

# CHAPTER FOUR: BEST MANAGEMENT PRACTICES IN RURAL AREAS



Photo 4-1: How we manage land in rural areas affects the quality of our ponds, streams, wetlands, and lakes.

This chapter focuses on provisions that rural communities in the Great Lakes Region can use in Master Plans and Zoning Ordinances to better protect water quality by preventing pollution in the first place. Many of the techniques rely on low impact development approaches to prevent stormwater runoff. Many others are largely educational or encourage property owners to utilize options with less environmental impact.

## INTRODUCTION

This chapter focuses on provisions that rural communities in the Great Lakes Region can use in Master Plans and Zoning Ordinances to better protect water quality by preventing pollution in the first place. Many of the techniques rely on low impact development (LID) approaches to prevent stormwater runoff. Many others are largely educational or encourage property owners to utilize options with less environmental impact.

The chapter is divided into four parts. Part A focuses on a half-dozen approaches to water quality protection that should be included in every local Master Plan and Zoning Ordinance. If a community only incorporated these measures into its Master Plan and Zoning Ordinance, it would go a long way to establishing reasonable and prudent water quality protection measures.

Part B focuses on a half-dozen more specific best management practices (BMPs) that are largely tied to LID techniques and basic lot configuration issues.

Part C presents five techniques that are somewhat more sophisticated and require well-trained staff to properly administer. Most are tied to provisions in overlay zones. While there are far more sophisticated zoning techniques that could be used, a fundamental premise of this guidebook is to include techniques that can be utilized by a rural Zoning Administrator with only a modicum of training. These techniques still fit those criteria.

Part D in this chapter presents public education measures primarily designed for inclusion in the Master Plan. The process of preparing a local Master Plan and of reading one after adoption presents great opportunities to educate the community on a wide variety of issues, including water quality protection. A four water quality protection approaches are described in this section.

## A. ESSENTIAL ELEMENTS TO INCLUDE IN MASTER PLANS AND ZONING ORDINANCES

The techniques described in this part have been identified as essential for every Master Plan and Zoning Ordinance in the State of Michigan. They are probably applicable throughout the Midwest. These techniques provide a basic level of guidance on matters related to water pollution prevention and coordinated permitting. They are organized around the concept of low impact development, rely on a good environmental inventory, are guided by appropriate goals and objectives in the local Master Plan, and are implemented through coordinated permitting administrative procedures tied to state and local laws. To protect water quality, the techniques that follow should be implemented in the Master Plan and Zoning Ordinance (as indicated) to achieve a contemporary level of water quality protection.

## Low Impact Development

### What is Low Impact Development?

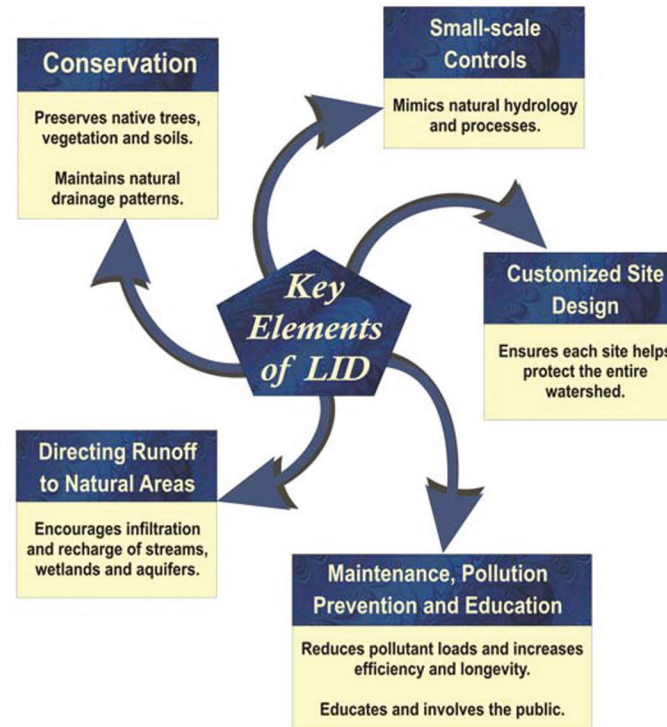
Low impact development is an organizing concept for developers, contractors, municipalities, property owners, and regulators that seek to minimize environmental damage as new developments occur. According to the U.S. Environmental Protection Agency, LID is an approach to land development that *works with nature* to manage stormwater as close to its source as possible.<sup>4</sup> Low impact development emphasizes cost-effective, site-specific strategies that have the goal of maintaining or replicating predevelopment conditions. These techniques manage stormwater primarily through retention/detention and infiltration, the use of living vegetation as filters, reducing the area of impervious surfaces, and the trapping of sediment through natural courses and baffles<sup>5</sup> (see Figure 4-1). These strategies are targeted to land owners and developers, and should be strongly encouraged through the local Master Plan and Zoning Ordinance with technical support from the municipality and in cooperation with the county's Soil Erosion and Sedimentation Control enforcing agent.

4. Low Impact Development, U.S. Environmental

Protection Agency: <http://water.epa.gov/polwaste/green/>.

5. "Low Impact Development (LID): A Literature Review," U.S. Environmental Protection Agency: <http://water.epa.gov/polwaste/green/upload/lid.pdf>.

Figure 4-1: Key Elements of Low Impact Development



Source: *Design: Low Impact Development Manual*, U.S. Department of Defense, 2004.

### Why Use Low Impact Development?

Traditional curb-and-gutter stormwater infrastructure operates in an “out-of-sight, out-of-mind” framework. These methods work remarkably well for removing water runoff from a site; however, they are designed more to address quantity of water and speed of removal than the quality of the water before it

is discharged to the ground or surface water. In contrast, LID techniques are designed to mimic natural systems by accommodating runoff and removing pollutants throughout the conveyance process and without the use of costly end-of-system treatments. Depending on the characteristics of the site, LID techniques may potentially be a more cost-effective solution for managing stormwater than traditional



methods. The applicability of LID may be constrained by specific conditions of the site, such as space available, soil types, and other obstacles, but creative design and a variety of tools available make these techniques adaptable to even the most complicated sites. Removing pollutants before they reach our rivers, lakes, and groundwater can create additional savings due to improved public health, reducing the need for remediation efforts, and an enhanced public perception that the community's water resources are safe, drinkable, swimmable, and provide better habitat for fish and wildlife.

### Amending Your Community's Master Plan and Zoning Ordinance to Encourage Low Impact Development

Following is a set of guidelines for amending your community's Master Plan and Zoning Ordinance to encourage LID techniques (see Table 4-1). For specific recommended Master Plan and Zoning Ordinance language regarding this topic, refer to Appendix A, on page A-2.

#### **Master Plan**

The municipality should lead by example. If it wants citizens and businesses to adopt and use low impact development best practices, then it needs to use them itself; however, it needs to go a step further by encouraging LID practices in the Master Plan. The Master Plan should include a goal and corresponding objectives for LID, as well as educational information or references to these techniques.

#### **Zoning Ordinance**

In very rural communities, the lack of administrative capacity makes it difficult to set and enforce requirements for using LID, since Phase II standards for stormwater control only apply in areas with a population greater than 100,000. The most practical language to use in rural communities is to create zoning guidelines that encourage developers and landowners to consider LID approaches and reference relevant technical and educational documents that can show developers how to help reduce water quality impacts.

#### **Additional Resources**

The premier resource for LID in Michigan is the *Low Impact Development Manual for Michigan: A Design Guide for Implementers and Reviewers*, produced by the Southeast Michigan Council of Governments (SEMCOG) for the MDEQ. This document contains a wealth of information on LID, in general, and specific techniques available to developers, and should be at the top of any developer's reading list.

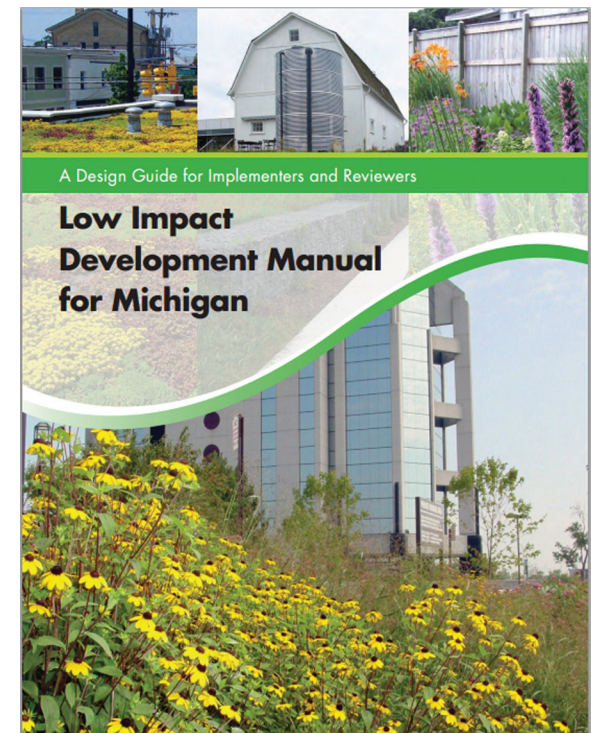


Photo 4-2: The SEMCOG *Low Impact Development Manual for Michigan*.

Table 4-1: Essential Elements in Master Plan and Zoning Ordinance – Low Impact Development

Essential Elements in Master Plan and Zoning Ordinance			
	GOOD	BETTER	BEST
<b>Low Impact Development</b>	Encourage the use of LID approaches in new development and redevelopment projects.	Describe how LIDs handle stormwater management and give examples.	The “Better” approach may be the highest needed for this element.

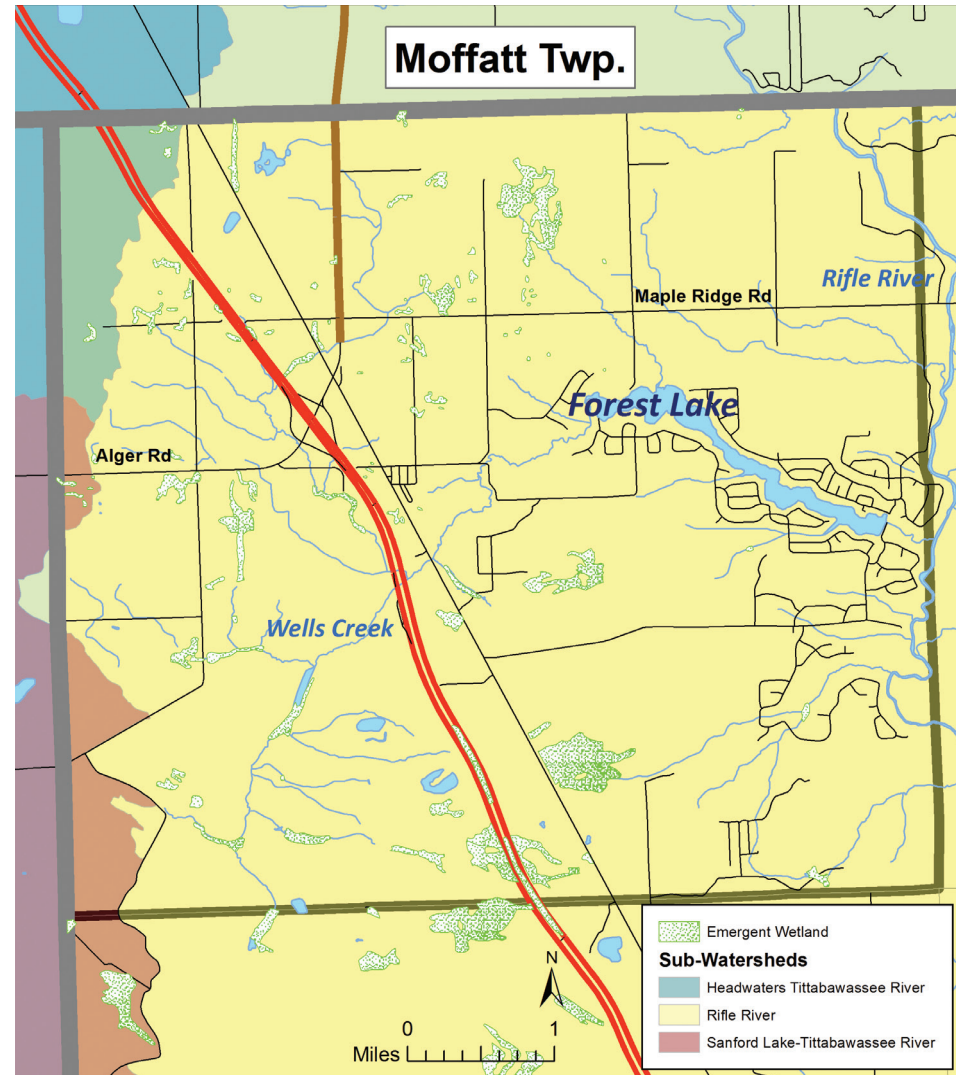
## Environmental Inventory

### What is an Environmental Inventory?

Even before educating on LID, it is important to learn about the location and condition of existing environmental resources. This requires an environmental inventory, or a natural resource inventory. This is a compilation of text and maps about natural features and characteristics that is included within the community's Master Plan. At a minimum, the environmental inventory should address land cover, topography, hydrology, soils, floodplains, wetlands, high-risk erosion areas, and significant natural features like sand dunes, steep slopes, or sinkholes. Additional elements that could be included are: wildlife/habitat by type, geology, climate, and air quality. An environmental inventory may contain text, maps, tables, figures, and graphs that describe and compare the conditions and locations of natural features within the community. An example environmental inventory map is shown in Figure 4-2, and an aerial photo to identify woodland and other features is shown in Photo 4-3. It is important to connect the local environment's relationship to the bigger picture by relating local environmental features to regional resources, such as watersheds, aquifers, and ecosystems. There are water features in every region and local jurisdiction in Michigan (see Figure 4-3).

The purpose of an environmental inventory is to provide: 1) useful information to facilitate critical thinking and understanding; and

Figure 4-2: Sample Map of Emergent Wetlands and Sub-Watersheds as Part of an Environmental Inventory from Moffatt Township



Source: Michigan Geographic Data Library, Michigan Department of Technology, Management & Budget.



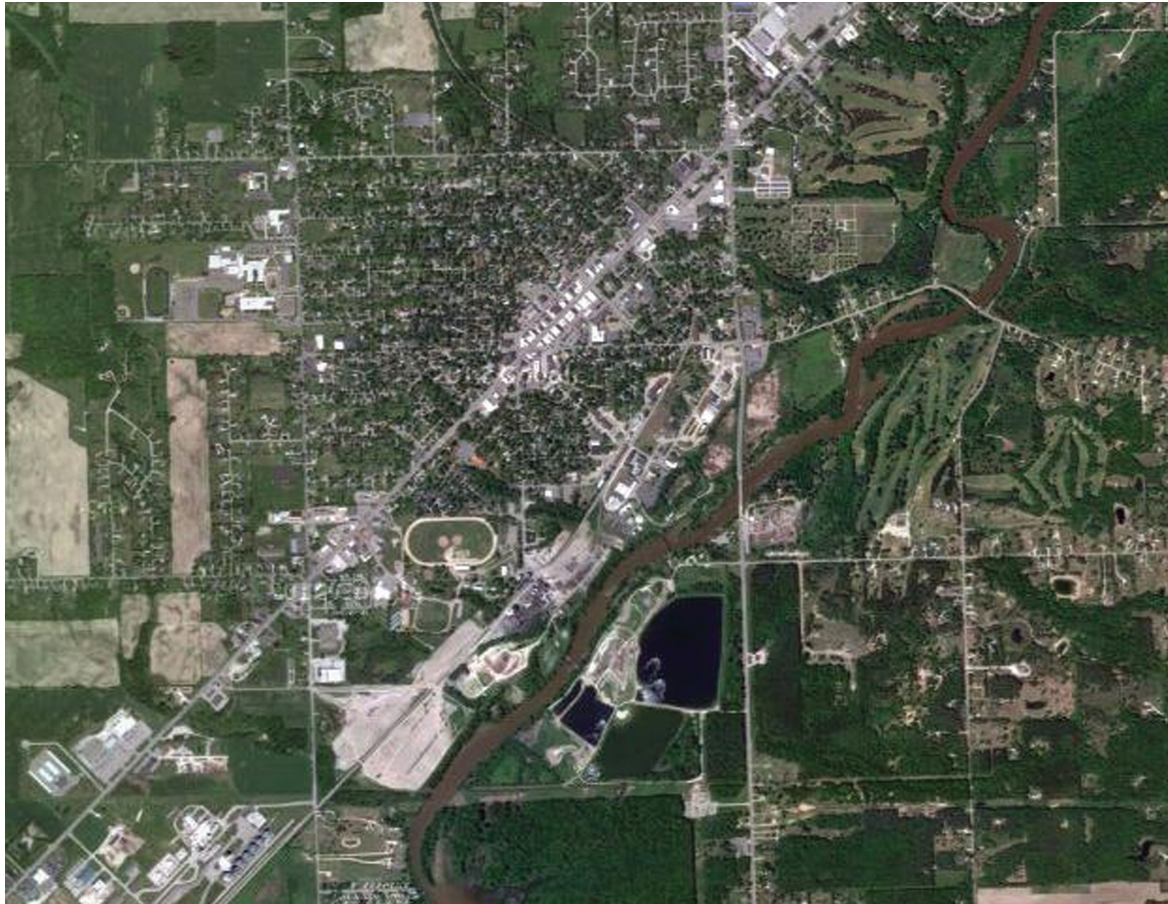


Photo 4-3: Aerial imagery of Caro, MI, shows the woodlots (dark green), sewage lagoon water (dark blue), river (brown) and the agricultural land (light green).

2) as a baseline for resource protection measures within a community. Therefore, the environmental inventory must be objective and descriptive. Interpretation, analysis, and recommendations in regard to environmental resources are appropriate in the Master Plan, but should be separate from the inventory.

#### Why Do an Environmental Inventory?

With good information about existing environmental features, their locations, and the interrelationship between them and the region, communities can: 1) plan for the protection and management of natural features; and 2) guide development in ways that retain

the value of the resource. For example, the environmental inventory can identify areas within the community for wetland or open space preservation and then separately zone these spaces appropriately, to ensure their future protection.

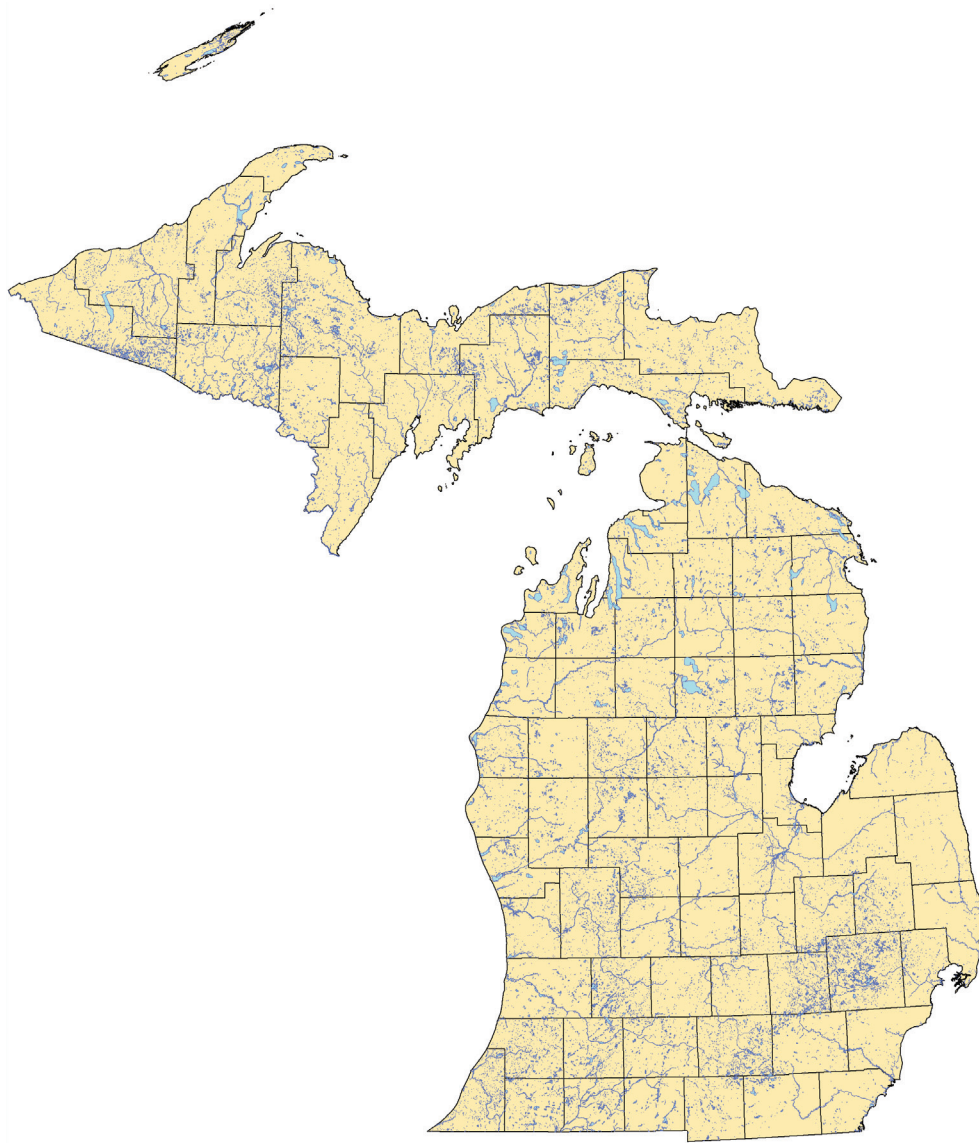
Creating an environmental inventory is also the first step in helping a community identify its environmental goals. Identifying current conditions and trends over the years will help the community target those resources and areas that are in need of protection or remediation.

Municipalities can obtain professionally gathered Geographic Information System (GIS) data regarding these topics from the Michigan Geographic Data Library located at: <http://www.mcgi.state.mi.us/mgdl/>. However, if a community does not have access to computer GIS, or administrative staff to operate it, then the community may want to work with the county or regional planning office, or a consultant for the creation of local maps. While elements, such as woodlands, agricultural fields, and water features, are relatively easy to identify using aerial imagery, features, such as wetlands, may require ground inspection, because wetlands that are only seasonally inundated may be difficult to accurately interpret with aerial imagery.

#### Updating Your Community's Master Plan to Include an Environmental Inventory

Following is a set of guidelines for updating your community's Master Plan to include an environmental inventory (see Table 4-2 ). For

**Figure 4-3: Michigan Has an Abundance of Water Features**



Source: Michigan Geographic Data Library, Michigan Department of Technology, Management & Budget.

a more detailed step-by-step guide, download the [West Michigan Tool Kit for Local Green Initiatives](http://www.gvmc.org/naturalresources/documents/WMI_ToolKit_LGI.pdf), at: [http://www.gvmc.org/naturalresources/documents/WMI\\_ToolKit\\_LGI.pdf](http://www.gvmc.org/naturalresources/documents/WMI_ToolKit_LGI.pdf).

For recommended plan language regarding this topic, refer to Appendix A, on page A-2.

#### **Master Plan**

Include appropriate maps and text that identify natural and environmental resources in the community, giving precise locations and objective descriptions of each. Observations on the impact of development patterns on these resources are encouraged and should be placed in this section; however, goals and objectives for protecting these resources should be included in the designated Goals and Objectives section, which may precede or follow this section.

#### **Zoning Ordinance**

No changes are required for the Zoning Ordinance in regard to this topic. However, this is where floodplain maps and wetland maps would be gathered for use in future Zoning Ordinance regulations.

#### **Water Quality**

##### **What is the Purpose of Addressing Water Quality in the Master Plan?**

A Master Plan is a guiding document for public infrastructure, land use, and private development investment in the community. It is the basis for regulations that are included in the Zoning Ordinance, and it expresses the



Table 4-2: Essential Elements in Master Plan and Zoning Ordinance – Environmental Inventory

Essential Elements in Master Plan and Zoning Ordinance			
	GOOD	BETTER	BEST
<b>Environmental Inventory</b>	The Master Plan's environmental inventory should, at a minimum, identify existing conditions and issues for major water courses, minor and major drains, hydrologic soils, and other significant natural features.	All the elements of the "Good" category, plus the plan has a goal to consider natural features maps and maps of existing natural resources when planning areas for future land uses or public infrastructure, when considering proposed amendments to the Master Plan or Zoning Ordinance, and when considering any new public or private uses of land or public buildings.	All the elements of the "Better" category, plus the plan has objectives for how to accomplish the goal.

values of the community through a well-defined goal and objectives. Since clean water is one of the building blocks of life and civilization, and is repeatedly identified by citizens as the most important natural resource to protect, it is essential that communities protect their water resources from contamination. The first step to protecting a community's water resources is to develop a plan of action; planning how to safeguard against potential contamination. The Master Plan is the standard tool that allows the community to set goals and objectives for land use that, if implemented, will protect water quality into the future by reducing negative impacts from development.

The development of goals and objectives in a Master Plan creates the basis for future

changes in the Zoning Ordinance and in other regulatory ordinances.

#### Updating Your Community's Documents to Include Water Quality

Following is a set of guidelines for updating your community's Master Plan to include a goal and objectives for water quality and Zoning Ordinance language (see Table 4-3). For recommended language regarding this topic, refer to Appendix A, on page A-2.

#### **Master Plan**

Including a goal and objectives in the Master Plan is an important step that sets the stage for other elements, practices, and techniques to protect water quality in a the community.

#### **Zoning Ordinance**

Commonly, within the first Article of a Zoning Ordinance there is a section titled "Purpose." This section is designed to explain the rationale for regulation; therefore, it is useful in educating readers and courts about the intent of the community as expressed by the governing body when it adopts the Zoning Ordinance, or amendments to it. The purposes have to be legitimate public health, safety, and general welfare reasons. So, it is appropriate to place a sentence in the Purpose section that shows the ordinance purpose regarding protection of water quality. It can be very simple. See Appendix A, on page A-3, for example language.

#### **Coordinated Permitting**

##### What is Coordinated Permitting?

Coordinated permitting is an administrative process through which all relevant agencies (federal, state, county, and municipal) involved in the development permitting process stage their approvals in a way that ensures due diligence among all parties involved AND a timely response to an applicant. Without a coordinated process, applicants must seek and obtain permits separately and sequentially from all permitting agencies, ensuring the maximum possible time for review and approval. Coordinated permits result in a much shorter review and approval period without any loss of public interests. The final checkpoint on permitting before building permits are considered should be the Zoning Administrator before a zoning permit (sometimes called a land



Table 4-3: Essential Elements in Master Plan and Zoning Ordinance –Water Quality

Essential Elements in Master Plan and Zoning Ordinance			
	GOOD	BETTER	BEST
<b>Water Quality (Master Plan)</b>	The local community has a goal to preserve and enhance its natural and environmental resources, including surface and ground water.	All the elements of the “Good” category, plus the Master Plan explains specific dangers to the community’s waterways and gives possible solutions.	All of the measures of the “Better” approach, plus the plan indicates what measures should be taken.
<b>Water Quality (Zoning Ordinance)</b>	Insert a statement into the Purpose section of the Zoning Ordinance on protecting water quality.	The “Good” approach may be the highest needed for this statement.	The “Good” approach may be the highest needed for this statement.

use permit) is issued; this allows the issuer to withhold the requested permit until all other required permits are accounted for.

Typical parties involved:

- The Michigan Department of Transportation for access to a state highway.
- The Michigan Department of Environmental Quality for a wetland, floodplain, sand dunes, or environmental area.
- The U.S. Army Corps of Engineers for a coastal or connecting waters structure.
- The County Road Commission for access to a county road.
- The County Drain Commissioner for county drain impacts.

- The County Soil Erosion and Sedimentation Control (SESC) enforcing agent for SESC permits.
- The district or county Health Department for septic system permits.
- The county or local Building Department for building permits.
- The county or local Zoning Department for zoning permits.

**Why Utilize Coordinated Permitting?**

Without a system to coordinate permits among agencies, a situation will arise at some point where a developer receives a building or a zoning permit and proceeds with construction only to later find out that a required permit from another agency was not obtained. This can have extreme consequences, such as with developments in a floodplain, or if a builder installs a septic

system without a permit. Subsequently, if a house is flooded or a septic system fails, because it was improperly installed, then not only are those violations of public regulations for which penalties would be imposed, along with the health risks of contaminated water, private law suits would also probably result. This is completely preventable if the Zoning Administrator does not issue any zoning permit until evidence that all other required permits (except building permits) have been obtained. Then the Building Code Administrator can issue a building permit.

**Implementing Coordinated Permitting**

Following is a set of guidelines for updating your community’s Master Plan and Zoning Ordinance to include Coordinated Permitting (see Table 4-4).

**Master Plan**

Updating your community’s Master Plan to include a goal and objectives for the creation of a coordinated permit system for new land uses is the first step in initiating a coordinated permit system. See Appendix A, on page A-3, for sample goal and objectives language for insertion into the Master Plan on this topic.

**Zoning Ordinance**

The responsibility for coordinated permitting should be provided in the municipal Zoning Ordinance. Including a requirement in the General Provisions section or Zoning Administration section that specifies a zoning permit shall only be issued upon proof that all relevant permits from other agencies have first been obtained is

Table 4-4: Essential Elements in Master Plan and Zoning Ordinance – Coordinated Permitting and Coordinated Site Plan Review

Essential Elements in Master Plan and Zoning Ordinance			
	GOOD	BETTER	BEST
<b>Coordinated Permitting (Master Plan)</b>	The Zoning Administrator will not issue land use permits nor shall the Building Administrator issue building permits until evidence that other permits required from other agencies has been received.	All the elements of the “Good” category, plus the Master Plan includes a description of the MDEQ Environmental Permits checklist and explains how it is useful for applicants.	All the elements of the “Better” category, plus insert objectives as to how the Planning Commission will accomplish its goals regarding coordinated permitting.
<b>Coordinated Site Plan Review (Zoning Ordinance)</b>	<i>The ordinance requires that all land uses and construction activities shall conform with the provisions of this Ordinance and all applicable local, county, state, and federal regulations including, but not limited to those listed. Also, all required permits must be submitted before obtaining a local building/zoning permit.</i>	<i>All of elements in the “Good” category, plus the ordinance lists the specific required permits and where to obtain them.</i>	<i>All the elements of the “Better” category, plus specific actions that the Zoning Administrator must take before approving a zoning/land use permit.</i>

necessary. This type of provision is not difficult to enforce, nor does it place any additional burden upon the Zoning Administrator; the burden is on the applicant, where it should be. This approach provides guidance and predictability throughout the process by identifying the Zoning Administrator as the entity responsible for issuing zoning permits only when evidence is presented that all other required permits were obtained. See Appendix A, on page A-4, for sample Zoning Ordinance language.

### Environmental Permits Checklist

Creating, maintaining, and making available a checklist document for all typically required permits is an easy and efficient way to assist landowners, developers, and builders in determining which permits are necessary. The simple procedure of putting a stack of blank permit checklist forms in the municipal planning and zoning department’s lobby can effectively minimize time spent on answering simple questions about other agencies’ permits. An environmental permits checklist should ask questions about the nature of the activity

that the developer would be engaging in, and then provide resources for where more information can be found on the permit related to this activity. Upon completion of a checklist and then appropriate applications elsewhere, the developer will be able to provide proof of receipt of all required permits to the municipal zoning permitting authority and proceed with the process. The Planning & Zoning Center recommends looking at the environmental permits checklist, which can be found on the MDEQ website at:

[http://www.michigan.gov/deq/0,4561,7-135-3307\\_29692---,00.html](http://www.michigan.gov/deq/0,4561,7-135-3307_29692---,00.html).

### Earth Change Activity

#### What is Soil Erosion and Sedimentation Control?

The Michigan Soil Erosion and Sedimentation Control Act was adopted in an effort to limit the amount of sediment pollution entering the state’s waters by improper construction site management practices. Part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act, 1994 P.A. 451 specifies that a permit is required for any earth change activity that disturbs one (1) or more acres of land and all earth change activities within 500 feet of a water course. Exempted activities include plowing and tilling for crop production and some logging and mining activities.

The purpose of soil erosion and sedimentation control is to mitigate the unnatural loss

and deposition of sand, silt, dust, and other particulates into waterways. While the loss of sediment due to erosion threatens traditionally buildable landscapes, the accumulation of sediment has the potential to cause serious physical and biological impairments to lakes and streams that they flow into. Sediment loads have the potential to alter the hydrology of the water bodies that they are deposited in, and can hold onto harmful pollutants and nutrients, such as phosphorous, which accelerate the growth of unwanted aquatic plants. Remediation efforts to remove deposited sediments and their side-effects typically come at a much higher cost to taxpayers than what preventative measures would take to implement, so it is recommended that BMPs be implemented to mitigate these processes.

### Why Include Soil and Sedimentation Controls?

During construction, a significant amount of soil erosion may occur if proper steps are not taken to safeguard against it. Trees, vegetation, and topsoil are often removed in the early stages of construction, which exposes the soil to erosion.

Stormwater from impervious surfaces, if not trapped by vegetation or artificial filters, can carry the nutrients, pathogens, sediments, toxic contaminants, and debris to the nearest watercourse.

The SESC regulations do not include prevention of impacts on all sensitive aquatic resources, including wetlands. Also, the SESC regulations only affect those earth change activities outside

of the 500-foot buffer from water courses that are *larger* than one acre; therefore, those communities with the staff capacity may want to expand the SESC permitting process to address these shortcomings.

Counties have the primary responsibility for issuing SESC permits, although some local municipalities have taken on the responsibility within their jurisdiction. Local soil erosion and sedimentation control ordinances and programs must be approved by the MDEQ prior to implementation.

### Updating your Community's Documents to Include Soil Erosion and Sedimentation Control

Following is a set of guidelines for amending your community's Master Plan and Zoning Ordinance to include minimal guidelines for Soil Erosion and Sedimentation Control (see Table 4-5). For recommended plan and ordinance language regarding this topic, refer to Appendix A, on page A-6.

#### **Master Plan**

The Master Plan should include goals and objectives for controlling soil erosion and sedimentation during and after development of a site. The Master Plan should provide general educational information on the negative impacts of soil erosion and sedimentation and refer to sources for more comprehensive information on the subject, such as a local NRCS Office or the County Drain Commissioner's Office (or whatever office is responsible for SESC permitting).

#### **Zoning Ordinance**

The community's Zoning Ordinance should specifically reference Michigan's Natural Resources and Environmental Protection Act of 1994, Part 91 Soil Erosion and Sedimentation Control for specifics on when a soil erosion and sedimentation control permit is required. Provisions should also identify the appropriate authority that developers should contact if a SESC permit is needed.

#### **Accumulation and Disposal of Waste**

##### Why is Regulating the Accumulation and Disposal of Waste Important?

The accumulation of waste and junk is not only unsightly, it has the potential to negatively impact a community's water resources and subsequently, human health. When left exposed to the elements, waste can leach harmful substances that may eventually infiltrate into groundwater or contaminate nearby lakes and streams. For this reason, it is necessary for all communities to regulate the open air storage of waste and junk— usually by preventing/prohibiting it!

Common types of waste:

- Yard waste;
- Household trash;
- Inoperable automobiles and farm implements;



Table 4-5: Essential Elements in Master Plan and Zoning Ordinance – Earth Change Activity

Essential Elements in Master Plan and Zoning Ordinance			
	GOOD	BETTER	BEST
<b>Earth Change Activity as Regulated under Soil Erosion and Sedimentation Control Act (Master Plan)</b>	There is nothing to add, as long as the “Good” language for Coordinated Permitting has been added.	The Master Plan has a goal that ensures that the Zoning Ordinance will require a SESC Permit before approving any new development or redevelopment.	All the elements of the “Better” category, plus the plan ensures that the Zoning Ordinance should also take into consideration the topography and existing vegetation before approving a zoning/land use permit.
<b>Earth Change Activity as Regulated under Soil Erosion and Sedimentation Control Act (Zoning Ordinance)</b>	<i>The ordinance requires a SESC Permit to be obtained for all developments within 500 feet of an inland lake or stream.</i>	<i>All the elements of the “Good” category, plus the ordinance requires that existing vegetation and topography must be respected.</i>	<i>All of the “Better” approach, plus cross-reference the section with regulation on setbacks from sensitive natural features.</i>

- Chemicals (paints, solvents, cleaners, etc.); and
- Batteries and electronics.

#### Where to Include Provisions for the Accumulation of Waste and Junk?

The accumulation of waste and junk may be dealt with in two different sections of the local code of ordinances: 1) for communities looking for the most stringent and comprehensive level of regulation in regard to the proliferation of waste, a stand-alone nuisance ordinance may be the best option; 2) for communities that seek to regulate waste by land use or district, an

additional section in the General Regulations chapter of the Zoning Ordinance is typically used. It is also possible for a community to adopt a separate nuisance ordinance that establishes a base level of regulation in addition to specific provisions in the Zoning Ordinance, so long as these provisions do not conflict.

In addition, P.A. 316 of 2003 allows for the creation of an administrative hearings bureau that has the power to impose sanctions for violators of the local Zoning Ordinance or other city charters related to blight. This Michigan Public Act pertains to cities with a

population of 7,500 or more that is located in any county, or a city that has a population of 3,300 or more and is located in a county that has a population of 2,000,000 or more. For more information regarding the establishment of an administrative hearings bureau, please visit the Michigan State University Extension’s website: <http://lu.msue.msu.edu/2004LUlegis.htm>. See Table 4-6, and Appendix A, on page A-7.

#### **B. Best Management Practices for Protecting Water Quality**

The following set of best management practices goes a step beyond the basic “Essential Elements” of water quality protection. If implemented, these regulations will have a direct positive impact on a community’s ability to protect their water resources through prevention of future contamination. The best practices listed below target some of the most common problems that are associated with new development on water quality and attempts to correct them through improved planning and zoning techniques.

#### **Parcel Splits for Buildable Area**

##### What is a Parcel Split or Land Division?

A parcel split occurs when one lot is permitted to be split from a parent parcel. A land division is a split that results in one or more (but not more than a certain number of) parcels smaller than 40 acres. A land division ordinance may be adopted by a local unit

Table 4-6: Essential Elements in Master Plan and Zoning Ordinance – Accumulation and Disposal of Waste

Essential Elements in Master Plan and Zoning Ordinance			
	GOOD	BETTER	BEST
<b>Accumulation &amp; Disposal of Waste (Master Plan)</b>	The Master Plan prevents the accumulation of junk or other waste materials in any way that could present a hazard to ground or surface water.	All the elements of the “Good” category, plus the plan has objectives for how to accomplish the goal.	The “Better” approach may be the highest needed for this element.
<b>Accumulation &amp; Disposal of Waste (Zoning Ordinance)</b>	<i>The ordinance does not allow for accumulation of junk or other waste.</i>	<i>Same as the “Good” approach, but specifically cross-reference other ordinances and regulatory agencies. Add language to the Site Plan Review section of the Zoning Ordinance per the Groundwater Protection – Zoning Ordinance in Appendix A.</i>	<i>The “Better” approach may be the highest needed for this element.</i>

of government to regulate parcel splits and land divisions as long it is in accordance with Section 109 of the Land Division Act, Public Act 288 of 167, as amended (MCL 560.109). In addition to standards for lot size, width-to-depth ratio and relationship to access are also provided by the statute. There are exceptions, as bonus lots are permitted for shared access and open space preservation. An existing lot in a subdivision cannot be further divided or split, unless there is a local ordinance adopted that provides for a review and process to approve the lot splitting.

The Land Division Act also contains requirements for platting (more lots than allowed under Section 109).

**Why Parcel Splits for Buildable Area?**

Environmentally speaking, the primary issues related to parcel splits are associated with lot width, depth, area, access, and “buildability” of the parcel. For example, deep, narrow frontage lots along shorelines will often result in long driveways and structures close to the water. Commonly, this translates into substantial impervious surface, which will help carry pollutants, nutrients, and warm water into the

water courses (see the section on Impervious Surfaces for more information).

Proper review and approval of parcel splits can reduce future problems associated with the use of lots. The process is similar to a Site Plan Review, except that in a parcel split there are many other statutorily required reviews by different entities. For example, the local government, the County Road Commission, the Drain Commissioner, the MDOT, and the MDEQ, may all have different requirements, depending on the location and proposed lot characteristics.

**Amendments for Better Parcel Splits**

Following is a set of guidelines for amending your community’s Master Plan and Zoning Ordinance to include guidelines for parcel splits (see Table 4-7). For recommended plan and ordinance language regarding this topic, refer to Appendix A, on page A-8.

**Master Plan**

Goals within a Master Plan should at the very least state that unbuildable land divisions should be prevented. In addition, the goal may call for the review of proposed lot splits to meet minimum standards.

**Zoning Ordinance**

The Land Division Act requires an applicant to submit the proposed split or plat to the community for administrative review. Therefore, a local ordinance should identify the steps necessary to get a parcel split approved.

Table 4-7: Best Management Practices – Parcel Splits for Buildable Area

Best Management Practices			
	GOOD	BETTER	BEST
<b>Parcel Splits for Buildable Area (Master Plan)</b>	The Master Plan has a goal to not create any unbuildable lots.	All the elements of the “Good” category, plus an objective for the Zoning Ordinance to require a review of all proposed lot splits for buildability.	The “Better” approach may be the highest needed for this practice.
<b>Parcel Splits for Buildable Area (Zoning Ordinance)</b>	<i>The Zoning Ordinance requires that all divisions/splits comply with the Land Division Act.</i>	<i>All the elements of the “Good” category, plus a requirement that there is enough buildable area when also including significant natural features areas.</i>	<i>All the elements of the “Better” category, plus a provision in the Site Plan Review that requires that the natural features and character of a land are preserved wherever possible.</i>

This is often a separate ordinance. It should be referenced in the Zoning Ordinance. A community would also benefit from stating that a parcel of land shall not be split in a way such that an “unbuildable” parcel is created; taking into account floodplains, wetlands, and other features that may create serious difficulties.

### Land Division Alternatives

#### What are Land Division Alternatives?

Planned unit developments (PUDs) and site condominiums are the two most common alternatives to land division in Michigan. These techniques are typically utilized by developers of multi-family housing, mixed-use developments, and other large-scale developments with a range of lessees.

#### Why Use Land Division Alternatives?

Land division alternatives allow the municipality and the developer an opportunity to work with natural characteristics of a site, while maximizing open space and preserving sensitive natural features. Preserving the natural landscape of the overall site typically yields a higher potential for control of runoff than if the site has been stripped of vegetation, graded, and developed parcel-by-parcel. Excessive divisions of land can result in an increased negative impact on water quality due to increased impervious coverage, compacted soils, and the total area consumed by buildings.

### Amendments to Encourage Land Division Alternatives

Following are guidelines for amending your community’s Master Plan and Zoning Ordinance to include guidelines for PUDs and site condominiums (see Table 4-8). For recommended plan and ordinance language regarding this topic, refer to Appendix A, on page A-9.

#### Master Plan

The Master Plan should have a goal and objective to guide municipal planning and zoning officials to encourage developers to utilize site condominium development and PUDs when feasible. These officials should conduct a Site Plan Review in these cases to identify and preserve natural features while avoiding negative impacts on the land.

#### Zoning Ordinance

A fairly standard provision for these types of developments is to require the identification of watercourses or other natural features to be identified. This may allow the developer to count features, such as wetlands and woodlots, as part of an open space requirement. The Zoning Ordinance should also specify in the cases of PUD and site condominium developments, that natural features and natural flow pathways for stormwater be preserved and that adequate protections be made for these features where appropriate.



Table 4-8: Best Management Practices – Land Division Alternatives

Best Management Practices			
	GOOD	BETTER	BEST
<b>Land Division Alternatives (Master Plan)</b>	The Master Plan includes a goal to encourage landowners with significant natural features to utilize land division alternatives to minimize negative impacts on identified natural features.	All the elements of the “Good” category, plus an objective on how to accomplish the goal.	The “Better” approach may be the highest needed for this practice.
<b>Land Division Alternatives (Zoning Ordinance)</b>	<i>The ordinance requires that all existing watercourses are identified during the Site Plan Review process.</i>	<i>All of the elements in the “Good” category, plus the natural features and character are preserved wherever possible.</i>	<i>All the elements in the “Better” category, plus language that encourages the preservation of natural features within PUDs and condominium subdivisions.</i>

## Stormwater Management

### What is Stormwater Management?

In low impact development, the goals of stormwater management are to detain, slow, or generally reduce the amount of runoff from a site. The implementation practices used as part of a stormwater management strategy typically consist of site design elements, such as retention basins, swales, and the use of baffles or vegetation in flow pathways.

### Why Is Stormwater Management Important?

Since the rise of traditional “curb and gutter” stormwater infrastructure, our culture has typically looked at stormwater runoff as more of a nuisance than a resource and as a result, we have operated in an “out-of-sight, out-of-

mind” attitude towards dealing with it. What many do not realize is that by collecting and moving stormwater away in pipes we are creating even greater problems for ourselves, such as burdensome maintenance expenses and contaminated stormwater, by taking this approach, rather than allowing water to take its natural course.

When stormwater runs off of an impervious surface, such as roads and parking lots, it carries with it any pollution that was on the surface. Dust from brake pads, oil, salt, bacteria, and general litter among other things are carried away, untreated, through traditional curb, gutter, and underground pipe systems and eventually end out in our rivers, streams, and

lakes. These harmful pollutants can adversely affect these ecosystems, as well as public health of those that come in contact with the water.

Managing stormwater to mitigate the amount and quality of runoff is a responsible approach that all developers should be encouraged to do; responsible management means cleaner waters, healthier communities, and less money spent on remediation in the future.

### Amendments to Promote and Enforce Stormwater Management

Following are a set of guidelines for amending your community’s Master Plan and Zoning Ordinance to include elements that encourage stormwater management (see Table 4-9). For recommended plan and ordinance language regarding this topic, refer to Appendix A, on page A-9.

#### Master Plan

The Master Plan should include a goal and objectives for the control of stormwater and acknowledge the extent to which developers of sites should attempt to manage runoff (for example, designing to accommodate: 10-, 50-, or 100-year storms). References should be provided for educational resources, such as those referenced in the LID chapter; information on any relevant local initiatives surrounding stormwater management; as well as contact information for your community’s County Drain Commissioner, the NRCS districts, and the MDEQ.

Table 4-9: Best Management Practices – Stormwater Management

Best Management Practices			
	GOOD	BETTER	BEST
<b>Stormwater Management (Master Plan)</b>	The Master Plan has a goal to establish minimum stormwater management standards and incorporate LID standards in the Zoning Ordinance.	All of the elements of the “Good” category, plus objectives on how to reach the goal.	All of the elements of the “Better” category, plus an objective to Initiate efforts in cooperation with the Drain Commissioner and conservation organizations to educate landowners and stakeholders about the potential benefits of various LID techniques and other stormwater BMPs.
<b>Stormwater Management (Zoning Ordinance)</b>	<i>The ordinance includes Site Plan Review language that requires attention be paid to surface drainage.</i>	<i>All the elements of the “Good” category, plus the ordinance does not allow for an approved permit if stormwater runoff creates a negative impact on adjacent lands, watercourses, or water bodies above the run-off impact when the application was made.</i>	<i>The “Better” approach may be the highest needed for this practice.</i>

### Zoning Ordinance

The most fundamental ordinance provision for stormwater is one that requires all new development to manage its runoff on-site without directly contributing additional runoff to adjacent properties and municipal sewers. At the “Better” and “Best” levels, these regulations can be adapted to address increased severity of storm events; from 10-, to 50- and 100-year storms.

### Impervious Surface Reduction

#### What is Impervious Surface Reduction?

Impervious surface reduction involves decreasing the amount of land cover that prevents water from being infiltrated into the ground before it reaches streams or lakes.

In less developed areas, precipitation will infiltrate the ground and eventually make it to bodies of water through groundwater seeps or springs. The water that is soaked up by vegetation will cycle through the atmosphere

through evaporation. However, if the land is covered with an impervious surface the water will run off of the surface directly into a stream or lake, likely through some type of stormwater conveyance. This process can increase the velocity of streams to highly erosive levels after large snowmelts or rain showers and slow streams to nearly dry during dry times.

Stream degradation has been observed at impervious levels as low as 10–20 percent watershed wide. However, there are many tools that can be utilized to reduce the amount of impervious land cover. For example, decrease the width of driveways, require parking lot landscaping, include open space provisions, and mandate that more pervious materials be used for new pavement, are all ways to reduce imperviousness through local ordinances.

#### Why should your Community Use This Best Management Practice?

Both the high flows and the low flows caused by large amounts of impervious surface in watersheds damage streams. The high flows have been shown to degrade water quality by increasing pollutants, such as fertilizer, sediment, and pesticides. Table 4-10 shows common pollutants borne from runoff and their major sources. Runoff from impervious surfaces also increases the temperature of the stream, which will decrease the amount of dissolved oxygen, harming aquatic wildlife. The heavy rains that cause high flows also collect debris on the way to rivers and streams.