to address these issues. For example, a partnership between the U.S. Department of Transportation (U.S. DOT), the State of Illinois, the City of Chicago, freight railroads, Metra, and Amtrak developed the Chicago Region Environmental and Transportation Efficiency Program (CREATE), which has identified specific infrastructure improvements that would reduce freight rail congestion and truck and automobile delays at grade crossings in the Chicago area. VISION 2050 recommends that the State, the Commission, and local manufacturers and shippers participate in and support efforts outside Southeastern Wisconsin that address issues affecting freight movement to and from the Region.

Financial Analysis of Expected Plan Costs and Revenues

The implementation of the transportation component of VISION 2050 will require adequate funding for the recommended improvements to the public transit system, bicycle and pedestrian network, and arterial street and highway system. The financial analysis in this section examines the expected costs of VISION 2050 and compares those costs to reasonably expected revenues that would be available to fund the transportation component of VISION 2050. Comparing cost and revenue forecasts illustrates potential funding gaps that would need to be addressed in order to fully implement VISION 2050. To address the funding gaps, VISION 2050 identifies additional revenue sources that should be explored. The transportation component of VISION 2050 is required by the Federal government to be funded with reasonably expected revenues. If funding gaps exist for the desired improvements of a particular element, those improvements would not meet federal requirements for fiscal constraint, necessitating identification of a "Fiscally Constrained Transportation Plan" for Southeastern Wisconsin, which is presented in Chapter 2 of this volume.

Expected Costs and Revenues

Tables 1.13 and 1.14 compare estimated costs of the VISION 2050 transportation system to reasonably expected future revenues. Table 1.13 provides this comparison based on year 2015 constant dollars, and Table 1.14 based on year of expenditure (YOE) dollars. Federal, State, and local capital and operating revenues for highways are based on estimated Federal, State, and local expenditures over the last several years. Federal capital and operating revenues for transit are based on historic expenditures over the last several years, and an assessment of available Federal formula and program funds.

The estimated arterial street and highway system and transit system costs shown in Tables 1.13 and 1.14 include all capital costs and operating and maintenance costs. The estimated costs include the necessary costs to preserve the existing transportation system such as arterial street resurfacing

[29] *Ibid.*

Table 1.13
Average Annual Costs and Revenues Associated with the VISION 2050 Transportation System in 2015 Constant Dollars: 2016 - 2050

Cost or Revenue Item	2015 Constant Dollars
Transportation System Cost (average annual 2016-2050 expressed as millions of dollars)[a]	
Arterial Street and Highway System	
Capital	
Freeway Reconstruction	$276
Surface Arterial Reconstruction/Resurfacing and Freeway Resurfacing[b]	382
Subtotal	$658
Operating	84
Highway Subtotal	$742
Transit System	
Capital	$125
Operating[c]	$235
Transit Subtotal	$360
Total	$1,102
Transportation System Revenues (average annual 2016-2050 expressed as millions of dollars)[a]	
Highway Capital	
Freeway Reconstruction (Federal/State)	$275
Surface Arterial Reconstruction/Resurfacing and Freeway Resurfacing	
Federal/State	338
Local	67
Subtotal	$680
Highway Operating	
State	$41
Local	38
Subtotal	$79
Highway Subtotal	$759
Transit Capital	
Federal	$94
Local	3
Subtotal	$97
Transit Operating	
Federal	$5
State	76
Local	21
Subtotal	$102
Transit Subtotal	$199
Total	$958

[a] *The estimated arterial street and highway system and transit system costs include all capital costs and operating and maintenance costs. The estimated costs include the necessary costs to preserve the existing transportation system such as arterial street resurfacing and reconstruction and transit system bus replacement, and the estimated costs of the transportation system improvement and expansion recommended under VISION 2050. The freeway system capital costs include the estimated cost to resurface the existing freeway system, as needed, estimated at $1.1 billion or $32 million per year, and the estimated cost to rebuild those segments of the existing freeway system, which can be expected to be completed by the year 2050 and within the reasonably expected revenues available to modern design standards, estimated at $8.4 billion or $240 million per year; the estimated incremental cost to rebuild 106 miles of the freeway system with additional lanes at $540 million or $15 million per year; the estimated cost of two new freeway interchanges at $73 million; and the estimated cost of the extension of the USH 12 freeway from Elkhorn to Whitewater at $438 million. These freeway capital costs include the cost to reconstruct IH 43 between Howard Avenue and Silver Spring Drive to modern design standards. Should it be determined that this segment of IH 43 be widened, the project cost would incrementally increase by $168 million. With respect to freeway resurfacing, it was assumed that segments of freeway that were reconstructed before 2016 would be resurfaced on average two times by 2050 and segments of freeway that are recommended to be reconstructed in 2016 and beyond would be resurfaced on average one time by 2050. Surface arterial capital costs include the costs of the estimated necessary resurfacing and reconstruction of the 3,157 miles of surface arterials that will require preservation of capacity over the plan design period, the estimated costs of reconstruction and widening with additional traffic lanes of about 163 miles of surface arterials, and the estimated costs of new construction of 63 miles of surface arterials. The estimated costs of resurfacing and reconstruction are based on the estimated lifecycle of existing surface arterials, and includes reconstruction of about 52 percent of surface arterials with approximately 66 percent resurfaced once, and 66 percent of the 48 percent resurfaced twice and 33 percent resurfaced three times. Unit costs for surface arterial resurfacing, reconstruction, widening, and new construction vary by cross-section from $0.4 to $13.4 million per mile (rural or urban, divided or undivided, and number of traffic lanes) and are based upon actual project costs over the past several years. The estimated capital cost of surface arterials is $348 million per year, including $298 million for preservation (resurfacing and reconstruction) and $50 million for new arterials and arterials reconstructed with additional traffic lanes. Transit system capital costs include preservation of the existing transit system, including bus replacement on a 12-year schedule and replacement of fixed facilities, and costs of system improvement and expansion including needed additional buses and facility expansion.*

Highway system operating (and maintenance) costs are based on estimated actual state and local highway system operating costs and verified by application of estimated unit lane-mile costs. Planned highway system operating costs are increased from estimated existing costs based on the proposed increase in VISION 2050 in arterial highway system lane-miles. Transit system operating (and maintenance) costs are based on existing estimated actual costs and unit costs based on service vehicle-miles and vehicle-hours.

Highway Federal, State, and local capital and operating revenues are based on historic expenditures over the last several years and are documented in Table 1.15. Transit Federal, State, and local capital and operating revenues are based on historic expenditures over the last several years and assessment of available Federal formula and program funds and are documented in Table 1.16.

[b] *Also includes the costs associated with the bicycle and pedestrian, TSM, and TDM elements of VISION 2050.*

[c] *Net operating cost (total operating costs less fare-box revenue).*

Source: SEWRPC

Table 1.14
Average Annual Costs and Revenues Associated with the VISION 2050 Transportation System Based on Year of Expenditure: 2016 - 2050

Cost or Revenue Item	YOE Dollars
Transportation System Cost (average annual 2016-2050 expressed as millions of dollars)[a]	
Arterial Street and Highway System	
Capital	
Freeway Reconstruction	$424
Surface Arterial Reconstruction/Resurfacing and Freeway Resurfacing[b]	590
Subtotal	$1,014
Operating	130
Highway Subtotal	$1,144
Transit System	
Capital	$198
Operating[c]	$334
Transit Subtotal	$532
Total	$1,676
Transportation System Revenues (average annual 2016-2050 expressed as millions of dollars)[a]	
Highway Capital	
Freeway Reconstruction (Federal/State)	$417
Surface Arterial Reconstruction/Resurfacing and Freeway Resurfacing	
Federal/State	520
Local	92
Subtotal	$1,029
Highway Operating	
State	$60
Local	55
Subtotal	$115
Highway Subtotal	$1,144
Transit Capital	
Federal	$126
Local	5
Subtotal	$131
Transit Operating	
Federal	$5
State	107
Local	28
Subtotal	$140
Transit Subtotal	$271
Total	$1,415

[a] *The estimated arterial street and highway system and transit system costs include all capital costs and operating and maintenance costs. The estimated costs include the necessary costs to preserve the existing transportation system such as arterial street resurfacing and reconstruction and transit system bus replacement, and the estimated costs of the transportation system improvement and expansion recommended under VISION 2050. The freeway system capital costs include the estimated cost to rebuild those segments of the existing freeway system, which can be expected to be completed by the year 2050 and within the reasonably expected revenues available to modern design standards, the estimated incremental cost to rebuild 106 miles of the freeway system with additional lanes, the estimated cost of two new freeway interchanges, and the estimated cost of the extension of the USH 12 freeway from Elkhorn to Whitewater. Surface arterial capital costs include the costs of the estimated necessary resurfacing and reconstruction of the 3,157 miles of surface arterials that will require preservation of capacity over the plan design period, the estimated costs of reconstruction and widening with additional traffic lanes of about 163 miles of surface arterials, and the estimated costs of new construction of 63 miles of surface arterials.*

The capital costs of VISION 2050 are based on equal annual expenditures of funds, in constant dollars, over the 35-year period. The operating costs for both the arterial street and highway system and transit system are based on equally increasing annual costs, in constant dollars, over the 35-year period. The conversion of year 2015 constant dollar cost to year of expenditure cost utilizes inflation rates based upon historical trends. The rate of inflation used for highway costs and transit construction costs of 2.3 percent was provided by WisDOT and is based on the average change in the Consumer Price Index over the previous 10 years. The inflation rate of 2.5 percent used for transit vehicle costs is based on the historical increase in the purchase price of transit vehicles as experienced by the transit operators of the Region. With regard to transit operating costs, the inflation rate of 2.0 percent is based on the historical inflation from the Consumer Price Index for the Milwaukee area and discussions with Milwaukee County Transit System staff.

Highway Federal, State, and local capital and operating revenues are based on historic expenditures over the last several years and are documented in Table 1.15. Transit Federal, State, and local capital and operating revenues are based on historic expenditures over the last several years and assessment of available Federal formula and program funds and are documented in Table 1.16.

[b] *Also includes the costs associated with the bicycle and pedestrian, TSM, and TDM elements of VISION 2050.*

[c] *Net operating cost (total operating costs less fare-box revenue).*

Source: SEWRPC

and reconstruction and transit system bus replacement, and the estimated costs of the transportation system improvement and expansion recommended under the VISION 2050.

The freeway system capital costs include the estimated cost to resurface the existing freeway system, as needed, estimated at $1.1 billion or $32 million per year in year 2015 constant dollars, and the estimated cost to rebuild those segments of the existing freeway system, which can be expected to be completed by the year 2050 and within the reasonably expected revenues available to modern design standards, estimated at $8.4 billion or $240 million per year in year 2015 constant dollars; the estimated incremental cost to rebuild 106 miles of the freeway system with additional lanes at $540 million or $15 million per year in year 2015 constant dollars; the estimated cost of two new freeway interchanges at $73 million in year 2015 constant dollars; and the estimated cost of the extension of the USH 12 freeway from Elkhorn to Whitewater at $438 million in year 2015 constant dollars. These freeway capital costs include the cost to reconstruct IH 43 between Howard Avenue and Silver Spring Drive to modern design standards. Should it be determined that this segment of IH 43 be widened, the project cost would incrementally increase by $168 million in year 2015 constant dollars. With respect to freeway resurfacing, it is assumed that segments of freeway that were reconstructed before 2016 would be resurfaced on average two times by 2050 and segments of freeway that are recommended to be reconstructed in 2016 and beyond would be resurfaced on average one time by 2050.

Surface arterial capital costs include the costs of the estimated necessary resurfacing and reconstruction of the 3,157 miles of surface arterials that will require preservation of capacity over the plan design period, the estimated costs of reconstruction and widening with additional traffic lanes of about 163 miles of surface arterials, and the estimated costs of new construction of 63 miles of surface arterials. The estimated costs of resurfacing and reconstruction are based on the estimated lifecycle of existing surface arterials, and includes reconstruction of about 52 percent of surface arterials with approximately 66 percent resurfaced once, and 66 percent of the 48 percent resurfaced twice and 33 percent resurfaced three times. Unit costs for surface arterial resurfacing, reconstruction, widening, and new construction vary by cross-section from $0.4 to $13.4 million per mile in year 2015 constant dollars (rural or urban, divided or undivided, and number of traffic lanes) and are based upon actual project costs over the past several years. The estimated capital cost of surface arterials is $348 million per year in year 2015 constant dollars, including $298 million for preservation (resurfacing and reconstruction) and $50 million for new arterials and arterials reconstructed with additional traffic lanes.

Transit system capital costs include preservation of the existing transit system, including bus replacement on a 12-year schedule and replacement of fixed facilities, and costs of system improvement and expansion including needed additional buses and facility expansion.

Highway system operating (and maintenance) costs are based on estimated actual State and local highway system operating costs and verified by application of estimated unit lane-mile costs. Planned highway system operating costs are increased from estimated existing costs based on the recommended increase in arterial highway system lane-miles in VISION 2050. Transit system operating (and maintenance) costs are based on existing estimated actual costs and unit costs based on service vehicle-miles and vehicle-hours.

The capital costs of VISION 2050 are based on equal annual expenditures of funds, in constant dollars, over the 35-year period. The operating costs for both the arterial street and highway system and transit system are based on equally increasing annual costs, in constant dollars, over the 35-year period. The conversion of year 2015 constant dollar cost to year of expenditure cost in Table 1.14 utilizes inflation rates based upon historical trends. The rate of inflation used for highway costs and transit construction costs of 2.3 percent was provided by WisDOT and is based on the average change in the Consumer Price Index over the previous 10 years. The inflation rate of 2.5 percent used for transit vehicle costs is based on the historical increase in the purchase price of transit vehicles as experienced by the transit operators of the Region. With regard to transit operating costs, the inflation rate of 2.0 percent is based on the historical inflation from the Consumer Price Index for the Milwaukee area and discussions with Milwaukee County Transit System staff.

Highway Federal, State, and local capital and operating revenues are based on historic expenditures over the last several years and are documented in Table 1.15. Transit Federal, State, and local capital and operating revenues are based on historic expenditures over the last several years, and assessment of available Federal formula and program funds and are documented in Table 1.16.

A significant portion of the arterial street and highway system expenses is related to the construction and reconstruction of freeway segments, which are shown in greater detail in Table 1.17, and the construction of new surface arterial segments and the reconstruction of existing arterial segments of four or more miles in length, which are shown in greater detail in Table 1.18. These tables are provided to give more insight into the costs associated with specific projects contained within the arterial streets and highways element.

The amount of transit service varies significantly by county, and is directly related to the number of jobs and residents that are located within a specific area. Due to these variations, the costs of constructing, operating, and maintaining the public transit element also vary significantly by county. Table 1.19 shows these costs, and is provided to further inform the discussion of determining the most appropriate method of funding the public transit element (see the next section of this chapter).

Funding Gap Identification

A comparison of estimated costs to expected revenues for the VISION 2050 transportation system, shown in Tables 1.13 and 1.14, indicates there may be enough revenue to fund the recommended arterial system improvements during the plan period. This conclusion assumes that the State will continue to provide the necessary level of funding for arterial improvements. In recent State budgets, the State has chosen to provide this level of funding through bonding and the long-term sustainability of this approach has been questioned. Other issues have also been raised regarding the ability to sustainably fund the arterial street and highway system at the regional, State, and Federal levels in the future. The Federal motor fuel tax has not changed since 1993, and the State motor fuel tax—the principal source of State transportation funding—is no longer indexed to inflation (the ability to index was repealed in 2006). Combined with improvements in motor vehicle fuel economy and increasing alternative fuel use, State and Federal motor fuel tax revenues have been declining.[30]

[30] *Wisconsin Transportation Finance and Policy Commission, Keep Wisconsin Moving—Smart Investments, Measurable Results, January 2013.*

Table 1.15
Estimate of Existing and Reasonably Expected Arterial Street and Highway Revenues

Federal and State Capital Funding

Assessment of Historic Statewide Funding

- Major Highway Development
  - 2015 – $368 million
  - 2011-2015 – 0.6 percent annual increase
  - 2006-2015 – 4.7 percent annual increase
- State Highway Rehabilitation
  - 2015 – $806 million
  - 2011-2015 – 3.0 percent annual increase
  - 2006-2015 – 3.5 percent annual increase
- Local Roads and Bridges
  - 2015 – $181 million
  - 2011-2015 – 0.6 percent annual increase
  - 2006-2015 – 0.5 percent annual increase
- Southeastern Wisconsin Freeway Megaproject
  - 2015-2017 State budget provides an annual $208 million
  - 2013-2015 State budget provided an annual $275 million
  - 2011-2015 – $276 million annual average (2015 constant dollars)
  - 2006-2015 – $291 million average annual funding (2015 constant dollars)

  The 2011 Wisconsin Act 32 eliminated the Southeastern Wisconsin freeway rehabilitation program and initiated the Southeast Wisconsin Freeway Megaproject program.

Conclusion

	2015 Constant Dollar Funding (millions)	Year of Expenditure Average Annual Increase (Percent)
Major Highway Development	$365	2.5
State Highway Rehabilitation	805	2.5
Local Roads and Bridges	180	0.5
Southeastern Wisconsin Freeway Megaproject	275	2.0
Total	$1,625	

The average annual increase is based on Wisconsin Department of Transportation assumptions of future transportation revenues.

Southeastern Wisconsin Share of State Revenues

Southeastern Wisconsin represents approximately 35 percent of the State in population, employment, income, and assessed value, and about 30 percent of vehicle-miles of travel. In the years after freeway system construction, and before freeway system reconstruction, Southeastern Wisconsin received about 25 to 30 percent of all State highway system revenues. To estimate Southeastern Wisconsin's share of State revenues, Option 1 allocates all Southeast Freeway Rehabilitation funds to Southeast Wisconsin and 25 percent of all other funds to Southeastern Wisconsin. Option 2 allocates 30 percent of all funds to Southeastern Wisconsin.

- Option 1
  - $275 + 0.25($1,350) = $613 million
- Option 2
  - $1,625 x 0.30 = $488 million
- Conclusion
  - $613 million Federal and State annual highway revenue in 2015 constant dollars (2.0 percent annual increase year of expenditure)

Local Capital

Estimate of annual revenue based upon local arterial highway annual expenditure – $52 million (2.0 percent annual increase year of expenditure)

Local Transportation Aids (Capital)

Estimate of annual general transportation aids attendant to estimated local highway capital expenditure – $15 million (0.5 percent annual increase year of expenditure)

Operating and Maintenance Funding

State

- Assessment of Historic Funding
  - $41 million annually
- Conclusion – 2050 Plan
  - $41 million annually (2.0 percent annual increase year of expenditure)

Local

- Assessment of Historic Funding
  - $38 million annually
- Conclusion – 2050 Plan
  - $38 million annually (2.0 percent annual increase year of expenditure)

Source: Transportation Budget Trends – 2014-2015 (Wisconsin Department of Transportation) and SEWRPC

Table 1.16
Estimate of Existing and Reasonably Expected Transit Revenues (Fixed-Route Systems)

Estimate of Year 2015 Constant Dollar Annual Funding

Federal

Assessment of Historic Funding
- Operating – $32 million (2004-2016)
- Capital – $7.1 million (2013-2016)

Assessment of Funding Sources
- Milwaukee Urbanized Area Section 5307 formula funds – $21.1 million (2004-2016)
- Racine, Kenosha, and West Bend Urbanized Ares 5307 operating funds – $5.8 million (2004-2016)
- Other:
  - FTA 5311 – $0.3 million (2013-2016)
  - FTA 5337 – $0.4 million (2013-2016)
  - FTA 5339 – $3.2 million (2013-2016)
  - FTA 5339b – $2.4 million (2016)
  - FHWA CMAQ – $1.3 million
  - FHWA STP-M – $1.7 million
- City of Milwaukee Streetcar
  - Capital
    - $54.9 million Federal Interstate Cost Estimate funding ($1.4 million average annual)
    - $34.2 million TIGER grant ($877,200 million average annual)
    - FTA 5337 – $263,800 beginning in 2025, 2026, and 2027 ($191,100 average annual)
  - Operating
    - CMAQ – $6.2 million ($160,500 average annual)
    - FTA 5307 – $547,300 beginning in 2020, 2021, and 2022 ($474,600 average annual)
- Milwaukee County Bus Rapid Transit
  - Capital
    - FTA 5309 Small Starts – $30 million ($767,100 average annual)
    - FTA 5337 – $860,000 beginning in 2026 ($623,000 average annual)
  - Operating
    - FTA 5307 – $1 million beginning in 2021 ($857,100 average annual)

Conclusion
- $23.6 million operating
- $18.0 million capital
- Transit service levels envisioned in VISION 2050 would be expected to generate an additional $57.2 million in Federal capital and operating funding annually on average

State

Assessment of Historic Operating Funding
- 43.7 percent of operating cost – $76.3 million (2014)
- 41.4 percent of total operating cost (average 2004-2014) – $83.2 million

Conclusion
- $76 million operating annually

Local

Assessment of Operating Funding
- $20.7 million (2014)
- $26.8 million (average 2004-2014)
- $2.9 million average annual parking revenue – City of Milwaukee Streetcar

Conclusion
- $26 million operating

Assessment of Capital Funding
- $3.2 million (2014)
- $3.4 million (average 2004-2015)
- $12.1 million (2016) for Milwaukee County Transit System, which represents approximately 90 percent of the transit service in the Region
- $79 million tax incremental finance funds ($2.1 million average annual) – City of Milwaukee Streetcar

Conclusion
- Up to $12 million capital

Table continued on next page.

Table 1.16 (Continued)

Estimate of Annual Increase in Funding for Year of Expenditure Revenues
Federal
Assessment of Historic Funding and Conclusion
FTA Section 5307 Milwaukee Area
0.4 percent annual increase (2004-2014)
FTA Section 5307 Kenosha, Racine, and West Bend
3.3 percent annual increase (2004-2014)
FTA 5311
-3.1 percent annually (2013-2016)
FTA 5337
5.1 percent annually (2013-2016)
FTA 5339
-2.0 percent annually (2013-2016)
FTA 5339b
Approximately $2.5 million (2016)
FHWA CMAQ
Assume no growth
FHWA STP-M
Assume no growth
State
Assessment of Historic Operating Funding
1.7 percent annual increase (average 2004-2014)
Conclusion
1.7 percent annual increase
Local
Assessment of Historic Funding
1.2 percent annual decrease (2004-2014 operating) in recent years due primarily to reductions in operating costs attributable to contract restructuring.
10 percent annual increase (2015-2016) for the Milwaukee County Transit System, which represents approximately 90 percent of the transit service in the Region.
Conclusion
1.5 percent annual increase
Average Fares
2.4 percent annual increase (2004-2014)
Conclusion
2.4 percent increase

Source: SEWRPC

Table 1.17
Estimated Cost and Potential Schedule of Freeway Reconstruction: 2016 - 2050[a]

Period Completed and Open to Traffic	Facility	Limits of Project	Estimated Cost		Estimated Funding-Year of Expenditure Dollars (millions)
			Year 2015 Constant Dollars (millions)[b]	Year of Expenditure Dollars (millions)[b]	
2016 to 2020	IH 794[c]	Lake Interchange to Carferry Drive (Including Lakefront Gateway)	45.3	46.4	
	Zoo IC[c]	Zoo Interchange	660.9	707.9	
		Subtotal	706.2	754.2	1,518.7
2021 to 2025	IH 94[c]	Illinois to Mitchell Interchange	560.4	635.5	
	IH 94	70th Street to 16th Street (including Stadium Interchange)	852.0	1,106.0	
	IH 43	Silver Spring Drive to STH 60	471.6	559.4	
		Subtotal	1,884.0	2,300.9	1,676.8
2026 to 2030	IH 43, IH 43/894, & IH 894	Lincoln Avenue to 27th Street (STH 241), Racine Avenue (CTH Y) to Hale Interchange (Including Hale Interchange)	1,001.7	1,316.6	
		Subtotal	1,001.7	1,316.6	1,851.3
2031 to 2035	IH 94	Jefferson Co. to 124TH	954.5	1,358.9	
	IH 43[d]	Howard to Silver Spring (excluding Marquette Interchange)	817.9	1,214.0	
		Subtotal	1,772.3	2,572.9	2,044.0
2036 to 2040	IH 41	Burleigh to Richfield Interchange	817.3	1,274.3	
	STH 175[e]	Stadium Interchange to Lisbon Avenue	140.5	235.1	
	USH 41[e]	Richfield Interchange to Dodge County	394.3	672.8	
	IH 43[e]	STH 83 to Racine Avenue (CTH Y)	258.4	398.7	
		Subtotal	1,610.5	2,580.9	2,256.7
2041 to 2050	IH 43[e]	IH 43 & USH 12 Interchange	68.7	131.9	
	IH 43[e]	STH 60 to Sheboygan County	391.3	758.0	
	USH 12	Illinois to Rock County	729.6	1,411.1	
	IH 43[e]	Rock County to STH 83	585.5	1,130.5	
	STH 16[e]	STH 67 to IH 94	418.5	887.9	
	STH 145[e]	Hampton Avenue to Good Hope Road	185.7	381.3	
	USH 45[e]	Richfield Interchange to CTH D	309.3	671.2	
		Subtotal	2,688.6	5,371.8	5,242.5
		Total	9,663.2	14,897.3	14,590.0

[a] *It is assumed that the State will continue to provide the necessary level of funding for freeway reconstruction through the year 2050. In recent State budgets, the State has chosen to provide this level of funding through bonding, which has been criticized by some as unsustainable. However, it is reasonable to expect that the State will address its long-term funding issues in order to reconstruct the aging freeway system in the Region. Project prioritization beyond the year 2021 is subject to change.*

[b] *Constant dollar and year of expenditure cost estimates for projects are reported in the period that the project is expected to be completed and open to traffic. Actual project expenditures will occur over multiple years and could extend over multiple periods dependent on the scope and complexity attendant to each project.*

[c] *Project is currently underway. Only those construction costs programmed for years 2016 through 2050 are included.*

[d] *VISION 2050 does not make a recommendation for whether IH 43 between Howard Avenue and Silver Spring Drive, when reconstructed, would be reconstructed with or without additional traffic lanes. The decision of how this segment of IH 43 would be reconstructed would be determined through preliminary engineering. Following the conclusion of the preliminary engineering for the reconstruction, VISION 2050 would be amended to reflect the decision made as to how this segment of IH 43 would be reconstructed. The estimated cost shown in this table reflects the cost to reconstruct this segment of IH 43 to modern design standards without additional traffic lanes. Providing the additional traffic lanes along this segment of IH 43 is estimated to have an incremental cost of $168 million.*

[e] *Current Majors Program budget levels will not provide funding for these projects before 2050; therefore, this project schedule assumes additional funding availability in the years shown. Projects listed for completion after 2036 will have to compete for Majors funding with other large projects statewide, on the basis of economic impact, traffic flow, safety, and environmental considerations.*

Source: Wisconsin Department of Transportation and SEWRPC

Table 1.18
Estimated Cost and Potential Schedule of Major Surface Arterial Construction and Reconstruction Projects[a, b]

Period Completed and Open to Traffic	County	Facility	Limits of Project	Cost (Millions 2015 Dollars)[c]	Cost (Millions Year of Expenditure Dollars)	Mileage
2016 to 2020	Kenosha	CTH S (part)	CTH H to STH 31	9.0		1.9
	Waukesha	CTH M (part)	CTH YY to Highland Drive and Lilly Road to 124th Street	13.1		1.7
	Waukesha	Waukesha West Bypass	IH 94 to STH 59	43.1		5.1
			Subtotal	65.2	69.8	8.7
2021 to 2025	Kenosha	CTH S (part)	E. Frontage Road to CTH H	7.5		1.9
	Kenosha	STH 50	IH 94 to 39th Avenue	61.0		4.8
	Waukesha	CTH M (part)	CTH Y to CTH YY	22.3		2.9
			Subtotal	90.9	109.1	9.6
2026 to 2030	Kenosha	CTH H (Part)	CTH S to STH 50	17.5		2.6
	Ozaukee	CTH W (part)	Highland Road to W. Glen Oaks Lane	6.7		1.0
	Milwaukee and Racine	STH 32	STH 100 to Five Mile Road	29.5		5.1
	Walworth	STH 50	IH 43 to STH 67	23.3		4.3
	Waukesha	STH 83	USH 18 to Phylis Parkway	31.5		2.4
	Waukesha	STH 83	Mariner Drive to STH 16	31.5		3.6
	Waukesha	CTH D (part)	Milwaukee County line to Calhoun Road	11.9		3.0
	Waukesha	CTH Y (part)	Hickory Trail to Downing Drive	15.8		4.0
			Subtotal	167.7	225.5	26.0
2031 to 2035	Kenosha	CTH H (Part)	STH 50 to STH 165	13.0		3.0
	Milwaukee	USH 45/STH 100	Rawson Avenue to 60th Street	22.0		4.8
	Racine	STH 20	IH 94 to Oaks Road	41.0		4.5
	Waukesha	Pilgrim Road	USH 18 to Lisbon Road	32.4		4.8
	Waukesha	CTH SR/Town Line Road extension (part)	CTH JJ to STH 190	21.6		3.2
	Waukesha	CTH Y (part)	CTH L to College Avenue	11.4		2.1
			Subtotal	141.3	170.3	22.4
2036 to 2040	Ozaukee	CTH W (part)	CTH V to Lakeland Road	20.9		3.1
	Waukesha	STH 67 (part)	CTH DR to USH 18	13.2		2.9
	Waukesha	STH 190	STH 16 to Brookfield Road	49.0		5.4
	Waukesha	CTH D (part)	Calhoun Road to STH 59/164	15.2		3.8
			Subtotal	98.3	166.0	15.2
2041 to 2045	Ozaukee	CTH W (part)	Lakeland Road to Highland Road	20.8		3.1
	Waukesha	STH 59/164	CTH XX to Arcadian Avenue	51.6		4.8
	Waukesha	CTH SR/Town Line Road extension (part)	STH 190 to Weyer Road	7.3		1.5
			Subtotal	79.7	150.8	9.4
2046 to 2050	Milwaukee	Lake Pkwy Extension	E. Edgerton Avenue to STH 100	219.7		6.0
			Subtotal	219.7	465.5	6.0
			Total	862.9	1,357.1	97.3

[a] *Major projects include those projects involving new construction or widening with a cumulative length of four or more miles.*

[b] *The schedule shown in this table represents an estimate of the timing of construction and reconstruction for the purposes of comparison of costs and revenues, and is not a recommendation for the schedule of construction and reconstruction. Such a schedule can only be developed by the responsible implementing agency and will necessarily entail frequent updating, for example, due to pavement and structure condition.*

[c] *Cost of Construction does not include the cost of right-of-way required for the project.*

Source: SEWRPC

Table 1.19
Average Annual Costs by County Associated with the VISION 2050 Public Transit Element in 2015 Constant Dollars: 2016-2050

County	Operating Cost[a] (Millions)	Capital Cost (Millions)	Total (Millions)
Kenosha	$23.7	$8.6	$32.3
Milwaukee	137.4	86.3	223.7
Ozaukee	5.4	1.0	6.4
Racine	24.8	8.9	33.7
Walworth	2.6	0.2	2.8
Washington	5.2	0.9	6.1
Waukesha	35.9	18.6	54.5
Region	$235.1	$124.6	$359.5

[a] *Net operating cost (total operating costs less fare-box revenue).*

Source: SEWRPC

Table 1.20
Estimated Gap Between VISION 2050 Costs and Existing and Reasonably Expected Revenues

Constant Year 2015 Dollars (Average Annual Through Year 2050)	
Public Transit	
Capital	$28 million
Operating	$133 million
Year of Expenditure Dollars (Average Annual Through Year 2050)	
Public Transit	
Capital	$67 million
Operating	$194 million

Source: SEWRPC

TSM, TDM, and bicycle and pedestrian facility costs are primarily included in the costs for surface arterial streets and highways, and typically represent a fraction of the cost to reconstruct an arterial facility. Therefore, there would also likely be enough revenue to fund the TSM, TDM, and bicycle and pedestrian elements as recommended under VISION 2050. As discussed in Chapter 3 of Volume I, the TSM and bicycle and pedestrian elements of the year 2035 regional transportation plan have also been substantially implemented since that plan was adopted, further supporting this conclusion. Similarly, many of the recommendations included in the freight element would either be funded as part of the construction, operation, and maintenance of the Region's arterial streets and highways, or could be funded through a successful application to the Federal government for funds targeted at improving freight movement in the Nation.

Although a funding gap was not identified for the arterial, TDM, TSM, freight, or bicycle and pedestrian elements, a significant funding shortfall was identified for the recommended public transit system (see Table 1.20). The overall funding gap between the forecast capital and operating costs for the recommended transit system and the forecast revenues for transit is about $161 million annually in year 2015 constant dollars and about $261 million annually in YOE dollars. The identified funding gap is a result of significantly constrained funding for public transit. Public transit in Southeastern Wisconsin is funded in a unique way, heavily dependent on Federal and State funding. The local share of funding for public transit in the Region is provided through county or municipal budgets, largely provided by property taxes, with public transit competing annually with mandated

services and projects. Increasingly, due to the constraints in property tax-based funding, counties and municipalities have found it difficult to provide funding to address transit needs, and to respond to any shortfalls in Federal and State funding.

Addressing the Transit Funding Gap

As long recommended in previous regional transportation plans, transit system improvement and expansion, as recommended under VISION 2050, would require State legislation to create local dedicated transit funding and a renewal of adequate annual State financial assistance to transit. In terms of State financial assistance to transit, VISION 2050 recommends that the State restore the cut in transit funding from the 2011-13 State budget, raise funding back to historic levels, and increase future funding at the rate of inflation. The Wisconsin Transportation Finance and Policy Commission recommended an annual increase in statewide transit funding of $36.3 million along with recommended revenue sources to support the additional funding (including restoring the cut in transit funding from the 2011-13 State budget, raising funding back to historic levels, and creating a transit capital program). In the 2015-2017 State budget, the WisDOT Secretary proposed an additional $60.7 million in statewide transit funding during the biennium, including a new capital program and increases to State transit operating assistance. Implementing these modest measures would have the potential to partially address the transit funding gap.

A sales tax is the most common dedicated local transit funding source in other areas of the country and has previously been proposed for the Region.[31] A sales tax has the potential to generate the needed revenue to implement the transit improvements recommended under VISION 2050. Milwaukee has by far the largest transit system of its peers not supported by dedicated funding. When comparing the Milwaukee metro area to 26 peer metro areas from the Midwest and across the nation, two-thirds of the peers have a local dedicated source of funding—typically a sales tax—which provides the bulk of their funding. The other peer metro area transit systems without dedicated funding provide one-half to one-fifth the transit service per capita provided in Milwaukee. In addition, the Milwaukee area is the most dependent on State funding compared to its 26 peers. The transit systems nationwide supported by sales tax revenue typically have a sales tax of 0.25 to 1.0 percent. In some of these areas, the sales tax rate varies by jurisdiction depending on the amount of transit service received by each jurisdiction.

As noted above, a sales tax could address the transit funding gap for VISION 2050, and was previously approved as part of an advisory referendum in Milwaukee County and proposed in State legislation. It should be noted that a half percent dedicated sales tax would likely generate significantly more revenue in some counties than the level of transit service recommended in

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[31] *In November 2008, an advisory referendum passed in Milwaukee County approving a one percent sales tax, including a half percent sales tax for public transit. In the 2009-2011 State budget, then-Governor Doyle proposed a regional transit authority (RTA) with a half percent sales tax local dedicated funding, but the State Legislature rejected his proposal, and it was not included in the adopted budget. The State Legislature did include half percent sales tax dedicated funding for MCTS, but then-Governor Doyle vetoed this dedicated funding. The budget also created a Kenosha-Racine-Milwaukee (KRM) commuter rail authority with vehicle rental fee dedicated funding. Another attempt was made to pass RTA legislation in April of 2010 during the regular session of the State biennial Legislature. The legislation came very close to passing, but was not adopted into State law.*

Table 1.21
Potential Revenue Sources to Address the Funding Gap of the VISION 2050 Public Transit Element

Revenue Source	Description with Approximate Revenues (2015 constant dollars)
Sales tax	Would involve an increase in existing sales tax rates, with the revenues dedicated to public transit. If enacted in each county, a 0.1% increase could generate about $25-30 million annually in the Region.
Vehicle registration fee ("wheel tax")	Would involve an increase in the existing vehicle registration fee, with the revenues dedicated to public transit. Each $1 increase could generate about $1.5 to 1.8 million annually in the Region.
Motor fuel tax ("gas tax")	Would involve an increase in the existing motor fuel tax levied by the State, with the revenues dedicated to public transit. Each $0.01 increase could generate about $9 million annually in the Region (assuming today's fuel consumption levels), declining to about $7 million (assuming year 2050 fuel consumption levels).
VMT/mileage-based registration fee ("VMT fee")	Would involve charging a fee to owners of passenger vehicles and light trucks based on the total distance they drive during a year. Assuming the fee would not be charged on the first 3,000 miles and would be capped at 20,000 miles, each $0.01 per mile fee could generate about $70 to 85 million annually in the Region.
Property tax increase	Would involve an increase in the existing property tax rate, with the revenues dedicated to public transit. Each $0.01 increase per $1,000 of valuation would generate about $1.7 million annually in the Region.
Vehicle rental fee	Would involve charging an additional fee for vehicles rented in the Region. State legislation previously allowed a vehicle rental fee of up to $18 per rental for KRM commuter rail costs, but it was repealed. In the KRM corridor, each $1 could generate about $400,000 to 500,000 annually.
Hotel room tax	Would involve increases to existing tax rates on short-term lodging (hotels, motels, etc.), with the revenues dedicated to public transit. A 1.0% increase could generate about $1.5 to 2 million annually in the Region.
Flex Federal highway funding to transit	Would involve flexing to public transit a portion of existing Federal highway funding that is allocated to the State, including Surface Transportation Program (STP), National Highway Performance Program (NHPP), and/or Congestion Mitigation and Air Quality Improvement Program (CMAQ) funding. In the past, about $14 million in STP-Milwaukee Urbanized Area (STP-M) funding has been utilized for transit projects. It should be noted there are Federal limitations on the use of Federal highway funds. For example, STP and NHPP funding can only be used for capital costs.
State transit capital assistance program	Would involve creating a program to grant funding for major transit capital improvement projects. A transit capital program previously created by the State would have provided up to $100 million in grant funding for Southeastern Wisconsin, but the program was repealed. The Wisconsin Transportation Finance and Policy Commission and the WisDOT Secretary also both proposed a transit capital program, which would have provided $15 million annually.
Capital cost value-capture	Would attempt to recover some or all of the value that a fixed-guideway station or other related infrastructure would generate for the private landowners in the station area. Examples include property tax TIF, sales tax TIF, development fees, and real estate transfer fee. Revenues would be generated on a project-specific basis and could be used for station and associated infrastructure costs.

Source: Wisconsin Transportation Finance and Policy Commission, Wisconsin Legislative Fiscal Bureau, Wisconsin Department of Revenue, Wisconsin Counties Association, Wisconsin Department of Transportation, and SEWRPC

those counties. In addition, the amount of transit funding entailed by VISION 2050 in some counties may not require consideration of dedicated funding. Alternatively, a sales tax could be levied only in the more urban areas of the Region that would be served by a majority of the recommended transit improvements and expansion. Enactment of a dedicated sales tax for transit would permit counties and municipalities to eliminate or partially eliminate the use of property tax revenues to fund transit.

This dedicated funding could come in many forms other than a sales tax, and these other potential revenue sources that could provide additional transit funding are shown in Table 1.21. In order to help address the transit funding gap identified for VISION 2050, these sources could be considered. Like the sales tax, the ability to implement most of the identified funding sources would require State legislation. Also like the sales tax, some revenue

sources could be levied only in the more urban areas of the Region that would be served by a majority of the recommended transit improvements and expansion, and counties and municipalities may be able to partially eliminate the use of property tax revenues to fund transit.

In addition to the revenue generated by a dedicated local transit funding source, the recommended increases in transit service under VISION 2050 have the potential to increase the amount of Federal funding the Region receives. FTA Section 5307 Urbanized Area Formula Grant funding is partially allocated to urbanized areas based on transit service and ridership. If additional routes are implemented and services are provided, more FTA 5307 funding would be allocated to the Region's urbanized areas. In addition to FTA Section 5307, the Region could obtain additional funding from a number of other FTA funding programs due to the additional transit service recommended under VISION 2050. Based on the amount of additional transit service recommended in VISION 2050, the Region could expect to receive up to $57 million (average annual in 2015 constant dollars) in additional FTA funding if VISION 2050 is implemented.

To implement the public transit element, VISION 2050 recommends that the Governor and State Legislature consider granting local jurisdictions the authority to hold binding referendums approving dedicated funding for public transit because:

- The State already provides substantial transit funding, at a higher rate than nearly all other states, and the potential for a significant increase is extremely unlikely. In addition, while significant State funding has been provided, it has not increased reliably in the past 15 years.

- Currently, transit systems in Southeastern Wisconsin and throughout the State have been using Federal funds, which are intended for capital projects, to fill gaps in operating funding. Long-term, using Federal funding in this way is not viable.

- In addition, significant increases in local property taxes to fund transit are unlikely, whether or not caps on property tax levies continue.

For a number of local governments that want to expand or even continue to provide their current level of transit service, the option to pursue a referendum for dedicated funding for transit service is needed.

In addition to providing adequate funding, implementation of the significant improvements and expansion of transit service would be bolstered through the creation of a regional transit authority (RTA) with the ability to collect dedicated funding, and construct, manage, and operate the recommended transit system. A number of the recommended transit services extend across city and county boundaries and a regional agency could assist in the implementation of these recommended services. Legislative efforts to create an RTA have not progressed since 2010.