

PORTAGE RIVER WATERSHED PLANNING PROJECT

BRADY TOWNSHIP KALAMAZOO COUNTY

POLICY REVIEW DOCUMENT MDEQ TRACKING CODE #2012-0017

OCTOBER 2014
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REVIEW DRAFT



Michigan's
Nonpoint Source
Program

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LIST OF ABBREVIATIONS/ACRONYMS

| | |
|----------|--|
| BMP | Best Management Practice |
| CCD | Calhoun Conservation District |
| FTCH | Fishbeck, Thompson, Carr & Huber, Inc. |
| LID | Low Impact Development |
| MDEQ | Michigan Department of Environmental Quality |
| MDNR | Michigan Department of Natural Resources |
| MS4 | Municipal Separate Storm Sewer System |
| NRCS | Natural Resources Conservation Services |
| NPS | Nonpoint Source |
| NREPA | Natural Resources and Environmental Protection Act |
| PRD | Policy Review Document |
| PRW | Portage River Watershed |
| PUD | Planned Unit Development |
| RPOD | Resource Protection Overlay District |
| SESC | Soil Erosion and Sedimentation Control |
| SWMPC | Southwest Michigan Planning Commission |
| Township | Brady Township |
| WMP | Watershed Management Plan |

EXECUTIVE SUMMARY

The Portage River flows southwest from its headwaters in Charleston Township, eastern Kalamazoo County, Michigan into St. Joseph County, where it empties into the St. Joseph River in the City of Three Rivers, Michigan. The Portage River Watershed (PRW) is experiencing very low development, similar to other areas around the state during the recent downturn in the economy. However, citizens are concerned when growth does happen it will be in an uncontrolled manner and could jeopardize the quality of the watershed's valued resources.

The Portage River Watershed Management Plan (WMP) stresses the importance of water resources as a vital component of land use decisions at the local level. Communities in the PRW are interested in achieving sustainable development, defined as economic growth protecting the environment.

This Policy Review Document (PRD) provides an assessment of the Master Plan, Zoning Ordinances, and other development standards of Brady Township (Township) which impact water quality. An examination of existing policies is crucial to provide for well crafted and complimentary municipal codes reflecting the desires of the diverse communities within the PRW. The current path of development in these communities can be evaluated through this process and redirected if necessary. Often, communities find their development codes and standards give developers little or no incentives to conserve natural areas and, in some cases, actually work against watershed protection. Careful attention to appropriate water resource management can help communities reach a level of sustainable development, which combines economic growth with the protection of natural resources.

Existing policies and regulations in the Township were compared to accepted development principles as presented in various water resource protection guidebooks. A policy review spreadsheet was used to document the comparisons and identify compliance and discrepancies with the principles. The assessment reviewed the status of land use planning and zoning in the Township, and how well the rules and regulations address concerns of the watershed. The results are summarized in Appendix 1.

The results of this policy review reveal specific areas of the existing development rules that are generally good in their efforts of watershed protection and other areas that could benefit from modifications. Priority actions that the Township could take to improve resource protection include:

Master Plan Revisions

1. Create a Resource Protection Overlay District (RPOD) and update the Master Map with identification of natural resources and RPOD delineation.
2. State the importance of a stormwater management plan, with a goal of increasing infiltration and decreasing imperviousness in new construction and redevelopment to reduce the amount of stormwater runoff.
3. Broaden the Water Resources Objectives and Policies to include other natural resources, including floodplains, high-quality natural areas, woodlands, wetlands, and greenways.

Zoning Ordinance Revisions

1. Create specifications for a RPOD to protect natural resources.
2. Requiring building setbacks from water bodies (streams, rivers, lakes, wetlands) with a native vegetative buffer.
3. Protecting wetlands through a Township wetlands ordinance.

4. Improving parking lot standards to reduce impervious surfaces (shared parking, parking space size, and minimum parking requirements).
5. Improving site plan review.
 - a. Identify natural features.
 - b. Review standards for protection.
 - c. Label Best Management Practices (BMPs) on site plan.
6. Encouraging LID techniques and BMPs to reduce runoff and increase infiltration.
7. Coordinating with the County Soil Erosion and Sedimentation Control (SESC) program and require compliance with County SESC standards.
8. Coordinate with receipt of other required state and county permits.
9. Requiring new septic systems be located at least 150 feet from a waterway.
10. Encouraging the use of native species in landscaping to increase infiltration of stormwater and to discourage the use of invasive species.
11. Improve private road standards to reduce impervious surfaces.

Other Recommendations

1. Update the Capital Improvement Program to include policies related to natural resource protection and stormwater management.
2. Develop a Recreation Plan and obtain approval of the plan from the Michigan Department of Natural Resources (MDNR).
3. Investigate funding options for conducting additional studies and projects to assist the Township in implementing the recommendations in this report.

Specific language that can be used to modify the sections within the Zoning Ordinance is included in the Recommendations Section of this report.

The use of the development principles to begin discussion on these issues will eventually lead to protecting natural and aquatic resources.

INTRODUCTION

PURPOSE

The purpose of this PRD is to assist the Township with implementation of generally accepted development standards and to identify impediments to innovative site design for the purpose of water resource protection. An examination of existing policies is crucial to provide for well crafted and complimentary municipal codes reflecting the desires of the Township. This policy assessment will provide a baseline from which to measure changes in the planning and management of growth in the coming years. The current path of development in the Township can be evaluated through this process and redirected if necessary. A similar assessment could be conducted in five years to determine if changes have been made to the rules and regulations increasing the level of watershed protection.

PORTAGE RIVER WMP

The Kalamazoo Conservation District developed a WMP for the PRW in 2006. The Calhoun Conservation District (CCD) has received an Act 319 grant to update the WMP. The scope of work for the grant includes completing policy reviews for three townships located within the PRW. Brady Township, which has requested that a review of its policies be completed, is located in the center of the watershed, at the southern end of Kalamazoo County, Michigan. Overall, the PRW encompasses 113,436 acres in Kalamazoo and St. Joseph Counties, Michigan (Exhibit 1). A small area in the southeast portion of the Township is in the Little Portage Creek Watershed (Exhibit 2). The CCD is developing a WMP for that watershed as part of this grant.

The 2006 WMP includes a complete evaluation of nonpoint source (NPS) pollutants and creates an implementation plan to address resource concerns, problems, and needs, and outlines solutions for known or suspected pollutants of the river. An examination of existing policies is crucial to provide for well-crafted and complimentary municipal codes reflecting the desires of the communities within the PRW.

The MDEQ determined in a 2004 study that water quality standards were not attained in Portage River from its confluence with Indian Lake upstream to Portage Lake in Kalamazoo County (including tributaries) (Wolf and Wuycheck, 2004). Indian Lake is located within the Township. The Portage River WMP identified priority NPS pollution impairments as follows:

- Sediment in rivers, streams, and lakes
- Excess nutrients
- Streambank erosion
- Bacteria and pathogens, especially from wildlife (geese)
- Hydrology (low flow/low lake levels)
- Temperature
- Chemical pollutants (oils, metals, pesticides)
- Cold water fishery use
- Warmwater fishery use

Exhibit 1 - Portage River Watershed

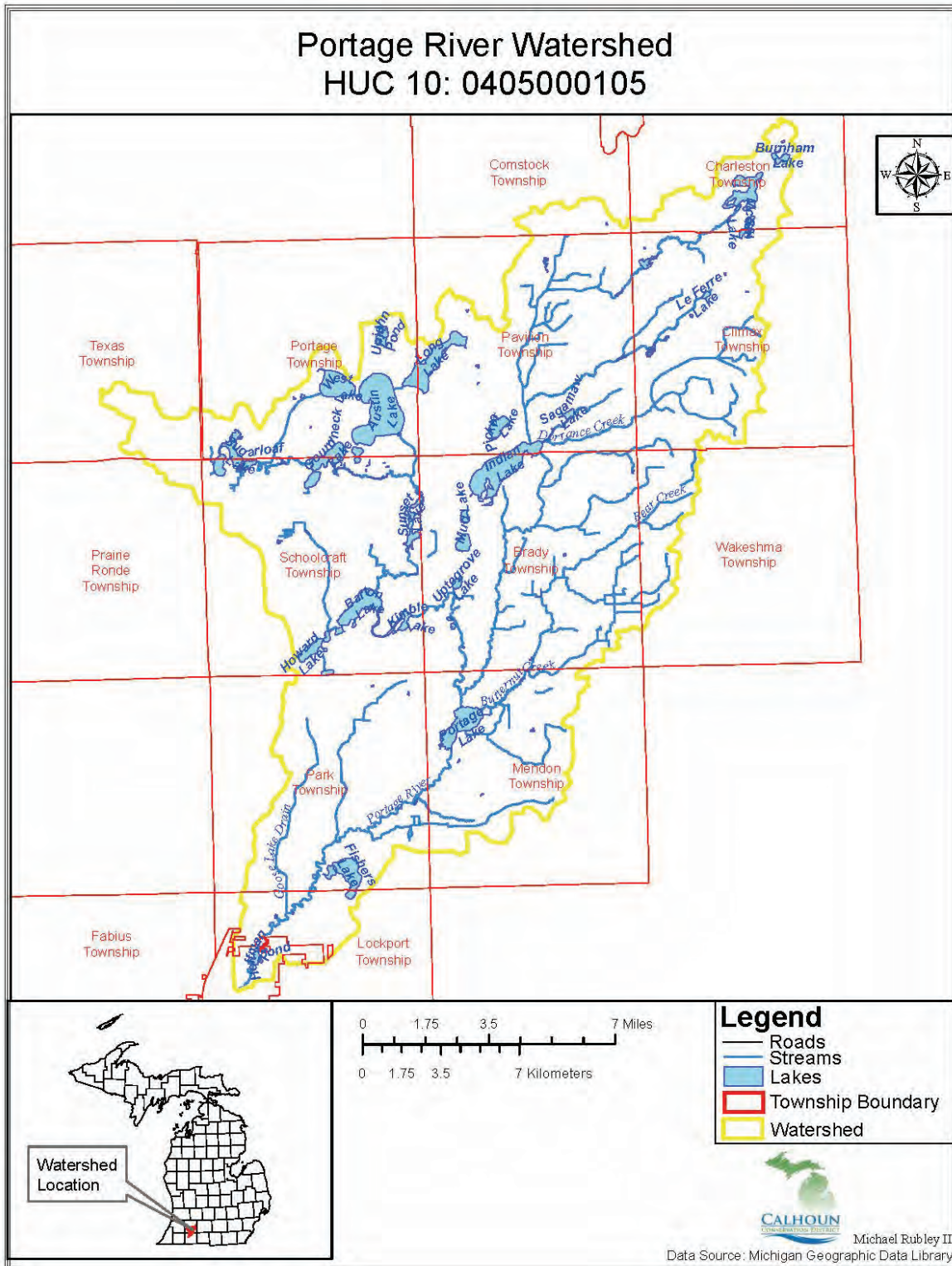
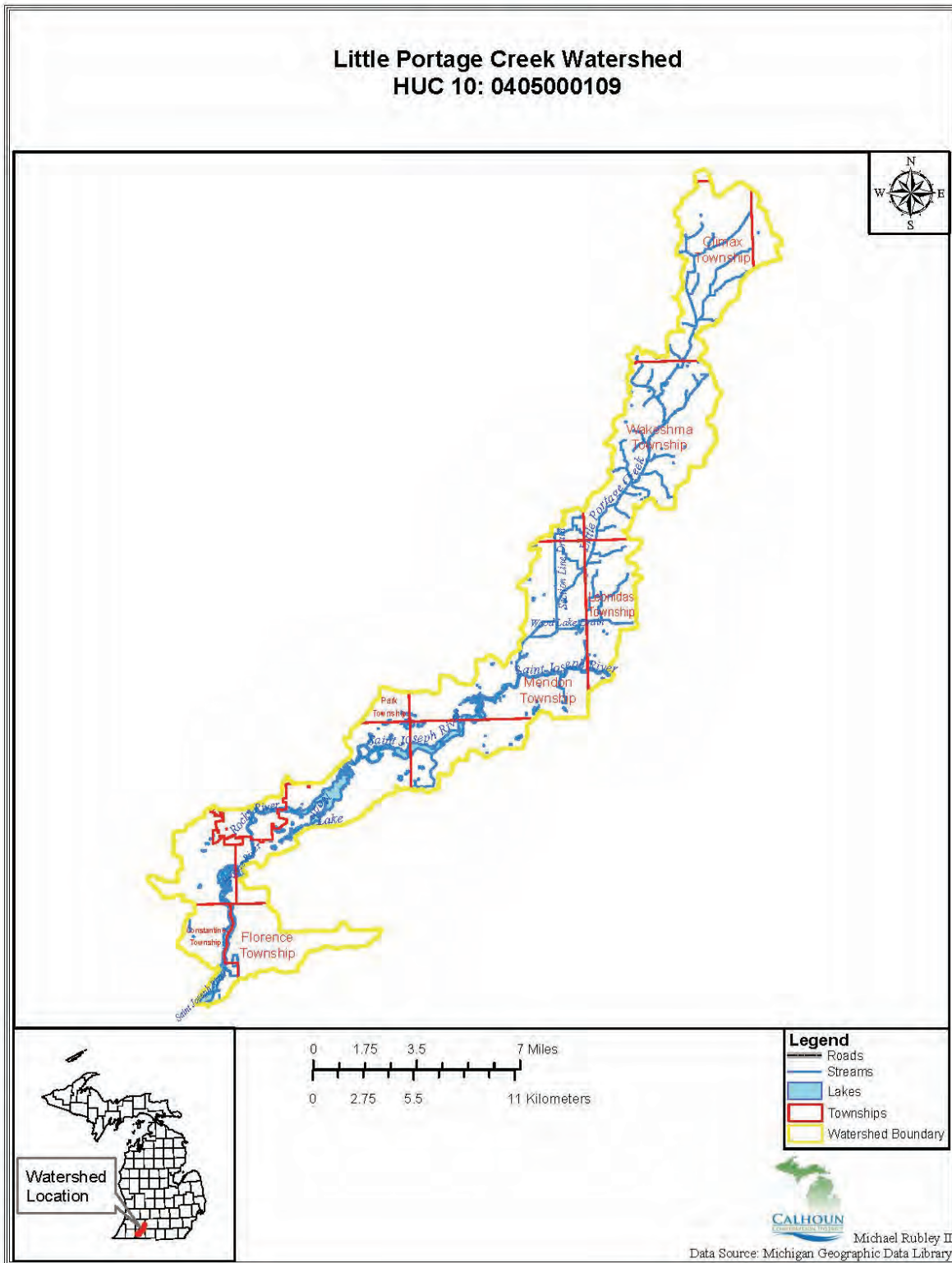


Exhibit 2 – Little Portage Creek Watershed



State and federal water quality programs have designated the following uses for all surface waters in the State of Michigan. Also indicated is whether these uses are met, threatened, or impaired, according to the WMP:

- Agricultural use (Met)
- Navigational use (Threatened)
- Industrial water supply (Met)
- Public water supply (Not applicable)
- Warm water fishery (Threatened)
- Other indigenous aquatic life and wildlife use (Threatened)
- Partial body contact recreational use (Threatened)
- Total body contact recreational use (Threatened)

The goals described in the WMP address improving water quality pertaining to these uses for all water bodies.

The Stakeholders in the PRW have also identified the following desired uses:

- Environmental education
- Maintain commercial discharges
- Protect wetlands
- Protect riparian corridors and floodplains
- Expand existing protected open space
- Explore natural rivers designation
- Improve fisheries
- Expand recreational uses
- Maintain water supply for agricultural and industrial uses
- Protect wildlife habitat

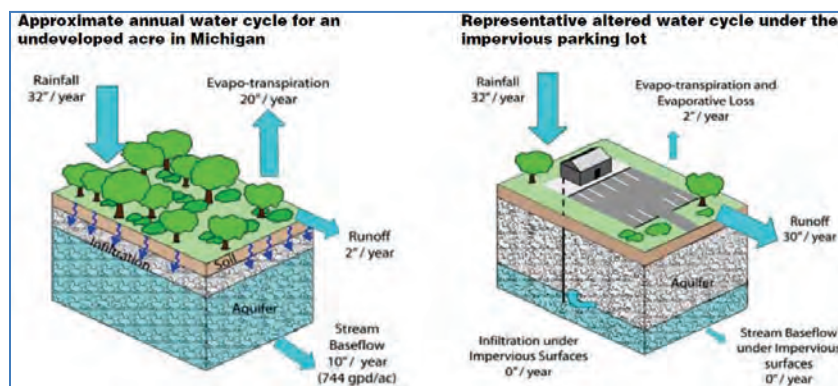
The objective of this policy review is to develop and implement specific land-use recommendations using a watershed-based approach to achieve the WMP goals and desired uses. This effort will bring together township boards, local officials, and planning commissions to protect water quality and reduce NPS pollution on a multi-township or county-wide basis through the revision of the Master Plan, addition of ordinances for natural resource protection, and zoning to protect water quality supporting the vision of the Township's Master Plan.

BACKGROUND

A grant was awarded to the CCD to update the 2006 WMP for the PRW and to expand it to include the Little Portage Creek watershed. As part of the grant, a task was defined to assist communities in assessing their policies and guidelines shaping how development happens in their communities. The Township was one of the communities agreeing to participate in this assessment. The time to plan for growth is now, when activity is low and time is available for a thorough review of policies and standards working together to improve the quality of life.

LAND USE AND WATER RESOURCE PROTECTION

Local Land Use Decisions Have Regional Impacts. Residents, business owners, and local planners are not always aware of the impacts their individual actions might have on their natural surroundings. Cumulative effects of these actions are not considered in most development and land use decisions. A watershed planning perspective will encourage local planners and developers to look at the entire area contributing to a water body and determine its needs for management and protection. Often, communities find their development codes and standards give developers little or no incentives to conserve natural areas and, in some cases, actually work against watershed protection. The PRW is taking the first step in realizing the regional consequences of the local land use decisions, by evaluating current policies and implementing appropriate measures to enhance and protect water quality while experiencing growth and development. Careful attention to appropriate water resource management can help communities reach a level of sustainable development, combining economic growth with the protection of natural resources.



(Source: *A Design Guide for Implementers and Reviewers: Low Impact Development Manual for Michigan*, SEMCOG, 2008)

Development Impacts to Watercourses. One of the basic concepts accepted in watershed planning is that the amount of impervious cover in a watershed directly relates to its water quality. Increased urbanization results in natural vegetation being replaced with hard surfaces, such as rooftops, roadways, and parking lots. The additional impervious area increases the rate and volume of surface water runoff and decreases water infiltration into the ground. Development often reduces base flow, since water is not infiltrating, which causes perennial streams to become intermittent streams. When more of the water enters the streams as surface runoff, the bankfull channel flows create highly erosive conditions. Other concerns of impervious surfaces include higher concentrations of nutrients in higher volumes of runoff and increased occurrences of heavy metals. Another impact occurs when municipal services are required to expand to provide water and sewer for developments currently outside of service areas. Locating developments close to existing towns and city centers reduces the effects of sprawl and minimizes the expansion of infrastructure that can increase harmful stormwater runoff.

REGULATIONS IMPACTING LAND USE AT THE STATE LEVEL

The Michigan Natural Resources and Environmental Protection Act (NREPA), Public Act 451 of 1994, as amended is the state's primary environmental legislation. The MDEQ regulates wetlands, sand dunes, soil erosion, and sedimentation from earth change activities, inland lakes and streams, shorelines, and other land use decisions impacting water resources, including management of floodplain development, public health standards, subdivision rules, and stormwater discharges from municipal separate storm sewer systems (MS4). The state, however, does not oversee land use planning at the local level. The over 1,850 units of government in Michigan are responsible for protecting water resources through local regulations (Ardizzone, 2010).

LAND USE PLANNING AT THE LOCAL LEVEL

Townships, cities, and villages are responsible for developing land use plans and zoning ordinances, as well as ensuring their implementation. Land use plans and zoning ordinances are the regulatory tools that can be used to protect surface water and groundwater. The planning and zoning process typically starts with a Master Plan, outlining the vision of how the residents and leaders want the communities to look in future years. The Master Plan is the foundation upon which the Code of Ordinances and zoning ordinances are developed. Formulation of a Master Plan is therefore of highest importance to the communities. A Master Plan should identify goals and a vision for future development in the community. The Code of Ordinances is intended to provide the rules and regulations preserving the peace, health, safety, and welfare of the inhabitants of the community. Design manuals and construction specifications for development guide the alterations of land and water necessary for growth in the community. All of these policies must be integrated to ensure their goals and objectives are compatible. The policy review requires the examination of all of these documents to be able to assess the capacity of the community to continue to grow and prosper while protecting the natural resources.

METHODOLOGY

Fishbeck, Thompson, Carr & Huber, Inc. (FTCH) worked with the CCD to develop a worksheet that lists water quality issues and outlines accepted development principles. CCD and FTCH met with Township officials to review the worksheet and obtain policies, standards, ordinances, and guidance the Township has for growth and infrastructure management. These one-on-one meetings with the Township helped ensure all documents were current and the intent of the development standards was understood. The following documents were reviewed:

- Master Plan, Brady Township, 2010-2020, approved by the Brady Township Board on December 1, 2009
- Brady Township Land Use Map, dated August 2009
- Brady Township Zoning Map, effective November 16, 2012 (Figure 1)
- Brady Township Zoning Ordinances, Ordinance No. 70, adopted May 6, 1997, as amended through Ordinance No.129, March 2014
- Kalamazoo County Sanitary Code
- Kalamazoo County Road Commission Construction Guidelines, December 4, 2012

These documents were reviewed using the worksheet to evaluate their conformity to development principles for water resource protection.

Recommendations and suggestions for the Township to consider in future updates, and planning and zoning decisions are included in the Recommendations section of this report.

The detailed results of the policy review are in table format in Appendix 1.

RECOMMENDATIONS

MASTER PLAN REVIEW

The stated primary purpose of the Master Plan is to provide a guide for making future land use and development decisions to accommodate growth within the community. The Plan reviews the physical and historical character of the Township, population and demographics, and the Township's land use classifications. The intent of each land use classification is defined and management objectives and policies are discussed. The overall goals of the Master Plan are to facilitate growth in an orderly manner while providing for the health, safety, and welfare of all Township residents, and to protect and maintain the natural beauty and resources of the Township. The Master Plan lists specific objectives and policies to obtain these goals.

GOALS

Based on the results of this policy review, the following additional goals are suggested that would address resource protection and conformance with accepted development principles.

- Call for protection of watershed resources in order to protect the health, safety, and welfare of residents (on page 17, Land Use Goals).
- In the Open Space and Recreational Land Use Objectives (page 19), recognize the importance of open space preservation as a way to protect the health and safety of residents, to protect air, land and water quality, to buffer air and noise pollution, to preserve wildlife habitat, and to preserve aesthetic values and the community's beauty.

OBJECTIVES

The following objectives and actions are suggested that would address resource protection and conformance with accepted development principles.

A. AGRICULTURAL/RURAL LAND USE OBJECTIVES

Land Conservation and Development Techniques

- Identify priority lands for acquisition or protection for future recreational use.
- Identify the use of conservation easements or other tools to conserve open space.

Stormwater Management

- Preserve natural features to maintain infiltration of stormwater.

B. RESIDENTIAL LAND USE OBJECTIVES

Impervious Surface Reduction

- Encourage minimizing hard surfaces in new construction and redevelopment projects to reduce runoff and improve infiltration.
- Promote the reduction of impervious surfaces for the protection of water quality, natural features, and open space.

Erosion and Sedimentation Control

- Require erosion and sedimentation control as a mechanism to protect health, safety, and welfare of residents through protection of water and soil resources.

C. COMMERCIAL LAND USE OBJECTIVES

Groundwater

- Limit high-risk land use activities in groundwater recharge and wellhead protection areas.

Impervious Surface Reduction

- Encourage minimizing hard surfaces in new construction and redevelopment projects to reduce runoff and improve infiltration.
- Promote the reduction of impervious surfaces for the protection of water quality, natural features, and open space.

Erosion and Sedimentation Control

- Require erosion and sedimentation control as a mechanism to protect health, safety, and welfare of residents through protection of water and soil resources.

D. INDUSTRIAL LAND USE OBJECTIVES

Groundwater

- Limit high-risk land use activities in groundwater recharge and wellhead protection areas.

Impervious Surface Reduction

- Encourage minimizing hard surfaces in new construction and redevelopment projects to reduce runoff and improve infiltration.
- Promote the reduction of impervious surfaces for the protection of water quality, natural features, and open space.

Erosion and Sedimentation Control

- Require erosion and sedimentation control as a mechanism to protect health, safety, and welfare of residents through protection of water and soil resources.

E. NATURAL RESOURCES OBJECTIVES (RENAME THE WATER RESOURCES SECTION ON PAGE 19)

Expand the Water Resources Objectives noted in the Master Plan to include the following:

Watershed Issues

- Identify watershed boundaries
- Encourage protection of watershed resources in order to protect the health, safety, and welfare of residents.

Stream Corridors, Floodplains, and Lakes

- Indicate the importance of protecting streams and lakes due to their overall benefits, such as encouraging riparian buffers to assist in flood control, removing pollutants from stormwater, providing food and habitat for wildlife, providing tree canopy to shade streams; and promoting scenic value, recreational opportunities, and economic development.

Flood Control

- Identify floodplain protection as important for any of the following to promote the health, safety, and welfare of residents: flood control, stream bank protection, pollutant filter, wildlife habitat, reduce sedimentation, shade watercourse or provide scenic value and recreational opportunities.

Habitat Preservation

- Identify high-quality natural areas.
- Develop a plan to protect high-priority areas for wildlife habitat protection.
- Encourage use of native vegetation to protect air, land and water quality; buffer noise and air pollution; preserve wildlife habitat; and preserve aesthetic value and community beauty.

Woodlands Preservation

- Update the Woodland and Wetland Map (page 7 of the Master Plan). Figure 6 of this policy review document notes forested areas, as determined through aerial photograph interpretation.
- Conduct a woodlands inventory and map the information.
- Recognize the importance of woodlands to protect air, water and soil quality; buffer air and noise pollution; moderate local climate and storm hazards; preserve wildlife habitat; and preserve aesthetic values and community beauty.

Wetlands Preservation

- Update the Woodland and Wetland Map (page 7 of the Master Plan). Figure 7 notes wetland areas, as determined through aerial photograph interpretation by the National Wetlands Inventory.
- Conduct a wetlands inventory and map the information.
- Recognize the importance of wetlands and their functions (water quality preservation, stormwater management, habitat, etc.).

Greenways and Green Infrastructure

- Strengthen the Open Space and Recreational Land Use Objectives to include greenways and green infrastructure. These may provide important natural transportation corridors for wildlife, and protect natural features.

Groundwater

- Develop wellhead protection program.
- Restrict high-risk land use activities in wellhead protection areas (see Figure 5).

F. OPEN SPACE AND RECREATIONAL LAND USE OBJECTIVES

Recreation Plan

- Gain MDNR approval of a Recreation Plan every five years.
- Identify priority lands for acquisition or protection for future recreational use in the Recreation Plan.

G. ROADS AND INFRASTRUCTURE OBJECTIVES

Impervious Surface Reduction

- Encourage minimizing hard surfaces in new construction and redevelopment projects to reduce runoff and improve infiltration.
- Promote the reduction of impervious surfaces for the protection of water quality, natural features, and open space.

Stormwater Management

- Assess future stormwater management needs and goals.
- Develop stormwater management policies that include quality and quantity of stormwater.
- Encourage stormwater management for the protection of health, safety, and welfare of community residents.
- Encourage policies that use BMPs to minimize, collect, and treat stormwater.

Sanitary Sewer Planning and Infrastructure

- Utilize the delineated Sewer Service Area to plan for growth and development.
- Identified and/or map designated county drainage system, including all points of discharge to natural systems.
- Encourage a program for identifying and eliminating illicit discharges.
- Encourage a program that labels outfall structures that discharge runoff to natural systems.

RESOURCE PROTECTION OVERLAY DISTRICT

Based on the policy review, an additional land use category of a RPOD could be added to increase the Township's ability to provide greater resource protection. Example language is provided below:

The Township is fortunate to have several lakes and high quality streams providing recreational and aesthetic value. By identifying and delineating these areas, the Township can utilize an overlay zone to protect these natural resources. Properties included within these geographical areas retain their underlying zoning classification, but are subject to additional requirements specified in the overlay district ordinance. The RPOD builds on established local preservation policies.

To create an overlay zone, characteristics of natural features and specific land uses can be identified and mapped, as described below.

Agriculture

Prime farmland soils and farmland of local importance soils are identified and mapped on Figure 3, with data available from the NRCS Soil Survey. The RPOD could incorporate the prime farmland soils areas or the prime agricultural areas noted on the Brady Township Land Use map (Figure 2).

Surface Water

Several waterways flow through the Township (Figure 4). A buffer can be delineated along these waterways to protect them from pollutants, including increased temperatures, in stormwater runoff.

Groundwater

Several wellhead protection areas have been defined within the Township (Figure 5). The geographic area of the defined wellhead protection area is typically based on the area of groundwater contribution to the wellhead based upon a 10-year time of travel. Zoning regulations may be placed directly on the wellhead protection areas to preserve and protect groundwater quality. These areas may be included in the RPOD.

Floodplains

The 100-year floodplain is identified in Figure 4.

Woodlands

Figure 6 notes land cover as determined by aerial photography. A more detailed inventory may be conducted to identify high-quality woodlands for inclusion in the RPOD.

Wetlands

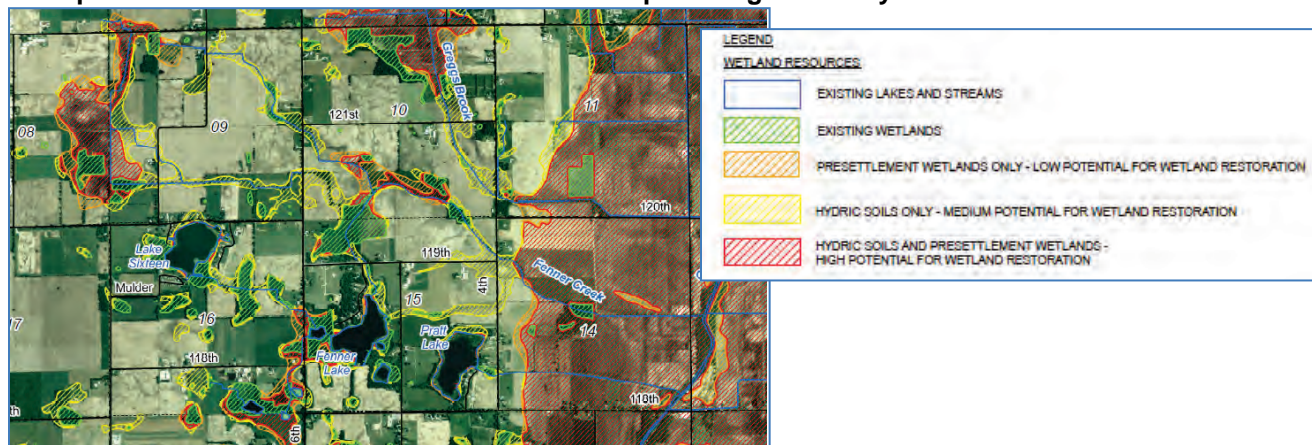
The presence of existing wetlands within the Township is noted on Figure 7, as determined by the National Wetlands Inventory. Potential wetland restoration areas are noted in Figure 8, as determined by the MDEQ. Existing wetlands and a naturally vegetated 150 foot buffer around the existing wetlands may be included in the RPOD. Areas identified as high potential for wetland restoration may also be included in the RPOD.

High-Priority Natural Lands

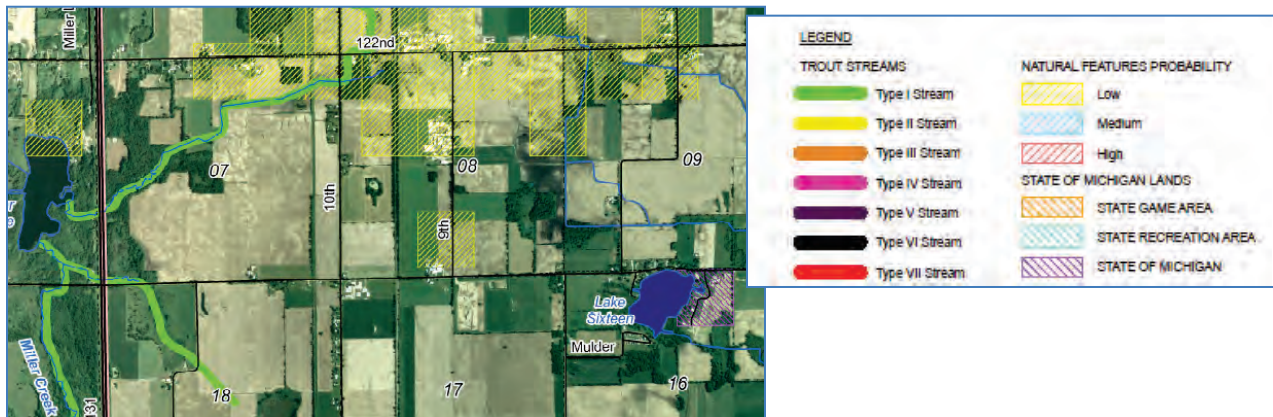
High-priority natural areas are mapped that are of special concern to the Township for protection and preservation. Figure 9 notes areas known to contain occurrences of threatened, endangered, and special concern species, as determined by the Michigan Natural Features Inventory. Conservation and recreation lands are also noted on the map. The RPOD may include the quarter-quarter sections identified as having 10 or greater occurrences of threatened, endangered, or special concern species and protected lands (with a 150-foot naturally vegetated buffer).

Following are two examples of mapped RPODs:

Example 1 - Wetland Resources in Martin Township in Allegan County



Example 2 - High-Priority Natural Lands in Martin Township, Allegan County, Michigan



ZONING ORDINANCE REVIEW

A review of the Brady Zoning Ordinances resulted in additional recommendations to consider for incorporation into the existing Zoning Ordinances to improve resource protection. The priority zoning concepts that provide the most benefit and protection of water resources include:

1. Create specifications for a RPOD to protect natural resources.
2. Requiring building setbacks from water bodies (streams, rivers, lakes, wetlands) with a native vegetative buffer.
3. Protecting wetlands through a Township wetlands ordinance.
4. Improving parking lot standards to reduce impervious surfaces (shared parking, parking space size, and minimum parking requirements).
5. Improving site plan review.
 - a. Identify natural features.
 - b. Review standards for protection.
 - c. Label BMPs on site plan.
6. Encouraging LID techniques and BMPs to reduce runoff and increase infiltration.
7. Coordinating with the County Soil Erosion and Sedimentation Control (SESC) program and require compliance with County SESC standards.
8. Coordinate with receipt of other required state and county permits.
9. Requiring new septic systems be located at least 150 feet from a waterway.
10. Encouraging the use of native species in landscaping to increase infiltration of stormwater and to discourage the use of invasive species.
11. Improve private road standards to reduce impervious surfaces.

PROPOSED ORDINANCE ADDITIONS AND MODIFICATIONS

The Southwest Michigan Planning Commission (SWMPC) has recognized and been promoting implementation of LID techniques to improve stormwater quality. LID is the most sensible approach when considering the benefit of clean water coupled with the fact that often these techniques can be less costly to the developer than conventional development (www.swpmc.org/lid.asp).

The following zoning ordinance modifications incorporate priority zoning and LID concepts. The modifications address deficiencies that were noted in the ordinance review checklist and are in alignment with Township priorities, as noted in the Master Plan. For example, many of the proposed additions address preserving the rural character and natural features present in the Township. In general, LID techniques that are commonly employed in heavily urban environments are not promoted.

The noted sections refer to appropriate sections of the Township zoning ordinance. ***Proposed additions are in bold italics.***

Section 1.2 - PURPOSE

; **and** to enhance the social and economic stability of Brady Township **and to protect water quality and maintain the natural functions of the Portage River and Little Portage Creek Watersheds.**

Section 3.1 DEFINITIONS

Low Impact Development (LID): an ecologically friendly approach to site development and stormwater management that aims to mitigate development impacts to land, water and air. LID emphasizes the integration of site design and planning techniques that conserve natural systems and hydrologic functions on a site by increasing infiltration and decreasing impervious surfaces.

Watershed: the area of land bordered by hills and ridges that catches rain and snow and drains or seeps into a common outlet, such as a marsh, stream, river, lake or groundwater. Just as creeks drain into rivers, watersheds are nearly always part of a larger watershed. For example, the Pigeon River Watershed is part of the St. Joseph River Watershed, which is part of the Lake Michigan Watershed.

Section 4.1 - ZONING DISTRICTS

RPO RESOURCE PROTECTION OVERLAY DISTRICT

ARTICLE VI "AG" AGRICULTURAL DISTRICT

Section 6.1 STATEMENT OF PURPOSE AND DESCRIPTION OF DISTRICT:

The regulations of this district are designed to stabilize and protect the essential characteristics of the district, ***including its natural features (such as wetlands and groundwater)***, without unduly restricting its use solely to that of an agricultural nature. **Large** non-agricultural uses, such as housing developments and subdivisions, should be discouraged from locating in this district, to minimize conflicts between agricultural production and non-agricultural uses, and also to preserve an agricultural land base for the production of a food supply essential to the health and welfare of the Township, and the county, state and nation.

ARTICLE XIII-B - "RPO" RESOURCE PROTECTION OVERLAY DISTRICT

Section 13.1-B – STATEMENT OF PURPOSE AND DESCRIPTION OF DISTRICT

This district is designed to preserve and enhance the recreational, ecological, and aesthetic values of the Township's natural resources for future generations by identifying specific areas in which special restrictions apply.

Section 13.2-B – PERMITTED USED

To be determined.

Section 13.3-B – SPECIAL EXCEPTION USES

To be determined.

Section 13.4-B – DENSITY, AREA, HEIGHT AND PLACEMENT REQUIREMENTS

In accordance with Article XIV of this Ordinance.

Section 13.5-B – OFF-STREET PARKING REQUIREMENTS

In accordance with Article XXI of this Ordinance.

Section 13.6-B – SITE PLAN REVIEW

In accordance with Article XIX of this Ordinance.

Section 13.7-B – ADDITIONAL REQUIREMENTS

Example from Green Oak Township, Michigan:

- ***Prohibiting cutting and/or filling for building on the floodplain and filling for buildings on the upland within 500 feet of the river’s edge where the groundwater table is within six feet of the surface.***
- ***Preserving a natural vegetation strip adjacent to the river on all private and publicly owned land.***
- ***Restricting placement of septic system drain fields to 150 feet from the river.***
- ***Prohibiting use of pesticides, herbicides, and fertilizers within the riparian zone.***

ARTICLE XIV – SCHEDULE OF LOT, YARD AND AREA REQUIREMENTS

Add Column for **RPO (Resource Protection Zone)**.

Add setbacks for each Principle Structure as determined by the Planning Commission.

Add Rows for **Natural Features**, with rows below for **Wetlands, Rivers and Streams, Lakes**, and add setback for each zoning district.

Example from Green Oak Township, Michigan:

- ***Minimum setback for new buildings of 125 feet from the ordinary high water mark.***

ARTICLE XV – WATERFRONT DEVELOPMENT AND USE REGULATIONS

- ***Prohibit cutting and/or filling for building on the floodplain and filling for buildings on the upland within 500 feet of the river’s edge where the groundwater table is within six feet of the surface.***
- ***Preserve a natural vegetation strip adjacent to the river on all private and publicly owned land.***
- ***Minimize use of pesticides, herbicides, and fertilizers within the riparian zone.***

Section 15.3.1 Septic systems shall not be constructed within **150** feet of any waterway or such greater distance as may be required by regulations enforced by the County or State.

ARTICLE XIX - SITE PLAN REVIEW

Section 19.4 FORMAL SITE PLAN APPLICATION CONTENT

Section 19.4.19. The location of all lakes, streams, wetlands, county drains, other waterways, **floodplains, floodways, woodlands, steep slopes, and natural drainage patterns on** or within 100 feet of the subject property.

Section 19.4.26 Coordination of site plan review with receipt of applicable county (drain, soil erosion) and state permits.

Section 19.4.27 *The location of all stormwater best management practices (rain gardens, swales, etc.).*

Section 19.4.28 *The location of all soil erosion and sedimentation control BMPs. Native or site suitable plants must be utilized in all vegetative stormwater BMPs (to help reduce stormwater velocities, filter runoff, provide additional opportunities for wildlife habitat and prevent invasive species from being introduced into the Township).*

Section 19.4.29 *Review of the site plan by the County Drain Commissioner if the site discharges to a County Drain.*

Section 19.6.2 Criteria for Site Plan Review:

The site plan shall be reviewed and approved by the Planning Commission upon a finding that:

e. The natural features of the landscape, such as ponds, streams, hills, wooded areas, ***floodplains, floodways, wetlands, steep slopes, and natural drainage patterns*** have been retained ***to the fullest extent possible and site disturbance is minimized as much as possible. Natural features should also be maintained*** to afford a barrier or buffer between adjoining properties being put to different use or where they assist in preserving the general appearance of the area. **Grade** changes ***should be*** in keeping with the general appearance of neighboring developed areas and not detrimental to erosion control.

k. The site plan review is coordinated with receipt of applicable county (drain, soil erosion) and state permits.

l. The site plan is reviewed by the County Drain Commissioner if the site discharges to a County Drain.

Section 19.9-A.2.a Standards and Requirements for Private Road Within a PUD:

(1) The private road shall be constructed with a deeded and recorded easement or right-of-way width of **no more than 45** feet for its entire length.

ARTICLE XXI – PARKING AND LOADING SPACES

- ***Allow for flexibility in parking requirements to reduce impervious surfaces as much as possible and encourage shared parking.***
- ***Require some percentage of large parking lots to have landscaping to break up the impervious surfaces.***
- ***Require stormwater treatment for parking lot runoff in landscaped areas - encourage the use of parking lot islands as stormwater infiltration areas.***
- ***Require 30% of parking area to have spaces with smaller dimension for compact cars (9 feet wide and 18 feet long or less).***
- ***Require maximum parking spaces instead of minimum number of spaces.***
- ***Allow for driveways or overflow parking areas to be pervious or porous pavements.***

Section 21.10 TABLE OF OFF-STREET REQUIREMENTS

5. RPO (Resource Protection Zone)

Add list of approved uses and note number of minimum **and maximum** parking spaces per unit of measure.

OR

Discuss parking space requirements for the RPO in Article 21.9-B.

Section 103.5 TENTATIVE APPROVAL OF PRELIMINARY PLAT (STEP 1 APPROVAL)

A. **Submission Requirements.** The proposed preliminary plat shall be prepared by a land surveyor, and shall show at least the following:

7. The general location and size of any floodplain, ***floodways***, wetlands, ***woodlands, and natural drainage patterns on or within 100 feet of*** the proposed plat.

NEW ARTICLE - PRIVATE ROAD STANDARDS AND PROCEDURES OR ADD TO SECTIONS 11.9 AND 19.9A

- ***Where curbs are deemed necessary to protect the roadway edge, allow the use of perforated curbs (that allow runoff to flow into swales) or invisible curbs (flush with the road surface).***
- ***Minimize the required radii for cul-de-sacs. A radius of 35 feet is optimal, depending on emergency vehicles.***
- ***Allow the creation of landscaped islands and bio-retention cells with cul-de-sacs.***
- ***Permit the use of one-way loop streets to eliminate turn-arounds.***

NEW ARTICLE – WETLAND PROTECTION

A sample wetland protection ordinance may be found on the MDEQ’s website:

http://www.michigan.gov/documents/deq/lwm-wetlands-SampleDEQWetlandOrdinance_261730_7.pdf

IMPLEMENTATION

The WMP outlines recommendations to meet the goals and objectives identified by the Steering Committee. Land use planning was determined to be an important part of the sustainability of the watershed project since future growth is expected to occur around the urban and recreational areas. Several recommendations contained in this policy review could involve changes that may not be fully within the control of the Township. Some might require state approval or legislative action. This policy review is one component of the complex issue of land use planning, but will assist the Township in identifying the next step in the process.

Implementation of the recommendations of this policy review document includes the following tasks:

1. Update The Master Plan

Use information contained in this report to update the Master Plan with goals and objectives that expand natural resource protection within the Township.

2. Update Zoning Ordinances

Use information contained in this report to update zoning ordinance language for greater resource protection.

3. Site Design Standards

The WMP's recommendations recognize the importance of flexibility in standards to allow and encourage innovation in land use planning and design. The Township should continue to promote this concept and consider the results of this policy review to assist in that effort.

4. Plan For Natural Areas

Natural areas are an important feature of the Township. A natural features inventory should be conducted to assess those resources. The inventory could be the basis for the Resource Protection Overlay Zone.

5. Update The Capital Improvement Program

Update the Capital Improvement Program to include policies related to natural resource protection and stormwater management. Include opportunities for incorporating green infrastructure into identified projects.

6. Develop A Community Recreation Plan

Develop a Recreation Plan which includes a process for identifying and acquiring open space to increase recreational opportunities. The plan may contain greenways and green infrastructure. Obtain approval of the plan from the MDNR. The plan should be reviewed annually and updated every five years to maintain approval by the MDNR and eligibility for various grant programs.

7. Obtain Funding Sources

Investigate funding options for conducting additional studies and projects to assist the Township in implementing the recommendations in this report.

CONCLUSIONS

The recommendations listed in this report would improve plans and policies in the Township to better protect water quality and natural resources. Introducing new concepts to local officials requires substantial time and effort spent on presenting information to gain a level of comfort with the new techniques. The policy review spreadsheet (Appendix 1) can continue to guide future work for both an updated Master Plan and zoning ordinances. This document and the policy review spreadsheet should be used as a review tool and the language developed for the Township could be applicable to other communities within the county.

The results of this policy review reveal specific areas of the existing development rules that are generally good in their efforts of watershed protection and other areas that could be enhanced for greater resource protection. Assessing the current development rules and the identification of the impediments to innovative site design will assist the community to create and implement better development designs.

REFERENCES AND LAND USE PLANNING RESOURCES

Ardizzone, Katherine A. and Mark A. Wyckoff, FAICP. *FILLING THE GAPS: Environmental Protection Options for Local Governments*, 2nd Ed. Michigan Department of Natural Resources and Environment, Coastal Management Program with financial assistance from the National Oceanic and Atmospheric Administration, authorized by the Coastal Zone Management Act of 1972. December 2010.

Center for Watershed Protection, 1998. *Better Site Design: A Handbook for Changing Development Rules in Your Community*. Prepared for the Site Planning Roundtable, Ellicott City, MD.

Center for Watershed Protection, 2000. *Recommended Model Development Principles for Frederick County, MD*. Ellicott City, MD.

Galli, J. 1991. *Thermal Impacts Associated with Urbanization and Stormwater Management Best Management Practices*. Metropolitan Washington Council of Governments. Maryland Department of Environment. Washington, D.C. 188pp.

Heraty, M. 1993. *Riparian Buffer Programs: A Guide to Developing and Implementing a Riparian Buffer Program as an Urban Best Management Practice*. Metropolitan Washington Council of Governments, U.S. Environmental Protection Agency Office of Wetlands, Oceans and Watersheds. Washington, DC.

Kalamazoo Conservation District, 2006. *Portage River Watershed Management Plan, Kalamazoo and St. Joseph Counties, Michigan*.

Schueler, Thomas R. 1995. "The Importance of Imperviousness." *Watershed Protection Techniques*. 1 (3): 100-111.

Southeast Michigan Council of Governments Information Services. 2002. *Opportunities for Water Resource Protection in Local Plans, Ordinances, and Programs: A Workbook for Local Governments*. SEMCOG, Detroit, Michigan.

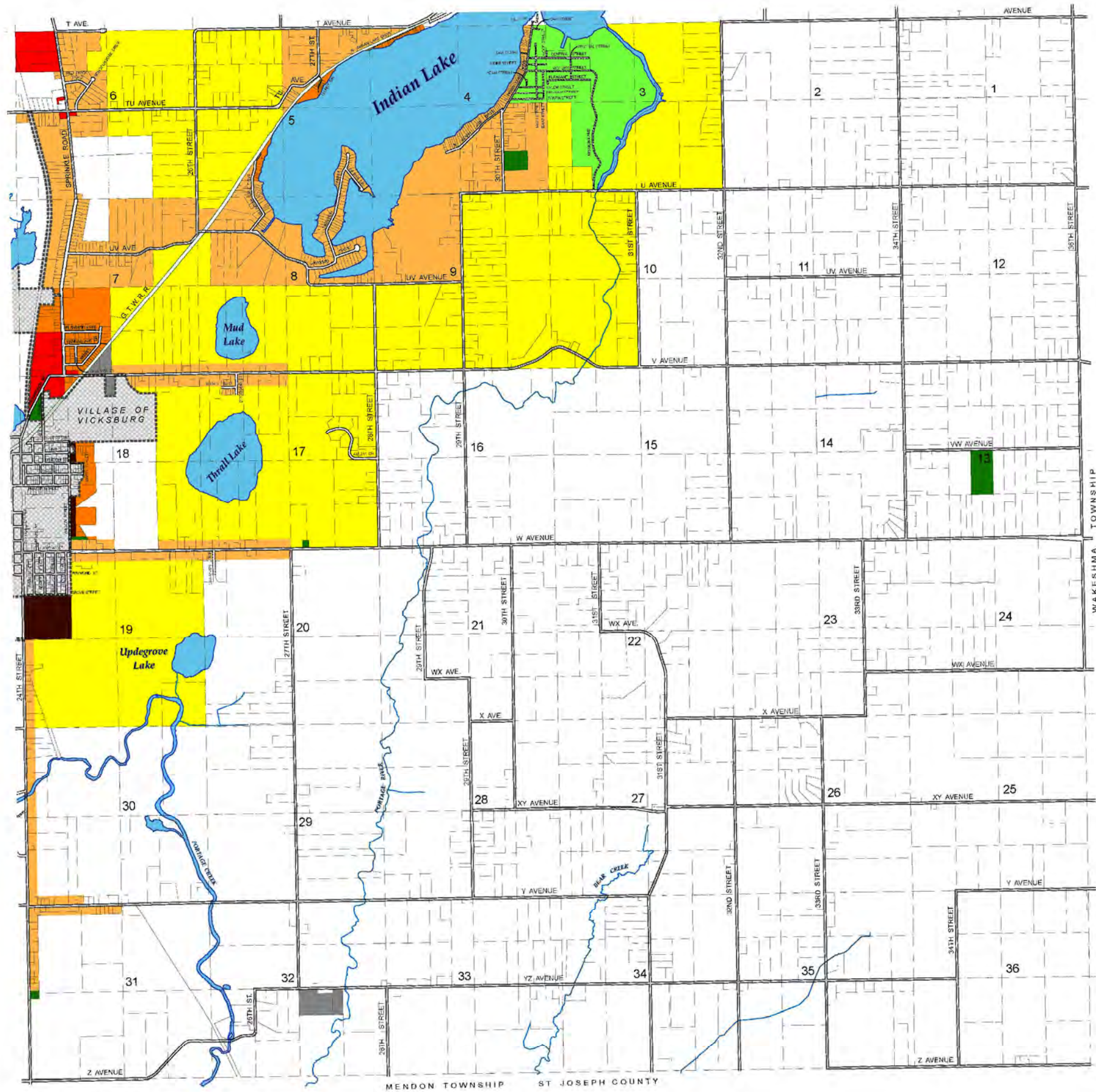
Southeast Michigan Council of Governments. 2003. *Opportunities Land Use Tools and Techniques: A Handbook for Local Communities*. SEMCOG, Detroit, Michigan.

Southeast Michigan Council of Governments Information Services. 2008. *Low Impact Development Manual for Michigan: A Design Guide for Implementors and Reviewers*. SEMCOG, Detroit, Michigan.

Smart Growth Network. 2002. "This is Smart Growth." International City/County Management Association and U.S. Environmental Protection Agency, Washington, D.C.

(<http://www.smartgrowth.org/about/principles/Default.asp?res=1280>)

Figures

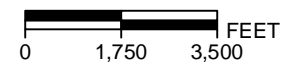


Legend

- AG Agricultural District
- RR Single Family Rural Residential District
- R-1 Single Family Residential District
- R-2 Single Family Residential District
- R-3 Two Family and Multiple Family Residential District
- R-4 Mobile Home Park Residential District
- R-5 Multiple Use Development Residential District
- C-1 General Commercial District
- I-1 Light Industrial District
- P/RU Public/Recreational Use District



**BRADY TOWNSHIP
ZONING**



Data Sources: Brady Township,
December 2012



engineers
scientist
architects
constructors

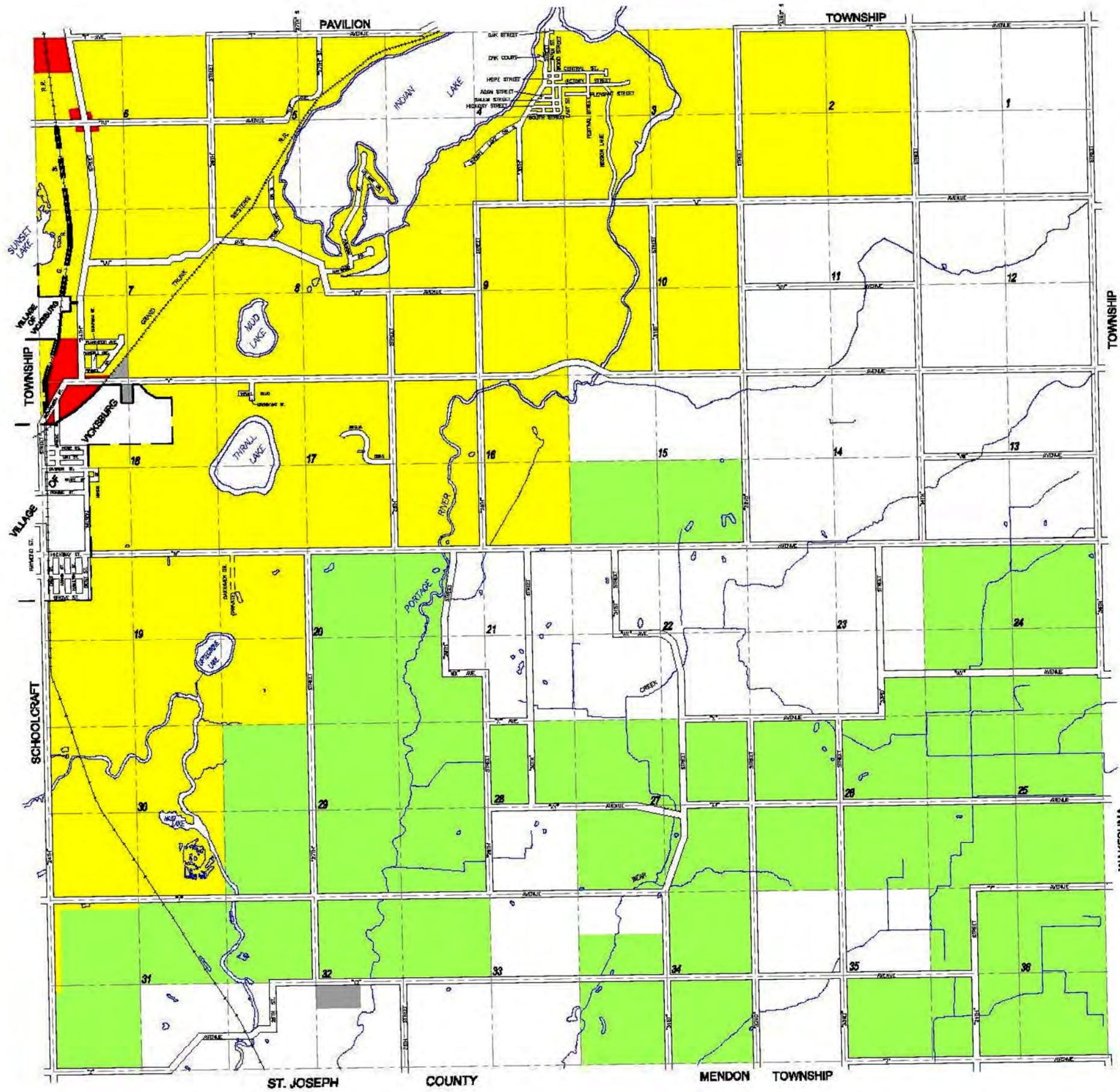
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Brady Township
Kalamazoo County, Michigan
Portage River Watershed Planning Project
MDEQ Tracking Code #2012-0017

PROJECT NO.
G130188

FIGURE NO.
1



- Legend**
- GENERAL AGRICULTURAL
 - PRIME AGRICULTURAL
 - RESIDENTIAL
 - COMMERCIAL
 - INDUSTRIAL

**BRADY TOWNSHIP
LAND USE**

NORTH

0 1,750 3,500 FEET

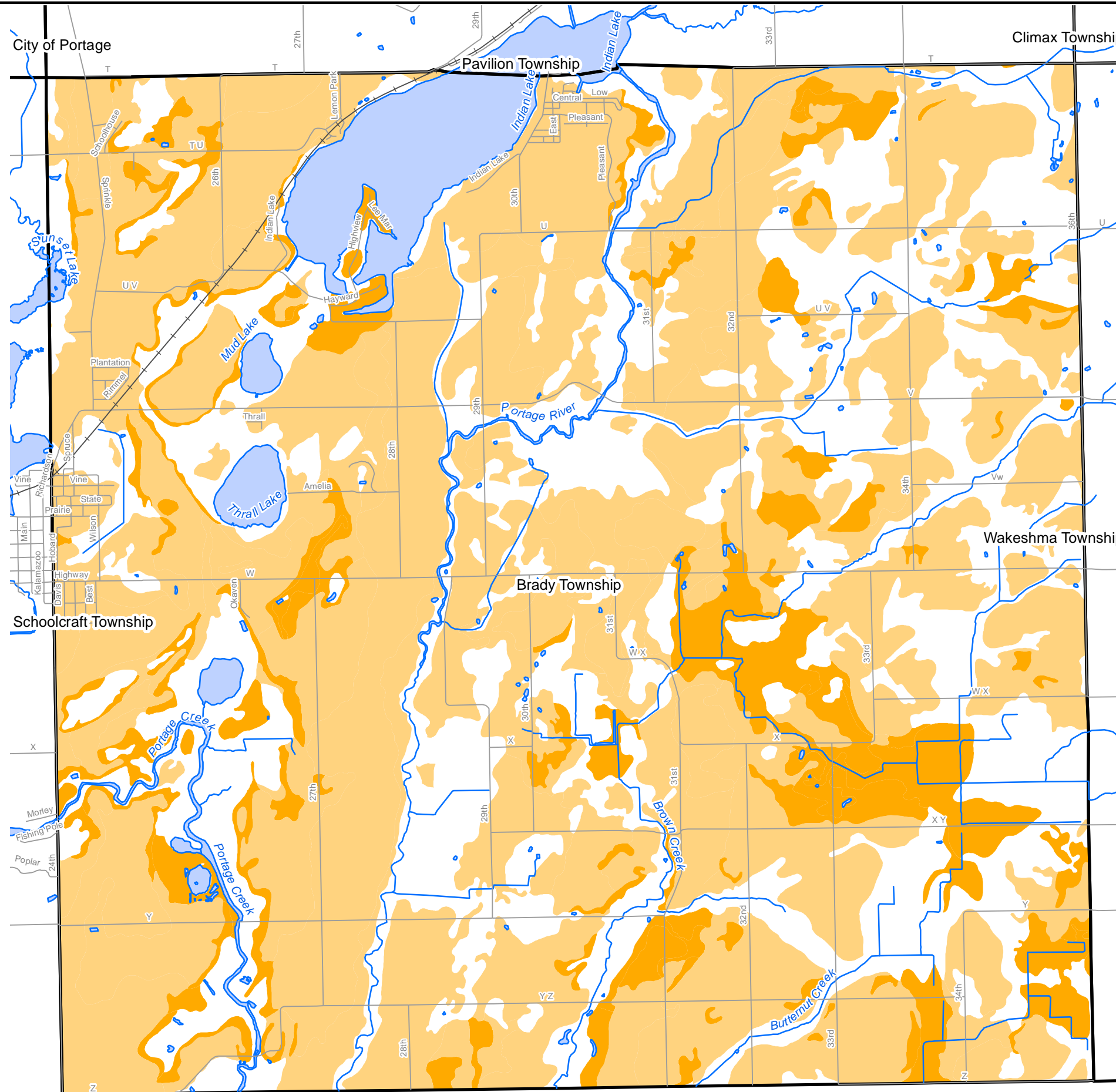
Data Sources: Brady Township, August 2009

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MDEQ Tracking Code #2012-0017

PROJECT NO.
G130188
FIGURE NO.
2
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Data Sources: Michigan Geographic Framework v13a. USDA NRCS Soil Survey - Kalamazoo County Prime Farmland.

Legend

- All Prime Farmland Soils
- Farmland of Local Importance Soils

**BRADY TOWNSHIP
PRIME FARMLAND**

NORTH



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architects
constructors

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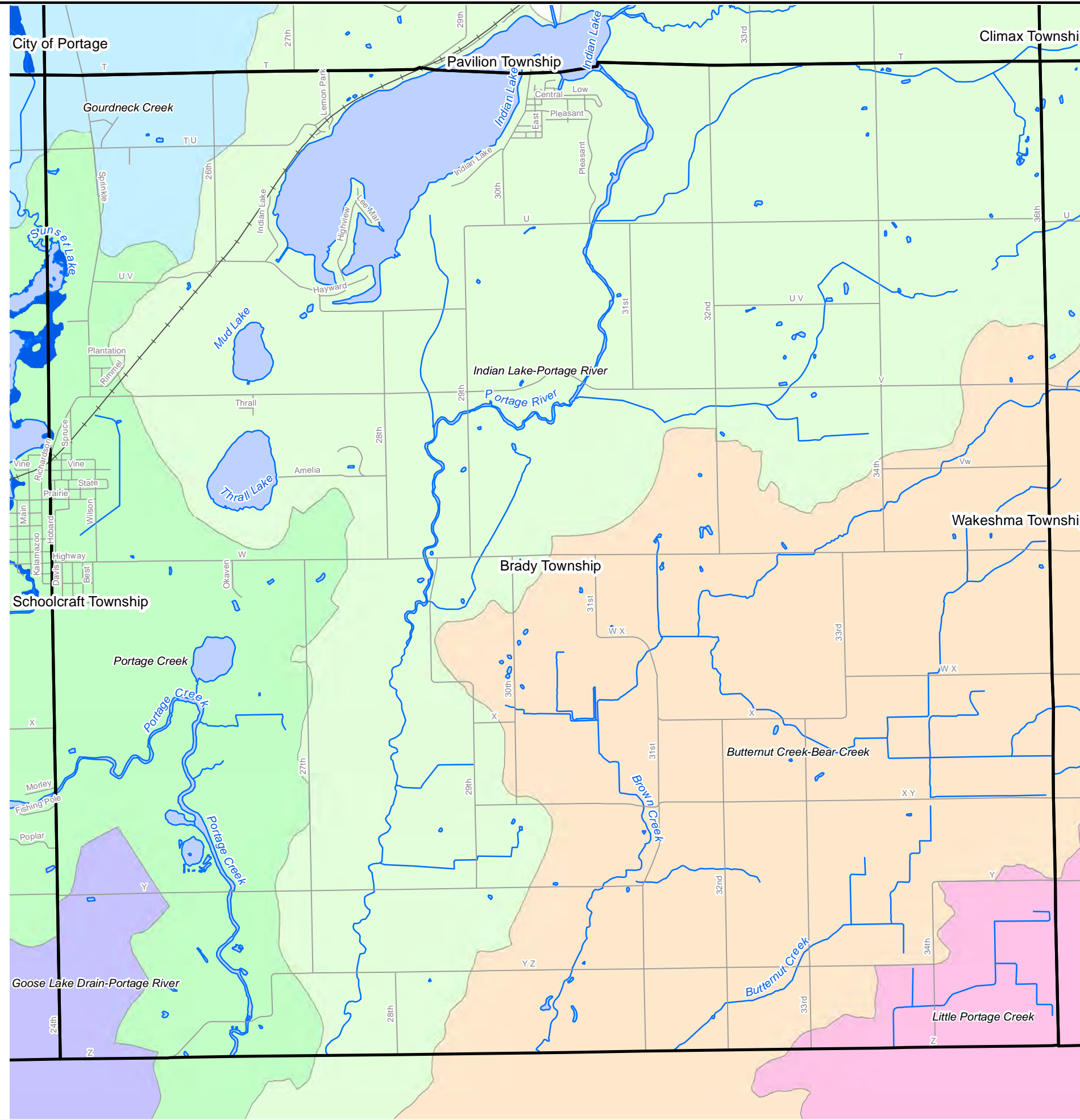
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PROJECT NO.
G130188

FIGURE NO.
3

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Data Sources: Michigan Geographic Framework v13a. EPA Watersheds HUC12-Kalamazoo County. FEMA 100 Year Flood Zones.

Legend

- FEMA 100 year Flood Zones
- Butternut Creek-Bear Creek
- Goose Lake Drain-Portage River
- Gourneck Creek
- Indian Lake-Portage River
- Little Portage Creek
- Portage Creek

**BRADY TOWNSHIP
STREAMS AND
SUBWATERSHEDS**

NORTH FEET

0 1,750 3,500

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engineers
scientist
architects
constructors

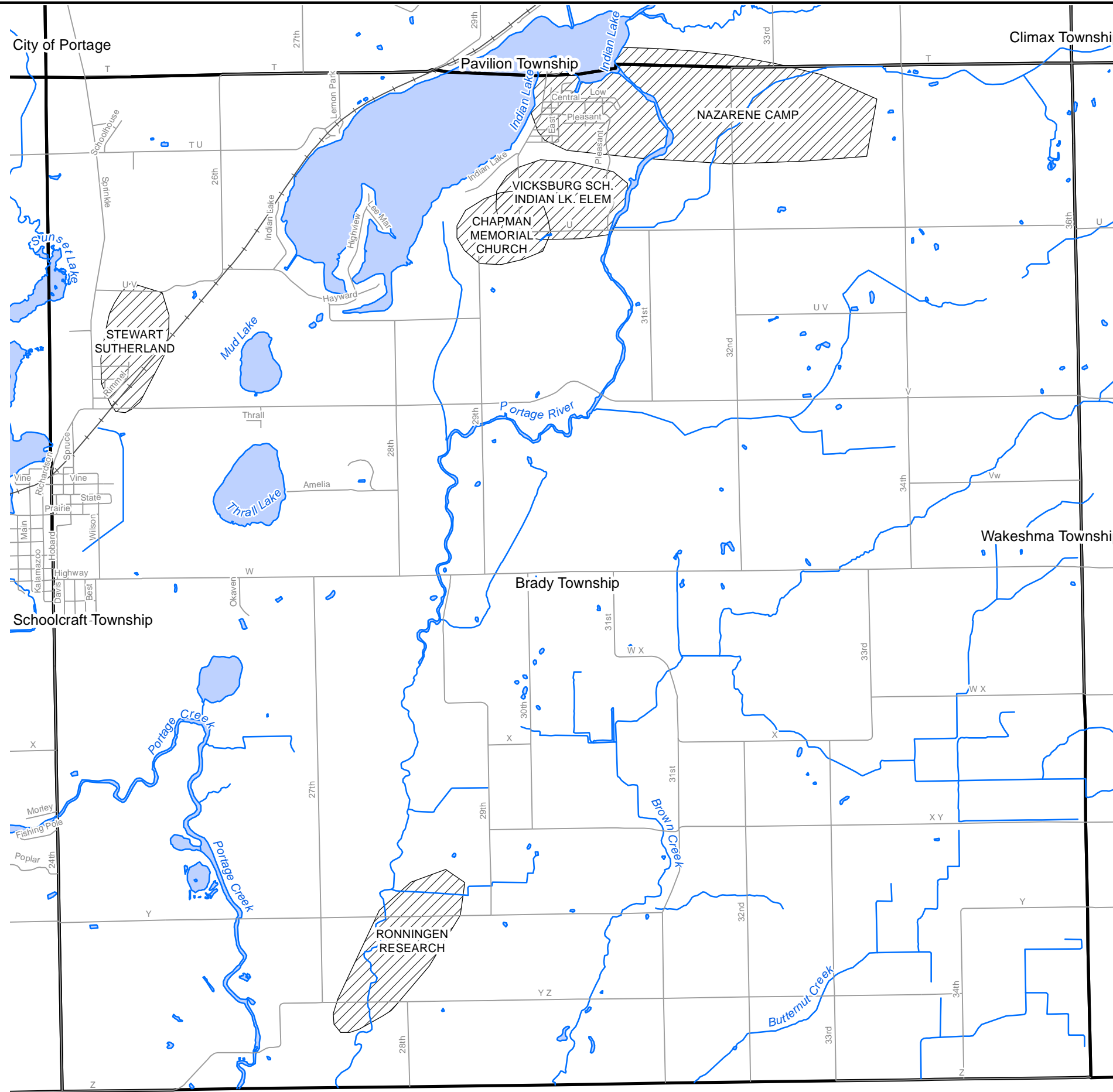
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PROJECT NO.
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FIGURE NO.
4

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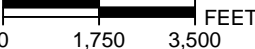
Data Sources: Michigan Geographic Framework v13a. Michigan DEQ Wellhead Protection Area.

Legend

 Wellhead Protection Area

WELLHEAD PROTECTION AREAS WITHIN BRADY TOWNSHIP

 NORTH

 FEET

fish

engineers
scientist
architects
constructors

fishbeck, thompson,
carr & huber, inc.

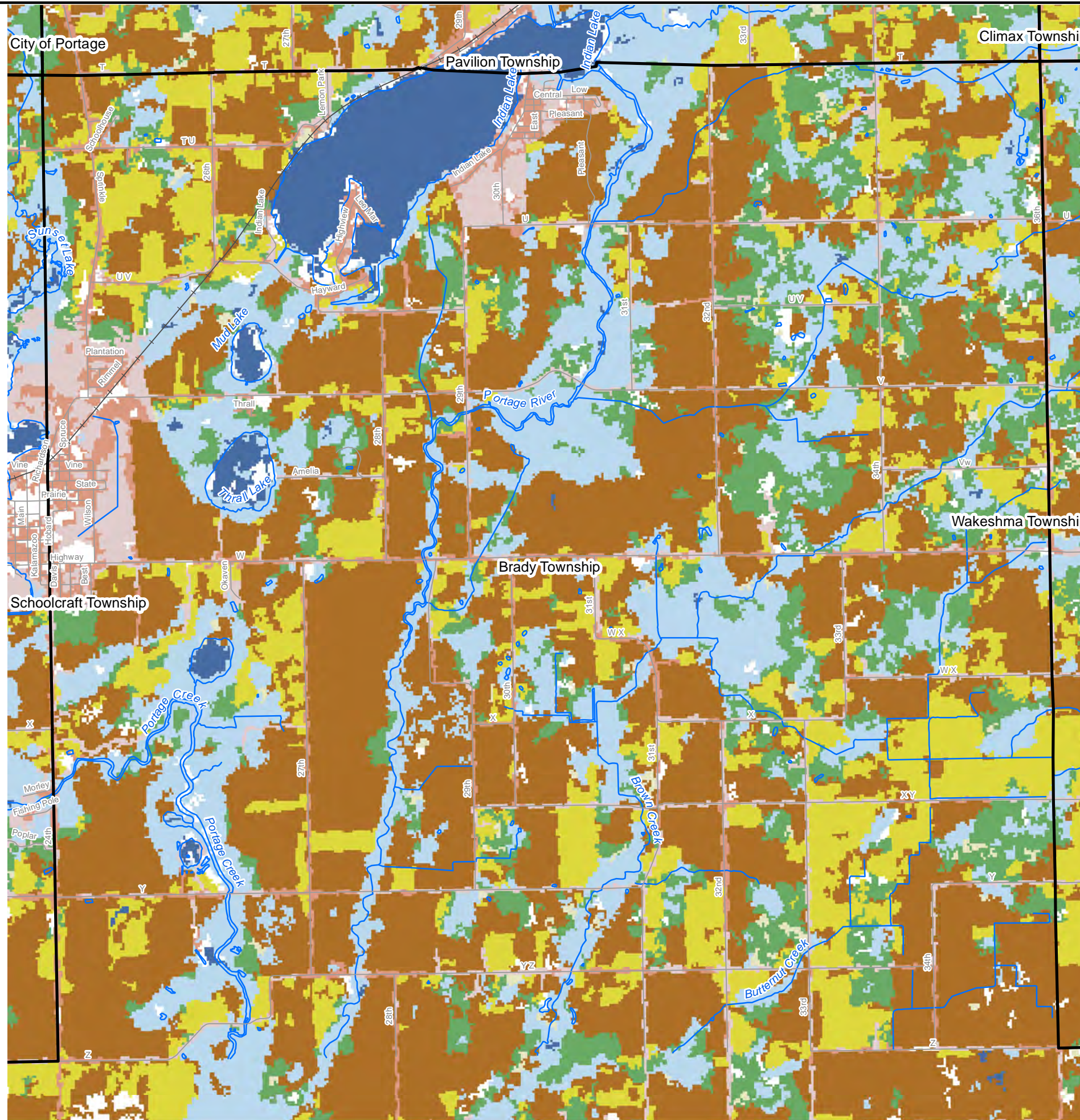
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Kalamazoo County, Michigan
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MDEQ Tracking Code #2012-0017

PROJECT NO.
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FIGURE NO.
5

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Data Sources: Michigan Geographic Framework v13a. USDA National Land Cover Dataset 2006.

Legend

Land Cover 2006

- Cultivated Crops
- Deciduous Forest
- Developed, Low Intensity
- Developed, Open Space
- Hay/Pasture
- Herbaceous
- Open Water
- Woody Wetlands

**BRADY TOWNSHIP
LAND COVER**

NORTH

0 1,750 3,500 FEET

ftc&h

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scientist
architects
constructors

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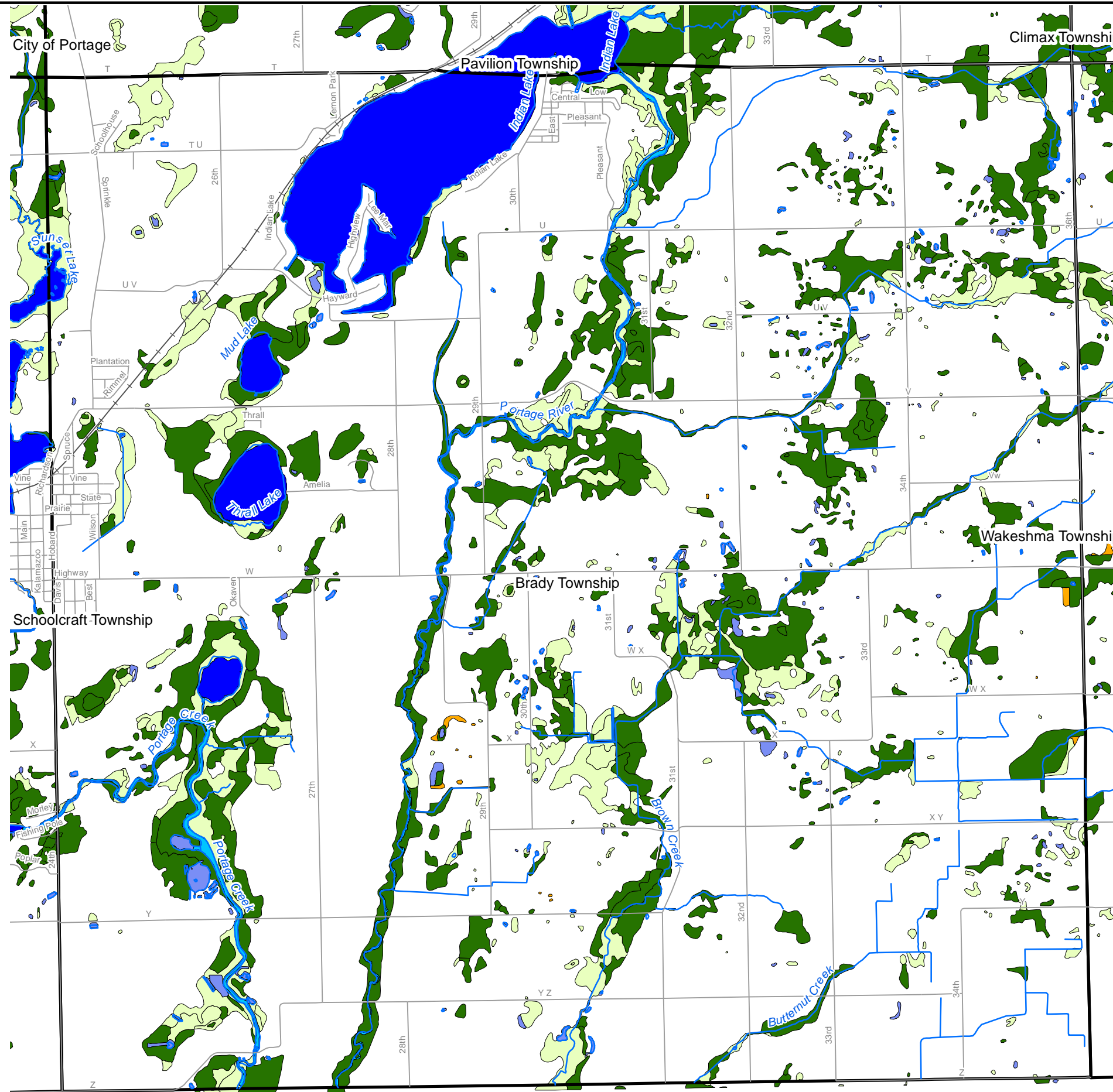
Brady Township
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Portage River Watershed Planning Project
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PROJECT NO.
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FIGURE NO.
6

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Legend

- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Freshwater Emergent Wetland
- Other
- Riverine

**BRADY TOWNSHIP
EXISTING WETLANDS**

NORTH

Data Sources: Michigan Geographic Framework v13a. US Fish & Wildlife National Wetlands Inventory 24k.



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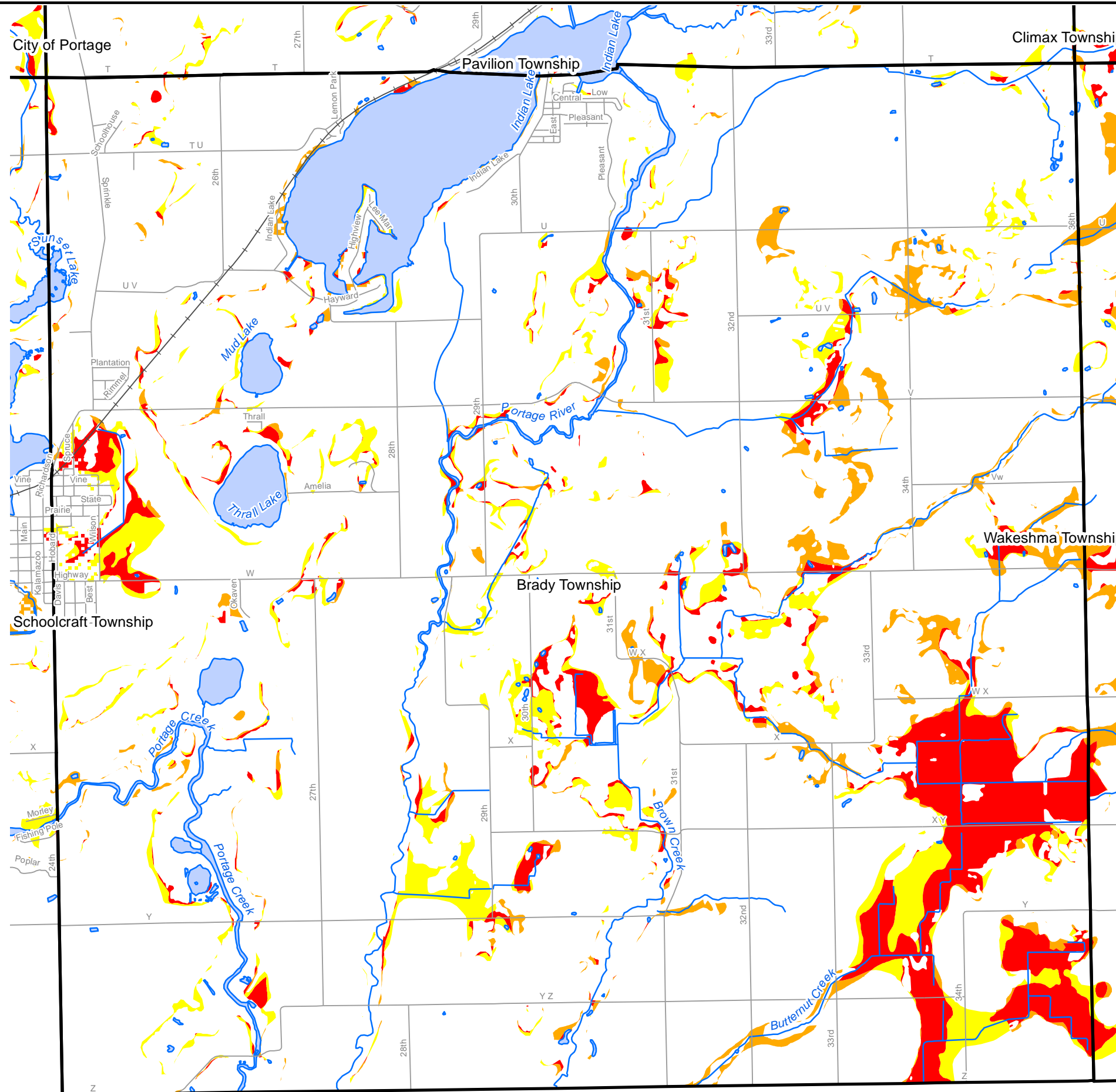
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Portage River Watershed Planning Project
MDEQ Tracking Code #2012-0017

PROJECT NO.
G130188

FIGURE NO.
7



Data Sources: Michigan Geographic Framework v13a. EPA Watersheds HUC12-Kalamazoo County.

Legend

Potential Wetland Restoration Areas

- High Potential: Hydric Soil and Presettlement Wetland Overlay
- Medium Potential: Only Hydric Soils
- Low Potential: Only Presettlement Wetlands

**BRADY TOWNSHIP
POTENTIAL WETLAND
RESTORATION AREAS**

NORTH FEET

0 1,750 3,500



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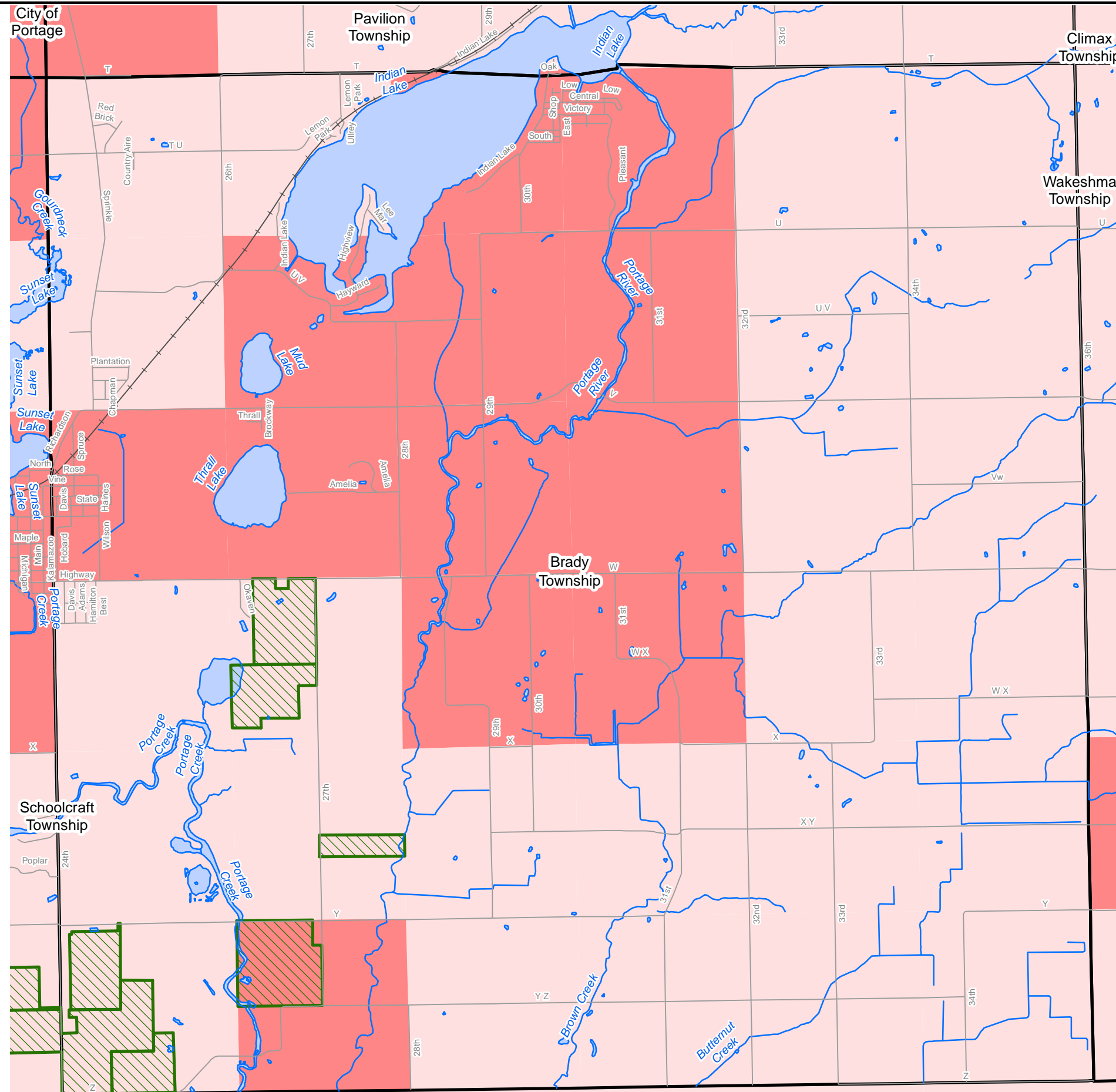
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PROJECT NO.
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FIGURE NO.
8

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Data Sources: Michigan Natural Features Inventory, Biological Rarity Index.
 CARL, Ducks Unlimited, 2013.

Legend

Conservation and Recreation Lands

Number of Threatened, Endangered or Special Concern Species per Quarter-Quarter Section

0.01 - 10

10 - 25

BIOLOGICAL RARITY AREAS WITHIN BRADY TOWNSHIP

NORTH

FEET

0 1,750 3,500

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PROJECT NO.
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FIGURE NO.
9

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Appendix 1

Document Review for Water Resource Protection

BradyTownship - Kalamazoo County, Michigan

June 2014

| Criteria | Yes/ No | Comments |
|---|---------|--|
| | | List page number in Master Plan and list the section of the Zoning Ordinance |
| Watershed Issues | | |
| I. Watershed Activities | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan identify the watershed(s) in which the community is located? | Yes | MP, p 4-5 |
| 2. Does the Master Plan call for protection of watershed resources in order to protect the health, safety and welfare of residents? | No | |
| Stream Corridors and Flood Plains | | |
| I. Stream Corridors | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan indicate the importance of any of the following: riparian buffers to assist in flood control, protect the streambank from erosion, remove pollutants from storm water runoff, provide food and habitat for wildlife, prevent sediment from settling in the water course, provides tree canopy to shade streams, and promote desirable aquatic organisms, scenic value and recreational opportunities? | No | |
| 2. Does the Master Plan state that protection of stream corridors is important in promoting the health, safety and welfare of residents through flood control, and water quality and riparian corridor preservation? | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Are regulations coordinated with regulations protecting County drains? | NA | ZO does not contain regulations that specifically target county drains. |
| 2. Does the community require naturally-vegetated buffers along drainage way corridors? | No | |
| a. What is the width of the corridor? | NA | |
| 3. Does the community restrict development adjacent to stream corridors to those which do any of the following: offer no danger of topographical disturbance to the corridor, degradation to water quality, increased runoff, sedimentation, stream channel alterations, or degradation of dependent, non-hydrologic resources (i.e. flora and fauna)? | | ZO contains set development setbacks from water bodies and wetlands; setbacks do not vary depending on landscape context. |
| 4. Are waterbody setbacks in place of at least 30-50 feet? | Yes | ZO 113 (amendment to ZO 15.3): No building construction within 100 feet of a waterway or within 100 feet of any slope greater than 6% leading to a watercourse or within 100 feet of a regulated wetland (some exceptions are listed). There are no exceptions for the waterway setback. |
| | | |

Document Review for Water Resource Protection

BradyTownship - Kalamazoo County, Michigan

June 2014

| Criteria | Yes/ No | Comments |
|--|----------------|---|
| II. Flood Control | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan identify floodplain protection as important for any of the following to promote the health, safety and welfare of residents: flood control, stream bank protection, pollutant filter, wildlife habitat, reduce sedimentation, shade watercourse and provide scenic value and recreational opportunities? | No | The Water Resource Objectives and Policies on p. 19 could be strengthened by adding floodplain protection language. ZO 103.5.D.3.c: Lands subject to flooding or determined to be uninhabitable shall not be platted for development purposes. They must be set aside within a subdivision as parkland or open space. |
| 2. Does the community call for coordination of their efforts to protect the floodplain with adjoining communities and the County? | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the community participate in the National Flood Insurance Program? | No | The only FEMA 100 year flood zone located in the Township is located at its northwestern edge along a portion of Portage Creek (see Figure 2). |
| 2. If yes, does the community have an overlay zone or other ordinance language that protects floodplains from undesirable development? | Yes | ZO 103.7.D.4: Development within floodplains is restricted as provided by Section 194 of Michigan's Land Division Act. Restrictions shall be recorded in the plat by the Register of Deeds. |
| 3. Do the community's floodplain regulations address the following: | | |
| a. Provide for assessing the impacts of flood management projects on water quality? | NA | |
| b. Provide for adding BMP's to existing projects? | NA | |
| 4. Is there a variable width, naturally vegetated buffer that encompasses the 100 year floodplain area? | NA | |
| Impervious Surface Reduction | | |
| I. Reducing Impervious Surfaces | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan call for minimizing impervious surfaces in new construction and redevelopment projects to reduce the amount of runoff and improve infiltration? | No | MP indicates the Township is primarily rural. Therefore, this may not be a high priority. |
| 2. Is the Master Plan goal of reducing impervious surface tied to protecting the health, safety and welfare of residents through protection of water quality, natural features and open space? | NA | |
| II. Parking Lots/Driveways/Sidewalks | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Does the community have flexibility in the parking ordinance to reduce the number of spaces constructed if warranted by the proposed development? | No | |
| 2. Is some portion of a parking lot required to be planted with trees/ vegetation within the parking lot paving? | No | |
| 3. Does the community require stormwater treatment for parking lot runoff in landscaping areas? | No | |

Document Review for Water Resource Protection

BradyTownship - Kalamazoo County, Michigan

June 2014

| Criteria | Yes/ No | Comments |
|--|----------------|--|
| B. Design Standards: | | |
| 1. Are shared parking facilities encouraged? | No | ZO 21.4 requires the number of parking spaces in a shared facility to equal the number required for the individual uses. |
| 2. Is 30% of the parking area required to have spaces with smaller dimensions for compact cars? (9ft-width and 18ft - length or less)? | No | This is not addressed in ZO 21. |
| 3. Is there a maximum on parking spaces size (9ft-width and 18ft - length or less)? | No | ZO 21.4 requires a minimum size of 9 feet wide and 180 SF area. |
| 4. Are developers encouraged to use parking lot islands as stormwater infiltration areas? | No | This is not addressed in ZO 21. |
| 5. Are driveways or overflow parking areas allowed to be pervious or porous pavements? | | This is not addressed in ZO 21. |
| 6. Are maximum spaces given instead of minimum (for office bldgs - 3spaces/1000ft ² ; shopping - 4.5 spaces/1000ft ² ; residential - 2 spaces/single family home)? | No | Minimum spaces required per land use is summarized in ZO 21.10. |
| 7. Are sidewalks only allowed to be on one side of the road? | | This is not addressed in the ZO. |
| 8. Are sidewalks eliminated if an alternative path is provided? | | This is not addressed in the ZO. |
| III. Street and Access | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Does the community have jurisdiction over roads or allow private roads? | Yes | Most roads are under the jurisdiction of the Kalamazoo County Road Commission. Areas zoned R-5, subdivisions and PUDs may have private roads. |
| 2. If yes, do regulations pertaining to roads include the following standards: | | |
| a. Are streets to be designed with the minimum required pavement width needed to support travel lanes, emergency, maintenance and service vehicles (18-22 ft for low traffic roads)? | Yes | ZO 11.9-A.D.1.b.6 and ZO 19.9-A.2.a(4): two-way road will be 24 feet wide if it has curb and gutter, or 22 wide with 4 foot wide shoulders (in PUD) or 3 foot wide shoulders (in R-5). One-way road will be 14-foot wide with curb and gutter, or 12 feet wide with 4-foot shoulders. KCRC: 20 foot minimum width, with minimum 4 foot shoulder. |
| b. Are right-of-way widths minimized to avoid mass clearing and grading (less than 45 feet)? | No | ZO 19.9-A.2.a(1): ROW width must be at least 66 feet within a PUD. ZO 11.9-A.D.1.b.1: In R-5 zone, ROW width must be at least 50 feet for 2-way street, 36 for one-way street. KCRC: Right-of-way widths vary from 66 to 120 feet, depending upon type of road. |
| c. Are there required landscaped areas in cul-de-sacs? | No | |
| d. Are the minimum radii of cul-de-sacs no more than 35 feet? | No | ZO 11.9-A.D.1.b.7 and ZO 19.9-A.2.a(5): Minimum diameter is 50 feet. KCRC: Minimum pavement radius is 50 feet and ROW radius is 70 feet. |
| e. Are hammerheads allowed instead of cul-de-sacs? | Yes | ZO 11.9-A.D.1.b.7 and ZO 19.9-A.2.a(5): an alternative to the cul-de-sac is allowed if it allows turn-around for all vehicles that may use the road. KCRC: this is not addressed in the KCRC Construction Guidelines. |
| f. Are the use of open swales allowed instead of curb and gutter? | Yes | ZO 11.9-A.D.1.b.4 and ZO 19.9-A.2.a(2): sloping and ditches may be used if they promote effective storm water management. KCRC: this is not addressed in the KCRC Construction Guidelines. |
| g. If curb and gutter is used, are perforated curbs (allows water to flow into swales) or invisible curbs (flush with road surface) required? | | This is not addressed in the ZO. KCRC: this is not addressed in the KCRC Construction Guidelines. |

Document Review for Water Resource Protection

BradyTownship - Kalamazoo County, Michigan

June 2014

| Criteria | Yes/ No | Comments |
|--|---------|--|
| IV. Lot Setbacks / Lot Width / Lot Coverage | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance allow for the relaxation of side yard setbacks and narrower frontages to reduce the total road length (and overall site imperviousness)? | No | |
| 2. Does the Zoning Ordinance allow for the relaxation of front yard setbacks to reduce driveway lengths (and overall site imperviousness)? | No | |
| 3. Does the Zoning Ordinance allow the location of bioretention, rain gardens, filter strips and swales in required setback areas and common areas? | | This is not addressed in the ZO. |
| 4. In rural, low density areas are there limits on impervious lot coverage (15% maximum includes all impervious surfaces not just the house)? | Yes | Only maximum total building coverage is addressed in ZO 14: 10% in Zones AG and RR. |
| 5. Are there limits on the extent of lawn area on residential lots in rural areas? | No | |
| The Development Review Process | | |
| I. Site Plan Review | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Is the review process coordinated with the receipt of applicable County and State permits? | Yes | ZO19.6.2: Criteria for site plan approval includes the plan must comply with all applicable laws, rules and regulations (g); hazardous materials , and contaminated storm water and washwater must be handled in accordance with state and governmental regulations and permits (i); floor drains must be approved by the responsible governmental agency for connection to a holding tank, septic system, public sewer or groundwater discharge approved by State of Michigan (j). ZO1036.A requires subdivision plats to get approval from the County Road Commission, Drain Commission, MDOT, MDEQ, and County Health Department, as appropriate. ZO 103.6.A.3: A requirement of final plat approval for a subdivision is that the Health Department provides a letter stating the proposed private water system and septic system are <u>acceptable and approvable</u> |
| 2. Does the Zoning Ordinance require that developers preserve natural features, such as lakes, ponds, streams, floodplains and floodways, wetlands, woodlands, steep slopes, and natural drainage patterns to the fullest extent possible? | Yes | ZO19.6.2.e: Natural features should be retained as practicable. ZO103.5.D.3.b and c: existing features should be preserved as possible in subdivisions and lands subject to flooding shall not be platted for development but left as open space. |
| 3. Are BMP's required to be labeled and shown, in detail, on the site plan so that they can be reviewed for effectiveness during the site plan review process? | No | |
| 4. Is a Soil Erosion and Sedimentation Control Plan required as part of the site plan review process? | No | The SESC plan is not listed as required content in the site plan application. |
| 5. Are developers required to show all natural features on site plans, such as lakes, ponds, streams, rivers, floodplains and floodways, wetlands, woodlands, steep slopes, and natural drainage patterns? | Yes | ZO 19.4: (19) all lakes, rivers, streams, wetlands, county drains, and other waterways abutting or within 100 feet of the property; (18) existing and proposed topography, at a minimum of 2 foot contours. ZO103.5.A.5, 7: all natural features within 100 feet of the proposed subdivision plat, including topography, bodies of water and watercourses, floodplains, and wetlands. |

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| Criteria | Yes/ No | Comments |
|--|-------------------|---|
| II. Pre-Construction Meetings | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Is the construction sequence required to start with a pre-construction meeting? | No | |
| III. Construction | | |
| A. Plans and Policies: | | |
| 1. Does the community chart the progress of all construction projects to ensure that they are in compliance with the approved site plan? | No | ZO 19.8 and 19.9: Site development must strictly conform to the approved site plan. Site Plan approval may be revoked if development is not in conformance with the approved plans. |
| B. Development / Redevelopment Regulations: | | |
| 1. Is a Pre-winter meeting required to assess whether the existing soil cover will provide adequate soil erosion and sedimentation control during winter months? | No | |
| Land Conservation and Development Techniques | | |
| I. Open Space / Park Acquisition | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan and/or Recreation Master Plan call for community acquisition of open space? | Yes | MP p. 19 |
| 2. Does the Master Plan and/or Recreation Master Plan recognize the importance of open space preservation as a way to protect the health, safety and welfare of residents, protect vital air, land and water resource quality, to buffer air and noise pollution, preserve wildlife habitat, and preserve aesthetic values and the community's beauty? | Partially | MP p. 19 recognizes the value of open space to serve the recreational needs of the community. |
| II. Conservation Easement and Similar Tools | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan call for the use of conservation easements or other tools to conserve open space in the community? | Yes | ZO 5.26.2: Conservation easement, plat dedication, restrictive covenant, or other legal means that runs with the land. |
| III. Clustering and Open Space Developments | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan include goals to preserve natural features and protect the quality of vital air, land, and water resources while accommodating development? | Indirectly Yes | MP pp 18-19 and 20-22 call for limiting development to already developed areas, and limiting types of development to areas which already have those types of development. |

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| Criteria | Yes/ No | Comments |
|---|---------|---|
| B. Development / Redevelopment Regulations: | | |
| 1. Does the community have a Clustering and/or Open Space Ordinance? | Yes | ZO 5.25 addresses open space preservation development. ZO 11.9-A.D.4: Zone R-5 may also be required to have 20% or more open space. ZO 103.5.D.3.c: Lands subject to flooding or determined to be uninhabitable shall not be platted for development purposes. They must be set aside within a subdivision as parkland or open space. |
| 2. Are flexible site design criteria available for developers that use open space or cluster design options? (Ex. Relaxed setback widths and lessened sidewalk requirements.) | Yes | ZO 5.25 |
| 3. Are open spaces required to be consolidated into larger units (contiguous), or required to be a minimum size or width? | Yes | ZO 5.25.2: not less than 50% of the land area must remain perpetually in an undeveloped state. |
| 4. Does the open space have to be managed in a natural condition? | No | ZO 5.25 : It may be maintained as agricultural use, or as parkland (picnic area, playground). |
| 5. Are the types of uses allowed in the open space restricted to low impact uses? | Yes | |
| 6. Is open space required to be protected through a conservation easement or other similar mechanism? | Yes | ZO 5.25.2: Conservation easement, plat dedication, restrictive covenant, or other legal means that runs with the land. |
| 7. Are incentives put into place to encourage open space development? | Yes | Just in PUDs |
| a. Are bonus densities utilized as an incentive? | Yes | ZO 19.7-A4 defines bonus density factors. |
| 8. Do all Planned Unit Developments require open space? | No | ZO 19.7-A.6: an open space buffer 100 feet wide is required where a PUD abuts land zoned AG - Agricultural. |
| | | |

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| Criteria | Yes/ No | Comments |
|--|----------------|---|
| IV. Urbanized Communities | | |
| A. Plans and Policies: | | |
| 1. Are infill developments encouraged in areas that already have significant development? | Yes | MP pp18--22 |
| B. Design Standards: | | |
| 1. Are infill and redevelopment projects encouraged to promote conservation and natural resource preservation? | Not explicitly | |
| 2. Are re-development projects required to coordinate improvements with existing facilities and infrastructure? | Partially | If municipal sewer and water are present, they must be utilized when developing a site. |
| V. Rural Communities | | |
| A. Plans and Policies: | | |
| 1. Is agriculture described in the Master Plan as an economically viable profession in the community? | Yes | MP p. 4: recognizes the prevalence of prime farmland; MP p. 15: 51% of Township is used for agricultural purposes. MP p. 20 states the goals of protecting prime farmland from incompatible uses and preserving rural areas. |
| 2. Have prime and unique agricultural lands been identified and mapped in the Master Plan? | Yes | MP p. 6: prime farmland map; MP also contains a Future Land Use Map that notes all prime agricultural land. |
| B. Development / Redevelopment Regulations: | | |
| 1. Has the community designated an Agricultural Zoning District? | Yes | "AG" Agricultural District is described in Article VI of the ZO. |
| 2. Does the agricultural zoning district utilize a method such as sliding scale to limit fragmentation of farmland and to less conflicts between farming and residential uses? | No | |
| 3. Does the agricultural zoning district utilize setbacks or buffers for any new residential development? | Yes | Defined in Article XIV of ZO. |
| 4. Does the Agricultural Zoning District also consider the preservation and protection of natural features, such as wetlands or groundwater? | Partially | Section VI.6.1 states the purpose of this district is to preserve and encourage the principal land uses of agricultural production and other rural-type activities. The AG district includes large vacant areas, fallow areas and wooded areas. |
| Recreation Plan | | |
| A. Plans and Policies | | |
| 1. Has a Recreation Plan been approved by MDNR within the last 5 years that identifies priority lands for acquisition or protection for future recreational use? | No | |

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| Criteria | Yes/ No | Comments |
|--|-----------|--|
| Wetland Preservation | | |
| I. Inventory | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan include a map of wetlands? | Yes | MP p.7 has a wetland map (of poor quality) |
| II. Wetlands Protection | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan recognize the importance of wetlands, and the functions they play in protecting residents' health, safety and welfare from problems such as flooding and poor water quality? | Yes | MP p. 5 notes values of groundwater retention and recharge, wildlife habitat, and enhancing the natural environment. |
| 2. Does the Master Plan call for the protection of wetlands within an ecosystem context (protecting adjacent uplands, waterways, and vegetated buffers as well)? | Partially | MP p. 19: this is partially covered in the water resources objectives and policies. |
| B. Development / Redevelopment Regulations: | | |
| 1. Has the community adopted a local wetlands ordinance that protects wetlands less than five acres in size? | No | ZO 5.22.2.a: No filling may occur in a regulated wetland without a permit obtained from the MDEQ. |
| 2. Is this ordinance coordinated with the State's wetlands regulations? | NA | |
| 3. Are there building and a no-disturbance setback requirements from wetland areas (at least 20-30 feet)? | Yes | ZO 15.3.2 (amended): no building construction within 100 feet of a wetland (some exceptions) |
| Lake Management | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan have a map of lakes? | Yes | |
| 2. Does the Master Plan discuss the values of lakes such as recreation, economic development, habitat, fisheries? | Yes | MP p.5: The only noted value is natural retention and groundwater recharge. |
| B. Development / Redevelopment Regulations | | |
| 1. Does the zoning ordinance include an anti-funneling provision for waterbodies? | Yes | ZO XV: Waterfront Development and Use Regulations. 15.6 discusses access and use regulations for waterfront land. |
| Habitat Preservation | | |
| I. Natural Area Preservation / Restoration | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan call for preservation of natural areas for wildlife habitat protection? | Partially | MP p. 19 open space objectives and policies call for preservation of open space, but do not mention wildlife habitat protection. |
| 2. Does the Master Plan link habitat preservation to protection of the health, safety and welfare of residents through natural resource preservation? | No | |
| 3. Has the community identified high quality natural areas to be preserved? | No | |
| 4. Does the community have a plan to protect the high priority areas? | No | |

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| Criteria | Yes/ No | Comments |
|--|-----------------------|---|
| II. Native Plant Species | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan recognize the importance of native vegetation in the protection of vital air, land and water resource quality, to buffer air and noise pollution, preserve wildlife habitat, and preserve aesthetic values and the community's beauty? | No | |
| B. Design Standards: | | |
| 1. Do the Design Standards specify the use of native plant species in the storm water system to help reduce storm water velocities, filter runoff and provide additional opportunities for wildlife habitat? | No | |
| 2. Are invasive and exotic plants prohibited from being used? | No | |
| 3. Does the site plan review process require developers to consult with the Michigan Department of Environmental Quality about Threatened/Endangered Species on site? | No | |
| Woodlands Preservation | | |
| I. Inventory | | |
| A. Plans and Policies: | | |
| 1. Has the community conducted a woodlands inventory and mapped this information? | Yes: a desktop review | MP p.7: Woodland map (poor quality, based upon 1981 land use map - should be updated). There is no indication this map was field verified. |
| II. Woodlands Protection | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan recognize the importance of woodlands to protect any of the following: water, air and soil quality, to buffer air and noise pollution, to moderate local climate and storm hazards, to preserve wildlife habitat, and to preserve aesthetic values and community beauty? | Yes | MP p. 5: only 12% of Township is identified as woodland (wooded areas 50 acres or more). These are valued as an asset for greenbelts, parkland, and buffers to development. |
| 2. Does the Master Plan recognize the importance of woodlands for storm water infiltration, thus reducing flooding and minimizing water pollution? | No | |
| 3. Does the Master Plan identify woodlands as an important landscape feature that protects the health, safety and welfare of residents? | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Has the community adopted a local woodlands or tree protection ordinance? | No | |
| 2. Are woodlands defined in a broad manner so that existing trees and remnant woodlands are also protected? | No | Woodlands are not defined in the Definition section of the ZO (Article III). |
| 3. Does the ordinance require replacement of trees that are removed? | No | |
| 4. Does the ordinance minimize the clearing of a site? | No | |
| 5. Are permits required to clear a site? | No | |
| | | |

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| Criteria | Yes/ No | Comments |
|--|-----------|---|
| Greenways/Green Infrastructure | | |
| I. Greenway/Green Infrastructure Plan | | |
| A. Plans and Policies: | | |
| 1. Does the community have a greenway plan or support greenways/green infrastructure through its Master Plan or Recreation Master Plan? | Partially | MP has open space and recreational land use objectives and policies. These promote identification and preservation of open space and creation of parks and recreational facilities. ZO 13 discusses the P/RU (Public/Recreational Use District), which includes parks and recreational areas. |
| 2. If yes, does this plan do the following: | | |
| a. Identify greenways/green infrastructure as important natural transportation corridors for wildlife, and for the protection of other natural features? | No | |
| b. Connect many natural areas within the community? | No | |
| c. Connect the community's greenway/green infrastructure plan with adjacent communities', County's or regional greenway plans? | No | |
| Groundwater | | |
| I. Mapping | | |
| A. Plans and Policies: | | |
| 1. Do Master Plan goals call for the identification and mapping of groundwater recharge areas? | Partially | MP p. 5 identifies 5 lakes that act as groundwater recharge basins. |
| 2. Is a map of groundwater resources or groundwater recharge areas included in the Master Plan? | No | |
| II. Groundwater Protection | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan recognize the importance of the groundwater to the health, safety and welfare of its residents? | Yes | MP p. 5 notes groundwater reservoirs within the Township provide limited water supply. |
| 2. Does the Master Plan identify groundwater as an important natural resource, and call for its protection? | Yes | MP p.19: Water Resource objective to protect groundwater by promoting appropriate land development standards and controls. Water Resources policy to limit development in areas not served by municipal water and sewer systems, to protect groundwater. |
| B. Development / Redevelopment Regulations: | | |
| 1. Is ground water considered in the zoning designations of parcels? | No | |
| 2. Are there additional requirements for site plan submittals in groundwater recharge areas? | No | |
| III. Wellhead Protection | | |
| A. Plans and Policies: | | |
| 1. Does this community have municipal well fields? | No | |
| 2. If yes, has the community done the following: | | |
| a. Developed a wellhead protection program? | NA | Five wellhead protection areas are noted on Figure 3. |
| b. Restricts high risk land use activities in wellhead protection areas? | NA | |

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| Criteria | Yes/ No | Comments |
|--|------------------|---|
| Storm Water Management | | |
| I. Storm Water Management Standards | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan call for the preservation of natural features as parkland and/or in open space developments to help alleviate problems associated with storm water runoff? | Yes, indirectly | MP p. 19: Water Resource objective to maintain and improve the quality of Township surface water. Water Resource policy to minimize the pollution of surface waters by endorsing appropriate development density controls and building setback standards. |
| 2. Does the Master Plan identify storm water management as an important community goal or policy? | Yes, indirectly | See above |
| 3. Does the Master Plan state both the quality and quantity of stormwater are important issues to address in storm water management policies? | No | |
| 4. Does the Master Plan relate storm water management to the protection of health, safety and welfare of the community's residents? (For example, storm water management can reduce flooding, improve water quality, etc.) | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance require that developers preserve natural drainage patterns to the fullest extent possible? | No | |
| 2. Do you regulate storm water in your community? | No, other than → | ZO 5.17.1 requires storm water be retained on-site by the use of retention areas and other necessary measures. ZO11.9-A.D.3: Storm water may not be directly discharged into Indian Lake or any stream or ditch leading into it. |
| 3. If yes, are your regulations coordinated with the County's storm water regulations so that your rules do not contradict the County's? | NA | |
| 4. If your community regulates storm water, do your regulations address the following: | | |
| a. Are there storm water guidelines that fully detail specific storm water design criteria? | No | |
| b. Maintain or establish buffer strips (between 30 and 100 feet wide) from the top of bank of any watercourse or surface water? | | ZO 15.3.2 (amended): No building construction within 100 feet of any slope greater than 6% leading to a watercourse (some exceptions). |
| 5. Does the Zoning Ordinance include flood control and water resource protection performance standards? | No | |
| 6. If yes, do they address the following to reduce the quantity of runoff and improve runoff quality: | | |
| a. Limit land disturbance and grading? | Yes | ZO 15.3.2 (amended): No building construction within 100 feet of a waterway or within 100 feet of any slope greater than 6% leading to a watercourse (some exceptions). |
| b. Maintain vegetated buffer strips and other existing vegetation to improve infiltration of storm water? | Yes | See above |
| c. Minimize impervious surfaces? | No | |
| d. Encourage the use of infiltration devices (such as filter strips, vegetated swales, sand filters, rain gardens, etc and allow for 72 hour ponding prior to infiltration?) | No | |
| 7. Are all development/redevelopment plans required to go to the County Drain Commissioner for review? | No | |
| | | |

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| Criteria | Yes/ No | Comments |
|---|---------|--|
| II. Engineered Best Management Practices (BMP's) | | |
| A. Plan and Policies | | |
| 1. Does the Master Plan include goals / policies that encourage the use of Best Management Practices (BMP's) to minimize, collect, and treat storm water? | Yes | MP p. 19: control of building density, setbacks, oppose inappropriate filling or dredging of lakeshore frontage or wetlands for building purposes. |

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| Criteria | Yes/ No | Comments |
|---|----------------|--|
| B. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance require the use of BMP's when possible? | No | |
| 2. Does the Zoning Ordinance require the use of above ground BMP's instead of belowground storm water conveyance systems? | No | |
| 3. Does the Zoning Ordinance prohibit direct discharge of storm water into wetlands, streams or other surface waters without pre-treatment? | Partially | ZO11.9-A.D.3: Storm water may not be directly discharged into Indian Lake or any stream or ditch leading into it. |
| 4. Does the Zoning Ordinance call for periodic monitoring of BMP's to ensure they are working properly? | No | |
| 5. Does the Zoning Ordinance require that all storm water management systems and / or BMP's be maintained? | No | |
| C. Design Standards: | | |
| 1. Do the Design Standards provide minimum guidelines for BMP's that pre-treat and filter storm water, and retain storm water in a bio-retention facility? | No | |
| III. Infiltration | | |
| A. Plans and Policies | | |
| 1. Does the Master Plan call for the preservation of natural features for the purpose of preserving the existing infiltration of storm water? | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance call for the use of BMP's that improve a site's infiltration potential? | No | |
| Soil Erosion and Sedimentation Control | | |
| I. Soil Erosion and Sedimentation Control (SESC): | | |
| A. Plans and Policies: | | |
| 1. Is soil erosion and sedimentation control identified in the Master Plan as an important mechanism to protect the health, safety and welfare of residents through protection of water and soil resources? | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance address erosion and sedimentation controls? | Yes | ZO 15.1: No grading or site development adjacent to waterways may be allowed until it is determined groundcover removal conforms to the County's SESC regulations. ZO 5.22.2.b: A SESC permit must be obtained before filling activities occur that could result in impacts to surface waters. |
| 2. If yes, is the program coordinated with the County's program? | NA | SESC permits are obtained from the Kalamazoo County Drain Commissioner, who is the authorized Soil Erosion Control Agent for the County. |

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| Criteria | Yes/ No | Comments |
|---|----------------|---|
| 3. If yes, does the community's program include the following standards? | | |
| a. Require that soil erosion control measures be in place before granting a building permit? | NA | |
| b. Protect waterways and stabilize drainage ways by requiring mechanisms, such as silt fencing, at the edge of the waterway buffer and special crossing and diversion techniques at waterway crossings? | NA | |
| c. Require that all erosion and sedimentation controls be maintained? | NA | |
| d. Require that all erosion and sedimentation controls be monitored on a periodic basis? | NA | |
| e. Methods to respond to public complaints regarding construction site erosion control? | NA | |
| 4. If no, does the community staff report erosion problems to the County enforcing agency? | Yes | If erosion is observed, staff knows to contact the County. |
| 5. Are there any references in the Zoning Ordinance about compliance with the County Soil Erosion and Sediment Control Standards? | Yes | ZO 15.1; ZO 5.22.2.b |
| Sanitary Sewer Planning and Infrastructure | | |
| I. Sanitary Sewer Planning and Infrastructure | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan address sanitary sewer planning? | Yes | MP p. 12: Only the Indian Lake area has a municipal sanitary sewer system. MP p. 23: the Indian/Pickerel Lake sewer project was completed in 2000. It is administered by the South County Water and Sewer Authority. |
| 2. If yes, does the Master Plan tie sanitary sewer planning to protection of the health, safety and welfare of residents? | No | |
| 3. If yes, does the Master Plan address the following: | | |
| a. Has the community delineated a Sewer Service Area? | Yes | MP p. 12: The only area served with a sanitary sewer system is the Indian Lake area. The Village of Vicksburg potentially could expand its system to provide limited service to the Township. Studies have been completed to explore future expansion along the Sprinkle Road corridor. |
| b. Has the Sewer Service Area been mapped, including all the facilities in the system (such as manholes, pipes, etc.)? | Yes | Map is included in the MP. |
| c. Is the map to be used in zoning decisions? | Unknown | |
| II. Septic Systems | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan identify areas that are suitable and unsuitable for septic systems? | No | |
| 2. Does the Master Plan state that community involvement in placement and maintenance of septic systems is critical to the health, safety and welfare of residents? | No | |
| B. Development / Redevelopment Regulations: | | |

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| Criteria | Yes/ No | Comments |
|---|---------|--|
| 1. Are regulations that pertain to septic systems coordinated with the County's regulations? | Yes | ZO 5.14 requires that municipal sewer systems be utilized if available. Otherwise, a building must obtain all required well system and septic system permits from the County Health Department and/or other governmental agency with jurisdiction. ZO 103.6.A.3: A requirement of final plat approval is that the Health Department provides a letter stating the proposed septic system is acceptable and approvable. |
| 2. Does the Zoning Ordinance require that a septic system location be at least 100 feet from a lake, wetland, stream, or other water feature? | Yes | ZO 15.3: Septic systems must be 100 feet from any waterway. |
| 3. Does the Zoning Ordinance specify a minimum isolation distance from residential and community wells? | No | The Kalamazoo County Sanitary Code requires a 50 foot isolation distance from wells. |
| 4. Does the Zoning Ordinance create septic maintenance districts? | No | |

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| Criteria | Yes/ No | Comments |
|---|----------------|-----------------|
| III. Minimizing Inflow | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Does the community prohibit connecting downspouts to the storm water system? | No | |
| 2. Does the community have a program to identify and disconnect footing drains from sanitary sewer lines? | NA | |
| 3. Does the community promote rain barrels and rain gardens? | No | |
| | | |

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| Criteria | Yes/ No | Comments |
|--|----------------|--|
| IV. Illicit Discharge Elimination | | |
| A. Plans and Policies: | | |
| 1. Has the community identified and/or mapped the community's drainage system, including all points of discharge and locations of illicit discharges to the drainage system? | No | The Township does not have a storm sewer system. The Kalamazoo County Drain Commission manages storm water drainage. |
| 2. Does the community have a program for identifying illicit discharges, and eliminating them? | No | |
| 3. Does the community have a program to identify sanitary sewer or septic systems that are seeping into the storm water system, surface waters or groundwater? | No | |
| Public Education | | |
| I. Public Education Efforts | | |
| A. Plans and Policies: | | |
| 1. Does the community have a system in place to distribute environmental education information? | Yes | Township website - but link to stormwater page does not work |
| 2. Has the community encouraged residents to report illicit discharges or improper disposal of materials into storm drains or natural water bodies? | No | |
| 3. Has the community educated commercial, industrial and institutional owners and tenants on how to reduce significant storm water pollutants? | No | |
| Pollution Prevention and Housekeeping Practices | | |
| I. Storm Water System Maintenance | | |
| A. Plans and Policies: | | |
| 1. Does the community have a program in place to regularly clean out, maintain and/or inspect structural controls (such as catch basins, vegetated swales, infiltration basins, sedimentation basins, etc.)? | NA | Township does not own any of these structures |
| 2. Does the community have a program that labels outfall structures that discharge runoff to natural systems? | NA | Township does not own any of these structures |
| II. Roadways | | |
| A. Plans and Policies: | | |
| 1. Does the community have jurisdiction over streets? | No | Roads are under the jurisdiction of the Kalamazoo County Road Commission. Private roads are allowed by the Township, as described in Section III: Street and Access. |
| 2. If yes, | | |
| a. Does the community sweep the streets monthly or more often in high construction areas? | NA | |
| b. Does the community evaluate the amount of salt and/or sand that is applied to its roads in the winter? | NA | |
| c. Does the community provide leaf collection in the fall? | NA | |

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| Criteria | Yes/ No | Comments |
|--|----------------|-----------------|
| III. Public Facilities Maintenance | | |
| A. Plans and Policies: | | |
| 1. Does your community have a maintenance building? | No | |
| 2. If yes, does the following occur: | | |
| a. Confirm that floor drains are connected to a sanitary sewer, or sealed? | N/A | |
| 3. Does the community maintain its own vehicles? | No | |
| 4. If yes, is a regular schedule of maintenance followed? | N/A | |
| 5. Are vehicles or other equipment maintained and cleaned where fluids and/or cleaning water will not flow into the street, gutter, storm drain or water body? | N/A | |
| IV. Landscaping Practices | | |
| A. Plans and Policies: | | |
| 1. Does the community have a schedule of landscape maintenance practices for municipal property? | No | |
| 2. Are employees trained on the proper application of chemical pesticides, herbicides and fertilizers? | No | |
| 3. Are soils tested on municipal property before fertilizers are applied? | No | |
| 4. Does the community use native vegetation in landscaping their properties? | No | |
| 5. Does the community encourage landscaping with native plant species throughout the community? | No | |
| B. Development / Redevelopment Regulations | | |
| 1. Is a fertilizer ordinance in place that only permits zero-phosphorus fertilizer to be used? | No | |
| Animal Waste (Pets & Kennels) | | |
| A. Plans and Policies | | |
| 1. Are residents educated about the availability, location, and requirements of properly disposing of pet waste? | No | |
| Capital Improvement Plan | | |
| I. Capital Improvement Plan | | |
| A. Plans and Policies: | | |
| 1. Does the community have a Capital Improvement Plan? | Yes | |
| 2. If yes, does the Master Plan link the Capital Improvement Plan with the protection of the health, safety and welfare of residents? | No | |
| 3. If a Capital Improvement Plan is in place, does the plan: | | |
| a. Include policies related to natural resource protection? | No | |
| b. Include standards as the basis for design of storm water and sanitary systems? | No | |
| c. Include capital improvement for installation, maintenance and replacement of storm water utilities? | No | |
| d. Include capital improvement for installation, maintenance and replacement of sanitary sewer utilities? | No | |
| e. Call for the use, maintenance and replacement of storm water BMP's? | No | |

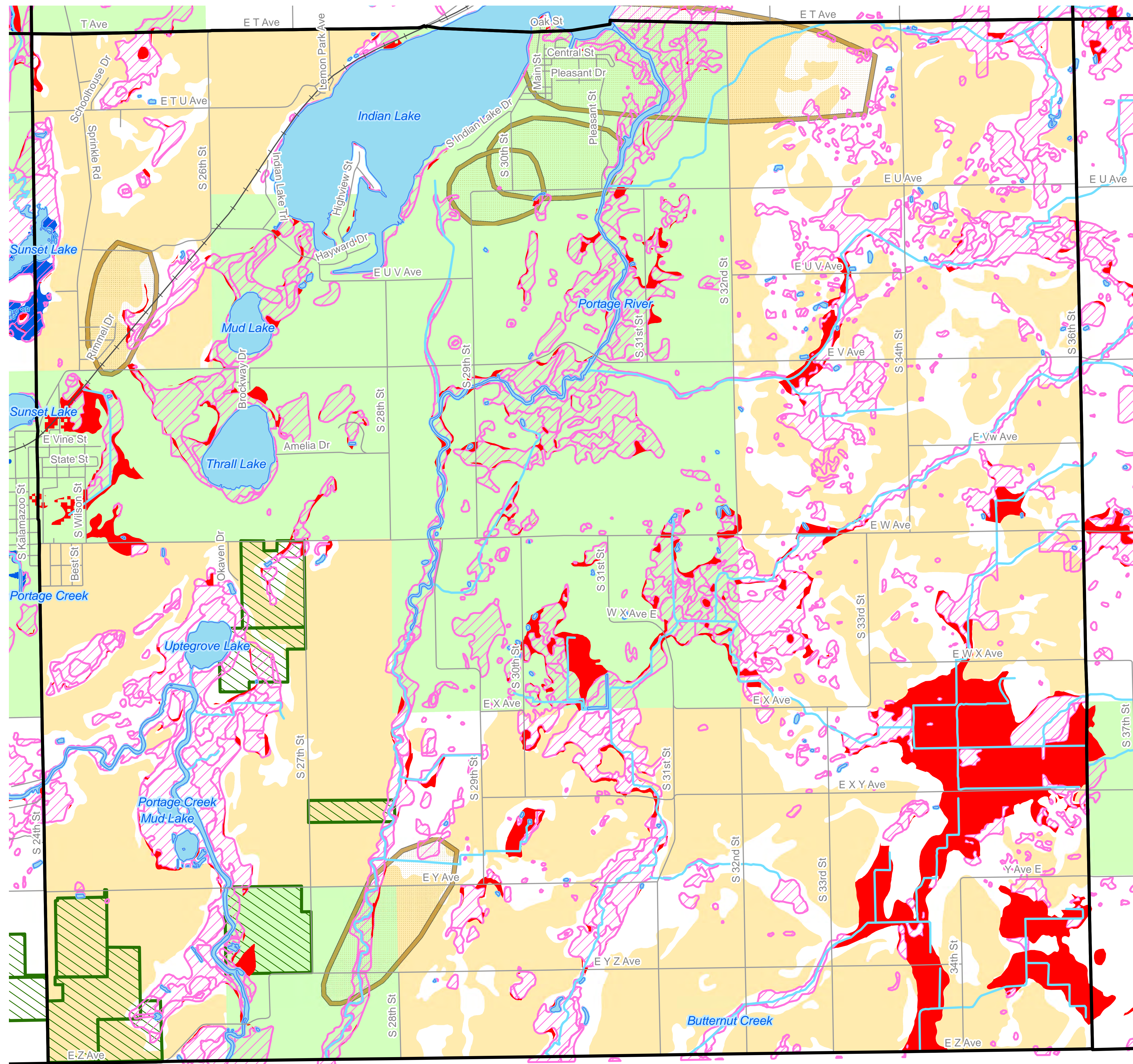
Document Review for Water Resource Protection

BradyTownship - Kalamazoo County, Michigan

June 2014

| Criteria | Yes/ No | Comments |
|--|----------------|--|
| Agricultural Manure Management | | |
| A. Plans and Policies | | |
| 1. Are agricultural operators educated about the requirements of properly storing and applying manure? | Yes | Right-to-Farm Act brought up at Planning Commission meetings |
| Wind Ordinance | | |
| A. Plans and Policies | | |
| 1. Does a zoning district allow and promote the effective and efficient use of wind energy conversion systems? | | This is not addressed in the ZO. |

Brady Township
Kalamazoo County, Michigan
Portage River Watershed Planning Project
MDEQ Tracking Code #2012-0017



- LEGEND**
- Lakes
 - High Potential Wetland Restoration Area - Michigan DNR
 - Wetlands - US Fish & Wildlife National Wetlands Inventory
 - FEMA 100 Year Floodplain - DFIRM Kalamazoo County Effective 6/4/2010
 - Conservation and Recreation Lands - Ducks Unlimited, 2013
 - Wellhead Protection Area - Michigan DEQ
 - 10 to 50 Threatened, Endangered or Special Concern Species per Quarter-Quarter Section - Michigan Natural Features Inventory, Biological Rarity Index
 - All Prime Farmland Soils - USDA NRCS Soil Survey Kalamazoo County Prime Farmland, 2009



**RESOURCE CONSERVATION
OVERLAY AREAS WITHIN
BRADY TOWNSHIP**

Drawn By:
Designer:
Reviewer:
Manager:

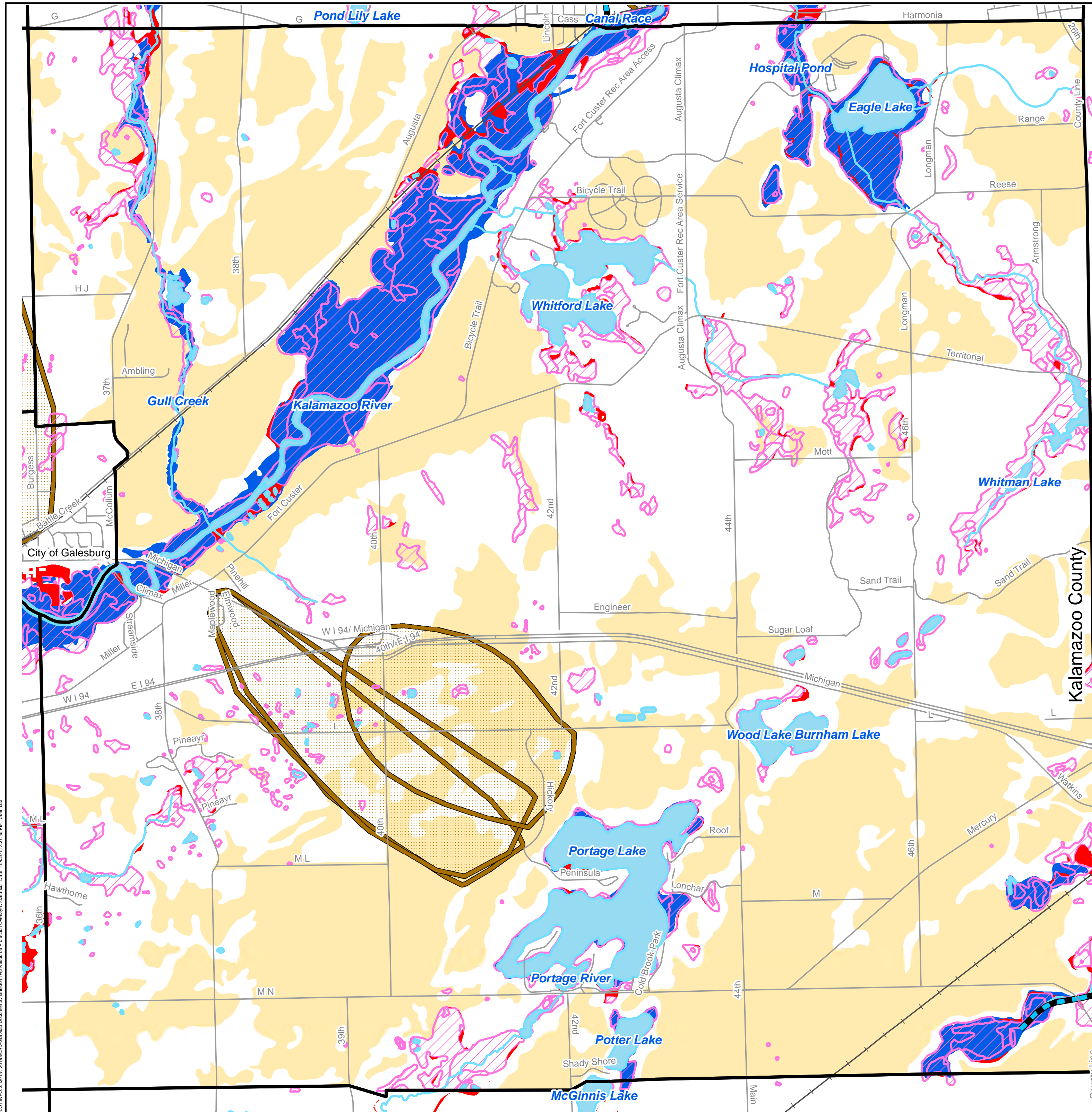
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PROJECT NO.
G130188

SHEET NO.
1

CUT HERE 2:00:15:1018802014.mxd Document Path: Resource Conservation Area 2014.mxd Date: 11/20/14 10:23:41 AM User: cda

DATA SOURCES: BASE MAP MICHIGAN GEOGRAPHIC FRAMEWORK V13A.



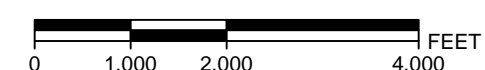
LEGEND

- MDNR Trout Stream 2008
- High Potential Wetland Restoration Area
- Wetlands NWI
- FEMA 100 year Flood Zones
- Wellhead Protection Area
- Prime Farmland Soils

Data Sources:
 USDA NRCS Soil Survey-Kalamazoo County
 Prime Farmland, 2009.
 EPA Watersheds HUC12-Kalamazoo County.
 FEMA 100 Year Flood Zones, effective 2/17/2010.
 US Fish & Wildlife National Wetlands
 Inventory 24k.
 Michigan DNR Potential Wetland Restoration
 Area.
 Michigan DEQ Wellhead Protection Area.
 MDNR Trout Streams 2008.



**RESOURCE
 PROTECTION
 OVERLAY DISTRICT**



engineers
 scientists
 architects
 constructors

fishbeck, thompson, carr & huber, inc.

Charleston Township

Kalamazoo County, Michigan

Portage River Watershed Planning Project
 MDEQ Tracking Code #2012-0017

Drawn By:
 Designer:
 Reviewer:
 Manager:

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PROJECT NO.
 G130188

FIGURE NO.

1

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PLOT INFO: Z:\2013\188\GIS\Map_Document\Charleston_Twp_Resource_Protection_Overlay_C.sxd Date: 11/20/14 3:27:46 PM User: cda

Portage River Watershed Planning Project

**Charleston Township
Kalamazoo County, Michigan**

**Policy Review Document
MDEQ Tracking Code #2012-0017**

**October 2014
Project No. G130188**

fitch

PORTAGE RIVER WATERSHED PLANNING PROJECT

**CHARLESTON TOWNSHIP
KALAMAZOO COUNTY, MICHIGAN**

**POLICY REVIEW DOCUMENT
MDEQ TRACKING CODE #2012-0017**

**OCTOBER 2014
PROJECT NO. G130188**



This nonpoint source pollution control project has been funded in part through the Michigan Nonpoint Source Program by the United States Environmental Protection Agency under assistance agreement C9975474-12 to the Calhoun Conservation District, for the Portage River Watershed Planning project. The contents of the document do not necessarily reflect the views and policies of the EPA, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

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LIST OF ABBREVIATIONS/ACRONYMS

| | |
|----------|--|
| BMP | Best Management Practice |
| CCD | Calhoun Conservation District |
| FTCH | Fishbeck, Thompson, Carr & Huber, Inc. |
| LID | Low Impact Development |
| KCD | Kalamazoo Conservation District |
| MDEQ | Michigan Department of Environmental Quality |
| MDNR | Michigan Department of Natural Resources |
| MS4 | municipal separate storm sewer system |
| NPS | nonpoint source |
| NRCS | Natural Resources Conservation Service |
| NREPA | Natural Resources and Environmental Protection Act |
| PRD | Policy Review Document |
| PRW | Portage River Watershed |
| PUD | Planned Unit Development |
| RPOD | Resource Protection Overlay District |
| SESC | Soil Erosion and Sedimentation Control |
| SWMPC | Southwest Michigan Planning Commission |
| Township | Charleston Township |
| WMP | Watershed Management Plan |

EXECUTIVE SUMMARY

The Portage River flows southwest from its headwaters in Charleston Township, eastern Kalamazoo County, Michigan into St. Joseph County, where it empties into the St. Joseph River in the City of Three Rivers, Michigan. Although the Portage River Watershed (PRW) is experiencing low development pressure overall, Charleston Township has been facing increased patterns of urban growth from nearby Cities of Kalamazoo and Battle Creek. Citizens are concerned that when this growth does happen, it will be in an uncontrolled manner and could jeopardize the quality of the watershed's valued resources.

The Portage River Watershed Management Plan (WMP) stresses the importance of water resources as a vital component of land use decisions at the local level. Communities in the PRW are interested in achieving sustainable development, defined as economic growth protecting the environment.

This Policy Review Document (PRD) provides an assessment of the Land Use Plan, Zoning Ordinances, and other development standards of Charleston Township (Township) impacting water quality. An examination of existing policies is crucial to provide for well-crafted and complimentary municipal codes reflecting the desires of the diverse communities within the PRW. The current path of development in these communities can be evaluated through this process and redirected if necessary. Often, communities find their development codes and standards give developers little or no incentives to conserve natural areas and, in some cases, actually work against watershed protection. Careful attention to appropriate water resource management can help communities reach a level of sustainable development, which combines economic growth with the protection of natural resources.

Existing policies and regulations in the Township were compared to accepted development principles as presented in various water resource protection guidebooks. A policy review spreadsheet was used to document the comparisons and identify compliance and discrepancies with the principles.

The assessment reviewed the status of land use planning and zoning in the Township, and how well the rules and regulations address concerns of the watershed. The results are summarized in Appendix 1.

The results of this policy review reveal specific areas of the existing development rules that are generally good in their efforts of watershed protection and other areas that could benefit from modifications. Priority actions that the Township could take to improve resource protection include:

Land Use Plan Revisions

1. Support adoption of a County Farmland Preservation Ordinance.
2. Create Resource Protection Overlay District (RPOD) and update Future Land Use Map with RPOD delineation.

Zoning Ordinance Revisions

1. Require setbacks from all water resources.
2. Improve parking lot standards to minimize impervious surfaces.
3. Develop a Planned Unit Development (PUD) ordinance.
4. Create specifications for RPOD.

Other Recommendations

1. Develop a Capital Improvement Program.
2. Develop a Recreation Plan to submit to the Michigan Department of Natural Resources (MDNR) for approval.
3. Investigate funding options for conducting additional studies and projects assisting the Township in implementing the recommendations in this report.

The existing Land Use Plan adopted in 2005 was created to address development issues that the Township believed would likely impact the Township during the next 15 years. Since almost 10 years have passed, the Township should review the plan and determine if these development issues have occurred and how well the Land Use Plan addressed the issues. An update to the Land Use Plan is advised. The use of the development principles to begin discussion on these issues will eventually lead to protecting natural and aquatic resources.

INTRODUCTION

PURPOSE

The purpose of this PRD is to assist the Township with implementation of generally accepted development standards and to identify impediments to innovative site design for the purpose of water resource protection. An examination of existing policies is crucial to provide for well crafted and complimentary municipal codes reflecting the desires of the Township. This policy assessment will provide a baseline from which to measure changes in the planning and management of growth in the coming years. The current path of development in the Township can be evaluated through this process and redirected if necessary. A similar assessment could be conducted in five years to determine if changes have been made to the rules and regulations increasing the level of watershed protection.

PORTAGE RIVER WMP

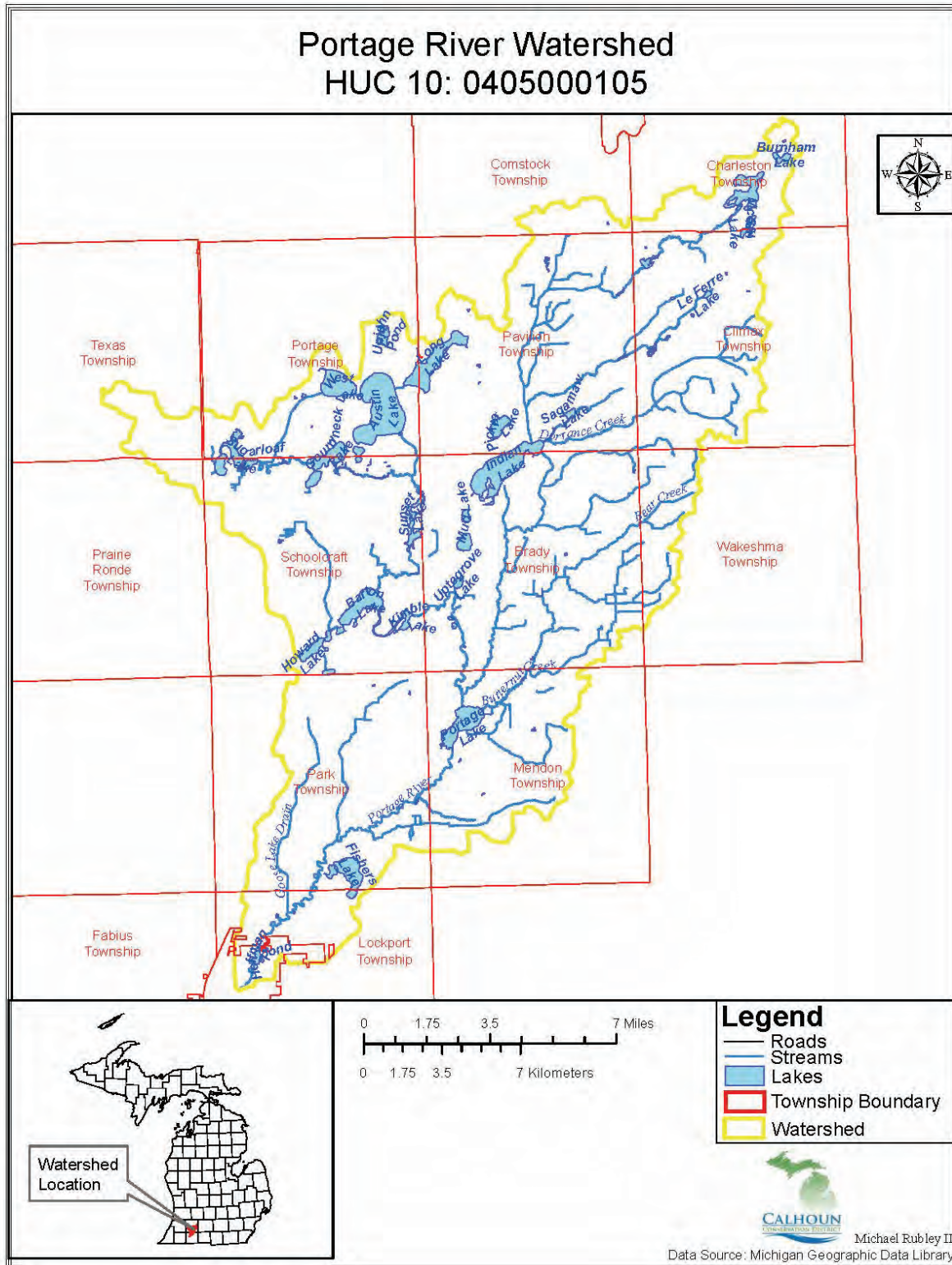
The Kalamazoo Conservation District (KCD) developed a WMP for the PRW in 2006. The Calhoun Conservation District (CCD) has received an Act 319 grant to update the WMP. The scope of work for the grant includes completing policy reviews for three townships located within the PRW. Charleston Township, which has requested that a review of its policies be completed, is located in the northeast corner of the watershed, in the east-central region of Kalamazoo County, Michigan (Exhibit 1). Overall, the PRW encompasses 125,539 acres in Branch and St. Joseph Counties, Michigan.

The 2006 WMP includes a complete evaluation of nonpoint source (NPS) pollutants and creates an implementation plan to address resource concerns, problems, and needs, and outlines solutions for known or suspected pollutants of the river. An examination of existing policies is crucial to provide for well-crafted and complimentary municipal codes reflecting the desires of the communities within the PRW.

The Michigan Department of Environmental Quality (MDEQ) determined in a 2004 study that water quality standards were not attained in Portage River from its confluence with Indian Lake upstream to Portage Lake in Kalamazoo County (including tributaries) (Wolf and Wuycheck, 2004). Charleston Township is located within this area. The Portage River WMP identified priority NPS pollution impairments as follows:

- Sediment in rivers, streams, and lakes
- Excess nutrients
- Streambank erosion
- Bacteria and pathogens, especially from wildlife (geese)
- Hydrology (low flow/low lake levels)
- Temperature
- Chemical pollutants (oils, metals, pesticides)
- Cold water fishery use
- Warmwater fishery use

Exhibit 1 - Portage River Watershed



Michael Rubley II
Data Source: Michigan Geographic Data Library

State and federal water quality programs have designated the following uses for all surface waters in the State of Michigan. Also indicated is whether these uses are met, threatened, or impaired, according to the WMP:

- Agricultural use (Met)
- Navigational use (Threatened)
- Industrial water supply (Met)
- Public water supply (Not applicable)
- Warm water fishery (Threatened)
- Other indigenous aquatic life and wildlife use (Threatened)
- Partial body contact recreational use (Threatened)
- Total body contact recreational use (Threatened)

The goals described in the WMP address improving water quality pertaining to these uses for all water bodies.

The Stakeholders in the PRW have also identified the following desired uses:

- Environmental education
- Maintain commercial discharges
- Protect wetlands
- Protect riparian corridors and floodplains
- Expand existing protected open space
- Explore natural rivers designation
- Improve fisheries
- Expand recreational uses
- Maintain water supply for agricultural and industrial uses
- Protect wildlife habitat

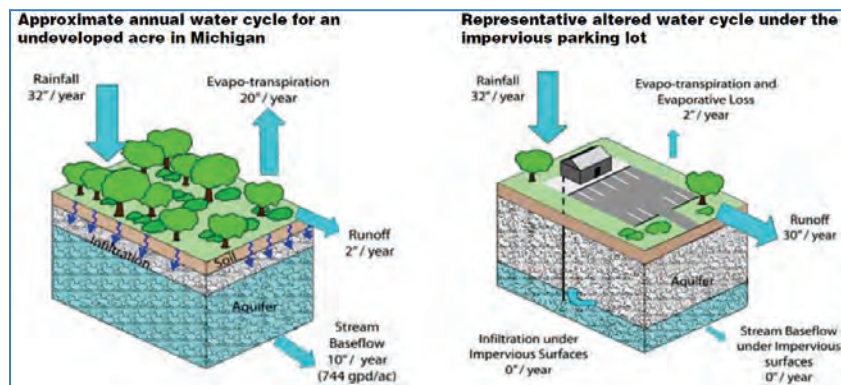
The objective of this policy review is to develop and implement specific land-use recommendations using a watershed-based approach to achieve the WMP goals and desired uses. This effort will bring together township boards, local officials, and planning commissions to protect water quality and reduce NPS pollution on a multi-township or county-wide basis through the revision of Master Plans and Land Use Plans, addition of ordinances for natural resource protection, and zoning to protect water quality supporting the vision of the Township's Land Use Plan.

BACKGROUND

A grant was awarded to the CCD to update the 2006 WMP for the PRW and to expand it to include the Little Portage River watershed. As part of the grant, a task was defined to assist communities in assessing their policies and guidelines shaping how development happens in their communities. The Township was one of the communities agreeing to participate in this assessment. The time to plan for growth is now, when activity is low and time is available for a thorough review of policies and standards working together to improve the quality of life.

LAND USE AND WATER RESOURCE PROTECTION

Local Land Use Decisions Have Regional Impacts. Residents, business owners, and local planners are not always aware of the impacts their individual actions might have on their natural surroundings. Cumulative effects of these actions are not considered in most development and land use decisions. A watershed planning perspective will encourage local planners and developers to look at the entire area contributing to a water body and determine its needs for management and protection. Often, communities find their development codes and standards give developers little or no incentives to conserve natural areas and, in some cases, actually work against watershed protection. The PRW is taking the first step in realizing the regional consequences of the local land use decisions, by evaluating current policies and implementing appropriate measures to enhance and protect water quality while experiencing growth and development. Careful attention to appropriate water resource management can help communities reach a level of sustainable development, combining economic growth with the protection of natural resources.



(Source: *A Design Guide for Implementers and Reviewers: Low Impact Development Manual for Michigan*, SEMCOG, 2008)

Development Impacts to Watercourses. One of the basic concepts accepted in watershed planning is that the amount of impervious cover in a watershed directly relates to its water quality. Increased urbanization results in natural vegetation being replaced with hard surfaces, such as rooftops, roadways, and parking lots. The additional impervious area increases the rate and volume of surface water runoff and decreases water infiltration into the ground. Development often reduces base flow, since water is not infiltrating, which causes perennial streams to become intermittent streams. When more of the water enters the streams as surface runoff, the bankfull channel flows create highly erosive conditions. Other concerns of impervious surfaces include higher concentrations of nutrients in higher volumes of runoff and increased occurrences of heavy metals. Another impact occurs when municipal services are required to expand to provide water and sewer for developments currently outside of service areas. Locating developments close to existing towns and city centers reduces the effects of sprawl and minimizes the expansion of infrastructure that can increase harmful stormwater runoff.

REGULATIONS IMPACTING LAND USE AT THE STATE LEVEL

The Michigan Natural Resources and Environmental Protection Act (NREPA), Public Act 451 of 1994, as amended is the state's primary environmental legislation. The MDEQ regulates wetlands, sand dunes, soil erosion and sedimentation from earth change activities, inland lakes and streams, shorelines, and other land use decisions impacting water resources, including management of floodplain development, public health standards, subdivision rules, and stormwater discharges from municipal separate storm sewer systems (MS4). The state, however, does not oversee land use planning at the local level. The over 1,850 units of government in Michigan are responsible for protecting water resources through local regulations (Ardizzone, 2010).

LAND USE PLANNING AT THE LOCAL LEVEL

Townships, cities, and villages are responsible for developing land use plans and zoning ordinances, as well as ensuring their implementation. Land use plans and zoning ordinances are the regulatory tools that can be used to protect surface water and groundwater. The planning and zoning process typically starts with a Master Plan, outlining the vision of how the residents and leaders want the communities to look in future years. The Master Plan is the foundation upon which the Code of Ordinances and zoning ordinances are developed. Formulation of a Master Plan is therefore of highest importance to the communities. A Master Plan should identify goals and a vision for future development in the community. The Code of Ordinances is intended to provide the rules and regulations preserving the peace, health, safety, and welfare of the inhabitants of the community. Design manuals and construction specifications for development guide the alterations of land and water necessary for growth in the community. All of these policies must be integrated to ensure their goals and objectives are compatible. The policy review requires the examination of all of these documents to be able to assess the capacity of the community to continue to grow and prosper while protecting the natural resources.

METHODOLOGY

POLICY REVIEW

Fishbeck, Thompson, Carr & Huber, Inc. (FTCH) worked with the CCD to develop a worksheet that lists water quality issues and outlines accepted development principles. Meetings were held with Township officials to review the worksheet and obtain policies, standards, ordinances, and guidance the Township has for growth and infrastructure management. These one-on-one meetings with the Township helped ensure all documents were current and the intent of the development standards was understood. The following documents were reviewed:

- Charleston Township Land Use Plan, initially adopted in 1992, and amended and revised in 1998, 2001, and 2005
- Land Use Plan Map of Charleston Township, adopted September 27, 2005
- Charleston Township Zoning Ordinance, Ordinance No. 112, effective October 14, 2000, as amended through Ordinance No.148, January 2013
- Kalamazoo County Sanitary Code
- Kalamazoo County Road Commission Construction Guidelines, December 4, 2012
- Kalamazoo County Drain Commissioner Site Development Rules

These documents were reviewed using the worksheet to evaluate their conformity to development principles for water resource protection.

Recommendations and suggestions for the Township to consider in their future updates, and planning and zoning decisions are included in the Recommendations section of this report.

The detailed results of the policy review are in table format in Appendix 1.

RECOMMENDATIONS

LAND USE PLAN REVIEW

After completing the review of the Land Use Plan for the Township, a list of recommendations was developed and shared with the planning commission to consider.

The stated primary purpose of the Land Use Plan is to guide the Township Planning Commission as it considers rezoning and special use requests. The Plan reviews the physical and historical character of the Township, population and demographics, and the Township's land use classifications. The intent of each land use classification is defined and management objectives are discussed. An overall objective of the Land Use Plan is to facilitate residential and commercial/industrial growth in an orderly manner and in appropriate locations, while avoiding land use conflicts which can cause degradation of property values. The Charleston Land Use Plan describes how the Township can promote residential development and commercial and industrial uses along development corridors within the Township while preserving farmland. The twelve designated land uses serve as the guidance for zoning decisions and are to be considered the starting point for review of any request for rezoning of property. The Land Use Plan describes twelve land uses, which are also illustrated on Exhibit 2. The Zoning Map (Exhibit 3) notes 15 districts or areas which encompass the 12 land uses.

EXHIBIT 2

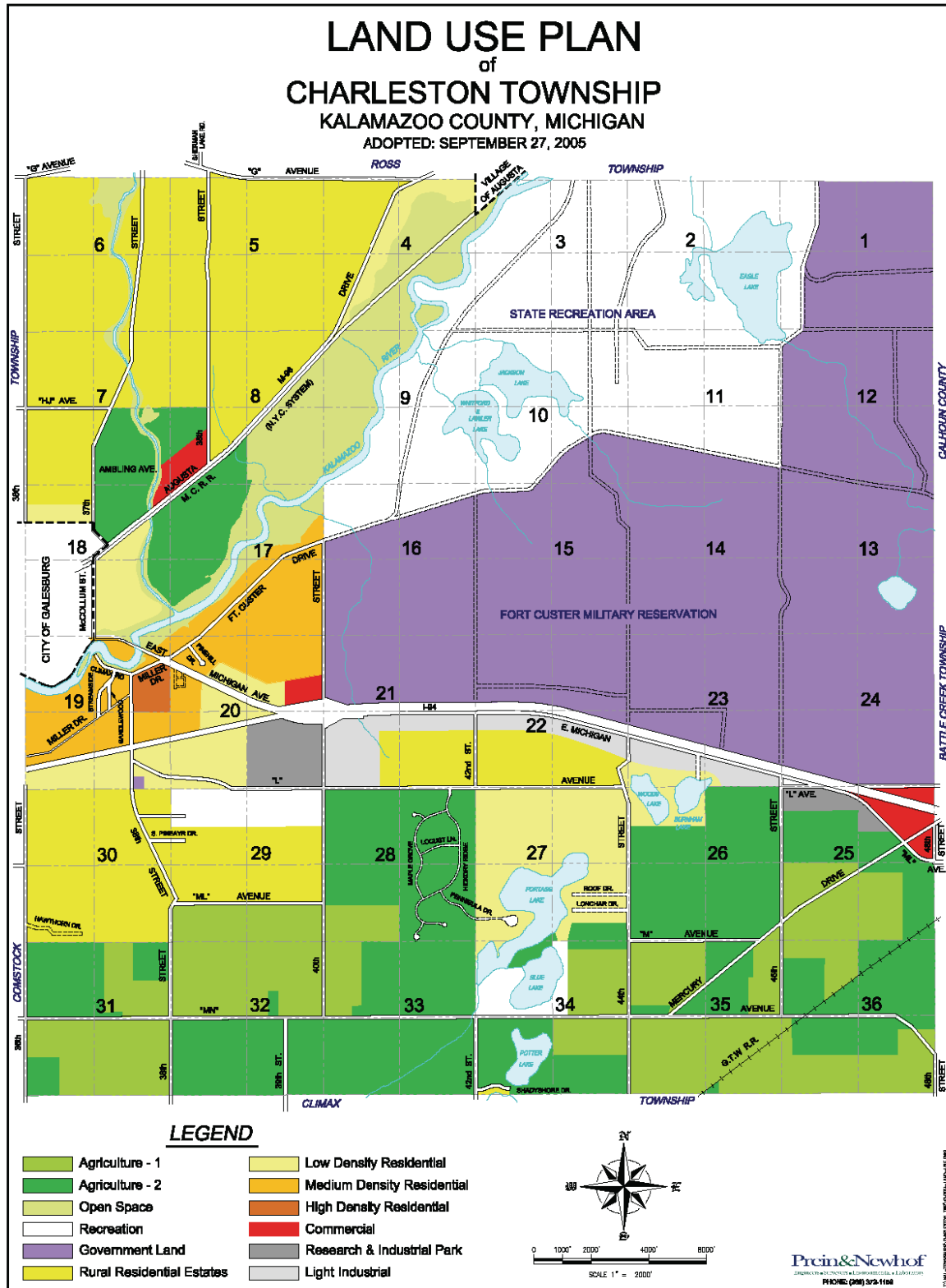
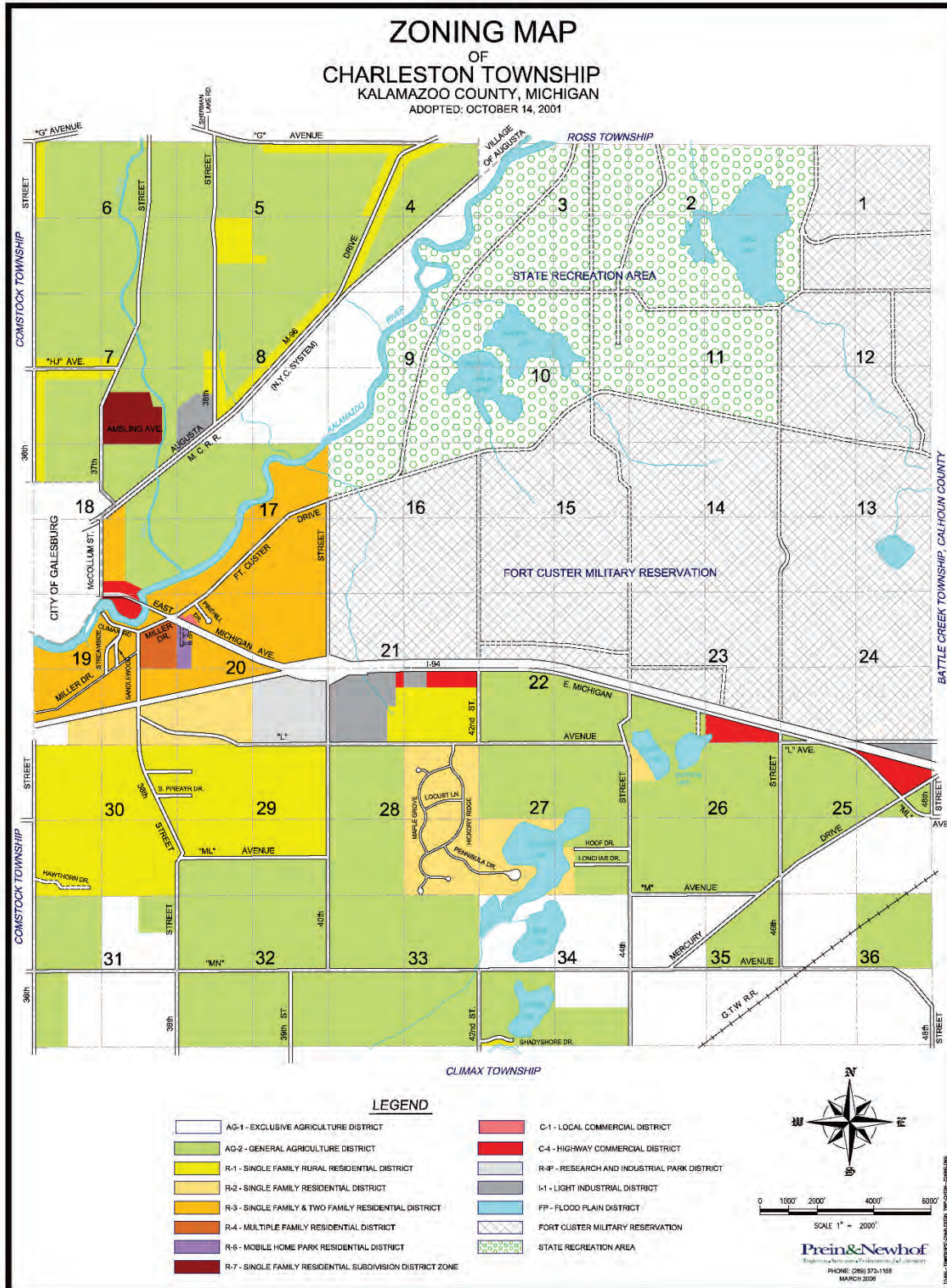


EXHIBIT 3



Based on the results of this policy review, the following policies and plans are suggested that would address resource protection and conformance with accepted development principles.

Open Space

Lands should be identified for the use of conservation easements or other tools to conserve open space. Natural features should be preserved as parkland in open space development to help alleviate problems associated with stormwater runoff. Natural features should be preserved to maintain existing infiltration of stormwater.

Recreation/Government Lands

Priority lands should be identified for acquisition or protection for future recreational use. A greenways plan should be created or greenways and green infrastructure encouraged as important natural transportation corridors for wildlife, and for the protection of other natural features.

Agricultural 1 And 2

Lands should be identified for the use of conservation easements or other tools to conserve open space.

Residential

Minimizing hard surfaces should be encouraged in new construction and redevelopment projects to reduce runoff and improve infiltration. The reduction of impervious surfaces should be promoted for the protection of water quality, natural features, and open space. Erosion and sedimentation control should be required as a mechanism to protect health, safety, and welfare of residents through protection of water and soil resources.

Commercial

High-risk land use activities in groundwater recharge and wellhead protection areas should be limited. Minimizing hard surfaces should be encouraged in new construction and redevelopment projects to reduce runoff and improve infiltration. The reduction of impervious surfaces should be promoted for the protection of water quality, natural features, and open space. Erosion and sedimentation control should be required as a mechanism to protect health, safety, and welfare of residents through protection of water and soil resources.

Industrial/ Research and Industrial Park

High-risk land use activities in groundwater recharge and wellhead protection areas should be limited. Minimizing hard surfaces should be encouraged in new construction and redevelopment projects to reduce runoff and improve infiltration. The reduction of impervious surfaces should be promoted for the protection of water quality, natural features, and open space. Erosion and sedimentation control should be required as a mechanism to protect health, safety, and welfare of residents through protection of water and soil resources.

Resource Protection Overlay District

Based on the policy review, an additional land use category of a RPOD could be added to increase the Township's ability to provide greater resource protection. Example language is provided below:

The Township is fortunate to have several lakes and high quality streams providing recreational and aesthetic value. By identifying and delineating these areas, the Township can utilize an overlay zone to

protect these natural resources. Properties included within these geographical areas retain their underlying zoning classification, but are subject to additional requirements specified in the overlay district ordinance. The RPOD builds on established local preservation policies.

RPOD MAP

To create the overlay zone, characteristics of natural features and specific land uses were identified and mapped, as described below.

Agriculture

Prime and unique agricultural lands are identified and mapped, with data available from the NRCS Soil Survey in Figure 1. The RPOD incorporates the Prime Farmland Soils layer.

Surface Water

Several waterways flow through the Township, as shown in Figure 2. The RPOD incorporates these streams.

Groundwater

The geographic area of the Wellhead Protection Areas illustrated in Figure 3, are typically based on the groundwater recharge areas and the wellhead zone of contribution in a 10-year time of travel. This allows for zoning regulations to be placed directly on the wellhead protection area at risk. The RPOD incorporate those areas.

Floodplains

Floodplains are identified with a naturally vegetated buffer that encompasses the 100-year floodplain (Figure 2) The RPOD incorporates all 100-year floodplains.

Woodlands

Existing woodlands are mapped as Deciduous Forest, Evergreen Forest, Mixed Forest, and Woody Wetlands in Figure 4. These areas could be inventoried to create a high quality woodlands map to be added to the RPOD in the future.

Wetlands

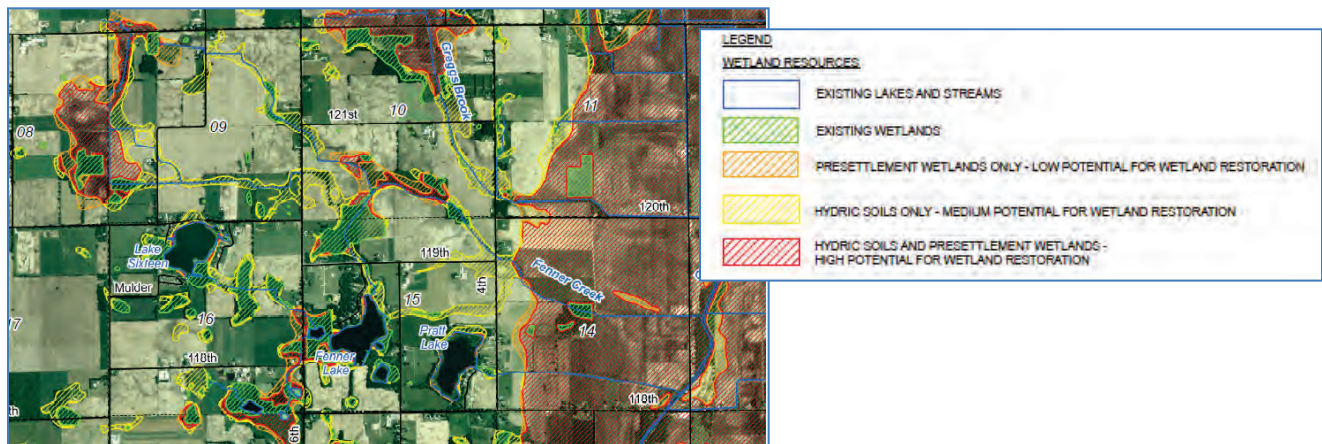
Existing wetlands are shown in Figure 5. MDEQ provides additional information in mapping of potential wetland restoration areas, as shown in Figure 6. The RPOD incorporates the existing wetlands and the high priority wetland restoration areas.

High-Priority Habitats

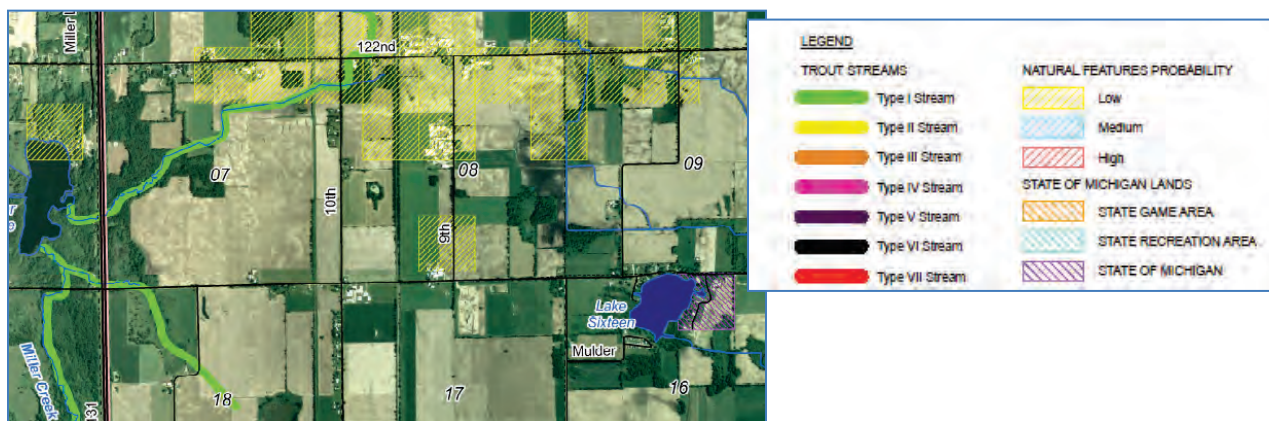
Areas of biological rarity, meaning areas with known occurrences of threatened or endangered species, are mapped in Figure 7. Since most of the high occurrences are within the Fort Custer lands, they are not included in the RPOD.

Examples of resource protection maps created for Martin Township, Allegan County, are included as Example 1 and Example 2 below. The resulting RPOD map for Charleston Township is included as Figure 8.

Example 1 - Wetland Resources in Martin Township in Allegan County



Example 2 - High-Priority Natural Lands in Martin Township, Allegan County, Michigan



ZONING ORDINANCE REVIEW

A review of the Charleston Zoning Ordinances resulted in additional recommendations for the planning commission to consider incorporating into the existing Zoning Ordinances to improve measures for resource protection. The priority zoning concepts that provide the most benefit and protection of water resources include:

- Requiring building setbacks from water bodies (streams, rivers, lakes, wetlands) with a native vegetative buffer.
- Protecting wetlands through a Township wetlands ordinance.
- Improving parking lot standards to reduce impervious surfaces (shared parking, parking space size, and minimum parking requirements).
- Adjusting maximum building area standard to include all impervious surfaces, not just building area.
- Preserving open spaces by encouraging compact development in areas with existing infrastructure and developing a Clustering and/or Open Space ordinance.
- Improving site plan review.
 - Identify all natural features.
 - Review standards for protection.
 - Label Best Management Practices (BMPs) on site plan.
 - Require a review of known occurrences of threatened and endangered species through the Michigan Natural Features Inventory.
- Encouraging Low Impact Development (LID) techniques and BMPs to reduce runoff and increase infiltration.
- Coordinating with the County Soil Erosion and Sedimentation Control (SESC) program and require compliance with County SESC standards.

- Requiring new septic systems be located at least 100 feet from a lake, stream, wetland, or other water features.
- Encouraging the use of native species in landscaping to increase infiltration of stormwater and to discourage the use of invasive species.
- Improve private road standards to reduce impervious surfaces.
- Require a buffer between agriculture and residential uses to protect agricultural landowners.

The Southwest Michigan Planning Commission (SWMPC) has recognized and been promoting the opportunity to implement LID techniques to avert the degradation of water. LID is the most sensible approach when considering the benefit of clean water coupled with the fact that often these techniques can be less costly to the developer than conventional development (www.swpmc.org/lid.asp).

Priority zoning and LID concepts can be incorporated into the current Zoning Ordinances, as demonstrated below with example language for the Planning Commission to consider.

(Additions are in bold italics.)

ARTICLE I

Section 1.2 PURPOSE

“...to ensure that uses of land shall be situated in appropriate locations and relationships” ***to protect water quality and maintain the natural functions of the Portage River watershed;***

ARTICLE III - DEFINITIONS

Section 3.1 DEFINITIONS

Insert before #58:

Low Impact Development (LID): an ecologically friendly approach to site development and stormwater management that aims to mitigate development impacts to land, water and air. LID emphasizes the integration of site design and planning techniques that conserve natural systems and hydrologic functions on a site by increasing infiltration and decreasing impervious surfaces.

Insert before #95:

Watershed: the area of land bordered by hills and ridges that catches rain and snow and drains or seeps into a common outlet, such as a marsh, stream, river, lake or groundwater. Just as creeks drain into rivers, watersheds are nearly always part of a larger watershed. For example, the Portage River Watershed is part of the St. Joseph River Watershed, which is part of the Lake Michigan Watershed.

ARTICLE IV

Section 4.1 ZONING DISTRICTS

RPO Resource Protection Overlay District

Article XVIII - "RPO" Resource Protection Overlay District

Section 18.1 – STATEMENT OF PURPOSE AND DESCRIPTION OF DISTRICT

This district is designed to preserve and enhance the recreational, ecological, and aesthetic values of the Township's natural resources for future generations by identifying specific areas in which special restrictions apply.

Section 18.2 - PERMITTED USES

To be determined.

Section 18.3 - SPECIAL EXCEPTION USES

To be determined.

Section 18.4 – DENSITY, AREA, HEIGHT AND PLACEMENT REQUIREMENTS

In accordance with Article XX of this Ordinance.

Example from Green Oak Township, Michigan: (Revise for Charleston usage)

- *Minimum setback for new buildings of 125 feet from the ordinary high water mark.*
- *Prohibiting cutting and/or filling for building on the floodplain and filling for buildings on the upland within 500 feet of the river's edge where the groundwater table is within six feet of the surface.*
- *Preserving a natural vegetation strip adjacent to the river on all private and publicly owned land.*
- *Restricting placement of septic system drain fields to 150 feet from the river.*
- *Prohibiting use of pesticides, herbicides, and fertilizers within the riparian zone.*

Section 18.5 – OFF-STREET PARKING REQUIREMENTS:

In accordance with Article XXVI of this Ordinance.

Section 18.6 – SITE PLAN REVIEW

In accordance with Article XXIV of this Ordinance.

ARTICLE XXIV - SITE PLAN REVIEW

Section 24.4 Formal Site Plan Application Content:

Section 4.4.19. The location of all lakes, streams, wetlands, county drains, other waterways, **floodplains, floodways, woodlands, steep slopes, and natural drainage patterns** on or within 100 feet of the subject property.

Section 24.4.27 Coordinate site plan review with receipt of applicable county (drain, soil erosion) and state permits.

Section 24.4.29 The location of all soil erosion and sedimentation control BMPs. Native or site suitable plants must be utilized in all vegetative stormwater BMPs (to help reduce stormwater velocities, filter

runoff, provide additional opportunities for wildlife habitat and prevent invasive species from being introduced into the Township).

Section 24.4.30 Review of the site plan by the County Drain Commissioner if the site discharges to a County Drain.

Section 24.6.2 Criteria for Site Plan Review:

The site plan shall be reviewed and approved by the Township Planning Commission upon a finding that:

e. The natural features of the landscape, such as ponds, streams, hills, wooded areas, **floodplains, floodways, wetlands, steep slopes, and natural drainage patterns** have been retained **to the fullest extent possible and site disturbance is minimized as much as possible.**

ARTICLE XXVI – PARKING AND LOADING SPACES

- **Allow for flexibility in parking requirements to reduce impervious surfaces as much as possible and encourage shared parking.**
- **Require some percentage of large parking lots to have landscaping to break up the impervious surfaces.**
- **Require 30% of parking area to have spaces with smaller dimension for compact cars.**
- **Require maximum parking spaces instead of minimum number of spaces.**
- **Allow for driveways or overflow parking areas to be pervious or porous pavements.**

ARTICLE V – GENERAL PROVISIONS

Section 5.16 – Waterfront Development and Use Regulations:

- **Prohibit cutting and/or filling for building on the floodplain and filling for buildings on the upland within 500 feet of the river’s edge where the groundwater table is within six feet of the surface.**
- **Preserve a natural vegetation strip adjacent to the river on all private and publicly owned land.**
- **Restrict placement of septic system drain fields to 150 feet from the waterbody or as far as possible away from waterbody.**
- **Minimize use of pesticides, herbicides, and fertilizers within the riparian zone.**

ARTICLE XX – SCHEDULE OF LOT, YARD AND AREA REQUIREMENTS

Add Column for RPO (Resource Protection Overlay District).
 Add setbacks for each Principle Structure as determined by the Planning Commission.
 Add Rows for **Natural Features**, with rows below for **Wetlands, Rivers and Streams, Lakes**, and add setback for each zoning district.

Section 26.10 – TABLE OF OFF-STREET REQUIREMENTS

Add Column for RPO (Resource Protection Overlay District).
 Add list of approved uses and note number of minimum **and maximum** parking spaces per unit of measure.
 OR

Discuss parking space requirements for the RPO in Article 26.11.

NEW ARTICLE - PRIVATE ROAD STANDARDS AND PROCEDURES

- **Permit a minimum pavement width of 18-22 feet on low traffic, local streets in residential neighborhoods. Allow narrower pavement widths along sections of the roadway where there are no houses, buildings, or intersections and where on-street parking is not anticipated.**

- *Permit the use of “open section” roadways with roadside swales. Do not require the use of conventional curbs for the full length of all streets in residential neighborhoods. Where curbs are deemed necessary to protect the roadway edge, allow the use of perforated curbs (that allow runoff to flow into swales) or invisible curbs (flush with the road surface).*
- *Minimize the required radii for cul-de-sacs. A radius of 35 feet is optimal, depending on emergency vehicles.*
- *Allow the creation of landscaped islands and bio-retention cells with cul-de-sacs.*
- *Permit the use of one-way loop streets to eliminate turnarounds.*
- *Permit hammerhead turnarounds instead of cul-de-sacs.*

IMPLEMENTATION

The WMP outlines recommendations to meet the goals and objectives identified by the Steering Committee. Land use planning was determined to be an important part of the sustainability of the watershed project since future growth is expected to occur around the urban and recreational areas. Several recommendations contained in this policy review could involve changes that may not be fully within the control of the Township. Some might require state approval or legislative action. This policy review is one component of the complex issue of land use planning, but will assist the Township in identifying the next step in the process.

Implementation of the recommendations of this policy review document includes the following tasks:

A. DEVELOP A CAPITAL IMPROVEMENT PROGRAM

Develop a Capital Improvement Program working with the zoning ordinance as a guide for economic development and capital improvement projects. Include opportunities for incorporating green infrastructure into identified projects.

B. DEVELOP WETLAND AND FLOODPLAIN ORDINANCES

The Land Use Plan refers to the Township's Floodplain and Wetland ordinances; however the Zoning Ordinance does not contain specific sections that address these natural features.

C. DEVELOP SUBDIVISION (AND CONDOMINIUM) REGULATIONS/ORDINANCE

Developing a PUD ordinance would allow the flexibility required to implement LID techniques in new developments and open space requirements.

D. UPDATE ZONING ORDINANCE

Use information contained in this report to update zoning ordinance language for greater resource protection.

CONCLUSIONS

The recommendations listed in this report would improve plans and policies in the Township to better protect water quality and natural resources.

Introducing new concepts to local officials requires substantial time and effort spent on presenting information to gain a level of comfort with the new techniques. The policy review spreadsheet (Appendix 1) can continue to guide future work for both an updated Land Use Plan and zoning ordinances. This document and the policy review spreadsheet should be used as a review tool and the language developed for the Township could be applicable to other communities within the county.

The results of this policy review reveal specific areas of the existing development rules that are generally good in their efforts of watershed protection and other areas that could be enhanced for greater resource protection. Assessing the current development rules and the identification of the impediments to innovative site design will assist the community to create and implement better development designs.

REFERENCES AND LAND USE PLANNING RESOURCES

Ardizzone, Katherine A. and Mark A. Wyckoff, FAICP. *FILLING THE GAPS: Environmental Protection Options for Local Governments*, 2nd Ed. Michigan Department of Natural Resources and Environment, Coastal Management Program with financial assistance from the National Oceanic and Atmospheric Administration, authorized by the Coastal Zone Management Act of 1972. December 2010.

Center for Watershed Protection, 1998. *Better Site Design: A Handbook for Changing Development Rules in Your Community*. Prepared for the Site Planning Roundtable, Ellicott City, MD.

Center for Watershed Protection, 2000. *Recommended Model Development Principles for Frederick County, MD*. Ellicott City, MD.

Galli, J. 1991. *Thermal Impacts Associated with Urbanization and Stormwater Management Best Management Practices*. Metropolitan Washington Council of Governments. Maryland Department of Environment. Washington, D.C. 188pp.

Heraty, M. 1993. *Riparian Buffer Programs: A Guide to Developing and Implementing a Riparian Buffer Program as an Urban Best Management Practice*. Metropolitan Washington Council of Governments, U.S. Environmental Protection Agency Office of Wetlands, Oceans and Watersheds. Washington, DC.

Kalamazoo Conservation District, 2006. *Portage River Watershed Management Plan, Kalamazoo and St. Joseph Counties, Michigan*.

Schueler, Thomas R. 1995. "The Importance of Imperviousness." *Watershed Protection Techniques*. 1 (3): 100-111.

Southeast Michigan Council of Governments Information Services. 2002. *Opportunities for Water Resource Protection in Local Plans, Ordinances, and Programs: A Workbook for Local Governments*. SEMCOG, Detroit, Michigan.

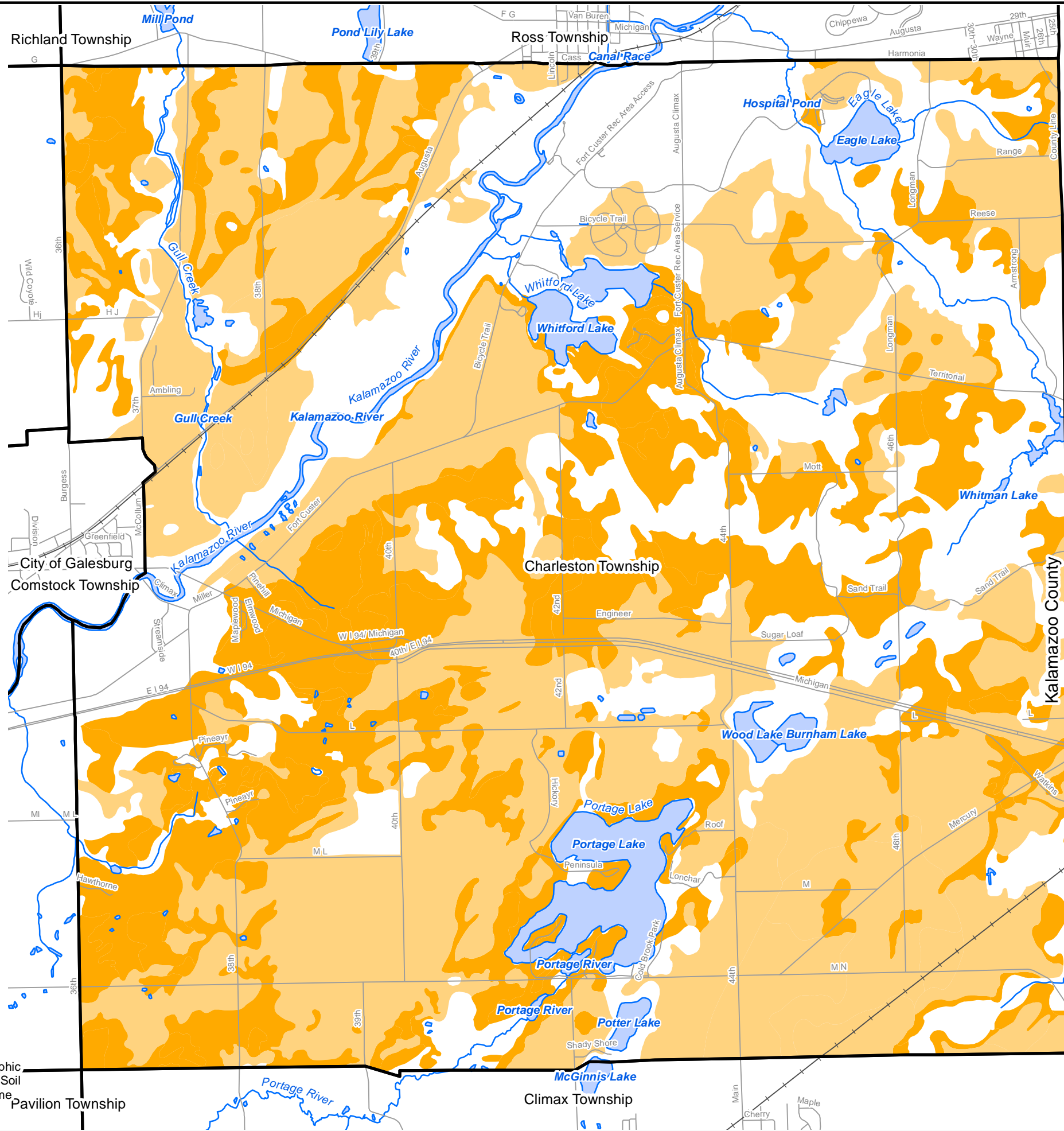
Southeast Michigan Council of Governments. 2003. *Opportunities Land Use Tools and Techniques: A Handbook for Local Communities*. SEMCOG, Detroit, Michigan.

Southeast Michigan Council of Governments Information Services. 2008. *Low Impact Development Manual for Michigan: A Design Guide for Implementors and Reviewers*. SEMCOG, Detroit, Michigan.

Smart Growth Network. 2002. "This is Smart Growth." International City/County Management Association and U.S. Environmental Protection Agency, Washington, D.C.

(<http://www.smartgrowth.org/about/principles/Default.asp?res=1280>)

Figures



Data Sources: Michigan Geographic Framework v13a. USDA NRCS Soil Survey - Kalamazoo County Prime Farmland.

Legend

- All Prime Farmland Soils
- Farmland of Local Importance Soils

CHARLESTON TOWNSHIP PRIME FARMLAND

NORTH

0 1,750 3,500 FEET

fish & h
 engineers
 scientist
 architects
 constructors

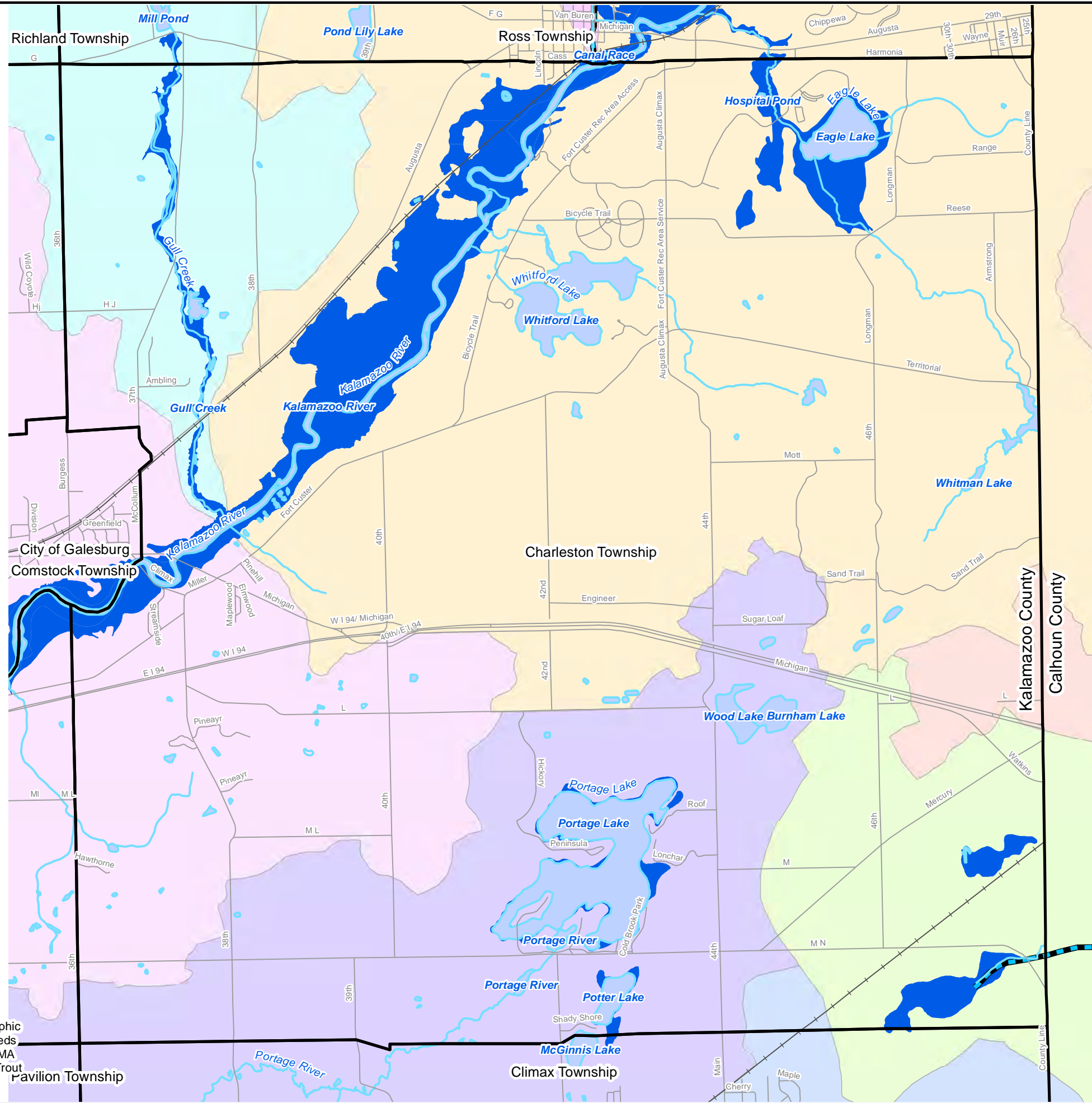
fishbeck, thompson, carr & huber, inc.
 Hard copy is intended to be 11"x17" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

Charleston Township
 Kalamazoo County, Michigan
 Portage River Watershed Planning Project
 MDEQ Tracking Code #2012-0017

PROJECT NO.
 G130188

FIGURE NO.
1

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Data Sources: Michigan Geographic Framework v13a. EPA Watersheds HUC12-Kalamazoo County. FEMA 100 Year Flood Zones. MDNR Trout Streams 2008.

Legend

- MDNR Trout Stream 2008
- Augusta Creek
- City of Galesburg-Kalamazoo River
- Eagle Lake-Kalamazoo River
- Gull Creek
- Harts Lake-Kalamazoo River
- Headwaters Little Portage Creek
- Headwaters Portage River
- Minges Brook
- FEMA 100 year Flood Zones

**CHARLESTON TOWNSHIP
TROUT STREAMS AND
SUBWATERSHEDS**

NORTH FEET
0 1,750 3,500

fish & h
engineers
scientist
architects
constructors

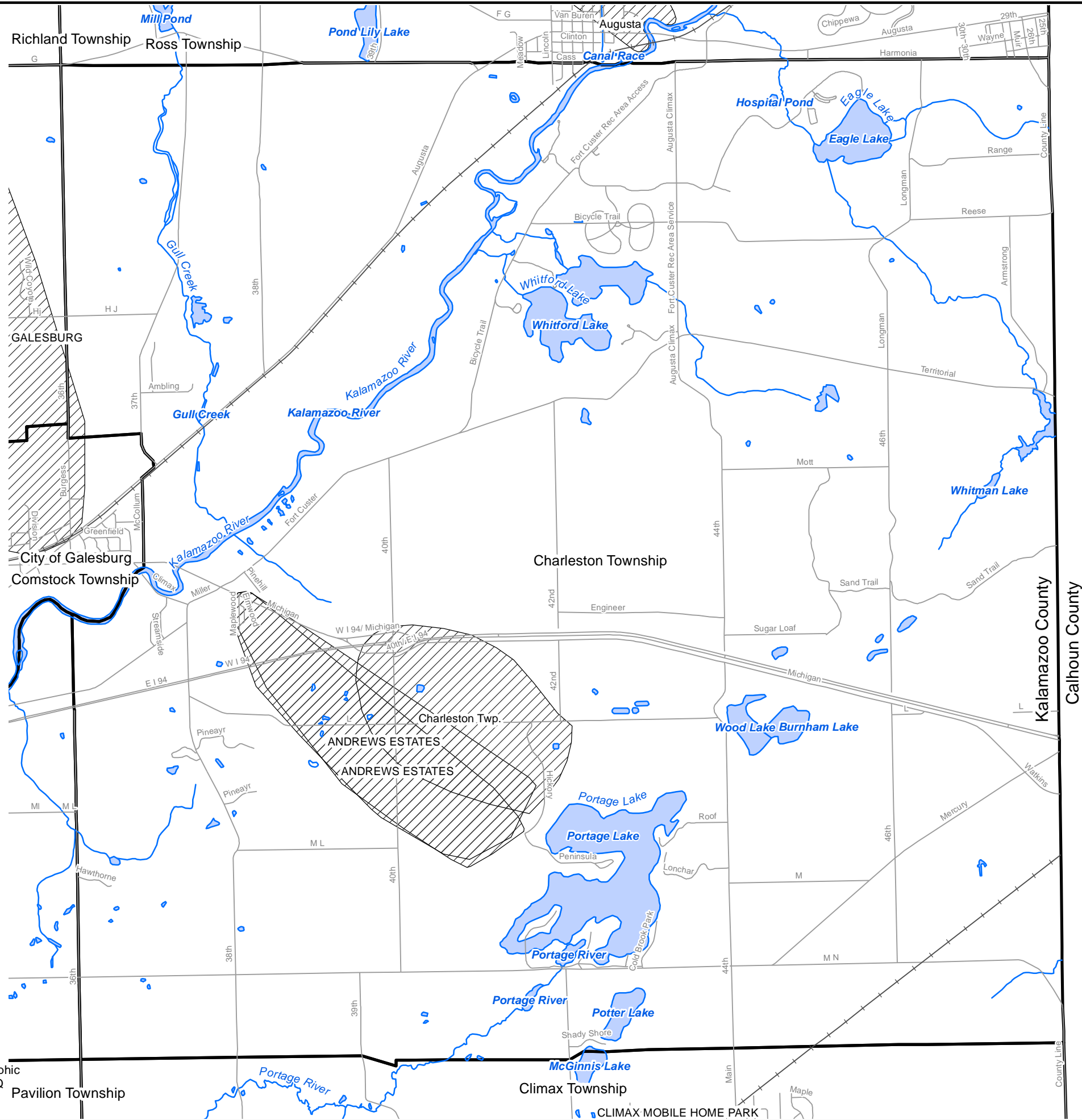
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FIGURE NO.
2

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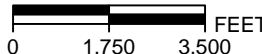
Data Sources: Michigan Geographic Framework v13a. Michigan DEQ Wellhead Protection Area.

Legend

 Wellhead Protection Area

WELLHEAD PROTECTION AREAS WITHIN CHARLESTON TOWNSHIP

 NORTH

 0 1,750 3,500 FEET

fish & h

engineers
scientist
architects
constructors

fishbeck, thompson, carr & huber, inc.

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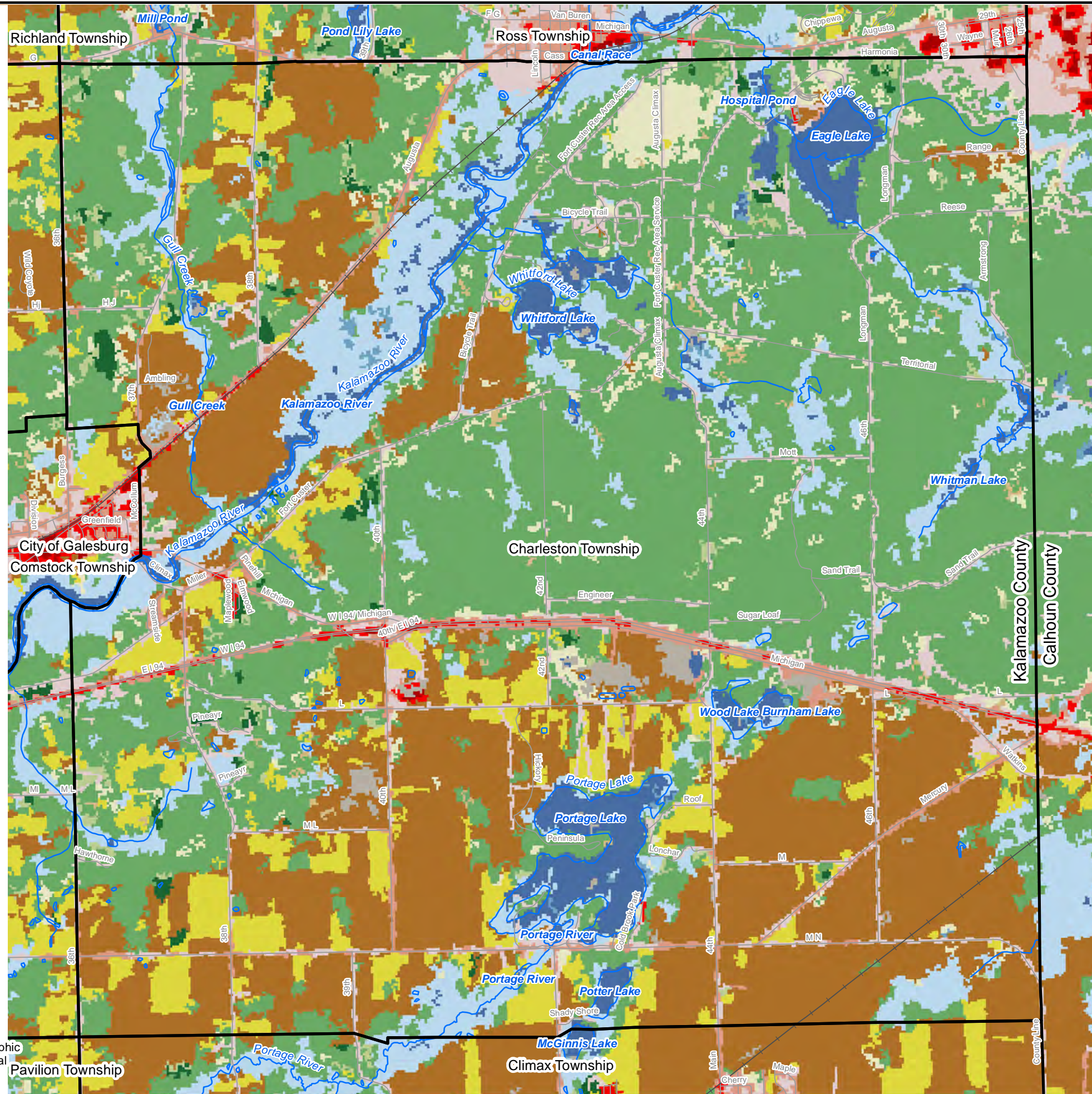
Charleston Township
Kalamazoo County, Michigan

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MDEQ Tracking Code #2012-0017

PROJECT NO.
G130188

FIGURE NO.
3

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Data Sources: Michigan Geographic Framework v13a. USDA National Land Cover Dataset 2006.

Legend

Land Cover 2006

- Barren Land
- Cultivated Crops
- Deciduous Forest
- Developed, High Intensity
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, Open Space
- Emergent Herbaceous Wetlands
- Evergreen Forest
- Hay/Pasture
- Herbaceous
- Mixed Forest
- Open Water
- Shrub/Scrub
- Woody Wetlands

CHARLESTON TOWNSHIP
LAND COVER

NORTH

0 1,750 3,500 FEET

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scientist
architects
constructors

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carr & huber, inc.

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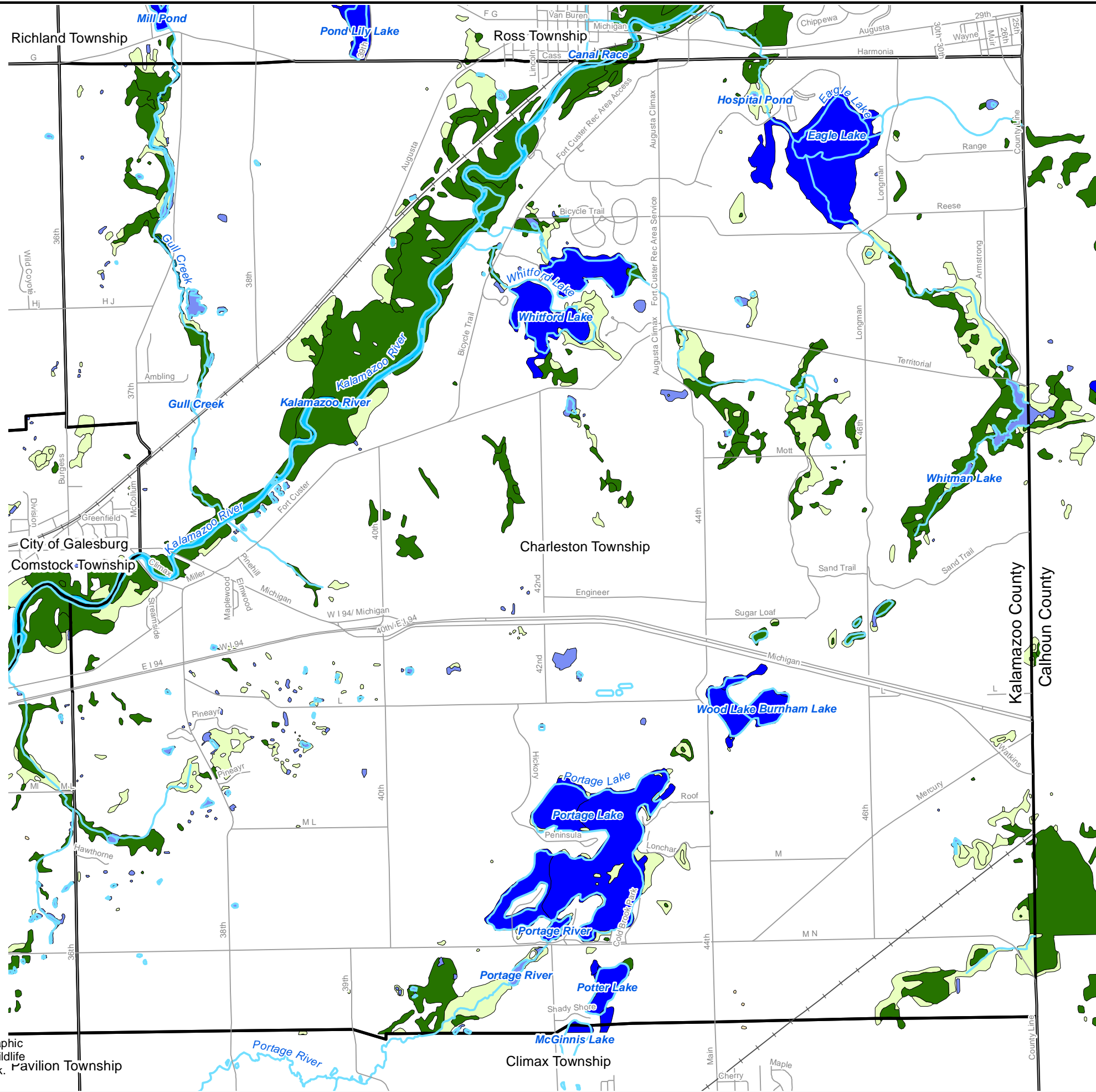
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Kalamazoo County, Michigan

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PROJECT NO.
G130188

FIGURE NO.
4

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Legend

- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Freshwater Emergent Wetland
- Other
- Riverine

**CHARLESTON TOWNSHIP
EXISTING WETLANDS**

Data Sources: Michigan Geographic Framework v13a. US Fish & Wildlife National Wetlands Inventory 24k. Pavilion Township

PLOT INFO: Z:\2013\130188\CAD\GIS\Map Document\Charleston Twp Wetlands.mxd Date: 10/31/2014 10:39:59 AM User: cda

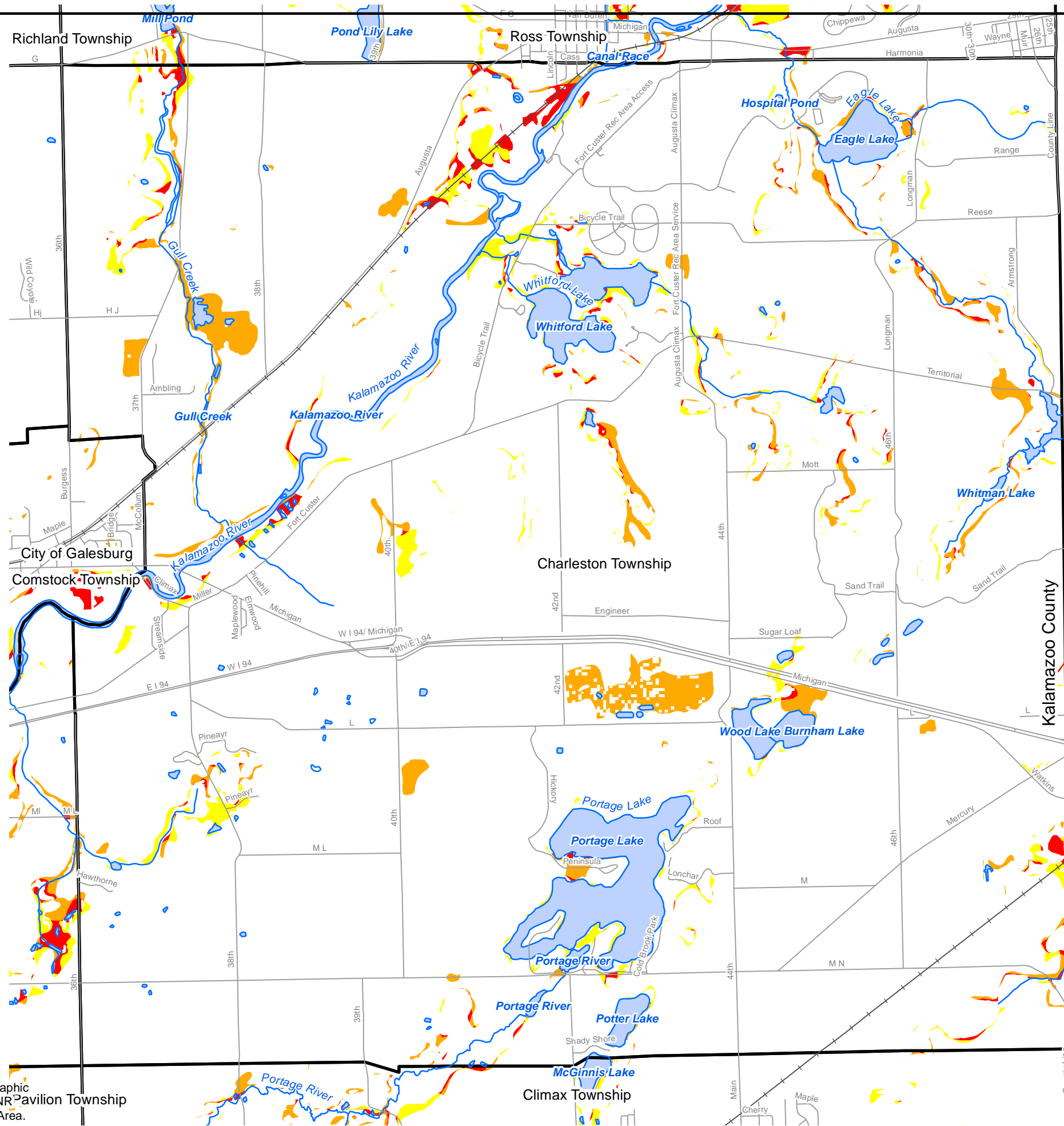
frch
engineers
scientist
architects
constructors

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Kalamazoo County, Michigan
Portage River Watershed Planning Project
MDEQ Tracking Code #2012-0017

PROJECT NO.
G120246

FIGURE NO.
5
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Data Sources: Michigan Geographic Framework v13a. Michigan DNR Pavilion Township Potential Wetland Restoration Area.

Legend

Potential Wetland Restoration Area

- High Potential-Hydric Soil and Presettlement Wetland Overlay
- Medium Potential-Only Hydric Soils
- Low Potential-Only Presettlement Wetlands

**CHARLESTON TOWNSHIP
POTENTIAL WETLAND
RESTORATION AREAS**

NORTH

0 0.5 1 MILES

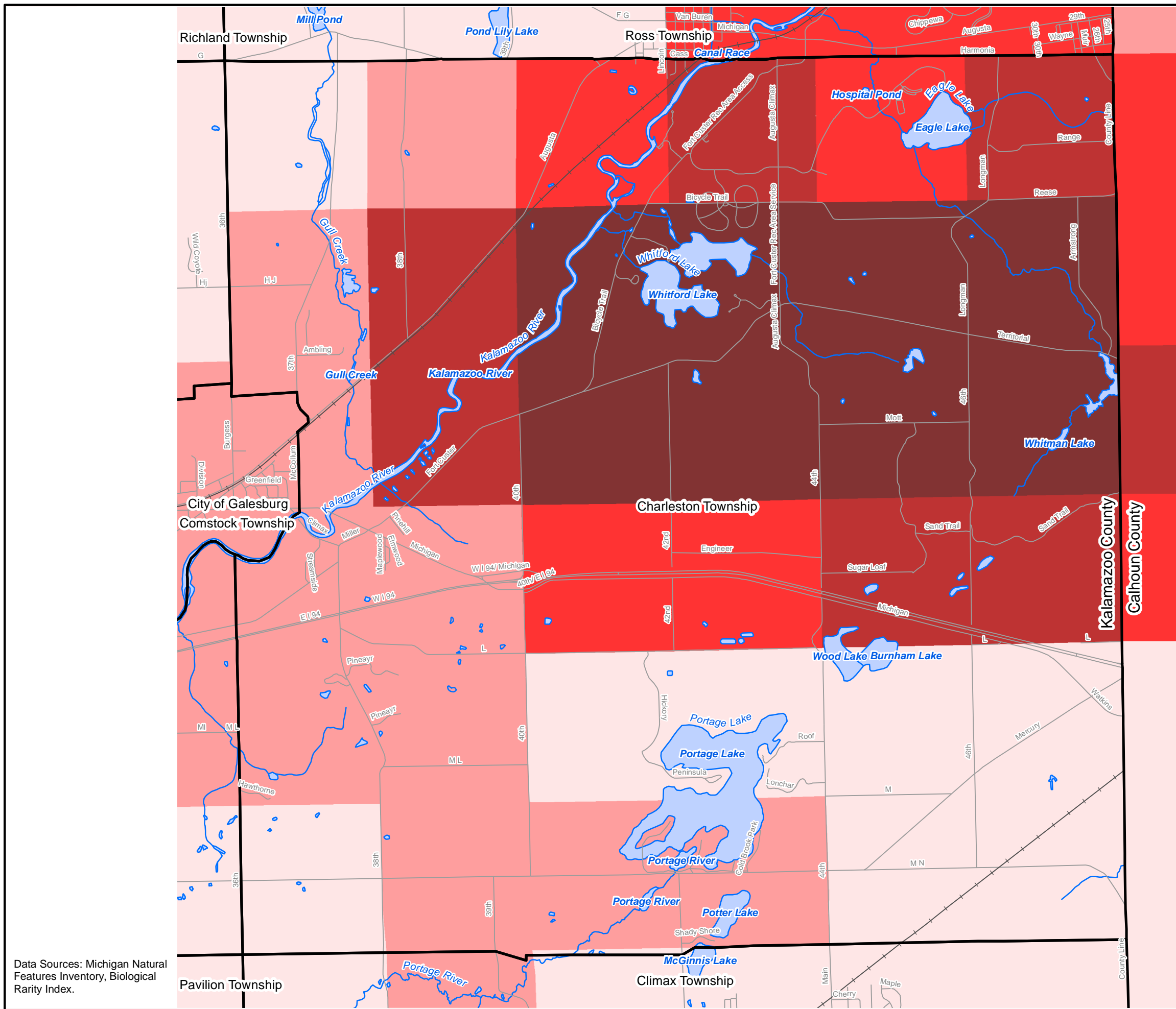
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engineers
scientist
architects
constructors

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Kalamazoo County, Michigan
Portage River Watershed Planning Project
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PROJECT NO.
G130188

FIGURE NO.
6
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Data Sources: Michigan Natural Features Inventory, Biological Rarity Index.

Legend

NUMBER OF THREATENED, ENDANGERED OR SPECIAL CONCERN SPECIES PER QUARTER-QUARTER SECTION

| | |
|------------|-----------|
| Light Pink | 0.01 - 10 |
| Light Red | 10 - 25 |
| Red | 25 - 50 |
| Dark Red | 50 - 100 |
| Dark Brown | 100 + |

BIOLOGICAL RARITY AREAS WITHIN CHARLESTON TOWNSHIP

NORTH

0 1,750 3,500 FEET

fish & h

engineers
scientist
architects
constructors

fishbeck, thompson, carr & huber, inc.

Hard copy is intended to be 11"x17" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

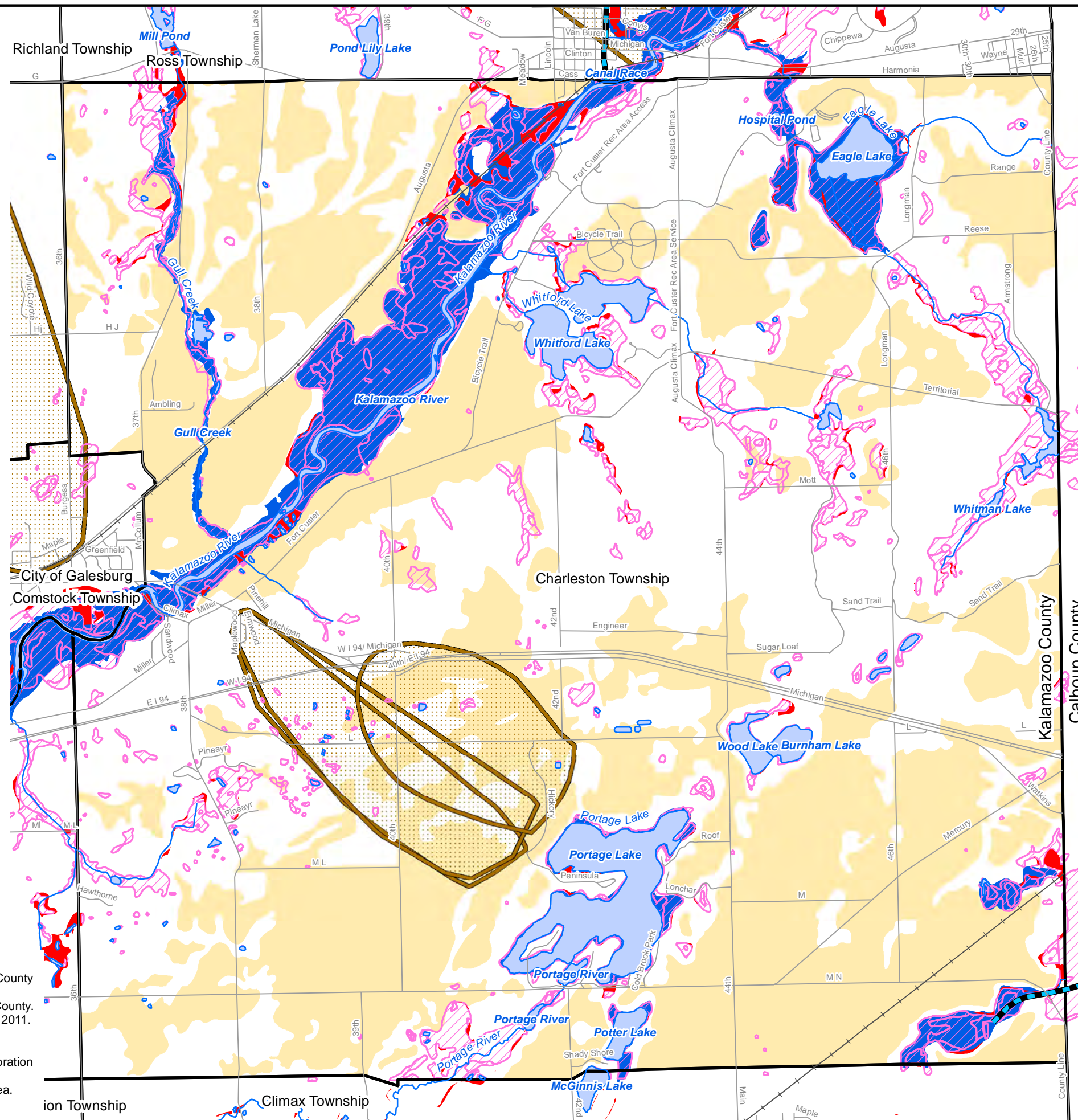
Charleston Township
Kalamazoo County, Michigan

Portage River Watershed Planning Project
MDEQ Tracking Code #2012-0017

PROJECT NO.
G130188

FIGURE NO.
7

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Data Sources:
 USDA NRCS Soil Survey-Kalamazoo County Prime Farmland, 2009.
 EPA Watersheds HUC12-Kalamazoo County.
 FEMA 100 Year Flood Zones, effective 2011.
 US Fish & Wildlife National Wetlands Inventory 24k.
 Michigan DNR Potential Wetland Restoration Area.
 Michigan DEQ Wellhead Protection Area.
 MDNR Trout Streams 2008.

Legend

- MDNR Trout Stream 2008
- High Potential Wetland Restoration Area
- Wetlands NWI
- FEMA 100 Year Flood Zones
- Wellhead Protection Area
- Prime Farmland Soils

RESOURCE PROTECTION OVERLAY DISTRICT

NORTH

0 1,750 3,500 FEET

ftc&h
 engineers
 scientist
 architects
 constructors

fishbeck, thompson,
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Portage River Watershed Planning Project
 MDEQ Tracking Code #2012-0017

PROJECT NO.
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 FIGURE NO.
8
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Appendix 1

Document Review for Water Resource Protection

Charleston Township - Kalamazoo County,
Michigan

October 2014

| Criteria | Yes/ No | Comments |
|---|------------|---|
| | | List page number in Master Plan and list the section of the Zoning Ordinance |
| Watershed Issues | | |
| I. Watershed Activities | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan identify the watershed(s) in which the community is located? | Yes | LUP page 5: The Kalamazoo River and St. Joseph River watersheds. |
| 2. Does the Master Plan call for protection of watershed resources in order to protect the health, safety and welfare of residents? | Yes | LUP page 5: "(Groundwater) should be protected and to that end the Township is poised to implement a wellhead protection program." |
| Stream Corridors and Flood Plains | | |
| I. Stream Corridors | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan indicate the importance of any of the following: riparian buffers to assist in flood control, protect the streambank from erosion, remove pollutants from storm water runoff, provide food and habitat for wildlife, prevent sediment from settling in the water course, provides tree canopy to shade streams, and promote desirable aquatic organisms, scenic value and recreational opportunities? | Yes | LUP page 16: The Open Space district is located in low-lying areas along the Kalamazoo River and Gull Creek. The purpose of this category is to protect these areas from potential causes of erosion and to provide an open, natural environment along waterways. |
| 2. Does the Master Plan state that protection of stream corridors is important in promoting the health, safety and welfare of residents through flood control, and water quality and riparian corridor preservation? | Partially | Same as above. |
| B. Development / Redevelopment Regulations: | | |
| 1. Are regulations coordinated with regulations protecting County drains? | | |
| 2. Does the community require naturally-vegetated buffers along drainage way corridors? | No | |
| a. What is the width of the corridor? | NA | |
| 3. Does the community restrict development adjacent to stream corridors to those which do any of the following: offer no danger of topographical disturbance to the corridor, degradation to water quality, increased runoff, sedimentation, stream channel alterations, or degradation of dependent, non-hydrologic resources (i.e. flora and fauna)? | | ZO 24.6.2e: Site plan review criteria requires the natural features of the landscape, such as ponds, streams, hills, wooded areas, have been retained as practicable, where they afford a barrier or buffer between adjoining properties...or where they assist in preserving the general appearance of the area. |
| 4. Are waterbody setbacks in place of at least 30-50 feet? | Yes | ZO 5.16.3a: Structures must be constructed at least 75 feet from a waterbody. In developed areas, the setback is established by averaging the setbacks of structures within 250 feet of each side of the subject lot. |
| II. Flood Control | | |

Document Review for Water Resource Protection

Charleston Township - Kalamazoo County,
Michigan

October 2014

| Criteria | Yes/ No | Comments |
|--|------------|---|
| A. Plans and Policies: | | |
| 1. Does the Master Plan identify floodplain protection as important for any of the following to promote the health, safety and welfare of residents: flood control, stream bank protection, pollutant filter, wildlife habitat, reduce sedimentation, shade watercourse and provide scenic value and recreational opportunities? | See I.A.1 | LUP page 16: Refers to the Township's Flood Plain ordinance. |
| 2. Does the community call for coordination of their efforts to protect the floodplain with adjoining communities and the County? | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the community participate in the National Flood Insurance Program? | Yes | |
| 2. If yes, does the community have an overlay zone or other ordinance language that protects floodplains from undesirable development? | Yes | ZO 5.23.2b: Proposed development in a Flood Hazard zone must comply with the Charleston Township Community Resolution To Manage Floodplain Development For The National Flood Insurance Program and Township Ordinance No. 142. |
| 3. Do the community's floodplain regulations address the following: | | |
| a. Provide for assessing the impacts of flood management projects on water quality? | No | |
| b. Provide for adding BMP's to existing projects? | No | |
| 4. Is there a variable width, naturally vegetated buffer that encompasses the 100 year floodplain area? | No | |
| Impervious Surface Reduction | | |
| I. Reducing Impervious Surfaces | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan call for minimizing impervious surfaces in new construction and redevelopment projects to reduce the amount of runoff and improve infiltration? | No | |
| 2. Is the Master Plan goal of reducing impervious surface tied to protecting the health, safety and welfare of residents through protection of water quality, natural features and open space? | NA | |
| II. Parking Lots/Driveways/Sidewalks | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Does the community have flexibility in the parking ordinance to reduce the number of spaces constructed if warranted by the proposed development? | Yes | ZO 24.7: The number of required parking spaces may be reduced if a variance is granted by the Zoning Board of Appeals. |
| 2. Is some portion of a parking lot required to be planted with trees/ vegetation within the parking lot paving? | No | |

Document Review for Water Resource Protection

Charleston Township - Kalamazoo County,
Michigan

October 2014

| Criteria | Yes/ No | Comments |
|--|------------|---|
| 3. Does the community require stormwater treatment for parking lot runoff in landscaping areas? | No | |
| B. Design Standards: | | |
| 1. Are shared parking facilities encouraged? | No | ZO 24.7: The total number of parking spaces must equal the number required for the individual uses. |
| 2. Is 30% of the parking area required to have spaces with smaller dimensions for compact cars? (9ft-width and 18ft - length or less)? | No | |
| 3. Is there a maximum on parking spaces size (9ft-width and 18ft - length or less)? | No | ZO 26.2: Minimum 9-foot width and 180 square foot area. |
| 4. Are developers encouraged to use parking lot islands as stormwater infiltration areas? | No | |
| 5. Are driveways or overflow parking areas allowed to be pervious or porous pavements? | | This is not addressed in the ZO. |
| 6. Are maximum spaces given instead of minimum (for office bldgs - 3spaces/1000ft ² ; shopping - 4.5 spaces/1000ft ² ; residential - 2 spaces/single family home)? | No | |
| 7. Are sidewalks only allowed to be on one side of the road? | | This is not addressed in the ZO. |
| 8. Are sidewalks eliminated if an alternative path is provided? | | This is not addressed in the ZO. |
| III. Street and Access | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Does the community have jurisdiction over roads or allow private roads? | No | Roads must meet the requirements of the Kalamazoo County Road Commission. |
| 2. If yes, do regulations pertaining to roads include the following standards: | | |
| a. Are streets to be designed with the minimum required pavement width needed to support travel lanes, emergency, maintenance and service vehicles (18-22 ft for low traffic roads)? | Yes | KCRC: 20-foot minimum width, with minimum 4-foot shoulder |
| b. Are right-of-way widths minimized to avoid mass clearing and grading (less than 45 feet)? | Yes | KCRC: Right-of-way widths vary from 66 to 120 feet, depending upon type of road. |
| c. Are there required landscaped areas in cul-de-sacs? | No | |
| d. Are the minimum radii of cul-de-sacs no more than 35 feet? | No | KCRC: Minimum pavement radius is 50 feet and ROW radius is 70 feet. |
| e. Are hammerheads allowed instead of cul-de-sacs? | | KCRC: this is not addressed in the KCRC Construction Guidelines. |
| f. Are the use of open swales allowed instead of curb and gutter? | | KCRC: this is not addressed in the KCRC Construction Guidelines. |
| g. If curb and gutter is used, are perforated curbs (allows water to flow into swales) or invisible curbs (flush with road surface) required? | | KCRC: this is not addressed in the KCRC Construction Guidelines. |
| IV. Lot Setbacks / Lot Width / Lot Coverage | | |
| A. Development / Redevelopment Regulations: | | |

Document Review for Water Resource Protection

Charleston Township - Kalamazoo County,
Michigan

October 2014

| Criteria | Yes/ No | Comments |
|--|------------|--|
| 1. Does the Zoning Ordinance allow for the relaxation of side yard setbacks and narrower frontages to reduce the total road length (and overall site imperviousness)? | No | |
| 2. Does the Zoning Ordinance allow for the relaxation of front yard setbacks to reduce driveway lengths (and overall site imperviousness)? | No | |
| 3. Does the Zoning Ordinance allow the location of bioretention, rain gardens, filter strips and swales in required setback areas and common areas? | | This is not addressed in the ZO. |
| 4. In rural, low density areas are there limits on impervious lot coverage (15% maximum includes all impervious surfaces not just the house)? | Yes | ZO XX: Maximum building coverage of 10% for AG-2 and R-2;5% for R-1. Standards only address building area, not all impervious surfaces. |
| 5. Are there limits on the extent of lawn area on residential lots in rural areas? | No | |
| The Development Review Process | | |
| I. Site Plan Review | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Is the review process coordinated with the receipt of applicable County and State permits? | | ZO 24.4.23: The site plan review must include engineering and architectural plans approved by the appropriate regulatory agency for the treatment or disposal of sewage and/or industrial waste tailings and unusable by-products. ZO 5.21.2a: No filling is allowed in wetlands unless a permit has been obtained from the MDEQ. |
| 2. Does the Zoning Ordinance require that developers preserve natural features, such as lakes, ponds, streams, floodplains and floodways, wetlands, woodlands, steep slopes, and natural drainage patterns to the fullest extent possible? | No | ZO 24.6.2e Mandates the natural features of the landscape be retained as practicable to provide a barrier or buffer between adjoining properties or to preserve the general appearance of the area and slope stability, to avoid erosion. |
| 3. Are BMP's required to be labeled and shown, in detail, on the site plan so that they can be reviewed for effectiveness during the site plan review process? | No | |
| 4. Is a Soil Erosion and Sedimentation Control Plan required as part of the site plan review process? | Yes | ZO 5.16 Requires that plans proposing development on land abutting a water body must verify that removal of ground cover conforms to the Sedimentation and Erosion Control Regulations enforced by Kalamazoo County. ZO 5.21.2b requires that a SESC permit be obtained before filling activities are conducted that may contribute sediment to surface water. |

Document Review for Water Resource Protection

Charleston Township - Kalamazoo County,
Michigan

October 2014

| Criteria | Yes/ No | Comments |
|--|------------|--|
| 5. Are developers required to show all natural features on site plans, such as lakes, ponds, streams, rivers, floodplains and floodways, wetlands, woodlands, steep slopes, and natural drainage patterns? | Yes | ZO 24.4.19 Requires that site plans include all lakes, streams, wetlands, county drains, and other waterways abutting or within 100 feet of the subject property. ZO 24.4.18 requires existing and proposed topography at a minimum of 2-foot intervals. ZO 24.4.22 requires a statement of the environmental impact of the proposed site development. ZO16.7.4 requires that watersheds, waterways, and wellheads be identified on property. zoned as R-IP. |
| II. Pre-Construction Meetings | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Is the construction sequence required to start with a pre-construction meeting? | No | |
| III. Construction | | |
| A. Plans and Policies: | | |
| 1. Does the community chart the progress of all construction projects to ensure that they are in compliance with the approved site plan? | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Is a Pre-winter meeting required to assess whether the existing soil cover will provide adequate soil erosion and sedimentation control during winter months? | No | |
| Land Conservation and Development Techniques | | |
| I. Open Space / Park Acquisition | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan and/or Recreation Master Plan call for community acquisition of open space? | No | LUP page 17: However, the Township currently has significant open space and recreational land (26% of total land). |
| 2. Does the Master Plan and/or Recreation Master Plan recognize the importance of open space preservation as a way to protect the health, safety and welfare of residents, protect vital air, land and water resource quality, to buffer air and noise pollution, preserve wildlife habitat, and preserve aesthetic values and the community's beauty? | Yes | LUP page 16: Describes the Open Space land use category. |
| II. Conservation Easement and Similar Tools | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan call for the use of conservation easements or other tools to conserve open space in the community? | No | |

Document Review for Water Resource Protection

Charleston Township - Kalamazoo County,
Michigan

October 2014

| Criteria | Yes/ No | Comments |
|---|------------|--|
| III. Clustering and Open Space Developments | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan include goals to preserve natural features and protect the quality of vital air, land, and water resources while accommodating development? | Yes | The LUP discusses the benefits of the Open Space and Recreation land use classifications. However, the Open Space classification on the 2005 Land Use Plan is designated as agricultural land on the 2006 Zoning map. |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the community have a Clustering and/or Open Space Ordinance? | No | ZO XX defines a minimum open space requirement: 25% building coverage in the R-IP district. If structures are located at least 300 feet from any Residential District, then building coverage may be up to 40%. ZO 16.7.3 requires that 25% of lots zoned R-IP must be landscaped open space. Maximum building coverage for Districts C-1, C-4 and I-1 is 40%. Maximum building coverage for single family residential districts and AG-2 range from 5 to 20%. |
| 2. Are flexible site design criteria available for developers that use open space or cluster design options? (Ex. Relaxed setback widths and lessened sidewalk requirements.) | No | |
| 3. Are open spaces required to be consolidated into larger units (contiguous), or required to be a minimum size or width? | | They are required to be a minimum size or width. Lot, yard and area requirements are specified in ZO XX. |
| 4. Does the open space have to be managed in a natural condition? | No | |
| 5. Are the types of uses allowed in the open space restricted to low impact uses? | No | |
| 6. Is open space required to be protected through a conservation easement or other similar mechanism? | No | |
| 7. Are incentives put into place to encourage open space development? | No | |
| a. Are bonus densities utilized as an incentive? | NA | |
| 8. Do all Planned Unit Developments require open space? | Yes | Planned Unit Developments are in Zoning District R-4, which has a maximum building coverage of 30%. |
| IV. Urbanized Communities | | |
| A. Plans and Policies: | | |
| 1. Are infill developments encouraged in areas that already have significant development? | Yes | LUP page 16: "residential development is encouraged in areas that already have some development and are close to the City of Galesburg, transportation networks and utility systems." |
| B. Design Standards: | | |

Document Review for Water Resource Protection

Charleston Township - Kalamazoo County,
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| Criteria | Yes/ No | Comments |
|--|------------|---|
| 1. Are infill and redevelopment projects encouraged to promote conservation and natural resource preservation? | NA | Charleston Township is generally a rural community. |
| 2. Are re-development projects required to coordinate improvements with existing facilities and infrastructure? | NA | Charleston Township is generally a rural community. |
| V. Rural Communities | | |
| A. Plans and Policies: | | |
| 1. Is agriculture described in the Master Plan as an economically viable profession in the community? | Yes | LUP page 16: Acknowledges that good agricultural land in the Township is a valuable asset. |
| 2. Have prime and unique agricultural lands been identified and mapped in the Master Plan? | Yes | LUP page 18: Zoning classification AG-1 contains prime agricultural soil and properties enrolled in Public Act 116 (the Michigan farmland preservation program). Development in this zone is severely restricted. |
| B. Development / Redevelopment Regulations: | | |
| 1. Has the community designated an Agricultural Zoning District? | Yes | LUP page 19: AG-1 (see above) and AG-2 (which allows all types of agricultural activities as well as new residential development with some restrictions. |
| 2. Does the agricultural zoning district utilize a method such as sliding scale to limit fragmentation of farmland and to less conflicts between farming and residential uses? | Yes | Having two agricultural districts addresses development prioritization. |
| 3. Does the agricultural zoning district utilize setbacks or buffers for any new residential development? | Yes | ZO XX notes lot requirements and setbacks for Districts AG-1 and AG-2. |
| 4. Does the Agricultural Zoning District also consider the preservation and protection of natural features, such as wetlands or groundwater? | No | |
| Recreation Plan | | |
| A. Plans and Policies | | |
| 1. Has a Recreation Plan been approved by MDNR within the last 5 years that identifies priority lands for acquisition or protection for future recreational use? | No | |
| Wetland Preservation | | |
| I. Inventory | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan include a map of wetlands? | No | |
| II. Wetlands Protection | | |

Document Review for Water Resource Protection

Charleston Township - Kalamazoo County,
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October 2014

| Criteria | Yes/ No | Comments |
|--|--------------|--|
| A. Plans and Policies: | | |
| 1. Does the Master Plan recognize the importance of wetlands, and the functions they play in protecting residents' health, safety and welfare from problems such as flooding and poor water quality? | No | |
| 2. Does the Master Plan call for the protection of wetlands within an ecosystem context (protecting adjacent uplands, waterways, and vegetated buffers as well)? | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Has the community adopted a local wetlands ordinance that protects wetlands less than five acres in size? | No | |
| 2. Is this ordinance coordinated with the State's wetlands regulations? | NA | |
| 3. Are there building and a no-disturbance setback requirements from wetland areas (at least 20-30 feet)? | Yes | ZO 5.16.3a: Structures must be constructed at least 50 feet from a wetland. |
| Lake Management | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan have a map of lakes? | Yes | The Zoning Map notes lakes and includes them in the floodplain district. |
| 2. Does the Master Plan discuss the values of lakes such as recreation, economic development, habitat, fisheries? | No | |
| B. Development / Redevelopment Regulations | | |
| 1. Does the zoning ordinance include an anti-funneling provision for waterbodies? | Yes | ZO 5.16.2: No new channelization on lake front properties is allowed that would increase the number of lake users . ZO 5.16.5:The owners/occupants of a lake lot may not provide lake access to the general public or the owners/occupants of more than one other lot. |
| Habitat Preservation | | |
| I. Natural Area Preservation / Restoration | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan call for preservation of natural areas for wildlife habitat protection? | Not Directly | LUP page 6: Notes 39% of Township consists of federal and county lands, primarily composed of the Fort Custer Training Center, Fort Custer Recreation Area, and a county park. These contain large natural areas. |
| 2. Does the Master Plan link habitat preservation to protection of the health, safety and welfare of residents through natural resource preservation? | No | |

Document Review for Water Resource Protection

Charleston Township - Kalamazoo County,
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| Criteria | Yes/ No | Comments |
|--|------------|----------|
| 3. Has the community identified high quality natural areas to be preserved? | No | |
| 4. Does the community have a plan to protect the high priority areas? | No | |
| II. Native Plant Species | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan recognize the importance of native vegetation in the protection of vital air, land and water resource quality, to buffer air and noise pollution, preserve wildlife habitat, and preserve aesthetic values and the community's beauty? | No | |
| B. Design Standards: | | |
| 1. Do the Design Standards specify the use of native plant species in the storm water system to help reduce storm water velocities, filter runoff and provide additional opportunities for wildlife habitat? | No | |
| 2. Are invasive and exotic plants prohibited from being used? | No | |
| 3. Does the site plan review process require developers to consult with the Michigan Department of Environmental Quality about Threatened/Endangered Species on site? | No | |
| Woodlands Preservation | | |
| I. Inventory | | |
| A. Plans and Policies: | | |
| 1. Has the community conducted a woodlands inventory and mapped this information? | No | |
| II. Woodlands Protection | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan recognize the importance of woodlands to protect any of the following: water, air and soil quality, to buffer air and noise pollution, to moderate local climate and storm hazards, to preserve wildlife habitat, and to preserve aesthetic values and community beauty? | No | |
| 2. Does the Master Plan recognize the importance of woodlands for storm water infiltration, thus reducing flooding and minimizing water pollution? | No | |
| 3. Does the Master Plan identify woodlands as an important landscape feature that protects the health, safety and welfare of residents? | No | |
| B. Development / Redevelopment Regulations: | | |

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Charleston Township - Kalamazoo County,
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| Criteria | Yes/ No | Comments |
|--|------------|--|
| 1. Has the community adopted a local woodlands or tree protection ordinance? | No | |
| 2. Are woodlands defined in a broad manner so that existing trees and remnant woodlands are also protected? | No | |
| 3. Does the ordinance require replacement of trees that are removed? | No | |
| 4. Does the ordinance minimize the clearing of a site? | No | |
| 5. Are permits required to clear a site? | No | |
| Greenways/Green Infrastructure | | |
| I. Greenway/Green Infrastructure Plan | | |
| A. Plans and Policies: | | |
| 1. Does the community have a greenway plan or support greenways/green infrastructure through its Master Plan or Recreation Master Plan? | No | |
| 2. If yes, does this plan do the following: | | |
| a. Identify greenways/green infrastructure as important natural transportation corridors for wildlife, and for the protection of other natural features? | NA | |
| b. Connect many natural areas within the community? | NA | |
| c. Connect the community's greenway/green infrastructure plan with adjacent communities', County's or regional greenway plans? | NA | |
| Groundwater | | |
| I. Mapping | | |
| A. Plans and Policies: | | |
| 1. Do Master Plan goals call for the identification and mapping of groundwater recharge areas? | No | |
| 2. Is a map of groundwater resources or groundwater recharge areas included in the Master Plan? | No | |
| II. Groundwater Protection | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan recognize the importance of the groundwater to the health, safety and welfare of its residents? | Yes | LUP page 5 |
| 2. Does the Master Plan identify groundwater as an important natural resource, and call for its protection? | Yes | LUP page 5: "(Groundwater) should be protected and to that end the Township is poised to implement a wellhead protection program." |
| B. Development / Redevelopment Regulations: | | |

Document Review for Water Resource Protection

Charleston Township - Kalamazoo County,
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| Criteria | Yes/ No | Comments |
|--|------------|--|
| 1. Is ground water considered in the zoning designations of parcels? | No | |
| 2. Are there additional requirements for site plan submittals in groundwater recharge areas? | Yes | ZO16.7.4 requires that watersheds, waterways and wellheads be identified on property zoned as R-IP. |
| III. Wellhead Protection | | |
| A. Plans and Policies: | | |
| 1. Does this community have municipal well fields? | Yes | |
| 2. If yes, has the community done the following: | | |
| a. Developed a wellhead protection program? | In process | In October 2013, the MDEQ awarded the Township a \$4,500 grant through its Wellhead Protection Program to delineate the land area contributing drinking water to public wells, identify potential contaminants within that area, and implement management strategies and educational activities to protect the water supply. |
| b. Restricts high risk land use activities in wellhead protection areas? | In process | |
| Storm Water Management | | |
| I. Storm Water Management Standards | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan call for the preservation of natural features as parkland and/or in open space developments to help alleviate problems associated with storm water runoff? | No | |
| 2. Does the Master Plan identify storm water management as an important community goal or policy? | No | |
| 3. Does the Master Plan state both the quality and quantity of stormwater are important issues to address in storm water management policies? | No | |
| 4. Does the Master Plan relate storm water management to the protection of health, safety and welfare of the community's residents? (For example, storm water management can reduce flooding, improve water quality, etc.) | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance require that developers preserve natural drainage patterns to the fullest extent possible? | No | ZO 5.18 requires that storm water be retained onsite for all property with commercial and industrial use. |
| 2. Do you regulate storm water in your community? | No | |
| 3. If yes, are your regulations coordinated with the County's storm water regulations so that your rules do not contradict the County's? | NA | |

Document Review for Water Resource Protection

Charleston Township - Kalamazoo County,
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| Criteria | Yes/ No | Comments |
|---|------------|--|
| 4. If your community regulates storm water, do your regulations address the following: | | |
| a. Are there storm water guidelines that fully detail specific storm water design criteria? | NA | |
| b. Maintain or establish buffer strips (between 30 and 100 feet wide) from the top of bank of any watercourse or surface water? | NA | |
| 5. Does the Zoning Ordinance include flood control and water resource protection performance standards? | No | ZO 16.7.4 requires storm water detention/retention basins be located at facilities zoned R-IP. ZO 24.4.14 requires that the location and size of all storm water facilities be noted on the site plan, including the point of discharge of all pipes. |
| 6. If yes, do they address the following to reduce the quantity of runoff and improve runoff quality: | | |
| a. Limit land disturbance and grading? | NA | |
| b. Maintain vegetated buffer strips and other existing vegetation to improve infiltration of storm water? | NA | |
| c. Minimize impervious surfaces? | NA | |
| d. Encourage the use of infiltration devices (such as filter strips, vegetated swales, sand filters, rain gardens, etc and allow for 72 hour ponding prior to infiltration? | NA | |
| 7. Are all development/redevelopment plans required to go to the County Drain Commissioner for review? | No | |
| II. Engineered Best Management Practices (BMP's) | | |
| A. Plan and Policies | | |
| 1. Does the Master Plan include goals / policies that encourage the use of Best Management Practices (BMP's) to minimize, collect, and treat storm water? | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance require the use of BMP's when possible? | No | |
| 2. Does the Zoning Ordinance require the use of above ground BMP's instead of belowground storm water conveyance systems? | No | |
| 3. Does the Zoning Ordinance prohibit direct discharge of storm water into wetlands, streams or other surface waters without pre-treatment? | Partially | ZO 5.18.1: Storm water must be retained onsite by the use of retention areas and other necessary measures for all commercial and industrial properties. ZO 16.2.4: In the Research and Industrial Park District, watersheds, waterways, and wellheads must be identified and protected through retention/detention basins. |
| 4. Does the Zoning Ordinance call for periodic monitoring of BMP's to ensure they are working properly? | No | |
| 5. Does the Zoning Ordinance require that all storm water management systems and / or BMP's be maintained? | No | |
| C. Design Standards: | | |

Document Review for Water Resource Protection

Charleston Township - Kalamazoo County,
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| Criteria | Yes/ No | Comments |
|---|------------|---|
| 1. Do the Design Standards provide minimum guidelines for BMP's that pre-treat and filter storm water, and retain storm water in a bio-retention facility? | No | |
| III. Infiltration | | |
| A. Plans and Policies | | |
| 1. Does the Master Plan call for the preservation of natural features for the purpose of preserving the existing infiltration of storm water? | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance call for the use of BMP's that improve a site's infiltration potential? | No | |
| Soil Erosion and Sedimentation Control | | |
| I. Soil Erosion and Sedimentation Control (SESC): | | |
| A. Plans and Policies: | | |
| 1. Is soil erosion and sedimentation control identified in the Master Plan as an important mechanism to protect the health, safety and welfare of residents through protection of water and soil resources? | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance address erosion and sedimentation controls? | Yes | Multiple references address erosion control, but the Township does not have an erosion control program. When appropriate, a SESC permit must be obtained from the Kalamazoo County Drain Commissioner, who is the authorized Soil Erosion Control Agent for the County. |
| 2. If yes, is the program coordinated with the County's program? | NA | |
| 3. If yes, does the community's program include the following standards? | | |
| a. Require that soil erosion control measures be in place before granting a building permit? | NA | |
| b. Protect waterways and stabilize drainage ways by requiring mechanisms, such as silt fencing, at the edge of the waterway buffer and special crossing and diversion techniques at waterway crossings? | NA | |
| c. Require that all erosion and sedimentation controls be maintained? | NA | |
| d. Require that all erosion and sedimentation controls be monitored on a periodic basis? | NA | |
| e. Methods to respond to public complaints regarding construction site erosion control? | NA | |

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| Criteria | Yes/ No | Comments |
|---|------------|---|
| 4. If no, does the community staff report erosion problems to the County enforcing agency? | Yes | Zoning inspector |
| 5. Are there any references in the Zoning Ordinance about compliance with the County Soil Erosion and Sediment Control Standards? | Yes | ZO: 5.16.1: Pertaining to Greenbelt Preservation and development of land adjacent to a body of water. ZO 5.21.2.b: SESC permit requirement for fill operations in all zoning districts. |
| Sanitary Sewer Planning and Infrastructure | | |
| I. Sanitary Sewer Planning and Infrastructure | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan address sanitary sewer planning? | Partially | LUP page 5: Identifies the Galesburg Trunk Line Sewer which carries flow to the City of Kalamazoo Sewage Treatment Facility from the City of Galesburg, Village of Augusta and the Gull Lake area and services areas of the Township, including the Exit 88 intersection. |
| 2. If yes, does the Master Plan tie sanitary sewer planning to protection of the health, safety and welfare of residents? | No | |
| 3. If yes, does the Master Plan address the following: | | |
| a. Has the community delineated a Sewer Service Area? | No | |
| b. Has the Sewer Service Area been mapped, including all the facilities in the system (such as manholes, pipes, etc.)? | NA | |
| c. Is the map to be used in zoning decisions? | NA | |
| II. Septic Systems | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan identify areas that are suitable and unsuitable for septic systems? | No | |
| 2. Does the Master Plan state that community involvement in placement and maintenance of septic systems is critical to the health, safety and welfare of residents? | No | |
| B. Development / Redevelopment Regulations: | | |
| 1. Are regulations that pertain to septic systems coordinated with the County's regulations? | Yes | ZO 5.3 states no building or occupancy permit shall be issued until all required well and septic system permits have been obtained from the Kalamazoo County health department, when municipal water and/or sewer services are not available. |
| 2. Does the Zoning Ordinance require that a septic system location be at least 100 feet from a lake, wetland, stream, or other water feature? | No | ZO 5.16.3a states accessory structures shall not be constructed within 75 feet of any watercourse or within 50 feet of a wetland. |

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| Criteria | Yes/ No | Comments |
|--|------------|---|
| 3. Does the Zoning Ordinance specify a minimum isolation distance from residential and community wells? | No | The <i>Kalamazoo County Sanitary Code</i> requires a 50 foot isolation distance from wells. |
| 4. Does the Zoning Ordinance create septic maintenance districts? | No | |
| III. Minimizing Inflow | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Does the community prohibit connecting downspouts to the storm water system? | NA | |
| 2. Does the community have a program to identify and disconnect footing drains from sanitary sewer lines? | NA | |
| 3. Does the community promote rain barrels and rain gardens? | No | |
| IV. Illicit Discharge Elimination | | |
| A. Plans and Policies: | | |
| 1. Has the community identified and/or mapped the community's drainage system, including all points of discharge and locations of illicit discharges to the drainage system? | No | |
| 2. Does the community have a program for identifying illicit discharges, and eliminating them? | No | |
| 3. Does the community have a program to identify sanitary sewer or septic systems that are seeping into the storm water system, surface waters or groundwater? | No | |
| Public Education | | |
| I. Public Education Efforts | | |
| A. Plans and Policies: | | |
| 1. Does the community have a system in place to distribute environmental education information? | No | |
| 2. Has the community encouraged residents to report illicit discharges or improper disposal of materials into storm drains or natural water bodies? | No | |
| 3. Has the community educated commercial, industrial and institutional owners and tenants on how to reduce significant storm water pollutants? | No | |

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Charleston Township - Kalamazoo County,
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| Criteria | Yes/ No | Comments |
|--|------------|---|
| Pollution Prevention and Housekeeping Practices | | |
| I. Storm Water System Maintenance | | |
| A. Plans and Policies: | | |
| 1. Does the community have a program in place to regularly clean out, maintain and/or inspect structural controls (such as catch basins, vegetated swales, infiltration basins, sedimentation basins, etc.)? | No | |
| 2. Does the community have a program that labels outfall structures that discharge runoff to natural systems? | No | |
| II. Roadways | | |
| A. Plans and Policies: | | |
| 1. Does the community have jurisdiction over streets? | No | Streets are under the jurisdiction of the Kalamazoo County Road Commission. |
| 2. If yes, | | |
| a. Does the community sweep the streets monthly or more often in high construction areas? | NA | |
| b. Does the community evaluate the amount of salt and/or sand that is applied to its roads in the winter? | NA | |
| c. Does the community provide leaf collection in the fall? | NA | |
| III. Public Facilities Maintenance | | |
| A. Plans and Policies: | | |
| 1. Does your community have a maintenance building? | No | |
| 2. If yes, does the following occur: | | |
| a. Confirm that floor drains are connected to a sanitary sewer, or sealed? | NA | |
| 3. Does the community maintain its own vehicles? | No | |
| 4. If yes, is a regular schedule of maintenance followed? | NA | |
| 5. Are vehicles or other equipment maintained and cleaned where fluids and/or cleaning water will not flow into the street, gutter, storm drain or water body? | No | |
| IV. Landscaping Practices | | |
| A. Plans and Policies: | | |
| 1. Does the community have a schedule of landscape maintenance practices for municipal property? | No | |
| 2. Are employees trained on the proper application of chemical pesticides, herbicides and fertilizers? | No | |
| 3. Are soils tested on municipal property before fertilizers are applied? | No | |

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| Criteria | Yes/ No | Comments |
|---|-------------|----------|
| 4. Does the community use native vegetation in landscaping their properties? | No | |
| 5. Does the community encourage landscaping with native plant species throughout the community? | No | |
| B. Development / Redevelopment Regulations | | |
| 1. Is a fertilizer ordinance in place that only permits zero-phosphorus fertilizer to be used? | No | |
| Animal Waste (Pets & Kennels) | | |
| A. Plans and Policies | | |
| 1. Are residents educated about the availability, location, and requirements of properly disposing of pet waste? | No | |
| Capital Improvement Plan | | |
| I. Capital Improvement Plan | | |
| A. Plans and Policies: | | |
| 1. Does the community have a Capital Improvement Plan? | In progress | |
| 2. If yes, does the Master Plan link the Capital Improvement Plan with the protection of the health, safety and welfare of residents? | NA | |
| 3. If a Capital Improvement Plan is in place, does the plan: | | |
| a. Include policies related to natural resource protection? | NA | |
| b. Include standards as the basis for design of storm water and sanitary systems? | NA | |
| c. Include capital improvement for installation, maintenance and replacement of storm water utilities? | NA | |
| d. Include capital improvement for installation, maintenance and replacement of sanitary sewer utilities? | NA | |
| e. Call for the use, maintenance and replacement of storm water BMP's? | NA | |
| Agricultural Manure Management | | |
| A. Plans and Policies | | |
| 1. Are agricultural operators educated about the requirements of properly storing and applying manure? | No | |

Document Review for Water Resource Protection

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October 2014

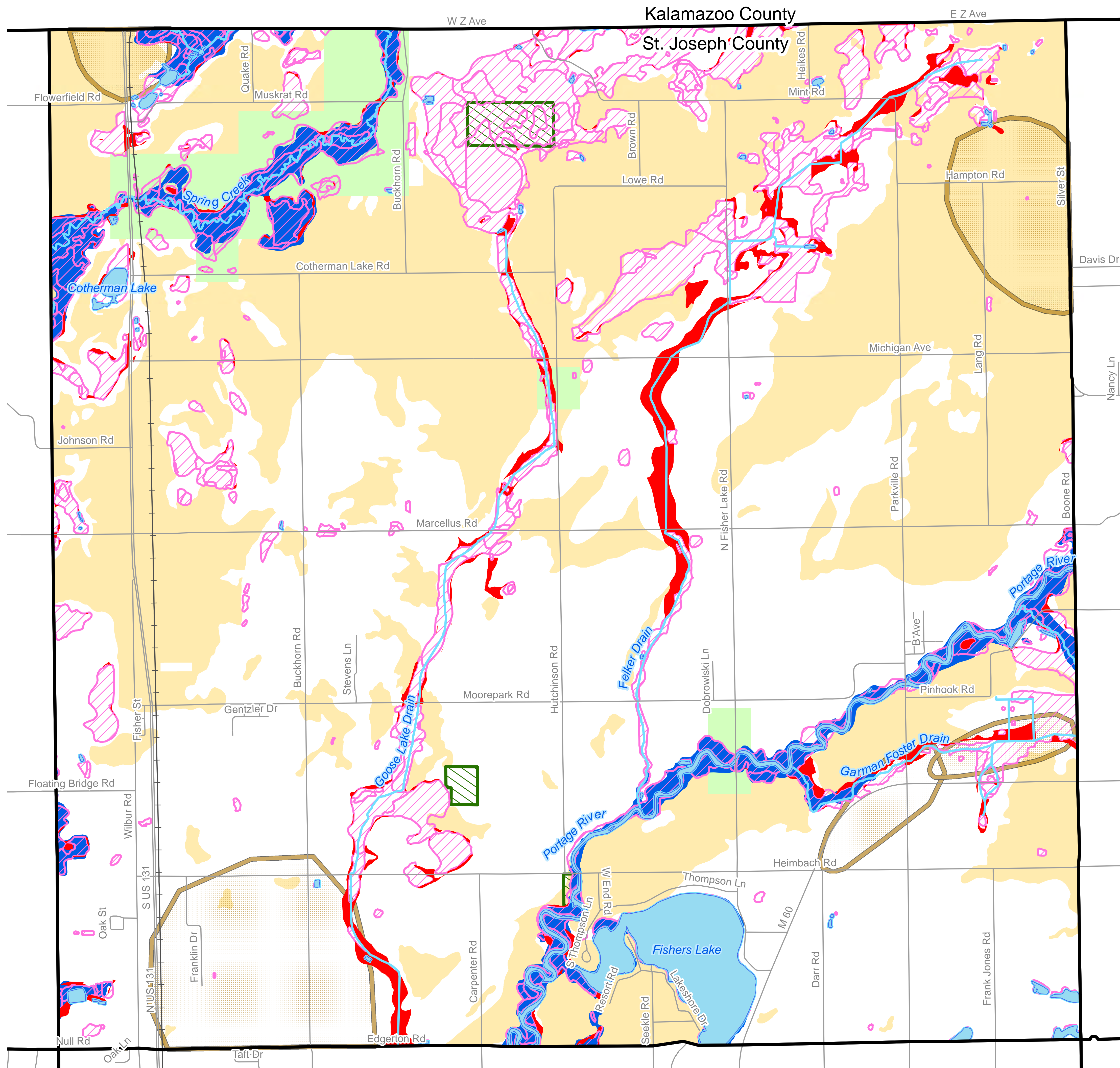
| Criteria | Yes/ No | Comments |
|--|------------|--|
| Wind Ordinance | | |
| A. Plans and Policies | | |
| 1. Does a zoning district allow and promote the effective and efficient use of wind energy conversion systems? | Yes | ZO 23.7.20 requires special exception use approval for private wind powered generator systems. The ordinance notes design specifications and requirements. |

ZO: Charleston Township Zoning Ordinance (Ordinance No. 112), Adopted 9-26-2000, Amended January 2013

LUP: Land Use Plan, Charleston Township, Adopted 10-27-2005

Kalamazoo County Health and Community Services Department

Kalamazoo County Road Commission Construction Guidelines, December 4, 2012



- LEGEND**
- Lakes
 - High Potential Wetland Restoration Area - Michigan DNR
 - Wetlands - US Fish & Wildlife National Wetlands Inventory
 - FEMA 100 Year Floodplain - DFIRM St. Joseph County Effective 6/4/2010
 - Conservation and Recreation Lands - Ducks Unlimited, 2013
 - 10 to 50 Threatened, Endangered or Special Concern Species per Quarter-Quarter Section - Michigan Natural Features Inventory, Biological Rarity Index
 - Wellhead Protection Area - Michigan DEQ
 - All Prime Farmland Soils - USDA NRCS Soil Survey St. Joseph County Prime Farmland, 2009

**RESOURCE CONSERVATION
OVERLAY AREAS WITHIN
PARK TOWNSHIP**

NORTH

0 750 1,500 3,000 FEET

CUT: MFC 2/20/15 10:05:02 AM Document: Park Top Resource Conservation Areas 2015.mxd Date: 11/20/14 3:54:03 PM User: cdk

DATA SOURCES: BASE MAP MICHIGAN GEOGRAPHIC FRAMEWORK V13A.

Portage River Watershed Planning Project

**Park Township
St. Joseph County, Michigan**

**Policy Review Document
MDEQ Tracking Code #2012-0017**

**November 2014
Project No. G130188**

frc&h

PORTAGE RIVER WATERSHED PLANNING PROJECT

**PARK TOWNSHIP
ST. JOSEPH COUNTY, MICHIGAN**

**POLICY REVIEW DOCUMENT
MDEQ TRACKING CODE #2012-0017**

**NOVEMBER 2014
PROJECT NO. G130188**



This nonpoint source pollution control project has been funded in part through the Michigan Nonpoint Source Program by the United States Environmental Protection Agency under assistance agreement C9975474-12 to the Calhoun Conservation District, for the Portage River Watershed Planning project. The contents of the document do not necessarily reflect the views and policies of the EPA, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

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LIST OF ABBREVIATIONS/ACRONYMS

| | |
|----------|--|
| BMP | Best Management Practice |
| CCD | Calhoun Conservation District |
| FTCH | Fishbeck, Thompson, Carr & Huber, Inc. |
| LID | Low Impact Development |
| KCD | Kalamazoo Conservation District |
| MDEQ | Michigan Department of Environmental Quality |
| MDNR | Michigan Department of Natural Resources |
| MS4 | Municipal Separate Storm Sewer System |
| NPS | nonpoint source |
| NREPA | Natural Resources and Environmental Protection Act |
| PRD | Policy Review Document |
| PRW | Portage River Watershed |
| PUD | Planned Unit Development |
| RCOA | Resource Conservation Overlay Area |
| RPO | Resource Conservation Zone |
| SESC | Soil Erosion and Sedimentation Control |
| SWMPC | Southwest Michigan Planning Commission |
| Township | Park Township |
| WMP | Watershed Management Plan |

EXECUTIVE SUMMARY

The Portage River flows southwest from its headwaters in Charleston Township, eastern Kalamazoo County, Michigan into St. Joseph County, where it empties into the St. Joseph River in the City of Three Rivers, Michigan. Park Township (Township) is located at the southwest end of the watershed. The Portage River Watershed (PRW) is experiencing low development, similar to other areas around the state during this downturn in the economy. However, citizens are concerned when growth does happen it will be in an uncontrolled manner and could jeopardize the quality of the watershed's valued resources.

The Portage River Watershed Management Plan (WMP) stresses the importance of water resources as a vital component of land use decisions at the local level. Communities in the PRW are interested in achieving sustainable development, defined as economic growth protecting the environment.

This Policy Review Document (PRD) provides an assessment of the Township's zoning ordinances which impact water quality. An examination of existing policies is crucial to provide for well crafted and complimentary municipal codes reflecting the desires of the diverse communities within the PRW. The current path of development in these communities can be evaluated through this process and redirected if necessary. Often, communities find their development codes and standards give developers little or no incentives to conserve natural areas and, in some cases, actually work against watershed protection. Careful attention to appropriate water resource management can help communities reach a level of sustainable development, which combines economic growth with the protection of natural resources.

Existing policies and regulations in the Township were compared to accepted development principles as presented in various water resource protection guidebooks. A policy review spreadsheet was used to document the comparisons and identify compliance and discrepancies with the principles. The results are summarized in Appendix 1.

The Township utilizes the 2001 Development Plan Update to establish development priorities. LandPlan Inc. is currently completing an in-depth review of this document and preparing an updated Master Plan for the Township. FTCH's policy review assessment is limited to review of local ordinances and recommendations of ways to update these ordinances to provide natural resource protection and watershed management benefits. FTCH's policy review determines how well the Township's rules and regulations address concerns of the watershed and proposes modifications to strengthen these ordinances.

The results of this policy review reveal specific areas of the existing development rules that are generally good in their efforts of watershed protection and other areas that could benefit from modifications. Priority actions that the Township could take to improve resource protection include:

Zoning Ordinance Revisions

1. Create specifications for a Resource Conservation Overlay Area (RCOA).
2. Require setbacks from all water resources and sensitive features.
3. Revise Site Plan Review requirements to require inclusion of all natural resources on site plans and have stormwater Best Management Practices (BMPs) reviewed by a qualified engineer.
4. Retain natural features and resources to the greatest extent during site development.
5. Revise the Township's Open Space Preservation ordinance.

Other Recommendations

1. Support the County's Farmland Preservation Program.
2. Encourage County Septic Ordinance adoption.
3. Investigate funding options for conducting additional studies and projects assisting the Township in implementing the recommendations in this report.

INTRODUCTION

PURPOSE

The purpose of this PRD is to assist the Township with implementation of generally accepted development standards and to identify impediments to innovative site design for the purpose of water resource protection. An examination of existing policies is crucial to provide for well crafted and complimentary municipal codes reflecting the desires of the Township. This policy assessment will provide a baseline from which to measure changes in the planning and management of growth in the coming years. The current path of development in the Township can be evaluated through this process and redirected if necessary. A similar assessment could be conducted in five years to determine if changes have been made to the rules and regulations increasing the level of watershed protection.

PORTAGE RIVER WMP

The Kalamazoo Conservation District (KCD) developed a WMP for the PRW in 2006. The Calhoun Conservation District (CCD) has received a Section 319 grant to update the WMP. The scope of work for the grant includes completing policy reviews for three townships located within the PRW. Park Township, which has requested that a review of its policies be completed, is located in the southwest end of the watershed, in the north-central region of St. Joseph County, Michigan. Overall, the PRW encompasses 125,539 acres in Branch and St. Joseph Counties, Michigan (Exhibit 1). A small area in the southeast portion of the Township is in the Little Portage Creek Watershed (Exhibit 2). The CCD is developing a WMP for that Watershed as part of this grant. The western portion of the Township is in the Rocky River Watershed (Exhibit 3). The St. Joseph Conservation District completed a WMP for that Watershed in 2003. A review of this plan is not part of this report, although the Township should review the recommendations in the WMP to enhance natural resource protection. The Rocky River Watershed Management Plan is available at the following website: <http://www.stjoeriver.net/wmp/docs/RRPlan.PDF>.

The 2006 Portage River WMP includes a complete evaluation of nonpoint source (NPS) pollutants and creates an implementation plan to address resource concerns, problems, and needs, and outlines solutions for known or suspected pollutants of the river. An examination of existing policies is crucial to provide for well-crafted and complimentary municipal codes reflecting the desires of the communities within the PRW.

The Michigan Department of Environmental Quality (MDEQ) determined in a 2004 study that water quality standards were not attained in Portage River from its confluence with Indian Lake upstream to Portage Lake in Kalamazoo County (including tributaries) (Wolf and Wuycheck, 2004). Park Township is located within this area. The Portage River WMP identified priority NPS pollution impairments as follows:

- Sediment in rivers, streams, and lakes
- Excess nutrients
- Streambank erosion
- Bacteria and pathogens, especially from wildlife (geese)
- Hydrology (low flow/low lake levels)
- Temperature
- Chemical pollutants (oils, metals, pesticides)
- Cold water fishery use
- Warmwater fishery use

Exhibit 1 - Portage River Watershed

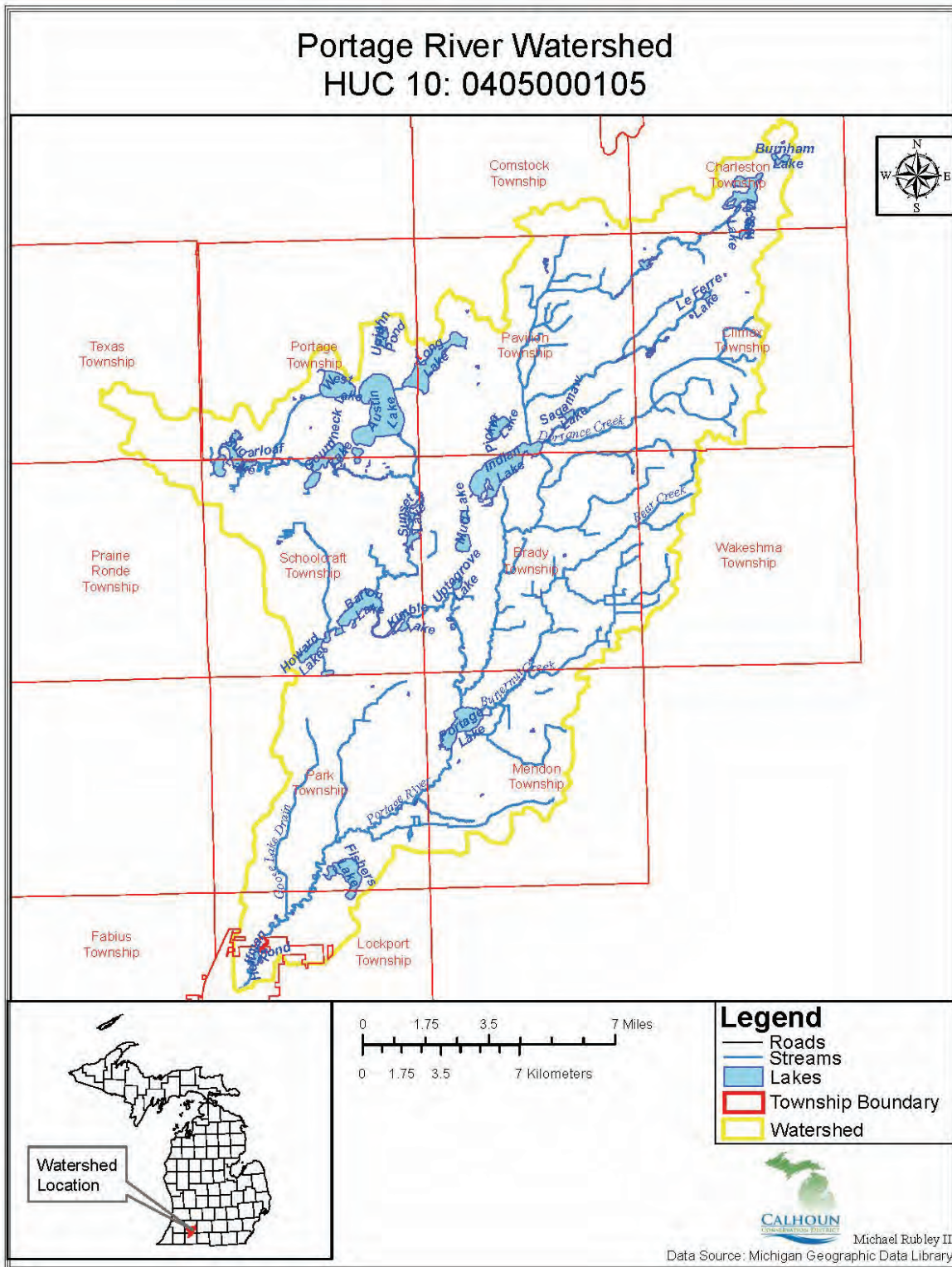


Exhibit 2. Little Portage Creek Watershed

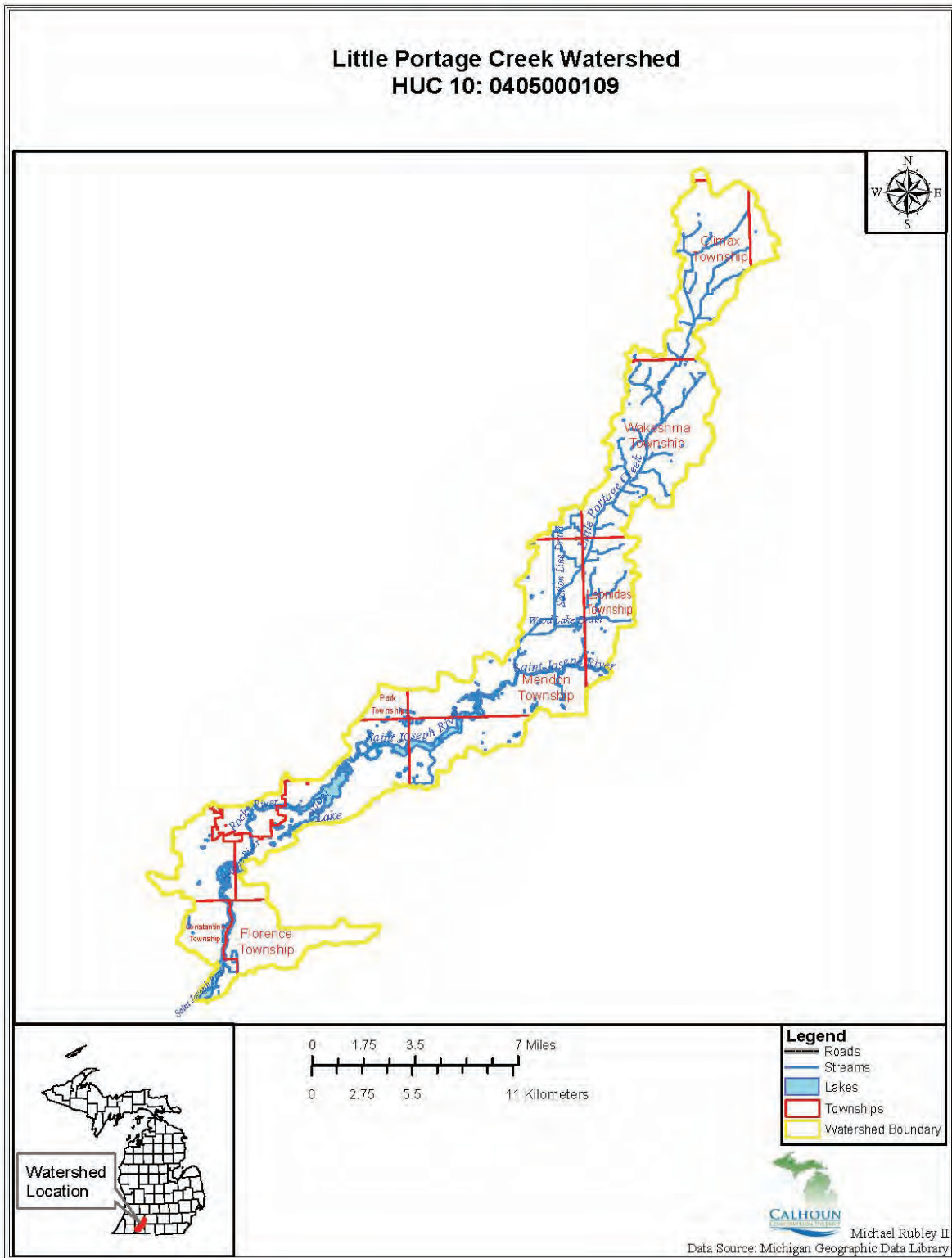
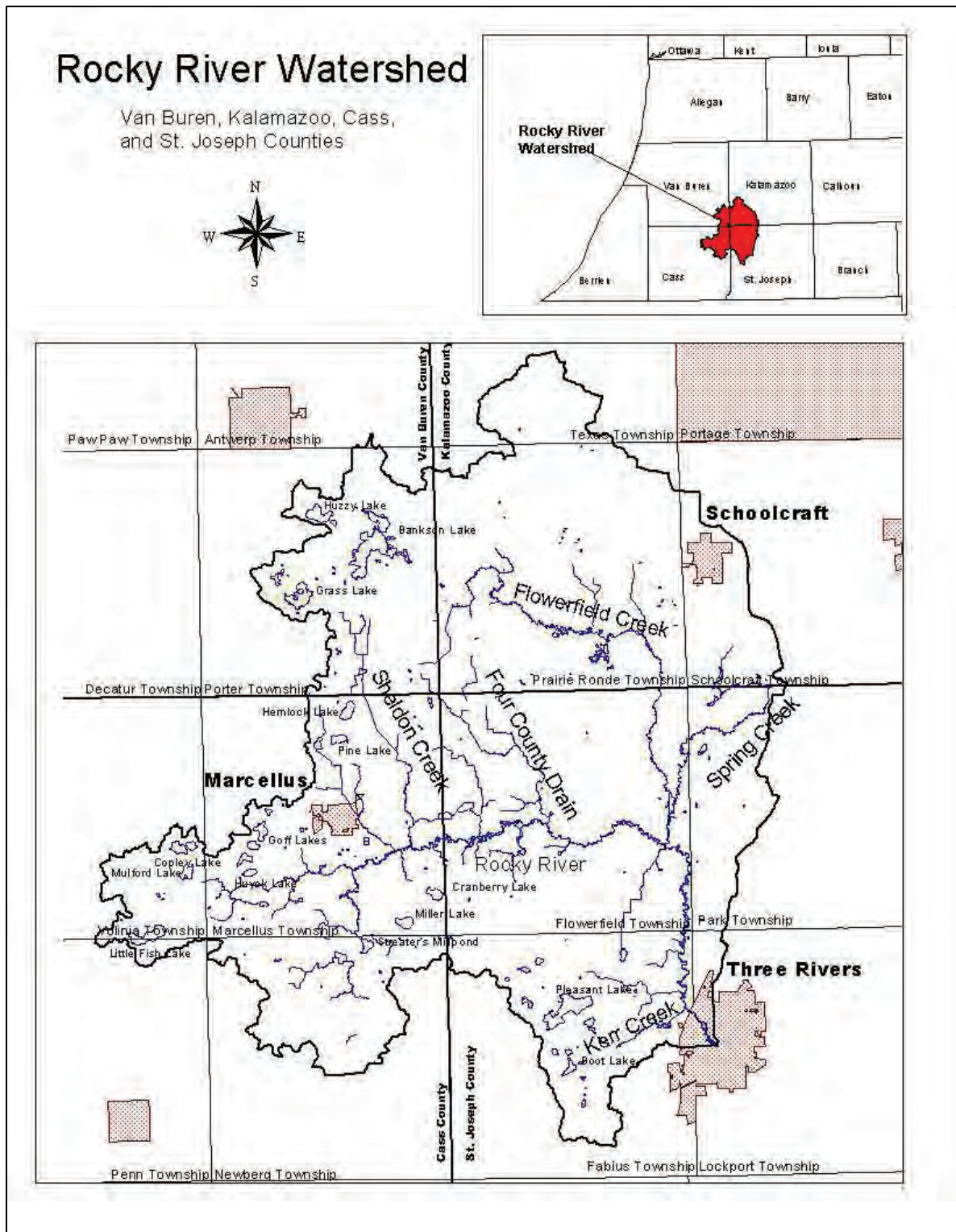


Exhibit 3. Rocky River Watershed



State and federal water quality programs have designated the following uses for all surface waters in the State of Michigan. Also indicated is whether these uses are met, threatened, or impaired, according to the WMP:

- Agricultural use (Met)
- Navigational use (Threatened)
- Industrial water supply (Met)
- Public water supply (Not applicable)
- Warm water fishery (Threatened)
- Other indigenous aquatic life and wildlife use (Threatened)
- Partial body contact recreational use (Threatened)
- Total body contact recreational use (Threatened)

The goals described in the Portage River WMP address improving water quality pertaining to these uses for all water bodies.

The Stakeholders in the PRW have also identified the following desired uses:

- Environmental education
- Maintain commercial discharges
- Protect wetlands
- Protect riparian corridors and floodplains
- Expand existing protected open space
- Explore natural rivers designation
- Improve fisheries
- Expand recreational uses
- Maintain water supply for agricultural and industrial uses
- Protect wildlife habitat

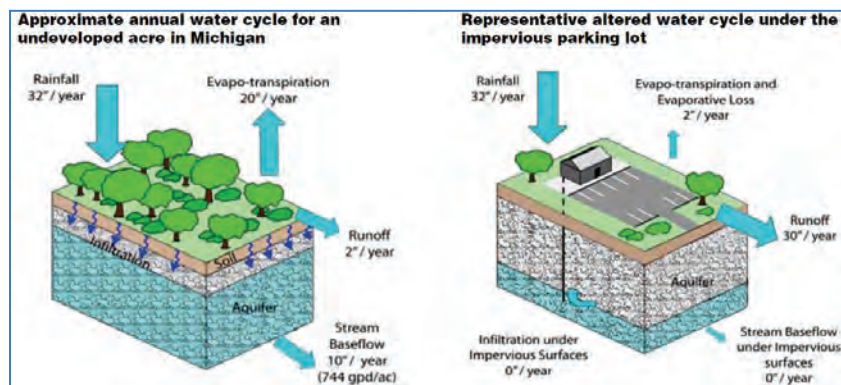
The objective of this policy review is to develop and implement specific land-use recommendations using a watershed-based approach to achieve the WMP goals and desired uses. This effort will bring together township boards, local officials, and planning commissions to protect water quality and reduce NPS pollution on a multi-township or county-wide basis through the revision of Master Plans and Land Use Plans, addition of ordinances for natural resource protection, and zoning to protect water quality supporting the vision of the Township's Land Use Plan.

BACKGROUND

A grant was awarded to the CCD to update the 2006 WMP for the PRW and to expand it to include the Little Portage Creek Watershed. As part of the grant, a task was defined to assist communities in assessing their policies and guidelines shaping how development happens in their communities. The Township was one of the communities agreeing to participate in this assessment. The Township has elected to have LandPlan, Inc. review the Park Township's 2001 *Development Plan Update* (its master plan) and prepare an updated master plan which incorporates elements that protect natural resources and watershed quality. FTCH's role is to review Township ordinances and policies, and propose modifications to strengthen watershed protection. The time to plan for growth is now, when development activity is low and time is available for a thorough review of policies and standards.

LAND USE AND WATER RESOURCE PROTECTION

Local Land Use Decisions Have Regional Impacts. Residents, business owners, and local planners are not always aware of the impacts their individual actions might have on their natural surroundings. Cumulative effects of these actions are not considered in most development and land use decisions. A watershed planning perspective will encourage local planners and developers to look at the entire area contributing to a water body and determine its needs for management and protection. Often, communities find their development codes and standards give developers little or no incentives to conserve natural areas and, in some cases, actually work against watershed protection. The PRW is taking the first step in realizing the regional consequences of the local land use decisions, by evaluating current policies and implementing appropriate measures to enhance and protect water quality while experiencing growth and development. Careful attention to appropriate water resource management can help communities reach a level of sustainable development, combining economic growth with the protection of natural resources.



(Source: *A Design Guide for Implementers and Reviewers: Low Impact Development Manual for Michigan*, SEMCOG, 2008)

Development Impacts to Watercourses. One of the basic concepts accepted in watershed planning is that the amount of impervious cover in a watershed directly relates to its water quality. Increased urbanization results in natural vegetation being replaced with hard surfaces, such as rooftops, roadways, and parking lots. The additional impervious area increases the rate and volume of surface water runoff and decreases water infiltration into the ground. Development often reduces base flow, since water is not infiltrating, which causes perennial streams to become intermittent streams. When more of the water enters the streams as surface runoff, the bankfull channel flows create highly erosive conditions. Other concerns of impervious surfaces include higher concentrations of nutrients in higher volumes of runoff and increased occurrences of heavy metals. Another impact occurs when municipal services are required to expand to provide water and sewer for developments currently outside of service areas. Locating

developments close to existing towns and city centers reduces the effects of sprawl and minimizes the expansion of infrastructure that can increase harmful stormwater runoff.

REGULATIONS IMPACTING LAND USE AT THE STATE LEVEL

The Michigan Natural Resources and Environmental Protection Act (NREPA), Public Act 451 of 1994, as amended, is the state’s primary environmental legislation. The MDEQ regulates wetlands, sand dunes, soil erosion and sedimentation from earth change activities, inland lakes and streams, shorelines, and other land use decisions impacting water resources, including management of floodplain development, public health standards, subdivision rules, and stormwater discharges from municipal separate storm sewer systems (MS4). The state, however, does not oversee land use planning at the local level. The over 1,850 units of government in Michigan are responsible for protecting water resources through local regulations (Ardizzone, 2010).

LAND USE PLANNING AT THE LOCAL LEVEL

Townships, cities, and villages are responsible for developing land use plans and zoning ordinances, as well as ensuring their implementation. Land use plans and zoning ordinances are regulatory tools that can be used to protect surface water and groundwater. The planning and zoning process typically starts with a Master Plan, outlining the vision of how the residents and leaders want the communities to look in future years. The Master Plan is the foundation upon which the Code of Ordinances and zoning ordinances are developed. Formulation of a Master Plan is therefore of highest importance to the communities. A Master Plan should identify goals and a vision for future development in the community. The Code of Ordinances is intended to provide the rules and regulations preserving the peace, health, safety, and welfare of the inhabitants of the community. Design manuals and construction specifications for development guide the alterations of land and water necessary for growth in the community. All of these policies must be integrated to ensure their goals and objectives are compatible. The policy review requires the examination of all of these documents to be able to assess the capacity of the community to continue to grow and prosper while protecting the natural resources.

METHODOLOGY

FTCH worked with the CCD to develop a worksheet that lists water quality issues and outlines accepted development principles. CCD and FTCH met with Township officials to review the worksheet and obtain policies, standards, ordinances, and guidance the Township has for growth and infrastructure management. These one-on-one meetings with the Township helped ensure all documents were current and the intent of the development standards was understood. The following documents were reviewed:

- Park Township Development Plan Update, 2001
- Draft Park Township Master Plan, 2014
- Future Land Use Plan Map of Park Township, 2001
- Draft Land Use Plan Map of Park Township, 2014
- Park Township Zoning Ordinance, compiled July 23, 2010, last amended August 8, 2012
- Park Township Ordinance No. 09-02, Ordinance addressing Floodplain Management Provisions of the State Construction Code, Adopted April 8, 2009, Effective May 24, 2009
- Park Township Ordinance No. 09-04, Ordinance Amending Ordinance No. 09-02 addressing Floodplain Management Provisions of the State Construction Code, Adopted May 13, 2009, Effective May 23, 2009
- Park Township Zoning Map, last amended July 2013 (Appendix 2)
- LandPlan, Inc. Memorandum, *Community Survey Results*, March 19, 2014
- Environmental Health Code for Branch, Hillsdale and St. Joseph Counties, Michigan, adopted December 20, 1990
- Requirements and Specifications for New Roads or Plat Roads, Board of County Road Commissioners of the County of St. Joseph, undated

These documents were reviewed using the worksheet to evaluate their conformity to development principles for water resource protection. The review was coordinated with the revisions to the Master Plan and Future Land use map being prepared by LandPlan, Inc.

The detailed results of the policy review are in table format in Appendix 1.

RECOMMENDATIONS

DRAFT MASTER PLAN

Park Township's Planning Commission received portions of their Draft Master Plan from LandPlan, Inc., in April and July of 2014 for review. The Draft was then reviewed according to the worksheet in Appendix 1. The review of the draft found that many of the goals and objectives were prepared to address key water resource protection themes as presented in the worksheet. A few additional considerations are proposed below. The Chapter and page numbers are listed to reference the Draft Master Plan. ***Proposed additions are in bold italics to be revised as desire by the Planning Commission.***

Chapter Two: PLANNING ISSUES, GOALS AND OBJECTIVES

Page 2-3 Natural Resources and the Environment

- ***Reference Appendix B in which the Township's areas within boundaries of Portage River, Little Portage Creek and Rocky River Watersheds are identified.***

Page 2-4 Natural Resources and the Environment

To recognize the following:

- the importance of native vegetation in the protection of vital air, land and water resource quality, to buffer air and noise pollution, preserve wildlife habitat, and preserve aesthetic values and the community's beauty.
- the importance of woodlands to protect any of the following: water, air and soil quality, to buffer air and noise pollution, to moderate local climate and storm hazards, to preserve wildlife habitat, and to preserve aesthetic values and community beauty.
- the importance of woodlands for storm water infiltration, thus reducing flooding and minimizing water pollution

These objectives could be added:

- ***Coordinate efforts to protect the floodplain with adjoining communities and the County.***
- ***Develop a greenway plan or support greenways/green infrastructure through the Master Plan***
 - ***Identify greenways/green infrastructure as important natural transportation corridors for wildlife, and for the protection of other natural features.***
 - ***Connect many natural areas within the community.***
 - ***Connect the community's greenway/green infrastructure plan with adjacent communities', County's or regional greenway plans.***
- ***Develop a Recreation Plan to be approved by MDNR that identifies priority lands for acquisition or protection for future recreational use***

Chapter Three: FUTURE LAND USE STRATEGY

Page 3-6 Resource Conservation Overlay Area

The RCOA includes the township's floodplains, wetlands, ***woodlands, groundwater recharge areas,*** and river and stream corridors. ***Areas with prime farmland soils and high quality habitats could also be included.*** These resources provide important environmental benefits including habitats for wildlife, flood control, wellhead protection areas, and surface water purification. In addition, they provide special opportunities for recreation and contribute to the township's overall rural character and desirability as a place of residence and business. In light of the significance of these resources, the Master Plan strongly supports their protection. Preservation should take precedence over the unnecessary disturbance and/or destruction of these resources. Land uses requiring state and/or federal permits (especially for wetland or floodplain alterations) should not receive final township approval until satisfactory evidence has been submitted verifying the acquisition of all necessary permits. The presence of such resources in areas designated for development should be recognized in land use and development deliberations and decisions. Where a portion of a parcel contains these resources, development should be directed elsewhere on the site. In addition, encouraging what is commonly referred to as "open space developments" or "clustering" is a preferred approach for accommodating development (as described earlier in this chapter). ***The RCOA consists of the following:***

Floodplains – The 100-year floodplain is identified in Figure 2. A 150 foot naturally vegetated buffer along the 100-year floodplain is included in the RCOA.

Wetlands - The presence of existing wetlands within the Township is noted on Figure 6, as determined by the National Wetlands Inventory. Potential wetland restoration areas are noted in Figure 7, as determined by the MDEQ. Existing wetlands and a naturally vegetated 150 foot buffer around the existing wetlands is included in the RCOA. Areas identified as high potential for wetland restoration are also included.

Woodlands - Existing woodlands will be mapped and inventoried to create an existing woodlands map. Figure 4 notes land cover as determined by aerial photography. A more detailed inventory will be conducted and the resulting high quality woodlands will be included in the RCOA.

Wellhead Protection Area - Several wellhead protection areas have been defined within the Township (Figure 3). The geographic area of the defined wellhead protection area is typically based on the area of groundwater contribution to the wellhead based upon a 10-year time of travel. Zoning regulations may be placed directly on the wellhead protection areas to preserve and protect groundwater quality. These areas are included in the RCOA.

Surface Water - Several waterways flow through the Township (Figure 2). The RCOA includes a 150 foot naturally vegetated buffer delineated along these waterways and around Fishers Lake to protect them from pollutants in stormwater runoff, including increased temperatures.

Agriculture - Prime and unique agricultural lands are identified and mapped on Figure 1, with data available from the NRCS Soil Survey. The RCOA includes areas with “Prime Farmland Soils.”

High-Priority Natural Lands - High-priority natural areas are mapped that are of special concern to the Township for protection and preservation. Figure 5 notes areas known to contain a high occurrence of threatened, endangered, and special concern species, as determined by the Michigan Natural Features Inventory. Permanently protected lands are also noted on the map. A 150 foot naturally vegetated buffer around these protected lands and the quarter-quarter sections identified as having 10 or greater occurrences of threatened, endangered, or special concern species are included in the RCOA.

Chapter Four: COORDINATED PUBLIC SERVICES

Page 4-2 Sewage Disposal and Potable Water

- ***Continue discussion with the City of Three Rivers in developing a sanitary sewer service area to study for Fisher Lake residential zone to be used in future zoning decisions.***
- ***Encourage St Joseph County to adopt a Septage Ordinance for inspections and maintenance of septic systems and create a program to educate residents on proper operation and maintenance.***

Page 4-3 Stormwater Management

- ***Include goals / policies that encourage the use of Best Management Practices (BMP's) to minimize, collect, and treat stormwater***

Chapter Five: IMPLEMENTATION

Page 5-1 Public Support, Communication and Community Involvement

- ***Chart the progress of all construction projects to ensure that they are in compliance with the approved site plan***

Page 5-9 Capital Improvements Programming

- ***Link the Capital Improvement Plan with the protection of the health, safety and welfare of residents***

ZONING ORDINANCE REVIEW

A review of the Township Zoning Ordinance resulted in the following recommendations to the Planning Commission for incorporation into the existing Zoning Ordinance to improve resource protection. The recommendations are based upon the priorities of Township residents and other interested parties, as determined through a community survey completed by LandPlan, Inc. in 2014. In summary, the highest priorities expressed by survey respondents included:

- Maintaining the Township's rural character
- Preservation of natural resources
- Property maintenance
- Managing the rate and character of growth and development
- Preserving agricultural resources by limiting residences in farm areas

Priority zoning concepts that provide the most benefit and protection of water resources include:

- Requiring building setbacks from water bodies (streams, rivers, lakes, wetlands) with a native vegetative buffer.
- Protecting existing and restored wetlands through a Township wetlands ordinance.
- Improving parking lot standards to reduce impervious surfaces (shared parking, parking space size, and minimum parking requirements).
- Preserving open spaces by encouraging compact development in areas with existing infrastructure and revising the Open Space Preservation ordinance.
- Offering incentives to encourage open space development.
- Improving site plan review.
 - Identify natural features, and require preservation of these features to the greatest extent possible.
 - Review standards for protection.
 - Label BMPs on site plan.
 - Coordinate the review process with the receipt of applicable State and County permits.
- Encouraging low impact development (LID) techniques and BMPs to reduce runoff and increase infiltration.
- Requiring new septic systems to be located at least 150 feet from a lake, stream, wetland, or other water features.

PROPOSED ORDINANCE ADDITIONS AND MODIFICATIONS

The Southwest Michigan Planning Commission (SWMPC) promotes implementation of LID techniques to avert degradation of stormwater quality. LID is a sensible approach when considering the benefits it provides coupled with the fact that these techniques are often less costly to the developer than conventional development (www.swpmc.org/lid.asp).

The following zoning ordinance modifications incorporate priority zoning and LID concepts. They address deficiencies that were noted in the ordinance review checklist and are in alignment with Township priorities, as determined through the community survey. For example, many of the proposed additions address preserving the rural character and natural features present in the Township. In general, they do not promote LID techniques that are commonly employed in heavily urban environments.

The noted sections refer to appropriate sections of the Park Township zoning ordinance. ***Proposed additions are in bold italics.***

ARTICLE I – SHORT TITLE, PURPOSE

Section 102 - Purpose

Section 102.14 Protecting water quality and maintaining the natural functions of the Portage River, Little Portage Creek and Rocky River Watersheds.

ARTICLE II - DEFINITIONS

Low Impact Development (LID) *An ecologically friendly approach to site development and stormwater management that aims to mitigate development impacts to land, water and air. LID emphasizes the integration of site design and planning techniques that conserve natural systems and hydrologic functions on a site by increasing infiltration and decreasing impervious surfaces.*

Watershed *The area of land bordered by hills and ridges that catches rain and snow and drains or seeps into a common outlet, such as a marsh, stream, river, lake or groundwater. Just as creeks drain into rivers, watersheds are nearly always part of a larger watershed. For example, the Portage River Watershed is part of the St. Joseph River Watershed, which is part of the Lake Michigan Watershed.*

ARTICLE III - ZONING DISTRICTS AND MAP

Section 310 R-4 Districts: Water Front Residential District

Section 310.1 **Purpose:**...It is further the purpose to ***protect Township lakes, streams, and groundwater from impairment due to any of the following: pollution resulting from stormwater inputs, increased runoff, sedimentation, stream channel alterations, degradation of dependent, non-hydrologic resources (i.e. flora and fauna) and a high concentration of septic tanks within the vicinity of these features.***

Section 310.4 Regulations and Standards

D. Setback Requirements

4. Additional Requirements:

- a. No cutting and/or filling for building construction on the floodplain or filling for buildings on the upland within 500 feet of the river's edge, where the groundwater table is within six feet of the surface.**
- b. Preserve a natural vegetation strip adjacent to the river on all private and publicly owned land.**
- c. Restrict placement of septic system drain fields to 150 feet from the waterbody or as far as possible away from waterbody.**
- d. Minimize use of pesticides, herbicides, and fertilizers within the riparian zone.**

Section 316 RESOURCE CONSERVATION OVERLAY AREA (RPOA)

Section 316.1 **Purpose:** *to preserve and enhance the recreational, ecological, and aesthetic values of the Township's natural resources for future generations by identifying specific areas in which special restrictions apply.*

Section 316.2 **Delineation of RCOA:** *Boundary Designated on Zoning Map – the RCOA shall overlay existing zoning districts delineated on the Official Zoning Map of Park Township.*

Section 316.3 **Uses Permitted by Right:** *To be determined.*

Section 316.4 **Uses Permitted by Special Land Use Permit:** *To be determined.*

Section 316.5 **Regulations and Standards:** *To be determined. Include building and development setbacks for each type of protected natural feature.*

Example regulations and standards:

- **Minimum setback for new buildings of 125 feet from the ordinary high water mark and 40 feet from a wetland.**
- **Prohibiting cutting and/or filling for building on the floodplain and filling for buildings on the upland within 500 feet of the river's edge where the groundwater table is within six feet of the surface.**
- **No disturbance within 20 feet of a wetland.**
- **Preserving a natural vegetation strip adjacent to the river on all private and publicly owned land.**
- **Restricting placement of septic system drain fields to 150 feet from a lake, stream, wetland, or other water feature.**
- **Prohibiting use of pesticides, herbicides, and fertilizers within the riparian zone (below the ordinary high water mark)**

ARTICLE IV – GENERAL PROVISIONS

Section 403.5 Off-Street Parking and Loading

- **Allow for flexibility in parking requirements to reduce impervious surfaces as much as possible and encourage shared parking.**
- **Require some percentage of large parking lots to have landscaping to break up the impervious surfaces.**
- **Require stormwater treatment for parking lot runoff in landscaped areas - encourage the use of parking lot islands as stormwater infiltration areas.**
- **Require 30% of parking area to have spaces with smaller dimension for compact cars.**
- **Require maximum parking spaces instead of minimum number of spaces.**
- **Allow for driveways or overflow parking areas to be pervious or porous pavements.**

H. Table of Parking Requirements

6. RCOA (Resource Conservation Overlay Area).

Add list of approved uses and note number of minimum and maximum parking spaces per unit of measure OR discuss parking space requirements for the RCOA in Section 316.

Section 409 Site Plan Review

Section 409.2 Site Plan: The site plan shall contain the following information:

M. The location of all lakes, streams, wetlands, county drains, other waterways, floodplains, floodways, woodlands, steep slopes, and natural drainage patterns on or within 100 feet of the subject property.

N. The location of all proposed stormwater BMPs (rain gardens, swales, etc.).

O. The location of all soil erosion and sedimentation control BMPs. Native or site suitable plants must be utilized in all vegetative stormwater BMPs (to help reduce stormwater velocities, filter runoff, provide additional opportunities for wildlife habitat and prevent invasive species from being introduced into the Township).

Section 409.4 Approval: The Township Board....shall be governed by the following standards:

C. That as many natural features of the landscape, **such as ponds, streams, hills, wooded areas, floodplains, floodways, wetlands, steep slopes, and natural drainage patterns, have been retained to the fullest extent possible and site disturbance is minimized as much as possible.**

G. That the plan, as approved, is consistent with the intent and purpose of zoning to promote...; **and to protect water quality and maintain the natural functions of the watersheds.**

H. That the site plan review is coordinated with receipt of applicable county (drain, soil erosion) and state permits.

I. That the site plan is reviewed by the County Drain Commissioner or a qualified engineer to ensure that stormwater management practices are in compliance with the County's design standards and specifications.

Section 410 Riparian Access Parcels

B. Water frontage shall not consist of a **wetland** (i.e. swamp, marsh, or bog) as shown on the most recent **National Wetlands Inventory map or otherwise determined to be wetland by the Michigan Department of Environmental Quality (MDEQ)**; and that in no event shall a **wetland** be altered by the addition of earth or fill material or by the drainage of water for the purpose of increasing the water frontage required by this ordinance without approval of the **MDEQ**.

C. The parcel, lot or building site shall not abut a manmade canal or channel, and no canal or channel shall be excavated for the purpose of increasing the water frontage required by this ordinance without the approval of the **MDEQ**. **No new channelization on lakefront properties is allowed that would increase the number of lake users.**

Section 412 Open Space Preservation

Note: The existing ordinance is not very clear in its intent. It should be revised to clarify its intent and should include the following elements:

- **Flexible site design criteria, such as relaxed setback widths and lessened sidewalk requirements.**
- **Consolidation of open spaces into larger, contiguous units or a requirement that the open space be a minimum size or width.**
- **Requirement that all or part of the open space be managed in a natural condition.**
- **Limiting use of open space to low impact uses.**
- **Protection of the open space through a conservation easement or other similar mechanism.**
- **Incentives to encourage open space development.**

NEW ARTICLE - PRIVATE ROAD STANDARDS AND PROCEDURES

- *Permit a minimum pavement width of 18-22 feet on low traffic, local streets in residential neighborhoods. Allow narrower pavement widths along sections of the roadway where there are no houses, buildings, or intersections and where on-street parking is not anticipated.*
- *Permit the use of “open section” roadways with roadside swales. Do not require the use of conventional curbs for the full length of all streets in residential neighborhoods. Where curbs are deemed necessary to protect the roadway edge, allow the use of perforated curbs (that allow runoff to flow into swales) or invisible curbs (flush with the road surface).*
- *Minimize the required radii for cul-de-sacs. A radius of 35 feet is optimal, depending on emergency vehicles.*
- *Allow the creation of landscaped islands and bio-retention cells with cul-de-sacs.*
- *Permit the use of one-way loop streets to eliminate turn-arounds.*
- *Permit hammerhead turnarounds instead of cul-de-sacs.*

NEW ARTICLE – WETLAND PROTECTION

A sample wetland protection ordinance may be found on the MDEQ’s website:

http://www.michigan.gov/documents/deq/lwm-wetlands-SampleDEQWetlandOrdinance_261730_7.pdf

IMPLEMENTATION

The WMP outlines recommendations to meet the goals and objectives identified by the Steering Committee. Land use planning was determined to be an important part of the sustainability of the watershed project since future growth is expected to occur around the urban and recreational areas. This policy review is one component of the complex issue of land use planning, but will assist the Township in identifying the next step in the process.

CONCLUSIONS

The recommendations listed in this report would improve plans and policies in the Township to better protect water quality and natural resources. Introducing new concepts to local officials requires substantial time and effort spent on presenting information to gain a level of comfort with the new techniques. The policy review worksheet (Appendix 1) can continue to guide future work for both an updated Land Use Plan and zoning ordinances. This document and the policy review spreadsheet should be used as a review tool and the language developed for the Township could be applicable to other communities within the county.

The results of this policy review reveal specific areas of the existing development rules that are generally good in their efforts of watershed protection and other areas that could be enhanced for greater resource protection. Assessing the current development rules and the identification of the impediments to innovative site design will assist the community to create and implement better development designs.

REFERENCES AND LAND USE PLANNING RESOURCES

Ardizzone, Katherine A. and Mark A. Wyckoff, FAICP. *FILLING THE GAPS: Environmental Protection Options for Local Governments*, 2nd Ed. Michigan Department of Natural Resources and Environment, Coastal Management Program with financial assistance from the National Oceanic and Atmospheric Administration, authorized by the Coastal Zone Management Act of 1972. December 2010.

Center for Watershed Protection, 1998. *Better Site Design: A Handbook for Changing Development Rules in Your Community*. Prepared for the Site Planning Roundtable, Ellicott City, MD.

Center for Watershed Protection, 2000. *Recommended Model Development Principles for Frederick County, MD*. Ellicott City, MD.

Galli, J. 1991. *Thermal Impacts Associated with Urbanization and Stormwater Management Best Management Practices*. Metropolitan Washington Council of Governments. Maryland Department of Environment. Washington, D.C. 188pp.

Heraty, M. 1993. *Riparian Buffer Programs: A Guide to Developing and Implementing a Riparian Buffer Program as an Urban Best Management Practice*. Metropolitan Washington Council of Governments, U.S. Environmental Protection Agency Office of Wetlands, Oceans and Watersheds. Washington, DC.

Kalamazoo Conservation District, 2006. *Portage River Watershed Management Plan, Kalamazoo and St. Joseph Counties, Michigan*.

Schueler, Thomas R. 1995. "The Importance of Imperviousness." *Watershed Protection Techniques*. 1 (3): 100-111.

Southeast Michigan Council of Governments Information Services. 2002. *Opportunities for Water Resource Protection in Local Plans, Ordinances, and Programs: A Workbook for Local Governments*. SEMCOG, Detroit, Michigan.

Southeast Michigan Council of Governments. 2003. *Opportunities Land Use Tools and Techniques: A Handbook for Local Communities*. SEMCOG, Detroit, Michigan.

Southeast Michigan Council of Governments Information Services. 2008. *Low Impact Development Manual for Michigan: A Design Guide for Implementors and Reviewers*. SEMCOG, Detroit, Michigan.

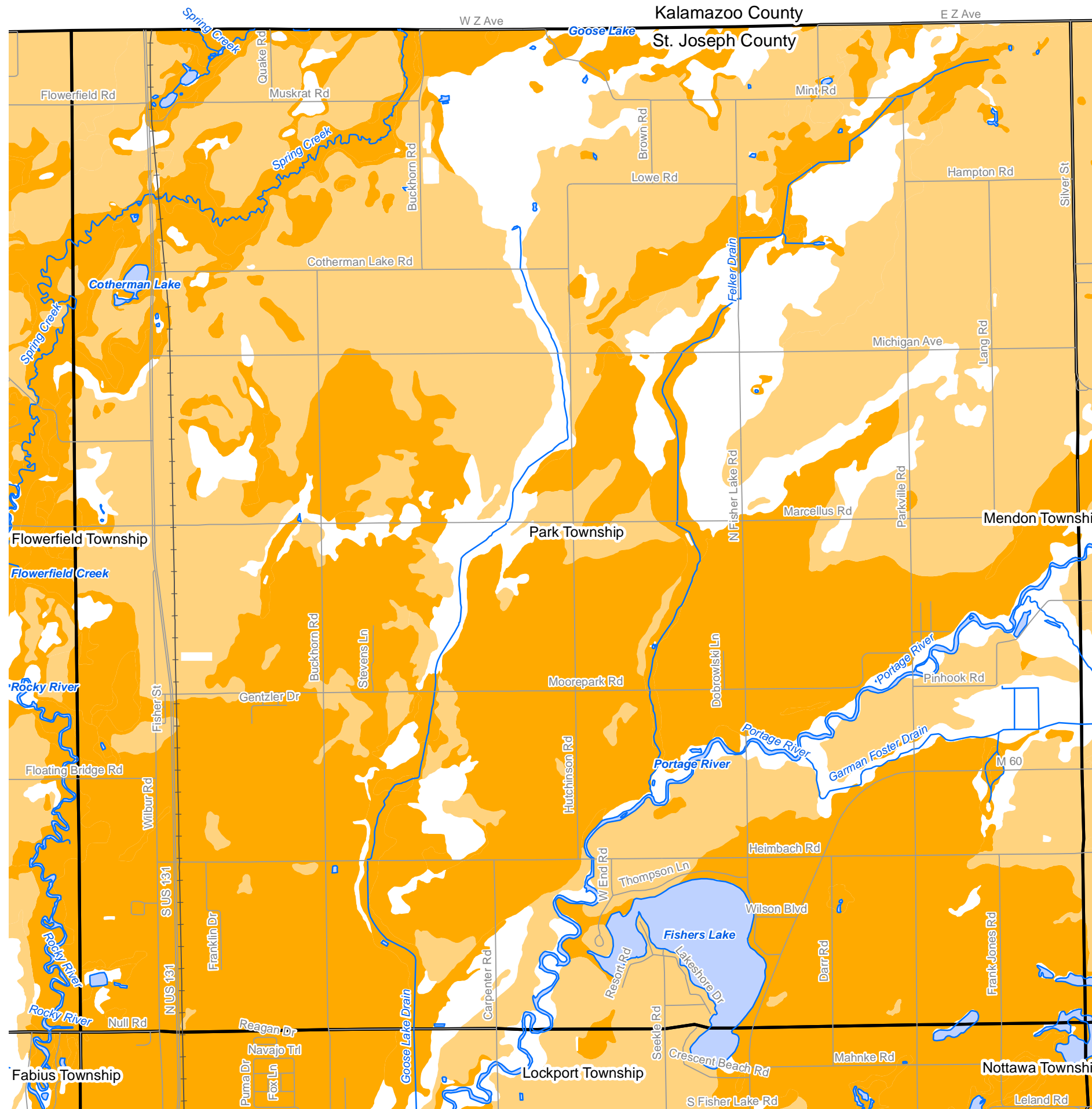
Smart Growth Network. 2002. "This is Smart Growth." International City/County Management Association and U.S. Environmental Protection Agency, Washington, D.C.

(<http://www.smartgrowth.org/about/principles/Default.asp?res=1280>)

VanDelfzijl, Sarah. 2003. *Rocky River Watershed Management Plan*. St. Joseph County Conservation District, Centreville, MI.

<http://www.stjoeriver.net/wmp/docs/RRPlan.PDF>

Figures



Data Sources: Michigan Geographic Framework v13a. USDA NRCS Soil Survey - St. Joseph County Prime Farmland.

Legend

- All Prime Farmland Soils
- Farmland of Local Importance Soils

PARK TOWNSHIP PRIME FARMLAND

NORTH

0 1,750 3,500 FEET



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scientist
architects
constructors

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carr & huber, inc.

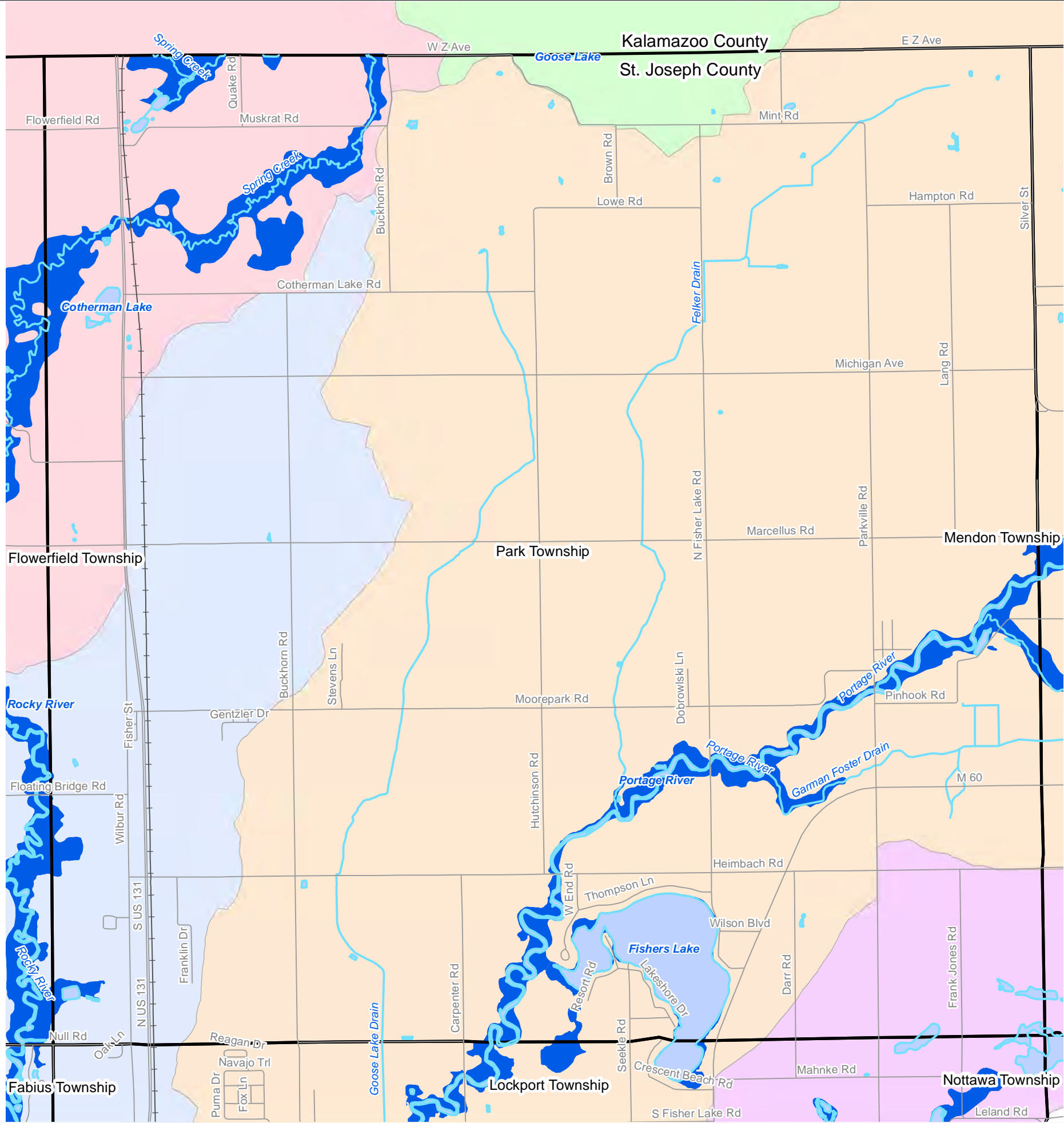
Hard copy is intended to be 11"x17" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

Park Township
St. Joseph County, Michigan
Portage River Watershed Planning Project
MDEQ Tracking Code #2012-0017

PROJECT NO.
G130188

FIGURE NO.
1

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Data Sources: Michigan Geographic Framework v13a. EPA Watersheds HUC12-St. Joseph County. FEMA 100 Year Flood Zones.

Legend

- City of Florence-Saint Joseph River
- Goose Lake Drain-Portage River
- Kerr Creek-Rocky River
- Lower Flowerfield Creek
- Portage Creek
- FEMA 100 year Flood Zones

**PARK TOWNSHIP
STREAMS AND
SUBWATERSHEDS**

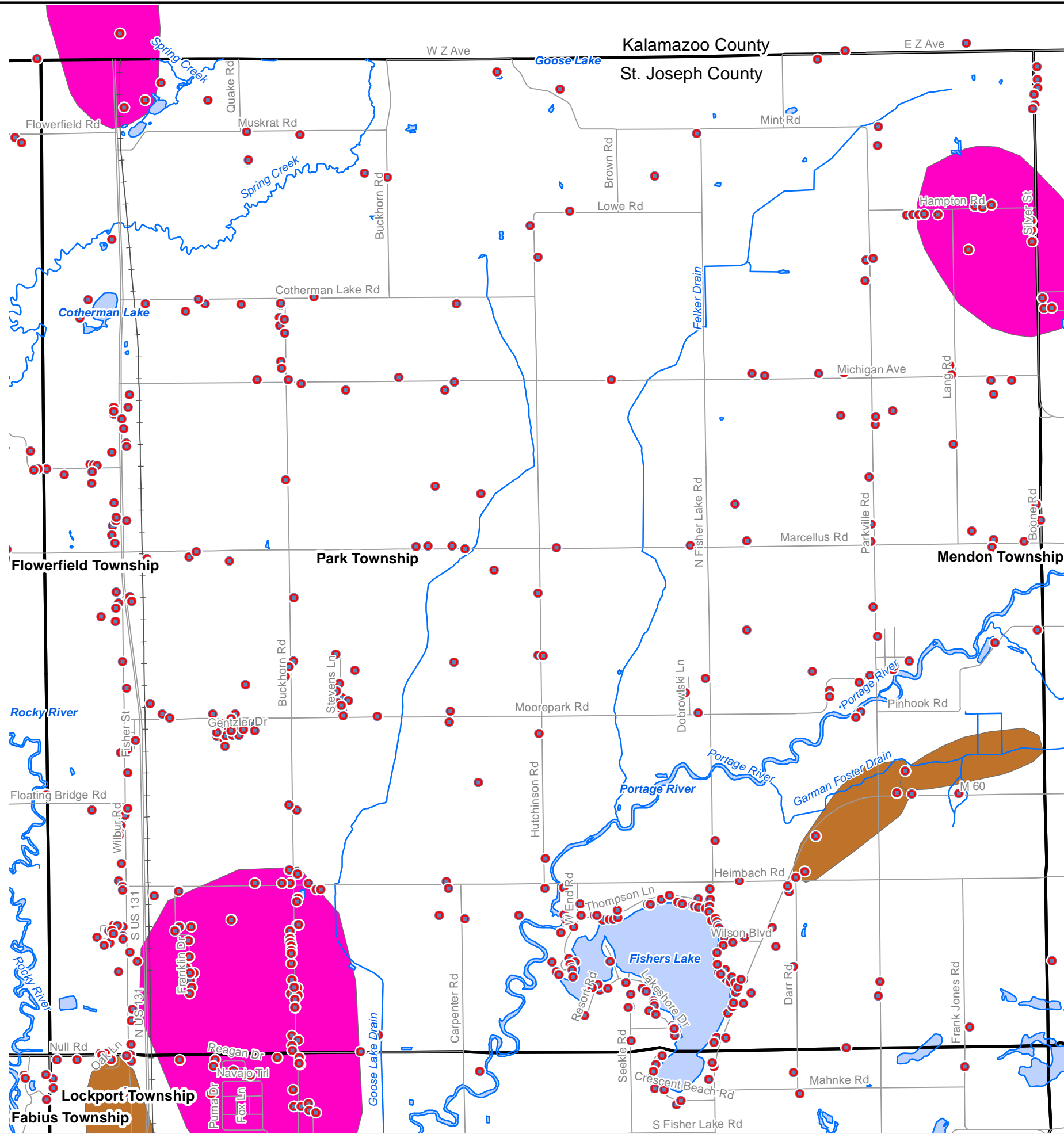
NORTH 0 1,750 3,500 FEET

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PROJECT NO.
G130188
 FIGURE NO.
2
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Legend

- Wells
- Type 1 Provisional Wellhead Protection Area
- Type 2 Provisional Wellhead Protection Area

WELLHEAD PROTECTION AREAS WITHIN PARK TOWNSHIP

NORTH

0 1,750 3,500 FEET

Data Sources: Michigan Geographic Framework v13a. Michigan DEQ Wellhead Protection Area.

PLOT INFO: Z:\2013\130188\CAD\GIS\Map Document\Park Twp Wellhead Protection.mxd Date: 4/4/2014 10:02:41 AM User: CDA



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carr & huber, inc.

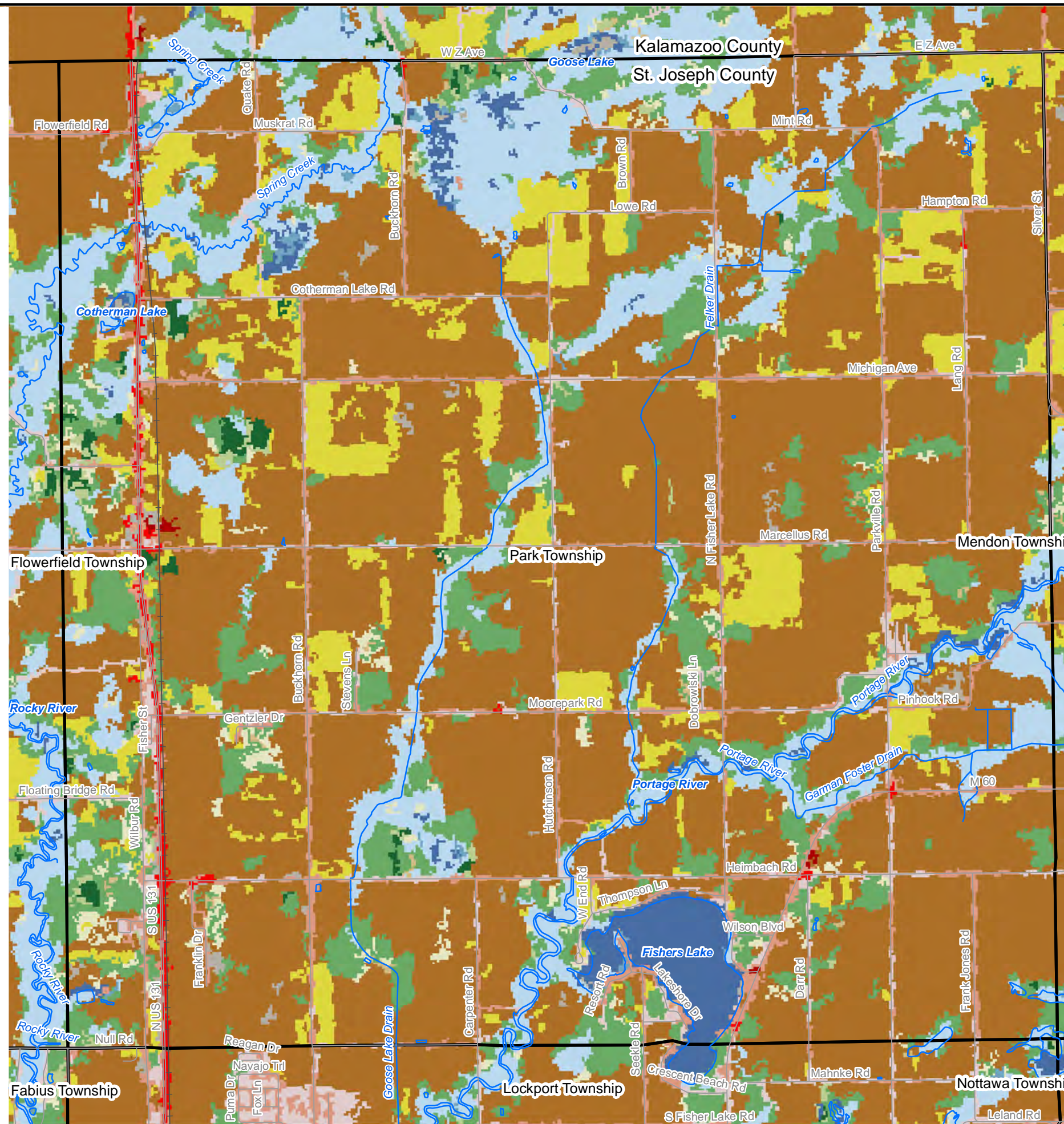
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St. Joseph County, Michigan
Portage River Watershed Planning Project
MDEQ Tracking Code #2012-0017

PROJECT NO.
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FIGURE NO.
3

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Legend

Land Cover 2006

- Barren Land
- Cultivated Crops
- Deciduous Forest
- Developed, High Intensity
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, Open Space
- Emergent Herbaceous Wetlands
- Evergreen Forest
- Hay/Pasture
- Herbaceous
- Mixed Forest
- Open Water
- Shrub/Scrub
- Woody Wetlands

**PARK TOWNSHIP
LAND COVER**

NORTH

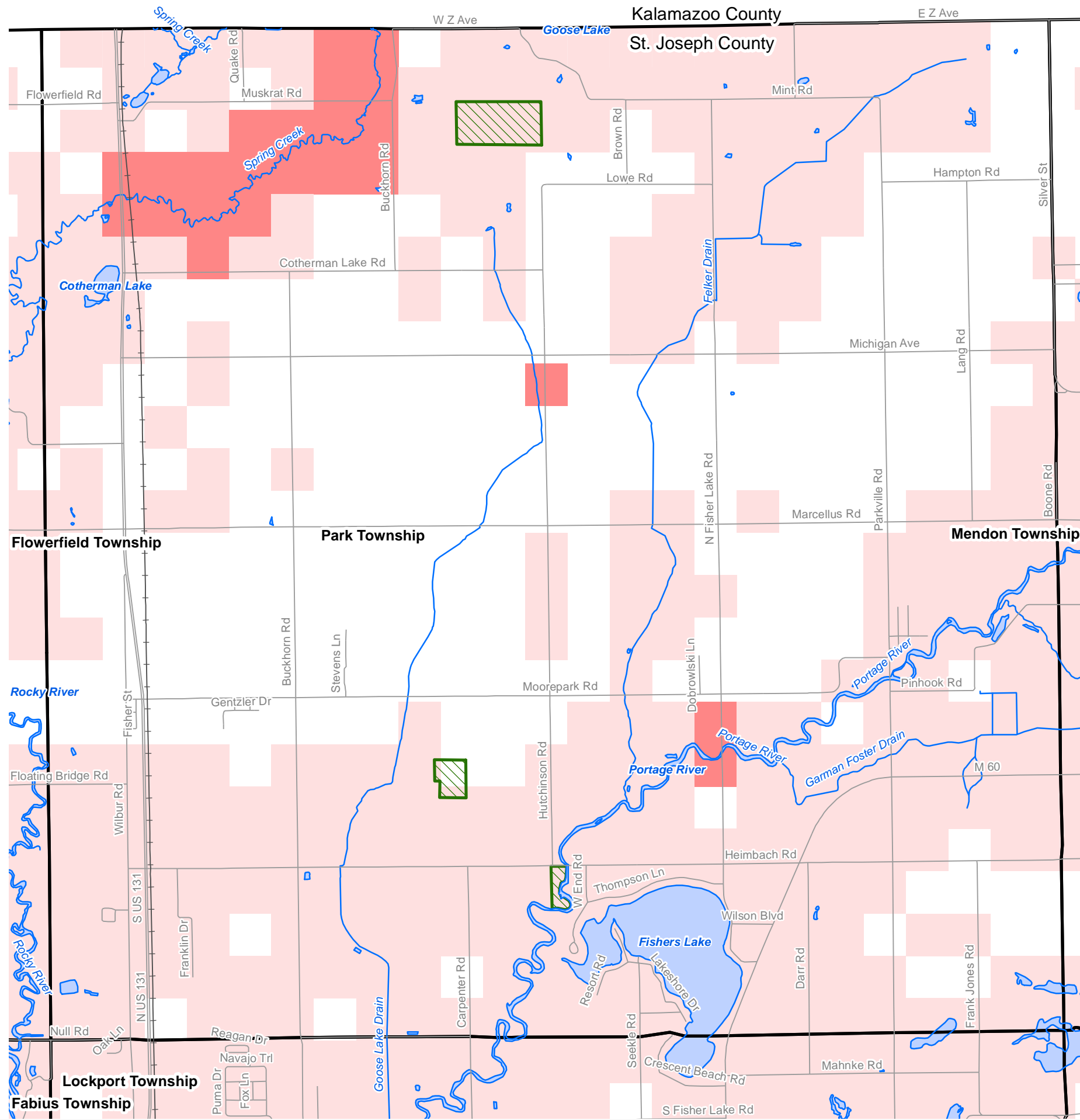
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Data Sources: Michigan Geographic Framework v13a. USDA National Land Cover Dataset 2006.

PROJECT NO.
G130188

FIGURE NO.
4

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Legend

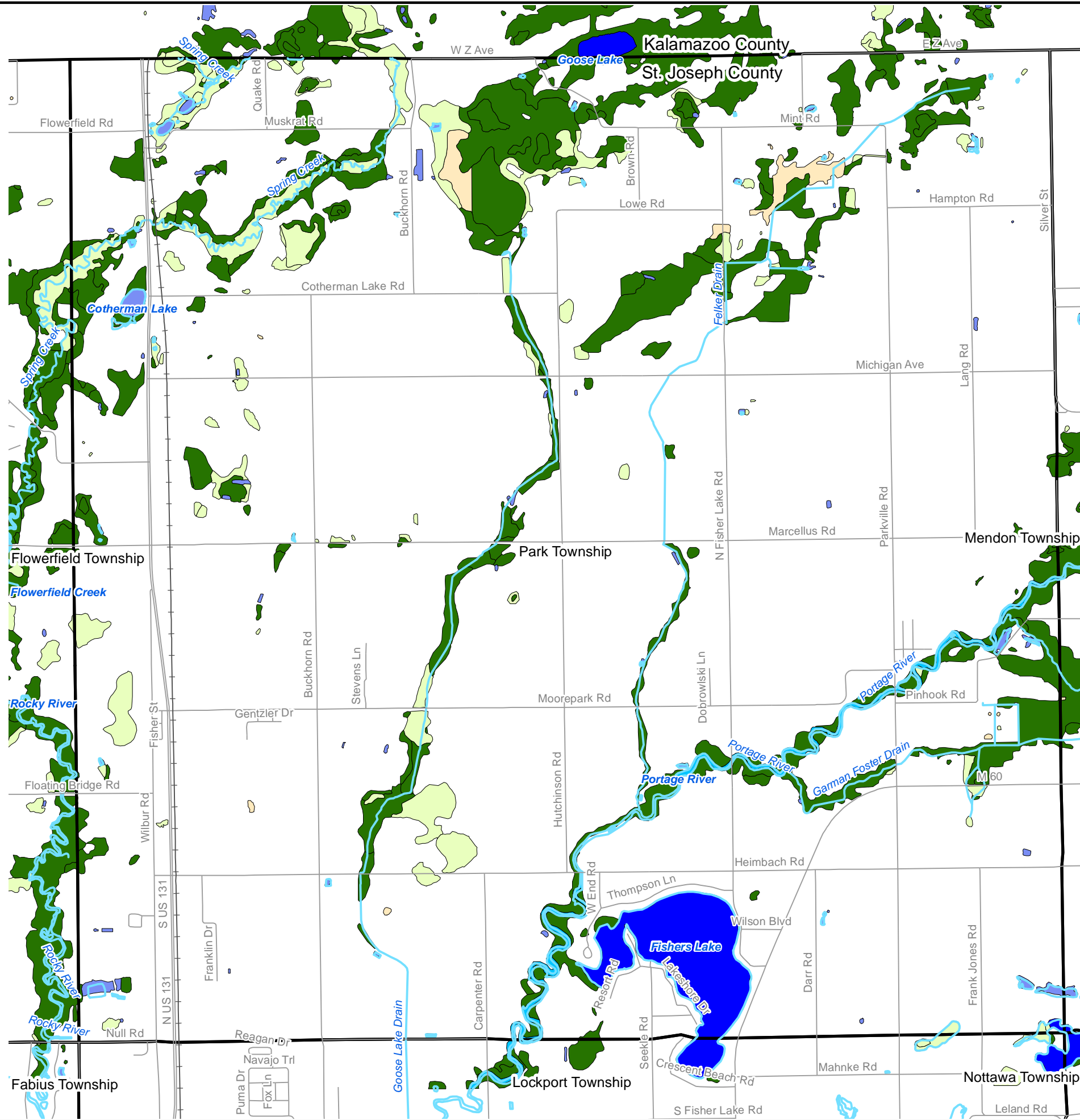
- Conservation and Recreation Lands
- Number of Threatened, Endangered or Special Concern Species per Quarter-Quarter Section
- 0.01 - 10
- 10 - 25
- 25 - 50

**BIOLOGICAL RARITY
AREAS WITHIN
PARK TOWNSHIP**

NORTH FEET

0 1,750 3,500

Data Sources: Michigan Natural
Features Inventory, Biological
Rarity Index.
CARL, Ducks Unlimited, 2013.



Legend

- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Freshwater Emergent Wetland
- Other
- Riverine

**PARK TOWNSHIP
EXISTING WETLANDS**

NORTH

0 1,750 3,500 FEET

Data Sources: Michigan Geographic Framework v13a. US Fish & Wildlife National Wetlands Inventory 24k.

PLOT INFO: Z:\2013\130188\CAD\GIS\Map Document\Park Twp Wetlands.mxd Date: 4/4/2014 8:44:04 AM User: cda

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scientist
architects
constructors

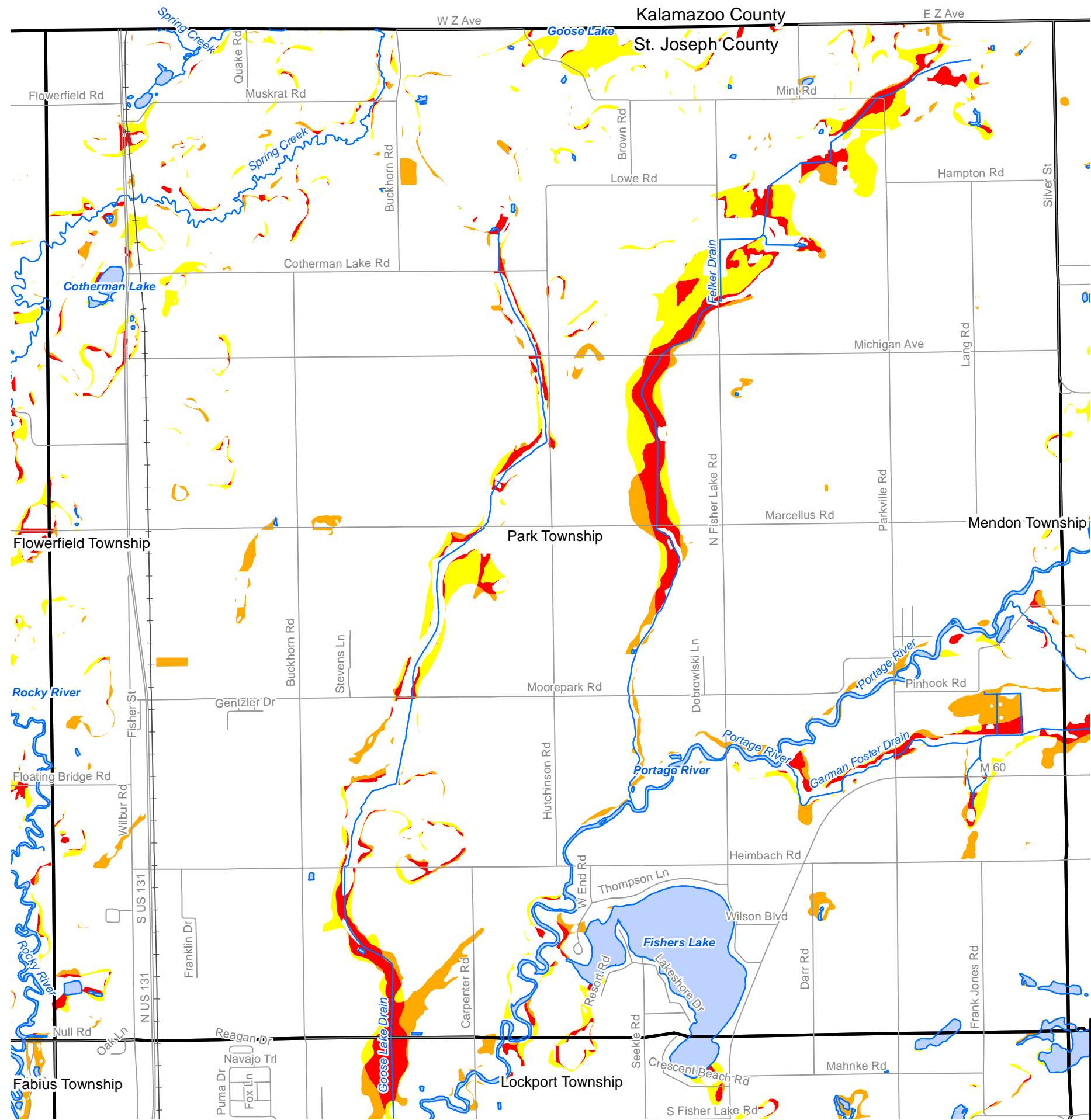
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Park Township
St. Joseph County, Michigan
Portage River Watershed Planning Project
MDEQ Tracking Code #2012-0017

PROJECT NO.
G120246

FIGURE NO.
6

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Legend

Potential Wetland Restoration Area

- High Potential-Hydric Soil and Presettlement Wetland Overlay
- Medium Potential-Only Hydric Soils
- Low Potential-Only Presettlement Wetlands

**PARK TOWNSHIP
POTENTIAL WETLAND
RESTORATION AREAS**

NORTH

0 0.5 1 MILES

Data Sources: Michigan Geographic Framework v13a. Michigan DNR Potential Wetland Restoration Area.

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scientist
architects
constructors

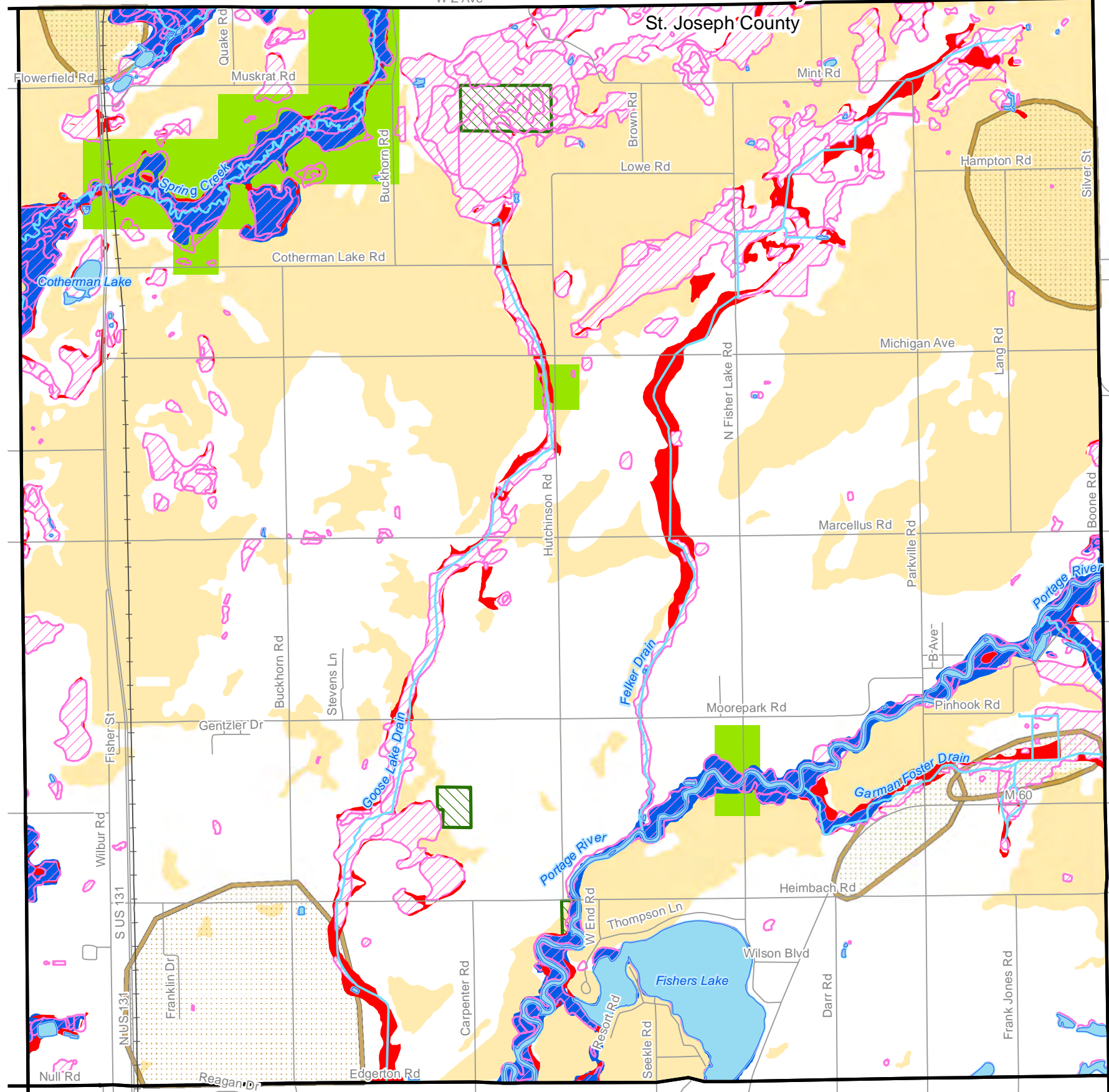
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St. Joseph County, Michigan
Portage River Watershed Planning Project
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PROJECT NO.
G130188

FIGURE NO.
7

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Data Sources:
 USDA NRCS Soil Survey-St. Joseph County Prime Farmland, 2009.
 EPA Watersheds HUC12-St. Joseph County. FEMA 100 Year Flood Zones, effective 2010.
 US Fish & Wildlife National Wetlands Inventory 24k.
 Michigan DNR Potential Wetland Restoration Area.
 Michigan DEQ Wellhead Protection Area.
 Michigan Natural Features Inventory, Biological Rarity Index.
 CARL, Ducks Unlimited, 2013.

Legend

- Wetlands NWI
- FEMA 100 year Flood Zones
- High Potential Wetland Restoration Area
- Conservation and Recreation Lands
- 10 to 50 Threatened, Endangered or Special Concern Species per Quarter-Quarter Section
- Wellhead Protection Area
- Prime Farmland Soils

RESOURCE CONSERVATION OVERLAY AREAS WITHIN PARK TOWNSHIP

NORTH

0 1,750 3,500 FEET

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 St. Joseph County, Michigan
Portage River Watershed Planning Project
MDEQ Tracking Code #2012-0017

PROJECT NO.
 G130188
 FIGURE NO.
8
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Appendix 1

Document Review for Water Resource Protection

Park Township - St. Joseph County, Michigan

February 2014

| Criteria | Yes/ No | Comments |
|---|---------|--|
| | | List page number in Master Plan and list the section of the Zoning Ordinance |
| Watershed Issues | | |
| I. Watershed Activities | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan identify the watershed(s) in which the community is located? | | Recommended |
| 2. Does the Master Plan call for protection of watershed resources in order to protect the health, safety and welfare of residents? | | Recommended |
| Stream Corridors and Flood Plains | | |
| I. Stream Corridors | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan indicate the importance of any of the following: riparian buffers to assist in flood control, protect the streambank from erosion, remove pollutants from storm water runoff, provide food and habitat for wildlife, prevent sediment from settling in the water course, provides tree canopy to shade streams, and promote desirable aquatic organisms, scenic value and recreational opportunities? | Yes | |
| 2. Does the Master Plan state that protection of stream corridors is important in promoting the health, safety and welfare of residents through flood control, and water quality and riparian corridor preservation? | Yes | |
| B. Development / Redevelopment Regulations: | | |
| 1. Are regulations coordinated with regulations protecting County drains? | Unknown | The zoning ordinance does not reference county drain regulations. |
| 2. Does the community require naturally-vegetated buffers along drainage way corridors? | No | |
| a. What is the width of the corridor? | NA | |
| 3. Does the community restrict development adjacent to stream corridors to those which do any of the following: offer no danger of topographical disturbance to the corridor, degradation to water quality, increased runoff, sedimentation, stream channel alterations, or degradation of dependent, non-hydrologic resources (i.e. flora and fauna)? | Yes | The Water Front Residential District provides single family residential use in areas adjacent to lakes and streams, but seeks to protect these features from excessive pollution due to an over concentration of septic tank systems (ZO 310). |
| 4. Are waterbody setbacks in place of at least 30-50 feet? | Depends | If adjacent property contains buildings, the setback shall not be less than the average setback of these two buildings. If there are no adjacent buildings, the setback will be a minimum of 50 feet on a lake, and 75 feet on a river (ZO 310.4.D.3). |
| II. Flood Control | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan identify floodplain protection as important for any of the following to promote the health, safety and welfare of residents: flood control, stream bank protection, pollutant filter, wildlife habitat, reduce sedimentation, shade watercourse and provide scenic value and recreational opportunities? | Yes | |
| 2. Does the community call for coordination of their efforts to protect the floodplain with adjoining communities and the County? | | Recommended |

Document Review for Water Resource Protection

Park Township - St. Joseph County, Michigan

February 2014

| Criteria | Yes/ No | Comments |
|--|----------------|---|
| B. Development / Redevelopment Regulations: | | |
| 1. Does the community participate in the National Flood Insurance Program? | Yes | ZO's 09-02 and 09-04 adopt preliminary FEMA FIRMS in Park Township. |
| 2. If yes, does the community have an overlay zone or other ordinance language that protects floodplains from undesirable development? | Yes | ZO 402 describes the floodplain overlay district. ZO 09-02 confirms FEMA's Designated Flood Prone Hazard Areas. |
| 3. Do the community's floodplain regulations address the following: | | |
| a. Provide for assessing the impacts of flood management projects on water quality? | No | |
| b. Provide for adding BMP's to existing projects? | No | |
| 4. Is there a variable width, naturally vegetated buffer that encompasses the 100 year floodplain area? | No | |
| Impervious Surface Reduction | | |
| I. Reducing Impervious Surfaces | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan call for minimizing impervious surfaces in new construction and redevelopment projects to reduce the amount of runoff and improve infiltration? | Yes | |
| 2. Is the Master Plan goal of reducing impervious surface tied to protecting the health, safety and welfare of residents through protection of water quality, natural features and open space? | Yes | |
| II. Parking Lots/Driveways/Sidewalks | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Does the community have flexibility in the parking ordinance to reduce the number of spaces constructed if warranted by the proposed development? | | This is not addressed in the Zoning Ordinance. |
| 2. Is some portion of a parking lot required to be planted with trees/vegetation within the parking lot paving? | No | |
| 3. Does the community require stormwater treatment for parking lot runoff in landscaping areas? | No | |
| B. Design Standards: | | |
| 1. Are shared parking facilities encouraged? | Possibly | ZO 403.5C states the Planning Commission may determine whether adequate parking is available in shared parking areas where demand occurs out of normal store operation hours (such as churches and theaters). |
| 2. Is 30% of the parking area required to have spaces with smaller dimensions for compact cars? (9ft-width and 18ft - length or less)? | No | |
| 3. Is there a maximum on parking spaces size (9ft-width and 18ft - length or less)? | Yes | Off street parking dimensions are specified in ZO 403.5 and depend upon parking pattern. The smallest space allowed is 9 feet wide and 18 feet long (75 to 90 degree diagonal). |
| 4. Are developers encouraged to use parking lot islands as stormwater infiltration areas? | No | |
| 5. Are driveways or overflow parking areas allowed to be pervious or porous pavements? | | This is not addressed in the Zoning Ordinance. |
| 6. Are maximum spaces given instead of minimum (for office bldgs - 3spaces/1000ft ² ; shopping - 4.5 spaces/1000ft ² ; residential - 2 spaces/single family home)? | No | |
| 7. Are sidewalks only allowed to be on one side of the road? | | This is not addressed in the Zoning Ordinance. |
| 8. Are sidewalks eliminated if an alternative path is provided? | | This is not addressed in the Zoning Ordinance. |

Document Review for Water Resource Protection

Park Township - St. Joseph County, Michigan

February 2014

| Criteria | Yes/ No | Comments |
|--|----------------|--|
| III. Street and Access | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Does the community have jurisdiction over roads or allow private roads? | Yes | St. Joseph County has jurisdiction over public roads. Private roads are allowed, and are defined as a right-of-way reserved for use by occupants of the abutting structures (ZO 202.105). |
| 2. If yes, do regulations pertaining to roads include the following standards: | | |
| a. Are streets to be designed with the minimum required pavement width needed to support travel lanes, emergency, maintenance and service vehicles (18-22 ft for low traffic roads)? | Yes | ZO 202.105: Private roads must meet the design criteria of the St. Joseph Highway Department. These criteria are specified in <i>Board of County Road Commissioners (CRC) of the County of St. Joseph, Requirements and Specifications for New Roads or Plat Roads</i> . Minimum paved width is 22 feet. |
| b. Are right-of-way widths minimized to avoid mass clearing and grading (less than 45 feet)? | No | Minimum ROW width specified by the County is 66 feet. However, all sound trees outside the grading limits, but within the ROW, of new roads may not be removed without the permission of the CRC Board. |
| c. Are there required landscaped areas in cul-de-sacs? | No | |
| d. Are the minimum radii of cul-de-sacs no more than 35 feet? | No | Minimum radii of cul-de-sacs is 37.5 feet, with an additional 5 foot shoulder. |
| e. Are hammerheads allowed instead of cul-de-sacs? | | This is not addressed in the CRC road specifications. |
| f. Are the use of open swales allowed instead of curb and gutter? | Yes | |
| g. If curb and gutter is used, are perforated curbs (allows water to flow into swales) or invisible curbs (flush with road surface) required? | | This is not addressed in the CRC road specifications. |
| IV. Lot Setbacks / Lot Width / Lot Coverage | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance allow for the relaxation of side yard setbacks and narrower frontages to reduce the total road length (and overall site imperviousness)? | No | |
| 2. Does the Zoning Ordinance allow for the relaxation of front yard setbacks to reduce driveway lengths (and overall site imperviousness)? | No | |
| 3. Does the Zoning Ordinance allow the location of bioretention, rain gardens, filter strips and swales in required setback areas and common areas? | | This is not addressed in the Zoning Ordinance. |
| 4. In rural, low density areas are there limits on impervious lot coverage (15% maximum includes all impervious surfaces not just the house)? | Yes | In the Rural Residential District, the maximum building site coverage is 25% (ZO 306.4C). In the Agricultural District, the maximum building site coverage is 5% (ZO 305.4C). When original principal farm residences are split from agriculturally productive land, the maximum building site coverage is 15% (ZO 305.5D). These ordinances only note building coverage, not total impervious surfaces. |
| 5. Are there limits on the extent of lawn area on residential lots in rural areas? | No | |
| The Development Review Process | | |
| I. Site Plan Review | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Is the review process coordinated with the receipt of applicable County and State permits? | Depends | ZO 402.3 requires presentation of a MDEQ permit before the Township issues a building permit within a flood hazard area. The ZO has no similar requirement for MDEQ permits for wetland, inland lake or stream impacts. |

Document Review for Water Resource Protection

Park Township - St. Joseph County, Michigan

February 2014

| Criteria | Yes/ No | Comments |
|--|----------------|--|
| 2. Does the Zoning Ordinance require that developers preserve natural features, such as lakes, ponds, streams, floodplains and floodways, wetlands, woodlands, steep slopes, and natural drainage patterns to the fullest extent possible? | No | ZO 409.4C requires that as many natural features of the landscape be retained as possible when they furnish a barrier or buffer between the project and adjoining properties and where they assist in preserving the general appearance of the neighborhood or help control erosion or the discharge of storm water. |
| 3. Are BMP's required to be labeled and shown, in detail, on the site plan so that they can be reviewed for effectiveness during the site plan review process? | No | |
| 4. Is a Soil Erosion and Sedimentation Control Plan required as part of the site plan review process? | No | ZO 503.2: Plans for for Multiple Housing Development must be reviewed by the St. Joseph Drain Commission. The St. Joseph County Drain Commissioner is the County Enforcement Agent for SESC. SESC permits are obtained from the SJCDC office. |
| 5. Are developers required to show all natural features on site plans, such as lakes, ponds, streams, rivers, floodplains and floodways, wetlands, woodlands, steep slopes, and natural drainage patterns? | No | |
| II. Pre-Construction Meetings | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Is the construction sequence required to start with a pre-construction meeting? | No | |
| III. Construction | | |
| A. Plans and Policies: | | |
| 1. Does the community chart the progress of all construction projects to ensure that they are in compliance with the approved site plan? | | Recommended |
| B. Development / Redevelopment Regulations: | | |
| 1. Is a Pre-winter meeting required to assess whether the existing soil cover will provide adequate soil erosion and sedimentation control during winter months? | No | |
| Land Conservation and Development Techniques | | |
| I. Open Space / Park Acquisition | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan and/or Recreation Master Plan call for community acquisition of open space? | Yes | |
| 2. Does the Master Plan and/or Recreation Master Plan recognize the importance of open space preservation as a way to protect the health, safety and welfare of residents, protect vital air, land and water resource quality, to buffer air and noise pollution, preserve wildlife habitat, and preserve aesthetic values and the community's beauty? | Yes | |
| II. Conservation Easement and Similar Tools | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan call for the use of conservation easements or other tools to conserve open space in the community? | Yes | |

Document Review for Water Resource Protection

Park Township - St. Joseph County, Michigan

February 2014

| Criteria | Yes/ No | Comments |
|---|----------------|---|
| III. Clustering and Open Space Developments | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan include goals to preserve natural features and protect the quality of vital air, land, and water resources while accommodating development? | Yes | |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the community have a Clustering and/or Open Space Ordinance? | Yes | ZO 407 provides open space requirements for the zoning districts. Open space guidance for Planned Unit Developments is found in ZO 315. ZO 412 deals with optional open space preservation, but it is so poorly written that it is incomprehensible. |
| 2. Are flexible site design criteria available for developers that use open space or cluster design options? (Ex. Relaxed setback widths and lessened sidewalk requirements.) | Yes | The PUD ordinance allows up to 150% density of that which is permitted in the existing zoning district (ZO 315.10). Building site area per dwelling unit and building site width may vary in PUDs from those stipulated in existing zoning districts. |
| 3. Are open spaces required to be consolidated into larger units (contiguous), or required to be a minimum size or width? | No | ZO 407.1 and 407.2 note requirements for placement of landscaped, open space. Every property in the PUD must abut the open space; therefore, clustering is encouraged (ZO 315.11). |
| 4. Does the open space have to be managed in a natural condition? | No | |
| 5. Are the types of uses allowed in the open space restricted to low impact uses? | No | Land uses in open spaces are not specified in ZO 315 or 407. |
| 6. Is open space required to be protected through a conservation easement or other similar mechanism? | No | In a PUD, common open space may either be held in corporate ownership by owners of the project area or be dedicated to the Township and retained as common open space for parks, recreation and related uses (ZO 315.8). |
| 7. Are incentives put into place to encourage open space development? | No | |
| a. Are bonus densities utilized as an incentive? | No | |
| 8. Do all Planned Unit Developments require open space? | Yes | ZO 315 requires a minimum 20% of the PUD contain open space. |
| IV. Urbanized Communities | | |
| A. Plans and Policies: | | |
| 1. Are infill developments encouraged in areas that already have significant development? | N/A | The Township is mostly rural. Commercial and industrial development and zoning are concentrated along US-131. |
| B. Design Standards: | | |
| 1. Are infill and redevelopment projects encouraged to promote conservation and natural resource preservation? | No | |
| 2. Are re-development projects required to coordinate improvements with existing facilities and infrastructure? | No | |

Document Review for Water Resource Protection

Park Township - St. Joseph County, Michigan

February 2014

| Criteria | Yes/ No | Comments |
|--|----------------|--|
| V. Rural Communities | | |
| A. Plans and Policies: | | |
| 1. Is agriculture described in the Master Plan as an economically viable profession in the community? | Yes | |
| 2. Have prime and unique agricultural lands been identified and mapped in the Master Plan? | Yes | |
| B. Development / Redevelopment Regulations: | | |
| 1. Has the community designated an Agricultural Zoning District? | Yes | ZO 305 defines this district. |
| 2. Does the agricultural zoning district utilize a method such as sliding scale to limit fragmentation of farmland and to lessen conflicts between farming and residential uses? | Yes | ZO 305.3: a Special Use Permit is required to split off a residential parcel from agricultural production land. Agricultural production parcels must be at least 20 acres (ZO 305.4A). |
| 3. Does the agricultural zoning district utilize setbacks or buffers for any new residential development? | Yes | Setbacks and other building standards are noted in ZO 305.4. |
| 4. Does the Agricultural Zoning District also consider the preservation and protection of natural features, such as wetlands or groundwater? | No | |
| Recreation Plan | | |
| A. Plans and Policies | | |
| 1. Has a Recreation Plan been approved by MDNR within the last 5 years that identifies priority lands for acquisition or protection for future recreational use? | No | |

Document Review for Water Resource Protection

Park Township - St. Joseph County, Michigan

February 2014

| Criteria | Yes/ No | Comments |
|--|----------------|---|
| Wetland Preservation | | |
| I. Inventory | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan include a map of wetlands? | | Included in Policy Review Document |
| II. Wetlands Protection | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan recognize the importance of wetlands, and the functions they play in protecting residents' health, safety and welfare from problems such as flooding and poor water quality? | Yes | |
| 2. Does the Master Plan call for the protection of wetlands within an ecosystem context (protecting adjacent uplands, waterways, and vegetated buffers as well)? | Yes | |
| B. Development / Redevelopment Regulations: | | |
| 1. Has the community adopted a local wetlands ordinance that protects wetlands less than five acres in size? | No | |
| 2. Is this ordinance coordinated with the State's wetlands regulations? | NA | |
| 3. Are there building and a no-disturbance setback requirements from wetland areas (at least 20-30 feet)? | No | |
| Lake Management | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan have a map of lakes? | | Included in Policy Review Document |
| 2. Does the Master Plan discuss the values of lakes such as recreation, economic development, habitat, fisheries? | Yes | |
| B. Development / Redevelopment Regulations | | |
| 1. Does the zoning ordinance include an anti-funneling provision for waterbodies? | Yes | ZO 410 regulates riparian access parcels. |
| Habitat Preservation | | |
| I. Natural Area Preservation / Restoration | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan call for preservation of natural areas for wildlife habitat protection? | Yes | |
| 2. Does the Master Plan link habitat preservation to protection of the health, safety and welfare of residents through natural resource preservation? | Yes | |
| 3. Has the community identified high quality natural areas to be preserved? | No | |
| 4. Does the community have a plan to protect the high priority areas? | No | |

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| Criteria | Yes/ No | Comments |
|--|----------------|--|
| II. Native Plant Species | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan recognize the importance of native vegetation in the protection of vital air, land and water resource quality, to buffer air and noise pollution, preserve wildlife habitat, and preserve aesthetic values and the community's beauty? | | Recommended |
| B. Design Standards: | | |
| 1. Do the Design Standards specify the use of native plant species in the storm water system to help reduce storm water velocities, filter runoff and provide additional opportunities for wildlife habitat? | No | |
| 2. Are invasive and exotic plants prohibited from being used? | No | |
| 3. Does the site plan review process require developers to consult with the Michigan Department of Environmental Quality about Threatened/Endangered Species on site? | No | |
| Woodlands Preservation | | |
| I. Inventory | | |
| A. Plans and Policies: | | |
| 1. Has the community conducted a woodlands inventory and mapped this information? | No | |
| II. Woodlands Protection | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan recognize the importance of woodlands to protect any of the following: water, air and soil quality, to buffer air and noise pollution, to moderate local climate and storm hazards, to preserve wildlife habitat, and to preserve aesthetic values and community beauty? | | Recommended |
| 2. Does the Master Plan recognize the importance of woodlands for storm water infiltration, thus reducing flooding and minimizing water pollution? | | Recommended |
| 3. Does the Master Plan identify woodlands as an important landscape feature that protects the health, safety and welfare of residents? | Yes | |
| B. Development / Redevelopment Regulations: | | |
| 1. Has the community adopted a local woodlands or tree protection ordinance? | No | The ZO encourages preservation of existing trees when possible during site development (ZO 503.3F, 504.2B, 505.2B) |
| 2. Are woodlands defined in a broad manner so that existing trees and remnant woodlands are also protected? | No | |
| 3. Does the ordinance require replacement of trees that are removed? | No | |
| 4. Does the ordinance minimize the clearing of a site? | No | |
| 5. Are permits required to clear a site? | No | ZO 403.1 requires a permit to construct structures (including site excavation), but not to clear a site. |

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| Criteria | Yes/ No | Comments |
|--|----------------|---|
| Greenways/Green Infrastructure | | |
| I. Greenway/Green Infrastructure Plan | | |
| A. Plans and Policies: | | |
| 1. Does the community have a greenway plan or support greenways/green infrastructure through its Master Plan or Recreation Master Plan? | | Recommended |
| 2. If yes, does this plan do the following: | | |
| a. Identify greenways/green infrastructure as important natural transportation corridors for wildlife, and for the protection of other natural features? | | Recommended |
| b. Connect many natural areas within the community? | | Recommended |
| c. Connect the community's greenway/green infrastructure plan with adjacent communities', County's or regional greenway plans? | | Recommended |
| Groundwater | | |
| I. Mapping | | |
| A. Plans and Policies: | | |
| 1. Do Master Plan goals call for the identification and mapping of groundwater recharge areas? | | Recommended |
| 2. Is a map of groundwater resources or groundwater recharge areas included in the Master Plan? | | Included in Policy Review Document |
| II. Groundwater Protection | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan recognize the importance of the groundwater to the health, safety and welfare of its residents? | Yes | |
| 2. Does the Master Plan identify groundwater as an important natural resource, and call for its protection? | Yes | |
| B. Development / Redevelopment Regulations: | | |
| 1. Is ground water considered in the zoning designations of parcels? | No | |
| 2. Are there additional requirements for site plan submittals in groundwater recharge areas? | No | |
| III. Wellhead Protection | | |
| A. Plans and Policies: | | |
| 1. Does this community have municipal well fields? | | Neighboring communities and industries have mapped wellhead protection areas. |
| 2. If yes, has the community done the following: | | |
| a. Developed a wellhead protection program? | No | |
| b. Restricts high risk land use activities in wellhead protection areas? | No | |

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| Criteria | Yes/ No | Comments |
|--|---------|---|
| Storm Water Management | | |
| I. Stormwater Management Standards | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan call for the preservation of natural features as parkland and/or in open space developments to help alleviate problems associated with storm water runoff? | Yes | |
| 2. Does the Master Plan identify storm water management as an important community goal or policy? | Yes | |
| 3. Does the Master Plan state both the quality and quantity of storm water are important issues to address in storm water management policies? | Yes | |
| 4. Does the Master Plan relate storm water management to the protection of health, safety and welfare of the community's residents? (For example, storm water management can reduce flooding, improve water quality, etc.) | Yes | |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance require that developers preserve natural drainage patterns to the fullest extent possible? | No | |
| 2. Do you regulate storm water in your community? | No | ZO 404.5 states no residential or business operation or activity shall discharge storm waters in violation of state and federal law and regulation. |
| 3. If yes, are your regulations coordinated with the County's storm water regulations so that your rules do not contradict the County's? | NA | |
| 4. If your community regulates storm water, do your regulations address the following: | | |
| a. Are there storm water guidelines that fully detail specific storm water design criteria? | NA | |
| b. Maintain or establish buffer strips (between 30 and 100 feet wide) from the top of bank of any watercourse or surface water? | NA | |
| 5. Does the Zoning Ordinance include flood control and water resource protection performance standards? | No | |
| 6. If yes, do they address the following to reduce the quantity of runoff and improve runoff quality: | | |
| a. Limit land disturbance and grading? | NA | |
| b. Maintain vegetated buffer strips and other existing vegetation to improve infiltration of storm water? | NA | |
| c. Minimize impervious surfaces? | NA | |
| d. Encourage the use of infiltration devices (such as filter strips, vegetated swales, sand filters, rain gardens, etc and allow for 72 hour ponding prior to infiltration? | NA | |
| 7. Are all development/redevelopment plans required to go to the County Drain Commissioner for review? | No | ZO 503.2: Plans for for Multiple Housing Development must be reviewed by the St. Joseph County Road Commission and Drain Commission. |

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| Criteria | Yes/ No | Comments |
|---|-----------------------|--|
| II. Engineered Best Management Practices (BMP's) | | |
| A. Plan and Policies | | |
| 1. Does the Master Plan include goals / policies that encourage the use of Best Management Practices (BMP's) to minimize, collect, and treat storm water? | | Recommended |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance require the use of BMP's when possible? | No | |
| 2. Does the Zoning Ordinance require the use of above ground BMP's instead of belowground storm water conveyance systems? | No | |
| 3. Does the Zoning Ordinance prohibit direct discharge of storm water into wetlands, streams or other surface waters without pre-treatment? | No | |
| 4. Does the Zoning Ordinance call for periodic monitoring of BMP's to ensure they are working properly? | No | |
| 5. Does the Zoning Ordinance require that all storm water management systems and / or BMP's be maintained? | No | |
| C. Design Standards: | | |
| 1. Do the Design Standards provide minimum guidelines for BMP's that pre-treat and filter storm water, and retain storm water in a bio-retention facility? | No | |
| III. Infiltration | | |
| A. Plans and Policies | | |
| 1. Does the Master Plan call for the preservation of natural features for the purpose of preserving the existing infiltration of storm water? | Yes | |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance call for the use of BMP's that improve a site's infiltration potential? | No | |
| Erosion and Sedimentation Control | | |
| I. Soil Erosion and Sedimentation Control (SESC): | | |
| A. Plans and Policies: | | |
| 1. Is erosion and sedimentation control identified in the Master Plan as an important mechanism to protect the health, safety and welfare of residents through protection of water and soil resources? | Yes | |
| B. Development / Redevelopment Regulations: | | |
| 1. Does the Zoning Ordinance address erosion and sedimentation controls? | In a very limited way | A Special Land Use Permit for Removal of Soil, Sand, Gravel, and Other Materials requires the soil erosion control standards of St. Joseph County be followed (ZO 502.3). |
| 2. If yes, is the program coordinated with the County's program? | NA | The Township does not have a SESC program. The St. Joseph County Drain Commissioner is the County Enforcement Agent for SESC. SESC permits are obtained from the SJCDC office. |
| 3. If yes, does the community's program include the following standards? | | |
| a. Require that soil erosion control measures be in place before granting a building permit? | NA | |
| b. Protect waterways and stabilize drainage ways by requiring mechanisms, such as silt fencing, at the edge of the waterway buffer and special crossing and diversion techniques at waterway crossings? | NA | |
| c. Require that all erosion and sedimentation controls be maintained? | NA | |
| d. Require that all erosion and sedimentation controls be monitored on a periodic basis? | NA | |
| e. Methods to respond to public complaints regarding construction site erosion control? | NA | |
| 4. If no, does the community staff report erosion problems to the County enforcing agency? | Yes | |

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| Criteria | Yes/ No | Comments |
|---|-----------------------|---|
| 5. Are there any references in the Zoning Ordinance about compliance with the County Soil Erosion and Sediment Control Standards? | In a very limited way | A Special Land Use Permit for Removal of Soil, Sand, Gravel, and Other Materials requires the soil erosion control standards of St. Joseph County be followed (ZO 502.3). |

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| Criteria | Yes/ No | Comments |
|---|---------|--|
| Sanitary Sewer Planning and Infrastructure | | |
| I. Sanitary Sewer Planning and Infrastructure | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan address sanitary sewer planning? | | Recommended |
| 2. If yes, does the Master Plan tie sanitary sewer planning to protection of the health, safety and welfare of residents? | Yes | |
| 3. If yes, does the Master Plan address the following: | | |
| a. Has the community delineated a Sewer Service Area? | | Recommended |
| b. Has the Sewer Service Area been mapped, including all the facilities in the system (such as manholes, pipes, etc.)? | | Recommended |
| c. Is the map to be used in zoning decisions? | | Recommended |
| II. Septic Systems | | |
| A. Plans and Policies: | | |
| 1. Does the Master Plan identify areas that are suitable and unsuitable for septic systems? | | Recommended |
| 2. Does the Master Plan state that community involvement in placement and maintenance of septic systems is critical to the health, safety and welfare of residents? | | Recommended |
| B. Development / Redevelopment Regulations: | | |
| 1. Are regulations that pertain to septic systems coordinated with the County's regulations? | | The Township defers to the septic system standards found in the <i>Environmental Health Code, the Branch-Hillsdale-St. Joseph Community Health Agency.</i> |
| 2. Does the Zoning Ordinance require that a septic system location be at least 100 feet from a lake, wetland, stream, or other water feature? | No | The County Health Code specifies an isolation distance of 50 feet from a surface water body for sewage disposal facilities constructed after 7/1/1975. Prior to this date, septic tanks must be more than 25 feet from surface water bodies, and absorption areas must be 50 feet. |
| 3. Does the Zoning Ordinance specify a minimum isolation distance from residential and community wells? | No | The County Health Code specifies a 50 foot isolation distance from private wells. Distance from public and semi-public wells is as mandated by Michigan Law Act 399, P.A. 1976. |
| 4. Does the Zoning Ordinance create septic maintenance districts? | No | |
| III. Minimizing Inflow | | |
| A. Development / Redevelopment Regulations: | | |
| 1. Does the community prohibit connecting downspouts to the storm water system? | No | |
| 2. Does the community have a program to identify and disconnect footing drains from sanitary sewer lines? | No | |
| 3. Does the community promote rain barrels and rain gardens? | No | |

| Criteria | Yes/ No | Comments |
|--|---------|---|
| IV. Illicit Discharge Elimination | | |
| A. Plans and Policies: | | |
| 1. Has the community identified and/or mapped the community's drainage system, including all points of discharge and locations of illicit discharges to the drainage system? | N/A | |
| 2. Does the community have a program for identifying illicit discharges, and eliminating them? | | |
| 3. Does the community have a program to identify sanitary sewer or septic systems that are seeping into the storm water system, surface waters or groundwater? | | |
| Public Education | | |
| I. Public Education Efforts | | |
| A. Plans and Policies: | | |
| 1. Does the community have a system in place to distribute environmental education information? | N/A | |
| 2. Has the community encouraged residents to report illicit discharges or improper disposal of materials into storm drains or natural water bodies? | | |
| 3. Has the community educated commercial, industrial and institutional owners and tenants on how to reduce significant storm water pollutants? | | |
| Pollution Prevention and Housekeeping Practices | | |
| I. Storm Water System Maintenance | | |
| A. Plans and Policies: | | |
| 1. Does the community have a program in place to regularly clean out, maintain and/or inspect structural controls (such as catch basins, vegetated swales, infiltration basins, sedimentation basins, etc.)? | N/A | |
| 2. Does the community have a program that labels outfall structures that discharge runoff to natural systems? | | |
| II. Roadways | | |
| A. Plans and Policies: | | |
| 1. Does the community have jurisdiction over streets? | No | Streets are under the jurisdiction of the St. Joseph Road Commission. ZO 315.18C requires streets be adequate designed to handle traffic generated by a proposed PUD. |
| 2. If yes, | | |
| a. Does the community sweep the streets monthly or more often in high construction areas? | | |
| b. Does the community evaluate the amount of salt and/or sand that is applied to its roads in the winter? | | |
| c. Does the community provide leaf collection in the fall? | | |

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| Criteria | Yes/ No | Comments |
|--|------------------|--|
| III. Public Facilities Maintenance | | |
| A. Plans and Policies: | | |
| 1. Does your community have a maintenance building? | No | |
| 2. If yes, does the following occur: | | |
| a. Confirm that floor drains are connected to a sanitary sewer, or sealed? | | |
| 3. Does the community maintain its own vehicles? | | |
| 4. If yes, is a regular schedule of maintenance followed? | | |
| 5. Are vehicles or other equipment maintained and cleaned where fluids and/or cleaning water will not flow into the street, gutter, storm drain or water body? | | |
| IV. Landscaping Practices | | |
| A. Plans and Policies: | | |
| 1. Does the community have a schedule of landscape maintenance practices for municipal property? | No | |
| 2. Are employees trained on the proper application of chemical pesticides, herbicides and fertilizers? | | |
| 3. Are soils tested on municipal property before fertilizers are applied? | | |
| 4. Does the community use native vegetation in landscaping their properties? | Unknown | |
| 5. Does the community encourage landscaping with native plant species throughout the community? | In a limited way | ZO 503.3F states Multiple Housing Developments must retain and protect existing trees and other site features to preserve the character of the site. ZO 504.2B states existing trees should be preserved if possible during development of shopping centers. ZO 505.2B states that existing trees should be preserved whenever possible for Miscellaneous Special Use Permits. |
| B. Development / Redevelopment Regulations | | |
| 1. Is a fertilizer ordinance in place that only permits zero-phosphorus fertilizer to be used? | No | |
| Animal Waste (Pets & Kennels) | | |
| A. Plans and Policies | | |
| 1. Are residents educated about the availability, location, and requirements of properly disposing of pet waste? | No | |
| Capital Improvement Plan | | |
| I. Capital Improvement Plan | | |
| A. Plans and Policies: | | |
| 1. Does the community have a Capital Improvement Plan? | No | Recommended |
| 2. If yes, does the Master Plan link the Capital Improvement Plan with the protection of the health, safety and welfare of residents? | | Recommended |
| 3. If a Capital Improvement Plan is in place, does the plan: | | |
| a. Include policies related to natural resource protection? | | Recommended |
| b. Include standards as the basis for design of storm water and sanitary systems? | | Recommended |
| c. Include capital improvement for installation, maintenance and replacement of storm water utilities? | | Recommended |
| d. Include capital improvement for installation, maintenance and replacement of sanitary sewer utilities? | | Recommended |
| e. Call for the use, maintenance and replacement of storm water BMP's? | | Recommended |

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| Criteria | Yes/ No | Comments |
|--|----------------|---|
| Agricultural Manure Management | | |
| A. Plans and Policies | | |
| 1. Are agricultural operators educated about the requirements of properly storing and applying manure? | | ZO requires manure not be stored closer than 150 feet from dwellings and parcel boundaries in the Agricultural, Rural Residential and Rural Estate zoning districts (305.4D.4, 306.4D.4, 309.4D.4). |
| Wind Ordinance | | |
| A. Plans and Policies | | |
| 1. Does a zoning district allow and promote the effective and efficient use of wind energy conversion systems? | No | The zoning ordinance does not address wind energy conversion systems. |

Appendix 2

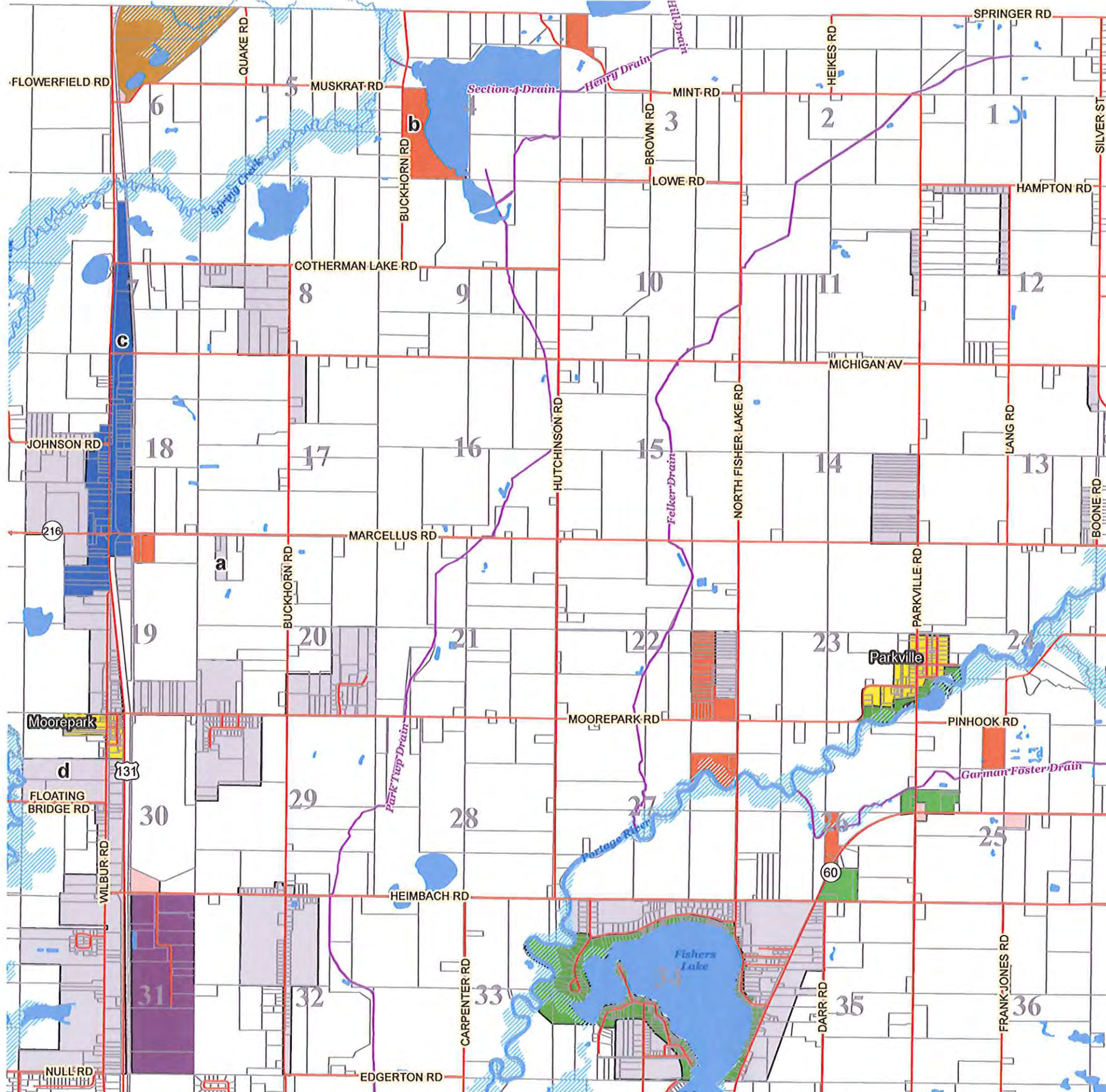
Park Township Zoning Map

St Joseph County, Michigan

Flowerfield Township

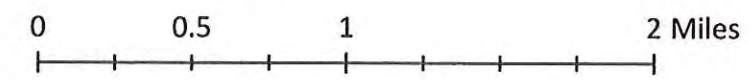
Mendon Township

Lockport Township



| | |
|--------------------|-----------------------------------|
| [White Box] | AR Agricultural Residential |
| [Light Purple Box] | RR Rural Residential |
| [Yellow Box] | R-1 High Density Residential |
| [Orange Box] | R-2 Mobile Home Park |
| [Red Box] | R-3 Rural Estate |
| [Green Box] | R-4 Waterfront Residential |
| [Pink Box] | C Commercial |
| [Dark Purple Box] | I Industrial |
| [Light Green Box] | LI Limited Industrial |
| [Blue Box] | CLI Commercial/Limited Industrial |
| [Blue Hatched Box] | D-FIRM Areas |

Amendments:
 December, 1997 - a
 August, 2012 - b
 June, 2013 - c
 July, 2013 - d



The zoning information contained herein has been supplied by the local unit of government.

Digital Flood Insurance Rate Map (D-FIRM) data supplied by FEMA. St. Joseph County assumes no responsibility for the accuracy of the map or information herein depicted.

Produced by: St. Joseph County Land Resource Centre (269) 467-5576
Geographic Information Systems Department