NPDES PHASE II
MS4 GENERAL PERMIT
STORM WATER QUALITY MANAGEMENT PLAN
PART B: BASELINE CHARACTERIZATION REPORT
UPDATE

TOWN OF ZIONSVILLE, INDIANA

PERMIT #INR040035

OCTOBER 1, 2010

NPDES PHASE II
STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)
PART B: BASELINE CHARACTERIZATION REPORT
UPDATE

Prepared for:

Town of Zionsville, Indiana

October 2010

Prepared by:

Christopher B. Burke Engineering, Ltd.
PNC Center, Suite 1368-South
115 W. Washington Street
Indianapolis, Indiana 46204

CBBEL Project Number 07-235

DISCLAIMER: Exhibits and any GIS data used within this report are not intended to be used as legal documents or references. They are intended to serve as an aid in graphic representation only. Information shown on exhibits is not warranted for accuracy or merchantability.

TABLE OF CONTENTS

	Page #
1.0 INTRODUCTION	**1**
2.0 LAND USE WITHIN MS4 AREA	**2**
2.1 DESCRIPTION OF MS4 AREA	**2**
2.2 POPULATION DATA	**2**
2.3 LAND USE DATA	**2**
2.4 WATERSHEDS WITHIN MS4 AREA	**3**
2.5 SUMMARY OF LAND USE EVALUATIONS	**3**
3.0 SENSITIVE AREA	**5**
3.1 ERODIBLE SOIL	**5**
3.2 SOIL SUITABLITY FOR SEPTIC SYSTEMS	**5**
3.3 NATURAL HERITAGE DATA	**6**
3.4 WETLANDS	**6**
3.5 OUTSTANDING AND EXCEPTIONAL USE WATERS	**6**
3.6 ESTABLISHED TMDL WATERS	**6**
3.7 RECREATIONAL WATERS	**7**
3.8 PUBLIC DRINKING WATER SOURCES	**7**
3.9 SUMMARY OF SENSITIVE AREA CONCLUSIONS	**7**
4.0 SUMMARY OF EXISTING MONITORING DATA	**8**
4.1 INDIANA INTEGRATED WATER MONITORING AND ASSESSMENT REPORT	**8**
4.2 STREAM REACH CHARACTERIZATION EVALUATION REPORT	**8**
4.3 CLEAN WATER ACT CHAPTER 319 GRANT STUDIES	**9**
5.0 IDENTIFICATION AND ASSESSMENT OF EXISTING BMPs	**10**

5.1 PUBLIC EDUCATION AND OUTREACH 10

5.2 PUBLIC PARTICIPATION AND INVOLVEMENT 10

5.3 ILLICIT DISCHARGE DETECTION AND ELIMINATION 10

5.4 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL 11

5.5 POST-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL 11

5.6 POLLUTION PREVENTION AND GOOD HOUSEKEEPING 11

6.0 POTENTIAL PROBLEM AREAS 12

6.1 LAND USES 12

6.2 SENSITIVE AREAS 12

6.3 WATER QUALITY 12

6.4 SPECIFIC LOCATIONS REQUIRING STRUCTURAL BMPs 13

7.0 REFERENCES 14

LIST OF TABLES

2-1 Receiving Waters 2
2-2 2010 Land Cover Data for Zionsville's MS4 Area 3
2-3 14-Digit Watersheds within Zionsville's MS4 Area 3
3-1 Highly Erodible Soils 5
3-2 Soil Suitability for Septic Systems 6
4-1 2008 IDEM Integrated Report (IR) 8

LIST OF EXHIBITS

1. Zionsville MS4 Area
2. Zionsville Receiving Waters, 14-Digit HUCs, Wetlands
3. Zionsville Land Use

1.0 INTRODUCTION

As part of the 1987 amendments to the federal Clean Water Act (CWA), the United States Congress added Chapter 402(p) to the CWA to address the water quality impacts of stormwater discharges from industrial facilities and large to medium municipal separate storm sewer systems (MS4s). Large to medium MS4s were defined as communities serving populations of 100,000 or more and are regulated by the Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System's (NPDES) Storm Water Phase I Program.

In addition to these amendments, Congress directed the Environmental Protection Agency (EPA) to issue further regulations to identify and regulate additional stormwater discharges that were considered to be contributing to national water quality impairments. On December 8, 1999, the EPA issued regulations that expanded the existing NPDES Storm Water Program to include discharges from small MS4s in "urbanized areas" serving populations of less than 100,000 and stormwater discharges from construction activities that disturb more than one acre of land. These regulations are referred to as the NPDES Phase II Storm Water Program. The Town of Zionsville met this criterion and was consequently designated as a MS4 entity.

In the State of Indiana, the Indiana Department of Environmental Management (IDEM) is responsible for the development and oversight of the NPDES Phase II Program. The IDEM initiated adoption of the Phase II Rules that were ultimately codified as 327 IAC 15-13 (Rule 13). Rule 13 became effective on August 6, 2003 and required designated MS4 entities to apply for permit coverage and develop Storm Water Quality Management Plans (SWQMPs) through a phased submittal process.

This report has been prepared to update (where necessary) the SWQMP Part B: Baseline Characterization Report for the Town of Zionsville, Indiana and includes the following information:

- An investigation and assessment of the impacts of existing land uses on stormwater runoff within the MS4 area,
- An identification of sensitive areas within the MS4 area,
- A review of known existing and available water quality monitoring data for the MS4 area,
- *An identification and assessment of structural and non-structural Best Management Practices (BMPs) within the MS4 area,*
- *An identification of priority areas for the implementation of BMPs, and*
- *Recommendations for implementation of both structural and non-structural BMPs for each of the six minimum control measures required by Rule 13.*

The italicized bulleted items above are briefly mentioned within this report. However, full details regarding these items can be found in the Zionsville SWQMP Part C: Program Implementation. Portions of this document are highlighted to indicate what information has been updated from the development of the 2004 Part B during the first permit term. The source information has been highlighted where information contained in the table has not changed but sources were consulted during the development of this update.

2.0 LAND USE WITHIN MS4 AREA

Rule 13 requires the investigation of land usage and the assessment of structural and non-structural stormwater Best Management Practice (BMP) locations. The following discussion provides an evaluation of land uses within Zionsville's MS4 area. Structural and non-structural BMPs are identified and assessed in Chapter 5.0 of this report.

2.1 DESCRIPTION OF MS4 AREA

The Town of Zionsville is located in Eagle and Union Townships in the southeastern corner of Boone County. The Town is located approximately 2 miles upstream of Eagle Creek Reservoir, constructed for flood control in the later 1960's but now utilized as a public drinking water supply and recreational activities. **Exhibit 1** identifies the Town's MS4 boundary.

As provided by the Town of Zionsville Street and Stormwater Department, the MS4 area receiving streams are listed in **Table 2-1** and illustrated in **Exhibit 2**.

Table 2-1: Receiving Waters

Boone Creek	Holliday Creek
Cemetery Creek	Irishman Run
Cross Branch	Little Eagle Creek (Little Eagle Branch)
Eagle Creek	Long Branch
Gem Creek	Pee Wee Creek
Green Creek	Starkey Branch

(Zionsville Street and Stormwater Department, 2010)

2.2 POPULATION DATA

According to STATS Indiana, in 2009, Zionsville was ranked as the 2nd largest community in Boone County with a population of 14,012, approximately 24.9% of the County's population. It is estimated that the Town of Zionsville experienced a 33% population increase from 2000 to 2009 going from 10,531 to 14,012. Following a recent consolidation of the Town along with 2 Townships, the following population estimates have been provided by the Town of Zionsville Town Manager:

- Former Eagle Township (outside of Whitestown and Zionsville: 9,593
- Former Union Township: 2,567
- Former Town of Zionsville: 14,622

Zionsville is also among the 20 fastest growing Cities and Towns in Indiana, according to the Indiana Business Research Center at the Indiana University Kelley School of Business.

2.3 LAND USE DATA

As illustrated in **Exhibit 3**, approximately 64% of Zionsville's MS4 area is in agricultural production and 19% is considered to be urbanized. This data was gathered from the 2001 National Land Cover Dataset. **Table 2-2** summarizes land use data within Zionsville, including the recently consolidated Eagle and Union Townships, as determined by the 2001 data.

Table 2-2: 2001 Land Cover Data for Zionsville's MS4 Area

Land Use	Land Area (acres)	MS4 Area (%)
Agriculture	20,394.9	64.0
Forest, Open Space	4,587.1	14.4
Urban, Low Intensity	4,207.9	13.2
Urban, High Intensity	1,844.1	5.8
Commercial	424.8	1.3
Water	164.1	0.5
Wetland	143.4	0.5
Industrial	91.4	0.3
Total	**31,857.7**	**100.0**

(NLCD, 2001)

2.4 WATERSHEDS WITHIN MS4 AREA

Zionsville is located within one 8-digit Hydrologic Unit Code (HUC) watershed, the West Fork White River Basin. As illustrated in Exhibit 2 and listed in **Table 2-3**, there are 11, 14-digit Hydrologic Unit Code (HUC) subwatersheds that drain Zionsville's MS4 area. The acreage shown in the table is the total acreage of the subwatershed, not just the portion within the MS4 area.

Table 2-3: 14-Digit Watersheds within Zionsville

Watershed Name	14-digit HUC	Size (ac)*
Crooked Creek (Marion)	05120201090070	12,659.4
Eagle Creek-Dixon Branch	05120201120100	12,596.0
Eagle Creek-Finley Creek	05120201120010	10,496.5
Eagle Creek-Jackson Run	05120201120030	6,640.9
Eagle Creek-Kreager Ditch	05120201120050	11,995.7
Eagle Creek-Long Branch/Irishman Run	05120201120020	7,729.9
Eagle Creek-Neese Ditch	05120201120080	11,982.8
Eagle Creek Reservoir-School Branch	05120201120090	13,358.7
Fishback Creek (Eagle Creek Reservoir)	05120201120070	8,683.5
Little Eagle Branch-Woodruff Branch	05120201120040	10,187.1
White Lick Creek-Wiley Thompson Ditch	05120201150010	12,924.0

(IDEM, 2010)

*: This acreage represents the acreage of the entire subwatershed and not just the portion of the watershed within the MS4 area.

2.5 SUMMARY OF LAND USE EVALUATIONS

The effects of land use and land use change on surface runoff, streamflow, and groundwater recharge are fundamental considerations in the practice of stormwater management. Expansion of urban areas significantly impacts the environment in terms of groundwater recharge, water pollution, and stormwater drainage. Urbanization can lead to an expansion of impervious surfaces, which can in turn lead to increases in surface runoff volume, downstream flooding, and detrimental impacts to local waterways. Since each land use has a different impact on stormwater runoff, strategic land use planning can help minimize these impacts.

As agricultural land uses account for approximately 64% of land uses within the MS4 area, Zionsville encourages local agricultural producers to implement agricultural BMPs, including, but not limited to, conservation tillage, nutrient and pesticide management, buffer strips, and wetland restoration. This is accomplished by working with the Boone County Soil and Water Conservation District (SWCD) and the Upper White River Watershed Alliance (UWRWA) to target local agricultural producers in the MS4 area.

Further, urban/residential land uses account for approximately 19% of land use within the MS4 Area, and the Town attempts to manage growth and development in a way that minimizes potential impacts on water quality. As required by Rule 13, Zionsville adopted a comprehensive stormwater ordinance designed to minimize the impacts that urbanized areas have on water quality.

3.0 SENSITIVE AREAS

Rule 13 requires the identification of "Sensitive Areas" as locations that should be given the highest priority for the selection of BMPs and the prohibition of new or significantly increased MS4 discharges. The Town of Zionsville's 2004 Part B identified several specific areas as those where there is a potential for contamination of stormwater runoff: The Town's intent was to focus initial stormwater program implementation within these specific areas. However, after further evaluation, the Town has determined that programs will be continued throughout the MS4 area. This approach will simplify program implementation and should maximize the overall benefit that the stormwater program has on all local receiving waters. The following discussion provides an evaluation of potentially sensitive areas within Zionsville's MS4 area.

3.1 ERODIBLE SOIL

The Natural Resources Conservation Service (NRCS) uses the soil erodibility index (EI) to provide a numerical expression of the potential for a soil to erode considering the physical and chemical properties of the soil and the climatic conditions where it is located. As a result, the basis for identifying highly erodible land (HEL) is the erodibility index of a soil map unit.

The erodibility index of a soil is determined by dividing the potential erodibility for each soil by the soil loss tolerance (T) value established for the soil. The T value represents the maximum "tolerable" annual rate of soil erosion that could take place without causing a decline in long-term productivity. **Table 3-1** documents the highly erodible and potentially highly erodible soils within Zionsville's MS4 area.

Table 3-1: Highly Erodible Soils

Map Unit Symbol	Soil Name	HEL Classification
CrA, CsB2	Crosby	Potentially Highly Erodible
FSB2, FSC2	Fox	Potentially Highly Erodible
HEF	Hennepin	Potentially Highly Erodible
MMB2, MMC2, MMB3, MSB3	Miami	Potentially Highly Erodible
MMD2, MME2, MSC3, MSD3	Miami	Highly Erodible
OcB2	Ockley	Potentially Highly Erodible

(NRCS, 1987)

Recognizing the potential water quality impacts associated with disturbing highly erodible soils, Zionsville will consider these soils to be "sensitive areas". The Town will prioritize new/redevelopment sites, which contain the identified highly erodible or potentially highly erodible soils during the plan review, inspection, and enforcement process.

3.2 SOIL SUITABILITY FOR SEPTIC SYSTEMS

Based upon a review of the NRCS Soil Survey Geographic Database, soils unsuitable for septic systems are common throughout Zionsville's MS4 area. Approximately 98% of the soils within Zionsville's MS4 area have severe limitations for septic systems. Existing Town policy dictates that all new developments occurring within Zionsville are required to connect to the sanitary sewer system, if service is readily available. However, when sanitary sewer service is not available, on-site wastewater treatment permits are issued by the Boone County Health Department, if site conditions meet all

applicable Indiana State Department of Health standards.

Sufficient controls are in place to address on-site wastewater treatment in developing and redeveloping areas; however, priority will be given to those areas within the MS4 area with known septic system failures or inadequacies.

3.3 NATURAL HERITAGE DATA

The IDNR's Division of Nature Preserves maintains the Natural Heritage Data for the State of Indiana. National Heritage Data includes general information on endangered, threatened, and rare species for each Indiana County. As of June 2010, there are 3 plants, 14 birds, and 2 species of mammals listed as endangered, threatened or rare within Boone County. Further, there are 5 species of bivalves or mussels that have been identified within Boone County.

Town of Zionsville officials are unaware of specific stretches of streams or rivers within the MS4 area that currently contain threatened or endangered species and their habitats. If endangered or threatened species and their habitats are identified in the future, Zionsville will consider those locations to be sensitive areas and will update their stormwater program accordingly. Endangered, threatened, and rare species and habitats are not considered to be sensitive areas as part of Zionsville's stormwater program.

3.4 WETLANDS

The 2009 National Wetland Inventory (NWI) Map, as illustrated in Exhibit 2, identifies potential wetlands within Zionsville's MS4 area. It should be noted that the NWI data was generated from infrared photography and has not been field verified. The NWI map should be used only as a reference, not as a definitive answer of whether wetlands are present on a particular site.

Rule 13 requires MS4s to establish a construction program that contains, at a minimum, the requirements of 327 IAC 15-5 (Rule 5). Rule 5 requires all project site owners to develop construction plans that include an existing project site layout describing the location and name of all wetlands, lakes, and water courses on or adjacent to the project site (327 IAC 15-5-6.5(a)(3)).

Since Rules 5 and 13 require the identification of wetlands in conjunction with planning for construction site stormwater runoff controls, wetlands are considered sensitive areas in the Stormwater Program. The Town's required stormwater ordinance requires developers to meet, at a minimum, the requirements for identifying and protecting wetlands as outlined in 327 IAC 15-5-6.5(a)(3).

3.5 OUTSTANDING AND EXCEPTIONAL USE WATERS

According to IDEM's listing of Indiana Waters Designated for Special Protection, there are no waters in Boone County or the Town of Zionsville that have been designated as "outstanding state resource waters" or as "exceptional use waters".

3.6 ESTABLISHED TMDL WATERS

States are required to develop a priority ranking for waters that do not or are not expected to meet applicable water quality standards taking into account the severity of the pollution and the designated uses of the waters. Once this listing and ranking of waters is completed, the states are required to

develop Total Maximum Daily Loads (TMDLs) for these waters in order to achieve compliance with water quality standards. These streams are discussed further in Section 4.2.

There have been no TMDLs prepared for streams or rivers within the Town of Zionsville's MS4 boundaries.

3.7 RECREATIONAL WATERS

Recreational activities such as canoeing and fishing are commonly seen along Eagle Creek and within the MS4 boundary. Other waterbodies within the MS4 boundary are smaller streams or private lakes or subdivision detention ponds.

3.8 PUBLIC DRINKING WATER SOURCES

According to Indiana Code, a public water supply system is a public water supply for the provision to the public of piped water for human consumption, if such system has at least fifteen (15) service connections, or regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days of the year.

According to the Town of Zionsville, the public drinking water wells within Zionsville's MS4 area are owned and operated by Indianapolis Water Company. Public Drinking Water Sources will not be considered a priority for the Town's Stormwater Program.

3.9 SUMMARY OF SENSITIVE AREA CONCLUSIONS

As discussed in the sections above, several sensitive areas have been identified as having the potential to impact or be impacted by stormwater runoff from Zionsville's MS4 area. These areas include highly erodible soils, soils unsuitable for septic systems, and wetlands.

4.0 SUMMARY OF EXISTING MONITORING DATA

Rule 13 requires a review of known existing and available monitoring data for the MS4 area receiving waters, including, as applicable, data that can be correlated from chemical, biological, physical, land use, and complaint data. The following discussion provides an evaluation of known and available data for Zionsville's MS4 area receiving waters.

4.1 INDIANA INTEGRATED WATER MONITORING AND ASSESSMENT REPORT

Section 303(d) of the Clean Water Act requires states to identify waters that do not or are not expected to meet applicable water quality standards with technology based standards alone. States are also required to develop a priority ranking for these waters, taking into account the severity of the pollution and the designated uses of the waters. Once this listing and ranking of waters is completed, States are required to develop Total Maximum Daily Loads (TMDLs) for these waters in order to achieve compliance with water quality standards.

Section 305(b) of the Clean Water Act requires the state to assess and report on how well the waters of Indiana support the beneficial uses designated in the Water Quality Standards (WQS). Indiana's Integrated Water Monitoring and Assessment Report (IR) is developed every 2 years to fulfill this requirement and describes the condition of Indiana's lakes and streams, the Lake Michigan shoreline, and ground water. All IDEM water quality data is evaluated and interpreted for each 14-digit HUC subwatershed. Each subwatershed is given a water quality rating relative to its streams status in meeting WQS. WQS are set at levels necessary for protecting a waterway's designated use(s), such as swimmable, fishable, or drinkable. Each subwatershed is given a rating of fully, partially, or not supportive of its designated uses. **Table 4-1** identifies known impairments (*E. coli* and Impaired Biotic Communities (IBC)) for watersheds within Zionsville according to the IDEM's 2008 Indiana IR. Exhibit 2 illustrates the 303(d) listed streams within the MS4 area.

Table 4-1: 2008 IDEM Integrated Report (IR)

Watershed Name	Impairment
Eagle Creek-Dixon Branch	*E. coli*
Eagle Creek-Finley Creek	*E. coli*
Eagle Creek-Jackson Run	*E. coli*
Eagle Creek-Kreager Ditch	*E. coli,* IBC
Eagle Creek-Neese Ditch	*E. coli*
Little Eagle Branch-Woodruff Branch	*E. coli*
Mounts Run-Neese Ditch	*E. coli*

(IDEM, 2008)

4.2 STREAM REACH CHARACTERIZATION EVALUATION REPORT

According to Indiana's Combined Sewer Overflow (CSO) Strategy, all CSO communities within the state were required to address the ninth minimum control measure (monitoring to effectively characterize CSO impacts) by conducting a Stream Reach Characterization and Evaluation study.

Zionsville is not listed as a CSO Community and is therefore not required to complete a Stream Reach Characterization and Evaluation study.

4.3 CLEAN WATER ACT CHAPTER 319 GRANT STUDIES

Eagle Creek Watershed Implementation Project

According to IDEM, "Indiana University (IU) is addressing agricultural and urban nonpoint source water pollution concerns in the Eagle Creek watershed by implementing the Eagle Creek Watershed Management Plan (WMP). IU will develop and implement a cost-share program to implement BMPs such as rain gardens, swales, two-stage ditches, and conservation tillage that address the water quality concerns outlined in the Eagle Creek WMP. They will promote the cost-share program and identify projects in part through an education and outreach program including watershed committee meetings, a quarterly watershed newsletter, news releases, agricultural field days, urban field days, and workshops. IU is also conducting a monitoring program to document trends in the watershed and provide information to educational programs".

The primary concerns noted by the Eagle Creek Watershed Alliance include:

- Phosphorus and nitrogen runoff from fertilizers and septic systems resulting in algal blooms
- Degradation of aquatic habitats as a result of increased sedimentation
- Harmful levels of herbicides and other chemicals in our streams
- High levels of *E. coli* and pathogens in recreational waterways
- Limited public awareness of the watershed and its value as a natural resource

5.0 IDENTIFICATION AND ASSESSMENT OF BMPs

Rule 13 requires the assessment of structural and nonstructural stormwater Best Management Practices (BMPs) and locations. The following discussion provides an inventory of BMPs identified for Zionsville. Structural and non-structural BMPs are identified according to each of the six required Minimum Control Measures (MCMs). Further details regarding the BMP, measurable goals, timelines, and responsible parties may be found in the Zionsville SWQMP Part C update.

5.1 PUBLIC EDUCATION AND OUTREACH

Compliance with this MCM requires MS4s to demonstrate that residents, visitors, public service employees, commercial and industrial facilities, and construction site personnel within the MS4 are educated about the impacts of polluted stormwater runoff on MS4 area receiving streams.

Public Education and Outreach activities in Zionsville include:

- Stormwater Survey
- Partnerships
- SWMD Activities
- Stormwater Educational Materials
- Watershed Signage
- Website
- Rule 13 Participation List
- Local Media Opportunities
- Citizen Advisory Group
- Clean-Up Events
- Storm Drain Marking
- Public Meetings
- Pollution Tip Hotline

5.2 PUBLIC PARTICIPATION AND INVOLVEMENT

Compliance with this MCM requires MS4s to demonstrate that citizens and community members were provided with ample opportunities to participate in the development and implementation of the SWQMP.

Many of the BMPs listed in Section 5.1 include a component for Public Participation and Involvement.

5.3 ILLICIT DISCHARGE DETECTION AND ELIMINATION

Compliance with this MCM requires MS4s to develop and implement a strategy to detect and eliminate illicit discharges to the MS4 conveyance system.

Illicit Discharge Detection and Elimination activities in Zionsville include:

- Stormwater System Map
- IDDE Ordinance
- IDDE Plan

- Pollution Tip Hotline
- Recycling
- Education

5.4 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Compliance with this MCM requires MS4s to develop, implement, manage, and enforce an erosion and sediment control program for construction activities that disturb one or more acres of land within the MS4 area.

Construction Site Stormwater Runoff Control programs in Zionsville include:

- Erosion and Sediment Control Ordinance
- Zionsville Stormwater Technical Standards
- Operation & Maintenance Manuals
- Plan review, Site Inspection, and Enforcement
- Staff Training
- Erosion and Sediment Control and Post-Construction BMP Tracking Database
- Training for Construction Professionals
- Inspection and Enforcement Documentation
- Zionsville Rule 5 Compliance

5.5 POST-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Compliance with this MCM requires MS4s to develop a program for managing post-construction Best Management Practices (BMPs) that will ensure adequate, long-term stormwater quality benefits in new development and redevelopment activities. Once construction is complete, post-construction practices specified by the MS4 must be implemented to ensure adequate stormwater quality is maintained from the developed site via an enforceable ordinance or other regulatory mechanism.

Many of the BMPs listed in Section 5.4 contain a component for Post-Construction Site Stormwater Runoff Control.

5.6 POLLUTION PREVENTION AND GOOD HOUSEKEEPING

The Town of Zionsville has taken several steps to ensure that various departments are implementing pollution prevention efforts. Consequently, the Town has implemented several pollution prevention measures designed to benefit stormwater quality.

Pollution Prevention and Good Housekeeping activities in Zionsville include:

- Annual IDDE, Good Housekeeping, & Pollution Prevention Staff Training
- Maintenance Schedules and Database
- Flood Management Projects
- MS4 Conveyance System Maintenance
- Street Sweeping Program
- Canine Park Location
- Stormwater Pollution Prevention Plans (SWPPPs) – Facility Specific

6.0 POTENTIAL PROBLEM AREAS

Rule 13 requires the identification of areas having reasonable potential for or actually causing stormwater quality problems based upon relevant land use data and identified sensitive areas, as well as, existing and available water quality data. These areas are required to be given the highest priority for the selection of BMPs and the prohibition of new or significantly increased MS4 discharges. The following discussion summarizes potential problem areas identified within Zionsville. BMPs being considered are discussed in Chapter 5 of this report.

6.1 LAND USES

Agricultural land uses account for approximately 64% of land uses within the MS4 boundary. In order to minimize potential impacts associated with agricultural land uses, local agricultural producers will be encouraged to implement agricultural BMPs, including, but not limited to, conservation tillage, nutrient and pesticide management, buffer strips, and wetland restoration. This can be accomplished through the educational partners of the Town of Zionsville such as the Boone County SWCD or the UWRWA.

Urban land uses account for 19% of land uses within Zionsville, however, growth in the MS4 area is occurring. This trend towards urbanization, particularly in the western and northern portion of the Town, will likely continue in the near future. It will be important for Zionsville to manage growth and development in a way that minimizes the potential impacts on water quality. As required by Rule 13, the Town adopted a comprehensive stormwater ordinance designed to minimize the impacts of the urbanized areas on water quality. BMPs discussed in Chapter 5 should also minimize the water quality impacts of the Town's urban land uses on receiving waters.

6.2 SENSITIVE AREAS

Highly Erodible Soils

As discussed in Section 3.1, several soils in the Town's MS4 area have been classified as highly erodible or potentially highly erodible. Recognizing the potential water quality impacts associated with disturbing these soils, the Town will consider these soils to be "sensitive areas". The Town will prioritize new/redevelopment occurring on sites that contain these soils during the plan review, inspection, and enforcement process.

Soil Suitability for Septic Systems

The soil suitability data discussed in Section 3.2 suggests a high probability for septic system failures within the Town's MS4 area. While some existing controls are in place to address wastewater treatment in new/redeveloping areas, priority will be given to those areas within the Town's MS4 area with known septic system failures or inadequacies.

6.3 WATER QUALITY

Existing water quality data and studies related to the Town's MS4 area receiving streams has identified few instances of stormwater related pollutants. Zionsville's intent in the previous permit term was to focus initial stormwater program implementation within areas of concern previously mentioned in Section 4.0. However, after further evaluation, the Town has determined that all areas within the MS4 area will be considered priorities for many BMPs listed within the SWQMP Part C. This approach will simplify program implementation and should maximize the overall benefit that the stormwater program has on all local receiving waters.

6.4 SPECIFIC LOCATIONS REQUIRING STRUCTURUAL BMPs

Rule 13 requires MS4s to identify areas having reasonable potential for causing stormwater quality problems. A list of BMPs being considered for implementation throughout the MS4 area can be found in the SWQMP Part C update.

7.0 REFERENCES

Indiana DNR. *List of Endangered, Threatened, and Rare Species*. 2010. http://www.in.gov/dnr/naturepreserve/4666.htm

Indiana DNR. *Outstanding Rivers List for Indiana.* 2010 http://www.in.gov/legislative/register/20070530-IR-312070287NRA.xml.pdf

Indiana Department of Environmental Management. *Indiana's Integrated Water Monitoring and Assessment Report*. 2008. http://www.in.gov/idem/4679.htm

Indiana Department of Environmental Management. *Drinking Water Watch: Public Water Supply System Search*. 2010. https://myweb.in.gov/IDEM/DWW/

Indiana Department of Environmental Management. *Indiana Surface Water Public Water Supply System*. 2002.

Natural Resources Conservation Service, Soil Conservation Service. *Indiana Technical Guide, Section II*. 1987.

Purdue University. *Residential Onsite Wastewater Disposal website.* 2004. http://www.ces.purdue.edu/onsite/census.htm

Indiana Business Research Center. Stats Indiana. *Boone County, Indiana*. 2010. http://www.stats.indiana.edu/profiles

U.S. Environmental Protection Agency. *Managing Urban Runoff.* 1997. http://www.epa.gov/OWOW/NPS/facts/point7.htm

U.S. Environmental Protection Agency. Managing *Nonpoint Source Pollution from Agriculture.* 1997. http://www.epa.gov/owow/nps/facts/point6.htm

U.S. Fish and Wildlife Service. *National Wetland Inventory Maps*. 2009.