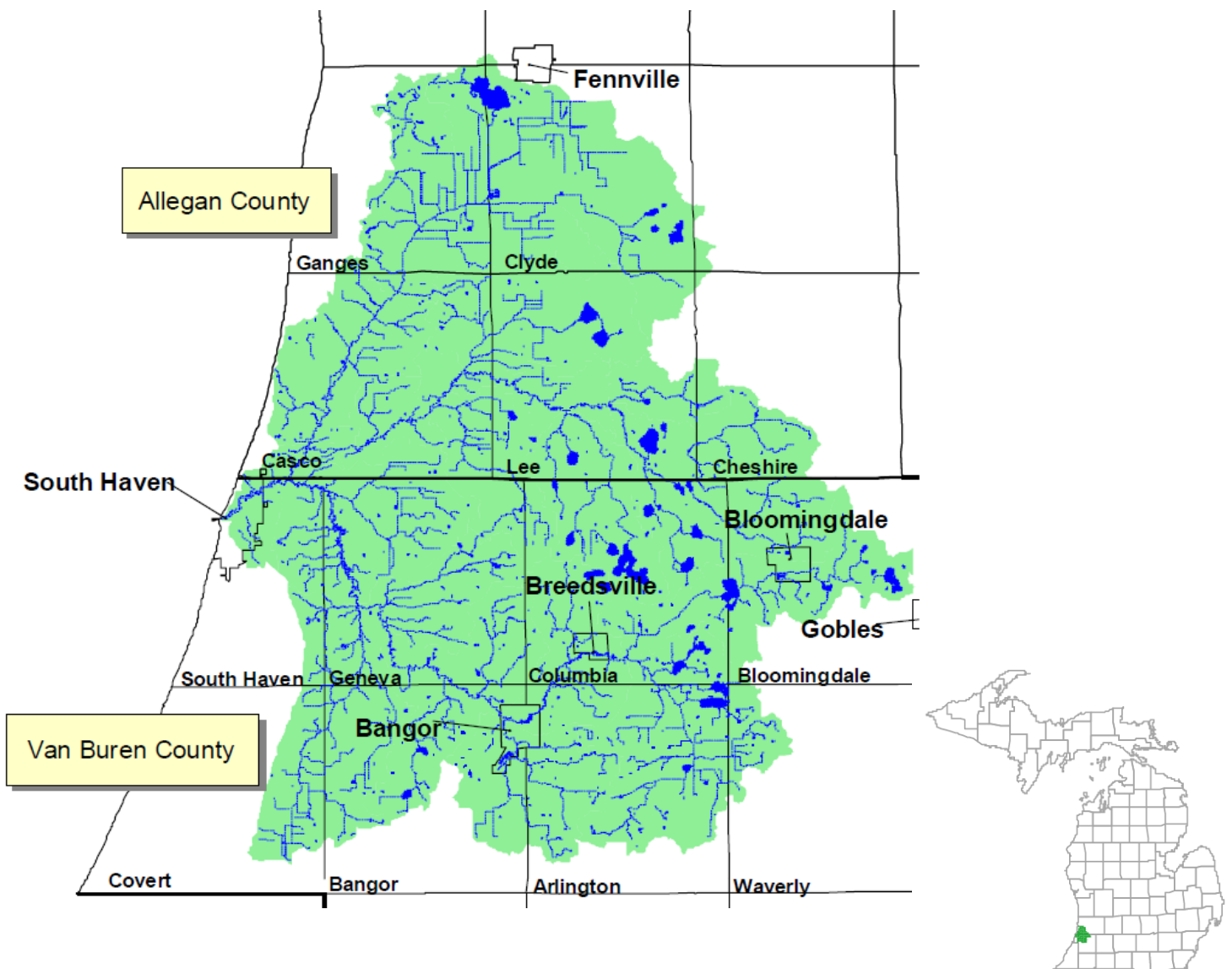


Planning and Zoning for Water Quality Protection in the Black River Watershed



Southwest Michigan Planning Commission

September 2009

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Black River Watershed Overview

The Black River Watershed encompasses approximately 287 square miles in Allegan and Van Buren Counties. The three main branches of the Black River join just east of South Haven and then flow into Lake Michigan at South Haven. Townships within the Allegan County portion of the watershed include Ganges, Clyde, Casco, Lee and Cheshire. In Van Buren County, townships include South Haven, Geneva, Columbia, Bloomingdale, Covert, Bangor, Arlington and Waverly. Cities and villages within the watershed include Bangor, Bloomingdale, Breedsville and South Haven.

What is A Watershed?

A watershed is the area of land that catches rain and snow and drains or seeps into a marsh, stream, river, lake or groundwater. **You are sitting in a watershed now.** Homes, farms, forests, small towns make up watersheds. Just as creeks drain into rivers, watersheds are nearly always part of a larger watershed or basin. For example the Black River Watershed is part of the Lake Michigan Watershed which is part of the Great Lakes Basin.

The land use in the Black River Watershed is dominated by agriculture at 57%. With growth and development, the amount of developed land will increase in the watershed. Land use decisions are having a significant impact on water and natural resources. The townships, cities and villages through their master plans and zoning ordinances will determine where and how land use changes will occur. If local government officials consider watershed protection measures in their plans and ordinances, the negative impacts of land use change on water resources can be minimized.

Land use within the Black River Watershed, 1992

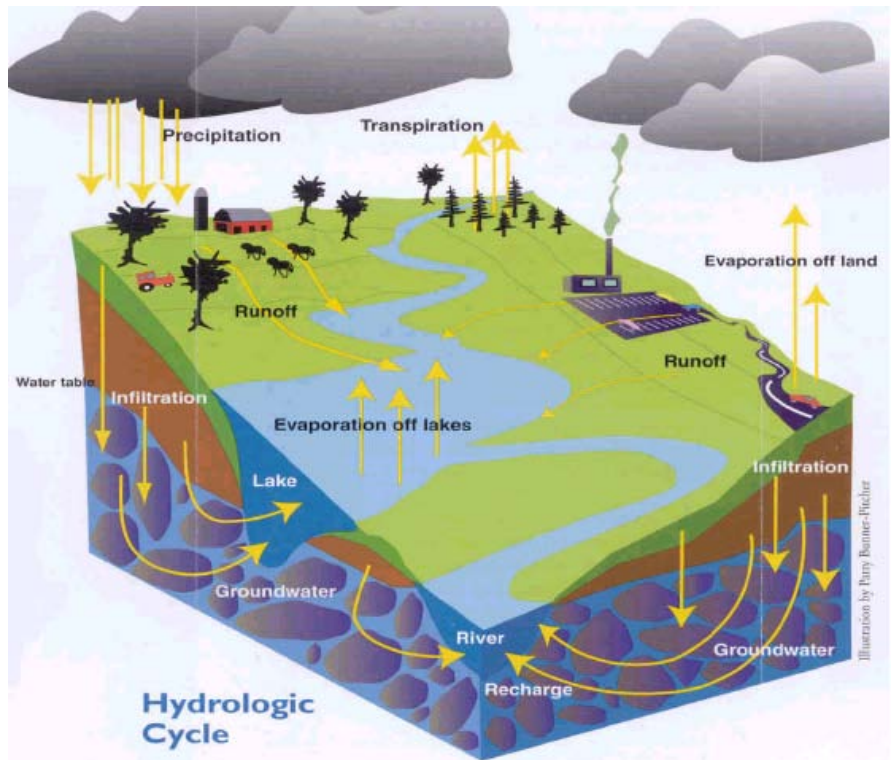
Land Use	Percentage
Agriculture	57.38%
Forest	32.94%
Developed	1.17%
Wetlands	6.72%
Water	1.51
Other	0.28%
<i>TOTAL</i>	<i>100%</i>

For more information on the Black River Watershed and other efforts to improve water quality in the watershed, visit http://vbco.org/blackriver_2.asp.

Land Use and Water Quality

Land use and water resources are undeniably linked. The type of land use and the intensity of use will have a strong influence on water resources. Whether the source is natural or comes from a human activity, the impact of any land use practice on either the quantity or quality of water can be substantial.

Intensity of land use can be categorized as low intensity (open space including farmland, natural areas and managed green spaces) or high intensity (industrial, commercial, urban centers). Open spaces or low intensity areas not only collect and filter water, but they also perform other vital and important functions such as filtering air, providing habitat for wildlife, providing areas for recreational opportunities and providing food and fiber. Land use decisions often result in the reduction and fragmentation of open space.

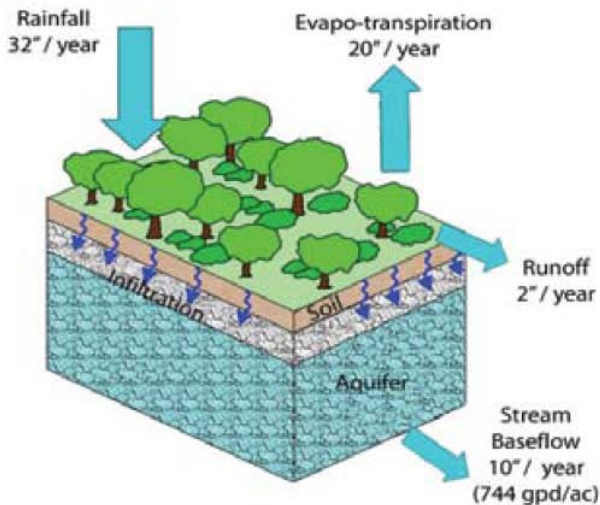


Polluted runoff is the #1 water quality problem in the United States.

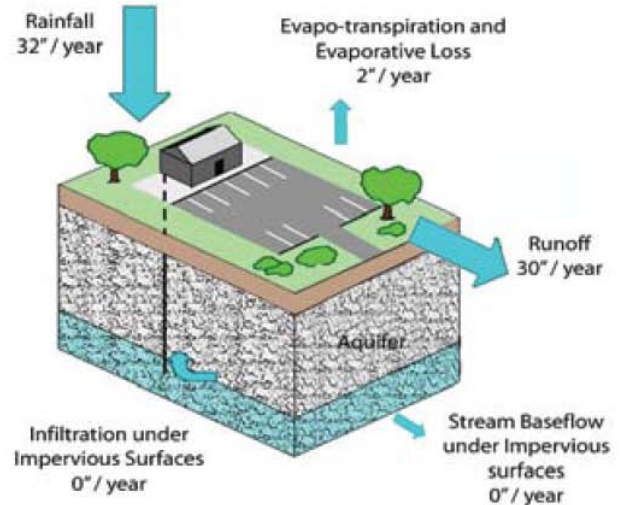
More intensely developed areas have more impervious surfaces (roads, rooftops, etc) than low intensity areas. Impervious surfaces prevent natural infiltration of water and increase stormwater runoff. As the intensity of land use increases, infiltration and the ability to recharge groundwater decreases. The increased runoff that results leads to increased water pollution and physical damage to aquatic systems.

Scientific studies show a corresponding increase in the amount of impervious surfaces as the intensity of land use increases. An increase in impervious surfaces causes the volume and velocity of stormwater runoff to increase significantly. The results can be increased flooding, severe erosion and physical degradation of stream and river habitats that adversely impact the watershed and water supply.

Approximate annual water cycle for an undeveloped acre in Michigan

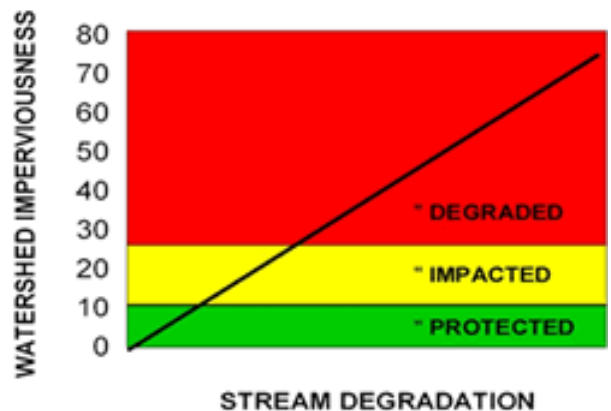


Representative altered water cycle under the impervious parking lot



Source: [A Design Guide for Implementers and Reviewers: Low Impact Development Manual for Michigan](#), SWMCOG, 2008

Studies have shown that streams in watersheds with greater than 10 percent of their land area in impervious cover begin to show signs of water quality impairment. As impervious cover approaches 25 percent, streams become degraded with great reductions in water quality, habitat quality and biological diversity. As stormwater runoff increases in volume and velocity, the types and amounts of pollutants increase. Very little infiltration of stormwater occurs eliminating the soils' ability to filter water as part of the natural water cycle. Pollutants such as sediment, nutrients, pathogens and toxic contaminants, pose a threat to our drinking water supply and can reduce or destroy fish populations and aquatic life. Pollutants may also render water resources unfit for recreational uses such as swimming and fishing.



Stylized relationship between imperviousness and receiving stream impact (adapted from Schueler, 1992).

There are a number of options that can be employed to reduce the impacts of development on water quantity and quality. Preventing such impacts in the first place is the most effective (and cost effective) approach and should always be emphasized. To this end, local officials should consider a three-tiered strategy of 1) natural resource-based planning, 2) appropriate site design and use of low impact development techniques, and 3) remediation and maintenance of existing structures.

1. Natural resource-base planning can be used to minimize runoff, pollutants, and impacts on natural resources by locating development in non-sensitive areas and by providing protection for critical natural resources.
2. Improved site design and use of low impact development can reduce the amount of runoff and pollutants resulting from development. Reducing the amount of impervious pavement in new developments and routing water to natural areas and filter strips where water can slowly percolate into the soil are examples of effective ways to reduce the impact of new development. Technological advances are continually being developed that can be used by communities to protect their natural resources while accommodating growth.
3. Remediation measures can be employed to mitigate the impact of development when proper siting and design of development are not sufficient to control runoff and pollutants resulting from development. Practices such as constructed wetlands and retention basins are examples of practices that can mitigate the impacts of development on water resources in your community. Maintenance activities can include street and parking lot sweeping.

Planning and Zoning for Water Quality Protection

Communities throughout Michigan are growing and changing. The changes that growth brings can have both positive and negative impacts. A community's water and natural resources are assets that can be negatively impacted by growth if careful planning and proactive steps are not taken. With a commitment to protect streams, rivers, lakes and groundwater, local governments can lessen the negative impacts of development on water quality through planning and zoning. Land use practices can be implemented that balance the need for jobs and economic development with the protection of water quality and natural resources.

Development that takes place without such considerations can lead to significant degradation

of streams and ground water and loss of aquatic life. Water quality degradation often results in decreased property values and can also have negative impacts on the health and welfare of residents.

Most land use decisions are made at the local level (townships, cities, villages and counties) and local government officials have the responsibility through planning and zoning to protect public health and welfare. The general public has continuously expressed concern for water quality and natural resources in community surveys conducted in southwest Michigan. For example, a survey conducted by the Southwest Michigan Planning Commission and Michigan State University in 2008 indicate over 80% of homeowners in Van Buren County support conservation efforts that will protect lakes and rivers. Over 60% feel that local government should be primarily be involved in conservation efforts. Further, over 86% feel that planning should have either happened this year, should happen next year or should have already taken place years ago. (Growing Greener in Southwest Michigan: Community Needs Analysis Mail Survey; www.swmpc.org/growgreen.asp)

Since local governments have jurisdiction over most land use decisions, master plans and zoning ordinances are essential tools to protect water quality and natural resources. Local governments have the ability to adopt plans, remove barriers, create incentives and enact regulations to protect water quality. Master plans layout the vision of the municipality and how to achieve that vision. The master plan should identify water and natural resources and state their value to the community. The implementation section of the master plan can then layout specific actions or policies the local government can take or enact to protect the water and natural resources.

Master plans should:

- Identify water and natural resources in the municipality
- State the value of the water and natural resources to the community
- Target development to the most appropriate areas
- List specific actions or policies to protect water quality and natural resources

The zoning ordinance contains the regulations to achieve the community's vision in the master plan. However, zoning ordinances often contain regulations that can be detrimental to water quality and natural resources. These regulations often increase the amount of impervious surfaces in a watershed which leads to increased runoff and water pollution. These regulations often deal with parking and road standards such as minimum parking space requirements and restrictions on the type of surfaces allowed for parking lots and roads. Since parking lot design provides an easy and great opportunity for water quality protection, the Appendix contains suggested design standards for parking areas.

Natural resources such as wetlands, floodplains, recharge zones, riparian areas, open space, and native habitats should be identified, preserved and restored as valued assets for flood protection, water quality improvement, groundwater recharge, habitat and overall long-term water resource sustainability.

Other problem regulations often require that stormwater be piped and carried off the property to nearest ditch or stream, not allowing for infiltration and recharging of groundwater supplies. Zoning ordinances can require the use of Low Impact Development techniques to meet water and natural resource protection goals. The Appendix contains information on Low Impact Development and more can be found at www.swmpc.org/lid.asp.

Lastly, the land directly adjacent to streams, rivers, lakes and wetlands (riparian area) is where stormwater runoff can be infiltrated or filtered before it reaches the waterbody. If development is setback from these waterbodies and a native vegetative strip is left intact, water quality will be protected. This riparian area can be thought of as a right-of-way for the waterbody, which not only helps to protect water quality, but also protects adjacent property from flooding and erosion. For more on riparian areas see the appendix.

Basic planning and zoning approaches that will help to protect water quality include:

- preserving open spaces by encouraging compact development in areas with existing infrastructure
- enacting water quality protection setbacks from surface waterbodies (rivers, streams, lakes, wetlands)
- reducing impervious surfaces (parking lots, driveways, roads, lot setbacks, lot coverage)

- requiring low impact development techniques to be utilized to reduce runoff and slow water down, spread it out and soak it in as much as possible
- ensuring the site plan review process requires the identification of natural features on site plans and having review standards which require their protection
- clustering development to reduce impervious surfaces and protect open spaces and environmentally sensitive areas
- requiring the use of native plants species to increase infiltration of stormwater
- limiting growth in areas where soils are not suitable for septic systems

Planning and Zoning Assistance in the Black River Watershed

The Van Buren Conservation District (VBCD) and the Southwest Michigan Planning Commission (SWMPC) with grant funds from the Michigan Department of Environmental Quality provided planning and zoning assistance to several municipalities in the watershed. The purpose of the assistance was to empower local officials to incorporate watershed protection measures into plans and policies. Further, the language developed during this project is provided as a model for other municipalities in the watershed. Recommended master plan and zoning ordinance language can be found in the appendix and at www.swmpc.org/ordinances.asp.

The Van Buren Conservation District solicited proposals from municipalities within the Black River Watershed for planning and zoning assistance. The Black River Watershed Project Steering Committee ranked the proposals and awarded assistance to four communities (Arlington Township, Bangor City, Clyde Township and Columbia Township). The selection was based on amount of land in the watershed, the amount of land in a priority area, and the community's commitment to protecting water quality and natural resources. Each of the four communities signed a partnership agreement with the Van Buren Conservation District (see Appendix).

Process for Improving Master Plan and Zoning Documents in the Black River Watershed:

- Review master plan and zoning ordinance
- Meet with planning commission to identify issues of concern
- Develop priority list of issues
- Develop master plan language
- Adopt master plan language
- Develop zoning ordinance language
- Have language reviewed by municipal lawyer
- Adopt zoning ordinance language

The assistance provided included a review of the master plan and zoning ordinance. A document review tool was developed by SWMPC to evaluate master plan and zoning ordinances. The tool can be found in the appendix and can be utilized by other municipalities to review their master plans and zoning ordinances. The review was followed by meetings with the planning commission to identify issues of concern for the municipality. From the meetings, SWMPC developed a list of priority issues for the planning commission to consider addressing. Then SWMPC met with the planning commission to develop master plan and/or zoning ordinance language to address priority issues.

In addition to the four selected municipalities, several other municipalities in the watershed received assistance in various ways. Waverly Township received assistance through the Paw Paw River Watershed Project. South Haven City asked SWMPC for assistance in developing parking requirements which would allow pervious pavement. Bloomingdale Township and Bloomingdale Village were updating their Recreation Plan and incorporated water quality language. South Haven Township was updating their master plan and zoning ordinance and incorporated many water quality issues and concerns. Lastly, Van Buren County is currently working with the SWMPC to develop their first recreation plan. This plan will highlight watersheds, water quality issues and green infrastructure.

<p>The following municipalities in the Black River Watershed received planning and zoning assistance from the Southwest Michigan Planning Commission:</p> <ul style="list-style-type: none">Arlington TownshipBangor CityBloomingdale TownshipBloomingdale VillageClyde TownshipColumbia TownshipSouth Haven TownshipSouth Haven CityWaverly TownshipVan Buren County
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SWMPC developed recommended master plan language for Arlington, Clyde and Columbia Townships. The City of Bangor does not have a master plan, so no language was provided for the City. The following table summarizes the issues and topics that language was developed by municipality. The full master plan text for each municipality can be found in the Appendix. Clyde Township's master plan already contained much of the language addressing water quality, watersheds and natural resources. Overall, the municipalities were very supportive of adding language addressing water quality and natural resources to their master plans.

Master Plan Language Recommendations by Municipality

Issue	Arlington Township	Clyde Township	Columbia Township
Watersheds	X		X
Black River Watershed Plan	X		X
Lakes	X	X	X
Streams	X		X
Riparian Buffers	X	X	X
Wetlands	X		X
Floodplains	X		X
Stormwater Management – Low Impact Development	X	X	X
Impervious Surfaces	X	X	X
Native Vegetation	X	X	X
Woodlands	X		X
Wildlife Habitat	X		X
Wildlife Corridors	X		X
Agricultural Lands	X		X
Green Infrastructure	X	X	X
Erosion and Sediment Control	X		
Land Protection and Management	X		
Invasive Species		X	

SWMPC developed zoning ordinance language recommendations for Bangor City, Clyde Township and Columbia Township (see appendix). Language was not developed for Arlington Township, because they were focusing on the master plan development and were not ready to address the zoning ordinance. Overall the municipalities were willing to implement changes to the zoning ordinance to better protect water quality. However, the municipalities were not willing to require low impact development. They were only willing to put language in that encourages its use. This is a first step, but it is also unfortunate because it is known that conventional development will degrade water quality.

Low Impact Development – saves money and our water!

If conventional development continues, the costs to clean our water supplies, implement after the fact solutions to deal with flooding and retrofit areas to lessen the impact on water resources will be substantial in the future.

In southwest Michigan, there is an opportunity to require Low Impact Development and not see the degradation of water resources that has been experienced in other areas of the state and country. Using low impact development techniques is a solution which allows development and helps keep our water clean and healthy. Low impact development is the most sensible approach when one considers the

benefit of clean water coupled with the fact that often low impact developments can be less costly to the developer than conventional development. If conventional development continues, the costs to clean our water supplies, implement after the fact solutions to deal with flooding and retrofit areas to lessen the impact on water resources will be substantial in the future. For more on low impact development, see the appendix or visit www.swpmc.org/lid.asp.

Zoning Ordinance Language Recommended by Municipality

Zoning Ordinance Language	Bangor City	Clyde Township	Columbia Township
Require building setbacks from water bodies (streams, rivers, lakes, wetlands) with a native vegetative buffer	X	X	X
Improve parking standards to reduce impervious surfaces (shared parking, parking space size, minimum parking requirements)	X	X	X
Require open space in Planned Unit Developments	X		
Improve site plan review (identification of natural features and review standards for protection)	X	X	X
Encourage low impact development techniques to reduce runoff and slow water down, spread it out and soak it in as much as possible.	X	X	
Encourage use of native species in landscaping	X	X	X
Improve private road standards to reduce impervious surfaces			X
Require a buffer between agriculture and residential uses to protect agricultural landowners		X	

Priorities by Municipality

After completing the document review for each municipality, a list of priority recommendations were developed and shared with the planning commissions. The full document reviews for each municipality can be found at www.swmpc.org/brw_reviews.asp. The following is a list of priorities developed for each municipality.

Arlington Township Priorities Master Plan

Watershed Issues

- identify watershed in community(Black River Watershed)

Stream Corridors

- Discuss importance of riparian buffers, stream bank erosion protection, provide food and habitat for wildlife, tree canopy to shade streams
- Discuss protection of stream corridors is important in promoting health safety of residents (flood control, water quality, corridor preservation)

Wetland Protection

- discuss protection of wetland within an ecosystem context
- add Wetland map

Flood Control

- floodplain protection as important for health, safety and welfare of residents, etc. (coordination of efforts to protect floodplain with adjoining communities in watershed)

Stormwater Management

- preservation of natural features as parkland to help alleviate stormwater runoff
- list stormwater management as important goal
- discuss quality and quantity of stormwater as important management policies
- relate stormwater management to protection of health, safety and welfare of community residents
- add goal that encourage use of BMP to minimize, collect, and treat stormwater
- discuss the preservation of natural features to preserve infiltration of stormwater

Impervious Surface Reduction

- discuss importance of minimizing surfaces in new construction and redevelopment projects to reduce runoff and improve infiltration
- include a goal of reducing impervious surfaced tied to protection of water quality, natural features, open space

Conservation Easement and Similar Tools

- discuss use of conservation easements to conserve open space

Woodlands

- add existing woodland map
- recognize the importance of woodlands for storm water infiltration, thus reducing flooding and minimizing water pollution – connect to health, safety and welfare of residents (importance to buffer noise, air, water pollution, preserve habitat, community beauty and climate, etc.

Erosion and Sedimentation Control

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

Native Plant Species

- discuss importance of native vegetation to protect air, land and water quality, buffer noise and air pollution, preserve wildlife habitat, preserve aesthetic value and community beauty

Lake Management

- add map of lakes
- discuss value of lakes for recreation, economic development, habitat and fisheries

Natural Area Preservation/Restoration

- link habitat preservation to protection of the health, safety and welfare of resident
- discuss protection of high priority areas

- add map of high priority natural areas

Groundwater

- map of groundwater recharge areas
- discuss importance of groundwater to health, safety and welfare of residents

City of Bangor Priorities

The City of Bangor does not have a master plan.

Zoning Ordinance

Water Body Protection

- Regulations coordinated with County Drain Commissioner and with county soil erosion program (require soil erosion control measure be in place before granting a building permit and reference compliance with county soil erosion and sediment control standards)
- For water body setbacks (50-100 feet) require naturally vegetated buffers along streams, lakes and wetlands
- building and no-disturbance setback requirements from wetland at least 20-30 feet
- Flood control - overlay zone or other language that protects floodplains from undesirable development and a vegetated buffer that encompasses the 100 year floodplain

Site Plan Review

- require to show all natural features on site plans (wetlands, woodlands, streams, rivers, etc)
- require developers to preserve natural features and natural drainage patterns to the fullest extent possible (minimize site clearing)
- coordinate with receipt of applicable county (drain, soil erosion) and state permits
- encourage use of BMPS that improve a site's infiltration and have BMPs labeled and shown on site plan
- require use of native plants for landscaping plans and for runoff/stormwater controls (prohibit invasive and exotics species)
- require use of BMP's and encourage use of above ground BMP instead of belowground stormwater conveyance systems
- prohibit direct discharge of stormwater into wetlands, streams, or other surface waters without pre-treatment
- require periodic monitoring of BMPs to ensure they are working properly and require that all stormwater BMP's be maintained
- require developers to consult with MDEQ about threatened/endangered species on site

Clustering and Open Space Development

- require open spaces to be consolidated into larger units when feasible and ensure open space are managed in a natural condition
- list types of uses allowed in dedicated open space - restrict to low impact uses
- utilize incentives to encourage use of open space development option (such as bonus densities)
- require open space in PUDs

Parking Lots/Driveways/Sidewalks

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

Clyde Township Priorities

Master Plan

Stream Corridors

- Discuss protection of stream corridors is important in promoting health and safety of residents (flood control, water quality, corridor preservation)

Flood Control

- Discuss floodplain protection as important for health, safety and welfare of residents (coordination of efforts to protect floodplain with adjoining communities in watershed)

Impervious Surface Reduction

- discuss importance of minimizing surfaces in new construction and redevelopment projects to reduce runoff and improve infiltration
- Discuss the need to preserve natural features to preserve infiltration of stormwater
- include a goal of reducing impervious surfaced tied to protection of water quality, natural features, open space

Greenway/Green Infrastructure Plan

- language supporting the West MI Strategic Alliance's green infrastructure initiative

Groundwater

- Map of groundwater recharge areas

Zoning Ordinance

Water Body Protection

- Regulations coordinated with County Drain Commissioner and with county soil erosion program (require soil erosion control measure be in place before granting a building permit and reference compliance with county soil erosion and sediment control standards)
- For water body setbacks require naturally vegetated buffers along streams, lakes and wetlands
- building and no-disturbance setback requirements from wetland at least 20-30 feet
- Flood control - overlay zone or other language that protects floodplains from undesirable development and a vegetated buffer that encompasses the 100 year floodplain
- anti-funneling provision for lakes

Site Plan Review

- coordinate with receipt of applicable county (drain, soil erosion) and state permits

- require developers to preserve natural features and natural drainage patterns to the fullest extent possible (minimize site clearing)
- encourage use of BMPs that improve a site's infiltration and have BMPs labeled and shown on site plan
- require use of native plants for landscaping plans and for runoff/stormwater controls (prohibit invasive and exotics species)
- require use of BMP's and encourage use of above ground BMP instead of belowground stormwater conveyance systems
- prohibit direct discharge of stormwater into wetlands, streams, or other surface waters without pre-treatment
- require periodic monitoring of BMPs to ensure they are working properly and require that all stormwater BMP's be maintained
- require developers to consult with MDEQ about threatened/endangered species on site

Clustering and Open Space Development

- require open spaces to be consolidated into larger units when feasible and ensure open space are managed in a natural condition
- list types of uses allowed in dedicated open space - restrict to low impact uses
- utilize incentives to encourage use of open space development option (such as bonus densities)
- require open space in PUDs

Rural communities – Agricultural Lands

- use a method such as sliding scale to limit fragmentation of farmland to lessen conflicts between farming and residential uses
- require setbacks or buffers for any new residential development
- limit impervious lot coverages in rural residential areas

Parking Lots/Driveways/Sidewalks

- require some percentage of large parking lots to have landscaping to break up the impervious surfaces
- require stormwater treatment for parking lot runoff in landscaped areas – encourage the use of parking lot islands as stormwater infiltration areas
- require 30% of parking area to have spaces with smaller dimension for compact cars
- require maximum parking spaces instead of minimum number of spaces
- allow for driveways or overflow parking areas to be pervious or porous pavements

Other

- participate in national flood insurance program

Columbia Township Priorities

Master Plan

Watershed Issues

- identify the Black River watershed (page 6)

Stream Corridors

- discuss stream corridors importance for health, safety, and welfare of residents (flood control, water quality)
- discuss riparian buffers - assist in flood control, protect the streambank from erosion, remove pollutants from storm water runoff, provide food and habitat for wildlife, prevent sediment from settling in the water course, provides tree canopy to shade

streams, and promote desirable aquatic organisms, scenic value and recreational opportunities

Flood Control

- floodplain protection important for health, safety and welfare of residents (flood control, stream bank protection, pollutant filter, wildlife habitat, reduce sedimentation, shade watercourses, provide scenic value and recreation opportunities) – page 53

Impervious Surface Reduction

- discuss importance of impervious surface reduction in new construction and redevelopments to reduce runoff and improve infiltration – tie to protecting health, safety and welfare of residents through the protection of water quality – goal #7 (cluster development is one technique to reduce imperviousness surfaces)

Wetland Protection

- add wetland protection to goals

Lake Management

- add language about value of lakes (recreation, economic development, habitat, fisheries) P 26;6

Natural Area Preservation/Restoration

- link habitat protection to health, safety and welfare
- support green infrastructure initiative (see www.swmpc.org/growgreen.asp) - preservation of natural features as parkland and/or in open space developments helps alleviate problems associated with storm water runoff
- discuss how the preservation of natural features can preserve the existing infiltration of storm water

Native Plant Species

- discuss importance of native vegetation in the protection of vital air, land and water resource quality, to buffer air and noise pollution, preserve wildlife habitat, and preserve aesthetic values and the community's beauty

Woodlands

- add map of existing woodlands
- recognize the importance of woodlands for storm water infiltration, thus reducing flooding and minimizing water pollution – connect to health, safety and welfare of residents

Agricultural Lands

- add language about the importance of ag to economy; Goal #2 - farmland preservation; p.46-47 - farmland preservation zoning techniques; could include agricultural related items in economy section of implementation schedule
- add prime farmland map

Groundwater

- add map of groundwater recharge areas

Stormwater Management

- add goal about stormwater management with the use of infiltration and other stormwater bmps to address both quality and quantity of stormwater to protect health, safety and welfare of residents by reducing flooding and improving water quality
- include goals / policies that encourage the use of Best Management Practices (BMP's) to minimize, collect, and treat storm water

Septic Systems/Sanitary Sewer Planning

- septic system capability map – determine the placement of zoning districts (where not to allow higher density unless municipal sewer is available)

Zoning Ordinance

Site Plan Review

- Site Plan Review criteria – preservation of natural features, such as lakes, ponds, streams, floodplains, floodways, wetlands, woodlands, steep slopes, and natural drainage patterns to the fullest extent possible and minimize site disturbance as much as possible
- show and label all stormwater best management practices on the site plan (rain gardens, swales, etc)
- require the use of native plants in all vegetative stormwater bmps (to help reduce storm water velocities, filter runoff and provide additional opportunities for wildlife habitat)
- -4.11c – require on site plan – location of natural features, such as lakes, ponds, streams, floodplains, floodways, wetlands, woodlands, steep slopes, and natural drainage patterns
- -Require drain commissioner review in site plan process

Waterbody Protection

- -Require naturally vegetated buffers along waterbodies (increase setbacks on lakes to 50 feet, add setbacks to rivers, streams)
- -Floodplain overlay zone or other language that protects floodplains
- ensure zoning map respects natural features and groundwater recharge areas (compare zoning map to natural feature and groundwater recharge maps)

Open Space

- use bonus densities to encourage open space developments
- require all PUDS to provide open space
- Require open space areas to be contiguous and uses restricted to open space/natural condition

Limit Impervious Areas

- limit lot coverage in rural areas to 15%

Agricultural District

- agricultural zoning district - utilize a method such as sliding scale to limit fragmentation of farmland and to less conflicts between farming and residential uses
- master plan calls for buffers between existing ag and new residential uses – require this in ordinance
- allow for clustering/open space developments in ag district to protect natural features

Parking/Road Standards

- More flexibility in parking standards, encourage shared parking
- Require a portion of a paved parking lot to be planted with trees/vegetation
- Require treatment of stormwater parking lot runoff in landscaped areas
- Require 30% of the parking are to have compact car spaces (9 x18 ft or less)
- allow driveways and overflow parking to be pervious or porous pavement
- use maximum spaces instead of minimums for parking space numbers
- require landscaped areas in cul-de-sacs
- allow hammerheads
- allow swales instead of curb and gutter

- if curbs are used require perforated or invisible curbs (which allow for water to flow into swales)

Stormwater BMPs

- allow the location of bioretention (rain gardens, filter strips, swales) in required setback areas and common areas
- require the use of above ground BMP's instead of belowground storm water conveyance systems
- require that all storm water management systems and/or BMP's be maintained

Conclusion

With this project, major strides were made to improve plans and policies in the Black River Watershed to better protect water quality and natural resources. Many municipalities had not updated their master plans or zoning ordinances in some years. This project initiated interest in updating these documents. The recommendations from the Black River Watershed Project were generally well received and publicly supported. A big challenge with this project is that the political and public process required for updating plans and zoning ordinances often does not fit nicely into the timeframe of grant periods. The required municipal and public review process for updating plans and zoning ordinances are several months long each. In addition, often introducing new concepts to local officials requires substantial time and effort spent on presenting information to get them comfortable with the new techniques. There is obviously more work to be done and the list of priorities and the document review sheet will continue to guide future work. Further, some municipalities which applied for assistance did not receive it because of limited resources. The document review tool and the language developed for the other municipalities are available for their use.

Future work should focus on educating the municipalities about the need to require low impact development. Also, more data is now available such as the build out analysis and soon there will be a

Landscape Level Wetland Functional Analysis completed for the watershed. This new data and analyses will support local officials' efforts to enact and enforce watershed protection measures. There should be a focus on where development is being proposed on future land use maps compared to the new data such as the build out analysis, the landscape level

Low Impact Development – saves money and our water!

If conventional development continues, the costs to clean our water supplies, implement after the fact solutions to deal with flooding and retrofit areas to lessen the impact on water resources will be substantial in the future.

wetland function analysis, MNFI potential conservation areas (www.swmpc.org/swmi.asp) and other habitat and water quality priority modeling and mapping.

Appendices

Appendix 1 - Recommendations Regarding Parking Lot Design

Parking lots account for a significant amount of impervious surface in urban and suburban areas. Efforts to reduce the amount of impervious surface and treat stormwater before it leaves the area should be made. The following is a list of recommendations which can help to reduce the impact of parking lots on water quality.

- The zoning regulation's "statement of intent" should describe why landscaping is required in parking areas. In addition to the role of landscaping for improving appearance and safety, mention the value of water quality protection and storm water management.
- Regulations lacking parking lot landscape standards should be revised to include them.
- Where feasible, porous parking surfaces should be used in place of impervious materials.
- Where feasible, existing grades and vegetation should be retained and used for naturalistic landscaping of parking lots.
- Any paved parking areas should drain to on-site vegetative filter strips and any landscaped areas built above grade should have curb, berm or wall breaks to allow runoff inflow into landscaped areas.
- Perimeter and interior landscaped areas should be designed as bio-retention filters or vegetated filter strips capable of cleansing and infiltrating storm water runoff. To be effective filters, the landscaped areas should be built below grade and planted with vegetation that is heat and salt tolerant and has filtration capabilities (preferably native plants).
- Allow flexibility in the landscape design. Buffer and screen width and height will vary based on adjacent uses and the landscape materials proposed to screen or buffer those uses from the parking lot.
- Require that a minimum percentage of the parking lot's landscaped area be devoted to interior landscaping.
- Adjacent parking lots should be separated with landscaped filter strips to break up large impervious areas and to filter runoff from these areas.
- Require regular scheduled sweeping and vacuuming of impervious parking areas to remove pollutants.
- Where feasible, require the retrofitting of existing impervious parking lots with porous surfaces.

Appendix 2 - Low Impact Development

Clean water resources are essential to the economic vitality of southwest Michigan.

Low impact development is a cornerstone of stormwater management and thus is the pathway to protecting water resources and enabling economic growth.

The most basic definition of Low Impact Development (LID) is using site design methods to mimic the natural hydrology of the site in its natural predevelopment stage. The outcome of LID is mimicking a site's pre-settlement hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source. Because LID utilizes a variety of useful techniques for controlling runoff, designs can be customized according to local regulatory and resource protection requirements, as well as site constraints. LID practices offer additional benefits. They can be integrated into the existing infrastructure and are often more cost effective and aesthetically pleasing than

traditional, structural stormwater conveyance systems. LID focuses on the following stormwater outcomes:

- Preventing flooding,
- Protecting the stream channel,
- Improving/protecting water quality, and
- Recharging groundwater.

Successful application of LID is maximized when it is viewed in the context of the

larger design process. This process is reflected in the following set of principles:

- Plan first,
- Prevent. Then mitigate,
- Minimize disturbance,
- Manage stormwater as a resource — not a waste,
- Mimic the natural water cycle,
- Disconnect. Decentralize. Distribute,
- Integrate natural systems,
- Maximize the multiple benefits of LID,
- Use LID everywhere, and
- Make maintenance a priority.

For more information on LID visit www.swmpc.org/lid.asp.

Low Impact Development

Water.....
Spread it out
Slow it down
Soak it in

LID is cost effective!

A variety of sources are now available documenting the cost effectiveness — even cost reductions — which can be achieved through the application of LID practices. The U.S. Environmental Protection Agency (EPA) released *Reducing Stormwater Costs Through Low Impact Development (LID) Strategies and Practices*, reporting on cost comparisons for 17 different case studies across the country. EPA results demonstrate the positive cost advantages of LID practices, when compared with traditional development patterns using conventional stormwater management techniques.

Appendix 3 – Riparian Area Buffers

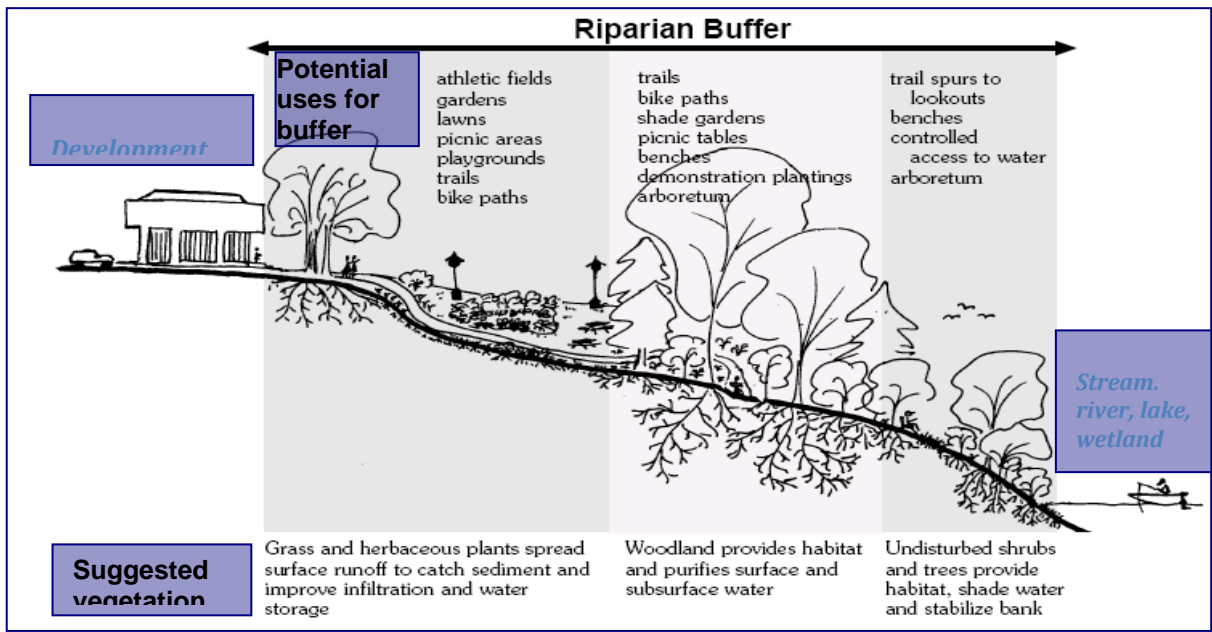
One of the most important steps a local government can take to protect water resources is to establish building setbacks from surface water (lakes, streams, rivers and wetlands). There should also be a native vegetated area directly adjacent to the waterbody to act as a buffer. The primary function of this riparian buffer is to physically protect and separate a stream, lake, or wetland from future disturbance or encroachment. If the buffer area contains native vegetation and is properly designed, it will infiltrate and filter pollutants, act as a storage area or right-of-way during floods, sustain the integrity of the stream ecosystem for fish and other aquatic life and also provide habitat for land based species.

A buffer is a river's natural right-of-way.

To protect water quality, studies and literature reviews indicate that the minimum width recommended to provide adequate stream protection is at least 100 feet, noting that buffers may be expanded beyond the minimum 100 feet to incorporate the following conditions:

- The full extent of the 100-year floodplain.
- Steep slopes greater than 25%.
- Adjacent delineated wetlands or critical habitats.
- Higher order or quality streams (such as cold water trout streams)

Buffers Protect Property
 Streamside land is a high-risk area for development even above flood elevation. Using vegetated buffers to set back buildings from the shorelines is cost effective protection against the hazards caused by flooding, shoreline erosion and moving streams.



Appendix 4 - Partnership Agreement

Black River Watershed Project Partnership Agreement

This document serves as a Partnership Agreement between the Van Buren Conservation District, Black River Watershed Project and _____, hereinafter referred to as the local unit of government.

The parties committed to this partnership agreement are united by a mutual concern for the hydrology and water quality of the Black River and its tributaries. The parties understand that:

1. land use decisions and policies have an impact on the water quality of our ground and surface waters; and
2. there are several public and economic benefits associated with improving and protecting the quality of our groundwater, rivers and lakes.

The parties recognize the need to be proactive in planning for growth and development in a way that protects the water quality within the Black River Watershed, as well as the rural character of this region. These efforts will also sustain and improve the region's future quality of life and economic stability.

Background

The Black River Watershed encompasses 287 square miles in Allegan and Van Buren Counties. A watershed does not respect state, county, township, village or city boundaries. The three main branches of the Black River drain portions of southwestern Allegan County and northwestern Van Buren County before joining and emptying into Lake Michigan at South Haven.

Townships within the Allegan County portion of the Black River Watershed include Ganges, Clyde, Casco, Lee and Cheshire. In Van Buren County, townships at least partially within the watershed include South Haven, Geneva, Columbia, Bloomingdale, Covert, Bangor, Arlington and Waverly. Cities and Villages within the watershed include Bangor, Bloomingdale, Breedsville and South Haven.

Residents of the Black River Watershed have expressed concern for the water quality of their lakes and streams, and have an interest in protecting and improving water quality. Primary water quality concerns in the watershed are erosion and sedimentation, nutrient loading, and development issues.

Water quality of both groundwater and surface water can be threatened by growth and development that does not limit impacts on these water resources. If not planned carefully, growth and development will cause water currently reaching the river through groundwater to be redirected and reach the river through overland flow via runoff from impervious surfaces. This threatens to change the watershed's flow regime, creating rivers with high flows after storm events and very low flows in drought periods. The increased runoff will also increase stream bank erosion and result in more pollutants (sediment, nutrients, etc.) reaching our water bodies, including Lake Michigan and our many inland lakes.

The Michigan Department of Environmental Quality (MDEQ) is providing grant funds to the Van Buren Conservation District to preserve and improve the water quality of the Black River Watershed. Some of these grant funds will specifically be used to provide tools and planning assistance to local units of government within the watershed.

Proposed Action

We the undersigned agree to the following:

The Van Buren Conservation District and Black River Watershed Project agree to:

1. Subcontract with the Southwest Michigan Planning Commission through March 2009 to:
 - a. review current land use plans and zoning ordinances to determine the level of water quality and hydrology protection efforts and to make recommendations (and prepare a report in hard and electronic copy);
 - b. facilitate work session(s) with the planning commission or appropriate body to identify issues and the level of concern and commitment;
 - c. assist the local unit of government with the preparation of master plan language to be included with an existing or new plan;
 - d. provide zoning assistance by preparing language for zoning ordinances necessary to implement the master plan language; and
 - e. prepare a build-out analysis and associated maps (in hard and electronic copy)
 - f. assist the local unit of government with the adoption requirements of the amended master plan and/or zoning ordinances.

The local unit of government agrees to:

1. be proactive in planning for growth and development and to protect the watershed's natural resources to the best of its abilities;
2. consider updating the master plan and zoning ordinance to address the protection and enhancement of the watershed's water quality and hydrology;
3. schedule meetings and work sessions (or time within regularly scheduled meetings) for the planning commission or appropriate body to meet with the Southwestern Michigan Commission (it is highly recommended that the township board members, zoning administrator and zoning board of appeals members attend these work sessions also);
4. focus on issues related to the Black River Watershed Project during these meetings and work sessions (the issues will be set forth by the Van Buren Conservation District);
5. be responsible for any costs above and beyond 7 meetings with the consultant to update a master plan and 5 meetings for the zoning ordinance update (the number of meetings includes the legal public hearing for adoption);
6. be responsible for any costs associated with holding meetings (per diem payments to board members, e.g.)

- 7. incur fees associated with legal requirements of adopting new planning or zoning language (notices in the newspaper, new printed copies of master plans, legal reviews, etc.) if any changes are approved.
- 8. use and help track local official's time as local match for the MDEQ grant (also any other funds used to complete the master plan and/or zoning ordinance are to be used as local match for the grant); and
- 9. send a representative to quarterly Black River Watershed Steering Committee meetings.

Note: Grant funding for the Black River Watershed Project ends in March 2009. Funding can only be provided to your community through this date.

Van Buren Conservation District

Local Unit of Government

Print Name

Print Name

Signature

Signature

Date

Date

Appendix 5 - Document Review for Water Resource Protection

Name of Entity

Date

Criteria	Yes/ No	Comments
		List page number in Master Plan and list the section of the Zoning Ordinance
Watershed Issues		
I. Watershed Activities		
A. Plans and Policies:		
1. Does the Master Plan identify the watershed(s) in which the community is located?		
2. Does the Master Plan call for protection of watershed resources in order to protect the health, safety and welfare of residents?		
Stream Corridors and Flood Plains		
I. Stream Corridors		
A. Plans and Policies:		
1. Does the Master Plan indicate the importance of any of the following: riparian buffers to assist in flood control, protect the streambank from erosion, remove pollutants from storm water runoff, provide food and habitat for wildlife, prevent sediment from settling in the water course, provides tree canopy to shade streams, and promote desirable aquatic organisms, scenic value and recreational opportunities?		
2. Does the Master Plan state that protection of stream corridors is important in promoting the health, safety and welfare of residents through flood control, and water quality and riparian corridor preservation?		
B. Development / Redevelopment Regulations:		
1. Are regulations coordinated with regulations protecting County drains?		
2. Does the community require naturally-vegetated buffers along drainage way corridors?		
a. What is the width of the corridor?		
3. Does the community restrict development adjacent to stream corridors to those which do any of the following: offer no danger of topographical disturbance to the corridor, degradation to water quality, increased runoff, sedimentation, stream channel alterations, or degradation of dependent, non-hydrologic resources (i.e. flora and fauna)?		
4. Are waterbody setbacks in place of at least 30-50 feet?		
II. Flood Control		
A. Plans and Policies:		

1. Does the Master Plan identify floodplain protection as important for any of the following to promote the health, safety and welfare of residents: flood control, stream bank protection, pollutant filter, wildlife habitat, reduce sedimentation, shade watercourse and provide scenic value and recreational opportunities?		
2. Does the community call for coordination of their efforts to protect the floodplain with adjoining communities and the County?		
B. Development / Redevelopment Regulations:		
1. Does the community participate in the National Flood Insurance Program?		
2. If yes, does the community have an overlay zone or other ordinance language that protects floodplains from undesirable development?		
3. Do the community's floodplain regulations address the following:		
a. Provide for assessing the impacts of flood management projects on water quality?		
b. Provide for adding BMP's to existing projects?		
4. Is there a variable width, naturally vegetated buffer that encompasses the 100 year floodplain area?		
Impervious Surface Reduction		
I. Reducing Impervious Surfaces		
A. Plans and Policies:		
1. Does the Master Plan call for minimizing impervious surfaces in new construction and redevelopment projects to reduce the amount of runoff and improve infiltration?		
2. Is the Master Plan goal of reducing impervious surface tied to protecting the health, safety and welfare of residents through protection of water quality, natural features and open space?		
II. Parking Lots/Driveways/Sidewalks		
A. Development / Redevelopment Regulations:		
1. Does the community have flexibility in the parking ordinance to reduce the number of spaces constructed if warranted by the proposed development?		
2. Is some portion of a parking lot required to be planted with trees/ vegetation within the parking lot paving?		
3. Does the community require stormwater treatment for parking lot runoff in landscaping areas?		
B. Design Standards:		
1. Are shared parking facilities encouraged?		
2. Is 30% of the parking area required to have spaces with smaller dimensions for compact cars? (9ft-width and 18ft - length or less)?		
3. Is there a maximum on parking spaces size (9ft-width and 18ft - length or less)?		
4. Are developers encouraged to use parking lot islands as stormwater infiltration areas?		

5. Are driveways or overflow parking areas allowed to be pervious or porous pavements?		
6. Are maximum spaces given instead of minimum (for office bldgs - 3spaces/1000ft ² ; shopping - 4.5 spaces/1000ft ² ; residential - 2 spaces/single family home)?		
7. Are sidewalks only allowed to be on one side of the road?		
8. Are sidewalks eliminated if an alternative path is provided?		
III. Street and Access		
A. Development / Redevelopment Regulations:		
1. Does the community have jurisdiction over roads or allow private roads?		
2. If yes, do regulations pertaining to roads include the following standards:		
a. Are streets to be designed with the minimum required pavement width needed to support travel lanes, emergency, maintenance and service vehicles (18-22 ft for low traffic roads)?		
b. Are right-of-way widths minimized to avoid mass clearing and grading (less than 45 feet)?		
c. Are there required landscaped areas in cul-de-sacs?		
d. Are the minimum radii of cul-de-sacs no more than 35 feet?		
e. Are hammerheads allowed instead of cul-de-sacs?		
f. Are the use of open swales allowed instead of curb and gutter?		
g. If curb and gutter is used, are perforated curbs (allows water to flow into swales) or invisible curbs (flush with road surface) required?		
IV. Lot Setbacks / Lot Width / Lot Coverage		
A. Development / Redevelopment Regulations:		
1. Does the Zoning Ordinance allow for the relaxation of side yard setbacks and narrower frontages to reduce the total road length (and overall site imperviousness)?		
2. Does the Zoning Ordinance allow for the relaxation of front yard setbacks to reduce driveway lengths (and overall site imperviousness)?		
3. Does the Zoning Ordinance allow the location of bioretention, rain gardens, filter strips and swales in required setback areas and common areas?		
4. In rural, low density areas are there limits on impervious lot coverage (15% maximum includes all impervious surfaces not just the house)?		
5. Are there limits on the extent of lawn area on residential lots in rural areas?		
The Development Review Process		
I. Site Plan Review		
A. Development / Redevelopment Regulations:		
1. Is the review process coordinated with the receipt of applicable County and State permits?		

2. Does the Zoning Ordinance require that developers preserve natural features, such as lakes, ponds, streams, floodplains and floodways, wetlands, woodlands, steep slopes, and natural drainage patterns to the fullest extent possible?		
3. Are BMP's required to be labeled and shown, in detail, on the site plan so that they can be reviewed for effectiveness during the site plan review process?		
4. Is a Soil Erosion and Sedimentation Control Plan required as part of the site plan review process?		
5. Are developers required to show all natural features on site plans, such as lakes, ponds, streams, rivers, floodplains and floodways, wetlands, woodlands, steep slopes, and natural drainage patterns?		
II. Pre-Construction Meetings		
A. Development / Redevelopment Regulations:		
1. Is the construction sequence required to start with a pre-construction meeting?		
III. Construction		
A. Plans and Policies:		
1. Does the community chart the progress of all construction projects to ensure that they are in compliance with the approved site plan?		
B. Development / Redevelopment Regulations:		
1. Is a Pre-winter meeting required to assess whether the existing soil cover will provide adequate soil erosion and sedimentation control during winter months?		
Land Conservation and Development Techniques		
I. Open Space / Park Acquisition		
A. Plans and Policies:		
1. Does the Master Plan and/or Recreation Master Plan call for community acquisition of open space?		
2. Does the Master Plan and/or Recreation Master Plan recognize the importance of open space preservation as a way to protect the health, safety and welfare of residents, protect vital air, land and water resource quality, to buffer air and noise pollution, preserve wildlife habitat, and preserve aesthetic values and the community's beauty?		
II. Conservation Easement and Similar Tools		
A. Plans and Policies:		
1. Does the Master Plan call for the use of conservation easements or other tools to conserve open space in the community?		

III. Clustering and Open Space Developments		
A. Plans and Policies:		
1. Does the Master Plan include goals to preserve natural features and protect the quality of vital air, land, and water resources while accommodating development?		
B. Development / Redevelopment Regulations:		
1. Does the community have a Clustering and/or Open Space Ordinance?		
2. Are flexible site design criteria available for developers that use open space or cluster design options? (Ex. Relaxed setback widths and lessened sidewalk requirements.)		
3. Are open spaces required to be consolidated into larger units (contiguous), or required to be a minimum size or width?		
4. Does the open space have to be managed in a natural condition?		
5. Are the types of uses allowed in the open space restricted to low impact uses?		
6. Is open space required to be protected through a conservation easement or other similar mechanism?		
7. Are incentives put into place to encourage open space development?		
a. Are bonus densities utilized as an incentive?		
8. Do all Planned Unit Developments require open space?		
IV. Urbanized Communities		
A. Plans and Policies:		
1. Are infill developments encouraged in areas that already have significant development?		
B. Design Standards:		
1. Are infill and redevelopment projects encouraged to promote conservation and natural resource preservation?		
2. Are re-development projects required to coordinate improvements with existing facilities and infrastructure?		
V. Rural Communities		
A. Plans and Policies:		
1. Is agriculture described in the Master Plan as an economically viable profession in the community?		
2. Have prime and unique agricultural lands been identified and mapped in the Master Plan?		
B. Development / Redevelopment Regulations:		
1. Has the community designated an Agricultural Zoning District?		
2. Does the agricultural zoning district utilize a method such as sliding scale to limit fragmentation of farmland and to less conflicts between farming and residential uses?		
3. Does the agricultural zoning district utilize setbacks or buffers for any new residential development?		

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

3. Has the community identified high quality natural areas to be preserved?		
4. Does the community have a plan to protect the high priority areas?		
II. Native Plant Species		
A. Plans and Policies:		
1. Does the Master Plan recognize the importance of native vegetation in the protection of vital air, land and water resource quality, to buffer air and noise pollution, preserve wildlife habitat, and preserve aesthetic values and the community's beauty?		
B. Design Standards:		
1. Do the Design Standards specify the use of native plant species in the storm water system to help reduce storm water velocities, filter runoff and provide additional opportunities for wildlife habitat?		
2. Are invasive and exotic plants prohibited from being used?		
3. Does the site plan review process require developers to consult with the Michigan Department of Environmental Quality about Threatened/Endangered Species on site?		
Woodlands Preservation		
I. Inventory		
A. Plans and Policies:		
1. Has the community conducted a woodlands inventory and mapped this information?		
II. Woodlands Protection		
A. Plans and Policies:		
1. Does the Master Plan recognize the importance of woodlands to protect any of the following: water, air and soil quality, to buffer air and noise pollution, to moderate local climate and storm hazards, to preserve wildlife habitat, and to preserve aesthetic values and community beauty?		
2. Does the Master Plan recognize the importance of woodlands for storm water infiltration, thus reducing flooding and minimizing water pollution?		
3. Does the Master Plan identify woodlands as an important landscape feature that protects the health, safety and welfare of residents?		
B. Development / Redevelopment Regulations:		
1. Has the community adopted a local woodlands or tree protection ordinance?		
2. Are woodlands defined in a broad manner so that existing trees and remnant woodlands are also protected?		
3. Does the ordinance require replacement of trees that are removed?		
4. Does the ordinance minimize the clearing of a site?		

5. Are permits required to clear a site?		
Greenways/Green Infrastructure		
I. Greenway/Green Infrastructure Plan		
A. Plans and Policies:		
1. Does the community have a greenway plan or support greenways/green infrastructure through its Master Plan or Recreation Master Plan?		
2. If yes, does this plan do the following:		
a. Identify greenways/green infrastructure as important natural transportation corridors for wildlife, and for the protection of other natural features?		
b. Connect many natural areas within the community?		
c. Connect the community's greenway/green infrastructure plan with adjacent communities', County's or regional greenway plans?		
Groundwater		
I. Mapping		
A. Plans and Policies:		
1. Do Master Plan goals call for the identification and mapping of groundwater recharge areas?		
2. Is a map of groundwater resources or groundwater recharge areas included in the Master Plan?		
II. Groundwater Protection		
A. Plans and Policies:		
1. Does the Master Plan recognize the importance of the groundwater to the health, safety and welfare of its residents?		
2. Does the Master Plan identify groundwater as an important natural resource, and call for its protection?		
B. Development / Redevelopment Regulations:		
1. Is ground water considered in the zoning designations of parcels?		
2. Are there additional requirements for site plan submittals in groundwater recharge areas?		
III. Wellhead Protection		
A. Plans and Policies:		
1. Does this community have municipal well fields?		
2. If yes, has the community done the following:		
a. Developed a wellhead protection program?		
b. Restricts high risk land use activities in wellhead protection areas?		

Storm Water Management		
I. Storm Water Management Standards		
A. Plans and Policies:		
1. Does the Master Plan call for the preservation of natural features as parkland and/or in open space developments to help alleviate problems associated with storm water runoff?		
2. Does the Master Plan identify storm water management as an important community goal or policy?		
3. Does the Master Plan state both the quality and quantity of storm water are important issues to address in storm water management policies?		
4. Does the Master Plan relate storm water management to the protection of health, safety and welfare of the community's residents? (For example, storm water management can reduce flooding, improve water quality, etc.)		
B. Development / Redevelopment Regulations:		
1. Does the Zoning Ordinance require that developers preserve natural drainage patterns to the fullest extent possible?		
2. Do you regulate storm water in your community?		
3. If yes, are your regulations coordinated with the County's storm water regulations so that your rules do not contradict the County's?		
4. If your community regulates storm water, do your regulations address the following:		
a. Are there storm water guidelines that fully detail specific storm water design criteria?		
b. Maintain or establish buffer strips (between 30 and 100 feet wide) from the top of bank of any watercourse or surface water?		
5. Does the Zoning Ordinance include flood control and water resource protection performance standards?		
6. If yes, do they address the following to reduce the quantity of runoff and improve runoff quality:		
a. Limit land disturbance and grading?		
b. Maintain vegetated buffer strips and other existing vegetation to improve infiltration of storm water?		
c. Minimize impervious surfaces?		
d. Encourage the use of infiltration devices (such as filter strips, vegetated swales, sand filters, rain gardens, etc and allow for 72 hour ponding prior to infiltration?		
7. Are all development/redevelopment plans required to go to the County Drain Commissioner for review?		
II. Engineered Best Management Practices (BMP's)		
A. Plan and Policies		
1. Does the Master Plan include goals / policies that encourage the use of Best Management Practices (BMP's) to minimize, collect, and treat storm water?		
B. Development / Redevelopment Regulations:		

1. Does the Zoning Ordinance require the use of BMP's when possible?		
2. Does the Zoning Ordinance require the use of above ground BMP's instead of belowground storm water conveyance systems?		
3. Does the Zoning Ordinance prohibit direct discharge of storm water into wetlands, streams or other surface waters without pre-treatment?		
4. Does the Zoning Ordinance call for periodic monitoring of BMP's to ensure they are working properly?		
5. Does the Zoning Ordinance require that all storm water management systems and / or BMP's be maintained?		
C. Design Standards:		
1. Do the Design Standards provide minimum guidelines for BMP's that pre-treat and filter storm water, and retain storm water in a bio-retention facility?		
III. Infiltration		
A. Plans and Policies		
1. Does the Master Plan call for the preservation of natural features for the purpose of preserving the existing infiltration of storm water?		
B. Development / Redevelopment Regulations:		
1. Does the Zoning Ordinance call for the use of BMP's that improve a site's infiltration potential?		
Erosion and Sedimentation Control		
I. Erosion and Sedimentation Control (ESC):		
A. Plans and Policies:		
1. Is erosion and sedimentation control identified in the Master Plan as an important mechanism to protect the health, safety and welfare of residents through protection of water and soil resources?		
B. Development / Redevelopment Regulations:		
1. Does the Zoning Ordinance address erosion and sedimentation controls?		
2. If yes, is the program coordinated with the County's program?		
3. If yes, does the community's program include the following standards?		
a. Require that soil erosion control measures be in place before granting a building permit?		
b. Protect waterways and stabilize drainage ways by requiring mechanisms, such as silt fencing, at the edge of the waterway buffer and special crossing and diversion techniques at waterway crossings?		
c. Require that all erosion and sedimentation controls be maintained?		
d. Require that all erosion and sedimentation controls be monitored on a periodic basis?		
e. Methods to respond to public complaints regarding construction site erosion control?		

4. If no, does the community staff report erosion problems to the County enforcing agency?		
5. Are there any references in the Zoning Ordinance about compliance with the County Soil Erosion and Sediment Control Standards?		
Sanitary Sewer Planning and Infrastructure		
I. Sanitary Sewer Planning and Infrastructure		
A. Plans and Policies:		
1. Does the Master Plan address sanitary sewer planning?		
2. If yes, does the Master Plan tie sanitary sewer planning to protection of the health, safety and welfare of residents?		
3. If yes, does the Master Plan address the following:		
a. Has the community delineated a Sewer Service Area?		
b. Has the Sewer Service Area been mapped, including all the facilities in the system (such as manholes, pipes, etc.)?		
c. Is the map to be used in zoning decisions?		
II. Septic Systems		
A. Plans and Policies:		
1. Does the Master Plan identify areas that are suitable and unsuitable for septic systems?		
2. Does the Master Plan state that community involvement in placement and maintenance of septic systems is critical to the health, safety and welfare of residents?		
B. Development / Redevelopment Regulations:		
1. Are regulations that pertain to septic systems coordinated with the County's regulations?		
2. Does the Zoning Ordinance require that a septic system location be at least 100 feet from a lake, wetland, stream, or other water feature?		
3. Does the Zoning Ordinance specify a minimum isolation distance from residential and community wells?		
4. Does the Zoning Ordinance create septic maintenance districts?		
III. Minimizing Inflow		
A. Development / Redevelopment Regulations:		
1. Does the community prohibit connecting downspouts to the storm water system?		
2. Does the community have a program to identify and disconnect footing drains from sanitary sewer lines?		
3. Does the community promote rain barrels and rain gardens?		
IV. Illicit Discharge Elimination		
A. Plans and Policies:		

1. Has the community identified and/or mapped the community's drainage system, including all points of discharge and locations of illicit discharges to the drainage system?		
2. Does the community have a program for identifying illicit discharges, and eliminating them?		
3. Does the community have a program to identify sanitary sewer or septic systems that are seeping into the storm water system, surface waters or groundwater?		
Public Education		
I. Public Education Efforts		
A. Plans and Policies:		
1. Does the community have a system in place to distribute environmental education information?		
2. Has the community encouraged residents to report illicit discharges or improper disposal of materials into storm drains or natural water bodies?		
3. Has the community educated commercial, industrial and institutional owners and tenants on how to reduce significant storm water pollutants?		
Pollution Prevention and Housekeeping Practices		
I. Storm Water System Maintenance		
A. Plans and Policies:		
1. Does the community have a program in place to regularly clean out, maintain and/or inspect structural controls (such as catch basins, vegetated swales, infiltration basins, sedimentation basins, etc.)?		
2. Does the community have a program that labels outfall structures that discharge runoff to natural systems?		
II. Roadways		
A. Plans and Policies:		
1. Does the community have jurisdiction over streets?		
2. If yes,		
a. Does the community sweep the streets monthly or more often in high construction areas?		
b. Does the community evaluate the amount of salt and/or sand that is applied to its roads in the winter?		
c. Does the community provide leaf collection in the fall?		
III. Public Facilities Maintenance		
A. Plans and Policies:		
1. Does your community have a maintenance building?		
2. If yes, does the following occur:		
a. Confirm that floor drains are connected to a sanitary sewer, or sealed?		

3. Does the community maintain its own vehicles?		
4. If yes, is a regular schedule of maintenance followed?		
5. Are vehicles or other equipment maintained and cleaned where fluids and/or cleaning water will not flow into the street, gutter, storm drain or water body?		
IV. Landscaping Practices		
A. Plans and Policies:		
1. Does the community have a schedule of landscape maintenance practices for municipal property?		
2. Are employees trained on the proper application of chemical pesticides, herbicides and fertilizers?		
3. Are soils tested on municipal property before fertilizers are applied?		
4. Does the community use native vegetation in landscaping their properties?		
5. Does the community encourage landscaping with native plant species throughout the community?		
B. Development / Redevelopment Regulations		
1. Is a fertilizer ordinance in place that only permits zero-phosphorus fertilizer to be used?		

Capital Improvement Plan		
I. Capital Improvement Plan		
A. Plans and Policies:		
1. Does the community have a Capital Improvement Plan?		
2. If yes, does the Master Plan link the Capital Improvement Plan with the protection of the health, safety and welfare of residents?		
3. If a Capital Improvement Plan is in place, does the plan:		
a. Include policies related to natural resource protection?		
b. Include standards as the basis for design of storm water and sanitary systems?		
c. Include capital improvement for installation, maintenance and replacement of storm water utilities?		
d. Include capital improvement for installation, maintenance and replacement of sanitary sewer utilities?		
e. Call for the use, maintenance and replacement of storm water BMP's?		

Appendix 6 - Master Plan Language Recommendations

Arlington Township

WATER QUALITY AND WATER RESOURCES

There is an integral relationship between water resources, water quality, and land use. People use water for everyday uses. People also live by bodies of water for aesthetics and recreation purposes. Farmers use water bodies as part of their farming activities and industry uses water for processing and wastewater discharge. The variety of applications for water means that there is constant pressure from different user groups of how to allocate this valuable resource.

Water quality is a term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose.

Water is also an important resource within Arlington Township with the large amounts of water and natural resources throughout the area. Lakes and streams within the Township provide recreational and agricultural opportunities for residents and visitors alike. Arlington Township is situated in a unique area to be a part of two major watersheds, the Paw Paw River Watershed and the Black River Watershed. In order to ensure that the resources associated with functional watersheds continues to serve as a central component within the community; greater discussion of the interrelated components of water quality is deserved.

Water resources are vital to planning and guiding land use decisions. Certain land uses require access to water; others isolation from it. Individual landowners, whether residential, agricultural, or industrial, are rarely aware of the complexity of water resources or of the effect their actions may have. This lack of awareness, coupled with the economic and cultural value of water resources, creates a need for action by the community.

The preservation and conservation of water quality is important for public health, plant and animal life, tourism and recreation, and drinking water supplies. Proactive and effective planning can be a step in the right direction for the future of water quality within a community.

Watersheds

Although major processes and events such as ice ages have sculpted much of our landscape structure over time, the flowing water of rivers has played a major role especially on more recent time scales. This can also be said of the Paw Paw and Black Rivers, which continue to define the landscape of southwestern Michigan.

A watershed is an area of land that drains to common body of water. Arlington Township is part of the Black River Watershed and the Paw Paw River Watershed. All land in the township drains to either the Black River River or the Paw Paw River and then eventually to Lake Michigan.

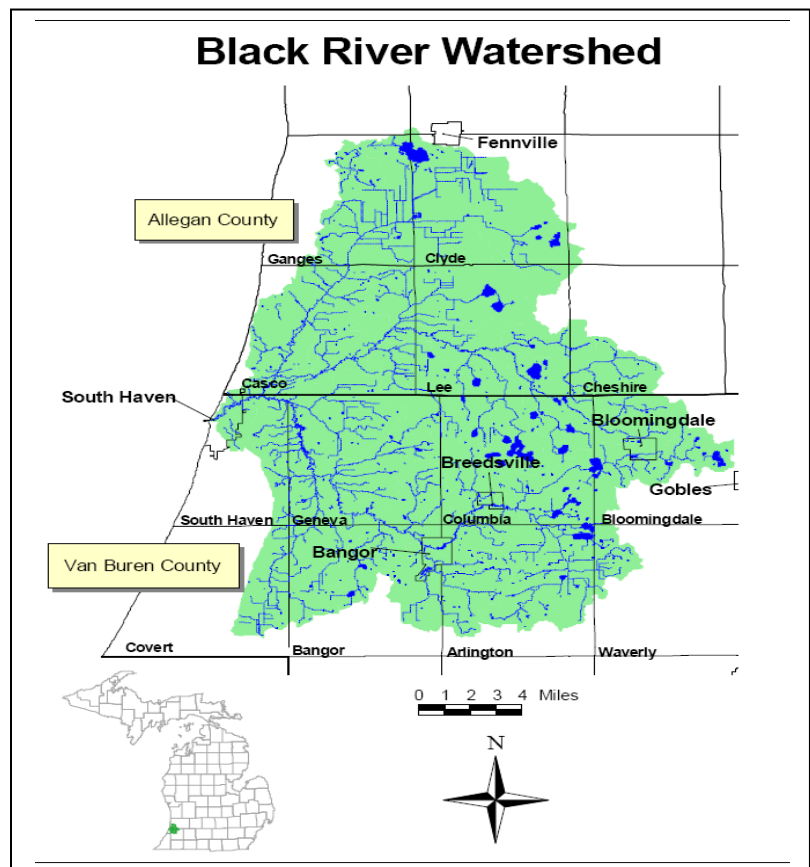
The Black River Watershed (BRW) encompasses approximately 183,490 acres in Allegan and Van Buren Counties. Arlington Township has over 27 square miles (17,280 acres) of the Black River Watershed within its boundaries. The remainder of the township (4,400 acres) is in the Paw Paw River Watershed (PPRW). The abundance of water resources within the township provides residents and visitors alike a vast array of water related activities that they can enjoy throughout the seasons. The importance of this resource means that careful attention must be paid to its protection and conservation.

Black River Watershed

The BRW plan was completed by the Van Buren Conservation District through a Section 319 grant from the United States Environmental Protection Agency and administered by the Michigan Department of Environmental Quality. The BRW plan focuses specifically on *nonpoint source pollution*, a form of pollution that is generally not regulated. Nonpoint source pollution can be delivered by indirect means such as runoff from farms and residential lawns, paved roadways and parking lots, and redevelopment or new construction areas. This type of pollution poses serious threats to the quality and functionality of the BRW.

Goals from the Black River Watershed Plan:

1. Improve water quality and habitat for fish, indigenous aquatic life and wildlife in the watershed by reducing



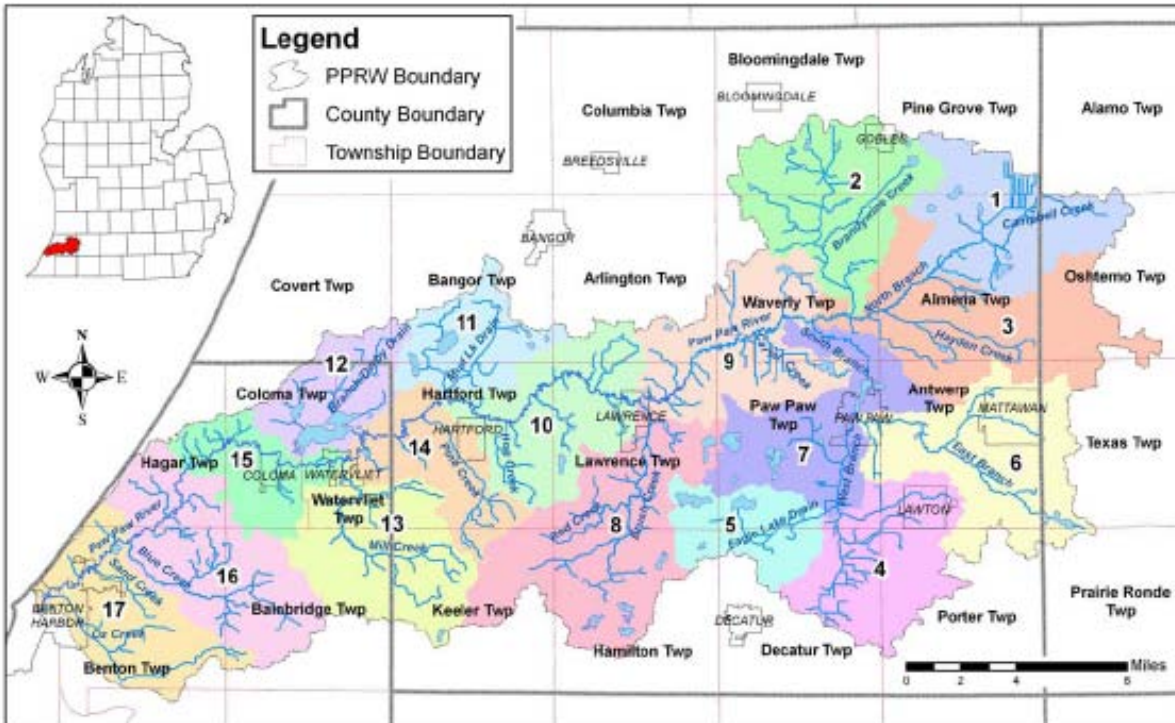
- the amount of nutrients, sediment and chemical pollutants entering the system.
2. Continue/increase watershed monitoring efforts and stewardship.
 3. Improve the hydrology and morphology of the river.
 4. Provide long-term protection of the Black River Watershed through improved local land use policies and conservation practices.
 5. Improve the navigability of the Black River for canoes, kayaks, and other self-propelled watercraft, by reducing sedimentation and reducing excess woody debris.
 6. Enhance recreational access sites to prevent the degradation of water quality.
 7. Increase knowledge and participation in programs regarding nonpoint source pollution and means of prevention.
 8. Prevent or reduce the introduction and spread of invasive species.

Paw Paw River Watershed

The PPRW encompasses approximately 285,557 acres (446 square miles) in Kalamazoo, Van Buren, and Berrien Counties. The largest portion of the watershed lies in Van Buren County, with approximately 203,720 acres. Arlington Township has approximately 4,400 acres within the Paw Paw River Watershed. The Paw Paw River Watershed (PPRW) is all of the land that drains into the Paw Paw River. Wetlands, lakes, streams, other surface water bodies on this land and groundwater are also part of the watershed. Water is a critical resource for recreation, irrigation, and increasing the value of adjacent real estate. These uses depend on good water quality, but they can also be a threat to it.

The PPRW is a priority for protection and preservation among southern Michigan watersheds because a relatively high percentage of its natural land cover remains in spite of increasing development pressure throughout the region.

The PPRW Management Plan is intended to guide individuals, businesses, organizations and municipalities to work cooperatively to build more environmentally and economically sustainable communities within the PPRW. The plan can be used to educate watershed residents on how they can improve and protect water quality, encourage and direct natural resource protection and preservation, and develop land use planning and zoning that will protect water quality in the future. Implementation of the plan will require stakeholders to work across township, county, and other political boundaries.



Goals from the Paw Paw River Watershed Plan:

1. Prevent or reduce pollutants threatening or impairing water quality by sufficiently preserving or managing protection areas to meet designated uses.
2. Reduce pollutants threatening or impairing water quality in restoration areas to meet designated uses.
3. Promote and implement coordinated planning in the PPRW.
4. Protect habitat for native aquatic and terrestrial wildlife.
5. Develop a green infrastructure network in the PPRW.
6. Protect groundwater resources.
7. Improve recreation infrastructure along river while respecting natural features.
8. Continue/increase watershed monitoring efforts.
9. Develop an organization to coordinate and implement the watershed management plan and to instill a sense of stewardship.

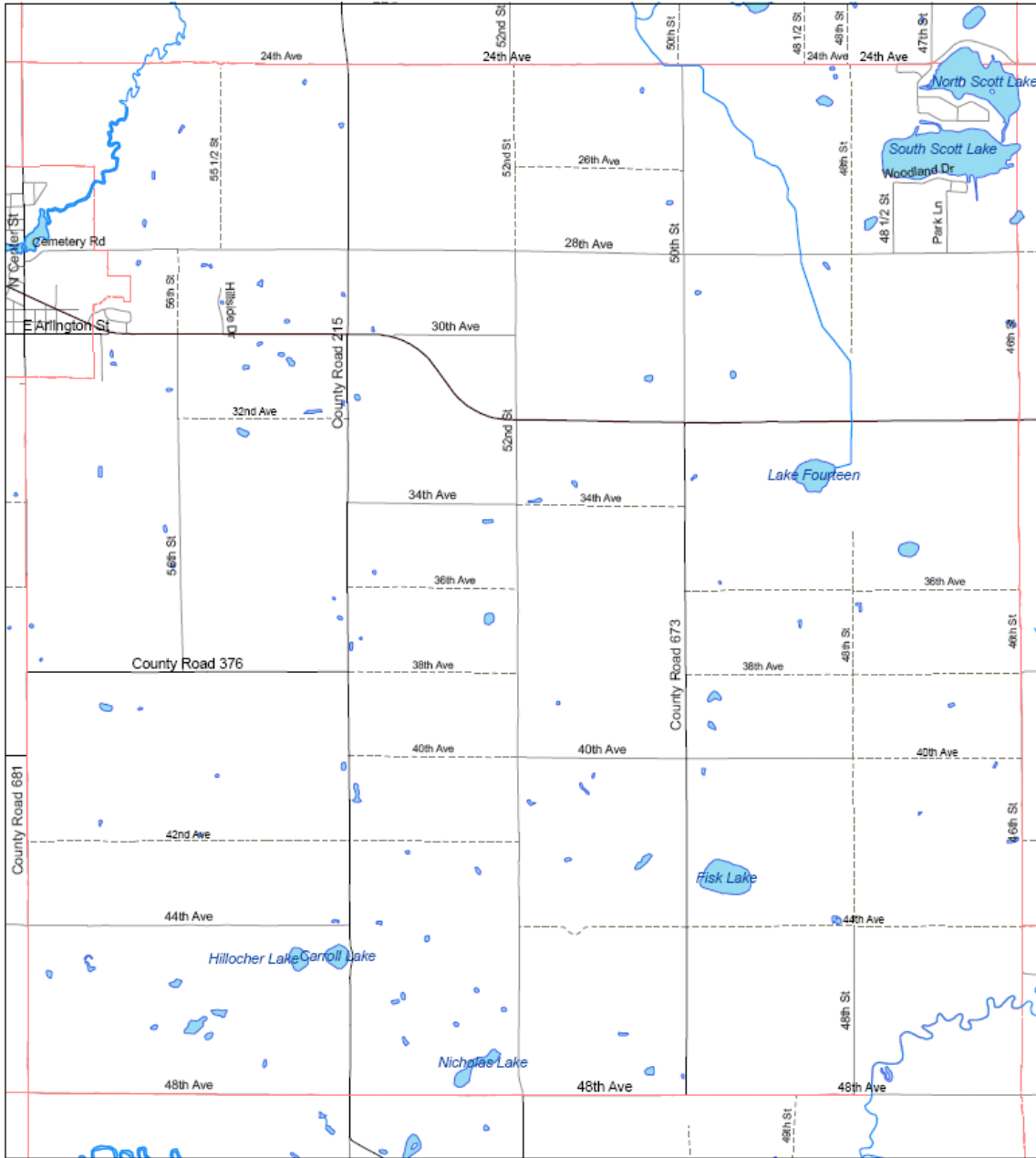
Lakes

The lakes in Arlington Township are what draw many people. Lakes are valuable for the array of recreational and economic opportunities that they offer. Lakes provide a community with extensive opportunities for recreation in every season. People visit lakes for numerous reasons but one reason that will keep them coming back is a clean, healthy lake. Arlington Township has 260 acres of lakes that contribute to the unique quality of the township. This abundance of fresh water is valued highly for its contributions to the unique ecological, recreational and economical value that these lakes present.




Arlington Township Lakes and Size

Lake Name	Acres
Black River Watershed	
1. South Scott Lake	118.1
2. North Scott Lake	76.3
3. Lake Fourteen	20.9
Paw Paw River Watershed	
4. Fisk Lake	30
5. Carroll Lake	9.2
6. Nicholas Lake	10.8
	Total Acres 265

Arlington Township Lakes



Legend

-  Rivers/Streams
-  Lakes/Ponds
-  Township Boundary

0 0.25 0.5 1 Miles



Stream Corridors/Riparian Corridors

The stream corridor or “riparian” corridor is a water route dominated by a river, stream, or other linear water feature. The river or stream is also usually vegetated on both banks by floodplain and then upland vegetation. Stream corridors are often left undeveloped, and therefore provide an opportunity to act as a link between natural areas. Because water rich floodplains, and uplands are all part of stream corridors, they provide numerous watershed functions. The presence of stream corridors in Arlington Township is plentiful due to the vast number of streams and rivers in the area.

Stream corridors “help absorb floodwaters, stabilize streambanks, and filter sediments and polluted runoff. Stream corridors also provide critical habitat for a variety of species. Riparian areas are important for water quality, plant species, wildlife species, and fisheries” (BRW, VBCCD, 73).

“Riparian vegetation can shade the river (thus helping to regulate water temperatures), and provide habitat for both riverine and terrestrial species. Debris from riparian vegetation provides habitat for fish and aquatic invertebrate species. Riparian areas can also filter out excess nutrients (e.g. runoff of fertilizer from agricultural area) before they reach the waterway. In addition, the roots of riparian vegetation can help limit erosion along the riverbank” (BRW, VBCCD, 73). The vegetation along the banks or the stream corridor provides valuable functions to the quality of the water in any community.

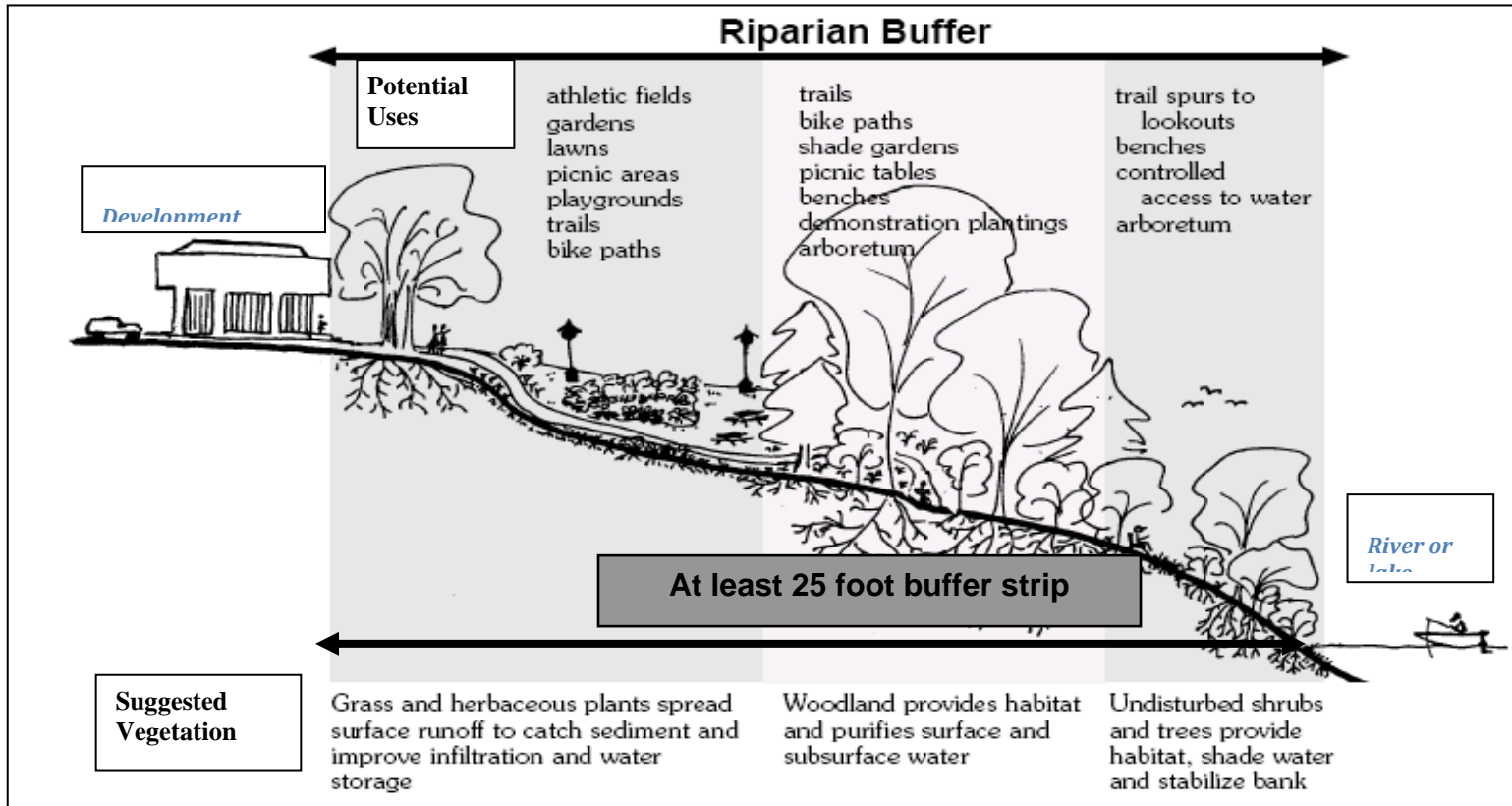
One of the most important actions that a community or property owner can do to protect water quality is to maintain a vegetated riparian buffer along streams, ditches, rivers, lakes and wetlands. Many river or stream edges are currently mowed on a periodic basis for a manicured-lawn look. Although this may be aesthetically pleasing to certain residents, this practice is detrimental to water quality and lake and river ecosystems. One of the first steps necessary to protect limited water resources is to enhance or restore a stream's capacity to function as a *natural, ecological system*.

Buffers Protect Property

Streamside land is a high-risk area for development even above flood elevation. Using riparian buffers in between development and water corridors is a practical and easy way to protect property against the hazards caused by flooding, shoreline erosion and moving streams.

One proven method of improving a stream's or lake's natural function is to create a vegetated buffer system along the shoreline. A *Riparian buffer* or buffer zone is a corridor of vegetation along rivers, streams, lakes and wetlands which help to protect water quality by providing a transition between upland development and adjoining surface waters. Vegetated riparian buffers filter stormwater runoff from impervious areas before it reaches the water body, shade and cool the water, provide channel

stability, and provide storage for floodwaters. Riparian buffers also allow for the development of natural stream meanders and increase the diversity of aquatic life, provide areas for diverse recreational opportunities, filter air and noise pollution and enhance wildlife habitat.



Wetlands

Wetlands are one of the largest contributors to good water quality. The Natural Resources and Environmental Protection Act (NREPA) defines a wetland as *“land characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances does support, wetland vegetation or aquatic life and is commonly referred to as a bog, swamp, or marsh...”* "Wetland" is the collective term for marshes, swamps, bogs, and similar areas often found between open water and upland areas.

Of the estimated 11 million acres of wetlands that stood in Michigan 150 years ago, only 3 million acres remain.

In the past, people viewed wetlands as wastelands --sources of mosquitoes, flies, and unpleasant odors. Some believed wetlands should be avoided, or better yet, eliminated. This negative view, combined with the demand for more developable land, resulted in the destruction of large areas of wetlands. Owners and developers drained their wetlands, and converted them to farmland, or filled them for housing developments or industrial and commercial facilities. Only one-fourth of the original 400,000 acres of coastal wetlands now line Michigan shores. Arlington Township has wetlands that are scattered throughout the Township. There is a significant area of wetlands in the township that amount to over 200 acres.

Attitudes today towards wetlands have changed with the discovery that wetlands are a valuable natural resource providing many important benefits to people, wildlife and water quality. For people, wetlands help filter sediment and pollutants before entering our waterways and ensuring that our favorite river, lakes and streams stay clean and function naturally. Wetlands also act as a staging area for groundwater recharge. Wetlands allow water to slowly filter back into the land and into areas that we pump our well water from. The recharging of this water is essential to all forms of life that need water to survive.

Many species of birds and mammals rely on wetlands for food, water, and shelter, especially during migration and breeding. Wetlands help improve water quality, provide important fish and wildlife habitat and support hunting and fishing activities. Wetlands contribute to the quality of other natural resources, such as inland lakes, groundwater, fisheries, and wildlife. Wetlands store excess water and nutrients; control floods, and slow the filling of rivers, lakes and streams with sediment. In addition, acre for acre, wetlands produce more wildlife and plants than any other natural area.

Floodplain

A river, stream, lake, or drain may on occasion overflow onto the surrounding banks and inundate adjacent land areas with floodwater. The land that is inundated by water is defined as a floodplain. In Michigan, the term floodplain has come to mean the land area that will be inundated by the overflow of water resulting from a 100-year flood (a flood which has a 1% chance of occurring any given year).

A floodplain is an area next to a river, stream, or creek that may be covered with water following heavy rainstorms. The floodplain holds excess water allowing it to be slowly released into the river system and seep into groundwater aquifers. Floodplains also give time for sediment to settle out of floodwaters, thereby keeping it out of water bodies. Floodplains often support important wildlife habitat and are frequently used by humans as recreation areas.

In many communities, the land that is best suited for development has been mostly developed and people are now seeking construction in parts of our communities that are not best suited for development such as floodplains. As development encroaches upon these areas, the safety and welfare of residents and visitors are in jeopardy. With increasing development in the floodplain, open spaces, and wetlands, our land has lost the ability to soak up rain. Buildings and pavement (impervious surfaces) are now replacing areas that were once effective sponges storing precipitation. As a result, floods have become far larger and more frequent.

In the past, we have developed on the floodplains and then tried to control stormwater, keeping it out of the floodplains. This practice causes water to overflow riverbanks in other locations - often creating floods of a greater magnitude and danger. Building on floodplains increases the risk of property damage and life threatening situations to humans and animals. Diverting stormwater into channels and easing its path to bodies of surface water forces water to flow faster. This greater velocity destroys habitats and causes greater erosion including the loss of soil.

Stormwater Management – Low Impact Development

New stormwater management through low impact development seeks to lessen the impacts of development on the quality and quantity of water. Stormwater runoff often carries pollutants and can have negative impacts on our water quality. When chemicals, oil, grease, salt, etc. are carried into our rivers, lakes, and streams, all of these bodies of water become polluted. Pollution of our water may not be immediate, but as the pollutants keep

Traditional attitudes about managing stormwater were to move the water off the site as quickly as possible with curbs, gutters, and storm sewers. *Today,* effective stormwater management practices include decreasing the total amount of stormwater, slowing down the flow of the stormwater and allowing as much of the water to soak naturally into the ground by using low impact development practices such as native plants, rain gardens, vegetated swales and riparian buffers.

washing into our water systems and chemicals increase, our waters may become unusable for drinking, fishing, swimming, canoeing, etc. Increase pollution levels of our water systems can lead to beach closures, fish and other aquatic deaths, lake odor, plant growth in lakes and an increase in water temperatures. Stormwater management using low impact development techniques is needed to protect the public health, safety and welfare of township residents.

As development and imperviousness increases (due to construction of roads, roof tops and parking lots), the infiltration ability of soil decreases. Consequently, more rainfall becomes stormwater runoff, which can cause erosion of land areas and stream banks or increased flooding. The use of stormwater management low impact development techniques, often called Best Management Practices, are activities which landowners, construction contractors and homeowners can do to limit the amount of pollution entering the water within their community. Arlington Township is committed to ensuring that the use of Best Management Practices is to be encouraged and incorporated into existing and future land use decisions through education and ordinance adoption.

Best Management Practices By Land User			
Homeowners	Agriculture	Construction	Municipality
Use native plants	Install and protect vegetated strips along water bodies	Utilize Low impact development techniques* (rain gardens, vegetated swales, etc)	Enact water quality protection zoning ordinances
Protect special natural features on your property	Utilize conservation tillage	Minimize impervious surfaces by clustering development and using porous pavement	Improve master plan to address water quality issues
Use porous pavement	Utilize fertilizer and manure management	Utilize green parking lots**	Ensure the location of high-density or intensity development does not negatively affect water quality.
Use rain barrels			Encourage low impact development techniques
Reduce fertilizer/pesticide use			Include open and green space in recreation plans

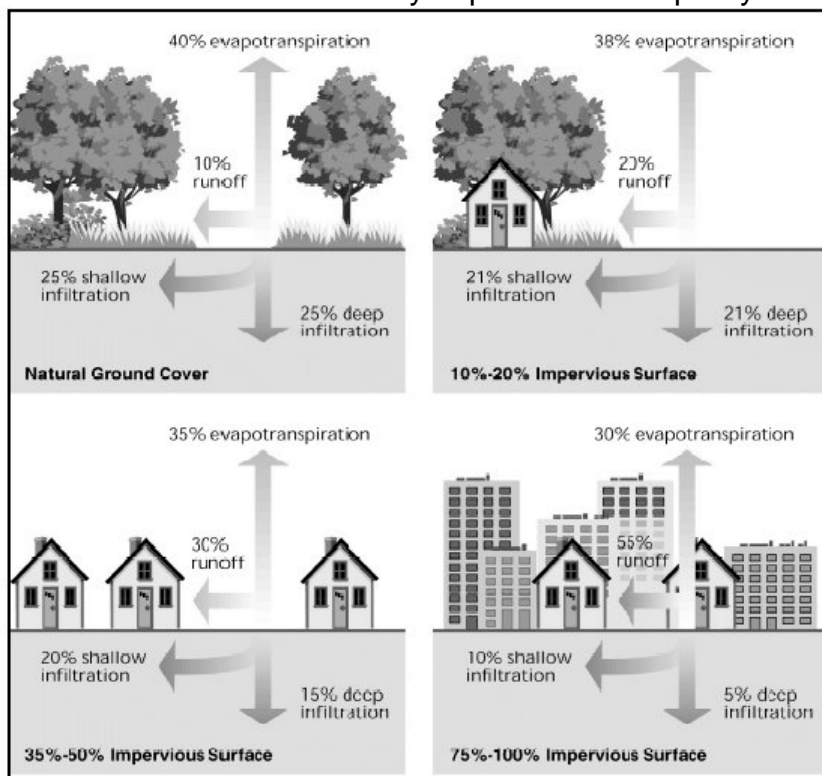
*www.swmpc.org/lid.asp **<http://www.seattle.gov/dclu/publications/cam/CAM515.pdf>

Impervious Surfaces

One of the imminent threats to water quality comes from the increase in the amount of impervious surfaces that are expanding into rural and agricultural areas; and the increase of the amount of nonpoint source pollutants that are being collected from these surfaces, which end up running into our rivers, lakes and streams.

Impervious surfaces are mainly constructed surfaces - rooftops, sidewalks, roads, and parking lots - covered by impenetrable materials such as asphalt, concrete, brick, and stone. These materials seal surfaces, repel water and prevent precipitation and melt water from infiltrating soils. Soils compacted by new construction are also highly impervious.

Impervious surfaces may cover anywhere from five to ten percent or more of a site. Smaller sites may have significantly higher coverages, particularly those with commercial and industrial uses with large parking areas. Not only quantity, but quality of runoff from normal precipitation may change considerably, as lawns, roads, and parking lots rinse clean. Other unnatural water sources are added, such as construction cleanup, car washing, or lawn watering. The diagram below helps people to understand what happens when we remove our natural ground covers, such as native plants and trees, and replace them with impervious surfaces. The increase in the amount of paved surfaces leads to a drastic rise in the amount of runoff and a decrease in the amount of deep infiltration that is being infiltrated back into the ground. With greater runoff, the amount of water that is able to filter down back into our groundwater supply becomes smaller and smaller. The Township is committed to reducing the amount of impervious surfaces within the community to protect water quality.



Erosion and Sedimentation Control

The health and safety of our waterways and residents is a top priority for the Township. Therefore, planning tools and education that will allow everyone to participate in curbing erosion and sedimentation to occur within in the Township is of great importance.

The need to control erosion and sedimentation from entering our bodies of water is important. Erosion and sedimentation are most widely linked to new development, existing development, and agricultural productions. Erosion occurs when vegetation is removed from the land surface and water washes away the topsoil. The second part comes in the form of sedimentation. Sedimentation occurs after the topsoil has been washed into water bodies and begins to build up layers in the bottom of streams, rivers and lakes.

Much erosion comes from construction sites. These simple measures can be taken to control erosion and sedimentation:

1. Proper use and installation of silt fencing
2. Use of sediment retention ponds
3. Not removing vegetation around development sites
4. Leaving existing trees on the property
5. Using vegetated buffers by streams, rivers and bodies of water
6. Incorporating native vegetation into the landscape

NATURAL FEATURES

There are features in any community that any resident would readily recognize as important to the character of the area and to their personal quality of life. These features are often the ones that residents will use to identify or connect themselves to a community. Some of these features may be cultural, such as a downtown business district, historic buildings, lighthouses, or other similar man-made features. Other features used to connect a community to its residents will be natural; lakes, woods, wildlife, views, and other similar features. How these elements are included in the fabric of a community can have a profound influence on their value. Clearly there are some resources, which, if lost, would significantly detract from the environment and the community as a whole.

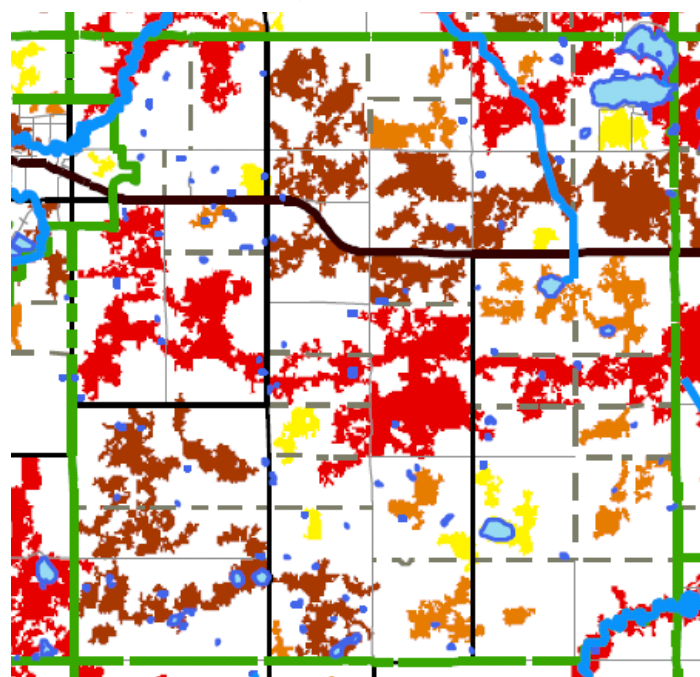
Natural features such as native vegetation, woodlands, wildlife habitat and wildlife corridors add to the natural features that lure people to Arlington Township. Removing these natural features will not only alter the landscape of a community but it can also lead to water quality issues such as increased runoff, erosion and flooding. Development should be limited in areas where significant natural features exist.

“Natural resource conservation is a fundamental component of a community’s long-term environmental and economic health. Natural resource areas perform important natural functions such as water filtration and they provide recreational opportunities and wildlife habitat that enhance the overall quality of life of a community. Abundant natural resources once surrounded population centers in the area. Now, much reduced in size, natural resource areas are becoming encircled by development. These remaining sites are the foundation of Van Buren County’s natural heritage; they represent the last remaining remnants of the area’s native ecosystems, natural plant communities and scenic qualities. Consequently, it is to a community’s advantage that these sites be carefully integrated into the planning for future development. Striking a balance between development and natural resource conservation and preservation is critical if Van Buren County is to maintain their unique natural heritage”(MNFI report, 2007, 1).

Significant Natural Areas

Potential Conservation Areas are defined as places on the landscape dominated by native vegetation that have various levels of potential for harboring high quality natural areas and unique natural features. In addition these areas may provide critical ecological services such as maintaining water quality and quantity, soil development and stabilization, pollination of cropland, wildlife travel corridors, stopover sites for migratory birds, sources of genetic diversity, and floodwater retention. However, the actual ecological value of these areas can only be truly ascertained through on the ground biological surveys (MNFI report, 2007, 3).

The Potential Conservation Area Map for Arlington Township can be utilized as a resource guide for community leaders, developers, and others. The map will also be a way for all community members and outside groups to see that there are considerable areas that warrant special attention when development/or changes are proposed. The map can be a resource for community leaders to steer development and other potential high impact activities away from areas that have a greater demand for protection and conservation. Arlington Township will have the resources to document where the potential conservation areas are and steer high impact activities away from these sensitive areas and create designated spaces to



Potential Conservation Area Ranking

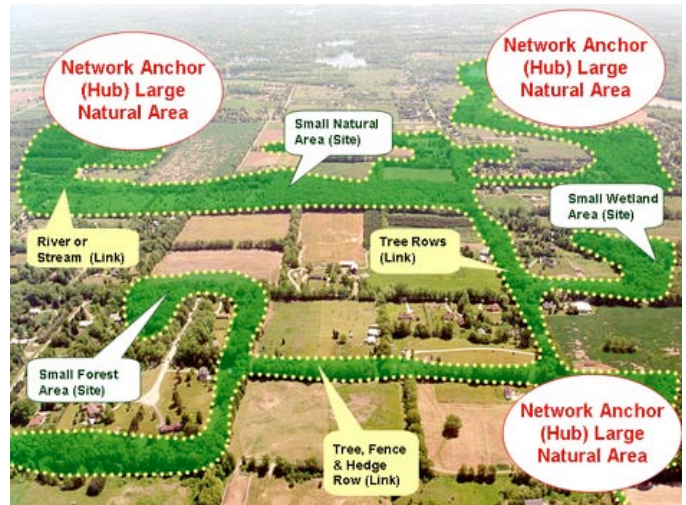
- Highest
- Higher
- High
- Medium

develop and conserve at the same time. This balance of development and conservation is a central principle of green infrastructure.

Green Infrastructure

Southwest Michigan Planning Commission is working with citizens and municipalities to create a vision of green infrastructure based on science and public input. This vision can be used as a tool for more sustainable economic and community development in southwest Michigan.

Green Infrastructure can provide an understanding of how to incorporate these lands into communities long range plans. The Potential Conservation Areas together with a green infrastructure network provides the framework to develop a comprehensive approach to land use planning that includes our green and built environments that will serve as a tool for a sustainable future. By interconnecting green space networks with human forms we can provide for beautiful landscapes within our everyday society.



Green infrastructure is a connected network of natural areas and other open spaces planned and managed to conserve natural ecosystems and the services they provide. These lands provide multiple benefits to people and wildlife such as maintaining clean air and water and providing areas for recreation. Often these natural areas are connected to communities by trails or greenways. Green infrastructure elements can be in urban, suburban and rural areas and may or may not be open to the public. Green infrastructure is an important component to the health, safety and welfare of residents.

Communities that incorporate both the built and natural environment into their long range plans will ensure that those areas that provide clean water, safe recreation opportunities for residents and habitats for wildlife, will be protected against development so that the features that the community has grown to enjoy will be there for generations to come. A clean environment, clean water, green spaces and connected communities will be the communities that have a stable and sustainable future.

Native Vegetation [photo JF New]

Native vegetation refers to the plant life that exists as a natural part of the landscape. It is increasingly recommended that native plants (vegetation that grows naturally in particular climates or regions) be used because of their performance, site enhancement, and life cycle cost benefits.



Native plants typically cost more initially (depending on local availability); however, they are more cost-effective in the long run because they require less water and fertilizer, and are more resistant to local pests and diseases than non-native ornamentals. Native plants are also known to be very effective in managing storm water because many species have deep root systems which stabilize soil and facilitate the infiltration of storm water runoff. Native plants provide habitat for birds, butterflies and other wildlife, help to buffer noise pollution, filter air pollution and provide us with stunning landscapes. Native plants can be incorporated into individual home sites, commercial sites, and industrial sites.

Woodlands

Woodlands act as a type of buffer and moderator of flooding, erosion, and noise and air pollution. Woodlands are also important to the Township's quality of life. Woodlands and agricultural lands comprise approximately 20,000 acres. This is over 31 square miles; a very significant amount given the Township has 36 square miles! Much of the woodlands within the Township lie either in small parcels, usually left from agricultural clearing, or in larger areas where farms have not been established and where intensive development has not yet occurred. In Arlington Township, the same can be said. Various species of hardwoods exist, including Ash, beech, Oak, Elm, Hickory, Maple, Walnut and Pine. These hardwoods are mainly second growth, and found on poorly drained mineral soils that were not suited for agricultural needs.

Values of Woodlands

1. Provide a varied and rich environment for plants and animals.
2. Provide breeding, feeding, and refuge areas for many species of insects, birds, and mammals.
3. Protect watersheds and soils.
4. Moderate the effect of winds and storms, stabilize and enrich the soil, and slow runoff, allowing the forest floor to filter groundwater.
5. Serve as buffers to the sights, sounds, and odors of civilization.
6. Mute noise from freeways and factories, and absorb air pollutants.
7. Provide visual relief along roadways.

Aesthetically pleasing roadways with natural vegetation tend to be more popular than those with little vegetation or highway clutter. Trees within the public domain should be managed for their aesthetic and critical role that they play in air quality mitigation, cooling of streets and the filtering of air and noise pollution. Mature roadside trees are sometimes considered hazardous, but always seen as attractive and valuable and should be managed and maintained as part of the community identity. To the extent possible, road improvements should respect and maintain these important landmarks, and their contribution to community identity.

Wildlife Habitat

A rich variety of wildlife is present in Arlington Township, providing a truly valuable living classroom of diversity that includes fish, mussels, frogs, rabbits, white-tailed deer, squirrels, bats, pheasants, fox and a variety of waterfowl species.

The presence of an array of wildlife means that protection of their habitat is necessary to ensure their survival. Michigan's wildlife is one of its most precious resources. Surveys consistently show that residents value wildlife as part of their quality of life. In addition, wildlife is valued throughout Michigan for the contribution it makes to tourism, recreation, hunting, and fishing. As a result, there is an increasing appreciation of the role that wildlife contributes to the economy and quality of life of Michigan residents.

A wildlife habitat is an area that offers feeding, roosting, breeding, nesting, and refuge areas for a variety of bird and mammal species native to the southwestern Michigan region.

As with other natural features, it is important to remember that wildlife does not respect jurisdictional boundaries. As a result, it is important to coordinate activities with other local governments on the basis of biological or geographical boundaries rather than on purely political ones. In rural areas, there are significant opportunities for wildlife management, simply because of already existing, abundant wildlife habitat. This makes planning for wildlife habitat protection possible, by identifying areas of high wildlife value and encouraging development elsewhere. Even with the development of scattered rural areas, large open spaces still may be found throughout the Township. This means that there is ample opportunity for movement of wildlife among habitat locations. It will require strong coordination of local governments and private landowners to ensure that wildlife considerations are included in the review of development plans.

The threat of fragmented habitats, due in part to strong development pressures in natural areas, can act as a motivator for the Township to establish a framework for the protection of these critical areas. These areas contribute to the Township's rural setting and community identity. The goal of establishing wildlife corridors is to maintain as nearly a contiguous greenway of native vegetation as possible, averaging 200 feet wide between various habitats.

Some interruptions in the corridors are inevitable because of existing roadways interposed between the habitats. Within this limitation, the objective is to locate corridor connectors to minimize the number of road crossings and maximize the greenspace available for protected wildlife transit. Wherever possible, the corridor should follow natural drainage corridors since this land offers more habitat value, is important for natural stormwater drainage, and is generally more difficult to develop.

Wildlife corridors can also be developed in coordination with other construction projects. For example, a utility corridor could be planned to provide a more natural system, rather than a swath of land devoid of natural features. Where it exists, native vegetation should be left undisturbed. In areas with exotic vegetation, undesirable plants should be removed and native trees, shrubs, grasses, etc. (as appropriate), planted and maintained.

Wildlife Corridor

A wildlife corridor is a continuous natural protected pathway along which native wildlife species can move in relative security between high quality natural wildlife habitats. The land through which wildlife must pass when transiting between these habitats may, at times, consist of platted lots in private ownership and public roads and rights-of-way. Corridors work best when sparsely developed.

Land Protection and Management

Most of the land in the township is in private ownership. Landowners have the opportunity to manage their lands in a way that protects natural resources, water quality and wildlife habitat. Landowners can work with the County Conservation District and the Natural Resources Conservation Service to ensure good management of the land. In addition, a landowner can work with a land trust such as the Southwest Michigan Land Conservancy or The Nature Conservancy to protect and manage their land. Options for private landowners include conservation easements, land donation, donation of land by will or trust, donation of remainder interest in land with reserved life estate or a bargain sale of the land. A description of these options is in the table below.

There are also options for the township to help protect the natural resources and wildlife habitat in the township. The location of high density or intensity land uses should be directed away from intact natural areas. Incentives for cluster or open space developments can be offered in the zoning ordinance to encourage these types of developments. Careful and thoughtful site plan review standards can help to protect water quality, natural features and wildlife habitat. Lastly, the township can participate in the County's Open Space and Farmland Preservation Program.

SUMMARY OF CONSERVATION OPTIONS – WORKING WITH A LAND CONSERVANCY

Land Protection Option	Description	Results	Income Tax Deduction? *	Estate Tax Reduction?*
Conservation easement	Legal agreement between a landowner and a land conservancy or government agency permanently limiting a property's uses.	Important features of the property protected by organization. Owner continues to own, use, live on land.	Yes	Yes
Outright land donation	Land is donated to the land conservancy.	Organization owns, manages, and protects land.	Yes	Yes
Donation of land by will	Land is specifically designated for donation to the land conservancy.	Organization owns, manages, and protects land.	No	Yes
Donation of remainder interest in land with reserved life estate	Personal residence or farm is donated to the land conservancy, but owner (or others designated) continue to live there, usually until death.	Organization owns remainder interest in the land, but owners (others) continue to live on and manage land during their lifetime subject to a conservation restriction.	Yes	Yes
Bargain sale of land	Land is sold to the land conservancy below fair market value. It provides cash, but may also reduce capital gains tax, and entitle you to an income tax deduction.	Organization owns, manages, and protects land.	Yes	Yes

*In most cases. The amounts of income tax and estate tax reduction depend on a number of factors. Please consult your own professional tax and/or legal advisor. (Adapted from Conservation Options: A Landowner's Guide, Land Trust Alliance.) Southwest Michigan Land Conservancy
(269) 324-1600

LAND MANAGEMENT OPTIONS**

Land Management Option	Description	Agreement Length	Landowner reimbursement
Wildlife Habitat Incentive Program (WHIP)	Provides technical and financial assistance to promote wildlife habitat including corridor, riparian buffer and rare species habitat development.	Minimum of 5 years and a maximum of 10 years.	Up to 75% of cost of improvements.
Wetland Reserve Program (WRP)	Assists in restoring active agricultural land to natural wetland condition.	10-year, 30-year or perpetual.	Up to 75%;100% for perpetual agreements
Environmental Quality Incentives Program (EQIP)	Assists in restoring agricultural land to wildlife habitat.	2-10 years.	Up to 75% of cost of improvements.

**These are just a few of many examples. For more information contact Van Buren Conservation District office at 269-657-4030 x5.

AGRICUTLRAL LANDS

The National Environmental Policy Act defines several classifications of farmland including Prime and Unique farmland. The prime and unique farmland in Arlington Township can be seen on the Prime and Unique Farmland Map. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding. Unique farmland is land other than prime farmland that is used for the production of specific high value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods.

Resource Value

The climate, terrain and variety of soils make several areas in Van Buren County well suited for agriculture. Open space lands including woodlands, wetlands and other environmentally significant areas are features normally associated with farmlands and agricultural areas. These lands provide unique and economic benefits to the citizens of Arlington Township and are an important part of the Township's natural and agricultural heritage. Agriculture also contributes to the local economy in direct sales of agricultural products. Many of the agricultural activities in Arlington Township provide the opportunity to harvest locally grown foods to sell at roadside stands, farmers markets and local retail food stores to increase tourism and the economic impact of agriculture.

Agriculture is an important economic activity for Van Buren County (statistics of economic impact at the township level are not available). In 2003, Van Buren County ranked 1st in blueberry production, 1st in cucumber processing, 2nd in grape production, and 3rd in apple and asparagus production for the State of Michigan. In 2002, there were 1,160 farms in Van Buren County of these 188 are orchards and 91 are vegetable farms. There were a total of 176,260 acres of land in farms with 10,281 acres in orchards, 10,553 acres in vegetables, 31,870 acres in grain corn and 29,321 in soybeans. The average size of a farm in Van Buren County in 2002 was 152 acres and the median size was 70 acres. In 2002, in Van Buren County the average market value of agricultural products sold per farm is \$83,382 with the total market value of agricultural products in the County valued at \$96,724,000.

Van Buren County Farmland and Agricultural Statistics 1987 - 2002				
	1987	1992	1997	2002
Total Acres of Farmland	190,251	206,781	189,432	176,260
Acres in Orchards	18,663	19,232	15,480	10,281
Acres in Vegetables	14,853	13,734	12,069	10,553
Acres in Corn (for grain)	35,282	38,255	34,695	31,870
Acres in Soybeans	9,684	23,679	24,702	29,321
Total Number of farms	1,278	1,164	1,217	1,160
Number of Orchards	373	312	256	188
Number of Vegetable Farms	201	158	104	91
Average Size of Farm	149	178	156	152
Median Size of Farm	N	N	73	70
Total Market Value of Agricultural Products	69,624,000	84,931,000	104,868,000	96,724,000
Average Market Value of Agricultural Products per Farm	54,479	72,965	86,169	83,382
Hogs and Pigs Inventory (farms)	147	119	68	36
Hogs and Pigs Inventory (number)	56,167	52,055	29,477	24,985
Hogs and Pigs Sold (farms)	152	116	64	41
Hogs and Pigs Sold (number)	84,358	103,464	56,245	67,997

N – no data available; Source: US Department of Agriculture, 1987, 1997, 2002 Census of Agriculture

Farmland Protection Benefits

Farming creates jobs, provides a product for sale, and provides vast areas of open space and scenic corridors. Farmland also provides substantial environmental benefits, including floodplain protection, groundwater recharge, and wildlife habitat. In addition, the tradition of family owned farms has been passed down from generation to generation; supporting a strong social structure focused on community and family.

Based upon agricultural statistics for Van Buren County, agriculture will continue to be a prominent economic force in the region. In evaluating the value of farmland, there must be a basic assumption that farmland is worth saving. Arlington Township recognizes the

significance of agriculture in the master plan and the future land use map which seeks to see the loss of farmland reduced to 3-7% over the next twenty years within the Township; as opposed to a county farmland loss of 14% from 1992 and 1997 (Census of Agriculture).

Economic Benefits

- Strengthens the agricultural economy
- Strengthens the total economy through diversification
- Increases the long-term sustainability of farming
- Lowers infrastructure costs to taxpayers
- Increases property values
- Reduces the trade deficit
- Allows growth and development to continue in specified areas
- Maintains or increases tourism related to open space, wildlife and farming
- Local economic development
- Provides a long-term business environment for agriculture
- Infrastructure follows development

Environmental Benefits

- Controls flooding and erosion
- Protects water quality
- Provides wildlife habitat
- Protects drinking water and aquifer recharge areas
- Preserves land, a limited resource
- Renewable resource/clean fuel, alternative energy
- Retains natural character

Social Benefits

- Strengthens and preserves farming communities
- Provides a future for young farmers
- Preserves scenic open space
- Encourages revitalization of cities
- Reduces traffic congestion
- Provides a local fresh food supply
- Provides a safe, high-quality food supply (e.g., more care is taken domestically when using pesticides)
- Preserves existing urban and rural communities
- Preserves our rural heritage in the state and the nation
- Provides recreational opportunities
- Improves the aesthetic quality of our rural and urban lives; saves beautiful land in rural areas, encourages saving beautiful buildings in cities
- Provides for a higher quality of life in a community
- Encourages a sense of community

Implications for Development

Van Buren County and Arlington Township are experiencing substantial residential

development. Historically, many areas in Van Buren County were predominantly farming communities; however, increasing growth pressure is resulting in farmland being developed and fragmented. The fragmentation of farmland will make it increasingly difficult for remaining farming operations to remain viable. The land that is suitable for farming is an irreplaceable natural resource that cannot be regained once it has been lost to development. Farmland is an important part of Van Buren County and Arlington Township's history, culture and economic structure.

Farmland Preservation Options

Several programs and zoning strategies are available to manage growth and preserve farmland. Agricultural preservation methods primarily fall in one of four categories: 1) purchase of agricultural easement programs (such as Van Buren County's Purchase of Development Rights Program), 2) right to farm laws, 3) agricultural zoning, and 4) circuit breaker tax relief credits. No one technique is right for all areas.

Van Buren County Farmland and Open Space Preservation Program

Arlington Township can participate in the Van Buren County Farmland and Open Space Preservation program pursuant to P.A. 183 of 1943, as amended, MCLA, 125.231 through 125.240. With this county program, the Van Buren County Board of Commissioners is authorized to acquire the development rights from farmland throughout Van Buren County by purchase, gift, grant, bequest, devise, covenant, or contract but only at a price which is equal to or less than the fair market value of the development rights as determined by valuation methods approved in this ordinance.

The County shall only purchase development rights for farmlands that meet the definition of eligible farmland or other eligible land as set forth in the county ordinance, are located within the jurisdiction of a participating local unit of government, are voluntarily offered for sale by an owner of farmland or other eligible land, have been determined to be consistent with the farmland and open space elements of the comprehensive plan of the participating local government and the Van Buren County Comprehensive Plan, and have applications that have been reviewed and approved by the land preservation board (LPB) and legislative body of the participating local government.

The primary purpose of the County ordinance is to allow local units of government to apply for funds for the purchase of farmland. However, funding may also come directly from local government, the county, or other private or not-for-profit entities to purchase lands through the county program. Further, although the emphasis seems to be placed on the purchase of productive farmland, if the interest arises to purchase open spaces as a goal to protect natural resources or recreational areas, the county ordinance also allows for that.

The permanent acquisition by Van Buren County, the State of Michigan, the United States, or other qualified conservancy organizations of voluntarily offered interest in farmland and open space lands within Van Buren County, as provided in this ordinance and as authorized by the Constitution and Statutes of the State of Michigan, will permit these lands to remain in

farmland and open space and provide long-term protection for the public interests that are served by farmland and open space lands in Van Buren County.

Sliding Scale Zoning

Sliding scale zoning limits the number of times that a parent parcel can be split, based on its size (i.e., the larger the parcel the more splits that may occur, up to a maximum number established). A larger minimum parcel size is also established.

Unlike exclusive use zoning, sliding scale zoning allows some non-farm residential development without special land use or other reviews. Sliding scale zoning can be useful in agricultural areas where there are significant development pressures and land speculation. The use of sliding scale zoning is most effective in areas where a wide range of parcel sizes exist and non-farm residential development has already begun to occur.

Minimum and maximum building lot sizes can be used to encourage the location of non-farm development on less productive farmland and/or in areas where development is more concentrated to direct growth onto already fragmented land. The use of buffer areas (see later discussion) is highly recommended to avoid land use conflicts between new residential development and agriculture fields.

Since this method does permit some use of land for non-agricultural uses, it allows communities to more effectively avoid a claim that land has been "taken" without compensation.

Large Lot Zoning

Large lot zoning simply increases the lot size required in residential zone districts where farming operations exist, except perhaps, where public utilities are/can be provided. Lot sizes are generally greater than 10 acres, depending on the objective (farmland preservation vs. rural character). In areas where farmland preservation is particularly important to the community individual lot sizes of 40 to 160 acres may be applicable.

Large lot zoning, however, is generally not considered to be effective in farmland protection since low density development patterns create parcel sizes which are "too big to mow, but too little to plow." In areas of marginal farming production this technique can have a detrimental effect by requiring large lots for individual homes and taking large parcels out of production for that purpose. This technique may be effective in maintaining rural character, but not farmland.

Open Space (Cluster) Development

Another approach to farmland preservation is to concentrate less on restricting development of property and work instead on the efficient use of land. Open space development (or as it is sometimes known, cluster development) provides for a denser concentration of development in a limited area, with no increase in the overall, or "gross density" of the site.

The object of clustering is not to increase the number of units developed, but to regulate the amount of land disturbed by structures, lawns, and drives. The gross density must still fall into the requirements of the Zoning Ordinance.

On larger parcels, the acreage not used in the development may be set aside for farming, provided that ownership or control of the area to be used for farming is firmly established. This development style permits areas of agricultural lands to remain in production, even as other parts of the property are developed for residential use.

Open space lands provided as part of an open space development could be incorporated in a long-term lease agreement with a local farmer. Farm operators may also take advantage of this option by developing only a portion of the property to gain additional financial resources, while retaining the remainder for agricultural purposes.

Even where open space development may have a limited impact on the preservation of farmland, it can allow for the preservation of many site features, such as wooded areas, steep slopes, wetlands, and other natural amenities.

Agricultural Buffers

Balancing the need to continue agricultural practices and the desire to develop land for non-agricultural purposes can be challenging. Open space buffers between active agricultural areas and other uses, such as residential development, can help reduce land use conflicts, particularly where residential and agricultural conflicts are occurring with greater frequency. The use of buffers can aid in easing land use conflicts and improving the relationship of agricultural uses and new residents.

Buffers are generally included in residential developments, rather than on farming operations, principally because the farm was probably the first use in place. Buffers should be sufficiently wide to protect the farming operation from lawn fertilizers, playing children, and other conflicts. At the same time, they cannot be so burdensome as to require excessive land commitments from residential property owners.

Buffers are most effective if a "no-disturb" zone is provided between residential properties and farmland. This requirement should be tied to subdivision, site condominium, planned unit development, or land division approval. It should also be required that the buffer be described in the property deed to alert potential buyers of the need to honor the no-disturb area.

Transfer of Development Rights

Transfer of development rights (TDR) offers a land preservation option that is quite similar to PDR. However, instead of simply being sold, the development rights are transferred from one area and given to another. Therefore, a conservation easement is placed on one parcel (typically agricultural), the sending area, and an increase in development density is allowed in another area, the receiving area. The costs of purchasing the easements are then recovered from the developers who build in the receiving area.

These sending and receiving areas are predetermined, and are therefore the main difference between TDR and PDR programs. This requires a more detailed comprehensive plan, with greater certainty about where development will occur and where it will not.

As in PDR, the owner of the preserved site retains existing use rights while receiving compensation for the development value of the land, thereby restricting development on this property. The down zoning of the sending area does not necessarily reduce the economic value of the property within that area, because the development rights can remain in the landowners' hands and can be used on other properties of the owner or sold to others for use elsewhere.

According to Timothy J. Lawrence from the Ohio State University (<http://ohioline.osu.edu/cd-fact/1264.html>), TDRs have been successful in many areas of the country for the preservation or protection of open space, natural resources, farmland, and urban areas of historical importance. More than 20 states have enacted or amended statutes to accommodate TDR.

Clyde Township

1. Add to p.5-13 last sentence -

Southwest Michigan Land Conservancy and West Michigan Land Conservancy

2. p. 2-13 replace last sentence and list with this:

The following list describes some unique features found in Allegan County:

- Crooked Lake Marsh is considered a Coastal Plains Marsh - a quite rare and unique wetland community. This marsh supports unique plants, which are adapted to frequent changes in the water table.
- Karner Blue Butterflies are a federal endangered species found in and around the Allegan County State Game Area.
- There were 23 bald eagles nesting in the area.
- The Allegan County State Game Area is noted for its Savannah Oaks, flower tours, migratory geese, deer, birds and raptors.

A threat to unique and native species in Clyde Township and Allegan County is the spread of invasive species such as purple loosestrife and garlic mustard. Purple loosestrife adapts readily to natural and disturbed wetlands. As it establishes and expands, it out competes and replaces native grasses, sedges, and other flowering plants that provide a higher quality source of nutrition for wildlife. The highly invasive nature of purple loosestrife allows it to form dense, homogeneous stands that restrict native wetland plant species, including some federally endangered orchids, and reduce habitat for waterfowl. Garlic mustard poses a severe threat to native plants and animals in forest communities in much of the eastern and Midwestern U.S. Many native wildflowers that complete their life cycles in the springtime (e.g., spring beauty, wild ginger, bloodroot, Dutchman's breeches, hepatica, toothworts, and trilliums) occur in the same habitat as garlic mustard. Once introduced to an area, garlic mustard out competes native plants by aggressively monopolizing light, moisture, nutrients, soil and space. Wildlife species that depend on these early plants for their foliage, pollen, nectar, fruits, seeds and roots, are deprived of these essential food sources when garlic mustard replaces them. Humans are also deprived of the vibrant display of beautiful spring wildflowers.

3. add a section after Unique Habitats and Species – called Green Infrastructure on p.2-13

Green infrastructure is a connected network of natural areas and other open spaces planned and managed to conserve natural ecosystems and the services they provide. These lands provide multiple benefits to people and wildlife such as maintaining clean air and water and providing areas for recreation. Often these natural areas are connected to communities by trails or greenways. Green infrastructure elements can be in urban, suburban and rural areas and can be either private or public lands. Green infrastructure is an important component to the health, safety and welfare of residents.

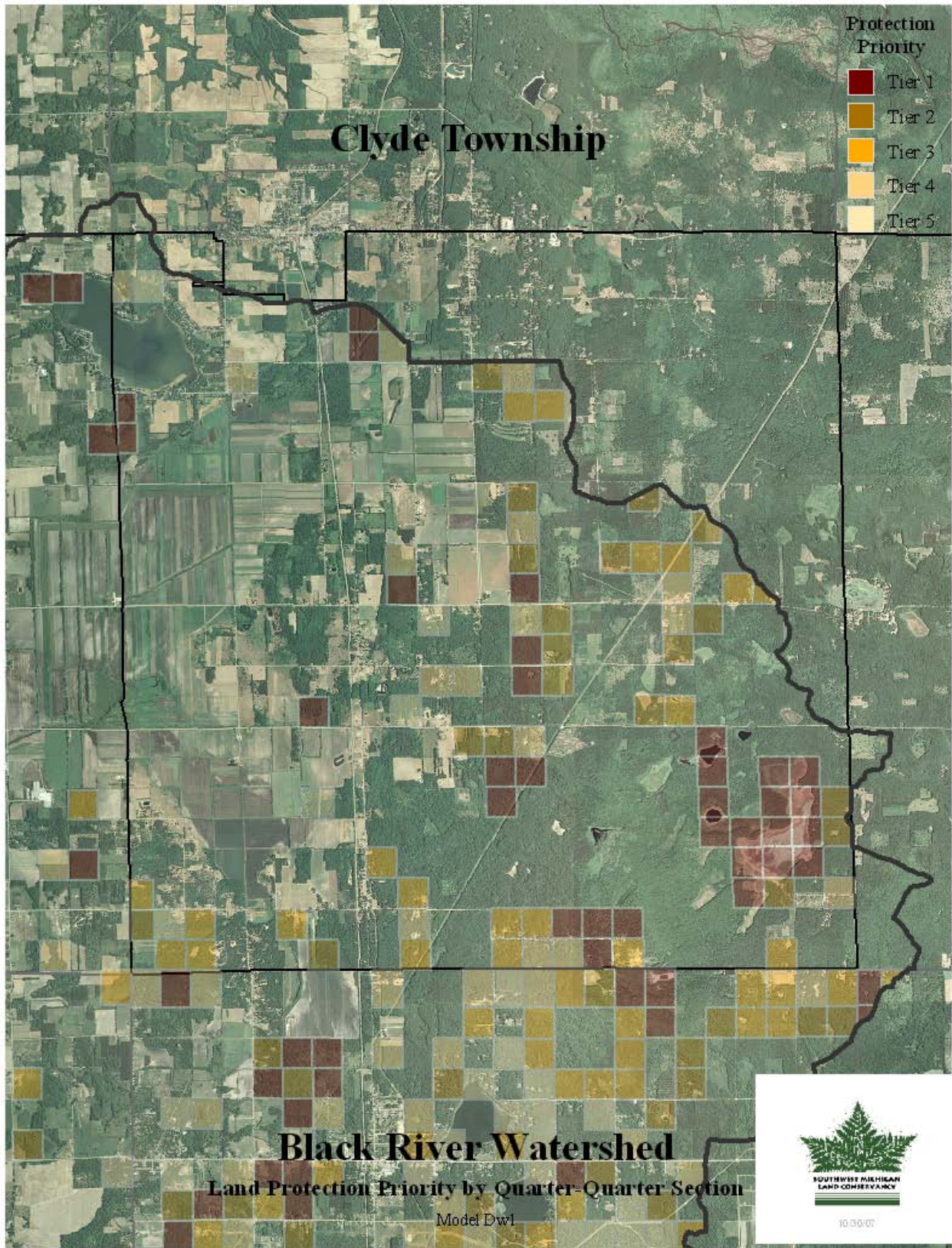
Communities that incorporate both the built and natural environment into their long range plans will ensure that those areas that provide clean water, safe recreation opportunities for residents and habitats for wildlife, will be protected against development so that the features that the community has grown to enjoy will be there for generations to come. A community with a clean environment, clean water, green spaces and trails will be the communities that have a stable and sustainable future.

Natural resource conservation is a fundamental component of a community's long-term environmental and economic health. Natural resource areas perform important natural functions such as water filtration and they provide recreational opportunities and wildlife habitat that enhance the overall quality of life of a community. The Conservation Priority map represents the last remaining remnants of the area's native ecosystems and natural plant communities. Consequently, it is to a community's advantage that these sites be carefully integrated into the planning for future development. Striking a balance between development and natural resource conservation and preservation is critical if Clyde Township is to maintain its unique natural heritage.

Ecosystem Services are the processes by which the environment produces resources that we often take for granted such as clean water, timber, and habitat for fisheries, and pollination of native and agricultural plants. Whether we find ourselves in the city or a rural area, the ecosystems in which humans live provide goods and services that are very familiar to us. Here are a few examples:

- Maintenance of healthy waterways
- Water and air filtration
- Mitigation of drought and floods
- Pollination of crops and natural vegetation
- Prevention of soil erosion
- Fulfillment of people's cultural spiritual and intellectual needs
- Contribute to climate stability
- Regulation of insect pests and disease carrying organisms
- Maintenance and provision of genetic resources
- Maintenance and regeneration of habitat
- Provision of shade and shelter
- Maintenance of soil fertility
- Maintenance of soil health

The Conservation Priority map created by the Southwest Michigan Land Conservancy shows areas where the landscape is dominated by native vegetation that have various levels of potential for harboring high quality natural areas and unique natural features. In addition, these areas provide critical ecological services such as maintaining water quality and quantity, soil development and stabilization, pollination of cropland, wildlife travel corridors, stopover sites for migratory birds, sources of genetic diversity, and floodwater retention. However, the actual ecological value of these areas can only be truly ascertained through on the ground biological surveys.



4. p. 2-14 add to section on Lakes –

The value of lakes is often taken for granted by those who enjoy them, and many people assume that the value of "clean water" is obvious. The value of water quality to local officials and property owners, who make the bulk of land-use decisions which affect water quality need to understand the value of clean water in lakes.

The lakes in the Township provide multiple values to the landowners living on the lake, the visitors to the region and to the local government and economy. Lakes are magnets for recreation such as boating and fishing. Lakes are also important for local economic development. In addition, lakes and their associated wetlands provide great wildlife habitat. The most significant feature of lakes, which affect people's enjoyment of the resource, is water clarity. A decline in water clarity can reduce property values by as much as \$200 per frontage foot, representing large losses in property value. Surveys show that water clarity, quality of swimming, and scenic beauty are important to most people when they choose which lake to visit or where to buy property. Because of the significant value that lakes have in the Township, protecting water quality must be at the forefront of all land use decisions.

5. Add to page 2-14 – Watersheds and Drainage

What is A Watershed?

A watershed is the area of land that catches rain and snow and drains or seeps into a marsh, stream, river, lake or groundwater. **You are sitting in a watershed now.** Homes, farms, ranches, forests, small towns, big cities and more can make up watersheds. Some watersheds go across county, state, and even international borders. Watersheds come in all shapes and sizes. Some are millions of square miles; others are just a few acres. Just as creeks drain into rivers, watersheds are nearly always part of a larger watershed or basin. The **St. Joseph River Watershed** is part of the **Lake Michigan Watershed**, which is part of the **Great Lakes Basin**. Every stream, river and lake has an associated watershed.

How land is developed impacts the quality and quantity of our water. Land uses from any part of the watershed, such as polluted runoff from homes and farms, eventually affect the health of the whole watershed.

6. p. 2-14 to 2-15 – add to wetlands section -

Requiring a building setback and a native vegetative strip of at least 50-100 feet from wetlands for all new development will ensure the values and functions that wetlands provide residents of the township are protected.

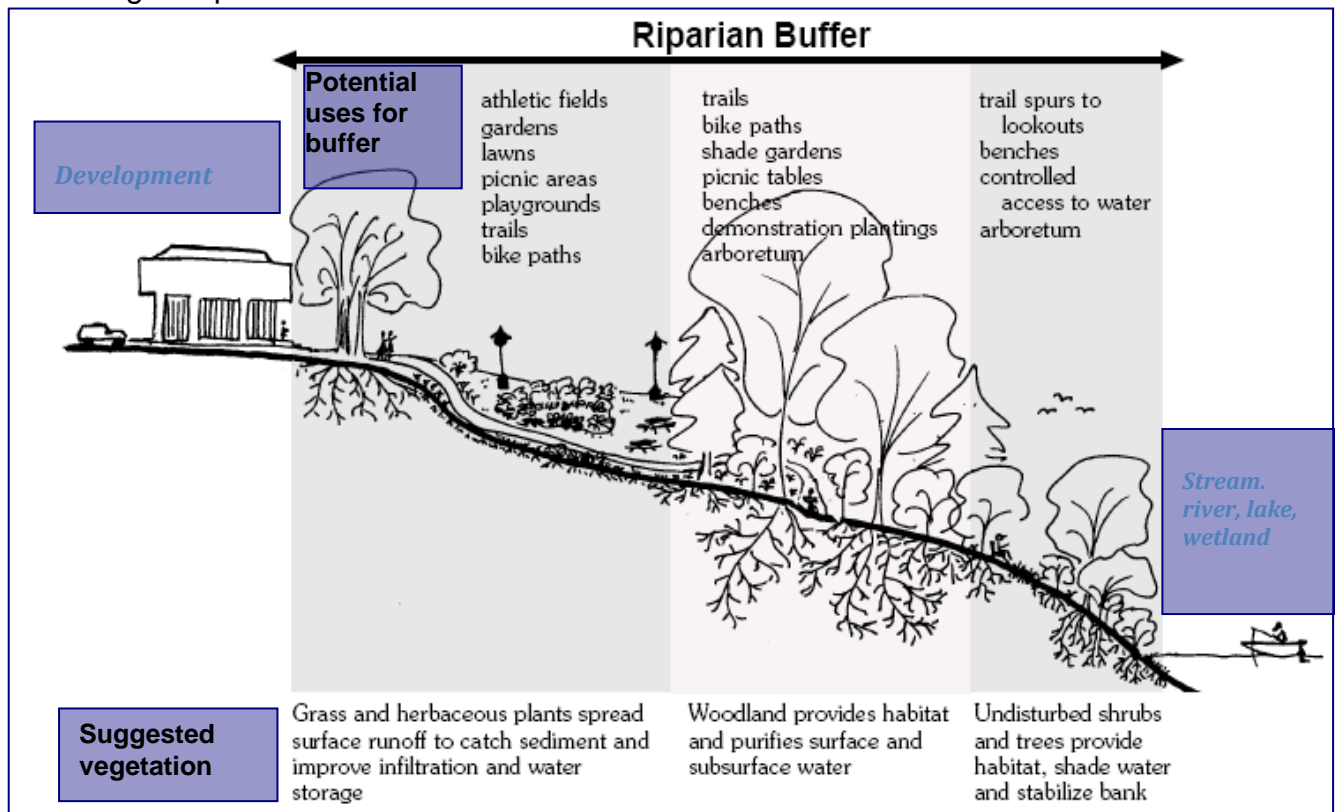
7. p. 2-15 - add section on Riparian Buffers after wetlands

One of the most important actions that a community or property owner can do to protect water quality is to maintain a vegetated riparian buffer along streams, ditches, rivers, lakes and wetlands. Protecting riparian buffers along streams, rivers, lakes and wetlands is important for promoting the health and safety of residents, providing flood control, protecting water quality and providing wildlife habitat. All new development should be set back from water bodies and wetlands and a native vegetation strip should be left to filter runoff entering the water body or wetland. The native vegetation strip should be at least 50 to 100 feet to improve the water quality of runoff. Setbacks of buildings should be at least 100 feet, but may be more if wetlands, floodplains or steep slopes are present along streams, rivers or lakes. Floodplain protection is extremely important for the health, safety and welfare of residents. It is important to coordinate efforts to protect floodplains with adjoining communities in watershed.

The intent is to protect and improve water quality, to support designated beneficial water uses and to protect the functions and values, which include, but are not limited to:

- Provide a vegetated corridor to separate water features from development;
- Maintain or reduce stream temperatures;
- Maintain natural stream corridors and natural shorelines of lakes;
- Minimize erosion, nutrient and pollutant loading into water bodies and wetlands;
- Provide filtration, infiltration and natural water purification;
- Stabilize slopes to prevent landslides contributing to sedimentation of water features

The following is a graphic depicting a proper vegetated riparian buffer along a stream, river, lake or wetland. This buffer is important for protection of water quality, protection of structures from flooding and provision of wildlife habitat.



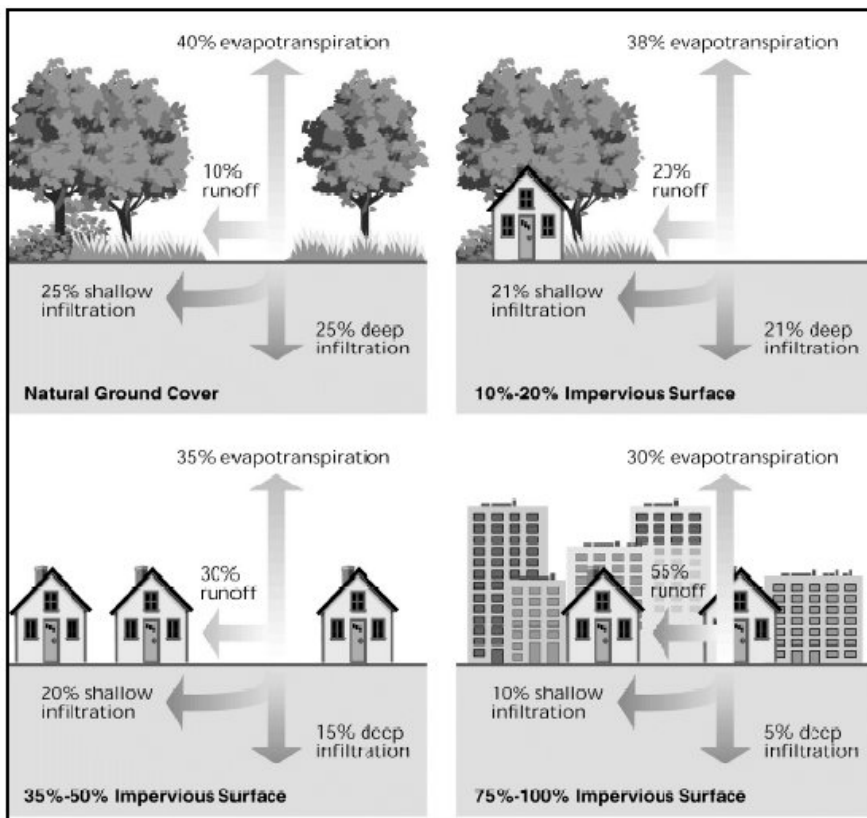
8. p. 2-15 – add the title of **Water Quality** (before the discussion of nonpoint source pollution problems and add discussion on impervious surface and water quality

Impervious Surfaces

One of the imminent threats to water quality comes from the increase in the amount of impervious surfaces and the increase of the amount of non-point source pollutants that are being collected from these surfaces, which end up running into our rivers, lakes and streams.

Impervious surfaces are mainly constructed surfaces - rooftops, sidewalks, roads, and parking lots - covered by impenetrable materials such as asphalt, concrete, brick, and stone. These materials seal surfaces, repel water and prevent precipitation and melt water from infiltrating soils. Soils compacted by new construction are also highly impervious.

Impervious surfaces may cover anywhere from five to ten percent or more of a site. Smaller sites may have significantly higher coverage, particularly those with commercial and industrial uses with large parking areas. Not only quantity, but also quality of runoff from normal precipitation may change considerably, as lawns, roads, and parking lots rinse clean. Other unnatural water sources are added, such as construction cleanup, car washing or lawn watering. The diagram describes what happens when we remove our natural ground covers, such as native plants and trees, and replace them with impervious surfaces. The increase in the amount of paved surfaces leads to a drastic rise in the amount of runoff and a decrease in the amount of deep infiltration that is being infiltrated back into the ground to provide drinking water supplies. With greater runoff, the amount of water that is able to filter down back into our groundwater supply becomes smaller and smaller.



A practical way to allow for development and to protect water quality is to utilize LOW IMPACT DEVELOPMENT (LID). LID is a way to develop land that preserves significant natural features, natural drainage patterns and topography to mimic the natural hydrology of the site as much as possible. See www.swmpc.org/lid.asp for information on implementing LID in new and redevelopments.

9. p. 3-7 – Lakes – add to this section:

The biggest factor on whether people will choose to recreate or buy a house on a lake is water clarity. Lake owners and township officials must ensure that land use decisions do not degrade the water quality and clarity of the lakes in the Township.

10. p.8-2 landscaping section – change 2nd sentence to read

Required landscaping could take the form of grass cover and/or shrub and trees and native species should be utilized to the greatest extent possible. The use of native plant species is key in the protection of air, land and water resource quality. Native plants typically cost more initially (depending on local availability); however, they are more cost-effective in the long run because they require less water and fertilizer, and are more resistant to local pests and diseases than non-native ornamentals. Native plants are also known to be very effective in managing storm water because many species have deep root systems which stabilize soil and facilitate the infiltration of storm water runoff. Native plants provide habitat for birds, butterflies and other wildlife, help to buffer noise pollution, filter air pollution and provide us with stunning landscapes. Native plants can be incorporated into individual home sites, commercial sites, and industrial sites.

11. p.4-4 Water Quality – add objectives to list:

- In all new developments, minimize impervious surfaces as much as possible and provide multiple opportunities for infiltration of water to protect water quality and the natural hydrology
- Provide incentives such as bonus densities for open space developments

12. p. 5-3 and 5-4

under the wetlands section references to MDNR should be Michigan Department of Environmental Quality (there are two instances of this – one on page 5-3 and another on page 5-4 – also on page 5-6 in the Lakes section)

on page 5-4 – “Avoidance” should be listed first and noted as the “Priority Strategy” and “Mitigation” should be listed 2nd with a note saying that if there are no options available to avoid wetlands, any negative impacts should be mitigated.

13. p. 5-11 Stormwater Management section change last paragraph to read:

Stormwater management should be concerned with controlling both the quality and quantity of water moving off a developed site. Low Impact Development techniques should be utilized to first protect natural features, natural drainage ways and existing topography. Second, LID techniques should be used slow and reduce runoff by maximizing opportunities for filtration and infiltration of water throughout the site. This will decrease the need for large detention or retention facilities. For more on Low Impact Development, visit www.swpmc.org/lid.asp.

14. Chapter 6 – Development Areas add this paragraph after the 3rd paragraph

Whether it is residential, commercial or industrial development, low impact development techniques should be utilized to balance development with the protection of natural and water resources that make Clyde Township an attractive place to live, visit and work. All development plans should take into consideration the following factors:

- Plan first!
- Prevent! Then Mitigate!
- Manage Water as a Resource – not a Waste!
- Design for the Natural Water Cycle.
- Disconnect. Decentralize. Distribute.
- Use Natural Systems.
- Minimize Disturbance.
- Maximize the Multiple Benefits of LID.
- Use LID Everywhere!
- Make Maintenance a Priority.

For more information reference the Low Impact Development Manual for Michigan: A Design Guide for Implementers and Reviewers, SEMCOG, 2008.

15. Future Land Use Map (Figure K)

The State Game Area lands are not considered a different land use category on the Future Land Use Map (Figure K). Wouldn't it make sense to have a land use category called "Conservation Area" or something similar to this and not plan for residential use in the State Game Area?

16. Other things to consider adding – not part of the BRW project

Pages. 2-16 and 3-8 - transportation sections - talk about the importance of non-motorized transportation options.

Also on p.4-7 under transportation related goals a goal about increasing non-motorized transportation options could be added

Columbia Township

WATER QUALITY AND NATURAL RESOURCES

There is an integral relationship between water resources, water quality, and land use. People use water for everyday uses. People also live by bodies of water for aesthetics and recreation purposes. Farmers use water bodies as part of their farming activities and industry uses water for processing and wastewater discharge. The variety of applications for water means that there is constant pressure from different user groups of how to allocate this valuable resource.

Water quality is a term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose.

Water is also an important resource within Columbia Township with the large amounts of water and natural resources throughout the area. Lakes and streams within the Township provide recreational and agricultural opportunities for residents and visitors alike. There are over 400 acres of lake and within the township. In order to ensure that this resource continues to serve as a central component within the community, greater discussion of the interrelated components of water quality is deserved.

Water resources are vital to planning and guiding land use decisions. Certain land uses require access to water; others isolation from it. Individual landowners, whether residential, agricultural, or industrial, are rarely aware of the complexity of water resources or of the effect their actions may have. This lack of awareness, coupled with the economic and cultural value of water resources, creates a need for action by the community.

The preservation and conservation of water quality is important for plant and animal life, tourism and recreation, and drinking water supplies. Proactive and effective planning can be a step in the right direction for the future of water quality within a community.

Black River Watershed

“Although major processes and events such as ice ages, earthquakes and volcanic eruptions have sculpted much of our landscape structure over time, the flowing water of streams [and rivers] has played a major role especially on more recent time scales”

(<http://www.epa.gov/watertrain/stream>). This can also be said of the Black River, which continues to define the landscape of southwestern Michigan. The Black River Watershed (BRW) encompasses approximately 183,490 acres in Allegan and Van Buren Counties; through its rivers, lakes, streams and wetlands. 56.2% of the watershed lies in Van Buren County and Columbia

A watershed is an area of land that drains to common body of water. Columbia Township is entirely within the Black River Watershed. All land in the township drains to the Black River River and eventually to Lake Michigan.

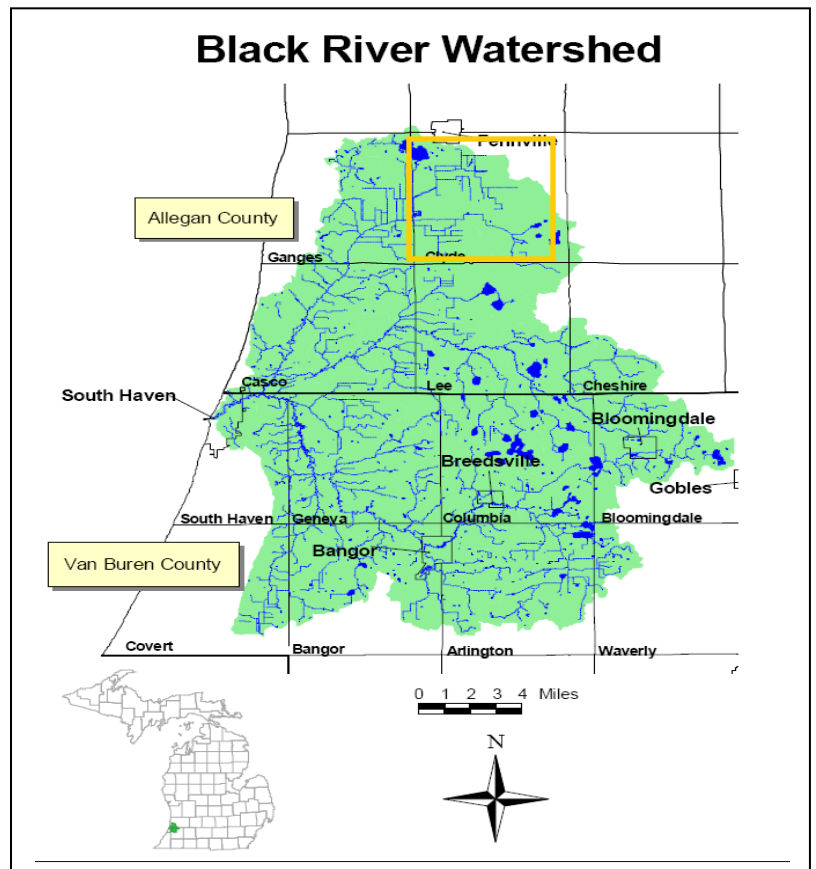
Township has over 1,000 acres of lakes and streams that are connected to the BRW. The abundance of water resources within the township provides residents and visitors alike a vast array of water related activities that they can enjoy throughout the seasons. The importance of this resource means that careful attention must be paid to its protection and conservation.

The BRW plan was completed by the Van Buren Conservation District through a Section 319 grant from the United States Environmental Protection Agency and administered by the Michigan Department of Environmental Quality.

The BRW plan focuses specifically on *nonpoint source pollution*, a form of pollution that is generally not regulated. Nonpoint source pollution can be delivered by indirect means such as runoff from farms and residential lawns, paved roadways and parking lots, and redevelopment or new construction areas. This type of pollution poses serious threats to the quality and functionality of the BRW.

Goals of the Black River Watershed include:

1. Improve water quality and habitat for fish, indigenous aquatic life and wildlife in the watershed by reducing the amount of nutrients, sediment and chemical pollutants entering the system.
2. Continue/increase watershed monitoring efforts and stewardship.
3. Improve the hydrology and morphology of the river.
4. Provide long term protection of the Black River Watershed through improved local land use policies and conservation practices.
5. Improve the navigability of the Black River for canoes, kayaks, and other self-propelled watercraft, by reducing sedimentation and reducing excess woody debris.
6. Enhance recreational access sites to prevent the degradation of water quality.
7. Increase knowledge and participation in programs regarding nonpoint source pollution and means of prevention.
8. Prevent or reduce the introduction and spread of invasive species.



There are many integral pieces to a watershed including floodplains, riparian buffers, wildlife habitat, woodlands, etc. The sections that follow will focus on the components of the watershed within the Township that are related to water quality.

Water Resources

Lakes

The lakes in Columbia Township are what draw many people. Lakes are valuable for the array of recreational, agricultural and economic opportunities that they offer. Lakes provide a community with extensive opportunities for recreation in every season. People visit lakes for numerous reasons but one reason that will keep them coming back is a clean, healthy lake. Columbia Township has over 1,000 acres of lakes that contribute to the unique quality of the township. This abundance of fresh water is valued highly for its contributions to the unique ecological, recreational and agricultural value that these lakes present. Table ____ lists the lakes within the Township and their size.

Table____ Columbia Township Lakes and Size

Lake Name	Acres	Lake Name	Acres
1. Mudd Lake	23.4	8. Great Bear Lake	166
2. Coffee Lake	40.4	9. Stillwell Lake	18.3
3. Silver Lake	50.1	10. Upper and Lower Jephtha Lakes	114.2
4. North Lake	60.6	11. Lake Moriah	17.0
5. Saddle Lake	283	12. Deer Lake	30.4
6. Munson Lake	38.5	13. Lake Eleven	53.9
7. Little Bear Lake	46.1	14. Lake Fourteen	69.5
			Total Acres 1,011.4

Stream Corridors/Riparian Corridors

The stream corridor or “riparian” corridor is a water route dominated by a river, stream, or other linear water feature. The river or stream is also usually vegetated on both banks by flood plain and then upland vegetation. Stream corridors are often left undeveloped, and therefore provide an opportunity to act as a link between natural areas. Because water rich floodplains, and uplands are all part of stream corridors, they provide numerous watershed functions. The presence of stream corridors in Columbia Township is plentiful due to the vast number of streams and rivers in the area.

Stream corridors “help absorb floodwaters, stabilize streambanks, and filter sediments and polluted runoff. Stream corridors also provide critical habitat for a variety of species. Riparian areas are important for water quality, plant species, wildlife species, and fisheries”

“Riparian vegetation can shade the river (thus helping to regulate water temperatures), and provide habitat for both riverine and terrestrial species. Debris from riparian vegetation provides habitat for aquatic invertebrate species. Riparian areas can also filter out excess nutrients (e.g. runoff of fertilizer from agricultural area) before they reach the waterway. In addition, the roots of riparian vegetation can help limit erosion along the riverbank” (BRW, VBCCD, 73). The vegetation

along the banks or the stream corridor provides valuable functions to the quality of the water in any community.

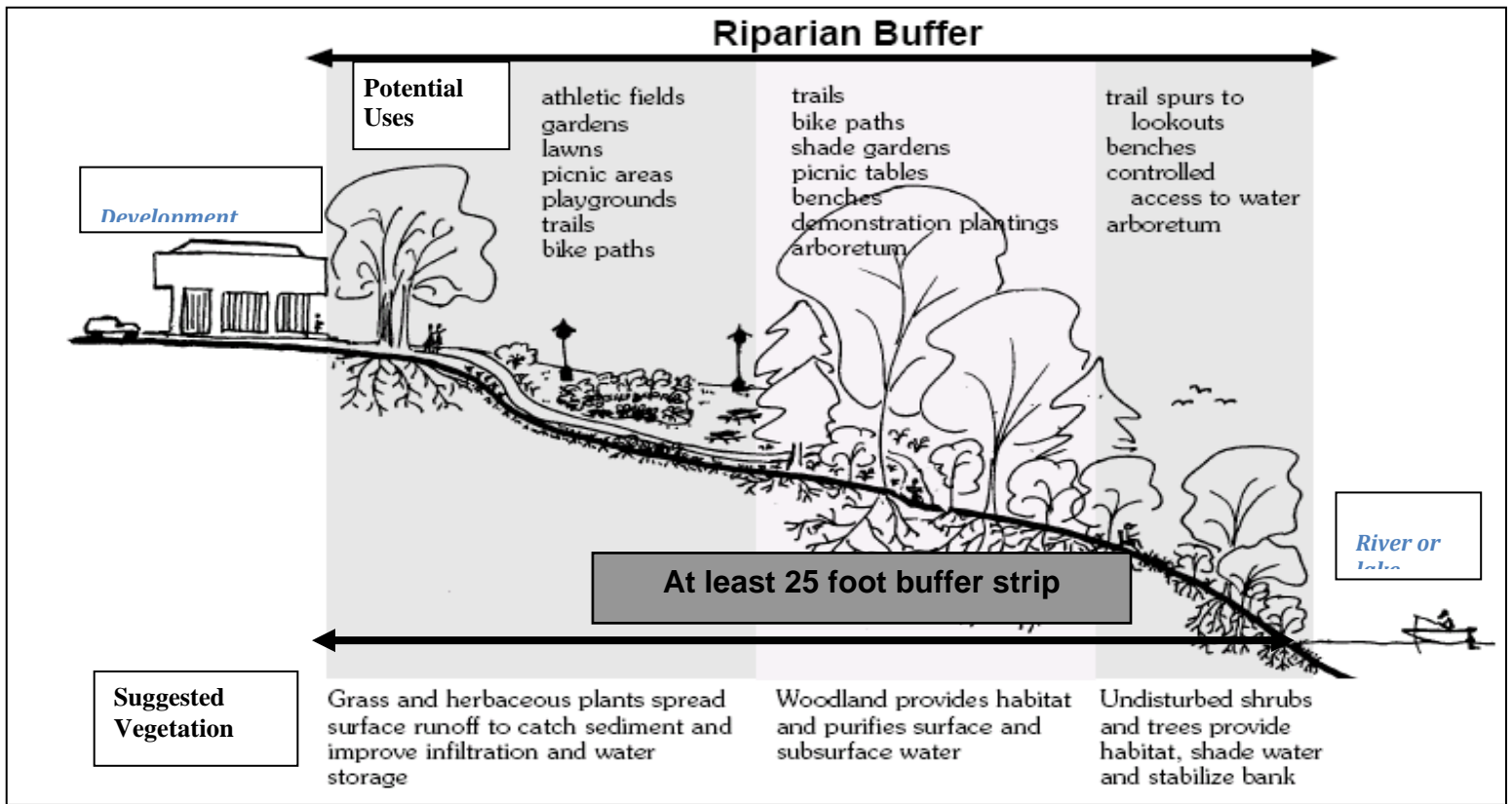
Riparian Buffers

One of the most important actions that a community or property owner can do to protect water quality is to maintain a vegetated riparian buffer along streams, ditches, rivers and lakes. Many river or stream edges are currently mowed on a periodic basis for a manicured-lawn look. Although this may be aesthetically pleasing to certain residents, this practice is detrimental to water quality and our lakes ecosystem. One of the first steps necessary to protect our limited water resources is to enhance or restore our stream's capacity to function as a *natural, ecological system*.

Buffers Protect Property

Streamside land is a high-risk area for development even above flood elevation. Using riparian buffers in between development and water corridors is a practical and easy way to protect property against the hazards caused by flooding, shoreline erosion and moving streams.

One proven method of improving a stream's or lake's natural function is to create a vegetated buffer system along the shoreline. A *Riparian buffer* or buffer zone is a corridor of vegetation along rivers, streams, lakes and wetlands which help to protect water quality by providing a transition between upland development and adjoining surface waters. Vegetated riparian buffers filter stormwater runoff from impervious areas before it reaches the water body, shade and cool the water, provide channel stability, and provide storage for floodwaters. Riparian buffers also allow for the development of natural stream meanders and increase the diversity of aquatic life, provide areas for diverse recreational opportunities, filter air and noise pollution and enhance wildlife habitat.



Wetlands

Lakes and floodplains are part of an interconnected water system that all plays a crucial role in water quality. One of the largest players in water quality is wetlands. The Natural Resources and Environmental Protection Act (NREPA) defines a wetland as *“land characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances does support, wetland vegetation or aquatic life and is commonly referred to as a bog, swamp, or marsh...”* "Wetland" is the collective term for marshes, swamps, bogs, and similar areas often found between open water and upland areas.

Of the estimated 11 million acres of wetlands that stood in Michigan 150 years ago, only 3 million acres remain.

In the past, people viewed wetlands as wastelands --sources of mosquitoes, flies, and unpleasant odors. They believed wetlands should be avoided, or better yet, eliminated. This negative view, combined with the demand for more developable land, resulted in the destruction of large areas of wetlands. Owners and developers drained their wetlands, and converted them to farmland, or filled them for housing developments or industrial facilities. Only one-fourth of the original 400,000 acres of coastal wetlands now line Michigan shores.

Attitudes today towards wetlands have changed with the discovery that wetlands are a valuable natural resource providing many important benefits to people, wildlife and water quality. For people, wetlands help filter sediment and pollutants before entering our waterways and ensuring that our favorite river, lakes and streams stay clean and function naturally.

Wetlands also act as a staging area for groundwater recharge. Wetlands allow water to slowly filter back into the land and into areas that we pump our well water from. The recharging of this water is essential to all forms of life that need water to survive.

Many species of birds and mammals rely on wetlands for food, water, and shelter, especially during migration and breeding. Wetlands help improve water quality, provide important fish and wildlife habitat and support hunting and fishing activities. Wetlands contribute to the quality of other natural resources, such as inland lakes, ground water, fisheries, and wildlife. Wetlands store excess water and nutrients; control floods, and slow the filling of rivers, lakes and streams with sediment. In addition, acre for acre, wetlands produce more wildlife and plants than any other natural area.

Floodplain

A river, stream, lake, or drain may on occasion overflow onto the surrounding banks and inundate adjacent land areas with flood water. The land that is inundated by water is defined as a floodplain. In Michigan, the term floodplain has come to mean the land area that will be inundated by the overflow of water resulting from a 100-year flood (a flood which has a 1% chance of occurring any given year).

In many communities, the land that is best suited for development has been mostly developed and people are now seeking construction in parts of our communities that are not best suited for development such as floodplains. As development encroaches upon these areas, the safety and welfare of residents and visitors are in jeopardy. With increasing development in the floodplain, open spaces, and wetlands, our land has lost the ability to soak up rain. Areas that were once effective sponges storing precipitation are now being replaced by buildings and pavement that have made the land increasingly impervious. As a result, floods have become far larger and more frequent.

A floodplain is an area next to a river, stream, or creek that may be covered with water following heavy rainstorms. This plain holds the excess water allowing it to be slowly released into the river system and seep into groundwater aquifers. Floodplains also give time for sediment to settle out of floodwaters, thereby keeping it out of water bodies. Floodplains often support important wildlife habitat and are frequently used by humans as recreation areas.

In the past, we have developed on the floodplains and then tried to control stormwater, keeping it out of the floodplains. This practice causes water to overflow riverbanks in other locations - often creating floods of a greater magnitude and danger. Building on floodplains increases the risk of property damage and life threatening situations to humans and animals. Diverting stormwater into channels and easing its path to bodies of surface water forces water to flow faster. This greater velocity destroys habitats and causes greater erosion including the loss of topsoil often creating a need for increased fertilizer use.

Stormwater Management

Stormwater management seeks to lessen the number of pollutants that are collected as it passes over impervious surfaces and moves into watersheds. Stormwater runoff can have negative impacts on our water quality. When chemicals, oil, grease, salt, etc. are carried into our rivers, lakes, and streams, all of these bodies of water become polluted. Pollution of our water may not be immediate, but as the pollutants keep washing into our water systems and chemicals increase, our waters may become unusable for fishing, swimming, canoeing, etc. Even our drinking water can be affected.

Traditional attitudes about managing stormwater were to move the water off the site as quickly as possible with curbs, gutters, and storm sewers. *Today,* effective stormwater management practices include decreasing the total amount of stormwater, slowing down the flow of the stormwater and allowing as much of the water to soak naturally into the ground by using low impact development practices such as native plants, rain gardens, and riparian buffers.

As development and imperviousness increases (due to construction of roads, roof tops and parking lots), the infiltration ability of soil decreases. Consequently, more rainfall becomes stormwater runoff, which can cause erosion of land areas and stream banks or increased flooding.

The use of stormwater management tools known as Best Management Practices are methods in which farmers, landowners, construction contractors and homeowners can do to limit the amount of pollution, point source and nonpoint source, entering the water within their community.

Best Management Practices By Land User			
Homeowners	Agriculture	Construction	Municipality
Native plants	Vegetated strips	Low impact development	Ordinance
Protect special features	Conservation tillage	Porous pavement	Master plan
Porous pavement	Fertilizer management	Cluster development	Zoning
Rain barrels	Animal waste management	Reduce street imperviousness	
Reduce fertilizer/pesticide use			

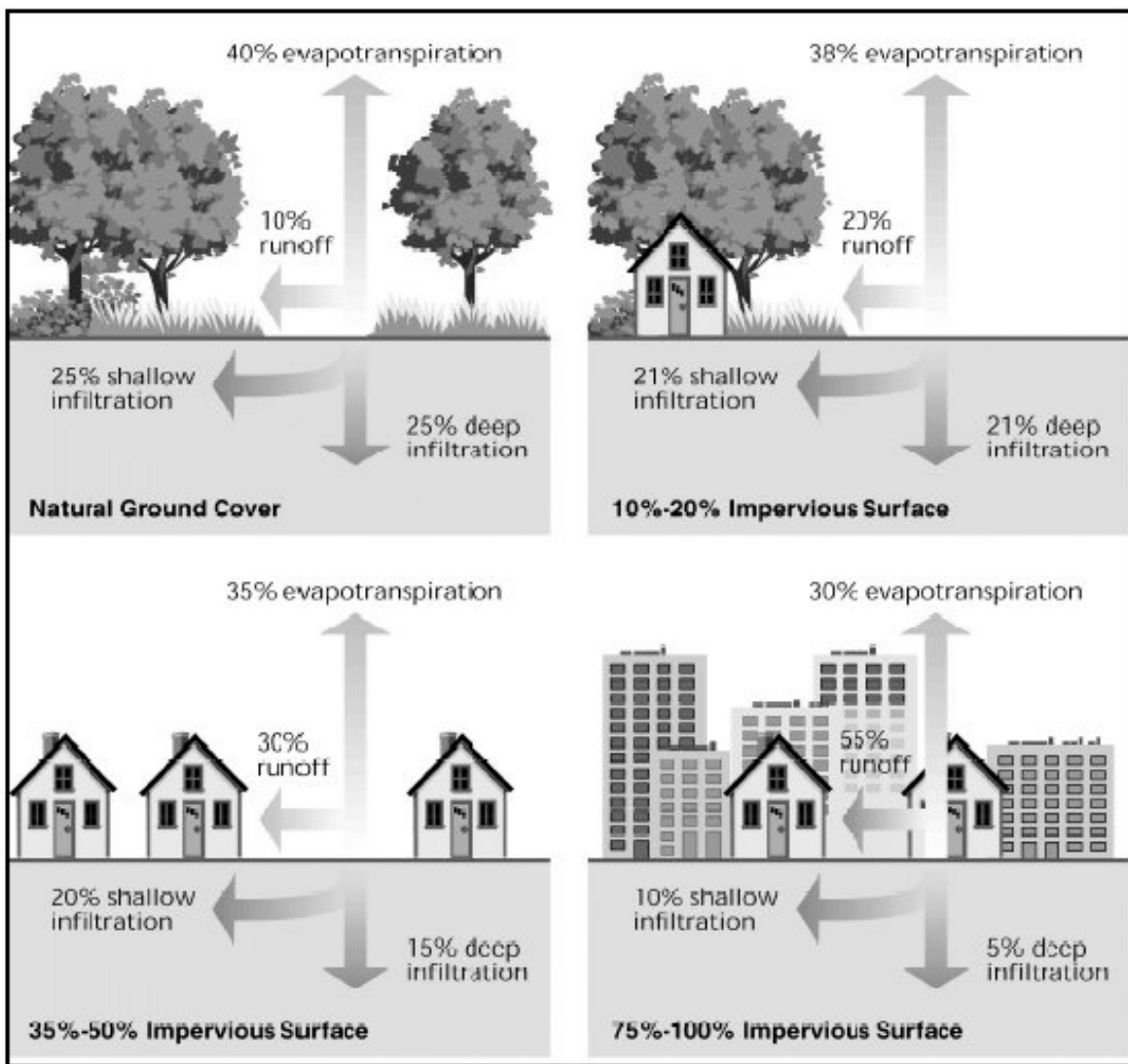
Increase pollution levels of our water systems can lead to beach closures, fish and other aquatic deaths, lake odor, plant growth in lakes, and an increase in water temperatures).

Impervious Surfaces

One of the imminent threats to water quality comes from the increase in the amount of impervious surfaces that are expanding into rural and agricultural areas; and the increase of the amount of nonpoint source pollutants that are being collected from these surfaces which end up running into our rivers, lakes and streams.

Impervious surfaces may cover anywhere from five to ten percent or more of a site. Smaller sites may have significantly higher coverages, particularly those with commercial and industrial uses with large parking areas. Not only quantity, but quality of runoff from normal precipitation may change considerably, as lawns, roads, and parking lots rinse clean. Other unnatural water sources are added, such as construction cleanup, car washing, or lawn watering. The diagram below helps people to understand what happens when we remove our natural ground covers, such as native plants and trees, and replace them with impervious surfaces. The increase in the amount of paved surfaces leads to a drastic rise in the amount of runoff and a decrease in the amount of deep infiltration that is being infiltrated back into the ground. With greater runoff, the amount of water that is able to filter down back into our groundwater supply becomes smaller and smaller.

Impervious surfaces are mainly constructed surfaces - rooftops, sidewalks, roads, and parking lots - covered by impenetrable materials such as asphalt, concrete, brick, and stone. These materials seal surfaces, repel water and prevent precipitation and melt water from infiltrating soils. Soils compacted by new construction are also highly impervious.



Other Natural Resources

There are features in any community that any resident would readily recognize as important to the character of the area and to their personal quality of life. These features are often the ones that residents will use to identify or connect themselves to a community. Some of these features may be cultural, such as a downtown business district, historic buildings, lighthouses, or other similar man-made features. Other features used to connect a community to its residents will be natural; lakes, woods, wildlife, views, and other similar features. How these elements are included in the fabric of a community can have a profound influence on their value. Clearly there are some resources which, if lost, would significantly detract from the environment and the community as a whole.

Natural features such as native vegetation, woodlands, wildlife habitat and wildlife corridors add to the natural features that lure people to Columbia Township. Removing these natural features will not only alter the landscape of a community but it can also lead to water quality issues such as increased runoff, erosion and flooding. Development should be discouraged or restricted to areas where significant natural features exist.



Native Vegetation [photo JF New]

Native vegetation refers to the plant life that exists as a natural part of the landscape. It is increasingly recommended that native plants (vegetation that grows naturally in particular climates or regions) be used because of their performance, site enhancement, and life cycle cost benefits.

Native plants typically cost more initially (depending on local availability); however, they are more cost-effective in the long run because they require less water and fertilizer, and are more resistant to local pests and diseases than non-native ornamentals. Native plants are also known to be very effective in managing storm water because many species have deep root systems which stabilize soil and facilitate the infiltration of storm water runoff. Native plants provide habitat for birds, butterflies and other wildlife, help to buffer noise pollution, filter air pollution and provide us with stunning landscapes.

Native plants can be incorporated into individual home sites, commercial sites, and industrial sites.

Woodlands

Woodlands act as a type of buffer and moderator of flooding, erosion, and noise and air pollution. Woodlands are also important to the Township's quality of life. Much of the woodlands within the Township lie either in small parcels, usually left from agricultural clearing, or in larger areas where farms have not been established and where intensive development has not yet occurred. In Columbia Township, the same can be said. Various species of hardwoods exist, including Ash, beech, Oak, Elm, Hickory, Maple, Walnut and Pine. These hardwoods are mainly second growth, and found on

Values of Woodlands

- Provide a varied and rich environment for plants and animals.
- Provide breeding, feeding, and refuge areas for many species of insects, birds, and mammals.
- Protect watersheds and soils.
- Moderate the effects of winds and storms, stabilizes and enriches the soil, and slows runoff, allowing the forest floor to filter groundwater.
- Serve as buffers to the sights, sounds, and odors of civilization.
- Mute noise from freeways and factories, and absorb air pollutants.
- Provide visual relief along roadways.

poorly drained mineral soils that were not suited for agricultural needs.

Aesthetically pleasing roadways with natural vegetation tend to be more popular than those with little vegetation or highway clutter. Trees within the public domain should be managed for their aesthetic and critical role that they play in air quality mitigation, cooling of city streets and the filtering of air and noise pollution. Mature roadside trees are sometimes considered hazardous, but always seen as attractive and valuable and should be managed and maintained as part of the community identity. To the extent possible, road improvements should respect and maintain these important landmarks, and their contribution to community identity.

Wildlife Habitat

A rich variety of wildlife is present in Columbia Township, providing a truly valuable living classroom of diversity that includes fish, mussels, frogs, rabbits, white-tailed deer, squirrels, bats, pheasants, fox and a variety of waterfowl species.

The presence of an array of wildlife means that protection of their habitat is necessary to ensure their survival. Michigan's wildlife is one of its most precious resources. Surveys consistently show that residents value wildlife as part of their quality of life. In addition, wildlife is valued throughout Michigan for the contribution it makes to tourism, recreation, hunting, and fishing. As a result, there is an increasing appreciation of the role that wildlife contributes to the economy and quality of life of Michigan residents.

A wildlife habitat is an area that offers feeding, roosting, breeding, nesting, and refuge areas for a variety of bird and mammal species native to the southwestern Michigan region.

As with other natural features, it is important to remember that wildlife does not respect jurisdictional boundaries. As a result, it is important to coordinate activities with other local governments on the basis of biological or geographical boundaries rather than on purely political ones. In rural areas, there are significant opportunities for wildlife management, simply because of already existing, abundant wildlife habitat. This makes planning for wildlife habitat protection possible, by identifying areas of high wildlife value and encouraging development elsewhere. Even with the development of scattered rural areas, large open spaces still may be found throughout the Township. This means that there is ample opportunity for movement of wildlife among habitat locations. It will require strong coordination of local governments and private landowners to ensure that wildlife considerations are included in the review of development plans.

Wildlife Corridors

The threat of fragmented habitats, due in part to strong development pressures in natural areas, can act as a motivator for the Township to establish a framework for the protection of these critical areas. These areas contribute to the Township's rural setting and community

identity. The goal of establishing wildlife corridors is to maintain as nearly a contiguous greenway of native vegetation as possible, averaging 200 feet wide between various habitats.

Some interruptions in the corridors are inevitable because of existing roadways interposed between the habitats. Within this limitation, the objective is to locate corridor connectors to minimize the number of road crossings and maximize the greenspace available for protected wildlife transit. Wherever possible, the corridor should follow natural drainage corridors since this land offers more habitat value, is important for natural stormwater drainage, and is generally more difficult to develop.

Wildlife corridors can also be developed in coordination with other construction projects. For example, a utility corridor could be planned to provide a more natural system, rather than a swath of land devoid of natural features. Where it exists, native vegetation should be left undisturbed. In areas with exotic vegetation, undesirable plants should be removed and native trees, shrubs, grasses, etc. (as appropriate), planted and maintained.

Wildlife Corridor

A wildlife corridor is a continuous natural protected pathway along which native wildlife species can move in relative security between high quality natural wildlife habitats. The land through which wildlife must pass when transiting between these habitats may, at times, consist of platted lots in private ownership and public roads and rights-of-way. Corridors work best when sparsely developed.

Agricultural Lands [community description section]

Agricultural, Open Space, and Vacant lands make up approximately 84% of the land use within Columbia Township. Farming creates jobs, provides a product for sale, and provides vast areas of open space and scenic corridors. Farmland also provides substantial environmental benefits, including floodplain protection, groundwater recharge, and wildlife habitat. In addition, the tradition of family owned farms has been passed down from generation to generation; supporting a strong social structure focused on community and family.

Based upon agricultural statistics for Van Buren County, agriculture will continue to be a prominent economic force. In evaluating the value of farmland, there must be a basic assumption that farmland is worth saving. The saving of this farmland is developed into Columbia Township's future land use plan and map which seeks to see the loss of land at only 3% over the next twenty years within the Township; as opposed to a county farmland loss of 14% from 1992 and 1997 (Census of Agriculture).

Van Buren County Farmland and Agricultural Statistics 1987 – 2002				
	1987	1992	1997	2002
Total Acres of Farmland	190,251	206,781	189,432	176,260
Acres in Orchards	18,663	19,232	15,480	10,281
Acres in Vegetables	14,853	13,734	12,069	10,553
Acres in Corn (for grain)	35,282	38,255	34,695	31,870
Acres in Soybeans	9,684	23,679	24,702	29,321
Total Number of farms	1,278	1,164	1,217	1,160
Number of Orchards	373	312	256	N
Number of Vegetable Farms	201	158	104	91
Average Size of Farm	149	178	156	152
Median Size of Farm	N	N	73	570
Total Market Value of Agricultural Products	69,624	84,931	104,868	96,724
Average Market Value of Agricultural Products per Farm	54,479	72,965	86,169	83,382
Hogs and Pigs Inventory (farms)	147	119	68	36
Hogs and Pigs Inventory (number)	56,167	52,055	29,477	24,985
Hogs and Pigs Sold (farms)	152	116	64	41
Hogs and Pigs Sold (number)	84,358	103,464	56,245	67,997

N – no data available

Source: US Department of Agriculture, 1987, 1997, 2002 Census of Agriculture

Appendix 7 – Zoning Language Recommendations

Bangor City

Planned Unit Development

154.162 Procedure

(A) (6) Existing natural features on the site (wetlands, stands of trees, floodplains, etc.)

154.63 Content of Petition

(A) preserved natural features

(D) including all preserved natural features and open space areas

(F) (8) The use of native plants is encouraged and the use of invasive plants is prohibited.

(9) Structural best management practices for storm water management

Bioretention	Vegetated Filter Strip
Vegetated Swale	Pervious Pavement
Infiltration Basin	Subsurface Infiltration Bed
Infiltration Trench	Dry Well
Level Spreaders	Berming
Planter Box	Runoff Volume/Non-infiltration
Vegetated Roof	Capture Reuse
Runoff Quality/ Non-infiltration	Constructed Wetland
Wet Ponds/Retention Basins	Constructed Filters
Water Quality Devices	Underground Detention
Riparian Buffer Restoration	Native Revegetation
Soil Restoration	Extended Detention/Dry Pond Restoration

154.166 Standards

(B) Residential

(1) All Planned Unit Developments containing residential use are required to have at least 15% open space. The open space should be contiguous areas and connect to open space areas on neighboring properties when possible. The open space shall be permanently preserved by a deed restriction or other instrument approved by the City.

(2) Residential density for a Planned Unit Development shall not be greater than the recommended density, as shown on the Land Use Plan nor shall any lot be less in area or dimension than that required by the district regulation applicable to the district in which the planned development is located, except that the Plan Commission may recommend and the City Council may grant a reduction in such lot area and dimension, but not more than 15% when the Planned Unit Development provides common open space more than 15% of the gross area of the Planned Unit Development.

154.081 General Provisions - Parking and Loading

(F) Size. A required off street parking space shall be no more than 9 feet in width and 20 feet in length, exclusive of access drives or aisles, ramps, columns or office or work areas. Up to 30% of the required parking spaces may have smaller dimensions to accommodate compact cars. All space shall have a vertical clearance of at least seven feet.

(H) Storm water Infiltration: Whenever possible, reduce the overall imperviousness associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, depressed center islands with curb cuts, and using pervious materials in the spillover parking areas where possible.

Parking lots exceeding five thousand (5,000) square feet (including all parking spaces, lanes, drives and other areas devoted to vehicular use) shall be landscaped with at least one landscape island to allow for the treatment and infiltration of storm water. For each additional five thousand (5,000) square feet (or each additional twenty (20) spaces, whichever is greater) an additional landscape island shall be required. Landscape islands shall be at least one hundred eighty (180) square feet in size, with a minimum width of ten (10') feet. Landscape islands shall be landscaped with one shade canopy tree and three (3) shrubs for every eight (8) parking spaces. If curbs are present, curb cuts must be provided to allow water to enter and the landscaped areas shall be depressed or concave.

The Zoning Administrator may allow the substitution of bump-outs or other landscaping elements in lieu of landscape islands, as long as the square footage, width, and landscaping requirements are still met.

(I) Surface: Parking areas may be constructed of surfaces which allow for infiltration such as pervious or porous pavement or concrete. A reinforced grass parking area may be allowed in parking areas with low use with permission from the Planning Commission.

(J) **Collective Parking:** Whenever possible, encourage shared parking between compatible uses.

1. The collective provision of off-street parking for two or more structures or uses may be permitted provided that the number of spaces provided collectively is not less than the sum of the requirements for various individual uses, except as provided below.

2. The total of such off-street parking facilities for joint or collective use may be reduced by the Planning Commission in accordance with the following rules and standards:

a. Uses for which the collective off-street parking facilities are to serve shall either operate during different hours of the day or night, or shall have peak hour parking demands that do not coincide.

b. Not more than fifty (50) percent of the off-street parking facilities required for churches, bowling alleys, dance halls and establishment for sale and consumption of alcoholic beverages, food, or refreshments may be supplied by off-street parking facilities provided for other buildings.

c. A legally sufficient written agreement assuring the joint usage of said common parking for the combination of uses or buildings shall be properly drawn and executed by the parties concerned, approved as to form and execution by the Planning

Commission and City Attorney, and filed with and made part of the application for a building permit.

General Provisions 154.017. Waterfront and Wetland Setbacks

A. Purpose & Intent: It is the intent of this section to establish natural buffers along wetlands, drains, streams, rivers in order to prevent impairment and/or destruction of water quality. Experience has shown that in the absence of regulation, development will encroach on these features leading to impairment and/or destruction, which is contrary to the public health, safety, and welfare of the community. These areas contribute to plant and animal species diversity by providing habitat areas, they absorb floodwaters, they filter sediment and pollutants out of storm water before entering the ground and surface water, and they are attractive areas for everyone to enjoy.

B. Definitions.

1. Ordinary high water mark -- the line between upland and bottomland that persists through successive changes in water levels, below which the presence and action of the water is so common or recurrent that the character of the land is marked distinctly from the upland and is apparent in the soil itself, the configuration of the surface of the soil, and the vegetation. Where the water levels vary for purposes of water level management, the ordinary high water mark shall be the higher of the levels generally present. (Section 324.30101 of Public Act 451 of 1994, as amended.)

2. Shoreline -- that area along the waterfront where land and water meet, established at the ordinary high water mark along watercourses and on water bodies.

3. Regulated wetland -- a wetland area that satisfies the size and location requirements to qualify as a wetland, according to the definition in Section 324.30301 of the Natural Resources and Environmental Protection Act, Public Act 451 of 1994, as amended.

4. Watercourse -- any waterway including a river, stream, channel, creek, ditch, canal, conduit, culvert, drain, gully, ravine, or wash, in which water flows in a definite direction or course, either continuously or intermittently, and which has a definite channel, bed and banks, and shall include any area on adjacent tracts subject to inundation by reason of overflow of floodwater.

5. Waterfront lot -- any lot, building site or parcel which abuts any body of water, including, but not limited to a lake, an inland lake, stream, river, or creek.

6. Wetland -- land characterized by the presence of water at a frequency and duration sufficient to support and that under normal circumstances does support, wetland vegetation or aquatic life, and is commonly referred to as a bog, swamp, or marsh.

C. Setback from shoreline or edge of wetland. All waterfront lots or lots containing wetlands shall maintain a minimum setback for any permanent structure from the ordinary high water mark and/or delineated wetland boundary as follows, which may be in excess of the minimum requirements of this Ordinance. Any person proposing to erect, install, move, or enlarge a permanent structure on a waterfront lot or lot containing a wetland is required to satisfy these minimum standards unless a greater setback is otherwise required elsewhere in this Ordinance:

1. Seventy-five (75) feet from the ordinary high water mark of an inland lake, river, stream, creek, drain or other watercourse.
2. Seventy-five (75) feet from the boundary or edge of a wetland, as delineated on a professionally prepared survey completed by a certified professional submitted to the City and reviewed by City staff, Michigan DEQ, and/or other professionals, as required.
3. Any other areas or setbacks as prescribed by MDEQ (as in Public Act 451 of 1994, as amended).

D. Additional setbacks. The following additional setback standards shall apply to the following specific uses or activities, as permitted in the underlying zoning district. Setbacks are measured from the ordinary high water mark or from the delineated boundary of the wetland.

1. Storage of hazardous substances – one hundred and fifty (150) feet.
2. Above or below ground petroleum storage facilities – one hundred and fifty (150) feet.
3. Raised septic systems – two hundred and fifty (250) feet.
4. Solid waste landfills or junkyards – three hundred (300) feet.

E. Natural vegetative strip. Within the required setback from a watercourse or wetland, a natural vegetation strip of at least 25 feet shall be maintained in its natural vegetative state, except for the clearing of dead or invasive plants. This restriction will help maintain a root and vegetative barrier to keep soil particles and nutrients from entering the watercourses and wetlands, while also helping to minimize water runoff.

1. Within this strip, a space of no greater than twenty-five (25) feet in width may be selectively trimmed and pruned to allow for the placement of walkways, and /or for a view of the waterbody, with the approval of the Zoning Administrator or Planning Commission. Any walkway constructed inside the strip shall be on the upland side and may be oriented perpendicular or parallel to the water line. A maximum of 15% of the total vegetative strip area may be cleared for this purpose. Because the intent of the native protective strip is water quality protection, porous materials such as wood chips or gravel shall be used for any trail construction.
2. The Zoning Administrator may allow limited clearing of the vegetation over and above this purpose only when required for construction of a permitted building or structure elsewhere on the site, provided that the land cleared is returned to a vegetative state, which is approximately the same quality and extent as that which existed prior to clearing.
3. Planting of native species in the required natural vegetative strip is encouraged, especially where exposed soils and steep slopes exist. A list of approved native species may be obtained from the City. Invasive or destructive plant species (i.e. Eurasian milfoil, English ivy) shall not be permitted.

F. Permitted accessory uses and construction within required waterfront and wetland setback.

1. Accessory structures less than 200 square feet in size shall be exempt from the requirements of this section of the Ordinance. Accessory buildings are limited to one building per 100 feet of frontage on the waterfront or wetland.
2. Accessory structures 200 square feet in size and greater shall be required to satisfy all of the setback requirements as set forth in this section of the Ordinance for other permanent structures.
3. Best management practices shall be employed so as to minimize disturbance of the natural terrain and vegetation during construction on waterfront lots. After construction, the lot, particularly within the wetland and waterfront setback area, should be restored to its prior conditions to the extent possible.
4. Accessory structures shall be subject to the policies and regulations of the MDEQ and other State and County agencies as well as the other requirements of this Ordinance.
5. A copy of the appropriate State or County permit, if necessary, must be on file in the City office, prior to any construction that changes the shape of the shoreline or is located in a waterfront or wetland setback area, such as a dock, seawall, or pilings.

G. More restrictive standards govern. Regulations imposed in areas identified as erosion control districts or flood hazard districts in this Zoning Ordinance shall govern if such restrictions or regulations impose a higher standard or requirement.

The requirements in this provision are in compliance with Public Act 451 of 1994, as amended, the Natural Resources and Environmental Protection Act. Any development in these areas must also comply with the standards of this Act. If a greater setback or prohibition is required by the Natural Resources and Environmental Protection Act, another Act or standard of the State or County, or another part of this Ordinance, the greater setback or prohibition shall apply.

Documentation of compliance with this Act and the requirements of the Michigan Department of Environmental Quality (MDEQ) and similar State and County agencies may be required prior to the issuance of a building permit. Similarly, issuance of a building permit by the City shall not be construed as establishing compliance with the provisions of the Natural Resources and Environmental Protection Act or the requirements of any State or County agency, and such action shall not create liability on the part of Bangor City, any official or employee thereof, or the MDEQ or other State or County agency for any damage to any structure that may result from locating near natural features.

154.013 - Site Plan Review and Approval

(3) Site Plan Requirements

(a) The following information...

5. Existing natural features, including but not limited to, stands of trees, streams, ponds, floodplains, hills, wetlands and similar natural assets.

15. Drainage of storm water onto adjacent property or into a city street is not allowed. On-site drainage may be discharged to an existing storm sewer or natural drainage course, after the application of structural and non-structural storm water best management practices are pursued and depending on capacity, review and approval. Any discharge to a natural drainage course or waterbody would require pre-treatment to ensure water quality is not degraded.

The site plan shall show all structural best management practices to be utilized on the site. In addition, a description of any non-structural best management practices which will be utilized should be submitted with the site plan. The applicant can refer to the Low Impact Development Manual for Michigan: A Design Guide for Implementers and Reviewers, SEMCOG 2008, for detailed information on Low Impact Development and the best management practices listed below.

1. The nonstructural Best Management Practices (BMPs) are:

Cluster development	Minimize soil compaction
Minimize total disturbed area	Protect natural flow pathways
Protect riparian buffers	Protect sensitive areas
Reduce impervious surfaces	Stormwater disconnection

2. The structural Best Management Practices (BMPs) are:

Bioretention (Rain Gardens)	Capture Reuse
Constructed Filter	Detention Basins
Infiltration Practices	Level Spreaders
Native Revegetation	Pervious Pavement with Infiltration
Planter Boxes	Riparian Buffer Restoration
Soil Restoration	Vegetated Filter Strip
Vegetated Roof	Vegetated Water Quality Devices

Remove this provision – (b) Maximum surface run for storm water shall be less than 300 feet.

16. Check with the Department of Environmental Quality for the presence of regulated wetlands and/or threatened and endangered species. Include a notation of all federal, state and local permits needed.

(4) Site Plan Review Criteria

(c) Recreation and open space areas shall be provided in all multiple family residential and planned unit developments. Open spaces should be consolidated into larger units when

feasible, be adjacent to neighboring open spaces when possible and restricted to low impact uses.

(j) The applicant shall utilize storm water structural and non-structural best management practices which are appropriate for site conditions to reduce storm water runoff by slowing it down, spreading it out and soaking it in as much as possible on the site. Only as a last resort, should storm water be removed from all roofs, canopies and paved areas and carried away in an underground piped drainage system.

(k) Surface water in all paved areas shall be collected at intervals so that it will not obstruct the flow of vehicular or pedestrian traffic, and will not create impounded water on the paved areas. Parking areas should utilize landscaped islands with curb cuts that allow for the infiltration of storm water.

(l) Natural Features: Site plans shall demonstrate that as many natural features as possible have been retained, particularly where such features provide a buffer between adjoining properties or assist in preserving the general appearance of the neighborhood or help control soil erosion or assist with the infiltration of stormwater.

(m) Topography: The proposed development shall preserve the natural topography to the maximum extent possible by minimizing the amount of cutting, filling, and grading required and reducing the potential for soil erosion or sedimentation.

(n) Landscaping: Landscaping, including trees, shrubs and other vegetative material, is provided to maintain, improve, and/or restore the aesthetic quality of the site. Native plants are encouraged and the use of any invasive species is prohibited.

(o) Erosion: Site plans shall fully conform to the Van Buren County Soil Erosion and Sedimentation Control Ordinance and evidence of such shall be provided.

(p) Hazardous Waste Management: Site plans shall demonstrate that reasonable precautions will be taken to prevent hazardous materials from entering the environment.

(q) Public Health: Site plans shall fully conform to the requirements of the Michigan Department of Public Health and the Van Buren County Health Department.

(r) Statutory Compliance: Site plans shall fully conform with all applicable State, County and Federal statutes.

Clyde Township

In each existing district add to “**Area Regulations**”

#___. Any parcel abutting or containing a stream, creek, river, lake or wetland must have a water quality setback as stated in Article 3.3?.

Check Existing Definitions to make sure the following are included:

1. Ordinary high water mark -- the line between upland and bottomland that persists through successive changes in water levels, below which the presence and action of the water is so common or recurrent that the character of the land is marked distinctly from the upland and is apparent in the soil itself, the configuration of the surface of the soil, and the vegetation. Where the water levels vary for purposes of water level management, the ordinary high water mark shall be the higher of the levels generally present. (Section 324.30101 of Public Act 451 of 1994, as amended.)
2. Shoreline -- that area along the waterfront where land and water meet, established at the ordinary high water mark along watercourses and on water bodies.
3. Regulated wetland -- a wetland area that satisfies the size and location requirements to qualify as a wetland, according to the definition in Section 324.30301 of the Natural Resources and Environmental Protection Act, Public Act 451 of 1994, as amended.
4. Watercourse -- any waterway including a river, stream, channel, creek, ditch, canal, conduit, culvert, drain, gully, ravine, or wash, in which water flows in a definite direction or course, either continuously or intermittently, and which has a definite channel, bed and banks, and shall include any area on adjacent tracts subject to inundation by reason of overflow of floodwater.
5. Waterfront lot -- any lot, building site or parcel which abuts any body of water, including, but not limited to a lake, an inland lake, stream, river, or creek.
6. Wetland -- land characterized by the presence of water at a frequency and duration sufficient to support and that under normal circumstances does support,

wetland vegetation or aquatic life, and is commonly referred to as a bog, swamp, or marsh.

Add to Article 3 General Provisions

Waterfront and Wetland Water Quality Setbacks

Setback from shoreline or edge of wetland. All waterfront lots or lots containing wetlands shall maintain a minimum setback for any permanent structure (dwelling unit, other principal building or an accessory building) from the ordinary high water mark and/or delineated wetland boundary as follows, which may be in excess of the minimum requirements of this Ordinance. Any person proposing to erect, install, move, or enlarge a permanent structure on a waterfront lot or lot containing a wetland is required to satisfy these minimum standards unless a greater setback is otherwise required elsewhere in this Ordinance:

1. Fifty (50) feet from the ordinary high water mark of an inland lake, river, stream, creek, or other watercourse.
2. Fifty (50) feet from the boundary or edge of a wetland, which is designated on the Township wetland map, as delineated on a professionally prepared survey completed by a certified professional submitted to Township and reviewed by Township staff, Michigan DEQ, and/or other professionals, as required.
3. Any other areas or setbacks as prescribed by MDEQ (as in Public Act 451 of 1994, as amended). The requirements in this provision are in compliance with Public Act 451 of 1994, as amended, the Natural Resources and Environmental Protection Act. Any development in these areas must also comply with the standards of this Act. If a greater setback or prohibition is required by the Natural Resources and Environmental Protection Act, another Act or standard of the State or County, or another part of this Ordinance, the greater setback or prohibition shall apply. Documentation of compliance with this Act and the requirements of the Michigan Department of Environmental Quality (MDEQ) and similar State and County agencies may be required prior to the issuance of a building permit. Similarly, issuance of a building permit by the Township shall not be construed as establishing compliance with the provisions of the Natural Resources and Environmental Protection Act or the requirements of any State or County agency, and such action shall not create liability on the part of Clyde Township, any official or employee thereof, or the MDEQ or other State or County agency for any damage to any structure that may result from locating near natural features.
4. **Exception for Steep Banks.** Where there is a steep bank along a water course or lake, a permanent structure may be constructed according to the following schedule:

Where the bank height, at the bluff, is (a) feet as measured in vertical feet from the high water mark, the structure may locate no closer than (b) horizontal feet from the bluff or the high water mark, whichever is greater:

<u>Bank Height (a)</u>	<u>Setback from Bluff or High Water Mark (b)</u>
10	90
15	80
20	70
25	60

B. Natural vegetative strip. Within the required setback from a watercourse or wetland, a natural vegetation strip shall be maintained in its natural vegetative state, except for the clearing of dead or invasive plants and for the exempted activities and areas listed below. This restriction will help maintain a root and vegetative barrier to keep soil particles and nutrients from entering the watercourses and wetlands, while also helping to minimize water runoff.

1. Within this strip, a space of no greater than twenty-five (25) feet in width may be selectively trimmed and pruned to allow for the placement of walkways, and /or for a view of the waterbody, with the approval of the Zoning Administrator. Any walkway constructed inside the strip shall be on the upland side and may be oriented perpendicular or parallel to the water line. A maximum of 15% of the total vegetative strip area may be cleared for this purpose. Because the intent of the native protective strip is water quality protection, porous materials such as wood chips or gravel shall be used for any trail construction.
2. The Zoning Administrator may allow limited clearing of the vegetation over and above this purpose only when required for construction of a permitted building or structure elsewhere on the site, provided that the land cleared is returned to a vegetative state, which is approximately the same quality and extent as that which existed prior to clearing.
3. Planting of native species in the required natural vegetative strip is encouraged, especially where exposed soils and steep slopes exist. A list of approved native species may be obtained from the Township. Invasive or destructive plant species (i.e. Eurasian milfoil, English ivy) shall not be permitted.
4. Exemptions. The following activities and areas are not subject to the natural vegetative strip
 - a. Waterfront lots around Hutchins Lake **without** a wetland present. If the lot contains wetlands, the natural vegetation strip applies to the wetland area.
 - b. Agricultural operations that are conducted in conformance with best management practices (BMPs) as defined and prescribed by the Michigan Right to Farm Act, Public Act 93 of 1981 as amended.
 - c. The cleaning out, straightening, widening, deepening, or extending, consolidation, relocation, tiling, and connection of drains established under

the provisions of the Michigan Drain Code, Public Act 40 of 1956, as amended.

C. Permitted accessory uses and construction within required waterfront and wetland setback.

1. Best management practices shall be employed so as to minimize disturbance of the natural terrain and vegetation during construction on waterfront lots. After construction, the lot, particularly within the wetland and waterfront setback area, should be restored to its prior conditions to the extent possible.
2. Accessory structures shall be subject to the policies and regulations of the MDEQ and other State and County agencies as well as the other requirements of this Ordinance.
3. A copy of the appropriate State or County permit, if necessary, must be on file in the Township office, prior to any construction that changes the shape of the shoreline or is located in a waterfront or wetland setback area, such as a dock, seawall, or pilings.

D. More restrictive standards govern. Regulations imposed in areas identified as erosion control districts or flood hazard districts in this Zoning Ordinance shall govern if such restrictions or regulations impose a higher standard or requirement. Likewise, if other federal, state, county or local standards are more restrictive, the more restrictive regulation will govern.

PARKING and LOADING SPACES - ARTICLE 14

Add language to 14.01

- A. Whenever possible, reduce the overall imperviousness associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, depressed center islands with curb cuts, and using pervious materials in the spillover parking areas where possible.
- B. Whenever possible, encourage shared parking between compatible uses.

Change Section 14.02 to read: Collective Parking.

- A. The collective provision of off-street parking for two or more structures or uses may be permitted provided that the number of spaces provided collectively is not less than the sum of the requirements for various individual uses, except as provided below.
- B. The total of such off-street parking facilities for joint or collective use may be reduced by the Planning Commission in accordance with the following rules and standards:

1. Uses for which the collective off-street parking facilities are to serve shall either operate during different hours of the day or night, or shall have peak hour parking demands that do not coincide.
2. Not more than fifty (50) percent of the off-street parking facilities required for churches, bowling alleys, dance halls and establishment for sale and consumption of alcoholic beverages, food, or refreshments may be supplied by off-street parking facilities provided for other buildings.
3. A legally sufficient written agreement assuring the joint usage of said common parking for the combination of uses or buildings shall be properly drawn and executed by the parties concerned, approved as to form and execution by the Planning Commission and Township Attorney, and filed with and made part of the application for a building permit.

Add language to Section 14.05 Requirements for Parking Areas

A. Parking lots exceeding five thousand (5,000) square feet (including all parking spaces, lanes, drives and other areas devoted to vehicular use) shall be landscaped with at least one landscape island. For each additional five thousand (5,000) square feet (or each additional twenty (20) spaces, whichever is greater) an additional landscape island shall be required. Landscape islands shall be at least one hundred eighty (180) square feet in size, with a minimum width of ten (10') feet. Landscape islands shall be landscaped with one shade canopy tree and three (3) shrubs for every eight (8) parking spaces.

B. The Zoning Administrator may allow the substitution of bump-outs or other landscaping elements in lieu of landscape islands, as long as the square footage, width, and landscaping requirements are still met.

C. Where plant material exists on a site prior to its development, such landscape material may be used if approved as meeting requirements of this part.

D. Use depressed center islands with curb cuts, and pervious materials in the spillover parking areas where possible.

Change 14.05 B.2. Surfaced with concrete, asphalt or pervious pavement, except that specialized farming and roadside stands, when located on gravel roads, may have gravel surface parking areas and drives.

ARTICLE 17 SITE PLAN REVIEW (Recommended changes are in blue)

17.01 INTENT AND PURPOSE

The intent of this section is to provide for consultation and cooperation between the applicant and the township planning commission so that the applicant may accomplish their objectives in the utilization of his or her land within the regulations of this zoning ordinance and with minimum adverse effect on the use of adjacent streets and

highways, and on existing and future uses and environment in the immediate area and vicinity.

17.02 USES REQUIRING SITE PLAN APPROVAL

A. A zoning permit will not be issued for any of the following until a site plan has been reviewed and approved by the planning commission:

1. Principal uses requiring more than four parking spaces.
2. A change of use.
3. Multifamily dwellings.
4. Mobile home parks, preliminary only as specified by the Mobile Home Commission Act.
5. All land uses permitted as a special land use under the zoning ordinance.
6. Subdivisions and site condominiums.
7. PUDs.
8. Any development, except single-family residences located on a private lot, in the Environmental Buffer Overlay. (only add this if you adopt the environmental buffer overlay)

B. Land Clearing: No person shall undertake any activity such as grading, clearing, cutting and filling, excavating or tree removal in preparations for a use or structure which requires a site plan review and approval until the proposed use or structure is authorized by a land use permit or preliminary plat approval.

17.03 APPLICATION PROCEDURES

An application for site plan review, plus 12 copies of the completed preliminary or final site plan, shall be submitted 30 days before the next scheduled planning commission meeting through the zoning administrator who will review the application and plans for completeness, then transmit the application and plans to the planning commission.

17.04 PRELIMINARY PLAN REVIEW

Preliminary sketches of proposed site and development plans must be submitted for review to the planning commission before final site plan submittal. The purpose of such procedure is to allow discussion between the applicant and the planning commission to better inform the applicant of the acceptability of his or her proposed plans before incurring extensive engineering and other costs which might be necessary for final site plan approval. Such plans will include the following as deemed necessary by the zoning administrator:

- A. Names, addresses, and telephone number of the property owner, the person or firm who prepared the plans and the applicant if other than the owner of the property.
- B. Scale, north arrow, and date of preparation.
- C. Legal description of the property.
- D. Small-scale location sketch showing location of properties and relationship of subject property to the area within ½ mile.
- E. A generalized site plan showing existing and proposed arrangement of:
 - 1. Streets.
 - 2. Lots.
 - 3. Access points.
 - 4. Other motorized and pedestrian transportation facilities such as frontage roads, bus stops, internal circulation, intended direction of flow, parking areas, and loading areas.
 - 5. Buffer strips screening.
 - 6. Natural characteristics, including but not limited to, open space, stands of trees, brooks, ponds, flood plains, hills, dune classifications, dune crests, [wetlands](#), and similar natural assets.
 - 7. Signs: Location and lighting.
 - 8. Existing and proposed structures and building dimensions.
 - 9. Adjacent property land uses and zoning.
 - 10. Dimensions, square footage, and acreage of the property.
 - 11. [Notation of all federal, state and local permits needed.](#)
- F. A written narrative describing:
 - 1. The overall objectives of the proposed development.
 - 2. Number of acres allocated to each proposed use and gross area in buildings, structures, parking, public and/or private streets and drives, and open space.
 - 3. Dwelling unit densities by type.
 - 4. Proposed method of providing sewer and water service, and other public and private utilities.
 - 5. Proposed method of providing storm drainage.

6. Proposed method of re-vegetating open excavated areas, both preexisting and newly created, to a stable condition.
7. Engineering cost estimate of all proposed improvements.

Besides the above, said applicant shall submit a fee according to the fee schedule established by the township board to cover the normal and specially incurred expenses of the planning commission. The required fee will be paid upon submission of the preliminary site plan.

17.05 PLANNING COMMISSION REVIEW OF PRELIMINARY SITE PLAN

The planning commission will review the preliminary site plan and make recommendations to the applicant at the regular planning commission meeting based on the purposes, objectives, and requirements in this ordinance, and specifically, the following considerations when applicable:

- A. Ingress and egress through the property and proposed structures thereon with particular reference to motor vehicle and pedestrian safety and convenience, traffic flow and control, and access in case of fires, catastrophe, or emergency.
- B. Off-street parking and loading areas where required, with particular attention to noise, glare, and odor effects of each use in the plan on adjoining properties and properties in the proposed development.
- C. Sewer, water, and storm drainage with reference to locations, availability, and compatibility. To the maximum extent feasible, stormwater shall be recharged rather than piped to surface water. Low impact development techniques should be utilized to manage rainfall at the source using decentralized micro-scale controls. Guidance on low impact development techniques can be found in the Michigan state manual called *Low Impact Development Manual for Michigan: A Design Guide for Implementers and Reviewers*, SEMCOG, 2008.
- D. Screening and buffering with reference to type, dimensions, and character.
- E. Signs, if any, and their proposed lighting relative to glare, traffic safety, economic effect, and compatibility and harmony with adjoining properties.
- F. Required setbacks.
- G. General compatibility with adjacent properties.
- H. The general purpose and spirit of this ordinance and the General Development Plan of the township.
- I. Engineering cost estimate of all proposed improvements.

Following their review and consideration, the planning commission will authorize the applicant to proceed with final site plan preparation according to the application procedures above.

17.06 FINAL SITE PLAN REVIEW

Twelve copies of the final site plan shall include the following information and such items as may be requested by the planning commission from its review of the preliminary site plan:

- A. All information required for preliminary site plan review.
- B. Site plans must be at a scale not to exceed 1 inch equals 100 feet for parcels greater than 5 acres, and a scale not to exceed 1 inch equals 50 feet for parcels less than 5 acres. The following items shall be shown on the map:
 - 1. Date the site plan was prepared.
 - 2. Name and address of the preparer.
 - 3. Existing manmade features.
 - 4. Contours sufficient to determine runoff with a maximum 2 foot intervals for projects of less than 5 acres, and 5-foot intervals for projects greater than 5 acres.
 - 5. Dimensions of setbacks, locations, heights, and size of buildings and structures.
 - 6. Street rights-of-ways, indicating proposed access routes, internal circulation, and a relationship to existing rights-of-ways.
 - 7. Proposed grading.
 - 8. Location and type of stormwater structural best management practices, drainage, sanitary sewers, storm sewers, and other utilities. A brief written description of any stormwater non-structural best management practices proposed.
 - 9. Location and type of fences, landscaping, buffer strips, and screening.
 - 10. Location and type of signs and onsite lighting.
 - 11. Proposed parking areas and drives. Parking areas shall be designated by lines showing individual spaces and shall conform with the provisions of this ordinance.
 - 12. Easements, if any.
 - 13. Dimensions and number of proposed lots.

- C. All plans and drawings shall be sealed by a registered engineer, landscape architect, architect, or land surveyor.

17.07 PLANNING COMMISSION REVIEW OF FINAL SITE PLAN

The planning commission shall review the final site plan and either approve, deny, or approve with conditions, the final site plan based on the purposes, objectives, and requirements of this ordinance.

- A. In its review of applications, the planning commission is empowered to request review and comment from the Allegan County Drain Commissioner, road commission, health department, or other agencies or professionals to assist in its determination associated with a project for which site plan approval is sought. This assistance is intended to insure satisfactory completion of the proposed improvements for the activity or project.
- B. ~~Failure to satisfy all elements of site plan review may constitute grounds for disapproval.~~ Standards for Granting Site Plan Approval

Each site plan shall conform to the applicable provisions of this Ordinance and the standards listed below:

1. Arrangement of Structures: Site plans shall demonstrate that buildings, parking areas, signs, walls, fences, and the like are designed to minimize adverse affects on development users and the occupants of adjacent properties.

2. Natural Features: Site plans shall demonstrate that as many natural features as possible have been retained, particularly where such features provide a buffer between adjoining properties or assist in preserving the general appearance of the neighborhood or help control soil erosion or assist with the infiltration of stormwater.

3. Topography: The proposed development preserves the natural topography to the maximum extent possible by minimizing the amount of cutting, filling, and grading required and reducing the potential for soil erosion or sedimentation.

4. Landscaping: Landscaping, including trees, shrubs and other vegetative material, is provided to maintain, improve, and/or restore the aesthetic quality of the site.

5. Vehicular and Pedestrian Traffic: Site plans shall fully conform to the driveway and traffic standards of the Michigan Department of Transportation and the Allegan County Road Commission. Further, the site plan shall demonstrate that there is a proper relationship between existing and proposed roadways, parking areas, and that the safety and convenience of pedestrian and vehicular traffic has been assured. For all uses other than one and two family dwellings, shared access between properties is required unless the applicant can provide evidence that the shared access is not feasible or reasonable.

1.6. Public Safety: Site plans shall fully conform with the applicable fire safety and emergency vehicle access requirements of both the Township and the County.

2.7. Drainage: Site plans shall fully conform to the Allegan County Drain Commissioner standards and evidence of such shall be provided. Further, the stormwater system shall be designed to protect public health, the environment and downstream or neighboring properties. Special attention shall be given to proper site surface drainage so that the flow of surface waters will not adversely affect adjacent, surrounding or downstream properties or the public storm drainage system. The applicant shall utilize Low Impact Development best management practices (listed below) which are appropriate for site conditions to reduce stormwater runoff by slowing it down, spreading it out and soaking it in as much as possible on the site. Only as a last resort, should storm water be removed from all roofs, canopies and paved areas and carried away in an underground piped drainage system. Surface water in all paved areas shall be collected at intervals so that it will not obstruct the flow of vehicular or pedestrian traffic, and will not create impounded water on the paved areas.

The site plan shall show all structural best management practices to be utilized on the site. In addition, a description of any non-structural best management practices which will be utilized should be submitted with the site plan. The applicant can refer to the *Low Impact Development Manual for Michigan: A Design Guide for Implementers and Reviewers*, SEMCOG 2008, for detailed information on Low Impact Development and the best management practices listed below.

1. The nonstructural Best Management Practices (BMPs) are:

- Cluster development,
- Minimize soil compaction,
- Minimize total disturbed area,
- Protect natural flow pathways,
- Protect riparian buffers,
- Protect sensitive areas,
- Reduce impervious surfaces, and
- Stormwater disconnection.

2. The structural Best Management Practices (BMPs) are:

- Bioretention
- Vegetated Filter Strip
- Vegetated Swale
- Pervious Pavement
- Infiltration Basin
- Subsurface Infiltration Bed
- Infiltration Trench
- Dry Well
- Level Spreaders
- Berming
- Planter Box

Runoff Volume/Non-infiltration
Vegetated Roof
Capture Reuse
Runoff Quality/ Non-infiltration
Constructed Wetland
Wet Ponds/Retention Basins
Constructed Filters
Water Quality Devices
Underground Detention
Extended Detention/Dry Pond Restoration
Riparian Buffer Restoration
Native Revegetation
Soil Restoration

8. Erosion: Site plans shall fully conform to the Allegan County Soil Erosion and Sedimentation Control Ordinance and evidence of such shall be provided.

9. Hazardous Waste Management: Site plans shall demonstrate that reasonable precautions will be taken to prevent hazardous materials from entering the environment.

10. Public Health: Site plans shall fully conform to the requirements of the Michigan Department of Public Health and the Allegan County Health Department.

11. Statutory Compliance: Site plans shall fully conform with all applicable State and Federal statutes.

12. Agricultural Buffer Strip: Prior to the commencement of construction of any residence or residential structure or accessory building where such property abuts, adjoins, or is adjacent to existing agricultural operations, a buffer strip shall be established. The buffer strip shall be an adequate width depending on the site plan and the site characteristics; shall be completed within six (6) months from the date of final inspection; shall thereafter be maintained with permanent native plant materials indigenous to this area; shall be at least four (4) feet in height if evergreens, ten (10) feet in height if deciduous and shall be supplemented with interspaced shrubbery at least two (2) feet in height so a sight screening effect can be expected within three (3) years.

C. Further, the planning commission is empowered to require a security deposit, certified check, irrevocable bank letter of credit, or surety bond covering the estimated costs of improvements associated with a project for which site plan approval is sought. The security deposit, certified check, irrevocable bank letter of credit, or surety bonds shall be deposited with the Clerk of the township to ensure faithful completion of the improvements and shall be deposited at the time of the issuance of the permit authorizing the activity or project. The security deposit must be received before the approval of the final site plan.

- D. In this ordinance, "improvements" means those features and actions associated with projects which are considered necessary by the planning commission to protect natural resources, or the health, safety, and welfare of residents of the township and future users or inhabitants of the proposed project or project area, including roadways, lighting, utilities, sidewalks, screening, and drainage. "Improvements" does not include the entire project which is the subject of zoning approval.
- E. If the improvements for which a security was deposited with the clerk of the township shall not be completed as indicated in the approved site plan, said security shall be forfeited. The township shall rebate a proportional share of cash deposits only when requested by the depositor, based on the percent of improvements completed, as attested to by the depositor and verified by the zoning administrator. The amount of the aforementioned performance guarantee shall be used by the township to return the property to a safe and healthy condition. The balance, if any, will be returned to the applicant.
- F. Each development shall be under construction within one year after the date of final approval by the planning commission. If said applicant does not fulfill this provision, the Commission may grant a 60-day extension provided the applicant presents reasonable evidence to the effect that said development has had problems but is then ready to proceed. Should neither of the aforementioned provisions be fulfilled or a 60-day extension has expired without construction underway, the site development plan shall be null and void.
- G. The planning commission will review and approve, disapprove or approve with modification all site plans. Upon approval of said plans, the Chairman of the planning commission will sign three copies thereof. One signed copy will be made a part of the Commission's files and one signed copy will be forwarded to the building inspector for issuance of a building permit. The third copy will be returned to the applicant.

17.08 SITE CHANGE *(added May 9, 2007)*

Except as otherwise set forth herein, any structure, use or field change added subsequent to the initial site plan approval must be approved by the Planning Commission. The following minor changes to an approved final site plan may be authorized by the Zoning Administrator without Planning Commission review:

- a. Increases or decreases of residential or non-residential floor areas by ten (10) percent or less.
- b. Relocation of any surface or subsurface structure or improvement by less than twenty (20) feet from its planned location.
- c. Increases or decreases in planned elevations of finished grades or changes in the area or materials of paved areas, which affect less than five hundred (500) square feet or five (5) percent of the total lot area, whichever is less.

- d. Increases or decreases or changes in type, height or length of walks, fencing, berms, or screened plantings.
- e. Additions or deletions of permitted accessory uses to the principal uses permitted by the approved site plan.
- f. Changes in the location of essential public utilities and services from those approved on the site plan in order to accommodate their installation.
- g. Increases in off-street parking areas or loading/unloading areas in commercial and industrial zoning districts.

Columbia Township

This review of Columbia Township's zoning ordinance is provided by the Southwest Michigan Planning Commission as part of the Black River Watershed Project in conjunction with the Van Buren Conservation District. The review only addresses issues related to water quality and natural features protection (except for a few typos caught). If you have questions regarding this review, please contact Marcy Colclough at 269-925-1137 x25 or colcloughm@swmpc.org.

Comments on Columbia Township Zoning Ordinance – Revised 2007

Page 18 – e.i. – Recommend at least a 30 foot setback from high water level, with at least 20 feet being a non-disturbance area with a natural vegetation.

e.ii. – only 5 feet for an accessory structure is not very much, would like to see at least 20 feet.

Page 20 and 22 – typo – g – “wills” – wells

Page 27 – 4.c. – recommend more than 10 feet setback from high water level with a non-disturbance area

Page 28 – D.1. - Recommend at least a 30 foot setback from high water level, with at least 20 feet being a non-disturbance area with a natural vegetation.

D.2. -only 5 feet for an accessory structure is not very much, would like to see at least 20 feet.

Page 29 – Section 4.05 – Good!

Page 30 – Parking Section 4.09 – Consider these suggestions:

- Permit the use of permeable paving for parking stalls and spillover parking areas.
- Do not require more than 3 off-street parking spaces per 1000 square feet of gross floor area in a professional office buildings.
- Do not require more than 4.5 off street parking spaces per 1000 square feet of gross floor area of shopping centers.
- Do not require more than 2 off street parking spaces per single family home.
- Establish parking maximums.
- Encourage shared parking. Establish formulas for the utilization of shared parking for uses with different peak times. Allow reduction of parking requirements is shared parking is proposed.
- Permit parking stall widths of 9 feet or less for a standard parking space.

- Permit stall length of 18 feet or less for a standard parking space.
- Recommend or require smaller stalls for compact cars, up to 30% of total number of parking spaces.
- Establish landscaping requirements for parking areas that include vegetated islands with bio-retention functions.

Page 32 - Section 4.11.B. – Why are PUDs and site condos not listed?

Page 33 –C.6. – what is the required landscaping? Are native species being recommended for all landscaping?

C.7 – review by Drain Commissioner - Good!

C.9.f – Why is “significant environmental features such as wetlands and waterbodies” listed above under Contents for a normal site plan? I would change the word environmental to “natural” and add “such as regulated and non-regulated wetlands, streams, ponds, lakes, floodplains, floodways, woodlands, steep slopes, natural drainage patterns.” to the list.

Page 34 – E.5. – Add criteria addressing the preservation of natural features such as regulated and non-regulated wetlands, streams, ponds, lakes, floodplains, floodways, woodlands, steep slopes, natural drainage patterns

E.5.g. - Adequate drainage and minimal land disturbance, clearing and grading

Page 38 – typo –C.10 – “sign” needs to be “signs”

Page 42- PUDs – have bonus density for open space preservation – GOOD!

Page 43 – typo – C.Planning Commission “n” order to discuss.... Should be “in” not “n”

Page 44 – 4d – could have setbacks here - Recommend at least a 30 foot setback from high water level or from the edge of a wetland, with at least 20 feet being a non-disturbance area with a natural vegetation.

4.f. – could encourage the use of native species for landscaping

add 4.i – maintain natural drainage ways whenever feasible and utilize infiltration practices for stormwater management.

Page 49 – typo - C.1. – “A private Roads” – should this say “All private roads”.... the it says from shoulder to “should”

Consider these suggestions for private roads:

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

Page 50 – Section 5.01 – refers to zoning commission – should this be planning commission?