

Chapter 2: Agricultural, Cultural, and Natural Resources

Introduction

The Agricultural, Cultural, and Natural Resources chapter provides a brief discussion of various natural resource base elements, including the general soil characteristics, topography, water resources, and wetlands.

The protection and wise management of the natural resource base are vital to the social and economic development of the Menomonie planning area. The natural resource base should be carefully considered in terms of its ability to sustain urban growth and protect wildlife habitat. Environmentally significant areas which deserve protection from intensive urban development, and which impose severe limitations on development, are also identified.

Through the identification and analysis of rivers, lakes, wetlands, steep slopes, and soil characteristics, development can be guided to the most appropriate locations, thus protecting the City's natural areas while providing opportunities for responsible growth. Development should be concentrated in the areas most suitable for the intended use, thus avoiding the environmental limiting factors. The data compiled in this element is for generalized classification, and should not be a substitute for site-specific analysis.

A thorough inventory and analysis of the natural resources of the City of Menomonie will serve to:

- Protect environmentally sensitive areas from development.
- Preserve and enhance waterways and other natural areas.
- Coordinate with the land use plan.

Productive Agricultural Areas

The Wisconsin Farmland Preservation Act was enacted in 1977 to slow the conversion of land from agricultural to urban usage. This legislation provides for the preparation of county farmland preservation plans and state income tax credits for the maintenance of farmland in delineated preservation areas. Ultimately, only those farmers owning lands within delineated prime agricultural areas which are zoned for exclusive agricultural use will be eligible for the full state income tax credits provided under the law.

The State of Wisconsin is in the process of having each county update its Farmland Preservation Plan. Dunn County is currently revising its plan and it must be updated by Dec. 31, 2012. The County received a planning grant from the Department of Agriculture, Trade, and Consumer Protection to complete the update. Once the Dunn County Farmland Preservation Plan is updated, the City may want to revisit the Land Use chapter to see if it affects the City's future land use plans.

Map 2-1 shows prime agricultural soils in and around the City of Menomonie. Although there are active farms in some of these areas, the land is the most desirable for future growth and development because it has been already cleared.

Cultural Resources

The loss of our State's cultural resources over the past century has been significant. According to the Wisconsin Historical Society, only 30% of historic buildings documented during the Great Depression by the Federal Historic American Building survey program still exist and only 25% of Wisconsin's Native American mounds remain intact. Today, we better realize the multiple benefits of these resources to our community.

The preservation and promotion of the City of Menomonie's cultural resources helps cultivate its own unique identity. Cultural resources include ancient and historical archeological sites, as well as historic buildings and structures.

The City has a long history of respect and appreciation of these resources which was reiterated in November of 2004 when a Citizen Advisory Board (CAB) was formed to kick-off the City of Menomonie's Comprehensive Plan. The Board was asked "What should the City look like in 10-20 years?" Their top reply was a "vibrant historic downtown".

The goal of historic preservation is to protect, restore, rehabilitate, and reconstruct your cultural resources. Many benefits may be realized through this process. The preservation of historic buildings can influence future development. New buildings may be designed to fit in with their historical surroundings. Historic preservation can lead to higher real estate values and municipal tax revenues. It can increase tourism and make your community a destination for people to visit. But most importantly, it can reveal our unique past and foster a sense of community pride.

While preserving historic places is an important tool for maintaining the character of the downtown area, growth and development are still factors. There should be a flexibility to take both aspects into consideration when looking at projects that affect the downtown.

The purpose of this section is not to be a comprehensive inventory of all historic and archeological sites in the Menomonie area. Rather, it is to create awareness of what we have and provide goals to maintain and enhance their quality.

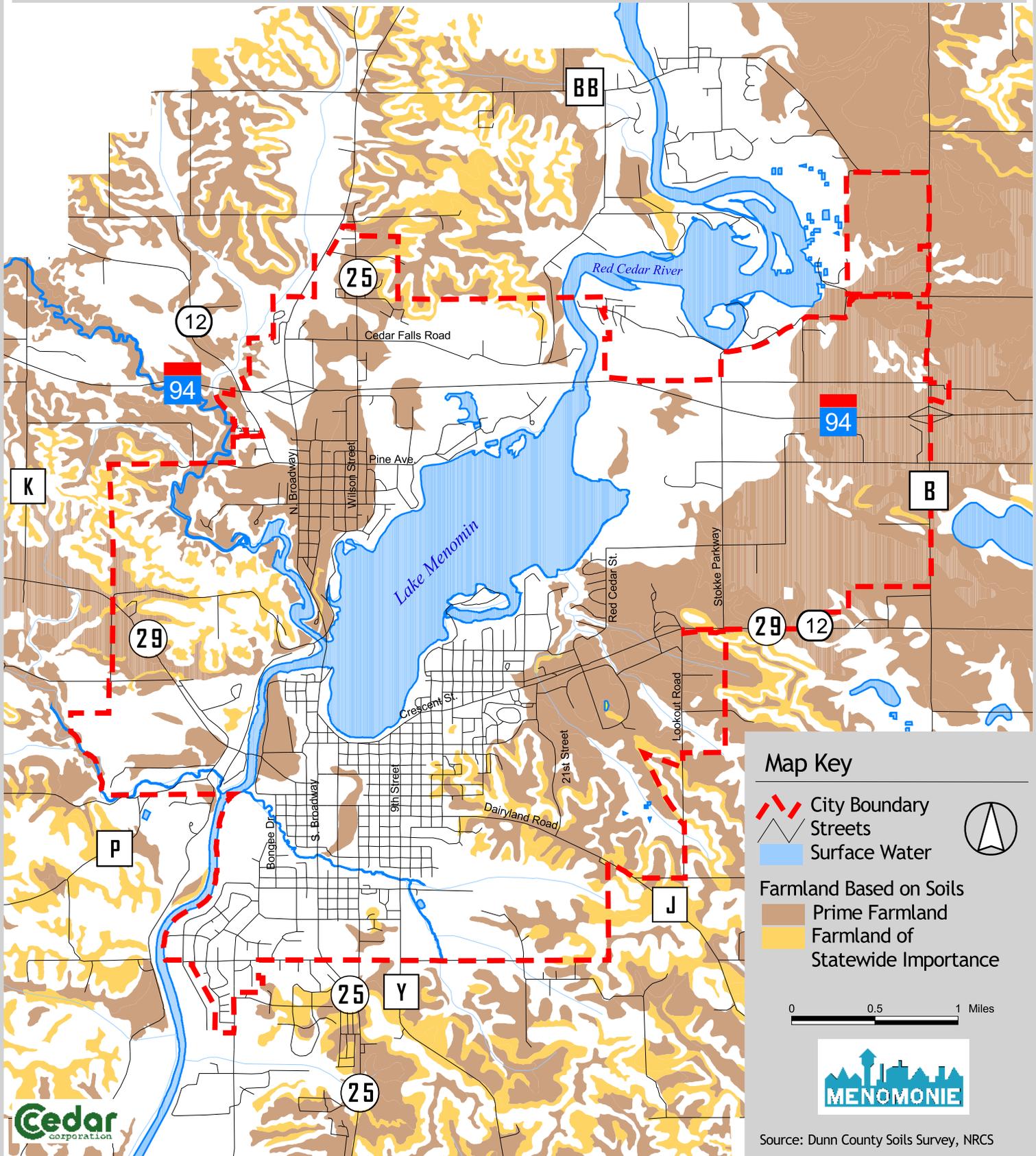
Current Sites

The State Historical Society's website hosts the Wisconsin Architecture & History Inventory (AHI). The Architecture and History Inventory (AHI) is a collection of information on historic buildings, structures, sites, objects, and historic districts throughout Wisconsin. This Inventory is housed at the Wisconsin Historical Society in Madison and is maintained by the Society's Division of Historic Preservation. The AHI is comprised of written text and photographs of each property, which document the property's architecture and history.

The City of Menomonie has 468 buildings, districts, and archeological sites listed. It should be noted that inclusion in this inventory conveys no special status, rights or benefits to owners of

Prime Farmland City of Menomonie

Map 2-1



Map Key

- City Boundary
- Streets
- Surface Water

- Farmland Based on Soils**
- Prime Farmland
- Farmland of Statewide Importance

0 0.5 1 Miles



Source: Dunn County Soils Survey, NRCS

these properties. These buildings and details along with historical buildings throughout the State may be viewed at www.wisconsinhistory.org. Follow the historical sites link.

The City of Menomonie has five buildings, districts, and sites listed in the State and/or National Historic Register. They include the Downtown Historic District, Louis Smith Tainter House, Mabel Tainter Memorial Theatre, Evergreen Cemetery, and the Upper Wakanda Park Mound Group (see Map 2-2).

Table 2-1 is a list of sites, structures, and districts that have been designated as historic by the Menomonie Historic District Preservation Commission and the year of their designation (see Map 2-3).

Table 2-1 - Designated Historic Sites, Structures, and Districts

Map Number	Designee	Year
1	Mabel Tainter Memorial Theatre*	1974
2	Downtown Historic District*	1995
3	Evergreen Cemetery (Island only)*	1996
4	Upper Wakanda Mound Group*	2001
5	Louis Smith Tainter Building*	2001
6	Wilson Place	2001
7	Revolutionary War Soldier	2006
8	Historic Fountains (Bundy Hall, Wilson Place, Healthcare Center, and Wilson Park)	2003

Source: Menomonie Historic Preservation Commission, *State/National Register of Historic Places

The most famous of these buildings is the Mabel Tainter Memorial Building. Built in 1889 by Andrew and Bertha Tainter in remembrance of their daughter Mabel who died at the age of 19, the Memorial is an anchor of the Historic District. Not only does it have local prominence, but regional and national importance as well. The entire Mabel Tainter Memorial Theatre was recently renovated at a cost of \$4.55 million. It included upgrades of everything from the draperies to the electrical system, along with a complete structural renovation.

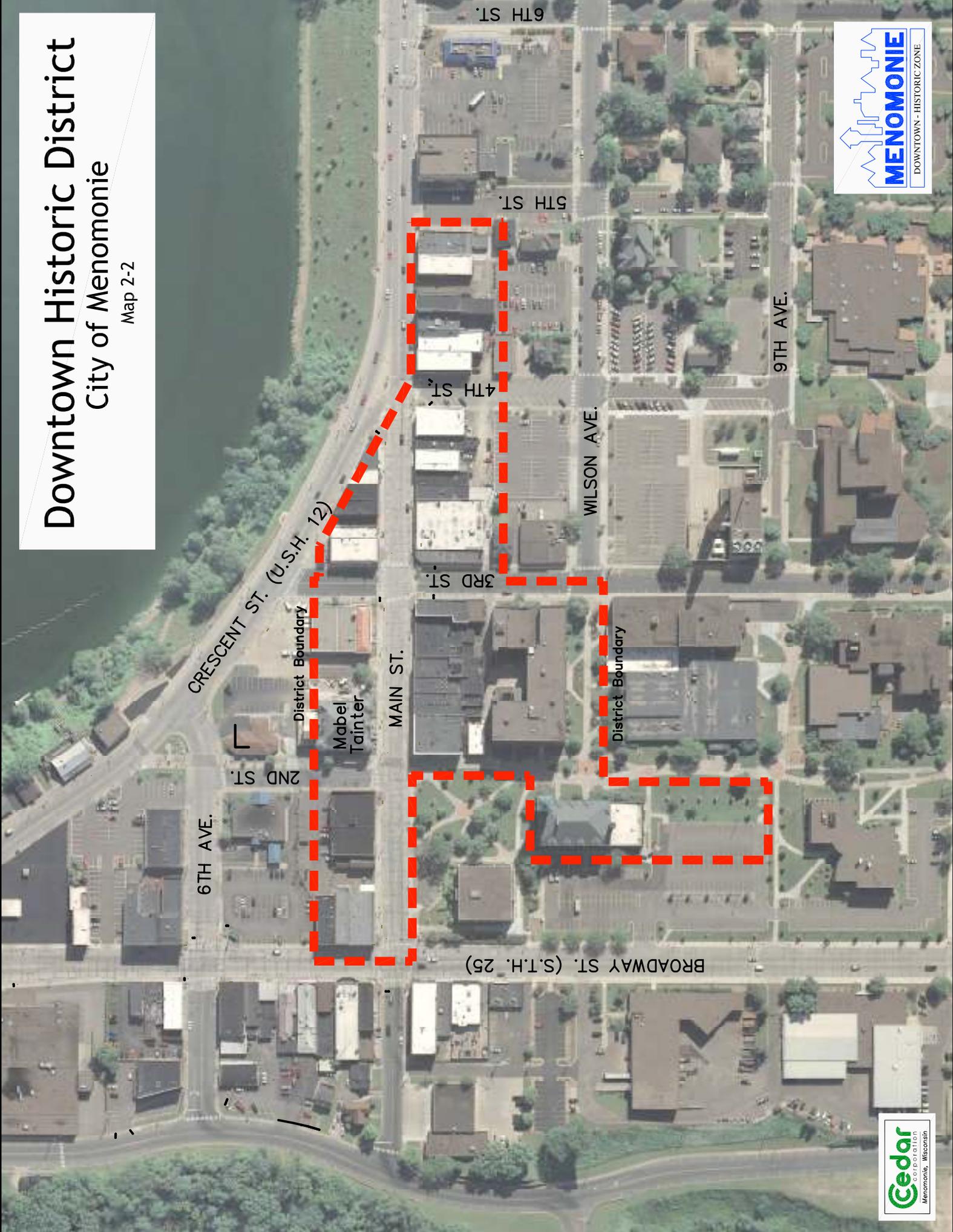
Besides the upgrades, an addition was added to the north side of the building to make the theater compliant with the ADA standards. Now functioning with an elevator to accommodate disabled people and provide public safety, the addition also provides a master staircase with access to all three floors of the theater.

Table 2-2 lists the cultural sites in the City of Menomonie Planning Area. The Wisconsin Historical Society also maintains a database of archeological sites and cemeteries. The inventory is not all inclusive but only includes sites that have been reported. A current search of their database reveals 24 sites of importance (see Map 2-3). This information is considered confidential and their locations are general in nature to protect them from intentional or unintentional disturbance as well as protecting the privacy of landowners.

Downtown Historic District

City of Menomonie

Map 2-2

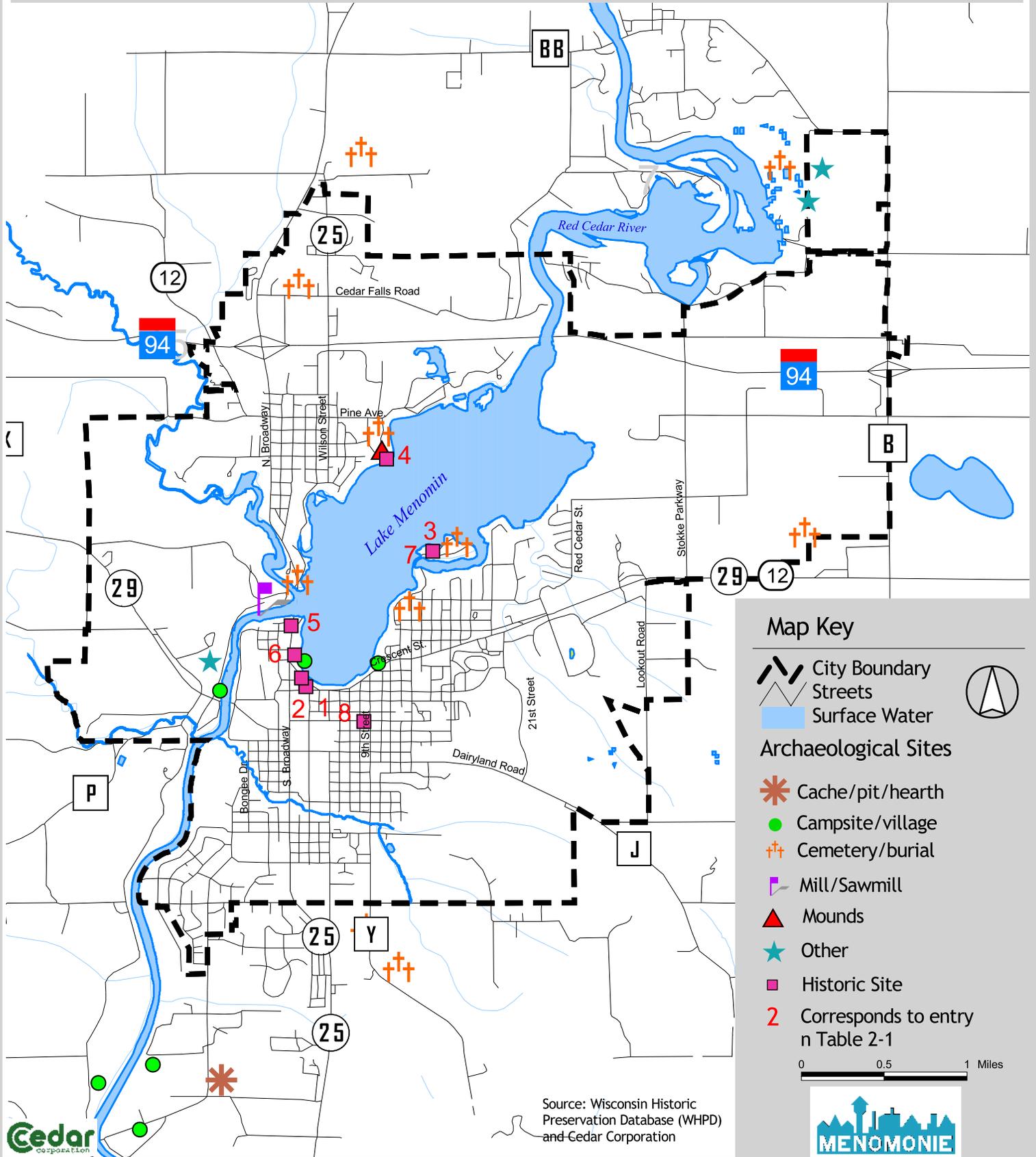


Historical & Archaeological Sites

City of Menomonie

Map 2-3

Symbols on map do not show exact locations of sites with archaeological significance in order to preserve sites and property owners.



Source: Wisconsin Historic Preservation Database (WHPD) and Cedar Corporation

Map Key

- City Boundary
- Streets
- Surface Water
-
- Archaeological Sites**
- Cache/pit/hearth
- Campsite/village
- Cemetery/burial
- Mill/Sawmill
- Mounds
- Other
- Historic Site
- Corresponds to entry in Table 2-1
- 0 0.5 1 Miles



Table 2-2 - Designated Cultural Sites

Site Name	Type	Cultural Study Unit	TSR
1. Cedar Falls Cemetery	Cemetery/burial		28, 12, W, 8
2. Peace Cemetery	Cemetery/burial		27, 13, W, 2
3. St. Pauls Cemetery	Cemetery/burial		27, 13, W, 2
4. Lost Treasure	Cache/pit/hearth	Historic Euro-American	27, 13, W, 10
5. Irvington	Campsite/village	Historic Euro-American	27, 13, W, 10
6. Brunn #1	Campsite/village	Unknown Prehistoric	27, 13, W, 10
7. Brunn #2	Campsite/village	Unknown Prehistoric	27, 13, W, 10
8. Unnamed Site	Campsite/village		27, 13, W, 10
9. Highland Cemetery	Cemetery/burial	Historic Euro-American	28, 13, W, 11
10. Halverson Cemetery	Cemetery/burial		28, 13, W, 14
11. Wakanda Park Mound Group	Mound(s) - Other/Unknown Cemetery/burial	Late Woodland	28, 13, W, 23
12. Upper Wakanda Park Mounds	Mound(s) - Conical	Late Woodland	28, 13, W, 23
	Mound(s) - Linear	Terminal Woodland	
13. Evergreen Cemetery	Cemetery/burial		28, 13, W, 24
14. St. Josephs Cemetery	Cemetery/burial	Historic Euro-American	28, 13, W, 26
15. Dotseth #1	Campsite/village	Unknown Prehistoric	28, 13, W, 26
16. Dotseth #2	Campsite/village	Unknown Prehistoric	28, 13, W, 26
17. Knapp-Stout Lumber Yard	Mill/sawmill and Cemetery/burial	Historic Euro-American	28, 13, W, 26
			28, 13, W, 26
18. Unnamed Site	Other	Historic Euro-American	28, 13, W, 27
19. Dog Town	Campsite/village	Historic Euro-American	28, 13, W, 27
20. Ford Cemetery	Cemetery/burial		28, 13, W, 32
21. Ridge Road Cemetery	Cemetery/burial		28, 13, W, 32
22. Potters Field Cemetery	Cemetery/burial	Historic Euro-American	28, 12, W, 20
23. Industrial Park	Isolated finds	Unknown Prehistoric	28, 12, W, 8
24. Ronneberger	HCM concentration	Historic Euro-American	28, 12, W, 8

Source: Wisconsin Historical Preservation Database (WHPD)

Awareness

Over the years, the City, several groups, and organizations have done and continue to do work, to protect, enhance, rehabilitate, and promote the uniqueness of the City's cultural resources. Their efforts include:

- The City of Menomonie adopting an ordinance establishing a Historic Preservation Commission to protect, enhance, and perpetuate sites of special character or historic interest.
- The publication of the *Intensive Survey Report: Architectural and Historical Survey Project* by Roxanne Owens and Dr. Claudia Smith. It is a comprehensive report to serve

as an educational resource for the citizens of Menomonie, as well as local and State historical societies.

- Design Guidelines for the Downtown Historic District created by the Menomonie Preservation Commission. This document provides recommendations for signs, awnings, and façade review for businesses.
- Landscape Research created *An Interpretive Plan for Downtown Menomonie Main Street*, which assessed the character and function of the downtown area and list possible futures for this area.
- Main Street Menomonie Inc. has published an informative brochure titled *Join us for a Stroll through Historic Downtown Menomonie*, which includes impressive photographs and descriptions of the historical downtown. Main Street Menomonie Inc. is continually involved with the promotion and enhancement of the downtown area.
- Area museums and historical sites that provide insight into our area's history are the Russell J. Raasbach Heritage Museum (home of the Dunn County Historical Society), the Wilson Place Mansion, the Empire in Pine Museum, Caddie Woodlawn Historical Park, and the Hillcrest School and Tainter Playhouse.
- The City of Menomonie has also established a Tax Incremental Finance (TIF) District Number Fifteen to assist the Mabel Tainter Memorial Theater with funding for their renovation project as well as put up cash grants for businesses that reinvest capital to improve the front of their buildings.

The City of Menomonie and its numerous organizations and volunteers have shown a thorough understanding of the importance of cultural resources to the identity of the area as well as their contributions to the quality of life of its residents and visitors. The City of Menomonie is committed to continuing this tradition and the promotion of its strong cultural resources.

Topography

The general terrain of the Menomonie planning area consists of rolling hills, with deep ravines and steeper hills located in the western, southwestern, and southeastern parts of the area. The elevation in those areas range from 800 feet above sea level along portions of the Red Cedar River to just over 1,100 feet on some of the outlying hilltops.

The City of Menomonie, like much of West Central Wisconsin, contains a significant number of hills throughout the area. Menomonie is aesthetically captivating due to the hilly topography and various landscapes. Much of the level land within Menomonie is located on top of glacial outwash in an area ¼ of a mile to four miles wide on either side of the Red Cedar Basin.

Lands surrounding the City of Menomonie drain into the Red Cedar River. Drainage patterns must be taken into account when siting potential development. Development in areas with steep slopes may cause excessive erosion as runoff carries sediment from the construction site. The impermeable surfaces created by development also pose potential erosion hazards, as rain and melt water flows unobstructed across these surfaces. If these areas are developed for urban uses, recommendations in the City's Stormwater Management Master Plan, Erosion and

Sediment Control Ordinance, and Stormwater Management Ordinance should be implemented for these sites. The use of natural vegetative cover to minimize the effects of runoff is common practice in these situations.

Construction of grassed waterways and/or the use of mechanical measures such as sediment basins and sediment traps can slow water velocities and allow sediments to settle out. Interruption of natural drainage patterns can cause flooding problems. As the natural hydrodynamics of a site are disrupted, water can pool, filling basements and inundating property. Sites should be examined closely to determine flood potential and areas that periodically flood should be avoided.

Soils

Soil properties exert a strong influence on the manner in which people use land. Soils are an irreplaceable resource. The activities of people continue to disrupt soil formation processes, thus making this resource increasingly valuable. Therefore, a need exists in any land use planning effort to examine not only how land and soils are presently used, but also how they can best be used and managed.

Soil characteristics vary widely across a given land area, but generalizations can be made based on the grouping of common soil properties. These generalizations form the basis for rating likely soil performance given certain development scenarios. Soil properties that affect potential land use decisions include permeability rating, depth to bedrock, slope class, surface water and wetlands, or the presence of a limiting factor within the soil profile.

In order to guide land use in the City of Menomonie, it is necessary to examine the soil properties and understand the restrictive characteristics of certain soil types. Soil data has been collected by the NRCS (Natural Resource Conservation Service). These data were collected through field survey and interpretation by NRCS soil scientists. Restrictive capacity of a particular soil type is conveyed through the soil ratings *Not Limited*, *Somewhat Limited*, and *Very Limited*. Restrictive features identify the soil property that creates the limitation for the specified use.

A rating of *Not Limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected.

A rating of *Somewhat Limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation techniques. Fair performance and moderate maintenance can be expected.

A rating of *Very Limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Soils with *Somewhat Limited* and *Very Limited* ratings for building foundations are found around Lake Menomin, the Red Cedar River, and several small creeks and intermittent streams. The largest areas with severe limitations are located adjacent to Gilbert Creek, Wilson Creek and the

intermittent streams north of it, and the section of the Red Cedar River northeast of Lake Menomin (*Map 2-4*).

Soils having *Somewhat Limited* and *Very Limited* ratings for septic systems are scattered throughout the Menomonie planning area, with notably large areas along the entire western boundary. Concentrations of soils that are very limited for septic systems are located along Gilbert Creek and in an area north of Interstate 94 and west of Highway 25, near the Union Pacific Railroad tracks (*Map 2-5*).

Shallow Soil Depth to Bedrock

One factor affecting urban development in Menomonie that is different from most communities in western Wisconsin is the shallow soil depth to bedrock. In glaciated areas of the state, communities are generally built on a layer of glacial till which is composed primarily of sand and gravel. In Menomonie, the sandstone bedrock outcrops in a number of locations and forms hilly ridges in the northern, western and southern parts of the community.

Urban development can take place on bedrock, but usually at a greater cost and effort. Consequently, shallow bedrock is generally considered an impediment to urban growth. The provision of municipal services such as sewer and water is often more costly where excavation has to occur in bedrock. Foundation construction can also be more difficult, although bedrock does provide a solid and firm base for buildings and roads. Another problem associated with shallow bedrock is that it tends to form steep slopes at the edges of the formation.

The location of soils having a shallow depth to bedrock within the Menomonie planning area is shown on Map 2-6. Shallow bedrock on this map is defined as bedrock located from zero to ten feet below the ground surface. In Menomonie, the bedrock is comprised of almost all sandstone. The sandstone bedrock varies in consistency from place to place. Some sandstone beds are firmly cemented together, while in other formations the individual sand particles are weakly bonded.

Some concentrated areas of shallow bedrock show up to the north and west of the city. There are several, separate hilly areas which are underlain by sandstone. Most of the hilly areas in the south central and southeast portions of the Menomonie planning area are also underlain by sandstone.

The City of Menomonie may want to exclude or limit future development which would require the City to install municipal services such as sewer and water through lengthy bedrock formations. Lower density development may be more appropriate for concentrated areas of shallow bedrock if septic tanks, well water, soil conditions, etc. are feasible for a site.

Building Foundations

Some soils within the Menomonie planning area have characteristics which are *Somewhat Limited* or *Very Limited* for the construction of building foundations. The limitations are generally caused by one or more of the following characteristics: hazard of flooding, high water table, shallow depth to bedrock, and slopes over 20%. It is difficult, if not impossible, to construct, safe, stable building foundations on soils which are flood prone or that have high water tables. Slopes over 20% are considered limiting because of erosion concerns. Soils with a shallow depth to bedrock are classified as limiting because of the high cost and work involved in excavating for building foundations.

A few of the area soil types have limitations due to a high shrink-swell potential and low bearing strength. On those particular soils, building slabs and basements are very susceptible to cracking and shifting as soil moisture conditions change.

Soils with *Somewhat Limited* and *Very Limited* ratings for building foundations are shown on Map 2-4. Most of the soils are found around Lake Menomin, the Red Cedar River, and several small creeks and intermittent streams. The largest areas with *Very Limited* soils are located adjacent to Gilbert Creek, Wilson Creek and the intermittent streams north of it, and the section of the Red Cedar River northeast of Lake Menomin.

The map with *Somewhat Limited* and *Very Limited* ratings for building foundations provides general information about areas where that type of development may be undesirable. Extensive soil testing and evaluation should be done on every site prior to planning potential developments.

Portions of eastern Menomonie have soils very suitable for building construction. The sandy soils, especially in the industrial park area, are very suitable for construction of footings for industrial buildings.

Septic Systems Suitability

One of the more important factors affecting development and land use patterns in the outlying areas of Menomonie is the suitability of soils for on-site septic tank filter fields. Soils which have *Somewhat Limited* and *Very Limited* ratings are depicted on Map 2-5. These soils have one or more of the following characteristics: slow permeability rates, fluctuating or high water tables, hazards of contamination of groundwater, and shallow depth to bedrock. In addition, they may be located on steep slopes, or may be subject to periodic flooding or surface ponding in low areas.

A soil rating of *Somewhat Limited* or *Very Limited* does not prohibit a property owner from installing a private on-site wastewater treatment system but may indicate that a conventional system is prone to failure and that an alternative system, such as mound system, may be required.

Soil permeability is an important feature in determining the limitations of soils for septic tank filter fields. Effluent is held above soil layers if permeability is moderately slow to very slow and will eventually emerge on the surface of the soil.

The depth to the water table is important because of the hazard of contamination where the soil layer is thin over groundwater. Contamination of groundwater can also occur where soils are underlain by fractured or creviced bedrock near the surface. There is a danger of effluent flowing for long distances and eventually getting into the groundwater.

A shallow depth to bedrock causes problems because the impervious bedrock restricts adequate leaching of the effluent. Impervious layers near the surface of the soil will cause unleached effluent to flow laterally and emerge on the surface as seepage.

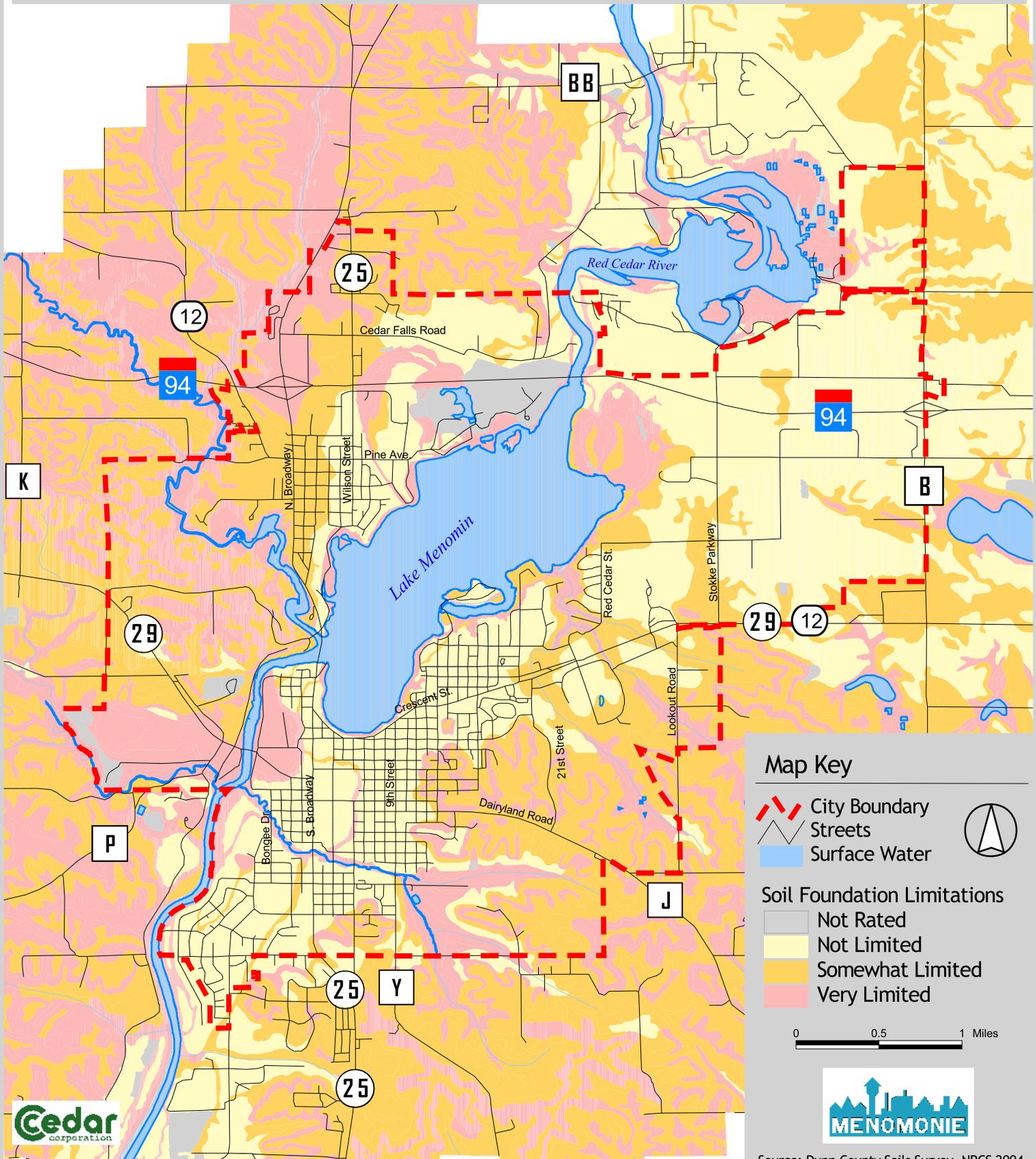
Where land is very steep, the effluent is likely to flow laterally and seep out at the surface. In areas of possible flooding, there are *Very Limited* filter fields because the systems will not function when flooded, and there is the danger of spreading effluent to downstream areas.

Limitations to Dwellings with Basements

City of Menomonie

Map 2-4

Note: These categories are only guidelines. An onsite investigation is needed to make an accurate determination.

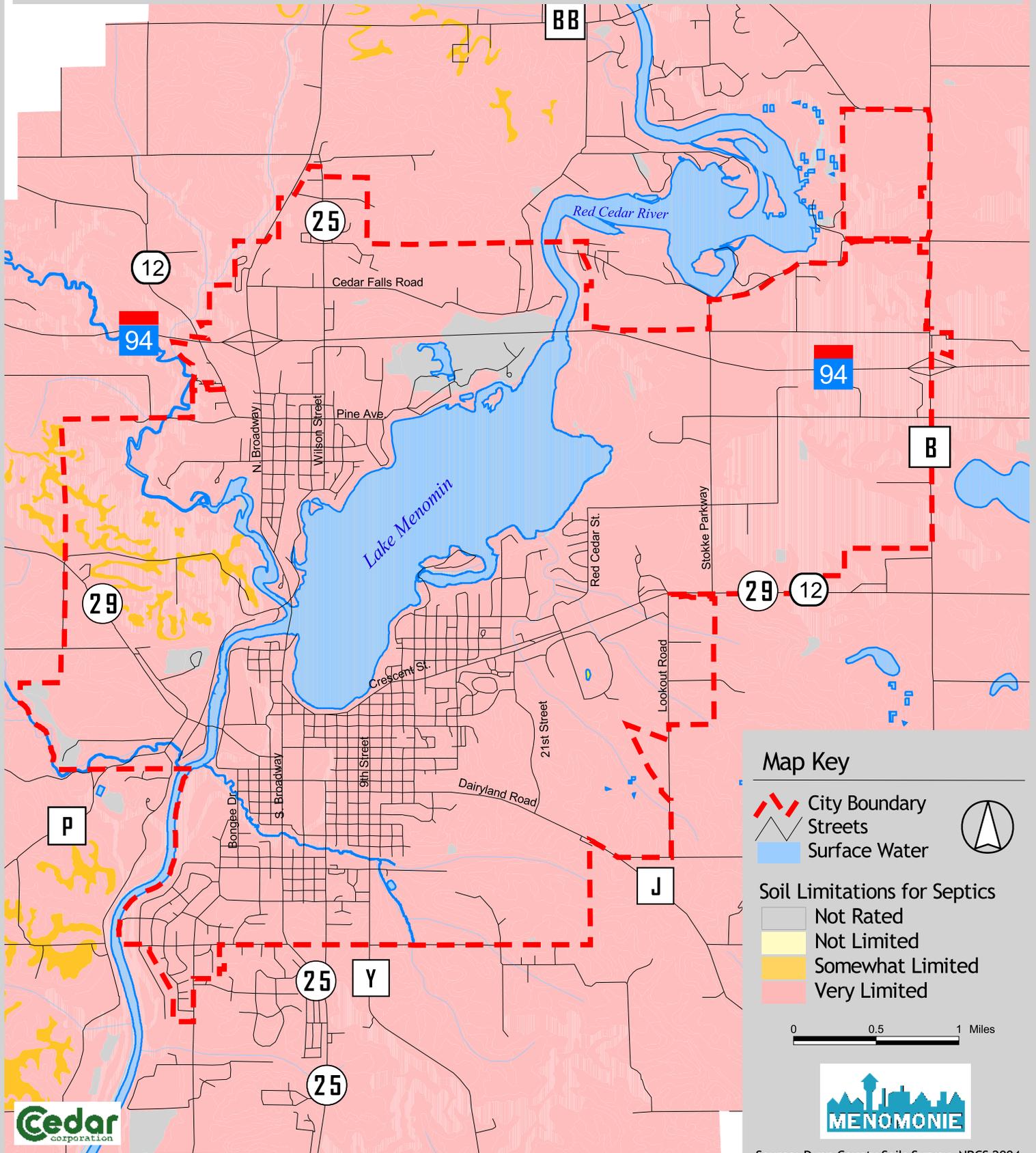


Limitations to Dwellings with Septics

City of Menomonie

Map 2-5

Note: These categories are only guidelines. An onsite investigation is needed to make an accurate determination.



Map Key

- City Boundary
- Streets
- Surface Water



Soil Limitations for Septics

- Not Rated
- Not Limited
- Somewhat Limited
- Very Limited

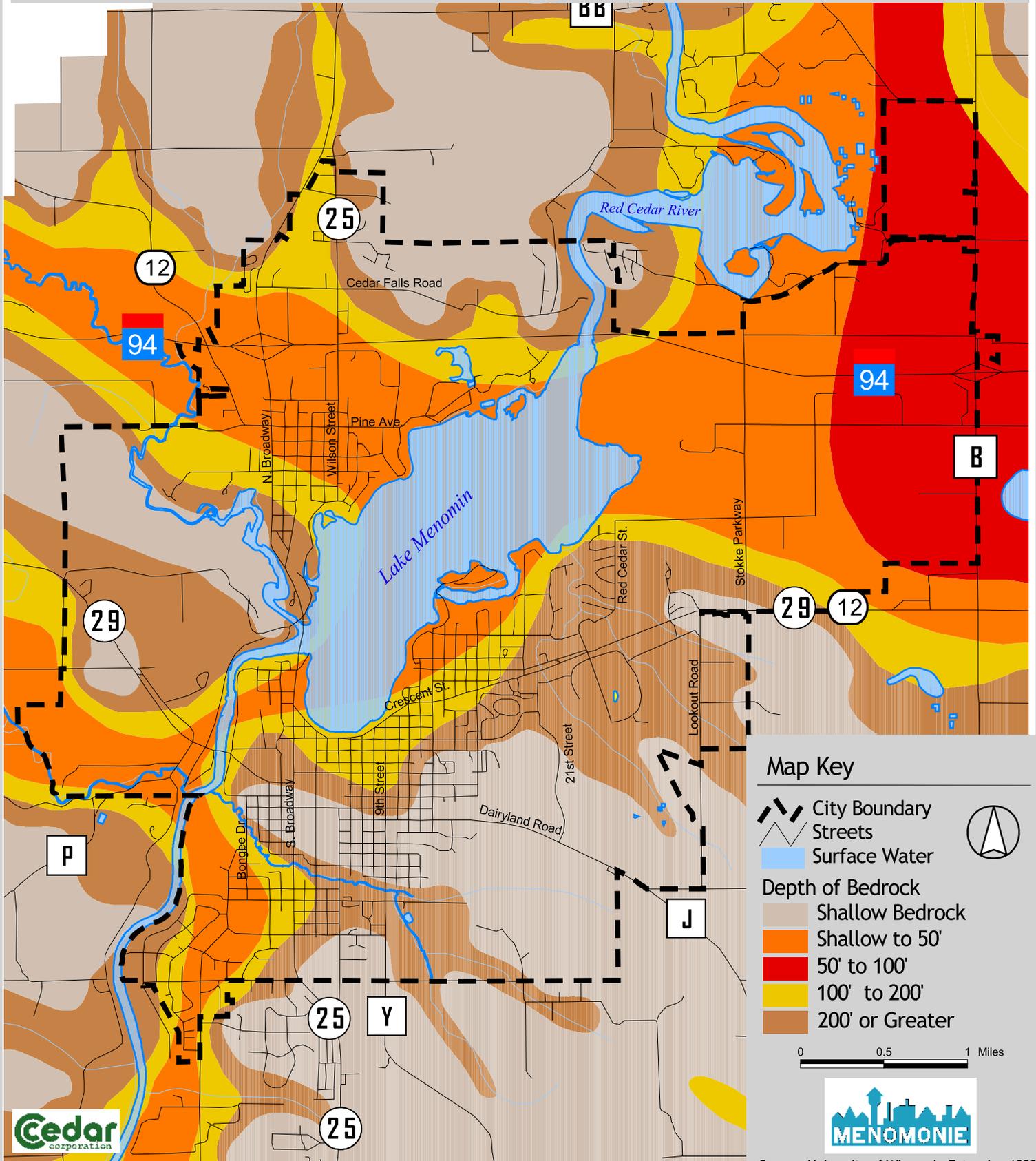
0 0.5 1 Miles



Depth of Bedrock

City of Menomonie

Map 2-6



Map Key

- City Boundary
- Streets
- Surface Water

Depth of Bedrock

- Shallow Bedrock
- Shallow to 50'
- 50' to 100'
- 100' to 200'
- 200' or Greater

0 0.5 1 Miles



Source: University of Wisconsin-Extension 1998

Soils having *Somewhat Limited* and *Very Limited* ratings for septic systems are found throughout the Menomonie planning area.

In outlying areas of Menomonie, where it will not be practical to provide City sanitary services, potential land use will be very limited on soils unsuitable for septic system. Appropriate land uses for those areas include agriculture, recreation, and undeveloped open space. Extensive soil testing for septic system suitability should be done prior to approval of developments in areas not serviced by the City sanitary system.

Slope

The slope of a given parcel of land to a great extent determines the use capability of that parcel. Lands with very steep slopes or rugged terrain are poorly suited for urban development, as well as for most agricultural purposes. Conversely, lands which are nearly level or gently sloping tend to be best suited for urban development and agricultural production.

Locating developments on slopes will often increase site preparation costs and may make it difficult to provide adequate transportation access, especially on sites with excessive slopes. In cool climates which characteristically have harsh winter weather (such as western Wisconsin), snow removal can be hampered on roads with steep inclines.

Soils with slopes greater than 15% are shown on Map 2-7 for the Menomonie planning area. The hilly topography surrounding and within parts of Menomonie is evidenced by the numerous areas on the map containing soils with slopes exceeding 15%. Particularly notable are the areas to the west of Wilson Creek and the Red Cedar River. This land is extremely hilly and heavily wooded which has discouraged development. Hilly areas to the north and southeast of Menomonie have also shaped the direction of the city's urban growth, which appears to be headed toward the more level topography northeast and east of Lake Menomin.

The presence of steep slopes (generally greater than 20%), marks a potential barrier to future land development. Excessive sloping can pose an erosion hazard when these lands are developed, which in turn, can lead to increased sediment and pollutant deposits in waterways. Removal of hillside vegetative cover and mechanical cut/fill operations can disturb the natural drainage regime, resulting in excessive runoff and increased erosion. Steep slope lands also are considered to be valuable habitats for a wide range of plant and animal species who occupy the many microhabitats found on these slopes. Also, development of steep sloping/bluff lands may be undesirable due to the high visibility of these locations.

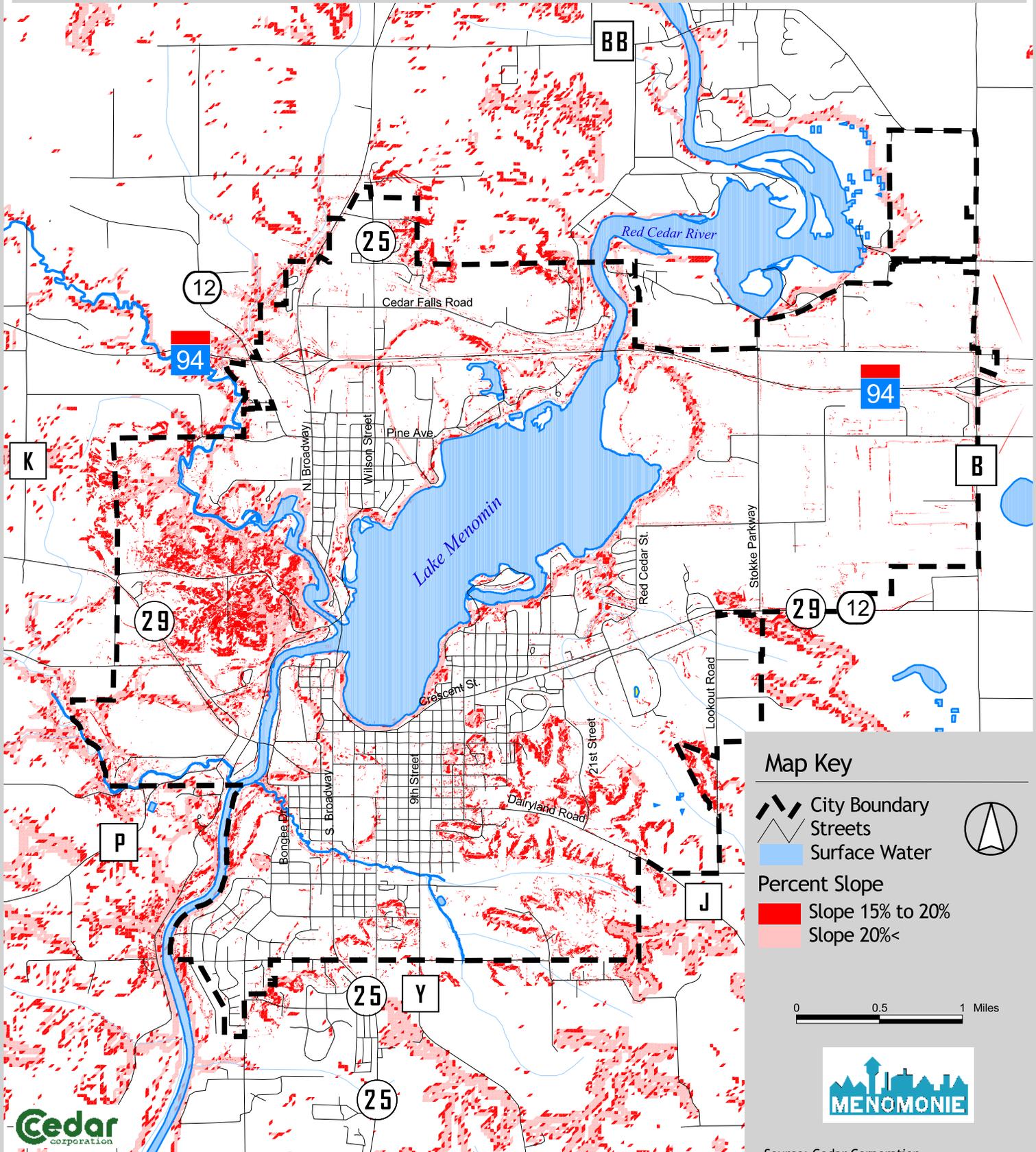
In addition to steep slopes being more difficult to develop because of the grade, there are often associated problems with the soils on sloping land. The soils can hinder development by having a shallow depth to bedrock and/or being unsuitable for septic tank use.

Land uses in the extremely hilly portions of Menomonie should be limited mostly to low density uses which have been carefully planned to mitigate or avoid potential problems caused by steep slopes. An example of an appropriate use is low density residential sites. Because much of the land surrounding Menomonie is hilly, those portions of land which are more level and suitable for future urban growth (primarily northeast and east of the city) could be evaluated in terms of the development needs of potential land uses and the interests of the community. For example,

Slopes

City of Menomonie

Map 2-7



Map Key

- City Boundary
- Streets
- Surface Water



Percent Slope

- Slope 15% to 20%
- Slope 20%<

0 0.5 1 Miles



Source: Cedar Corporation

industrial plants are particularly sensitive with regard to topography, requiring level or nearly level sites. In addition, the City's Urban Sewer Service Plan limits construction on steep slopes.

Slopes in the City of Menomonie were derived using digital elevation models and available two-foot contours. The map depicts the areas of excessive sloping as a percent slope (rise/run). For planning purposes, slopes in excess of 20% are considered to be steep slopes. Many areas within the planning district have slopes, which are in excess of the 20% benchmark. Land that has a 15%-20% slope is also shown on the map.

Slope is an important factor affecting patterns of development in Menomonie because of the hilly topography. Consequently, its implications should be carefully considered when making land use decisions.

Surface Water

Lakes and streams constitute focal points for water-related recreational activities, provide an attractive setting for properly planned residential and commercial development, and, when viewed in the context of open space areas, greatly enhance the aesthetic quality of the environment.

The City of Menomonie is located in a region with abundant surface water resources (*Map 2-8*). Lakes, rivers, streams, ponds, and intermittent watercourses are the primary hydrologic features found in the area. Water features within the Menomonie planning area include Lake Menomin, the Red Cedar River, and Wilson, Gilbert, Irving, and Galloway Creeks.

Lake Menomin is a drainage impoundment on the Red Cedar River. It has a navigable inlet from that stream and a 30 foot head public utility dam (Northern States Power Company/Xcel Energy) on its outlet. The lake covers 1,405 surface acres and has public frontage totaling approximately four miles, or 40% of the total shoreline.

The Red Cedar River flows south from Barron County and into the Chippewa River. The river is 51 miles long and covers 432 surface acres. Recreation access to the river is provided via the City of Menomonie's Riverside Park.

Menomonie is fortunate to have several water features within its boundaries. The Red Cedar River, and to a lesser degree Wilson Creek, are important water resources for recreational activities such as boating and fishing. Lake Menomin is an important aesthetic and recreational asset to the community. Travelers passing by on Interstate 94 are treated to a very picturesque view of the lake with parts of the city visible in the background.

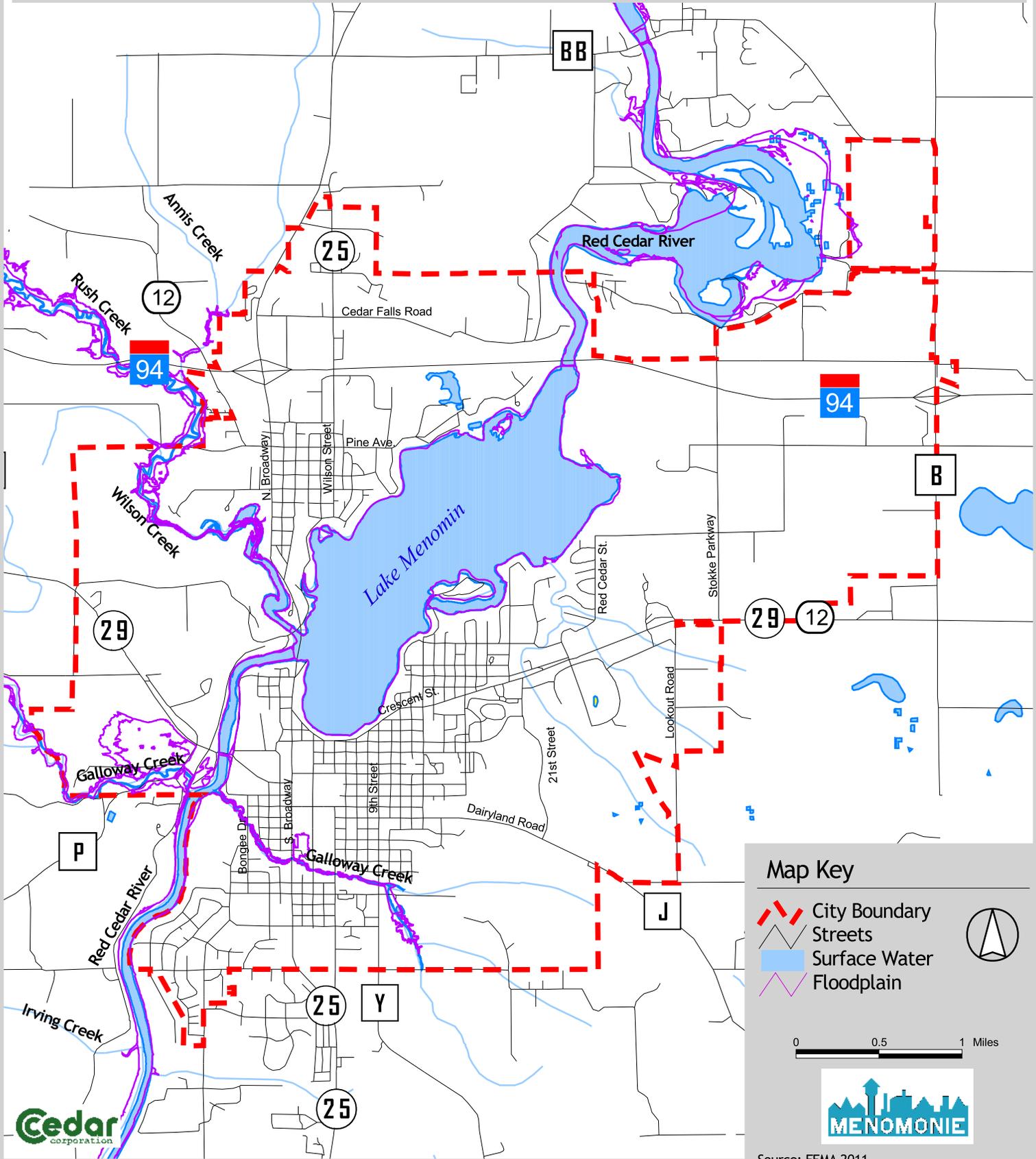
Menomonie's downtown area fronts the lake. The shoreline adjacent to the downtown is undeveloped and has been left in a natural state largely due to a steep drop down to the lake. While the topography of the shoreline somewhat limits the possibilities for a better interface between the downtown area and the lake, some options could be explored.

The surface waters of the Menomonie planning area are all within one of Wisconsin's major drainage systems, namely the Chippewa River. The streams in the area generally contain water of good quality, although man's use of the water has altered stream flow characteristics and water quality in some places. About 1,750 billion gallons of surface water leave the Chippewa River

Surface Water & Floodplain

City of Menomonie

Map 2-8



Map Key

- City Boundary
- Streets
- Surface Water
- Floodplain



0 0.5 1 Miles



Source: FEMA 2011

drainage system as stream flow each year. Along its way, this water passes through hydroelectric power generating turbines, it receives wastes, and a small amount is removed for irrigation and other uses. The water also passes through many stages of storage ranging from wetlands and small farm ponds to large reservoirs. At present, surface water is not used for municipal supply because the cost of treatment is high and groundwater is plentiful.

It is important to note that lakes and streams, such as those in Menomonie, are extremely susceptible to deterioration through improper rural and urban land use development and management. Water quality can degenerate rapidly as a result of excessive nutrient loads from malfunctioning or improperly placed septic systems, inadequately sized and improperly operated sewage facilities, and careless agricultural practices. A common concern voiced by area residents is the “greening” of the lake and associated odors during the summer months.

Menomonie has had problems in the past with water quality due to poor methods of waste disposal, sedimentation and bank erosion. Since the lakes and streams provide a very pleasant physical setting for the City, continued growth and development should be accomplished in a manner that preserves and enhances the natural beauty and environmental quality of these water features.

Surface waters also provide habitat for a wide variety of animals and plants, which also serve to attract tourism and recreation. Protection of surface water resources is critical to maintaining the water quality, and diversity of life, which attracts people to these resources. Surface water resources also play an important economic role within the planning district. Recreational opportunities provided by these natural resources provide revenue and lure visitors from outside of the planning district.

The City continues to take action to protect its surface water. Since this Plan was adopted in 2007, the City has implemented a rain barrel program, increased surface water education, implemented a stormwater utility, and repaired the Shorewood Heights ravine.

Shorelands

Shorelands are vital components to the relationship between the land and the water. Shoreland areas serve as environmental buffer zones, serving to catch potential pollutants and filter runoff before it enters the waterway. These buffer zones also provide habitat for a wide range of plant and animal species and would be considered environmentally sensitive areas.

Shoreland areas are also very attractive as housing sites, and the demand for waterfront property is placing evermore pressure on these fragile areas though steep slopes have limited the amount of development close to Lake Menomin. In the City of Menomonie, shoreland zoning applies to all lands within 300' of a river or stream or to the landward edge of the floodplain or within 1000' of a lake, pond, or flowage (*Map 2-9*). Shoreland zoning affects the type and amount of permitted development within the jurisdictional boundary, and regulates general land uses within this boundary. The protection of shoreland cover will help preserve water quality and the natural beauty of the area.

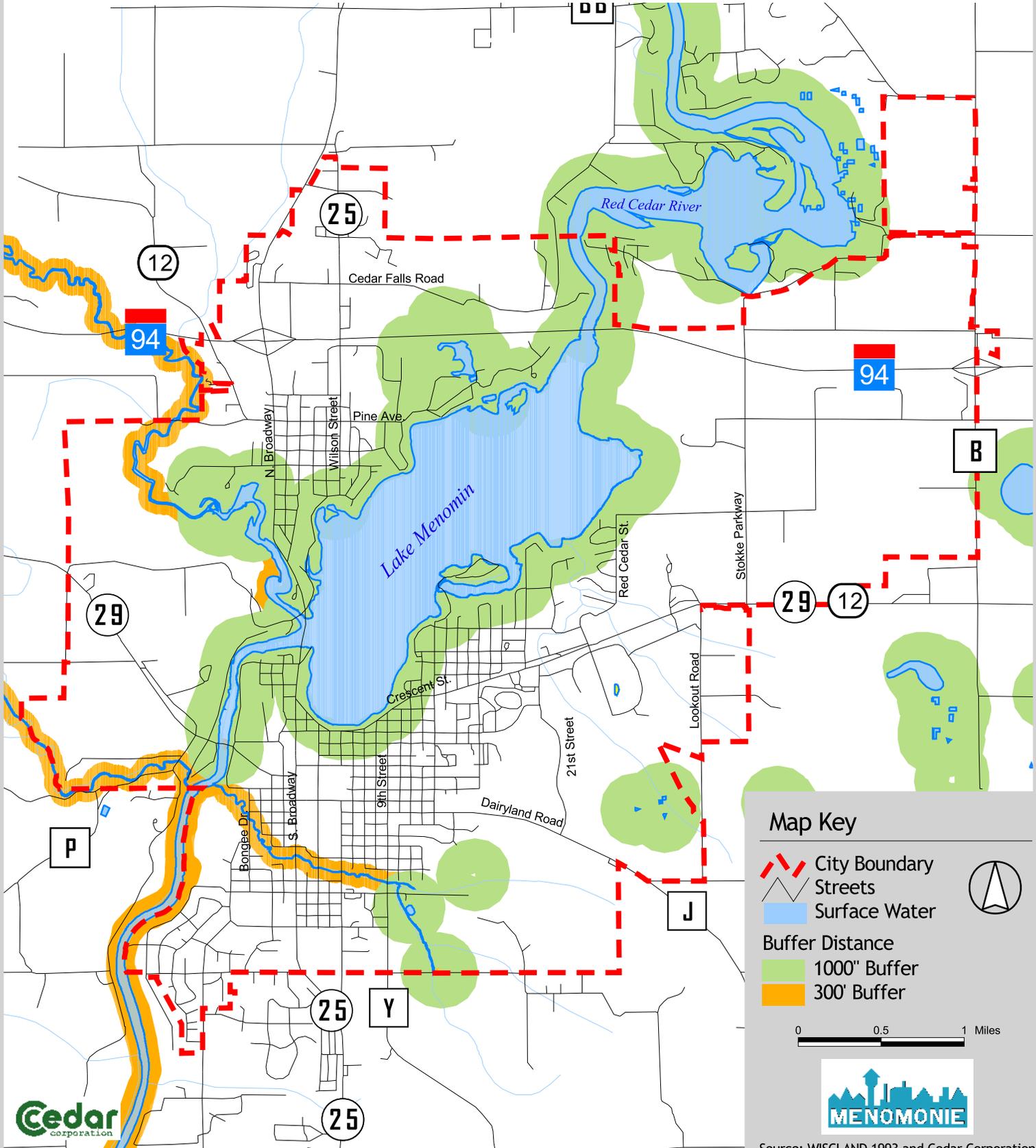
Watersheds

Most of Menomonie and the planning area are located within the Wilson Creek Watershed with smaller portions to the east in the Muddy and Elk Creek Watershed (*Map 2-10*). Watersheds can

Shoreland Areas

City of Menomonie

Map 2-9

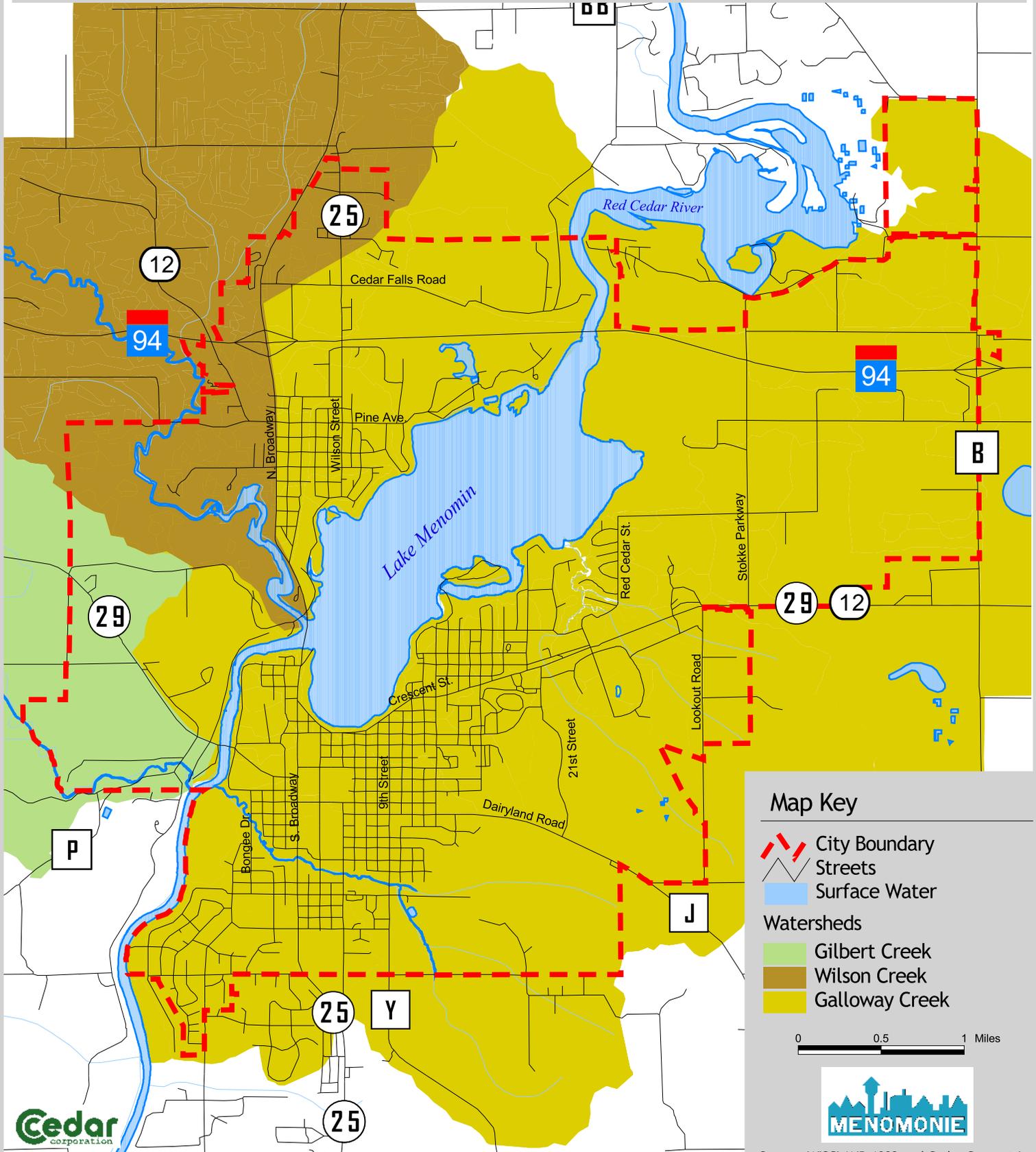


Source: WISLAND 1993 and Cedar Corporation

Watersheds

City of Menomonie

Map 2-10



Map Key

- City Boundary
- Streets
- Surface Water
- Watersheds**
- Gilbert Creek
- Wilson Creek
- Galloway Creek

0 0.5 1 Miles



Source: WISCLAND 1993 and Cedar Corporation

be defined as the land area which drains to a nearby lake or stream. Land uses within a watershed can dramatically affect water quality in that watershed. As rain or melt water flows across roads, parking lots or agricultural fields, chemicals and sediments are transported to lakes and rivers where they are deposited, disrupting the natural system. The City's Stormwater Management Plan further defines these watersheds.

Development in the watershed should take into account the impact on the function of natural systems, and address potential pollution problems through the use of best management practices such as sediment chambers, sand filtration units, infiltration basins, shoreland buffers, and the preservation of natural environmental which serve to reduce the pollutant load in lakes and streams.

The WisDNR is taking efforts to improve water quality in the City's watersheds and the Red Cedar Basin, including Tainter Lake and Lake Menomin. The goal is to reduce phosphorous loads by 45% to 65%. Currently, recommended, but voluntary, best management practices include:

- Conservation Tillage
- Eliminate Winter Manure Spreading by use of Storage
- Phosphorus based Nutrient Management
- Remove Winter Manure Application from Critical Acres
- Milk house Waste Treatment
- Traditional Conservation Practices
- Barnyard Runoff Controls
- Install Stream Buffers
- Control of Urban Stormwater Phosphorus Delivery
- Wetland Restoration
- Replace Failing, Critically Located Septic Systems
- Control of Stormwater on Rural, Riparian, Residential Properties

Groundwater

Groundwater is a significant and abundant natural resource in the planning area. The primary source for all water used for domestic, industrial, and agricultural purpose within the planning area is groundwater. The need for clean, reliable water supplies grows as a community expands. Groundwater is recovered from underground aquifers through a water supply well. These water supplies are recharged by rainfall and melt water, which seeps through the porous soil under the force of gravity, to a point where it collects on at an impervious layer such as granite bedrock. Recharge areas are typically located in the upland areas, with the low-lying areas such as rivers and streams being described as discharge zones.

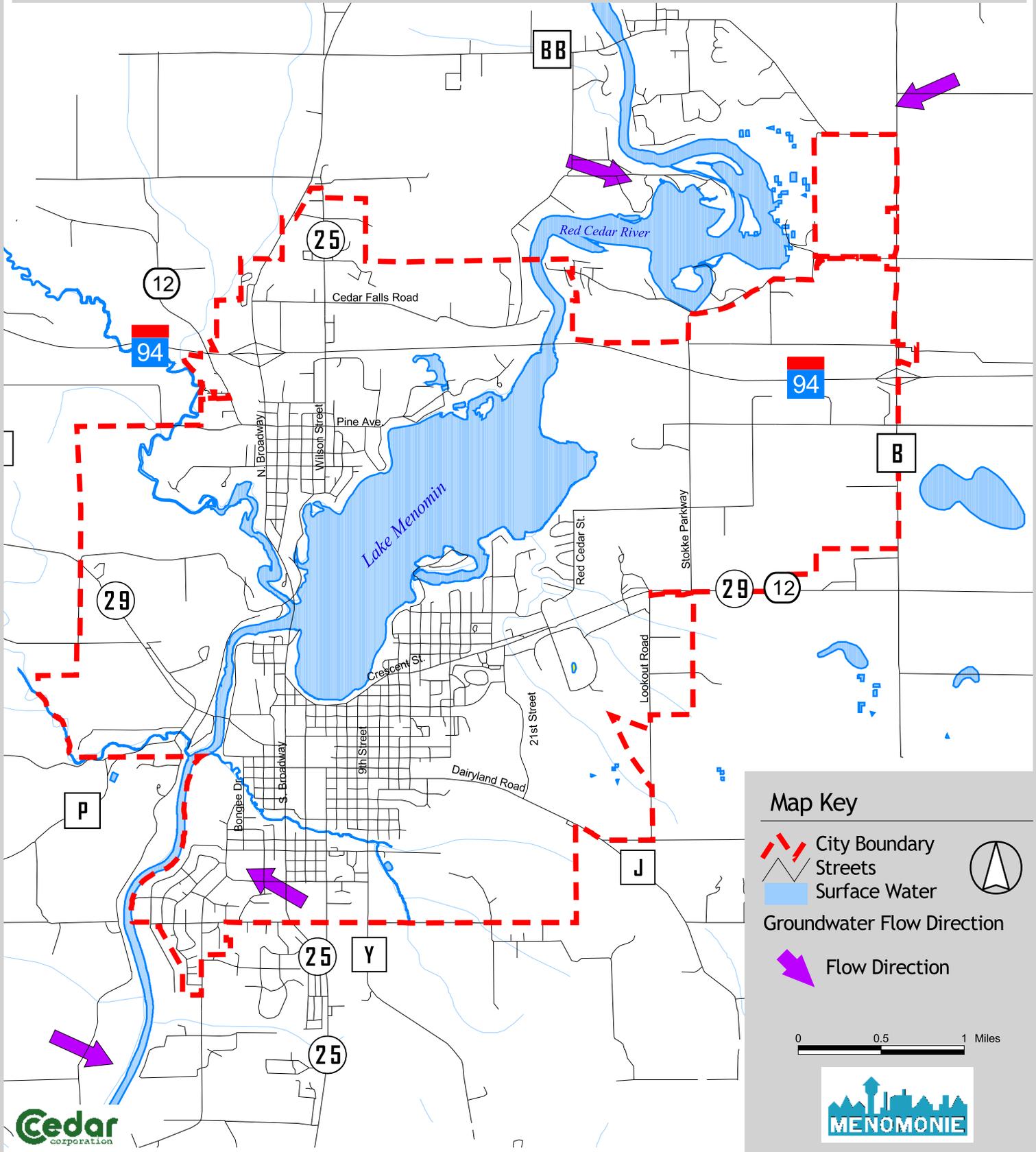
Groundwater underlies the entire planning area and constantly moves to areas of discharge -- streams, springs, and pumping wells (*Map 2-11*). The distance that groundwater in the area travels from a recharge to a discharge area is generally less than four miles.

Groundwater flow patterns typically follow the surface topography as the water slowly seeps to the discharge areas. Groundwater contamination potential is influenced by soil characteristics in the recharge area. These characteristics include soil chemistry, permeability, slope, and the ability of the unconsolidated materials overlying bedrock to filter contaminants (attenuation capacity).

Groundwater Flow Direction

City of Menomonie

Map 2-11



Map Key

- City Boundary
- Streets
- Surface Water
- Groundwater Flow Direction
- Flow Direction

0 0.5 1 Miles



Groundwater in the Menomonie water supply is obtained from either the sandstone aquifer or the sand and gravel aquifer. City water supply wells are located in the sandstone aquifer while private wells are generally completely in the sand and gravel aquifer. The high capacity wells in the sandstone aquifer are generally 100 to 475 feet deep with an average well yield exceeding 500 gallons per minute. Most of the high capacity wells in the sand and gravel aquifer are between 70 and 130 feet deep and have an average yield of 300 to 500 gallons per minute.

The sandy soils of the region and the sandstone combine to provide an excellent filtration system to protect the aquifer from contaminants in the infiltrating surface waters. However, there are some contaminants, such as, fertilizers, pesticides/herbicides, petroleum products, lead, and others that contain compounds that dissolve in the infiltrating water that can result in contamination of the water supply aquifer.

Typically these contaminants remain relatively shallow in the aquifer. If contamination does happen, deeper wells provide some protection. Protection of the water supply from these contaminants requires an understanding of the local geology, hydrology, and planning for proper design (location, total depth, and open well bore length) for placement of water supply wells. In addition, wellhead protection plans that identify water supply recharge areas and protective ordinances can be used to provide wellhead protection.

It is important to be aware of potential contamination risks when future land uses are considered as groundwater contamination can be very expensive and/or difficult and even impossible to overcome. Development in areas where the soil has a limited capacity to attenuate contaminants or within the groundwater recharge areas should be monitored to ensure protection of the resource.

Wetlands

Wetlands are areas where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic (water-loving) vegetation and which has soils indicative of wet conditions." The majority of wetlands border the creeks within the planning district (*Map 2-12*). Wetlands act as natural filters, removing sediments and contaminants from water. Wetlands also regulate water levels by containing water during periods of excessive rain or snow melt. These unique environments are host to wide variety of plant and animal communities, including some threatened and endangered species. Wetlands also serve as rest areas for migratory waterfowl during the fall and spring months.

Historically, wetlands have been viewed as wastelands with no real economic potential. This has resulted in wetlands being drained or filled and converted to other land uses. In the past decade, however, strict regulation of wetland conversion has slowed the loss of habitat and made conversion to other uses too expensive and impractical.

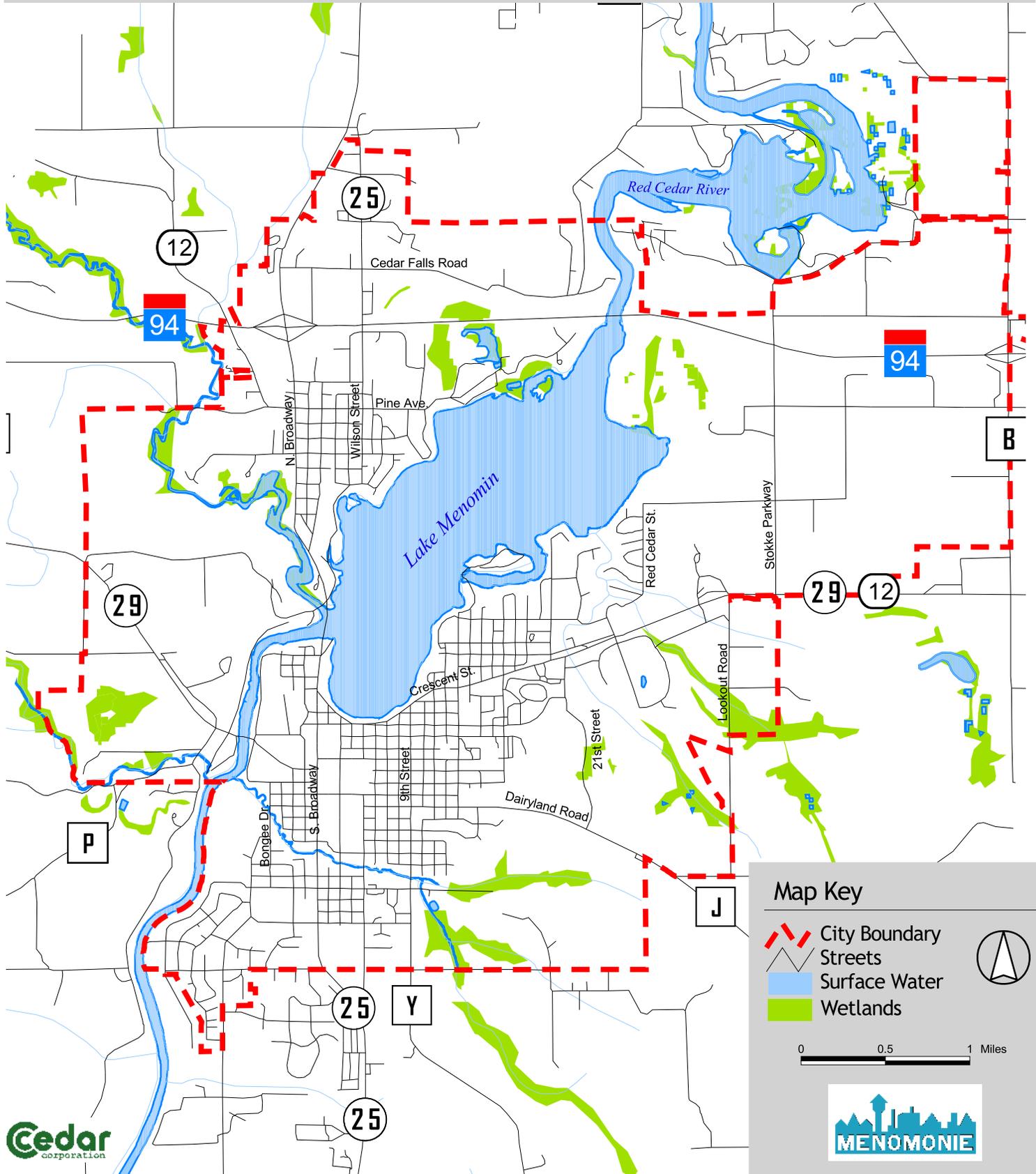
Wetlands within the planning district should be managed in accordance with the benefits they provide. Consideration of future land uses in the planning district should include emphasis on wetland habitats, and development should be guided to more appropriate areas.

Wetlands

City of Menomonie

Map 2-12

Note: These categories are only guidelines. An onsite investigation is needed to make an accurate determination.



Source: Wisconsin Wetland Inventory

Floodplains

Flood plains are areas, which have been, or may become inundated with water during a regional flood. Flood plains are comprised of two components, the floodway and floodfringe. Floodways are areas, which directly adjoin the channel of a stream and are characterized by deep, fast moving water. The floodway is typically the most dangerous part of a flood plain, and uses in this area should be limited to conservation areas or open space. The floodfringe is generally associated with standing, or slow flowing water adjacent to the floodway.

Development within the floodfringe is generally accepted, provided adequate flood proofing measures are in place. Section 87.30, Wisconsin statutes direct all Wisconsin counties, cities, and villages to adopt flood plain zoning ordinances. The Federal Emergency Management Agency (FEMA) has mapped and recently updated flood plains in the planning district (see *Map 2-8*). These maps delineate the entire flood plain boundary, and do not distinguish between floodway and floodfringe. The City of Menomonie and surrounding planning area have a minimal amount of floodland within its boundaries.

The floodlands of a river or stream are the wide, gently sloping areas contiguous with, and usually lying on both sides of a river or stream channel. Rivers and streams occupy their channels most of the time. However, during even minor flood events, stream discharges increase markedly such that the channel is not able to carry all the flow. As a result, stages increase and the river or stream spreads laterally over the floodlands. The periodic flow of a river onto its floodlands is a normal phenomenon, and in the absence of major, costly, structural flood control works, will occur regardless of whether or not urban development occurs on the floodlands.

Floodland areas are generally not well suited to urban development, not only because of the flood hazard, but also because of seasonally or perennially high water tables and the presence of soils poorly suited to urban use. The floodland areas, however, often contain important elements of the natural resource base such as woodlands, wetlands, and wildlife habitat and constitute prime locations for needed park and open space areas. Therefore, every effort should be made to discourage indiscriminate and incompatible urban development on floodlands, while encouraging compatible park and open space use.

For planning and regulatory purposes, floodlands are normally defined as the areas, excluding the channel, subject to inundation by the 100-year recurrence interval flood event. This is the event that would be reached or exceeded in severity once on the average of every 100 years. Stated another way, there is a one percent chance that this event will be reached or exceeded in severity in any given year.

Menomonie has a minimal amount of floodland within its boundaries. The Red Cedar River, although flowing through the heart of the city, is deeply entrenched and bordered by high, steep riverbanks which, in most areas, are adequate for containing any increases in the river flow. The levels of the Red Cedar River and Lake Menomin are also controlled to a degree by the NSP hydroelectric dam located at the conjunction of the Red Cedar River, Lake Menomin and STH 25/Broadway Street. Local tributaries of the Red Cedar River, including Wilson, Galloway and Gilbert Creeks, are similarly deeply incised into the local relief, minimizing the hazard of flooding.

The few 100-year floodplains in Menomonie are located along the edge of Lake Menomin, on Wilson Creek south of Heller Road, and at the mouth of Gilbert Creek-Riverside Park. In each of these areas, there is little to no urban development in the floodplain.

While the hazard of flooding is low for most areas within Menomonie, future developments adjacent to or nearby any rivers or the lake should be evaluated carefully on a case-by-case basis for the possibility of flooding. Undeveloped areas of Menomonie which are prone to flooding should be limited to park and open space use.

Forests/Wooded Lands

The Wisconsin Initiative for Statewide Cooperation on Landscape Analysis and Data (WISCLAND) completed a statewide land classification system in 1993 (*Map 2-13*). WISCLAND defines a forest as “an upland area of land covered with woody perennial plants, the tree reaching a mature height of at least 6 feet tall with a definite crown.” Large areas of forested lands can be found on the western side of Lake Menomin and Red Cedar River and are located near creeks and areas of steep slopes.

Forests create a setting for hunting, camping, hiking, and many other forms of recreation. Forests also provide valuable wildlife habitat and are the homes for less visible threatened and endangered plant and wildlife. Forests and trees can help protect other resources too. They can reduce heating and cooling costs of homes and business. Forests and trees offer erosion control for river banks and steep slopes.

In urban areas, forests and trees are used for traffic calming, the creation of parks, and add overall aesthetics that enhance the quality of life for residents. A contiguous forest is extremely important. The fragmentation of land can result in the disruption of habitat and can lead to problems between wildlife and humans.

In the past few years, the decimation of ash trees by the Emerald Ash Borer has been spreading in the Midwest. In 2008, the City began conducting a tree inventory and later received a grant to remove or treat ash trees susceptible to Emerald Ash Borer disease.

Environmentally Sensitive Areas / Wildlife Habitat

Environmentally sensitive areas and wildlife habitat area provide critical habitat for the protection of aquatic and terrestrial wildlife and plants. The preservation and possible expansion of these areas is vital to maintain a diverse ecosystem. Areas that may be considered environmentally sensitive area or wildlife habitat are forests, lakes, streams, rivers, wetlands, steep slopes, and shoreland buffers.

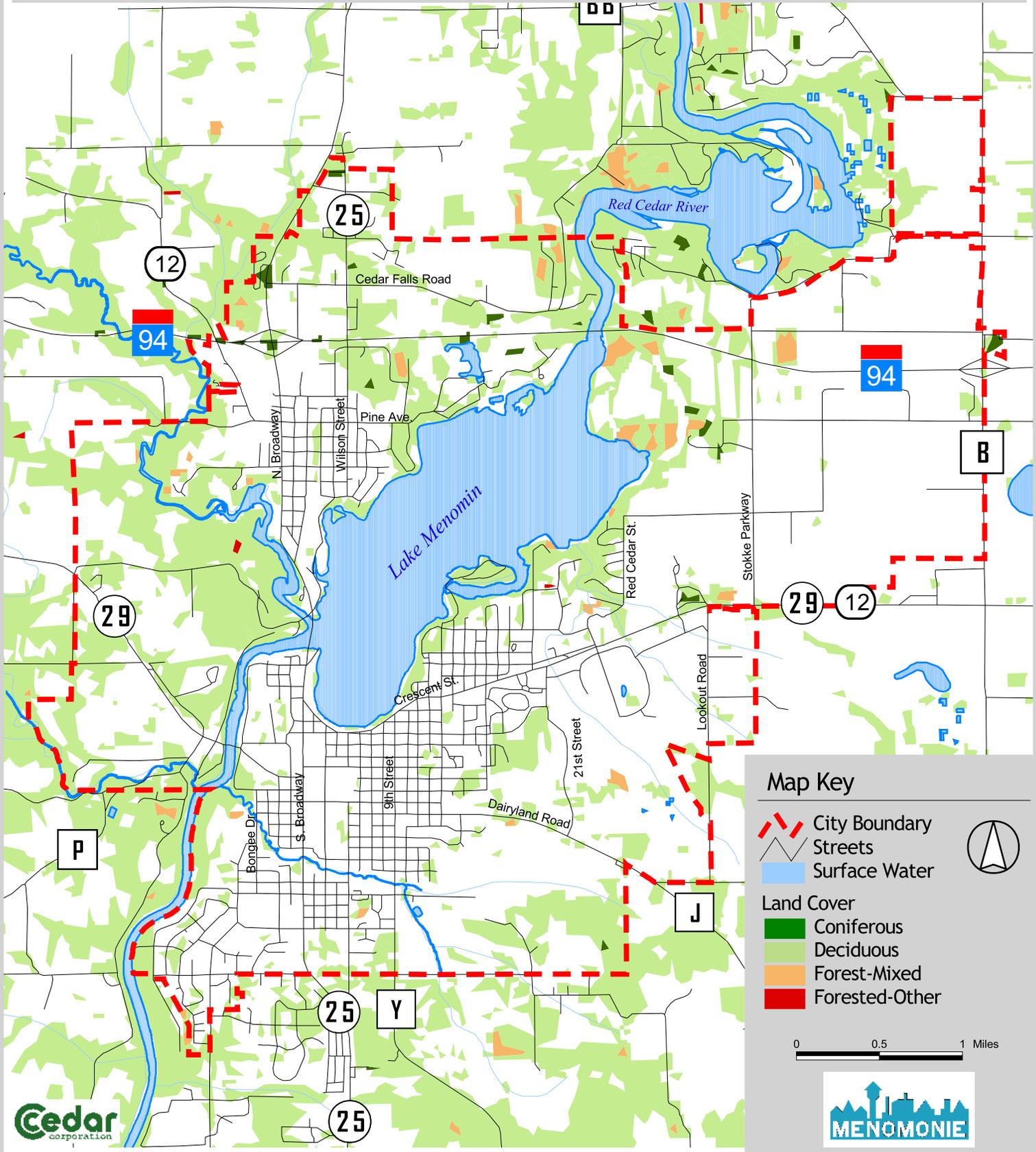
Map 2-14 combines these characteristics to identify environmental corridors. The City should consider preserving and protecting these areas if development occurs.

Threatened, Endangered, and Rare Species

According to the U.S. Fish and Wildlife Service, an “endangered” species is one that is in danger of extinction throughout all or significant portion of its range. A “threatened” species is one that is likely to become endangered in the foreseeable future. These species are protected because of their scientific, educational, aesthetic, and ecological importance.

Forested Areas City of Menomonie

Map 2-13

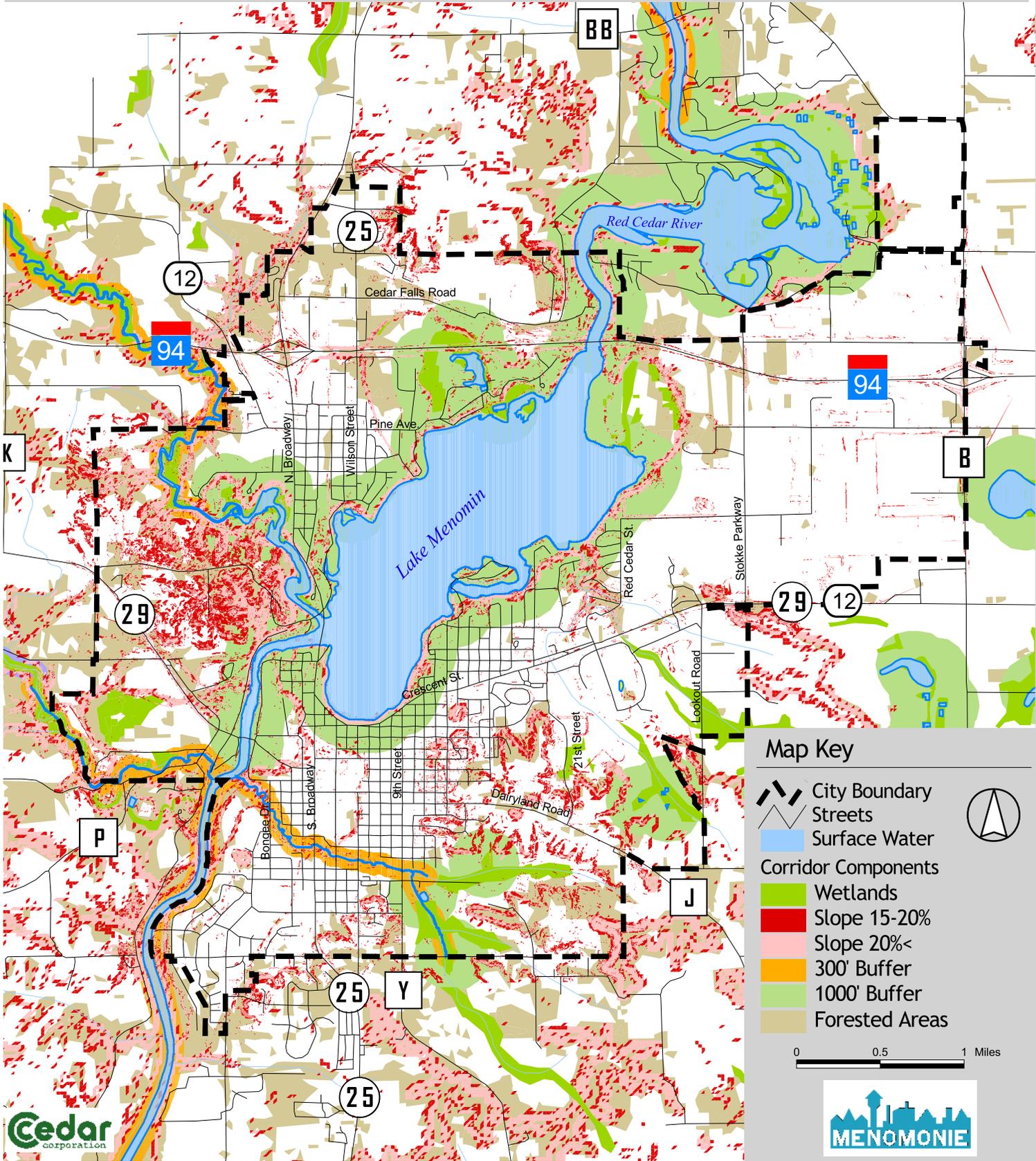


Source: WISCLAND 1999

Environmental Corridors

City of Menomonie

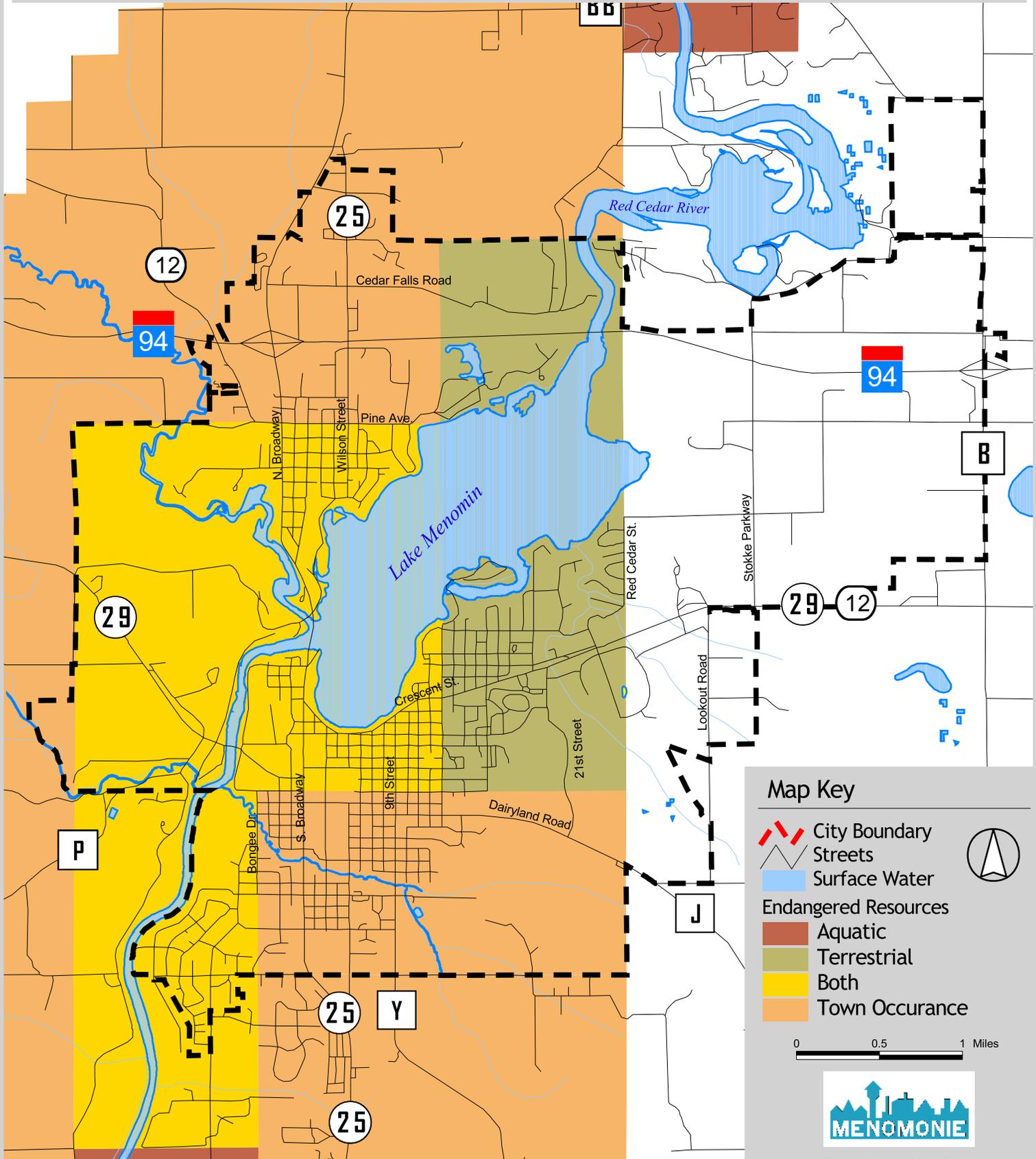
Map 2-14



Source: WISCLAND 1999 and USGS Topographic Maps

Endangered Species City of Menomonie

Map 2-15



Map Key

-  City Boundary
-  Streets
-  Surface Water
- Endangered Resources**
-  Aquatic
-  Terrestrial
-  Both
-  Town Occurance

0 0.5 1 Miles



Source: Wisconsin Natural Heritage Inventory

The Wisconsin Natural Heritage Inventory Program maintains data on the location and status of natural features, rare species, and natural communities in Wisconsin. These sites are broad in nature and provide a general location for rare, threatened, or endangered species as well as high-quality natural communities.

Map 2-15 reveals the sections and townships within the planning area with occurrences of rare species and natural communities. Most of these are likely located near the surface waters and wetlands.

In order to preserve these areas, it is recommended that the Wisconsin DNR be contacted for the exact location of these areas so they are not disturbed or destroyed by human use of the landscape and natural resources. Such areas may be incorporated into an environmental corridor or preserved for educational purposes.

Mineral Resources

Metallic and non-metallic mineral resources are naturally occurring sources of metal-bearing ore and non-metallic (rock or sand and gravel) materials. When economically viable, these materials may be removed through mining.

The recent increase in interest in the mining of silica sand is related to the increase in the use of a well stimulation technique called hydraulic fracturing. Hydraulic fracturing is used to maximize the extraction of oil or natural gas.

Lands in Dunn County contain large volumes of sand that meet the narrow range of specifications needed for hydraulic fracturing. This has drawn the attention of sand mining operations. Potential impacts from mining and processing operations include the excavation of sandstone ridges and hills, loss of agricultural land, noise from related equipment, dust, exposure to respirable silica dust, increased groundwater use, and increased traffic (truck and rail). Currently, there is one silica sand mining operation on the eastern edge of the City in the Town of Red Cedar.

Reclamation of non-metallic mining sites is covered under Chapter NR 135 of the Wisconsin Administrative Code and 295.12 of the Wisconsin State Statutes. Other governmental units and agencies are involved with permitting such as Dunn County and the Wisconsin Economic Development Corporation. The WDNR also permits air quality and stormwater management. The City of Menomonie does not have a non-metallic mining licensing ordinance.

Agricultural, Cultural, and Natural Resources Goals, Objectives, Programs, Policies & Actions

Goal 1: Protect and enhance buildings, districts, and archeological sites and artifacts of cultural and historical importance.

Objectives

1. Provide educational opportunities for area residents.
2. Preserve and promote links to the past.
3. Promote cultural resources as a significant part of the City's identity.
4. Promote the City of Menomonie as a destination to experience and enjoy its historic sites.

Programs, Policies, and Actions

1. Encourage local government actions that promote and preserve the City's cultural assets.
2. Continue to update and utilize guidelines that encourage responsible design and the preservation of historic properties in the downtown historic district.
3. Provide assistance, when possible, to individuals or groups pursuing grant monies that will offset costs of preservation of historic buildings or sites.
4. Continue to support and encourage local groups and organizations that promote our cultural resources and provide educational services to the public.
5. Encourage responsible design of public buildings in the City.

Goal 2: Protect sensitive environmental resources through conscious decision-making.

Objectives

1. Preserve and protect surface waters, wetlands, shorelands, floodplains, wildlife habitat, and groundwater resources.
2. Preserve open space.
3. Maintain landscape topography.
4. Encourage development which maximizes environmental protection
5. Conserve natural areas.
6. Limit the fragmentation of productive agricultural lands.

Programs, Policies, and Actions

1. Protect the quality and quantity of wetlands through national, state, county, and/or local wetland protection regulations.
2. Minimize the impact of development on environmentally sensitive areas such as excessive slopes, waterways, environmental corridors, and wetlands.
3. Periodically review and amend the wellhead protection, erosion control, floodplain ordinance and stormwater management ordinances.
4. Require future residential development to implement conservation practices to preserve larger areas of productive agricultural land where practical.
5. Support the inspection of new private septic systems and the inspection of existing systems every three years by Dunn County Environmental Services Department.

Goal 3: Promote awareness of environmental issues in the City.

Objectives

1. Conserve natural areas, soils, buffer zones, and sensitive habitat areas.
2. Identify areas of possible metallic/nonmetallic mining sources.

Programs, Policies, and Actions

1. Provide education to the public and developers regarding environmental and land use issues such as stormwater management and invasive species.
2. Require all mining practices to be completed in an environmentally friendly manner with required reclamation plans.
3. Create a licensing ordinance for the mining of metallic/non-metallic mineral resources to manage the possible negative impacts it may have on the City's natural resources.

Goal 4: Enhance access to natural resources.

Objectives

1. Preserve open space.
2. Provide recreational opportunities.
3. Conserve natural areas and habitats.
4. Protect sensitive resources such as remnant prairie habitats.

Programs, Policies, and Actions

1. Seek to acquire lands of environmental significance for public use where feasible. Investigate land funds that may be available to assist with purchase.
2. Identify and pursue land purchase, easements, and cooperative agreements with landowners and surrounding communities to protect and preserve natural areas.
3. Continue the development of a trail network on public lands or right-of-ways.
4. Explore available grants to assist in securing property for resource conservation and public benefit.
5. Continue to improve and enhance parks and recreation opportunities.
6. Maintain access points to Lake Menomin.
7. Coordinate with local land trusts to protect environmentally sensitive areas.
8. Begin working with local groups and organizations to develop and implement a long-term biking/walking trail plan.
9. Acquire additional park lands as needed.

Goal 5: Protect Lake Menomin and area surface waters.

Objectives

1. Preserve and protect surface waters, wetlands, shorelands, floodplains, and groundwater resources.
2. Protect sensitive resources and habitats along the lake.
3. Ensure that new development or other alterations in land use will not negatively impact the quality or quantity of surface and/or sub-surface water resources.
4. Preserve undeveloped areas along the lake.

Programs, Policies, and Actions

1. Support best management practices that continue to reduce the total maximum daily load (TMDL) of suspended solids in stormwater.
2. Protect drainage ways and areas that drain to Lake Menomin and other area surface waters.
3. Review and update zoning regulations pertaining to shorelands and waterways and strengthen where necessary.
4. Find creative/unique ways to reduce the impervious surfaces such as reviewing parking and landscaping requirements, and related ordinances.
5. Review and update the stormwater management plan on a regular basis.
6. Ensure that wetlands, man-made ponds, open drainage ditches, swales, and natural watercourses are used to convey and detain drainage to the maximum extent feasible for the benefits of filtration, aesthetics, wildlife habitat, and cost.
7. Regulate runoff from development in accordance with local, state, and federal laws.
8. Continue to regulate the location, type, size, vegetative cutting, and grading of developments along the perimeter of waterways.

Goal 6: Promote open/green spaces.

Objectives

1. Enhance aesthetics consistent with the character of Menomonie.
2. Preserve and enhance open/green space in new developments.

Programs, Policies, and Actions

1. Encourage forms of development which maximize the retention of open space, forested lands, and other undeveloped areas.
2. Review and update zoning regulations to determine ways to further encourage open/green space.
3. Support higher density residential areas (traditional neighborhoods/cluster developments) to maintain open/green spaces.

Goal 7: Protect the City's trees.

Objectives

1. Enhance and promote preservation of trees within community.

Programs, Policies, and Actions

1. Continue the Urban Forestry Program.
2. Seek grant funds to assist with tree maintenance, inventory, and planting.
3. Plant boulevard trees where possible.
4. Increase the tree canopy in the City.
5. Create and implement a policy for management diseases and pests that negatively affect the health of City trees.