

**BLACK RIVER WATERSHED PLANNING PROJECT
POLICY REVIEW DOCUMENT
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LIST OF ABBREVIATIONS/ACRONYMS

APA	Authorized Public Agency
BMP	Best Management Practice
BRW	Black River Watershed
CAFO	Concentrated Animal Feeding Operations
CD	Conservation District
CEA	County Enforcing Agency
CNMP	Comprehensive Nutrient Management Plans
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FTC&H	Fishbeck, Thompson, Carr & Huber, Inc.
GAAMP	Generally Accepted Agricultural and Management Practices
GDP	General Development Plan
GIS	Geographical Information System
LID	Low Impact Development
MDNRE	Michigan Department of Natural Resources and Environment
MEA	Municipal Enforcing Agencies
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
PDR	Property Development Rights
PRD	Policy Review Document
PUD	Planned Unit Development
ROW	Right-of-Way
SEMCOG	Southeast Michigan Council of Governments
SESC	Soil Erosion and Sedimentation Control
TDR	Transfer Development Rights
USEPA	U.S. Environmental Protection Agency
WMP	Watershed Management Plan

EXECUTIVE SUMMARY

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

This Policy Review Document (PRD) provides an assessment of the Master Plans, zoning ordinances, subdivision rules, and other development standards of the watershed communities that impact water quality. An examination of existing policies is crucial to provide for well crafted and complimentary municipal codes that reflect the desires of the diverse communities within the BRW. The current path of development in these communities can be evaluated through this process and redirected if necessary. Often, communities find that 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 land use plans, local ordinances, and development rules were compared to accepted development principles in various water resource protection guidebooks. The BRW Policy Review Committee selected the three counties in the Watershed (Sanilac, Lapeer, and St. Clair) and three communities (Sanilac Township, Custer Township, and Greenwood Township) to review.

The assessment reviewed the status of land use planning and zoning in each of the counties and communities selected, and how well the rules and regulations addressed the concerns of the watershed: sediment, unstable hydrology, nutrients, temperature, pathogens, and toxic contaminants. The results are summarized in Table 1, color coded as to their level of protection.

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 need improvement. Specific conclusion related to the Master Plan and Zoning Ordinances are listed below:

- Five-year updates of the Master Plan should address the most recent smart growth strategies and analyze changes from the past five year plan.
- Counties in the BRW should communicate goals with other counties in the region to understand each others' priorities and be able to focus on a specific aspect, such as agricultural protection.
- When communities in the Watershed are in the process of creating or updating their Master Plans, they must be aware of how the coordination of plans should occur in the Watershed.
- The counties have adequate site plan review processes, although preservation areas should be updated on future land use maps for easy reference in those reviews.
- Zoning should relate each community's intent and purpose to the Master Plan.
- Zoning should encourage flexibility and density in terms of land use, following current smart growth principles such as encouraging development in infill sites and directing infrastructure spending to designated growth areas.

Specific recommendations for watershed concerns and each development principle are listed throughout this document. Not all of the principles in this review will be applicable to all of the communities and should be considered as guidelines rather than milestones. The use of the principles to begin discussion on these issues will eventually lead to protecting natural and aquatic resources and revising the Master Plan, if necessary.

Model ordinances selected from communities in Michigan that support the development principles are provided at the end of the report for reference.

INTRODUCTION

PURPOSE

The purpose of this Policy Review Document (PRD) is to assist communities in the Black River Watershed (BRW) with implementation of better 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 that reflect the desires of the diverse communities within the BRW. This policy assessment will provide a baseline from which to measure changes in land use practices in the coming years. The current path of development in these communities 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 that would increase the level of watershed protection.

WATERSHED MANAGEMENT PLAN (WMP) GOALS

The BRW Management Plan outlines goals for reduction of nonpoint source (NPS) pollution from sediment, unstable hydrology, nutrients, temperature, pathogens, and toxic contaminants. The common goals stated in the WMP are:

1. Preserve and protect designated areas (as defined in WMP Section 4.3)
2. Protect and maintain waterbodies for agricultural use
3. Restore and maintain waterbodies for other indigenous aquatic life and wildlife use
4. Restore and maintain waterbodies for warmwater fishery use
5. Restore and maintain waterbodies for partial body contact recreational use
6. Restore and maintain waterbodies for total body contact recreational use
7. Protect and maintain waterbodies for navigational use
8. Promote and support desired uses and emphasize past improvements in water quality
9. Protect and maintain waterbodies for public water supplies for future uses
10. Restore and maintain waterbodies for industrial water supplies for future uses

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. This effort will bring together townships, 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, addition of ordinances for natural resource protection, and zoning to protect water quality.

BACKGROUND

LAND USE AND WATER RESOURCE PROTECTION

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.

Local Land Use Decisions Have Regional Impacts. Residents, business owners, and local planners are not always aware of the impacts that 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 that 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 Black River Watershed (BRW) 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, which combines economic growth with the protection of natural resources.

LAND USE PLANNING AT THE LOCAL LEVEL

Townships and cities 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, which outlines 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 that will preserve 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 that 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.

REGULATIONS IMPACTING LAND USE AT THE STATE LEVEL

State of Michigan statutes that impact land use decisions include management of floodplain development, soil erosion and sedimentation from earth change activities, public health standards, subdivision rules,

storm water discharges from municipal separate storm sewer systems, and wetland regulations (MDEQ, 2004).

METHODOLOGY

Existing land use plans and local ordinances were compared to best management practices (BMPs) cited in water resource protection guidebooks. The Black River Watershed (BRW) Policy Review Committee selected the three counties in the Watershed and three communities to review:

- Sanilac County
- Sanilac Township in Sanilac County
- Custer Township in Sanilac County
- Lapeer County
- St. Clair County
- Greenwood Township in St. Clair County

Local Land Use Plans and Ordinances. Existing local development rules were identified by searching for key documents that regulate development in the BRW. Comparisons were made between the county-wide and regional Master Plans and the local zoning ordinances and other development rules.

Guidebooks. The analysis of the existing development rules in the watershed communities was based on several handbooks and documents prepared by organizations throughout the nation. Key references are included in the bibliography. These documents were prepared to provide tools for planning and design that consider water quality protection. They provide a continuum of options for preserving and restoring water resources and demonstrate the connections between plans and ordinances. Specific documents that have been developed for Michigan were also referenced for their identification of how protection measures at the local level can complement and enhance state and federal regulations. All of these tools provide measurements from which to base improvements or modifications in land use planning.

Assessment. The assessment reviewed the status of land use planning and zoning in each of the counties and communities selected, and how well the rules and regulations addressed the concerns of the watershed: sediment, unstable hydrology, nutrients, temperature, pathogens, and toxic contaminants.

If a county or community had information pertinent to the issue, that information was included in this assessment. If information was not available, no reference to the community was listed.

Recommendations listed under each development principle are suggestions for all of the communities reviewed to consider in their future updates and planning and zoning decisions.

The results are summarized in Table 1, and are color coded as to their level of protection.

DEVELOPMENT PRINCIPLES FOR LAND USE PLANNING

MASTER PLANS

The first step of managing growth in a community is the development of a Master Plan to guide progress so communities can get the most out of new developments and maximize investments. A Master Plan or a Comprehensive Land Use Plan should state the community's intention for land use, natural resource preservation, and providing infrastructure. The status of Master Plans and Future Land Use Maps in the counties are as follows:

Sanilac County

Sanilac County completed a General Development Plan (GDP) for 2004 to 2024, which represents collective desires of county residents, business, and local leaders regarding future development. This GDP was developed in 2000 to assist the county in making future decisions regarding land use, environment, economy, transportation, and community facilities.

Vision: The GDP provides a guide to decision makers to help ensure that development is directed where current or planned infrastructure improvements exist to support such development, and with the hope that development will occur at a pace that will have a predominantly positive impact on the residents, environment, land uses, and economy of Sanilac County.

Critical Issues: The GDP includes recommendations for Future Land Use and General Development. The recommendations for future land use have an overall intent to limit sprawl, minimize future investments for infrastructure, and preserve open space for tourist and recreational purposes. Features of the recommendations consist of an Open Space Corridor System, Mass Transit System, and Future Land Use Map. The GDP's focus is to preserve Sanilac County's small-town and rural character and higher quality of life, while encouraging the preservation of the County's farmland and open spaces.

The GDP Recommendations outline Land Use Planning and Land Use Change, Preserving Environmental Quality, Economic Strategies, Public Facilities and Services, Transportation, and an Airport Plan.

Regional Planning: The Sanilac County GDP is structured to generally follow the Master Plan developed by St. Clair County, a valuable document given its proximity to Sanilac County. The definition of each land use district classification, Urban and General Service, Rural Residential, and Rural and Agricultural Conservation, was taken from the St. Clair County Master Plan (Spring 2000), since the two counties are facing very similar growth and development issues.

Municipalities are not bound by any provision of the county's GDP unless specifically adopted by the municipality. For the Black River Watershed (BRW), the Townships of **xxxx** follow the GDP of Sanilac County.

Sanilac Township

Sanilac Township follows the Sanilac County GDP as its Master Plan.

Custer Township

Custer Township follows the Sanilac County GDP as its Master Plan.

Lapeer County

The Lapeer County Comprehensive GDP was completed in August 2006, by McKenna Associates, Inc. The purpose of the plan is to guide future policies affecting land use, infrastructure, and support services within the county's jurisdiction.

Vision: The vision stated in the GDP was "In the year 2007, Lapeer County will be a cohesive community of people enjoying distinct, but interrelated urban and rural living environments; where the natural surroundings and important agricultural resources are protected; and where opportunities abound to live and work in a safe atmosphere, allowing people to enjoy the benefits of well-paying jobs, varying housing choices, excellent public services, superb education, quality health care, ample cultural and leisure opportunities and a healthy family environment."

Critical Issues: A consistent goal in the Master Plans of townships and cities throughout the county is the preservation of active farmland and associated industries, but there may be conflicts when urban dwellers move to the country and these two very different lifestyles attempt to coexist.

Regional Planning: A goal for Lapeer County in the GDP is to improve communication and a sharing of data and information with all local levels of government and agencies that service the needs of the county residents. Regional planning is challenging in this area due to the diversity of land use practices. Communities often desire to sustain their unique characteristics, identity and traditions, which presents a problem for service providers when trying to manage growth with a consistent approach. The local governments and the counties have several objectives in common, which should be reflected in county-wide initiatives and local land use regulations and zoning.

St. Clair County

The St. Clair Master Plan 2030 was developed in 2008 and adopted by the St. Clair County Metropolitan Planning Commission and endorsed by the St. Clair County Board of Commissioners. The Environmental Chapter of the Master Plan identifies the Black River as one of the environmentally sensitive areas to protect in the county.

Vision: The county recognizes that the initiatives put forth in the Master Plan will take continued commitment and support for many years. Cooperation and planning will be critical in order to achieve the goals desired by St. Clair County residents and maintain the high quality of life that are currently enjoyed and are desired for the future. The Vision Based Policy strives to:

- Protect critical natural resources
- Preserve farmland and open space
- Revitalize downtowns
- Ensure governmental collaboration and the efficient provision of public services
- Ensure the county is prepared to successfully compete in the knowledge economy
- Ensure that the county's workforce is well educated and highly-trained for 21st century jobs
- Support entrepreneurs and enhance the business environment in the county

- Ensure there are affordable housing opportunities throughout the county
- Promote the sustainable use of resources
- Capitalize on St. Clair County's cultural, historic, and community character

Critical Issues: The Master Plan is based on four principal themes deemed by the St. Clair County residents and local officials as being important: 1) Revitalizing the county's economy; 2) Improving the overall quality of life; 3) Managing growth; and 4) Creating a sustainable countywide community. Using these four principal themes as a foundation, the Master Plan focuses on six primary issues:

1. Land Use and Change Management
2. Environment
3. Economy
4. Transportation
5. Public Facilities and Services
6. Alternatives for Future Land Use

Regional Planning: The county is aware that attaining the goals of the Master Plan is in the hands of citizens and local community officials, working in collaboration with the County Board of Commissioners, the Metropolitan Planning Commission, other county government departments, and state and federal government officials.

St. Clair County has previously conducted an extensive policy review and has updated its policies based on development principles that meet resource protection goals. Therefore, further review of St. Clair County's policies is not included in this document. Recommendations for St. Clair County can be viewed at: <http://www.cis.stclaircounty.org/mpsummary2030.asp>.

Greenwood Township

The Greenwood Township Comprehensive Master Plan was developed in 2000 as a flexible framework within which public and private action may take place, thus producing a township in which the citizens are afforded a maximum of convenience and enjoyment. The township believes that the Comprehensive Master Plan should serve as the guide for future zoning actions and recommended that upon the adoption of the Comprehensive Master Plan, a review of its zoning ordinance should take place.

Vision: The vision of the township is to maintain the rural character.

Critical Issues: The township has identified the maintenance of the rural character of the area as its priority. Their rules and regulations strive to achieve a balance between farming, open space, and residential growth.

Regional Planning: The St. Clair County Metropolitan Planning Commission works to make St. Clair County a better place to live, work, and play. This mission is accomplished through comprehensive

community-wide planning programs that establish policies and plans to guide economic, physical, and social development.

Recommendations

- Five-year updates of the Master Plan should address the most recent smart growth strategies and analyze changes from the past five-year plan.
- Counties in the BRW should communicate goals with other counties in the region to understand each other's priorities and be able to focus on a specific aspect, such as agricultural protection.

ZONING ORDINANCES

Zoning Ordinances should enact the rules that support the vision of the Master Plan and Future Land Use Maps.

Sanilac County

Sanilac County's zoning ordinances are included in the county's GDP. Rules and regulations for development for each of the following districts are explained: Urban and General Service District, Rural Residential District, Rural and Agricultural District, and Parks. The requirements for each of these districts support the goals of the GDP by encouraging the preservation of the county's farmland and open spaces

Sanilac Township

The Zoning Ordinance for Sanilac Township went into effect in June 1, 1972. The ordinances were revised in 1980 and again in 1987.

Custer Township

The Zoning Ordinance (Ordinance No. 100) for the Township of Custer were enacted and given immediate effect in 1984.

Lapeer County

Lapeer County's GDP introduces districts of Preserved and Reserved Open Sectors; Restricted, Controlled and Infill Growth Sectors; and Enterprise Zones; as illustrated on the Future Land Use map. As the name of these districts suggest, they identify areas within the county that are appropriate for development and appropriate for preservation. Defined land uses are more appropriately addressed through local land use regulations.

Greenwood Township

The Zoning Ordinance for Greenwood Township went into effect in January 2002. Text amendments were approved in 2003 and 2005. The township adopted rezoning in 2003.

Recommendations

- Revise zoning to relate each community's intent and purpose to the Master Plan.

- Zoning to encourage flexibility and density in terms of land use, following current smart growth principles, such as encouraging development in infill sites and directing infrastructure spending to designated growth areas.

FLOODPLAIN MAPPING, OVERLAY DISTRICTS, FLOOD HAZARD MITIGATION PLANNING, FLOODPLAIN ORDINANCE

State and federal regulations offer some protection of floodplains through restrictions on development in identified and mapped floodplain areas through the National Flood Insurance Program. Flood hazard mitigation planning assesses the impacts of flood management projects on water quality and compensates for that impact in other areas. An overlay district can be established to delineate areas where development is not suitable. A community may also formulate local floodplain regulations to address activities in or near floodplains through a floodplain ordinance. Communities should recognize the extent of the 100-year floodplain and adopt provisions to protect or mitigate impacts to the floodplain.

Sanilac County

Sanilac County's GDP recommends an Open Space Corridor System to include floodplains for protection from the impacts of development. Currently, the City of Croswell is the only community enrolled in the National Floodplain Insurance Program. The GDP encourages other communities to participate in the program. The 100-year floodplains for Lexington Township, City of Croswell, Village of Lexington, and Worth Township have been mapped for the Flood Insurance Rate Maps (FIRM) issued by the Federal Emergency Management Agency (FEMA). The Sanilac County Drainage Rules require that the floodways not be obstructed and has mechanisms by which to clear debris from those areas. A site plan must delineate the 100-year floodplain on the map if not currently mapped by FEMA.

Sanilac Township

A FIRM has not been created for Sanilac Township.

Custer Township

A FIRM has not been created for Custer Township.

Lapeer County

The Lapeer County GDP supports the protection of floodplains by encouraging communities to designate floodplain areas as a "Flood Hazard Zone/Overlay District," which can be further protected in the community's zoning ordinance. The GDP recommends that the zoning ordinance contains restrictions on construction within this overlay-zoning district. The GDP supplies sample ordinance language that could be included: "All new construction shall have the lowest floor elevated to or above the base flood level, be constructed with materials resistant to flood damage, and be constructed by methods which minimize flood damage." An objective to meet the goal in the county GDP of natural resource protection is to move toward the adoption of model floodplain regulations.

The 1% annual chance flood (100-year flood) special flood hazard areas for Acadia, Goodland, Burnside, and North Branch Townships have been mapped for the FIRM Number 260878C0200E for

Lapeer County, issued by FEMA, effective September 19, 2007. All areas mapped are classified as Zone A, indicating that no base flood elevations have been determined.

St. Clair County

The 1% annual chance flood (100-year flood) special flood hazard areas for Port Huron, Kimball, and Fort Gratiot Townships and the City of Port Huron have been mapped for the FIRM, issued by FEMA.

Greenwood Township

Greenwood Township Zoning Ordinances identify an Open Space, Conservation & Recreation District. One of the district's purposes is to limit development within designated floodplains. The district regulations are designed to insure that land will be developed in a manner having the least possible impact on natural resources. Before issuance of a building permit, the site plan submitted must show the proposed location of any structures in relation to floodplain boundaries where applicable. A FIRM has not been created for Greenwood Township. Section 17.06 "Drainage Of Property & Development In Flood Prone Areas" explains the requirements for development in these areas and the responsible agency and guidelines for regulating that development.

Recommendations

- Create a variable width, naturally vegetated buffer system that encompasses the 100-year floodplain.
- Create and maintain floodplain maps that define the 100-year floodplain for all communities.
- Keep floodplain protection a high-priority.
- Communities and counties participate in the MSWFPA and ASFPM.
- Building Inspectors and appropriate local officials obtain their Certified Floodplain Manager certification.
- Adopt overlay district or ordinance to regulate land uses within the floodplain.

RECREATION PLANS

A Michigan Department of Natural Resources and Environment (MDNRE) approved 5-year Recreation Plan identifies priority lands for acquisition or protection for future recreational use and enables a community to be eligible for various state funding opportunities. Coordination of a recreation plan with the Master Plan is essential for a community to stay true to its visions and character.

Sanilac County

Sanilac County, Sanilac Township, nor Custer Township has an approved MDNRE Recreation Plan. The county's GDP recommends that Sanilac County prepare, update on a regular basis and keep on file with the State of Michigan a 5-Year County Parks Recreational Plan, developed with the input received at public meetings, that outlines goals and strategies for increasing recreational, camping and hiking opportunities for residents and attracting tourism trade opportunities in the county.

Lapeer County

The Lapeer County Recreation Master Plan was prepared in 1999 for the Lapeer County Department of Parks and Recreation. An update of this plan has not been completed. The county inventoried the natural

resources and land uses throughout the county to determine suitable locations for recreation facilities, and compared these results to nationally recognized park and recreation standards, long-range goals, and an action plan for implementation. The update of the plan should coordinate the inventory with the county's and adjoining county's GDP.

The county's GDP lists a goal for Recreational Uses as "Lapeer County recognizes that quality of life will be enhanced for its residents by utilizing and preserving natural features for recreational uses." An objective to meet that goal is to create a long-term Recreational Plan.

Greenwood Township

Greenwood Township completed a Recreation Plan, which has been approved by the MDNRE. The Recreation Plan is valid through December 2011.

Recommendations

- Develop MDNRE approved Five-Year Recreation Plans.
- Reference Master Plans and Future Land Use Plans to identify priority land for protection and review appropriateness of designating this for recreation.
- Designate areas within high-density residential development sites for recreational use, such as plazas, pocket parks or courtyards, to provide a gathering place for residents, a focal point as well as minimize storm water runoff.

DEVELOPMENT PLAN REQUIREMENTS

The site plan review process represents another opportunity for communities to ensure that the tools presented in this document are used to their best advantage.

Sanilac County

The Sanilac County GDP outlines strategit for the county to provide all county municipalities with tools and strategies for managing growth where desired by local municipal governments. This includes making recommendations to local governments, if requested, as a part of their general development planning process at the local municipal level. Sanilac County offers to help facilitate communication among municipalities and provide assistance for future municipal land use planning decisions. The county will encourage cooperation among governmental units and opportunities for dialogue with governmental units on the impacts of assessing, planning, and zoning for future land use at the boundaries of two or more municipal governmental units. These measures will support the county's goals of preserving environmental quality, proving incentives for economic growth, providing adequate public facilities and services, and planning for transportation needs. Specific site plan requirements of the county include natural features and drainage patterns illustrated on past site plans. The county drainage rules require a planned and approved detention pond to be constructed as the first step in the construction project.

Sanilac Township

Sanilac Township defers all site plan reviews to Sanilac County.

Custer Township

The Zoning Ordinance, Article XIV, explains the scope, procedures, and contents required for a site plan to be submitted for review. Exemptions for submitting site plans are given to single family residences, 2-family residences, farm buildings, and accessory buildings. The Planning Commission considers the adequacy of the landscaping to enhance the environment of the community and the adequacy of storm drainage. Natural features are not required to be indicated on the site plans.

Lapeer County

Chapter 12 of the GDP provides a checklist for communities to refer to when reviewing plans for Planned Unit Developments (PUD). The county offers assistance to local communities in reviewing all plans to coordinate land use policies and avoid conflict.

Greenwood Township

Greenwood Township's Master Plan requires that site plans include lot lines, streets, building sites, existing structures, reserved open space, landscaping, utilities, and any other required information. The Zoning Ordinance requires site plans to meet township requirements and standards for grading and surface drainage and for the design and construction of storm sewers and storm water holding facilities. The site plan must include storm water control facilities and structures including storm sewers, swales, retention and detention basins, drainage ways, and other facilities, including calculations for sizes. The Zoning Ordinance requires that development preserve natural resources by developing in a manner which will not detrimentally affect or destroy natural features. The site plan must include details of the following for natural features:

- Existing topography with a maximum contour interval of two (2) feet indicated. Topography on the site and beyond the site for a distance of one hundred (100) feet in all directions shall be indicated.
- A grading plan showing finished contours at a maximum interval of two (2) feet, correlated with existing contours so as to clearly indicate required cutting, filling, and grading.
- Location of existing drainage courses, lakes, ponds, wetlands, rivers and streams, including their water surface elevation, flood plain elevation, and ordinary high water mark.

Recommendations

- Incorporate protective measures into site plans and, ultimately, into developments that preserve natural features and water quality.
- Show existing and proposed conditions on site plans.
- Adopt model development principles of requirement storm water management practices and natural features on site plans.
- Designate priority development areas.
- Revisions to requirements within zoning districts should be reflected in site plan reviews.

LOW IMPACT DEVELOPMENT (LID) ORDINANCE - DEVELOPMENT AND DIVISION PRACTICES

LID mimics predevelopment site hydrology to store, infiltrate, evaporate and detain, retain, or reuse runoff. Many communities that desire to implement these techniques find that their existing design standards and zoning ordinances are not flexible enough to allow these techniques. Applied LID techniques mitigate the effects of development by reducing runoff and pollution levels of the site's storm

water during a rain event. LID recommendations are included in planning and zoning recommendations and post construction best management practices (BMPs) throughout the sections of this report.

Sanilac County

Sanilac County's GDP recommends the development of threshold standards and obtaining impact assessment for review of any proposed projects to ensure coordination with the goals of the Master Plan and to minimize environmental impacts from development. Specific practices that are associated with LID are not discussed.

Custer Township

The Zoning Ordinance, Article XV, allows projects to be granted special approval if a use is designed to protect natural resources, and the health, safety, and welfare of the users.

Lapeer County

The county recognizes that site design standards and ordinances need to be revised to allow for more flexibility and creativity in design. The innovative site design that is required for LID to be effective involves the use of special zoning standards and review procedures that provide design and regulatory flexibility, so as to encourage innovation in land use planning and design.

Greenwood Township

Greenwood Township identifies the property owner as responsible to utilize whatever means are necessary to contain all storm water on the premises, or to direct such storm water to an outlet approved by the Zoning Administrator.

Recommendations

- Provide resources to educate developers and local staff on LID techniques.
- Create a goal for LID and adopt policies and ordinances that follow Michigan's state-wide LID manual.
- State the intent of LID in zoning ordinances and allow flexibility in regulations to allow for those practices.

DEVELOPMENT PRINCIPLES ADDRESSING PRESERVATION AND CONSERVATION

AGRICULTURE AND FARMLAND PRESERVATION

Master Plans should describe the importance of agricultural land and rural character in a community. Zoning ordinances can provide regulations for preserving farmland.

Development Principle: If agriculture is an important asset to the community, the Master Plan should describe its importance; identify prime, unique, and/or threatened agricultural land; and set policies for farmland preservation.

Sanilac County

The Sanilac General Development Plan (GDP) emphasizes the preservation of agricultural and open space land through zoning, regulatory controls, and other programs. The GDP recommends that the majority of the county would be preserved as agriculture to limit sprawl, concentrate development in municipalities with existing infrastructure, provide businesses with a concentrated labor pool, and maintain the rural character and lifestyle for the majority of Sanilac County. The GDP acknowledges that zoning and planning cannot eliminate development of agricultural land for other uses. However, to preserve farmland and open space, the GDP recommended that local townships:

- Implement a Clustering Ordinance and take a proactive stance to preserve farmland and open space by providing density bonuses to prospective developers and encouraging cluster development in agricultural and lower density residential areas.
- Create a number of agriculture district categories in official zoning and land use maps to create more separation between agricultural and residential lands.
- Discourage Concentrated Animal Feeding Operations (CAFO) unless they are allowed in an agricultural zoning classification that is different from general agriculture.
- All townships should consider agriculture/industrial districts and develop zoning ordinances to address their needs.
- Work with prospective developers and existing technical resources so that all existing agricultural development tools can be utilized to preserve farmland and open space including, but not limited to, P.A. 116, P.A. 237, Property Development Rights (PDR) and Transfer Development Rights (TDR).
- Encourage business opportunities that can support economics of farming.
- Discourage new residential construction in agriculture areas but allowing for current homes to be sold off.

Custer Township

The zoning ordinance allows cropland production in every zoned district except commercial and industrial.

Lapeer County

The Lapeer County GDP identifies agriculture to be a fundamental part of the economy in the county. The Farmland Development Rights Agreement, commonly known as Michigan Public Act 116 of 1974, was instituted to preserve agricultural land. Lapeer County makes extensive use of P.A. 116 as a preservation

tool. Significant areas of land within the Black River Watershed (BRW) have been designated as farmland or open space under this program. In 2000, approximately 68,400 acres (about 12 percent of the total area) were enrolled in this program.

The Lapeer County Board of Commissioners voted to adopt a PDR Ordinance in 2000. The county is eligible to receive 75% matching funds from the Michigan Agricultural Preservation Fund to purchase development rights from qualified farmland. In 2006, the county had 1,446 acres in the PDR program.

A goal for Lapeer County in the GDP is to retain its farmlands and related industries as a viable and economic land use to further enhance the rural characteristics of the county. The objectives are to:

1. Continue to play a leadership role on techniques and tools to effectively deal with agricultural preservation.
2. Encourage the adoption of zoning standards that allow for related agricultural support services.
3. Promote the use of PA 116 that designates farmland areas for preservation and the PDR program.
4. Educate and assist in creating TDR.
5. Encourage the concentration of residential development density and commercial uses in closer proximity to population centers to preserve rural character and protect agricultural areas.

Greenwood Township

Greenwood Township has identified all of the land within the township as an Agricultural/Farmland Preservation Area. The Intensive Agricultural District provides for regular and intensive agricultural uses and agriculturally related commercial and industrial uses. This district is intended to provide for agriculture as a collective network of agriculturally related industry operations, and not to be a holding zone waiting for conversion to other uses or a large lot residential district. Larger blocks of agricultural land without competing and conflicting land uses are envisioned. Purchase of development rights, transfer of development rights, or other programs to preserve farmland, should first be generally applied on a voluntary basis to farmland and other properties within this district. The Agricultural/Rural Residential District encourages farms on land resources needed for agricultural production, fosters rural life styles, and prevents encroachment from untimely suburban and urban development.

Recommendations

- Ensure protection of farmland by adopting PDR tools and other conservation practices such as cluster development.
- Prohibit the granting of variances.
- Preserve farmland by establishing Agricultural Processing Renaissance Zones in coordination with the Michigan Economic Development Corporation.

RIPARIAN BUFFERS AND COASTAL SETBACKS

Riparian buffers can be in the form of overlay districts or actual setback limits that are required in the development standards portion of zoning codes. These vegetated systems provide habitat for aquatic wildlife and allow room for floodwaters to flow without damaging structures and dwellings. Storm water runoff is filtered through the buffers before entering surface water, thus improving water quality. Buffers can be part of a riparian trail system or community park that can also increase the awareness of the protection efforts for the streams, rivers, and wetlands in the community. Costs of buffers have been

extensively studied, for both the water quality effects and property value effects (Heraty, 1993). The water quality improvement benefits have been ascertained, and some studies have indicated that they can increase property values.

A stream buffer can greatly increase its function in both stream protection and flood mitigation by the types of vegetation planted to create the buffer. The purpose of the buffer determines the types of vegetation that will optimize their function.

Sanilac County

The Recommended Land Use Map illustrates the boundaries of the Open Space Corridors System that creates a greenway following rivers, creeks, and lakes and includes sensitive lands such as wetlands, floodplains, and forests. The system links communities throughout the county and also connects cultural areas such as historic landmarks. The county desires to plan for the greenway at the county level since it ensures consistency and coordination that is not necessarily present at the local level. The county supports the cohesion of the system and prevents the corridors from being fragmented, which would result in a much less effective and valuable system for the protection of the environment and the enjoyment of the people. The St. Clair County Master Plan also includes a system of open space corridors, environmental areas, and trails, which follow rivers and creeks within St. Clair County. This system could provide a natural connection for regional trails.

In the Land Use Map, the Lake Huron shoreline is marked in zones that are documented in the 1987 Sanilac County Environmental Features Report as areas at high risk for erosion. The report recommends that coastal communities, in accordance with the Shoreline Protection and Management Act of 1970, enact special zoning regulations or other types of land use control and restrict development in these areas. Recommended setback and minimum setback distances are included in the Environmental Features Report.

The county's Development Drainage Rules require buffer zones adjacent to water bodies be identified on plats.

Lapeer County

The Future Land Use Map identifies areas in a Natural Features Protection Zone, where a buffer is recommended on either side of all creeks, rivers, and drains within the county. Development in this zone must not adversely impact the natural features adjacent to the watercourses. A 100-foot setback is required, in which the removal of any trees, shrubs, and brush is discouraged, but not prohibited. Agricultural land uses within the zone is allowed, with filter strips recommended to minimize the impact that the agricultural activities have on water features.

Greenwood Township

The Zoning Ordinance requires that no structure be erected within fifty (50) feet from a stream bank or from any embankment identified as an escarpment or a "Short Steep Slope" in the 1974 St. Clair County Soil Survey, whichever is greater in all zoned districts. The part of the lot which lies within fifty (50) feet of the stream bank must be maintained in its natural condition and not filled or excavated except as needed for underground utilities. A lot is regarded as maintained in its natural wooded condition when at least one

(1) tree or shrub having the height of at least fifteen (15) feet for each five (5) feet of stream frontage on the same side of the stream and within fifty (50) feet of the stream bank is present.

Recommendations

- Describe the objectives of the buffer or setback, the physical delineation of the buffer or setback, and the maintenance requirements.
- Preserve or restore riparian buffers with native vegetation that can be maintained throughout the stages of development.
- Illustrate clear boundaries in Master Plans and zoning maps of where buffers or setbacks are required, to help developers and planners evaluate designs and storm water management controls.
- Identify priority areas benefitting from buffer overlay zone and adopt and enforce buffer ordinance.
- Consider the particular characteristics of the riparian zone and waterbody being protected. Different protection and accommodation is required for different types of waterbodies.

CLUSTERING AND OPEN SPACE DEVELOPMENTS

Preserving natural water features and the adjacent lands that support them is one of the most practical ways to protect water resources and manage storm water. An important concept to incorporate into preserving open space for storm water management is the “ecosystem” approach. This approach preserves both the natural features themselves and, as importantly, the functions those features play in creating a sustainable environment for people and wildlife.

Public Act 177 states that a landowner has the option to retain at least 50 percent of the property as open space and place dwellings on the remaining portion. The number of dwellings cannot be less than the number, which would be permitted on the land without the open space preservation requirement.

Clustering housing in one area to reduce densities in other areas is a technique that planners have been encouraged to pursue to preserve natural areas and create open space within communities. The concept has not often been viable to developers, however, due to restrictions on lot size and road dimension requirements. The goal of cluster development and open space design should be to reduce impervious cover and conserve the land. Redesigning traditional subdivisions into cluster/open space designs can have a dramatic effect on the reduction of impervious cover and, therefore, reduce storm water runoff. These alternative designs are often less costly for the developers, since construction is limited to smaller areas and less clearing and grading is required.

Cluster housing and open space design can preserve the natural areas of concern. However, the ownership and responsibility of the management must be determined before the designs are accepted. Establishing a legal authority for the area is necessary for the community to understand the concept of open space and address their fears of liability for the residents.

Sanilac County

The Rural Residential District described in the GDP provides for rural, low-density homes with zoning on the magnitude of 10 acres and homes clustered to minimize infrastructure extensions and maximize open space. The county encourages the abandonment of the current pattern of development along township borders and roads in favor of clustering and infill development to limit further sprawl. In the Rural and Agricultural Conservation District is for low-density homes, and residences are clustered together on a

small parcel preserving large tracts of land for agricultural and farming uses. The county does not specify a percentage of open space or a requirement of a covenant for managing the open space resulting from cluster development.

Sanilac Township

Section 9.13 of the Zoning Ordinance requires setback in all subdivisions, which could conflict with allowing cluster development.

Custer Township

Article 10 of the Zoning Ordinance requires lots to have frontage on a public road. Setback requirements are set as minimum dimensions.

Lapeer County

The county's GDP discusses Open Space Development and states that zoning ordinance requirements be no more difficult for rural open space developments than for conventional residential development. The county recommends that townships offer incentives to developers for open space development in the form of density bonuses, contingent upon the developer preserving a percentage of natural features and open space and sufficient infrastructure for the buildings.

The county's GDP provides a sample ordinance for using TDR within a planned unit development (PUD). This ordinance addresses how the open space will be managed and the responsible party agreements.

Greenwood Township

The Open Space, Conservation, & Recreation District's purpose is to preserve the natural character and beauty of areas having a high degree of environmental quality; to protect the clarity and purity of the watercourses by minimizing bank erosion and sedimentation; to protect the economic value and the scenic quality of the stream banks and basins for the community and its property owners; and to limit development within designated floodplains. The district regulations are designed to insure that land will be developed in a manner having the least possible impact on natural resources. Section 14.01 sets minimum dimensions for setbacks, which limits the flexibility needed for cluster development. The purpose of this section is to provide a mechanism for development of single family residences in rural areas which assists in meeting the following goals: maintain the rural character of the area, maintain an image of open space, permanently preserve open space and natural resources, protect a portion of lands for agriculture and farming, and achieve a balance between farming, open space and residential growth. In this district, not less than fifty (50) percent of the total area of the eligible parcel can be designated as open space or farmland.

Recommendations

- Preserve open spaces in a manner that promotes linking systems through naturally occurring corridors. Rivers, streams, and woodlands can create the backbone of a system of open spaces.
- Advocate "by right" open space and cluster development.
- Cluster development designs must be comparable in both review and approval time for the developer to consider it a feasible option.

- Clearly specify how community open space will be managed and designate a responsible legal entity.
- Provide incentives for cluster development such as density bonuses.
- Reduce setback requirements, increase open space requirements on valuable land sites.

CONSERVATION EASEMENTS AND SIMILAR TOOLS

Communities are becoming more aware of the quality of life values that can be enhanced when environmental resources are protected, but parks, natural areas, and scenic landscapes can also have great economic value. Conservation programs that encourage buffers and open spaces have often been cumbersome and difficult to follow for planners and developers. Communities need to be more flexible in their standards and specifications for development if changes are to be seen. Incentives to change and participate in conservation programs must be promoted and enticing enough for the developer to want to participate.

Sanilac County

Sanilac County's GDP recommends that local townships:

- Implement a Clustering Ordinance and take a proactive stance to preserve farmland and open space by providing density bonuses to prospective developers and encouraging cluster development in agricultural and lower density residential areas
- Work with prospective developers and existing technical resources so that all existing agricultural development tools can be utilized to preserve farmland and open space including, but not limited to, P.A. 116, P.A. 237, PDR and TDR.

Greenwood Township

The areas in open space, recreation, agriculture, or commons within a zoning district must be perpetually protected from development. The open space can be preserved using a combination of the methods, including conservation easements, density bonuses. These protection measures promote community character and discourage a suburban subdivision appearance.

Recommendations

- Encourage incentives and flexibility in the form of density compensation, buffer averaging, property tax reduction, storm water credits, transfer of development rights, and by-right open space development to promote conservation of areas of environmental value.
- Build incentives into zoning ordinance, such as density bonuses, property tax reduction, and TDR.

DEVELOPMENT PRINCIPLES ADDRESSING PRIORITY POLLUTANTS OF SEDIMENT AND UNSTABLE HYDROLOGY

STORM WATER MANAGEMENT STANDARDS

Water resource protection cannot be accomplished without comprehensive storm water management. Its importance should be reflected in the priorities noted in Master Plans and community regulations and design standards.

Sanilac County

The Drain Commissioner's Development Rules of 2007 sets standards for flood prevention, stream protection, and water quality for all land development decisions.

Sanilac Township

All plats are checked when direct drainage to the county drain is planned in the development.

Lapeer County

The Lapeer County Drain Commissioner has county standards for storm water management. The rules are modeled after Oakland County's standards for large projects. The county relies on the township requirements for small projects.

An objective to meet the goal in the county's GDP of protecting natural resources is to educate the county units of government on storm water management.

Greenwood Township

The Zoning Ordinance, Article 17.05 for establishing grades, requires new developments to contain all runoff on the site or direct runoff to an approved outlet without crossing abutting developed or platted lands. Plans must be approved by the Zoning Administrator.

Recommendations

- Consider storm water management in all land use and land development decisions.
- Develop model storm water ordinance that can be customized to a locality's conditions and preferences.
- Adopt local storm water ordinance customized to local conditions to control flooding, protect stream channels, and address water quality.

ENGINEERED BEST MANAGEMENT PRACTICES (BMPS)

If storm water is not captured and treated, pollutants on parking lots and other impervious surfaces are washed off by storm water into surface water. Developers of large impervious surfaces are often not required to address the quality of storm water, rather just the quantity.

Sanilac County

The Sanilac County Drain Commissioners' Development Drainage Rules require all new developments to be equipped with detention facilities for storm water. The rules discourage multiple small detention basins, which could be in conflict with a site plan integrating low impact development (LID) techniques, however, design criteria may be reviewed if more stringent designs are required for water quantity or quality is needed. Design criteria for wet detention, infiltration basins, porous pavements, and parking lot saturation is included.

Lapeer County

The General Development Plan (GDP) recognizes the need for incremental increases in drainage capacity and that the need is often not fully addressed at the local or township level. The GDP recommends that local zoning ordinances require developers to provide appropriate storm water management facilities for all proposed developments.

Recommendations

- Provide storm water treatment for parking lot runoff that can be integrated into the landscape.
- Use bioretention facilities, filter strips, sand filters, and vegetated swales to treat storm water runoff.
- Use quantity controls, such as detention and retention areas, to help to improve quality by reducing the volume of water that needs to be treated.
- Use vegetated open channels (swales) in the street right-of-way (ROW) to convey and treat storm water runoff.
- Adopt local storm water ordinances that clearly identify the entity responsible for long-term maintenance and build in a requirement for regular inspection visits.
- Plan for differing storm water issues in older urbanized areas (redevelopment) than in new developments.

RUNOFF VOLUME CONTROL AND MINIMIZING INFLOW

Many studies have cited that storm water runoff from streets is one of the major contributors of contamination to surface water. Streets that have curbs and gutters actually serve as a collection system for those pollutants, trapping them next to the curb and then washing them into the storm sewer with every rain. Treating storm water as wastewater perpetuates this system of channeling the water and getting it off the streets as soon as possible. Removing curbs and gutters allows runoff to enter grassed swales or open channels which filter runoff and capture pollutants. Grassed swales are becoming a preferred method to handle roadway runoff and are engineered to be wider and shallower than roadside ditches and encourage groundwater recharge.

Minimizing flow into the community storm water system may alleviate downstream flooding.

Sanilac County

The Sanilac County Development Drainage Rules allow for roadside swales for drainage internal to the development and detention/retention basin primary discharge control volume be designed for the 10-year flow capacity.

Recommendations

- Use vegetated open channels (swales) to convey and treat storm water runoff.
- Capture storm water on residential property in rain barrels or rain gardens.
- Direct rooftop runoff to pervious areas such as yards, open channels, or vegetated areas.
- Reduce the use of curbs and gutters.

SOIL EROSION AND SEDIMENTATION CONTROL (SESC)

State law allows communities to adopt their own SESC regulations and provide the inspection services to enforce them. Communities that adopt an SESC ordinance can provide a higher level of protection than the county's program. A community SESC ordinance may allow the community to be more involved in overseeing construction sites and assessing the effectiveness of soil erosion programs. Staging of construction activities minimizes the amount of soil exposed for one time and reduces the amount of soil erosion from a site. Rules that restrict clearing or grading of buffers, open space, and native vegetation during construction should be included in an SESC. Costs of storm water management are reduced when clearing and grading are minimized.

Master Plans should identify SESC as an important activity for the county to support to protect water resources, natural habitats, and aquatic life.

County Enforcing Agents (CEAs) are identified through Michigan Department of Natural Resources and Environment (MDNRE) as the agency to oversee the SESC program for that county. Authorized Public Agencies (APA) are public entities within the county that are approved through MDNRE to administer their own SESC programs. All County Drain Commissioners and Road Commissions in the watershed are APAs. Municipal Enforcing Agencies (MEA) are communities that have been approved by MDNRE to administrator their own programs and issue permits from their office. No communities within the watershed are authorized as MEAs. The Conservation Districts (CDs) are also identified as an agency to review site plans for the adequacy of their SESC practices and provide comments to the CEA.

Sanilac County

Sanilac County's Department of Construction is the CEA and administers the SESC program under the County's SESC Ordinance. A waiver is allowed if the project will disturb less than 225 square feet of earth and not result in any sediment leaving the sites and impacting a water body. No communities within the county are certified as APAs or MEAs.

Sanilac Township

Sanilac Township approved a High Risk Erosion Zoning Ordinance as a free standing amendment in the zoning ordinance. Although the purpose of the ordinance is stated to be for minimizing property loss and damage, which is an economics issue, it serves an environmental purpose of protecting the dunes along the Lake Huron lakeshore. This ordinance is not applicable to the Black River Watershed (BRW), however.

Lapeer County

Soil and Sedimentation Control Permits (PA 347 of 1972, as amended) are issued under the authority of the Lapeer County Planning Commission. No communities within the county are certified as APAs or MEAs.

St. Clair County

St. Clair County's Health Department is the CEA and administers the SESC program. No communities within the county are certified as APAs or MEAs.

Recommendations

- Continue to staff CEAs at a level to be able to enforce regulations.
- Evaluate effectiveness of ordinance administration in reducing impacts of soil erosion.
- Pass MDNRE audits with favorable ratings. Provide CEAs with adequate staff.
- Townships to become certified APAs or MEAs, if funding is available.

IMPERVIOUS SURFACE REDUCTION

REDUCING IMPERVIOUS SURFACES

Under natural land conditions, most precipitation soaks into the ground or is absorbed by plants. Under developed conditions, much of the land contains impervious surfaces, such as roads, roofs, and parking lots, which do not allow rainwater to soak into the ground. These surfaces can negatively impact both water quantity and quality. Rainwater draining off of impervious surfaces reaches streams faster than in undeveloped areas. These high flow rates result in the erosion of stream banks, loss of vegetation, and impaired water quality due to suspended soil.

Storm water running off of impervious surfaces also picks up soil and pollutants, which are deposited in the drainageway.

Sanilac County

The Development Drainage Rules have construction standards that include provisions for LID techniques and decreasing impermeable surfaces.

Recommendations

- Reduce impervious surface area in a site design to lessen storm water discharge and improve storm water quality.
- Allow flexibility in surfaces such as pervious pavement and minimum coverage requirements instead of maximum requirements.
- Design for narrower, more walkable streets with many open spaces to infiltrate storm water.

PARKING LOTS AND DRIVEWAYS

Rules to establish a minimum number of parking spaces to accommodate patrons at a business and to acquire commercial loans are usually set in excess of the actual needs. This practice leads to paved areas that are seldom used. Alternative parking designs can often reduce the amount of paved area without losing parking spaces. Strategies to reduce the amount of impervious area associated with each stall reduce the overall size of the parking lot, thus reducing the amount of impervious surfaces.

Parking requirements are based on the number of parking spaces that are needed for a particular land use or business. Features such as mass transit or a mix of land uses can influence the number of spaces required. Fewer parking spaces can also encourage use of a mass transit system, if available.

The prevalence of sport utility vehicles and trucks has encouraged developers to create designs with larger spaces. Typical dimensions of a parking stall range from 162 to 190 square feet, normally 10-feet-wide and 19-feet-long.

Spillover areas for the additional parking that is required a few times a year can often be constructed with permeable paving materials.

Sanilac Township

Section 9.12 of the zoning ordinance sets the off street parking requirements and the parking stall dimensions. One parking space is defined as 200 square feet. A minimum number of parking spaces are set for building types and special businesses.

Custer Township

Article XII of the zoning ordinance defines one parking space as 300-square-feet. Shared parking is allowed, but it cannot reduce the total number of spaces required under the separate minimum requirements. A minimum number of parking spaces are set for new buildings. All parking areas are required to be paved with materials to provide a solid parking area.

Greenwood Township

Section 17.20 "Off-Street Parking" requires all parking areas to be paved with concrete or plant mixed bituminous material in accordance with plans approved by the Building Inspector. The Planning Commission, after review and approval of design plans, may permit the use of brick, paving blocks, or other similar material of adequate load bearing nature if, in the opinion of the Planning Commission, such use is appropriate in the setting proposed. Spaces are calculated based on minimums required. One space equals 184 square feet.

Recommendations

- Set a maximum number of spaces allowed.
- Construct one-way aisles with angled parking stalls.
- Allow shared parking areas when businesses operate on different hours or have different peak seasons when extra parking is required.
- Promote shared driveways and alternative driveway surfaces.

- Eliminate parking stall dimension requirements and allow compact car spaces.
- Use pervious materials in spillover parking areas.

STREETS AND ACCESS

Residential paved streets have become the largest single component of impervious cover in a development. The standard street width of 36 feet is in excess of what is actually needed for adequate local transportation needs in most communities. Narrower streets can reduce the imperviousness of an area without compromising the flow of traffic. On-street parking is often required in residential areas, but sharing a lane for parking and queuing (waiting lane) can accommodate the narrower widths. Regulations for fire and rescue vehicles can be re-evaluated as to their need for access.

Lapeer County

In Lapeer County's GDP, "Access Management" is the application of regulations, standards and guidelines that control placement of driveways, sidewalks, roadway signage, and other features. Access Management encourages local units of government and the county to work together in establishing and enforcing standards for site ingress and egress. Several of the access management improvements relate to LID designs, such as creating boulevards or landscape islands to break up the wide expanse of pavement; installing "traffic calming" measures, such as textured pavement ; limiting numbers of driveway access points; installing frontage roads, shared access drives; and increasing building and parking setbacks and requiring landscape buffers, including street trees along roadway frontages.

Recommendations

- Design residential streets for the minimum required pavement width needed for volume of traffic and desired speed. Use a design standard to reflect average daily trips instead of housing density.
- Encourage developers to use minimums of design standards.
- Design for more walkable cities with narrower roads, and utilize pervious materials.

STREET PATTERNS

Urban settings are normally designed with grid patterns for their network of streets. Newer areas with subdivisions tend to design curvilinear patterns, which can increase the overall street length. Alternative development designs use concepts of cluster housing and open space preservation to reduce impervious surfaces.

Cul-de-sacs were a popular feature in the development boom 20 years ago and still are today. The prospect of less traveled streets and a "sense of neighborhood" attract home buyers to these lots. However, alternative designs exist that result in the same feeling of living at the end of a road. With open space designs and cluster development, home buyers have greater amenities with natural areas preserved for all to enjoy.

The large turnarounds that cul-de-sacs normally require add to the imperviousness of a development. The addition of a landscaped island in the center of the turnaround can capture storm water runoff and reduce the amount of imperviousness. Diameters of the turnarounds can also be reduced and still be large enough for emergency vehicles to turn around.

A typical street ROW, which includes the road, curbs and gutters, and sidewalks, ranges from 50 to 100 feet. The reduction of this distance is important to minimize the amount of land disturbed during construction and also to allow for more compact housing developments.

Recommendations

- Reduce the total length of residential streets by approving alternative street layouts that increase the number of homes per unit length.
- Minimize the number of residential cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.
- Minimize the radius of cul-de-sacs.
- Change development standards by reducing the minimum street width required, requiring sidewalks on only one side of the street, eliminating grassed areas between the sidewalks and the edges of the ROW, and allowing utilities to be buried in the ROW or under the street.
- Relax standards of required street dimensions, discourage cul-de-sacs.
- Set maximum limits instead of minimum limits.
- Construct narrow, well-connected, walkable streets.

LOT SETBACKS/LOT WIDTH/LOT COVERAGE

Local codes provide the restrictions and regulations that govern the shape and dimensions of lots and subdivisions. Setbacks and frontage distances can constrain alternative subdivision designs because of minimum standards that developers must follow. Often these restrictions can increase impervious cover. Large front yard setbacks can increase driveway lengths. Side yard setbacks determine the length of road needed to accommodate all of the houses in the plans. A planning board will not often approve smaller distances, which are required in cluster/open space designs, thus disabling the developer from using the alternative options.

Sanilac County

Sanilac County's GDP promotes cluster development to preserve open space. No specific dimensions are included in the plan.

Sanilac Township

All setbacks, as described in Section 9.13 "Subdivisions," have minimum dimensions required for all zoning districts.

Custer Township

All setbacks, as described in Article XIII. Sec. 13.01 "Area, Setback, and Height Requirements" have minimum dimensions required for all zoning districts.

Recommendations

- Relax the rules of setback and frontages to accommodate the open space designs allowing houses to cluster in areas most suitable for development.
- Allow for and encourage cluster development and Planned Unit Developments (PUDs).

SIDEWALKS

Development standards of requiring sidewalks on both sides of a street increase the impervious surfaces in a community.

Greenwood Township

Walkways in condominiums are to be installed in all single-family detached condominium developments at a minimum of five feet (5') in width along both sides of collector and minor streets and six feet (6') in width along all major thoroughfares. Access to all general common areas shall be provided. Upon review of the site plan, the Planning Commission may approve alternate locations for the walkways or may waive the walkway requirement if it would not serve the purpose of providing adequate pedestrian circulation.

Recommendations

- Promote more flexible designs allowing sidewalks on only one side of the road.
- Relax sidewalk requirements if suitable alternative path systems exist.
- Set flexible standards in other communities.
- Allow flexibility in standards for locations and widths.

DEVELOPMENT PRINCIPLES ADDRESSING PRIORITY POLLUTANT OF NUTRIENTS

WETLAND PRESERVATION

Wetlands are complex systems that serve vital ecological functions and provide many benefits to communities. Wetlands serve seven basic functions:

1. Floral diversity and wildlife habitat protection (provide food, shelter, and breeding sites for wildlife).
2. Fishery and herpetile habitat (provide food, shelter, and breeding sites for most of Michigan's reptiles and amphibians).
3. Flood and storm water storage (regulate the flow of water in a watershed, reducing the danger of downstream flooding).
4. Runoff attenuation (reduce the velocity of runoff, thus reducing erosion and sedimentation).
5. Water quality protection (removes or breaks down sediments, nutrients, and toxins from storm water).
6. Shoreline and stream bank protection (dissipate the erosive forces of wave action, currents, and ice flows along shorelines and stream banks).
7. Aesthetics and recreation (provide opportunities for fishing, nature observation, walking, and photography).

Currently, wetlands five acres or greater in size or contiguous with a body of water are protected under state and federal regulations.

Sanilac County

Sanilac County's General Development Plan (GDP) encourages an Open Space Corridors System that would include riparian wetlands in protection efforts. Other wetlands, however, are not under any sort of protection measures.

Lapeer County

The Lapeer County GDP states that communities can help ensure compliance with the federal and state wetland protection acts by requiring wetland determinations when reviewing development proposals, where visible factors indicate a wetland may be present.

Greenwood Township

The lack of water features in the township has made stricter regulations than the State have unnecessary. They could potentially have site restoration, however.

Recommendations

- Map wetlands and determine their functional values.
- Adopt a local wetlands ordinance to help protect wetlands that are not protected by other laws. Include a clear statement of the community's wetland protection goals, the definition of wetlands covered by the ordinance, standards for protection of wetlands and any allowed uses, and enforcement and penalties to ensure the rules are being carried out.
- Create a variable width, naturally vegetated buffer system that encompasses wetlands.
- Determine high-priority areas for wetland functional restoration.
- Use Elba Township, Lapeer County, wetland ordinance a model for other communities in the BRW.

SANITARY SEWER

Improving and sustaining rivers, streams, and lakes requires attention to and action on a wide range of contributors to water pollution.

Sanilac County

Sanilac County's Recommended Land Use Map encourages development along the shoreline and provides for growth around the municipalities of Brown City, Croswell, Deckerville, Marlette, and Sandusky. The growth around these cities would include industrial development because they possess the necessary infrastructure. Future industrial development should be concentrated around these municipalities to minimize infrastructure and associated costs of such growth. Sanilac County encourages development or expansion of water and sewer capacity in and around existing facilities and municipalities only when current capacity can no longer meet population and industry demands.

Lapeer County

The Utilities Section in Lapeer County's GDP concedes that sewage generated by new development and year round use of former seasonal lake front homes has created health and environmental problems in several locations. Most of the township Master Plans recommend public sewers only where needed to address a health hazard. The county's GDP Future Land Use Map identifies Controlled Growth Sectors, to delineate planning areas between local jurisdictions where inconsistencies in zoning and other land use regulations and competition for annexations can lead to friction and lack of coordination at both the local and county levels. The boundaries illustrated are flexible, but can assist both the localities and the county in planning for future service areas and infrastructure expansion.

Recommendations

- Provide a sewer infrastructure that adequately serves the needs of existing and future populations of the region.
- Address sanitary sewer planning and, if appropriate, determine a Sewer Service Area in the Master Plan.

SEPTIC SYSTEMS

Inadequate and failing septic systems can have a detrimental impact upon water quality within the community.

Sanilac County

Sanilac County's Rural Residential District provides for rural, low-density homes in areas where the soil will support on-site septic systems. The county encourages inspections and enforcement to address negative environmental impacts created by septic system failures and storm water runoff problems. The county's Environmental Health Program works with communities to provide oversight of permit issuance, inspections, monitoring, consultation, and education intended to protect the public's health by minimizing environmental health risks from septic systems to the county residents. Nearly 71% of the homes have a septic tank or cesspool for the means of sewage disposal (1990 Census).

Lapeer County

As stated above, the Utilities Section in the Lapeer County's GDP concedes that sewage generated by new development and year round use of former seasonal lake front homes has created health and environmental problems in several locations. The Lapeer County Health Department's Environmental Health Division requires a site evaluation and permit application to be completed before construction of a septic system. Detailed designs of the system are required on all site plans. A procedure is in place to respond to complaints of failing systems and health department follow up of the complaint.

Sanilac Township

The Zoning Ordinance, Section 9.02, requires septic permits to be obtained before applying for a building permit. The constructed system must be inspected by the Sanilac County Health Department. Section 0.97 states that all lots not serviced by municipal facilities must be large enough to accommodate sewage disposal and water supply.

Recommendations

- Determine site requirements for installing a septic system and a program for identifying and correcting failing septic systems.
- Create point-of-sale ordinance to identify and correct failing septic systems.

DEVELOPMENT PRINCIPLES ADDRESSING PRIORITY POLLUTANT OF TEMPERATURE

GREENWAYS/GREENBELTS

Greenways are areas of preserved, linear open space, which may be left in its natural condition, providing a buffer between a body of water and developed land. This buffer can help to filter storm water runoff and slow its velocity, protecting stream banks and riparian vegetation. Greenways also protect wildlife habitat, providing a corridor for movement and foraging. In addition, greenways provide pathways for pedestrian use and offer significant recreational opportunities, flood protection, and aesthetic beauty.

Sanilac County

The recommended land use map in the General Development Plan (GDP) includes an Open Space Corridors System, which would protect the riparian areas of rivers, creeks, lakes, wetlands, floodplains, and forests. The system links the townships, villages, and cities throughout Sanilac County and connects natural areas such as parks and historic areas. In addition, the Open Space Corridors System has several related purposes, including:

- Providing access to inland water features for public recreational uses such as fishing and hunting.
- Providing habitat connections for fish and wildlife.
- Protecting rivers, lakes, and forested areas from further development and environmental degradation such as pollution from runoff and erosion.

Recommendations

- Include greenways as a planning tool to help preserve high-quality water resources and link community assets such as parks, nature reserves, cultural features, or other important points-of-interest.
- Encourage greenways to be set aside as conservation areas.

WOODLAND PRESERVATION

Woodlands offer many ecological benefits, including capturing and filtering storm water, moderating temperature through shading and transpiration, and buffering buildings from the sun and wind. The key to protection is clearly defining those resources intended to be preserved, and then drafting goals and policies consistent with this definition.

Sanilac County

In Sanilac County's various planning documents, preservation is focused on agricultural land, although other resources are mentioned for protection.

Lapeer County

An objective to meet the goal of natural resource protection in Lapeer County's GDP is for the county to encourage and promote the formation of open space and woodlands ordinances within the communities of the county.

Recommendations

- Adopt local ordinances to protect individual trees, such as street trees in an urbanized community or tree-rows and woodlands in a rural community.
- Minimize the amount of clearing and grading of forests to only that needed to build lots, allow access, and provide fire protection. Include provisions for pre-construction, onsite monitoring, and post-construction maintenance.
- Assess tree and woodland resources, noting the types and locations of various plant communities, the presence of unique ecosystems, and the location of large “landmark” trees.
- Establish priorities and goals for preservation.
- Establish priorities and goals for tree and woodland preservation.

HABITAT PRESERVATION - NATURAL AREA PRESERVATION/RESTORATION

Land development can lead to fragmentation of wildlife habitat, resulting in disconnecting rivers and wetlands from woodlands and grasslands. Wildlife often requires different types of environments for their lifecycles, such as woodlands for shelter, grasslands for food, and wetlands for nesting and rearing young.

A community's Master Plan may call for preserving and/or restoring natural areas for wildlife habitat protection.

Sanilac County

No other lands, besides the riparian corridors are identified for protection.

Lapeer County

A goal for Lapeer County in the GDP is to promote the preservation of open space, the protection of its natural features, and improvement of the physical environment for the health, safety, and welfare of all the residents. An objective to meet that goal is to identify environmentally sensitive areas and help ensure their protection by compliance with State and Federal environmental regulations.

Recommendations

- Avoid habitat fragmentation by conscientiously linking open spaces with one another, allowing animals to travel from one natural area to the next, meeting their needs for food, shelter, and breeding.
- Conduct a natural areas inventory and develop a natural areas map and plan that identifies prime areas for preservation or restoration.

DEVELOPMENT PRINCIPLES ADDRESSING PRIORITY POLLUTANT OF PATHOGENS

ANIMAL WASTE

Fully achieving water quality improvements depends on the active participation and increasing support of residents conducting good stewardship practices as part of their daily lives, such as proper disposal of pet waste.

Recommendations

- Educate residents about the availability, location, and requirements of properly disposing of pet waste.

AGRICULTURAL MANURE MANAGEMENT

Sanilac County

Sanilac County's General Development Plan (GDP) recommends townships to:

- Discourage Concentrated Animal Feeding Operations (CAFO) unless they are allowed in an agricultural zoning classification that is different from general agriculture, and
- Consider agriculture/industrial districts and develop zoning ordinances to address their needs.

Custer Township

The Zoning Ordinance, Section 6.02, prohibits manure from accumulating and causing odor or attracting flies.

Greenwood Township

The Zoning Ordinance provides a comment in the Agricultural Districts descriptions that "the farm operator is advised that to avoid potential nuisance suits, the raising of livestock and farm animals should be conducted and sited in accordance with the Michigan "generally accepted agricultural and management practices" (GAAMPS) under PA 261 of 1999." The rules have been updated which should be reflected in this ordinance. Storage or piling of waste products shall be confined to areas where animal buildings and quarters are permitted and away from wells, water bodies, and drainage ways.

Recommendations

- Educate operators about the requirements of properly storing and applying manure.
- Education about GAAMPS and best management practices (BMPs).
- Promote the development of Comprehensive Nutrient Management Plans (CNMPs) through Conservation Districts (CDs).

ILLCIT DISCHARGE ELIMINATION

A community should eliminate illicit discharges and design new outfalls to treat or manage storm water runoff discharging to bodies of water.

Sanilac County

The Development Drainage Rules state that the Drain Commissioner will provide for the protection of the natural resources from pollution, impairment, and destruction resulting from storm water. The Sanilac County Road Commission is regulated as a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) community and supports the adoption and enforcement of an illicit discharge and elimination ordinance. No other communities are designated as such in the county.

Recommendations

- Map the drainage system to identify all points of discharge (especially locations of illicit discharges).
- Establish ordinances prohibiting the discharge of pollutants to the sewer system.
- Inspect and monitor potential sources of discharge to ensure compliance with local discharge ordinances.
- Develop and implement illicit discharge elimination plans for all communities.

DEVELOPMENT PRINCIPLE ADDRESSING PRIORITY POLLUTANT OF TOXIC CONTAMINANTS

WELLHEAD PROTECTION

The Wellhead Protection Program identifies sources of contamination within the groundwater recharge area. A community may also elect to identify sources of contamination if groundwater is only obtained from private wells. Residents within communities often depend upon groundwater for their drinking water supply. This water is obtained from either municipal or private wells.

The status of Wellhead Protection programs in the Black River Watershed (BRW) are summarized below:

Wellhead Protection								
County	Township	Town	Range	Section	Community	Protection Type		Approval Date
						Wellhead Area (delete this column)	Source Water Area	
Lapeer	Burnside	09N	12E	12, 13	Brown City		X	12/21/1995
Sanilac	Maple Valley	09N	13E	5-8, 17-20	Brown City		X	12/21/1995
	Marion	13N	15E	6, 7	Deckerville		X	11/8/1995
	Marion	13N	14E	1	Deckerville		X	11/8/1995
	Minden	14N	14E	36	Deckerville		X	11/8/1995
	Minden	13N	14E	1	Deckerville		X	11/8/1995
	Wheatland	13N	14E	1, 2, 11, 12	Deckerville		X	11/8/1995
	Wheatland	13N	15E	7	Deckerville		X	11/8/1995

Sanilac County

Nearly 69% of the homes in Sanilac County use a well for their water supply (1990 Census).

Lapeer County

Most of the Lapeer County's residents are dependent upon groundwater and individual wells to supply drinking water. The General Development Plan (GDP) acknowledges that protection of groundwater quality is of paramount concern.

Greenwood Township

High-risk uses cannot be located on lands classified as "wetlands" as defined on the National Wetland Inventory Map or determined by Michigan Department of Natural Resources and Environment (MDNRE), or upon lands within the 100-year floodplain, as defined on the Flood Insurance Rate Map (FIRM) or

Flood Hazard Boundary Map in order to protect the community from the danger of the leaching or runoff of chemicals or substances into the groundwater or surface water. Section 15.21 "High Volume Water Well Or Well System" requires that a study be conducted when a high volume well is proposed that documents the location and depth of existing wells within the maximum proposed cone of influence area or 2,000 feet, whichever is greater, and describes the anticipated impact on these wells.

Recommendations

- Identify, map, and protect groundwater recharge areas to maintaining groundwater quality.
- Restrict high-risk land use activities in wellhead protection areas
- Establish Wellhead Protection Programs in all communities with private groundwater wells.
- Establish groundwater protection and withdrawal regulations in all communities with private groundwater wells.

DEVELOPMENT PRINCIPLES ADDRESSING INVASIVE SPECIES

NATIVE AND SITE SPECIFIC PLANTS

Native and site specific plants are adapted to a specific habitat. They tend to be drought and disease tolerant, require little maintenance once established, and help stabilize and restore soil. Native and site specific plants serve valuable storm water function, including absorbing excess nutrients from runoff and stabilizing slopes.

Greenwood Township

Section 17.16 "Plant Materials" lists suitable plant materials with spacing as required, although the approved plant materials do include a few invasive species: Russian Olives, Honey Suckle, and Buckthorn. Trees not permitted should include other invasive species. The Ordinance requires that the remainder of the landscaped area which is not planted with the suitable plant materials be maintained as a well-kept lawn or other materials acceptable to the Planning Commission. All landscaping is required to be maintained in a healthy growing condition, neat and orderly in appearance, which might disallow rain gardens and native plantings.

Recommendations

- Encourage the use of native and site specific plants through zoning ordinances and prohibit the use of exotic invasive plant species in landscaping.
- Require developers to obtain an opinion from the Michigan Department of Natural Resources and Environment (MDNRE) regarding the likelihood of threatened and endangered species on a site.
- Enhance trees and other vegetation at sites by planting additional vegetation and promoting native and site specific plants.
- Develop and implement an invasive species management plan for the Black River Watershed (BRW).

DEVELOPMENT PRINCIPLES ADDRESSING WIND ENERGY SYSTEMS

Greenwood Township

Section 17.21 “Wind Energy Conversion Systems (Windmills)” allows special permitting for windmills in all districts, sets regulations for construction and operation.

Recommendations

- Establish Wind Ordinances for communities.

CONCLUSIONS

When communities in the Black River Watershed (BRW) are in the process of creating or updating their Master Plans, they must be aware of how the coordination of plans should occur. The health of a community and the natural resources are affected by development decisions. The Master Plans reviewed referenced the intended future land uses or zoning districts of adjacent communities. This permits a community to plan appropriately for land at its edge and to anticipate and coordinate issues with adjacent communities.

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 need improvement. 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. The counties and most communities have adequate site plan review processes, although preservation areas should be updated on future land use maps for easy reference in those reviews.

The most advanced, cutting-edge planning efforts found throughout the nation are utilizing the concept known as “Smart Growth” (www.epa.gov/smartgrowth). The stated goals of the county’s development plans and the common goals of the local jurisdictions are generally consistent with the “Principles of Smart Growth,” with two specific principles that are directly related to environmental protection (Smart Growth Network, 2000):

- [Preserve Open Space, Farmland, Natural Beauty and Critical Environmental Areas](#)
Open space preservation supports smart growth goals by bolstering local economies, preserving critical environmental areas, improving our communities quality of life, and guiding new growth into existing communities.
- [Strengthen and Direct Development Toward Existing Communities](#)
Smart growth directs development toward existing communities already served by infrastructure, seeking to utilize the resources that existing neighborhoods offer, and conserve open space and irreplaceable natural resources on the urban fringe.

Most township Master Plans encourage cluster development to preserve open space, but few have implemented such tools. Not all of the principles in this review will be applicable to the communities and should be considered as guidelines rather than milestones. The use of the principles to begin discussion on these issues will eventually lead to protecting natural and aquatic resources and revising the Master Plan, if necessary.

As the case with many local municipal and state regulations, agricultural land uses are exempt from those rules. Some communities have addressed that gap by requiring certain water quality best management practices (BMPs) be used when farmland is enrolled in a land protection or conservation arrangement. The “Healthy Water, Rural Pride” initiative is being promoted in several watersheds in southwest Michigan and could become a model for other areas. The status of the initiative should be monitored for its success and transferability to other watersheds.

IMPLEMENTATION

The Watershed Management Plan (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 areas. This policy review is just one component of the complex issue of land use planning but will assist the communities in the watershed in identifying the next step in the process.

An often complicating factor in managing the Black River Watershed (BRW) is the overlapping responsibilities and the layers of regulations to go through to implement practices. The Black River is a designated county drain, managed through the intercounty drainage board. The river is also designated as a natural river, which requires permits from the Michigan Department of Natural Resources and Environment (MDNRE) for any practices to be implemented. Increased cooperation in how to manage the river and its watershed is necessary for improvements to be realized.

Several recommendations contained in this policy review could involve changes that may not be fully within the control of the communities. Some might require state approval or legislative action. The communities' elected officials should consider these issues when reviewing the recommendations of this report.

COMMUNITY RESPONSIBILITIES

All of the county's development plans include similar recommendations to encourage cooperation among local governmental units and opportunities for dialogue with governmental units on the impacts of assessing, planning, and zoning for future land use at their boundaries. The following elements are part of the successful strategy for local governments to protect waterbodies within the BRW:

1. Form a committee to oversee the systematic review of a community's development rules to determine if changes can or should be made. This committee will help facilitate communication among municipalities and provide assistance for future municipal land use planning decisions. Create a systematic checklist and countywide development guidelines outlining a process that could be used when assessing, planning, zoning, and developing along municipal governmental boundaries.
2. Hire a full- or part-time planning person at the county level to provide qualified planning support and assistance to all municipalities in the BRW upon request.
3. Encourage community-minded, public-spirited individuals to serve on the planning commission, zoning board of appeals, and community board or council. Provide training for these individuals to develop the skills that are required to properly review proposed development sites for adequate water quality protection.
4. Develop a Master Plan and review zoning ordinances periodically to assess if revisions or a total update are necessary. Compare the community Master Plans with county development plans to ascertain if goals are aligned and coordinated with surrounding communities.
5. Be aware of changes in state legislation that might impact plans or ordinances. Encourage local, state, and federal agencies to provide the technical support, financial incentives, and regulatory flexibility needed to promote the model development principles.

6. Support a zoning administrator who communicates well with the residents. Ensure that the administrator understands the Master Plan and the zoning ordinances and is able to administer them as the planning commission so intended. Enable the zoning administrator to help create effective regulations and rules that provide the incentive and the enforcement measures necessary to ensure that the permitted land use activities do not harm water quality. Encourage planners and administrators to consider the model development principles when evaluating their local zoning codes, subdivision ordinances, and landscape ordinances.
7. Implement educational programs for residents, developers, contractors, lenders, local planners, and other landowners who should be educated about the impacts that all of their activities together can have on a watershed. Individual actions, such as properly installing silt fencing at construction projects, maintaining private septic systems, and preserving riparian corridors can provide cumulative improvements to water quality. Encourage the development community to incorporate model development principles in their land development projects. Encourage the lending and insurance communities to consider these principles and examine their role in land development. Encourage environmental groups, watershed organizations, and the general public to use these principles as educational tools.
8. Collecting all county land use and zoning information to be uploaded into Geographical Information System (GIS) to provide information and mapping assistance to all municipalities to aid in future land use and development decisions. Provide a benefit to residents, businesses, and other county departments by expanding local GIS programs into county-wide GIS systems. The formation of a GIS Committee is recommended, with representation from relevant county departments, to develop policies to compile information on current data, equipment, training, personnel, housing sites, and other resources already in-house, and to share current information, databases, or to communicate these information assets.
9. Facilitating a series of governmental forums on the possibility of creating a development impact assessment. The decision to impose an impact assessment would be the decision of each individual municipal government. Municipalities are strongly encouraged to weigh the cost and benefits of proposed development projects to ensure that the costs of adverse impacts are not unknowingly paid by local taxpayers.

MODEL ORDINANCES

Communities around the country have adopted ordinances using model language developed by organizations such as the U.S. Environmental Protection Agency (USEPA) and the Center for Watershed Protection. A model ordinance should be used as a framework for developing ordinances that include the unique features in the community. For example, wetland and native vegetation ordinances could include more specifics about local vegetation resources that are particular to a community.

Southeast Michigan Council of Governments (SEMCOG) prepared a booklet of Model Ordinances for the National Pollutant Discharge Elimination System (NPDES) Phase II program participants in the Southeast Michigan Area. The booklet identifies development strategies that address storm water. Model ordinances were selected for each strategy that could be adopted by the communities to strengthen their resource protection measures for the watersheds. Similar ordinances would be applicable to the BRW and should therefore be referenced when appropriate in addition to the model ordinances that are grouped by each development principle and provided at the end of this report.

REFERENCES

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.

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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.

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Smart Growth Network. 2002. "This is Smart Growth." International City/County Management Association (ICMA) and US Environmental Protection Agency (EPA), Washington, D.C.
(<http://www.smartgrowth.org/about/principles/Default.asp?res=1280>)

Montgomery Associates, Inc., 2002. *Zoning Ordinance for Greenwood Township, Michigan*.
(<http://www.cis.stclaircounty.org/planning1160479.asp>)

MODEL ORDINANCES

LAND USE PLANNING

Environmentally sensitive future land use plan:

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-AppendixN-EnvironmentallySensitiveMasterPlan.pdf>

Environmental impact assessment options:

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-appendixp-environmentalassessmentrequirements.pdf>

Regarding groundwater protection:

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-appendixu-groundwaterprotection.pdf>

Floodplain management model ordinance:

http://www.leelanau.cc/downloads/floodplain_model_ordinance_from_liaa.pdf

Natural river zoning ordinance:

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-AppendixJ-SampleNaturalRiversOrdinance.pdf>

AGRICULTURE

Model Storm Water Management/Impervious Surface Mitigation Ordinance from the Greater Lansing Regional Committee:

<http://www.mywatersheds.org/publications/GLRC%20Manuals/FINAL%20Ordinance%20MANUAL.pdf>

Model open space development ordinance:

<http://www.epa.gov/owow/nps/ordinance/mol3.htm#topofpage>

Overlay district model ordinance:

http://www.leelanau.cc/downloads/resource_protection_model_ordinance_from_liaa_1.pdf

Lot averaging model ordinance:

http://www.leelanau.cc/downloads/lot_averaging_model_ordinance_from_liaa_1.pdf

Sand dune preservation overlay:

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-AppendixM-SampleSandDuneOverlay.pdf>

Great Lakes shoreline protection overlay zone:

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-appendixs-shorelineprotection.pdf>

Cluster development and Planned Unit Development ordinances:

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-appendixt-clusterandpudexamples.pdf>

Hamburg Township, Michigan, open space community zoning ordinance:

<http://www.epa.gov/owow/nps/ordinance/documents/C2c-Hamburg.pdf>

SEDIMENT AND UNSTABLE HYDROLOGY

City of DeWitt Storm Water Ordinance

Model Storm Water Management/Impervious Surface Mitigation Ordinance from the Greater Lansing Regional Committee:

<http://www.mywatersheds.org/publications/GLRC%20Manuals/FINAL%20Ordinance%20MANUAL.pdf>

Model ordinance for storm water control, operation, and maintenance:

<http://www.epa.gov/owow/nps/ordinance/mol4.htm#topofpage>

Model ordinances for storm water management:

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-AppendixH-SampleStormwaterOrdinance.pdf>

http://www.leelanau.cc/downloads/stormwater_management_model_ordinance_from_liaa.pdf

Kent County model storm water ordinance:

http://www.accesskent.com/YourGovernment/DrainCommisioner/pdfs/kc_modelordinance.pdf

Grand Traverse County storm water ordinance:

<http://www.epa.gov/owow/nps/ordinance/documents/D2a-GrandTraverse.pdf>

Erosion and sedimentation control model ordinances:

<http://www.epa.gov/owow/nps/ordinance/mol2.htm#ml2>

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-AppendixG-SampleSESCOrdinance.pdf>

Steep slope development model ordinance:

http://www.leelanau.cc/downloads/steep_slope_model_ordinance_from_liaa.pdf

High risk erosion areas model ordinance:

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-AppendixK-HREAOOverlayZones-BluffErosionHazLine.pdf>

Critical dune areas model ordinance:

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-AppendixL-CriticalDuneOrdinance.pdf>

Grand Traverse County soil erosion ordinance:

<http://www.epa.gov/owow/nps/ordinance/documents/Grandtra.pdf>

Model post-construction storm water runoff control ordinance:

<http://www.epa.gov/owow/nps/ordinance/mol6.htm>

Model ordinance:

http://www.leelanau.cc/downloads/stormwater_management_model_ordinance_from_liaa.pdf

Private road regulations model ordinance:

http://www.leelanau.cc/downloads/private_road_standards_from_liaa.pdf

NUTRIENTS

Model Phosphorus Ban Ordinance from the Greater Lansing Regional Committee:

<http://www.mywatersheds.org/publications/GLRC%20Manuals/FINAL%20Ordinance%20MANUAL.pdf>

Muskegon County Ordinance to Ban Fertilizer Containing Phosphorus:

http://co.muskegon.mi.us/boardofcommissioners/ordinances/phosphorus_ordinance.pdf

Ordinances for aquatic buffer zones and set backs:

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-appendixr-sensitiveareaprotection.pdf>

<http://www.epa.gov/owow/nps/ordinance/mol1.htm>

Ada Township, Michigan, Riparian Protection Ordinance:

<http://www.ada.mi.us/propamend/Buffer-Ordinance-05-06-05-Draft.pdf>

Meridian Township Wetland Protection Ordinance:

[http://library1.municode.com:80/default-](http://library1.municode.com:80/default-test/template.htm?view=browse&doc_action=setdoc&doc_keytype=tocid&doc_key=4f160dd9add89f7ee761ced26c041558&infobase=13564)

[test/template.htm?view=browse&doc_action=setdoc&doc_keytype=tocid&doc_key=4f160dd9add89f7ee761ced26c041558&infobase=13564](http://library1.municode.com:80/default-test/template.htm?view=browse&doc_action=setdoc&doc_keytype=tocid&doc_key=4f160dd9add89f7ee761ced26c041558&infobase=13564)

Model Wetland and Watercourse Protection and Restoration Ordinance from the Greater Lansing Regional Committee:

<http://www.mywatersheds.org/publications/GLRC%20Manuals/FINAL%20Ordinance%20MANUAL.pdf>

Wetland protection model ordinances:

http://www.leelanau.cc/downloads/wetlands_model_ordinance_from_liaa.pdf

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-AppendixE-SampleDEQWetlandOrdinance.pdf>

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-AppendixF-SampleEnablingActsWetlandOrdinance.pdf>

Keyhole development ordinance:

<http://www.deq.state.mi.us/documents/deq-ess-cm-ftg-AppendixI-SampleKeyholeDevelopmentRegulations.pdf>

TEMPERATURE

Looking Glass River Overlay District:

<http://www.mywatersheds.org/publications/GLRC%20Manuals/FINAL%20Ordinance%20MANUAL.pdf>

City of Ann Arbor greenway ordinance (Chapter 42):

http://library4.municode.com/gateway.dll/MI/michigan/9631?f=templates&fn=default.htm&nusername=11782&npassword=MCC&npc_credentialspresent=true&vid=default

Cascade Charter Township landscape and greenbelt ordinance:

<http://www.cascadetwp.com/ReferenceDesk/OrdinancesResolutions/Zoning/Chapter20.htm>

Model Trees and Woodlands Protection Ordinance from the Greater Lansing Regional Committee:
<http://www.mywatersheds.org/publications/GLRC%20Manuals/FINAL%20Ordinance%20MANUAL.pdf>

Tree preservation model ordinance:
http://www.leelanau.cc/downloads/tree_preservation_ordinance_from_liaa.pdf

City of Auburn Hills Woodland Preservation Ordinance:
<http://www.auburnhills.org/departments/communitydevelopment/Shared%20Documents/Woodland%20Preservation%20Ordinance.pdf>

Forest Resource Ordinance for Frederick County, Maryland:
<http://www.epa.gov/owow/nps/ordinance/documents/E6-Frederick.pdf>

Overview of weed laws:
<http://www.epa.gov/greenacres/weedlaws/index.html>

Model weed ordinance that allows for the presence of native species:
<http://web.dcp.ufl.edu/ckibert/BCN6585/EPALandscaping/JMLRApndx.html>

Madison, Wisconsin, Natural Lawn Ordinance {Chapter 27.05(2)(f)2 and 3}:
http://library10.municode.com/gateway.dll/1?f=templates&fn=default.htm&vid=nextpage:500000&npsurname=50000&nppassword=MCC&npac_credentialspresent=true

Habitat ordinance from Portland, Oregon, metropolitan area:
http://www.metro-region.org/library_docs/nature/2nd_pdf_ord_05-1077b_only_071405.pdf

PATHOGENS

Grand Haven Township sewer ordinance:
<http://www.ght.org/OnlineResources/Ordinances/Ordinance%20%23180%20-%20Sewer%20Usage%20and%20Administration%20Ordinance.pdf>

City of Owosso sewer ordinance:
<http://ci.owosso.mi.us/ReferenceDesk/CityCode/Chapter34.htm>

Model Pet Waste Ordinance from the Greater Lansing Regional Committee:
<http://www.mywatersheds.org/publications/GLRC%20Manuals/FINAL%20Ordinance%20MANUAL.pdf>

Farmington Hills Animal Waste Ordinance (Chapter 6, Article II, Section 6-37):
http://library4.municode.com/gateway.dll/MI/michigan/11155?f=templates&fn=default.htm&npsurname=12046&nppassword=MCC&npac_credentialspresent=true&vid=default

Model Illicit Discharge Ordinance from the Greater Lansing Regional Committee:
<http://www.mywatersheds.org/publications/GLRC%20Manuals/FINAL%20Ordinance%20MANUAL.pdf>

TOXIC CONTAMINANTS

Illicit discharges model ordinance:

<http://www.epa.gov/owow/nps/ordinance/mol5.htm>

Model ordinance for groundwater protection overlay district:

<http://www.epa.gov/owow/nps/ordinance/mol7.htm#groundwater>

Washtenaw County Ordinance for the Inspection of Residential Onsite Water and Sewage Disposal Systems:

<http://www.epa.gov/owow/nps/ordinance/documents/WashtenawCounty.pdf>

INVASIVE SPECIES

Model Native Vegetation Ordinance from the Greater Lansing Regional Committee:

<http://www.mywatersheds.org/publications/GLRC%20Manuals/FINAL%20Ordinance%20MANUAL.pdf>

MISCELLANEOUS

Surface water protection ordinance (water reservoirs):

<http://www.epa.gov/owow/nps/ordinance/mol7.htm#surfacewater>

Model lighting ordinance:

http://www.leelanau.cc/downloads/model_lighting_ordinance_2003_1.pdf

Model Grease and Sand Interceptor Policy from the Greater Lansing Regional Committee:

<http://www.mywatersheds.org/publications/GLRC%20Manuals/FINAL%20Ordinance%20MANUAL.pdf>