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Final

Northern Kentucky Storm Water Feasibility Study

The Fiscal Courts of Boone, Campbell, and Kenton Counties, Kentucky

May 15, 1998

NORTHERN KENTUCKY
STORM WATER FEASIBILITY STUDY

Prepared for

The Fiscal Courts of
Boone, Campbell, and Kenton Counties, Kentucky

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FOREWORD

The Fiscal Courts of Boone, Campbell, and Kenton Counties, Kentucky provided equal portion funding of this feasibility study. The Sanitation District No. 1 performed the administration of the study and of the funds allocated by the counties.

As part of the development of this feasibility study, an Advisory Committee was assembled specifically for the purpose of providing review and input. The membership of the Advisory Committee consisted of the following persons:

- Rick Kennedy
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- Bill Martin
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  Cincinnati/Northern Kentucky International Airport
- Jim Parsons
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- Greg Sketch
  Director of Engineering
  Boone County Fiscal Court
- Steve Stevens
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  City of Crescent Springs, KY

Woolpert LLP thanks the Advisory Committee for their contributions to this feasibility study including their insightful discussion, timely review, and detailed input. Woolpert also thanks Derek R. Guthrie, P.E., Storm Water Manager, Louisville and Jefferson County Metropolitan Sewer District, for his briefing of the Advisory Committee on the organization and operation of a storm water management program.

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EXECUTIVE SUMMARY

On December 15, 1997, the U.S. Environmental Protection Agency (USEPA) issued proposed rules under Phase II of the comprehensive, phased program for regulating storm water discharges under the NPDES program required by the Water Quality Act of 1987. Phase I of the program has been in effect since 1990 and covers large communities and construction sites over 5 acres in size. Under Phase II, storm water discharges for (1) commercial, retail, light industrial, and institutional facilities; (2) construction activities involving under five acres of land disturbance; and (3) municipal separate storm sewer systems (MS4s) outside of an "urbanized area" with a population of at least 10,000 and a population density of 1,000 people per square mile will be covered. All of the remaining Phase II facilities must apply for permits by August 7, 2001, but only if the permitting program in place at the time requires permits.

The proposed Phase II rules were published in the *Federal Register* on January 9, 1998, and identified 33 of the 39 cities in Boone, Campbell, and Kenton Counties, as well as the counties themselves, as being automatically designated under the proposed rules. The emphasis of Phase II is directed more toward water quality than water quantity; however, a watershed management approach is strongly emphasized by the USEPA. Since the watersheds of Northern Kentucky often cross municipal boundaries, it will be hard to implement uniform storm water management measures unless numerous inter-government agreements are formulated or a single storm water management agency is established. The Phase II rule covers all storm water discharges not previously covered by Phase I including:

- Commercial, retail, light industrial, and institutional facilities.
- Construction activities involving under five acres and greater than one acre of land disturbance.
- MS4s serving over 10,000 people with a population density greater than 1,000 people per square mile.

The management of storm water in Boone, Campbell, and Kenton Counties widely varies. Boone County has initiated portions of a storm water management program through a storm water infrastructure inventory process. The City of Florence charges a property based fee to cover the cost of storm water drainage improvements. Other communities use general funds to pay for storm water drainage maintenance and operation. Still other communities treat storm water drainage problems as they occur with no maintenance program.

The components of a storm water management program exist in parts throughout the three-county region. There are several geographic information systems (GIS) available; however, none of the existing systems adequately address storm water drainage. The equipment needed to construct, operate, and maintain a storm water drainage system exists

within the municipal highway and public works departments, water utilities, and the Sanitation District No. 1. Several agencies perform plan review for storm water drainage projects including the Northern Kentucky Area Planning Commission (NKAPC).

A survey of the municipalities in Northern Kentucky indicated a general lack of knowledge of the Phase II rules. At the same time, the survey indicated a strong interest in storm water management primarily tied to flood reduction. There was also a majority opinion that a single storm water management agency should be established; however, there was no consensus on who that agency should be. The Sanitation District No. 1, the NKAPC, and a possible new agency were all identified as possible candidates to take on the task of storm water management.

A review of the current Kentucky statutes under which a storm water management agency can be established is provided. This review indicates that for a storm water management agency to be established in Northern Kentucky, either the existing statutes will need to be modified, a new statute written, or the full approval of every municipality in Northern Kentucky will need to be obtained to move forward.

This report identifies elements of a comprehensive storm water management program and the implementation issues for a regional agency. A discussion of several funding mechanisms is provided that provide for a fair and equitable distribution of the costs of building, running, and maintaining a storm water drainage system including flood control.

Finally, this report provides recommendations to move forward with developing a consistent storm water management program in the three counties of Northern Kentucky under the auspices of a single regional agency. These preliminary recommendations include:

1. The Sanitation District No. 1 should assume responsibility for the organization of a new storm water management utility.

2. The Sanitation District No. 1 should follow through with their proposed funding mechanism to initiate development of the necessary administrative structure for a storm water management utility.

3. The Sanitation District No. 1 should formulate the mission, goals, and objectives of a regional storm water management agency.

4. The Sanitation District No. 1 should build upon the authority granted under the revised KRS 220 that allows the development of a storm water management utility.

5. The existing storm water advisory committee should be continued and their role expanded. The advisory committee should be tasked with providing review and recommendations pursuant to a public awareness program.

6. The Sanitation District No. 1 should meet with the Northern Kentucky Area Planning Commission, Boone County Planning Commission and other appropriate agencies to explore possible areas of cooperation.

SECTION 1 — INTRODUCTION

Storm water management has long been associated with flood control and drainage. However, the emphasis on water quantity has changed to water quality. According to the U.S. Environmental Protection Agency (USEPA) in their 1994 report *The Quality of Our Nations's Water*, urban runoff/storm sewers are the fourth leading source of water quality impairment in rivers, the third leading source in lakes, and the leading source in estuaries.

In 1972 the passage of the Federal Clean Water Act (CWA) began to address the problem of storm water quality. The CWA prohibited point source discharges of pollutants to the waters of the United States unless authorized by a National Pollution Discharge Elimination System (NPDES) permit. The focus of this permit program was point source discharges of industrial and municipal wastewaters. It was soon realized that the goals of the CWA would not be attained unless water quality controls could be imposed on storm water discharges from industrial activities and large urban centers.

The 1987 amendments to the CWA, called the Water Quality Act of 1987, began to look at storm water point sources through the addition of Section 402(p). This section required the U.S. Environmental Protection Agency (USEPA) to develop a comprehensive, phased program for regulating storm water discharges under the NPDES program. Phase I of the program began in October 1990 and implemented NPDES storm water permitting regulations for:

- Storm water discharges associated with industrial activities falling within any of eleven industrial categories including construction sites with land activities of five or more acres.

- Discharges from large Municipal Separate Storm Sewer Systems (MS4s) serving a population of 250,000 or more, and for discharges from medium MS4s serving a population of 100,000 to 250,000.

- Discharges which are designated by the USEPA or an NPDES delegated state as needing an NPDES permit because the discharge contributes to a violation of a water quality standards or is a significant contributor of pollutants to the waters of the United States.

Kentucky is a delegated state and the NPDES permit program is known as the Kentucky Pollutant Discharge Elimination System (KPDES). All of the Phase I permits were to be applied for by May 17, 1993.

The final rule for Phase II of the program was first issued in draft form by the USEPA on August 7, 1995 (Ponzani, 1995). The current proposed rules, included as Appendix A to this report, were issued on December 15, 1997, and were published in the *Federal Register* on January 9, 1998. The Phase II rule covers all storm water discharges not previously covered by Phase I including:

- Commercial, retail, light industrial, and institutional facilities.

- Construction activities involving under five acres and greater than one acre of land disturbance.

- MS4s serving over 10,000 people with a population density greater than 1,000 people per square mile.

Oil and gas operators, silvicultural (forestry related), and agricultural discharges continue to be exempt under the Phase II permitting program. Under this second phase, all of the remaining Phase II facilities must apply for permits by August 7, 2001, but only if the permitting program in place at the time requires permits. The final rule for Phase II is expected to be issued by the USEPA by March 1, 1999. Under the current Phase II proposal, the NPDES permitting authorities would need to issues permits by May 31, 2002.

Although the USEPA, states, municipalities, and various water resources organizations are continuing to formulate the final Phase II rules, it is inevitable that Northern Kentucky will be impacted by the measures needed to comply with the rules. Where the term "Northern Kentucky" is used throughout this report, it is in reference to Boone, Campbell, and Kenton Counties. Phase II will directly involve every political subdivision in Northern Kentucky. The provisions of Phase II contain an emphasis on controlling storm water pollution through watershed management. Watershed management requires taking a holistic approach to a watershed including water quantity and quality issues.

Where watershed management becomes difficult is the realization that watersheds often cross political boundaries. Controlling development in the upper portion of a watershed to prevent detrimental effects in the lower portion of a watershed may not be popular and may be viewed as anti-development or an unnecessary restraint on growth of a municipality. Water pollution control measures may be considered as an unnecessary expense for homebuilders. The costs of watershed management in the form of a storm water fee may be viewed as an additional tax.

This is the reason that many communities throughout the United States are organizing regional storm water management authorities. Regional storm water management allows for an even-handed approach to watershed management. The same rate structure can be applied to everybody within the boundaries of an individual watershed or within the boundaries of the regional authority and storm water improvement projects are performed on a priority basis. Maintenance and operation activities for the storm water drainage system are the responsibility of the regional authority as are water quality control measures. The regional authority is recognized as a single entity by the state and federal regulators. The regional authority is responsible for the various environmental permit applications and compliance with the permits once they are granted thus relieving the individual communities of this burden.

This feasibility study was to identify and/or verify the relevant issues, level of interest, benefits, opportunities, and constraints associated with initiating a new regional storm water management program in Northern Kentucky. The study relied on input from the 39 cities in Northern Kentucky; Boone, Campbell, and Kenton Counties; the Northern Kentucky Area Planning Commission; and the Cincinnati/Northern Kentucky International Airport to evaluate the current state of storm water management. Lastly, this study presents recommendations to pursue an effective storm water management program in Northern Kentucky.

SECTION 2 — NPDES PERMIT REQUIREMENTS FOR MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4S)

The implementation of the NPDES Phase II rules for commercial, retail, light industrial, institutional facilities, and construction activities will be handled by the owners of these facilities. However, for the Municipal Separate Storm Sewer Systems (MS4) compliance with the provisions of the NPDES program will be the responsibility of the entity charged with storm water management accountability. In Northern Kentucky this entity could be each county fiscal court, the individual cities, or an existing or new entity assigned the responsibility for storm water management.

The USEPA defines MS4s as a conveyance or system of conveyances designed or used for collecting storm water which is not a combined sewer and which is not part of a publicly owned treatment works. The conveyance system can consist of roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains. Operators of MS4s can submit jurisdiction-wide or system-wide permit applications; however, regardless of the coverage of the permit, a two-part permit applications must be submitted. The following paragraphs define the NPDES permit requirements for large and medium MS4s per the Phase I rules. It is anticipated that these same requirements will be passed down for small MS4s under the Phase II rules.

Municipal Applications – Part 1

The following items must be included in Part 1 of the MS4 application for a permit under the NPDES regulations:

- General information about the system;
- A description of the operator's legal authority to control discharges to the system, and, where necessary, a description of additional authority that will be needed and a schedule and statement of commitment to seek such additional authority;
- Identification of dischargers to the MS4;
- A characterization of discharges from industrial sources and other sources into the system, including the results of a field screening analysis for illicit discharges and illegal dumping into the system;
- A description of existing management programs to control pollutants from the MS4, including a description of the existing program to identify and prevent illicit discharges; and
- A description of the financial resources currently available to the municipality to complete part 2 of the NPDES application.

Municipal Applications – Part 2

Part 2 of the NPDES application for MS4s consists of several sections. First, the applicant must demonstrate that it has the legal authority to control:

- Pollutants from industrial storm water discharges to the system and the quality of the storm water discharged from industrial sites;

- Illicit Discharges;

- Discharges into the MS4 from spills, dumping, or the disposal of materials other than storm water; and

- Pollutant transfers from one portion of the MS4 to another.

The applicant must also demonstrate that it can require compliance with relevant conditions in its ordinances, permits, contracts, or orders and perform all inspection and monitoring procedures needed to determine compliance or non-compliance with permit conditions.

The Part 2 application also requires:

- An identification of any major outfall discharging to the waters of the United States that was not previously reported, and an inventory of any facilities discharging storm water associated with industrial activity to the MS4;

- Discharge characterization data, including:
  (1) Quantitative data from five to ten "representative" major outfalls that the permitting authority designates based on information received in Part 1 of the permit application,
  (2) Estimates of the annual pollutant load of the system's cumulative discharges to the waters of the United States,
  (3) A proposed schedule to provide data estimates for each major outfall identified through the permit application process, and
  (4) A proposed monitoring program for "representative" data collection for the term of the permit;

- A proposed storm water management program covering the duration of the permit;

- An assessment of controls, including estimated pollutant loading reductions expected as the result of the municipal storm water management program for the MS4; and

- A fiscal analysis of the capital, operation, and maintenance expenditures needed to accomplish the management program's objectives, for each fiscal year covered by the permit. Fiscal analyses must describe funds expected to be available to meet expected expenditures and legal restrictions on the use of such funds.

Management Programs for MS4s

Part 2 of the NPDES permit application must include a management program covering the duration of the permit. This program must include a comprehensive planning process with opportunities for public participation and intergovernmental coordination where necessary. The program must reduce storm water pollutant discharges to the maximum extent practicable using management practices, control techniques, system design and engineering methods, and "such other provisions which are appropriate." A description of the staff and

equipment available to implement the program must be included. The management program must include the following items:

- Structural and source control measures to reduce pollutants from runoff from commercial and residential areas;

- Programs, including schedules for implementing such programs, to detect and remove illicit discharges and improper disposal of non-storm water substances (e.g. motor oil) into each MS4, or to require dischargers to obtain separate NPDES permits for such discharges and improper disposal practices;

- A program to monitor and control pollutants in storm water discharges to the MS4 from municipal landfills, hazardous waste facilities, industrial facilities subject to the public "right-to-know" requirements of section 313 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA), and from industrial facilities that the operator of the MS4 determines are contributing a "substantial" pollutant loading to the system; and

- A program to implement and maintain structural and non-structural best management practices (BMP) to reduce pollutant loadings to the MS4 from construction site storm water runoff. This shall include:

  (1) Site planning procedures that incorporate a consideration of potential water quality impacts;
  (2) Non-structural and structural BMPs to be required;
  (3) Procedures for identifying priorities for site inspection and control, taking into account the nature of the construction activity, the topography, the characteristics of the soils, and the quality of the receiving waters; and
  (4) Appropriate educational and training measures for construction site operators.

Identification of Illicit Connections and Improper Disposals

Part 1 of the NPDES permit process requires MS4s to begin identifying illicit connections to their systems while Part 2 requires the final identification of all major sources of non-stormwater discharges and the formulation of plans for controlling pollutant loadings from illicit connections and other non-storm water discharges. Many of the industrial connections to the MS4s were legal when they were made but are now considered "illicit" under the current USEPA limitations on dischargers of non-storm water to MS4s.

The requirements for non-storm water discharge source identification include the submission of U.S. Geological Survey (USGS) 7.5 minute topographic quadrangle maps or equivalent extending one mile beyond the boundaries of the system. The maps are to be annotated with the following information:

- The location of all known municipal sewer outfalls to U.S. waters;

- A description of local land use activities, including industrial uses, and estimates of population densities and a 10-year projection of growth expected in the drainage area;

- The location and description of each municipal landfill and other treatment, storage, and disposal facilities for municipal waste;

- The locations and permit numbers for all known NPDES permit holders discharging to the municipal storm sewer;

- The location of major structural controls for municipal storm water discharges, including retention and detention basins and major infiltration devices; and

- The names of publicly owned parks, recreation areas, and other open lands in the area.

The Part 1 illicit discharge field screening program requires the operator of the MS4 to relate the results of a field screening analysis for illicit connections and illicit dumping (e.g. waste motor oil) for either "selected field screening points" or "major outfalls" covered by the permit application. For each screening point or major outfall, the field screening analysis must include narrative descriptions of visual observations made during a dry period and an analysis of two grab samples collected during a 24-hour period, with a minimum of at least four hours between each sample. The grab samples must be characterized with a narrative including descriptions of the color, odor, turbidity, and presence of an oil sheen or surface scum in each sample as well as any other observations relative to the potential presence of non-storm water discharges or illegal dumping. Other data required for each grab samples includes flow rates, estimated pH, chlorine, total copper, total phenol, and detergents or surfactants.

The Part 1 permit application requires the MS4 applicant to describe existing management programs to control pollutants. Descriptions must include information on existing structural and source controls, including but not limited to:

- Procedures to control pollution stemming from construction activities;
- Floodplain management controls;
- Wetland protection measures;
- BMPs required for new subdivisions; and
- Emergency spill response programs.

The descriptions must include information concerning existing programs to identify and prevent illicit connections to the MS4s, as well as of areas where the illicit connection identification and prevention programs have been implemented.

As noted previously, the management programs required in Part 2 for MS4 operators must include a program for detecting and removing illicit discharges and controlling the improper disposal of waste substances (e.g. waste motor oil) into the MS4. The management program must include:

- Programs to implement ordinances, legal orders or similar means to prevent illicit discharges to the system;

- Ongoing field screening activities occurring over the life of the permit, and identification of the areas and locations to be evaluated by field screens;

- Procedures to investigate portions of the MS4 where there is a reasonable potential for illicit discharges or other sources of non-storm water, based on the results of the field screen;

- Procedures to prevent, contain, and respond to spills that may discharge pollutants into the system;

- Programs to promote public reporting of illicit discharges into the MS4 and water quality impacts associated with such discharges;

- Educational and public information activities to facilitate proper management of used oil and other toxic materials; and

- Controls on the infiltration of seepage from municipal sanitary sewers into the MS4.

Each management program must "effectively" prohibit all types of illicit discharges, which are discharges of non-storm water flows into the MS4 systems; however, the USEPA will allow non-storm water discharges into storm sewers "pursuant to an NPDES permit." The USEPA also recognizes several categories of non-storm water discharges that are relatively expensive to control and that may contribute relatively few pollutants to MS4s. The following categories of non-storm water discharges, therefore, must be addressed in management programs only when the municipalities involved identify them as "sources of pollutants to the waters of the United States":

- Water line flushing,
- Landscape irrigation,
- Diverted stream flows,
- Rising ground waters,
- Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20)) to separate storm sewers,
- Uncontaminated pumped ground water,
- Discharges from potable water sources,
- Foundation drains,
- Air conditioning condensation,
- Irrigation water,
- Springs,
- Water from crawl space pumps,
- Footing drains,
- Lawn watering,
- Individual residential car washing,
- Flows from riparian habitats and wetlands,
- Dechlorinated swimming pool discharges, and
- Street wash water.

Flows or discharges from fire fighting must be addressed in the management program only when they are identified as "significant" sources of pollutants to waters of the United States.

Discharges from Landfills and Hazardous Waste, SARA Title III, and Certain Other Industrial Facilities

The MS4 has a particular responsibility to monitor and control pollutants in storm water from facilities that the USEPA has identified as particularly troublesome. The MS4 must establish management plans to control discharges from the following:

- Municipal landfills;
- Hazardous waste treatment, disposal, and recovery facilities;
- Industrial facilities that are subject to SARA Title III, Section 313; and
- Industrial facilities that the municipal permit applicant has determined are contributing a substantial pollutant loading to the municipal storm sewer system.

Each MS4 comprehensive storm water management program must:

- Identify priorities and procedures for inspections, and for establishing and implementing control measures for these discharges; and

- Describe a monitoring program to be implemented during the permit term, to include quantitative data submissions on:

  (1) Any pollutant listed in an existing NPDES permit for the facility;
  (2) Any discharges for which information is required under 40 CFR 122.21(g)(7)(iii) and (iv);
  (3) Oil and grease, COD, pH, BOD_5, TSS, total phosphorous, total Kjeldahl nitrogen, and nitrate plus nitrite nitrogen; and
  (4) Any pollutants limited in effluent guideline subcategories, where applicable.

SECTION 3 — STORM WATER MANAGEMENT SURVEY

The survey portion of this Storm Water Feasibility Study was conducted to determine the current state of storm water management and infrastructure in Northern Kentucky. The survey questions covered topics that included:

- The physical system,
- Existing storm water programs,
- Regulation and enforcement,
- Financial management,
- Operation and maintenance, and
- Water quality.

The survey questionnaires were sent to 39 cities; Campbell, Kenton and Boone County; the Northern Kentucky Area Planning Commission (NKAPC); and the Cincinnati/Northern Kentucky International Airport (CNKIA). The response to the survey was very good with over 72 percent of the recipients (32 of 44) responding to the survey questionnaire and completing the subsequent interview. Those cities that did not respond to the survey were the smaller cities that were most likely not directly involved in storm water management. The exclusion of their responses did not dramatically affect the results.

To summarize the results of the survey, this section of the feasibility study report is divided into topic areas corresponding to the survey questions. The survey form and a summary table of responses are included in Appendix B to this report. A graphical representation of the survey data is also included in Appendix B and is organized into the same categories as listed in the following sections. Many of the questions in the survey do not directly apply to the counties, NKAPC, or the CNKIA, so there is a separate section for each of these entities. There is also a section labeled *Additional Comments* which summarizes several of the additional items that were discussed at the interviews with the city and county representatives. Many of the items discussed with the city and county representatives were not included in the surveys, but are addressed in this report to accurately represent the current state of storm water management in Northern Kentucky.

Physical System

Questions 1 through 7 on the survey questionnaire asked the respondents to characterize their community's problems with erosion, drainage and flooding on a relative scale of one to five. The results are illustrated in the table and graphs in Appendix B. Some cities indicated that they did not have a problem with erosion, drainage, or flooding, but overall the results indicated that most cities have some type of problem in these categories. Approximately 23 percent (10 of 44) of the respondents indicate that they have a *major* problem with both flooding and drainage (score of 4 or greater for both questions 3 and 4). The interviews also provided some insight into the relative magnitude of the existing problems. After numerous discussions with the respondents, it appears that minor problems are best characterized as street or yard flooding with no property damage and minor erosion problems. Some of the problems which were ranked between *minor* and *major* included infrequent stream flooding into garages or basements and minor erosion from storms with intense downpours. The problems that were classified as *major* included serious erosion of roadway embankments, chronic flooding with property damage, and those that involved law suits against the city or county.

The frequency and severity of the flooding was also measured in terms of the number of episodes per year where property damage or personal hazard was encountered (question 5). Half of the communities (16 of the 32 respondents) experienced between two and five of these types of flooding episodes per year while a small percentage (4 of the 32 respondents) experienced ten or more episodes per year. Overall, approximately 500 properties experienced property damage or personal hazard due to local flooding in Northern Kentucky each year.

Several of the cities in Northern Kentucky have combined sewers located within their city limits. The combined sewers transport both domestic waste water and storm water in the same system. Because the combined sewers transport wastewater during dry weather events, portions of the system are owned and maintained by the Sanitation District No. 1. There are separate storm water systems located in and around combined sewer areas, such as in the southern portions of Newport and Covington, that are maintained by the individual cities. However, most of the storm water infrastructure components in the combined sewer areas are maintained by Sanitation District No. 1. Therefore, the survey results from the combined sewer cities of Ludlow, Dayton, Newport, Covington and Bromley were similar in many aspects because the Sanitation District No. 1 provides the majority of storm water management and infrastructure maintenance in these areas.

Existing Storm Water Program Information

Questions 8 through 14 of the survey questionnaire addressed existing storm water management programs. Most of the cities that responded to the survey did not have a specific detailed inventory of their storm water infrastructure. The type of records most commonly kept by the cities were storm water complaint records and subdivision plans (question 9). None of the cities that responded to the survey have made an effort to locate storm water infrastructure and record them in a digital format. On a county-wide basis, Boone County has begun to inventory their storm water infrastructure.

Several of the cities that responded to the survey indicated that they had a community-related group or program that addressed storm water issues (question 10). The cities of Park Hills, Florence, Villa Hills, and Wilder have some type of community related storm water group. The City of Park Hills has formed a Street Task Force that involves city representatives, the city engineer, and local residents. The Street Task Force examines the condition of city streets and also addresses the related storm water problems. The City of Villa Hills has a Storm Water Committee that issued a survey to residents asking them to quantify the magnitude of storm water problems on their property. The results of the survey have helped city officials to locate areas where drainage or other storm water improvements are needed.

Many of the cities that responded to the survey, approximately 56 percent (18 of 32 respondents), indicated that they have plans for future storm water improvements (question 11). As stated previously, the magnitude of improvements to the storm water system varies according to the size of the city. For example, Florence is currently in the process of implementing the recommendations listed in a citywide storm water master plan and has completed the review of new storm water regulations that are to be implemented in the near future. The City of Covington has a report that describes the existing system and recommends several major storm water system improvements; however, the recommended improvements are not currently being implemented due to a lack of funds. The cities of

Bellevue, Dayton and Ft. Thomas, as well as the Sanitation District No. 1, are all involved in the major flooding problems along Covert Run Creek which may involve possibly relocating or dredging the creek. The City of Ft. Wright has formed a Storm Water Committee to examine the current storm water regulations and infrastructure within the city in response to the death of a child in the storm water system. As mentioned previously, Park Hills, Villa Hills, and Wilder all have aggressive storm water improvement plans that include input from the community.

Other cities such as Crescent Springs, Silver Grove, Southgate, Taylor Mill, and Walton have plans to address their storm water problems on a smaller scale. These plans include improvements such as the installation of additional catch basins to prevent street flooding, examination of the feasibility of constructing detention facilities, stabilization of road embankments to prevent further erosion, and the construction of curbs and gutters in existing neighborhoods to prevent localized flooding.

Regulation and Enforcement

Questions 15 through 18 in the survey dealt with regulation and enforcement of storm water infrastructure standards. Most of the cities in Kenton County defer the responsibility of regulating and inspecting new storm water infrastructure to the NKAPC. Therefore, the majority of the respondents indicated *yes* to most of the questions regarding regulation and enforcement even though the cities themselves are not directly responsible for these tasks.

Several cities such as Ft. Thomas and Newport have their own internal review process and enforcement policies through their Public Works departments. Other cities such as Highland Heights, Cold Spring, and Independence have an external review and enforcement policy that is conducted by an engineering consulting firm. The city of Alexandria has its own subdivision regulations that are modeled after those used by the NKAPC. Alexandria also contracts for the services of the NKAPC for construction inspection and enforcement of their regulations. A further discussion of regulations and enforcement is included in subsequent sections of this report.

Financial Management

Questions 19 through 21 of the survey reviewed financial management for existing storm water programs in Northern Kentucky. The majority of the cities that were surveyed, approximately 81 percent (26 of 32 respondents), raise at least a portion of the money needed for storm water maintenance or improvements through general fund revenues (question 19). Some cities actually set aside a specific amount of money for maintenance of catch basins and culverts and other minor storm water improvements. Others have a public works budget that includes street repair, grass cutting, and other maintenance items that include storm water infrastructure. For large projects or emergency situations, the smaller cities use money from their general funds based on the approval of the city council. The amount of money that each city applied toward storm water programs was difficult to exactly determine, but it ranged from $1,000 to $180,000 (question 20). Boone County estimates an annual budget of $200,000 for their storm water program while the City of Florence estimates their budget to be $1,000,000. Obviously, the amount of money applied to storm water maintenance varies in accordance with the size of the city, but the average amount was approximately $30,000.

Only 15 percent of the cities (5 of 32 respondents) have a special fee paid by city residents that is earmarked specifically for a storm water infrastructure program. Those cities that have a special fee are the cities of Florence, Southgate, Covington, Park Hills, and Villa Hills. In the City of Florence, a storm water charge of one dollar is applied to the water and sewer bill for every single-family residential unit within the city limits. A charge of one dollar for every 2,468 square feet of impervious area is assessed to commercial developments. However, commercial development in Florence can receive up to an 85 percent credit applied to their storm water fee if proper detention facilities are included on the site. The City of Villa Hills charges $10 per household to administer their storm water program. Park Hills uses a fee that is assessed based on property value to fund their Street Task Force.

Operations and Maintenance

Operations and maintenance data for the storm water infrastructure in Northern Kentucky was evaluated based on the responses to questions 22 through 24 in the survey. Approximately 63 percent of the cities (20 of 32 respondents) responding to the survey indicated that their storm water maintenance program is *primarily complaint driven* as opposed to *regularly scheduled* (question 23). Consequently, there are even fewer cities that have a storm water infrastructure maintenance program. Those cities that have a regularly scheduled maintenance program are limited to the cleaning of catch basins on a regular basis or the removal of debris from areas which are prone to localized flooding during heavy rains. None of the cities surveyed have a periodic inspection program as a part of their storm water program.

Storm Water Pollution Prevention Programs

Questions 25 through 28 in the survey addressed the water quality aspects of storm water even though most respondents were not aware of the water quality impacts of storm water. Over half of the cities (18 of 32 respondents) have a street sweeping program (question 25). Street sweeping can be very important in controlling the amount of floatable material that enters the streams and rivers. The variation in the number of times the streets are swept in a year varies greatly from city to city. Some cities sweep their business districts once per week and residential streets once per month while others only sweep those areas where sand was placed during a snowfall. Of the cities that have a street sweeping program, the streets are swept on average three times per year.

The interviews with the city representatives always centered around storm water *quantity* problems instead of the water *quality* problems that are inherent within storm water management. The only discussion of storm water quality that was generated by this section of the survey related to the combined sewer areas and their impacts on water quality.

Summary of Survey Results

The last four questions in the survey, questions 29 through 32, gauged the community's overall feelings on storm water management. The results of the survey indicate that 75 percent of the respondents (24 of 32 respondents) would support a regional storm water management agency (question 31). However, many of the respondents wrote comments outlining their concerns about the fairness of the funding mechanisms, the effectiveness of

a regional storm water agency, and the cooperation of the storm water agency with existing city maintenance programs. In the interviews, most city and county representatives realized that storm water management does not begin and end at the municipal boundaries and that an effective storm water management program needs to be on a regional basis.

Survey question 32 asked whether there was an existing agency that was suited for managing storm water in Northern Kentucky. From the 32 survey responses received, 17 (53 percent) think that the Sanitation District No. 1 is best suited to manage such an agency. One response each favored either the cities themselves, the NKAPC, or a new agency to manage storm water in Northern Kentucky, and 12 responses did not identify any agency. During the interview process, many of the cities indicated that the Sanitation District's familiarity with the combined sewer system in the river front cities makes them most qualified to handle other storm water issues. Others pointed out that the District's maintenance equipment could also be used for storm water system repairs in addition to the responsibilities to maintain sanitary sewer lines.

Kenton County/NKAPC

The regulation of new storm water facilities within the cities of Kenton County is the responsibility of the NKAPC. The NKAPC works under a contract with most of the cities in Kenton County to provide plan review and construction inspection for new developments. The cities have the opportunity to comment on the proposed developments, and most cities will send a representative to the site during construction to inspect the work. The NKAPC has several sources of information including drawings, complaint records, easement records, and maps on existing and proposed developments. Therefore, many of the Kenton County cities that responded to the survey did not have any information to contribute to the *Regulation and Enforcement* section of the survey questionnaire.

Also involved in the regulation of storm water in Kenton County is the Kenton County Planning and Zoning Board which establishes the standards which are enforced by the NKAPC. Recently, the regulations have been upgraded to require detention from single family residential developments. However, the regulations do not spell out who is required to maintain these facilities. Currently, either the private entities or a homeowners association are charged with the maintenance of the detention facility.

Campbell County

The responsibility for storm water management in Campbell County is handled by a group of organizations that includes the Campbell County Planning and Zoning Board, NKAPC, city governments, and consulting engineers under contract to individual cities. The Campbell County Planning and Zoning Board enforces their own set of subdivision regulations for the unincorporated portions of the county and the cities of Crestview, Melbourne, Silver Grove, and Southgate. Several of the cities in Campbell County, such as Fort Thomas, Newport, and Wilder have their own review process and subdivision regulations that are enforced by the cities or their consulting engineers. The NKAPC provides storm water management support to some cities in Campbell County including Bellevue, Dayton, and Alexandria.

The zoning administrator for Campbell County is a consultant who works under contract for the Campbell County Fiscal Court. A proposal to upgrade the storm water

management regulations has been sent to the Campbell County Fiscal Court for consideration and possible adoption. The storm water regulations in Campbell County are not as well defined as they are in the other counties, and an effort is being made to strengthen those regulations. The county does not have many records of storm water infrastructure other than subdivision plans from newer developments and some complaint records.

Boone County

The Boone County Planning Commission writes the subdivision regulations for the incorporated and unincorporated areas of Boone County. The Commission is a group of representatives from the incorporated and unincorporated areas in Boone County that includes Walton, Union, and Florence. The county has a county-city interlocal governmental agreement for maintenance of storm water infrastructure. The agreement covers the storm water as well as other items such as snow removal and some police services. In addition to the agreement with Boone County, Walton has its own maintenance department that addresses other issues related to storm water and other public works. This is partly due to the fact that the city limits of Walton extend into Kenton County. The City of Florence has its own storm water program and infrastructure maintenance program that is separate from the services provided by the county. Boone County and Florence will share resources when necessary in a joint venture to address some public works issues.

Boone County is currently involved in an extensive storm water planning effort under contract with an engineering consultant. The storm water planning study began by trying to find ways to eliminate flooding in the South Fork of Gunpowder Creek. The current plan proposes the construction of several detention basins near an existing single family development. A county-wide storm water planning effort to examine all of Boone County has been initiated. A one million-dollar bond passed by the Boone County Fiscal Court has funded the study and some of the improvements. There is no current funding mechanism for operation and maintenance. Boone County also has approved a storm water master plan ordinance. Since several of the existing storm water problems in Boone County are related to runoff from interstate highways, Boone County has established an agreement with the Kentucky Department of Highways (KDOH) that involves the state providing storm water detention for all new highway construction as recommended in the storm water master plan. The Louisville District, U.S. Army Corps of Engineers has also recently received $40,000 in local appropriation funding for storm water improvements in Boone County. These funds will likely be contracted to consultants for the design of small detention facilities in the county.

Boone County's proposed subdivision regulations would require developers to build detention structures for all new single-family developments. To expedite the agreement among all involved parties, the county has agreed to maintain the single-family detention structures. The county has not instituted the same policy for commercial or industrial developments. It is believed that the Boone County Planning and Zoning Commission will approve the new regulations.

Boone County has substantial data records that will be useful in developing a storm water infrastructure database. The county has an extensive amount of subdivision drawings to compliment their operation, maintenance, and easement records. The county also uses a software system that tracks old construction projects and prioritizes upcoming projects.

The Boone County GIS system currently contains a zoning layer, municipal boundaries, and the parcel layer is to be completed soon. Some man-made drainage features and most natural drainage features are included in the GIS but are not linked together in networks. The road maintenance videotape records that were used to identify the exact location of storm water structures will be incorporated into the GIS. Eventually, the road maintenance software will be interfaced with the GIS system.

Cincinnati/Northern Kentucky International Airport

The CNKIA has a large amount of impervious area that generates a significant quantity of runoff during a rain event. The airport uses the Boone County storm water regulations as a minimum for the design of their storm water system. The airport will begin construction next year on a new southwest detention facility that will help to detain a significant portion of the storm water runoff into the upper Gunpowder Creek watershed. The airport pays for the construction of new storm water infrastructure from their construction funds that are available for a variety of capital improvement projects. The funds for the operation and maintenance of the storm water facilities come directly from the airport budget. The airport has an aggressive street sweeping program that involves sweeping the service and primary roads daily. Overall, the airport has taken a proactive approach to storm water management at their rapidly growing facility.

Additional Comments

A recurrent theme in the interviews with the cities and counties was the strong desire to maintain the link between the maintenance and construction of streets with the storm water infrastructure. In most cities, the maintenance of roads and streets are closely coordinated with improvements to storm sewer lines that run through the right-of-way. Many city representatives commented that the ability to coordinate necessary street work and corresponding storm water infrastructure work through a separate agency might be a difficult task. Any new storm water agency will need to make provisions that incorporate the storm water aspects of street work usually handled by the individual cities.

The recent consolidation of responsibility for sanitary sewer lines under the Sanitation District No. 1 was another topic that was consistently raised at the meetings with the city and county representatives. Most cities want to ensure that the money that has been invested recently to improve their own systems will be taken into account if a regional storm water agency takes over the storm water infrastructure. In short, they do not want to be penalized for having a proactive storm water infrastructure and maintenance program.

Most of the respondents were not familiar with the new federal storm water regulations that may be passed as early as March 1999. They were not aware of the significant changes which would require control of runoff from construction sites, NPDES permits for separate storm water discharges, and other items that will quite possibly overwhelm their existing approach to storm water management. Other comments related to water quality included the link between storm water management and combined sewers and combined sewer overflows. Representatives from cities with separate sewer areas wanted to be sure that any storm water funds would not be used to address CSO problems.

During the interview process, several cities pointed out that a successful regional storm water agency must include all entities within the three-county area. In addition to all the

cities and unincorporated areas, it was pointed out that hospitals, academic institutions, state-owned properties, and other entities which are capable of producing a large amount of storm water must be included. These developments can cause major problems, yet are not under the jurisdiction of the cities in which they are located. Some cites also have problems controlling storm water from new highways or those which have had lanes added in recent years. To rectify these problems through a storm water management agency would require an agreement with the KDOH and other local entities that requires participation in any storm water management plan involving highway projects that will significantly increase storm water runoff.

SECTION 4 — REVIEW OF ENABLING AUTHORITY

The establishment of a local government or quasi-government agency to regulate the quantity and quality of storm water will need to be codified under the laws of the Commonwealth of Kentucky. The Kentucky Revised Statutes (KRS) applicable to the authority granted for local government and quasi-government agencies to impose and enforce regulations on the quantity and quality of storm water discharge to waters of the commonwealth are not clear as to the establishment of separate storm water management agencies.

Local governments, such as counties structured under authority of KRS 67, and Planning Commissions structured under authority of KRS 100, have broad powers that can include regulation of storm water quantity and quality. However, the focus of the USEPA's Phase II Storm Water Rules will provide an incentive for many jurisdictions to combine efforts to manage storm water by region and by watershed. The Phase II storm water rules may also encourage those entities already providing a regional service to consider extending their commission to include storm water management activities.

The investigation of enabling authority for development and implementation of a regional storm water program that may levy and collect fees for program operation and implement regulation must consider two perspectives. First, the legal perspective must be investigated to determine if direct or indirect enabling authority exists that will allow this type of program to be implemented, enforced, and capable of withstanding legal challenges. Second, the political feasibility to use the authority identified or to construct a new authority must be investigated.

KRS 220 Option

Existing federal regulation found in the Clean Water Act, 33 U.S.C. 1251 et. seq., has permit authority found at 40 CFR Part 122.26 (d) (2) (iv) (D). This section will be amended by Phase II. By delegation of the federal mandate, permits are currently issued by the Kentucky Division of Water under authority of KRS 224.16-050. In the event that the 1990 census data for the regional area exceeded 100,000 population then the state could designate the three-county area under the above referenced rule and require that an application for a permit be submitted. There is no conferring of power by these rules, and the authority to implement the required programs must be found in powers otherwise conferred.

In particular, the Sanitation District No. 1 is established pursuant to KRS 220.010 to 220.540. Until March 1998, the only references to management of storm water by the district were found in KRS 220.030 (1) ***" To prevent and correct the pollution of streams"*** and (6) ***"To develop and implement plans for the collection and disposal of storm drainage to the extent that collection and disposal of storm drainage is required by applicable federal and state regulations"***. Item (2) ***" To regulate the flow of streams for sanitary purposes"*** could have been interpreted to apply to storm water quantity control if one could assume that the intent was to accept (1) through (6) as a comprehensive program. In this light KRS 220.320 allowed the District Board to promulgate regulations such as to "…prevent unnecessary pollution of any watercourse or supply within the district…" Further, KRS 220.340 allowed the board to "establish and maintain stream gages and rain gages, and may make such surveys and examinations of rainfall, stream

flow and other scientific and engineering subjects as are necessary and proper for the purpose of the District." Assuming conditions of KRS 220.030 (6) were satisfied, there was enough language that applied to the area of storm water management for the District Board to develop regulations with adequate enforcement powers. It was reasonable that through the District's authority to charge fees for sewer collection and disposal that a storm water fee could be established. The District does have the authority to issue bonds. The District Board may be required to develop a Storm Water Utility Ordinance to govern the implementation of the utility.

KRS 220 is silent on specific exemptions; therefore, all entities may be subject to any requirements established under provisions of this statute. It is not clear if the sovereign (Kentucky state government) would be exempt. Typically, a lower authority cannot regulate the sovereign (Kentucky state government) that confers the powers unless the sovereign specifically allows for such control. The question of levying fees for storm water management to entities of the state such as office buildings, highways, school property, state parks etc. always tests the authority of implementation. Since KRS 220 does not specifically address regulation of the sovereign the assumption is that it is not allowed.

Another option that exists may be to ask the fiscal courts of Boone, Campbell, and Kenton Counties to make a storm water management utility part of the District's responsibility. KRS 220.035 (1) (c) may allow this if it is done through part (2) and/or (4) of this section.

Recently, the General Assembly of the Commonwealth of Kentucky passed House Bill No. 651 that revised KRS 220. This bill was signed by Governor Paul Patton and takes affect on July 15, 1998. The revisions to KRS 220 include a change to part (6) that removes the language that specifically limits the development and implementation of plans for the collection and disposal of storm drainage "*to the extent that collection and disposal of storm drainage is required by applicable federal and state regulations.*" Therefore, the Sanitation District No. 1 is now permitted to take on the responsibility and collect funds for regional storm water management.

The disadvantages of KRS 220 are as follows:

- The statute is silent on the appeals process.
- It may be awkward to implement for comprehensive watershed management.
- It apparently allows exemptions of the sovereign.

KRS 67 Option With Inter-local Agreement

It is possible to invoke the provisions of KRS 67 through inter-local agreement. However, the stumbling block associated with invoking KRS 67 is the agreements and approvals that are necessary to develop and implement the inter-local agreement.

If KRS 67 (county authority) were to be used, an inter-local agreement between the three counties and the Sanitation District No. 1 must be written and approved by the Attorney General. The purpose is to transfer county authority in 67.083 (a) "…abatement of public nuisances," (h) "conservation, preservation and enhancement of natural resources including soil, water, air, vegetation and wildlife," (i) "control of floods," and (k) "planning, zoning and subdivision control according to provisions of KRS 100 (Planning Commission)" to

the Sanitation District. An advantage of this option is that each of the 39 cities in the three-county region would not have to approve implementation of a utility or other regulation.

Under KRS 67.450-550, the county may issue bonds. The provisions specifically state that the bonds are not debt but must be supported by targeted revenues such as receipts from a building. Thus, the county cannot decide it needs additional funds and issue bonds. They must have a specific purpose for the funds, and that purpose must support the repayment of the bond.

Since KRS 67 is silent on enforcement provisions of this nature, it is not possible to transfer enforcement authority by inter-local agreement. Each county would be responsible for enforcing codes pertaining to management of storm water. This is an unacceptable alternative for management of storm water since it could lead to inconsistent or non-uniform application and enforcement of storm water management regulations.

KRS 100 Option With Inter-local Agreement

This option is similar to the invoking KRS 67; however, the 39 cities in the three-county region must approve instruments of implementation. There are specific exemptions that are allowed by KRS 100 that are not desirable for storm water management. For example, KRS 100.324, exempts public utilities operating under the Public Service Commission or Department of Vehicle Registration, the Federal Power Commission, municipally owned electric utilities, and common rail carriers. KRS 100 has no language concerning the issuance of bonds.

Enforcement by KRS 100.991 (1) is limited to $500.00 per day per violation. An option to invoke KRS 100 for authority is undesirable due to the problems associated with local municipal approval and specific exemptions.

New Statute Option

The option exists to develop a new statute that confers enabling authority to those organized pursuant to KRS 220 for the following:

- Implementation of storm water utilities,
- Regulation of water quantity and quality,
- Regulation of erosion and sediment control,
- Regulation of wetlands,
- Implementation of wetland mitigation banks,
- Implementation of comprehensive holistic watershed management, and
- Establishment of utility fees by watershed.

This authority would be specific and direct to the implementation of storm water management programs allowing the establishment of regional storm water management agencies. Other entities could be included such as those units of government or quasi-government agents operation pursuant to KRS 76, KRS 100 and KRS 67.

It would be necessary to confer the power for enforcement of storm water management rules created by authority of this new statute to those as identified. Further, the authority to regulate the activities of the sovereign should be conferred to the implementing authority.

SECTION 5 — GIS LINKAGES

A major complicating factor in the use of the Geographic Information Systems (GIS) is the decentralized nature of government in the Northern Kentucky area. Data is available for some areas but not others, and much of what is available is not consistently maintained across all three counties. Some data is available but not accurate enough, some is not current, and in some cases the available data is stored in different formats by different agencies, which makes it very difficult to use.

In Kenton County, the Northern Kentucky Area Planning Commission (NKAPC) maintains the bulk of the GIS information. They, along with the Sanitation District No. 1, the Northern Kentucky Water Service District, the Property Valuation Administration (PVA), and the Kenton County Fiscal Court, form the PlaNet consortium.

In Campbell County, GIS activities are much less structured. NKAPC does generate base maps for use by the Sanitation District No. 1, but little other data is in GIS format.

In Boone County, the Boone County Planning Commission (BCPC) maintains most GIS data, with the City of Florence also maintaining some data in a GIS.

GIS Data Availability

Woolpert conducted interviews with the Sanitation District No. 1, the BCPC, and the NKAPC. The discussions included information in three major subject areas:

- Information needed for storm water planning and design purposes (including modeling),
- Information needed for maintenance of storm water assets, and
- Information needed for possible storm water billing.

The major data components that are relevant to storm water and their availability are shown in Table 1.

TABLE 1
SUMMARY OF GIS DATA COMPONENTS
IN NORTHERN KENTUCKY

GIS Component	Use	Availability	Comments
Contours	Critical component for all storm water work	Kenton: Contours are from 1985, and only 25' contours have elevations in the GIS. Campbell: Contours for 75% of County. Boone: 5 foot contours (1994) available in Eastern Portion of the County, 10 foot in remainder. All: 5' Contours are also available for all 3 counties from USGS digital terrain models.	The contours that exist are at 5' intervals. Contours were not part of the most recent set of updates for Kenton or Campbell County
Watershed boundaries	Created from contours, needed for modeling	All: No watershed boundaries exist.	
Natural drainage features (streams, rivers, ponds, etc.)	Needed for all storm water planning and design	Kenton and Campbell: Features shown, but not intelligent Boone: Features shown, but not intelligent	The features are shown as lines, but are not closed polygons, and do not have attributes
Man-made drainage features (pipes, inlets, ditches, etc.)	Critical for design and maintenance purposes	Kenton and Campbell: Some features shown, from photography or digitized plans. Boone: Some features shown from photography, 1"=200' accuracy.	Large cost item to accurately locate and input these features.

GIS Component	Use	Availability	Comments
Land Use	Needed for predicting runoff amounts	All: Already developed for previous modeling, but limited classifications	
Soils (hydrologic groups)	Needed for predicting runoff amounts	All: Already developed for previous modeling	
Impervious areas	Needed for generation of impervious area bills	Kenton and Campbell: shown on GIS, buildings are polygons, but other features are not, and are not maintained, and no driveways shown. Boone: exist in usable form in GIS, maintained current	Even for areas where impervious surfaces are shown, work will be required to convert them to polygons. The scale and accuracy of impervious area data is important to the determination of storm water rates.
FEMA Flood levels	Defines official flood areas	Kenton: Exist, but from 1980 sources. Campbell: unknown Boone: Ohio River boundaries completed, others being done.	
Parcel boundaries	Needed for generation of impervious area bills	Kenton: Parcels available from PVA Campbell: Little or no parcels in GIS Boone: Approximately ½ the County in GIS (most of Sanitation service area), remainder to be completed within 1 year.	

GIS Data Summary

Although the GIS programs in Northern Kentucky will be able to supply much of the information necessary to effectively manage storm water infrastructure, there are three critical components that will need to be addressed:

1. **Storm Water Features**. Many storm water features are shown, but the features were not captured consistently or completely, nor are they organized in the GIS into storm water networks. This limitation exists in all three counties.

2. **Impervious Areas.** Impervious areas in Kenton and Campbell Counties are only updated when new planimetric maps are created, which might be only every 5 years. Roads are added now from improvement drawings, but buildings and other needed impervious areas (parking lots, etc.) are not. A system will be needed to update these features from new construction documents as is being done in Boone County.

3. **Parcel Data.** Parcel data is virtually non-existent in Campbell County. Parcels will have to be created in the GIS, at least for non-residential property, to generate impervious area based storm water utility bills.

A number of other issues will also need to be resolved, including:

1. Drawing watershed boundaries.
2. Determining if the land use boundaries drawn for sanitary sewer modeling are acceptable for storm system modeling.
3. Management of work order and complaint files.

Woolpert recommend that the funding plan for storm water management include funding to cover these items.

Sanitation District GIS Equipment and Staffing

Assuming that Sanitation District No. 1 proves to be the agency that is tasked with taking on storm water management responsibility in Northern Kentucky, Woolpert reviewed the current capabilities of its GIS. The District is progressing in updating the sanitary sewer system data, and can keep up with the current workload for the GIS. However, additional resources would be necessary to manage the storm water GIS information. Minimum resources needed would be an additional GIS workstation, software license, and a GIS technician.

Maintenance Management Software

With reference to the Sanitation District No. 1 GIS and the managing of the sanitary sewer collection systems, a decision was made to acquire a low-end Computerized Maintenance Management System (CMMS) to have a place to store and manage information about maintenance activities, preventative maintenance tasks, materials inventories, and purchasing. Two copies of a package called MaintMiser were acquired, one for the field crews, the other for the plant. The field staff has used their copy to manage information.

However, the existing software has limitations that are becoming more serious as more data is input. It has become unwieldy to use, and cannot perform several desired functions (particularly inventory). Because it was designed as an equipment maintenance package, it is not well suited to managing the massive number of features found in a sewer system. A replacement system that is designed for sewer features should be considered if any additional information is to be managed.

SECTION 6 — NEEDS ASSESSMENT

Regional storm water management is a relatively new concept in local government operations. It is the stepchild of industrialization and urbanization of our country. Historically, the control of local flooding has always been the responsibility of local government. Prior to 1987, the concern for water quality was limited to implementing the Clean Water Act of 1972. The real challenge is the administration of a regional program that addresses these quantity and quality issues by 42 local government entities.

For Northern Kentucky, the perceived needs are to:

- Create a regional authority responsible for a comprehensive storm water management program;
- Develop a master plan for the control of local flooding and water quality in the receiving streams;
- Provide uniform rules, regulations and design standards for the development of land in Northern Kentucky;
- Formulate the regulation and enforcement of a comprehensive storm water program that will insure compliance with the Clean Water Act; and
- Fund the program by a stable, adequate and publicly acceptable source of funding.

The new storm water authority could be a part of an existing agency such as the Sanitation District No. 1 or the NKAPC, or it could be a new agency created with the endorsement of the three counties and 39 cities.

The Elements of Comprehensive Storm Water Management

Storm water management agencies have been established in many communities and regions of the United States. These agencies have many organizational elements in common with each other that are summarized in the following outline.

1. Administration, Financial Management and Public Involvement
    - General Administration
    - Financial Management
    - Program Planning and Development
    - Public Involvement
2. Master Planning, Design and Engineering
    - Design Criteria and Construction Standards
    - Field Data Collection and Monitoring
    - Quantity and Quality Master Planning
    - Design, Field and Operations Engineering
    - Structural and Non-Structural Best Management Practices

3. Operations and Maintenance (O & M)

- Maintenance Management
- Routine Maintenance
- Remedial Maintenance

4. Regulation and Enforcement

- Storm water Management Code Development (Drainage Code)
- Code Enforcement
- Permit Administration
- Infrastructure Inspection
- Floodplain Management
- Separate Storm Sewer System
- Erosion Control Program

5. Capital Investments

- Major Capital Improvements
- Minor Capital Improvements

Not all of the above elements must necessarily be immediately implemented and some may never be needed. However, it is important to point out that for effective management, regional coordination is required. It should also be noted that not all of the elements contained in the above outline need to be directly performed by the storm water management agency. Contracting with other established public or private agencies such as public works departments, planning departments, highway departments, consulting engineers, data processing consultants, etc., is often used to reduce the overall staff and physical plant needed to address the management goals of the storm water agency.

A comprehensive definition of storm water management should include all government efforts to control storm runoff and the hydrologic problems it can cause. Included are the efforts to control the magnitude and frequency of floods, the nature and severity of water pollution events and the significance of erosion and sedimentation.

Government Programs

Storm water management is a proper function of government because the prevention of storm runoff problems is in the public interest. Many existing programs are not totally successful. A more comprehensive approach to storm water management should lead to greater success in protecting the public interest. The NPDES program expresses the USEPA's interest in storm water management; however, other federal, state, and local agencies have interests in the management of storm water that must be addressed by any future storm water authority in Northern Kentucky.

Federal Government

The Federal government's interest in storm water management, outside of the USEPA, has for the most part been focused on major flood control programs administered by the U.S.

Army Corps of Engineers. The construction of flood control reservoirs in the Ohio River Basin and the barrier dams, flood walls and levees related thereto, is an excellent example of the use of federal Dollars for flood control. The channelization of the Mill Creek, extending from the Ohio River opposite of Ludlow, Kentucky, northward to the Hamilton/Butler County line in Ohio is a smaller example of federal flood control at the local level. Regardless of the effectiveness of these projects, they never extend beyond the banks of major and sometimes minor receiving streams. These programs to date have been focused on water quantity issues and local flooding.

With the passage of the Water Quality Act of 1987, there has been an increased interest in the water quality of the "waters of the state" that by definition includes most all bodies of water in the Commonwealth of Kentucky and certainly Northern Kentucky. This interest in water quality manifests itself in regulations issued for the discharge of storm water by the USEPA and the Kentucky Division of Water (KDOW). The storm water permits that are a part of the National Pollution Discharge Elimination System (NPDES) program are a direct result of the implementation of the Clean Water Act.

State Government

State interests in storm water have not historically been related to the collection of local drainage except as it may impact water quality or the flooding of streams. Instead, state tax and grant dollars have tended to be allocated toward the administration and supply of safe drinking water throughout the state. The recreational use of water is also a major interest of the state.

The KDOW administers the NPDES permit system related to the water quality issues for storm water discharges into the "waters of the state". Kentucky is a delegated state meaning that it has been granted jurisdictional authority to administer the NPDES program by the USEPA, and the permit program is known as the KPDES program.

Like the federal government, local neighborhood flooding is perceived by the state as a local problem, and its control is the responsibility of local government.

Local Government

Since the federal and state governments have not chosen to enter into the area of local storm water management, the collection of local storm water runoff and the reduction of local flooding is clearly the responsibility of local government.

Historically, local governments have not done well because the players have different focuses. For example, the local highway department engineer wants the water to drain off of the roads in the community. Land developers want the water removed from their subdivisions/developments. Beyond that there is very little in the way of uniform planning for the discharge of storm water into waters of the state.

Water quality of the receiving streams as it is related to storm water discharges, has not yet become a local concern. However, with the implementation of the NPDES program, water quality moved to the forefront of storm water management concerns for local governments covered by the Phase I rules. Under the Phase II rules, it is likely that water quality issues will become a concern for the communities of Northern Kentucky.

Northern Kentucky is typical of many urbanized areas in that it has a multiplicity of local governments, each with its own concept relative to the collection and discharge of storm water runoff. Some jurisdictions are proactive in their approach, collecting a storm drainage service charge and beginning to address the local drainage problems. Others are totally reactive and consider the collection of surface water as a maintenance concern. However, it should be noted that storm water does not respect municipal boundaries, and storm water problems in one community may spill over into another.

Minimum Control Measures

The December 15, 1997, Storm Water Phase II Proposed Rule issued by the USEPA requires MS4s to develop, implement, and enforce a storm water management program designed to reduce pollutants from the MS4 to maximum extent practicable and protect water quality. Six minimum control measures must be included in the storm water management program:

- Public education and outreach on storm water impacts;
- Public involvement/participation;
- Illicit discharge detection and elimination;
- Construction site storm water runoff control;
- Post-construction storm water management in new development and redevelopment; and
- Pollution prevention/good housekeeping for municipal operations.

Storm Water Management Program Needs

Based on the elements of comprehensive storm water management and the minimum control measures identified above and the requirements of the NPDES program for MS4s outlined in Section 2, the needs for the entity charged with the responsibility for storm water management can be preliminarily defined. The following paragraphs identify key items that will need to be addressed for storm water management in Northern Kentucky.

Administration, Financial Management, and Public Involvement

The administration of a storm water management program in Northern Kentucky will depend on which entity or entities are charged with the responsibility for managing storm water. In Northern Kentucky there are 42 political jurisdictions (39 cities and 3 counties), a sanitary sewer utility and three area planning commissions all of which have an interest in storm water management. Should they choose to do so, each political jurisdiction could adopt development regulations related to the control of local flooding.

It is inconceivable that 42 separate jurisdictions could jointly administer a water quality program for the Northern Kentucky receiving streams that would fully comply with the Phase II program requirement of the 1987 Water Quality Act. Northern Kentucky needs an organization that is politically stable and publicly acceptable to administer a comprehensive storm water program. In line with the USEPA's emphasis on watershed management, the storm water authority should span municipal boundaries to ensure an effective control of pollution in the watersheds that drain Northern Kentucky.

A review of the storm water management surveys that were returned indicated general agreement with the concept of a regional storm water authority although there was not agreement on who that authority should be. The possible alternatives for a regional storm water management authority that meets the watershed management objectives of the USEPA consist of (1) a single authority, (2) three individual county authorities, or (3) a two-county authority with the remaining county organized under its own authority. There exists the possibility that under the Phase II rules and based on population, the KDOW will declare Boone, Campbell, and Kenton Counties to be a region to be administered under a single authority in which case only the first alternative can be considered.

A Single Storm Water Management Authority. There are many advantages to a single storm water authority to serve the Northern Kentucky area. First, there would be a consistent set of design criteria and rules and regulations applied throughout the entire storm water district. This is especially necessary when the NPDES regulations for storm water discharges into waters of the state are enforced at the local level in Northern Kentucky. The regulatory requirements for general construction activity for the control of erosion and sedimentation will require a uniform enforcement of these controls. The very nature of storm water runoff suggests that it would be impossible to manage storm runoff at the local political jurisdiction level.

Second, master planning must be accomplished on a watershed basis. Runoff does not respect political boundaries, and it is difficult if not impossible to regulate storm runoff without administrative control of the downstream and upstream properties.

Third, there are significant cost savings to be realized. Staff, whether they are employed by the authority or by the local jurisdictions, does not need to be duplicated. Also, a central staff would provide the unified direction necessary for successful control of local flooding and water quality control. Equipment purchase and its maintenance would also be directed from a central facility. Related to central maintenance is the realization that some of the equipment needed for drainage maintenance is also needed for street maintenance and the services provided by street maintenance crews. This overlapping of responsibility and expertise can be administered by interlocal agreements between the storm water authority and the local political jurisdictions.

Fourth, a central mapping and records section would be invaluable for both design and maintenance. The maintenance of records can best be administered by the completion of a Geographic Information System (GIS) with a storm water infrastructure component. Mapping data can be linked to maintenance activity, proposed development plans, complaint data, inspection reports, etc.

Fifth, capital improvements can be planned and implemented on a watershed basis.

There are several alternatives for the establishment of a single storm water authority in Northern Kentucky. These include both established agencies and a new agency as discussed in the following paragraphs.

- **Sanitation District No. 1**

  One obvious solution would be that the role of the single storm water management authority be assigned to Sanitation District No. 1. It has the technical expertise to administer such a program and a staff of trained personnel who are familiar with the

techniques of sewer and storm drainage design, construction, and maintenance. They have equipment necessary for storm water operation and maintenance. Notwithstanding this expertise, a new program could not be implemented without some major additions in both staff and equipment and a restructuring of the overall administration of the District.

- **Northern Kentucky Area Planning Commission**

  The NKAPC has the technical expertise to review storm water control plans and to manage data in a GIS. However, they do not have the staff and equipment to construct, maintain, or repair storm water infrastructure. Nor does the NKAPC have any experience with billing systems or the establishment of rate structures.

- **New Storm Water District**

  The other direction would be to create a new storm water district for the three-county area in Northern Kentucky. The advantage of this concept is that the new agency would be dedicated solely to storm water management and would not be burdened by coordination with other functions such as sanitary sewers. The disadvantage to a separate district would be the duplication of labor, materials and equipment necessary to organize a new entity. The new district would also have to establish overall enforcement authority for storm water management with all of the communities in the three counties of Northern Kentucky.

Three County-Wide Storm Sewer Authorities. In the urbanized areas of Northern Kentucky, the major county boundaries, with the exception of the boundary between Boone and Kenton Counties, are major waterways including the Ohio River and the Licking River. Many of the advantages of a single authority could be preserved with three county-wide authorities. Some staff, equipment, and record keeping systems would be duplicated with existing county agencies. The advantages of having three individual county storm water authorities rest mainly in the perception of maintaining control closer to home. The storm water fees charged to the property owners in the county would be spent to improve the infrastructure in the county and would not subsidize other projects outside of the county.

There are several disadvantages of establishing three individual county storm water authorities. First, storm water management would not be handled on a uniform basis across the three counties. Each county would establish its own regulations and project priorities. The project priorities would be tied to funding. Large, costly storm water control infrastructure improvements could only rely on the funding available within the county.

Second, each county would have to obtain and maintain the physical equipment necessary to construct, operate, and maintain the storm water drainage system. In many cases, construction, maintenance, and operation functions could be performed under inter-government agreements with the communities within the individual county. However, the priority of use for the equipment and staff could become a problem if the communities have more pressing needs.

Third, funding of storm water management would not be consistent across the three counties. The higher growth counties could rely on greater revenue to fund storm water

improvements based on their higher population and greater commercial and industrial development. The more rural counties would not have as great source of funding. This could lead to different storm water rate structures in each county with the associated impact on residential, commercial, and industrial development.

Two-County Authority With The Remaining County Organized Under Its Own Authority. This alternative recognizes that the population distribution of Northern Kentucky may favor a two-county and a one-county storm water management agency arrangement. The advantages and disadvantages of this option are the same as those discussed above for the three county-wide agencies.

Administrative Needs. The following objectives will need to be accomplished to establish a storm water management program acceptable to the USEPA in Northern Kentucky:

- One or more entities need to be tasked with storm water management in Northern Kentucky. The entity or entities need to be identified to the KDOW.
- The legal authority of the storm water management entity needs to be codified under the Kentucky Revised Statutes.
- The mission, goal, and objectives of the storm water management entity need to be formulated.
- The administrative structure of the storm water management entity needs to be defined.
- The responsibilities of the storm water management entity need to be identified including any sharing of responsibilities through inter-government agreements.
- The service area of the storm water management entity needs to be defined.

Financial Management Needs. In order for a storm water management program to be implemented, a source of income will be necessary to fund the activities of the responsible agency. Therefore, the following needs should to be addressed:

- A source of start-up funds for a new storm water management agency will need to be secured until regular income can be realized through a monthly fee structure.
- The basis for billing residential, commercial, industrial, and institutional customers' needs to be determined and an equitable rate assigned to each property.
- Accounting and billing procedures need to be established.

Public Involvement Needs. In line with the USEPA's recommended minimum control measures, a public education, outreach, and involvement program needs to be developed to provide the public with the opportunity to understand and endorse the goals of the storm water management program. The needs involved with public involvement include:

- A public information program needs to be established to advise the public of the reasons for a storm water management program.
- A public education program needs to be developed to assist the public in realizing the impacts of storm water pollution on the environment and human health.
- A series of public meetings need to be held during the formation of the storm water management program to allow public input in the development of storm water pollution prevention measures.

Master Planning, Design, and Engineering

One of the advantages of a storm water management program is that it allows for the development of a comprehensive water pollution control master plan and implementation of a uniform set of design and engineering standards and methods. The design and engineering methods to be used are based on the problems that are identified by the field data collection and monitoring required by the NPDES regulations.

A good master plan will identify the structural needs of the storm water infrastructure through appropriate hydrologic and hydraulic analysis. Using the techniques made available through the development of a GIS program can facilitate master planning. Some of the elements of a master plan would include:

- An inventory of the existing storm water infrastructure. This would include all sewers, street inlets and catch basins, ditches, channels, watercourses, and flood plains.

- Identification of the major and minor drainage ways. The major drainage ways should be modeled to predict their capacity to transport the 25-, 50-, and 100-year storms while the minor drainage ways should be modeled to handle the 2- and 10-year storms. In the case of FEMA regulated flood plains, the modeling must meet FEMA standards.

Where surface streets are "unimproved," the master plan should identify the street improvements needed to control drainage. Where the receiving streams or storm sewers do not have the capacity to carry the runoff from developing areas, the master plan should determine the most practical and/or economic solution to control local flooding. This includes stream widening or reshaping, construction of larger capacity sewers, or the construction of regional or local retention or detention facilities. The continuing maintenance of retention and detention facilities must be the concern of the master planner. In additions water quality concerns in the form of point and non-point sources must be addressed.

It should be noted that some of the master plan elements listed above are being accomplished by some but not all of the existing political jurisdictions in Northern Kentucky. The master plan elements that are performed are not accomplished uniformly throughout the area. The NKAPC does do some plan storm water system review in Kenton and Campbell Counties. Their work is uniformly implemented where they have the authority to enforce storm water standards.

Additional needs under this category can be identified as follows:

- The overall scope of storm water pollution problems need to be identified through a program of field data collection and monitoring in accordance with the NPDES requirements.
- Design criteria and construction standards need to be developed based on the types of problems identified by the field data collection and monitoring program.
- Structural and non-structural Best Management Practices (BMP) need to be identified for the types of problems identified by the field data collection and monitoring program.

Operations and Maintenance

A strong capital improvement program is needed to correct the problems existing in most Northern Kentucky communities, and the greater need exists in establishing an equally strong proactive operation and maintenance program. Almost all of the survey questionnaires returned indicated that maintenance of the storm water drainage system was weak at the best throughout the three-county region.

Experience by existing storm water utilities has indicated that one of the wisest investments in storm water management is maintenance. Much local flooding is caused by the lack of maintaining the infrastructure. The "out of site – out of mind" mentality is especially true when it comes to storm sewer maintenance.

Staff and equipment for an operations and maintenance program can be found in every public works/public service organization in the region as well as with Sanitation District No. 1. The needs of a central storm water management agency relative to proactive operation and maintenance include:

- Preparation of a Maintenance Master Plan for the entire service district;
- Identification of work centers (e.g. inlet cleaning, sewer replacement, ditch cleaning and relining, etc.);
- Development of performance standards;
- Identification of equipment and material needs; and
- An information hot-line (24 hour, 800 number) to report problems.

Maintenance can be categorized into two classifications: (1) remedial maintenance and (2) routine maintenance. Remedial maintenance projects require engineered solutions to local problems and have to be designed by an engineering staff. Work orders can then be issued, based on the engineering drawings or sketches. Routine maintenance, alternately, can be accomplished by a maintenance crew immediately upon the issuance of a work order. The work orders can then be issued to agency personnel based on the performance criteria establish in the maintenance master plan.

In most cases there is more work identified than can be done by current staff. Therefore, there are two alternatives to performing the work:

1. Obtain contingency contractors to perform work based on assignments assigned through the contract period, or

2. Negotiate with the existing cities and counties to utilize the expertise of their staff and to fully utilize equipment in their various public works/public service departments.

With a proactive operation and maintenance program, it is easy to establish priority for maintenance projects and to service locations with high maintenance needs (e.g. sag inlets in streets, storm sewer intakes and outlets at critical locations). Another immediate advantage of proactive maintenance is the public visibility given to the program.

Regulations and Enforcement

The entity responsible for storm water management will need to establish regulations consistent with the NPDES requirements and enforceable by law. The cornerstone of storm water management is a drainage code that includes the following components:

- The scope of the program;
- Definitions;
- Organization;
- The authority to promulgate rules and regulations;
- The requirements for master planning;
- The development permit process that includes plan review, permit issuance, inspection and enforcement;
- The storm water service charge rate and other items related to the funding of the comprehensive program;
- The adoption process for billings and collections related to the storm water program;
- A process for appeals and variances; and
- A schedule of violations and penalties.

The careful preparation of this document will pave the way for the implementation of comprehensive management. The code must uniformly be applied to the entire storm water service area.

Equally important to the program is the establishment of a technical document containing the criteria for the design, operation and maintenance of the storm water infrastructure. This document should be considered a vital document subject to change as needed to adjust to changing environmental requirements and conditions.
Major elements include:

- The design process;
- Prediction of rainfall and runoff;
- Design of open channels and ditches;
- Design of storm sewers and their appurtenances;
- Detention and retention requirements and design;
- Erosion and sedimentation control; and
- NPDES requirements.

Capital Investments

Once the storm water infrastructure inventory is completed and the field testing and monitoring program results are compiled and evaluated, a list of capital improvements can be developed. The projects listed can be prioritized based on maximum environmental benefit, cost in light of expected revenues, and compliance with NPDES requirements. The projects should be categorized as either major capital improvements or minor capital improvements. The major capital improvements are those projects that will require a significant outlay of funds, manpower, and equipment. Completion of these projects will be dependent on the storm water management agency's ability to raise sufficient revenue to fund the project. The minor capital improvement projects are those projects that can be handled on an "as needed" basis.

SECTION 7 — FUNDING MECHANISMS

Any comprehensive storm water management program must be supported by a stable, adequate and publicly acceptable source of revenue in order to implement and administer the program. From a review of the survey questionnaire responses it is obvious that such a revenue stream is currently not available from any of the conventional sources.

Federal and state funding support for local storm water drainage systems is limited. Major flood control projects are funded by the U.S. Army Corps of Engineers and the Natural Resource Conservation Service; however, small flood control and water quality improvement projects receive little or no funding support at the federal level except from sources such as revenue sharing or block grants. State assistance usually takes the form of planning advice, floodplain delineation, flash flood and contingency planning assistance, revolving loan funds, or construction of facilities. Therefore, the burden of storm water management falls upon local municipalities.

Controlling the quantity and quality of storm water runoff has, for the most part, not been a high priority of local government. However, under increasing federal and state regulatory pressure, local governments and private developers will need to find ways to finance storm water management.

Storm water financing can be categorized into two basic areas: (1) existing development or problems needing remedial treatment, and (2) new development or opportunities to prevent future problems. Financing must address annual operating costs (i.e. planning, administration, regulatory enforcement, maintenance, and operations) and capital improvements. The primary methods for financing storm water management for **existing developments** include:

- General tax fund (primarily for operations and maintenance (O&M) and capital improvements);
- Dedicated ad valorem taxes (primarily for O&M and capital improvements);
- Service charges or fees (primarily for O&M and capital improvements);
- Special Assessment (primarily for capital improvements);
- Bonds (primarily for capital improvements);
- Private Funds (primarily for capital improvements); and
- Storm water utilities (primarily for O&M and capital improvements).

For **new developments**, there are additional funding mechanisms:

- Developer fees (primarily for capital improvements);
- Developer provided facilities (primarily for capital improvements);
- Dedications (primarily for capital improvements); and
- Floodplain regulations (primarily for capital improvements).

A description of each of these types of funding is provided in the following paragraphs.

General Tax Revenues

Local government operations are supported with basic tax revenues including property taxes, sales taxes, fees, and licenses. In the case of most governments, the revenue from

these sources is already allocated for specific uses. Inserting the costs associated with storm water management into the demands for existing general tax revenue will either result in the need for a significant increase in taxes that is generally politically undesirable or increased competition between the various municipal services that rely on these funds with the possible result of reducing services in certain sectors of the local government. When drainage problems occur in developed areas, the costs associated with structural improvements, rights-of-way, engineering, and construction are particularly high. General fund revenues are better suited to funding on-going operation and maintenance and less suited for large capital improvement projects. However, general tax funds have been used for capital improvement projects. Usually this consists of setting aside a portion of sales tax or other tax revenue or annually escrowing funds into a sinking fund. In many communities, general tax funds are the only source of money for planning, plan review, inspection, mapping, and similar activities.

Dedicated Ad Valorem Taxes

The majority of existing flood control districts and a few city and county governments have the authority to levy taxes on improved property specifically for storm drainage and flood control. Examples of this authority can be found in the Ohio's conservancy district laws and Illinois's laws that allow a county-wide tax for storm water management in several urbanized areas. Dedicated ad valorem taxes are based on a property's assessed valuation; however, the increased number of storm water utilities speaks to a public desire to relate storm water management costs more to a criteria based on a property's contribution to storm water runoff. There is no link between a property's value and the amount of storm water runoff; however, there is a strong link between the amount of impervious area on a property and the amount of storm water runoff.

Service Charge or Fees

Service charges or fees are directly related to the service provided. The use of service charges by local government is not new and has been used in various forms to fund water and wastewater operations, mass transit, solid waste facilities, and gas and electric utilities. In terms of storm water management, the most common basis for service charges is the area of impervious surface. The principle is that each property owner pays a fee for the service of handling the drainage originating from that property. This provides an equitable distribution of funding responsibility since all property owners are charged on the same basis. Often, service charges are used to support a storm water utility such as in Cincinnati and Louisville.

There are many combinations and variations of storm water service charge rate structures and most have been upheld in the courts. The three approaches most often used are:

- *Amount of impervious surface area.* Rates are set in direct proportion to the measured, estimated, or assumed extent of impervious area for each parcel of land.

- *Density of development.* Rates are determined by a runoff coefficient that is deemed appropriate for the type of land and the nature of the improvements to each parcel.

- *Flat fee.* A constant or uniform fee for each property within pre-existing classes is used or can be applied on a community wide basis.

The City of Cincinnati currently uses the amount of impervious surface area as the basis for their storm water service charge rates while the City of Florence uses the flat fee approach.

Developing a basis for service charges requires a thorough review of several factors:

- Equity;
- Balance of rates with the level of service;
- Data requirements;
- Cost of implementation and upkeep;
- Compatibility with the storm water agency's data processing systems;
- Consistency with other financing and rate policies;
- Financial sufficiency;
- Revenue stability and sensitivity; and
- Flexibility.

The following paragraphs provide additional insight on the key elements identified above.

Equity

A reasonable degree of equity must be achieved in the design of a service charge to comply with basic legal guidelines. Essentially, legal standards dictate that utility rates must be fair and reasonable, and must result in charges that bear a substantial relationship to the cost of providing services and facilities. Public opinion and acceptance of a financing strategy, and particularly of a service charge, often turns on the general public's basic perception of equity, or "appearance of fairness." Simplicity is especially important in designing a rate structure that will be perceived as equitable.

Equity in the design of a storm water service charge is achieved by a fee that is related to the contribution to runoff from each property within the watershed. This contribution to runoff is then directly related to 1) the size of the property and 2) intensity of runoff from that property.

With the exception of those communities that use a flat fee basis for their service charges, most storm water service charges are designed on one of the following two concepts:

- A service charge based solely on impervious areas, or
- A service charge based on gross area and the intensity of development.

These two methods, with variations and modifying factors, are currently in use by several municipalities in the United States to relate contribution to runoff from each property within the watershed. Both have their basis from the Rational Method that estimates the runoff discharge from an area for a particular rainfall intensity based on the land use. The Rational Method can be applied directly to small properties with an acceptable degree of accuracy for this purpose.

When applied to a hydraulic study, the Rational Method is simply stated by the following formula:

$$Q = c\ i\ A$$

where: Q = the quantity of runoff from the property under study;
c = the coefficient of runoff which is directly related to the land use of the property under study;
i = the intensity of the storm (which would be considered constant for a financial study); and
A = the gross area of the property being studied.

When applied to a storm water service fee, the term Q in the equation becomes Q($) and the variables in the equation are redefined:

Q ($) = the total amount of the user fee to be collected from an individual property;
c = a parameter developed to relate to the intensity of development on each individual property;
i = a constant value for all properties and generally disregarded; and

A = a parameter developed to relate to the gross area of the individual property.

The above equation, therefore, indicates that the storm water service charge for each property is a function of the intensity of land use and the gross area of each property. The product of the land use parameter and the gross area parameter is frequently referred to as an Equivalent Residential Unit or an Equivalent Runoff Unit (ERU). The final equation becomes as follows:

$$\text{Monthly User Fee} = \text{Number of ERUs per Property} \times \text{Charge per ERU}.$$

This methodology, applied equally to all properties within the service area provides a service charge that is equitable and legally defensible. It also embraces the perception of equity.

A detailed rate structure analysis and rate study will develop the basis of the ERU for Northern Kentucky and the value of the charge per ERU to provide the stable, adequate, and publicly acceptable revenue stream.

Balance of Rates with Level of Service

Closely related to the concept of equity, storm water service charges must also be consistent with the level of service to be provided and the cost of service of the storm water program. Most storm water service charges are based on some measures or estimate of the contribution that each property to total storm water runoff, which is a key factor in the cost of services and facilities.

As the storm water program is designed, the level of service must be defined and the cost of those services included in the program determined. Based on the cost of service, the financial requirements of the comprehensive storm water management program can be determined and the cost per ERU determined.

Five-Year Cost of Service Study

The preparation of a five-year cost of service study is an important element in the implementation of storm water management program. It is a companion study to the determination of the number of ERU's in the storm water district. The two studies combine to provide the necessary data to determine the cost per ERU and the eventual storm water service charge.

The major recommended sections of a five-year cost of service study will include:

- Administration
  - General Administration
  - Public Awareness
  - Storm Water Utility Implementation
  - Storm Water Management Code

- Storm Water Master Planning
  - Water Quantity
  - Water Quality

- Regulation and Enforcement
  - Permit Review
  - NPDES Storm Water Permit Program

- Operation and Maintenance
  - Routine Maintenance
  - Remedial Maintenance

- Capital Improvement Program

Data Requirements

Selection of a rate methodology should be based partially on the type, quality and accessibility of local data, and the capacity of existing data processing systems to handle and maintain the necessary information. Assembling, organizing and verifying data, determining the parameters to be used to relate contribution of runoff to the service charge rate system, and preparing or modifying a master account file can be the most expensive part of implementing a storm water service charge.

This factor ties directly to the previous discussion on equity. In designing a methodology for a storm water user fee, the parameters used to compute the ERU's can be approached in different manners. One method is to determine the impervious area of each property and use that impervious area as a measure of the contribution to storm water runoff. This can be accomplished using aerial photography and photogrammetric methods to map and measure the impervious area for each property within the service area. Relating to the Rational Method through a GIS, this measurement can develop a parameter that combines the "c" and "A" factors. This method is the most accurate in terms of measuring intensity of development, but it may also be the most expensive.

A second approach would be to develop two parameters for the computation of ERU's, one based upon the gross area of the properties and the other based on the existing land use of the property. Either method provides equitable results and the choice depends primary on the data available.

Compatibility with Data Processing Systems

A storm water rate structure should be designed to be compatible with the existing data processing systems available to local governments or quasi-government agencies. Most storm water service charges are delivered through existing utility billing systems. A few storm water billing systems, mostly those established on a countywide basis, are billed using the current property tax systems rather than utility accounts. The Sanitation District No. 1 water and sewer billing system appears to be of a size and structure that could accept modifications to allow a new storm water service charge without substantial changes other than the addition of several thousand new "storm water only" accounts.

Consistency with Other Local Government Financing and Rate Policies

One way of making a storm water rate structure easily understandable to the general public is to insure that it is as consistent as possible with other local government rate policies. There are a number of established rate policies related to storm sewer rate structures and modifications that are available from existing storm water utilities in the United States.

Revenue Capacity, Stability and Sensitivity

Ideally, the revenue capacity of a rate methodology should be stable and sensitive to changing economic conditions. Basic storm water service charges tend to be relatively stable. Secondary funding methods (e.g. system development charges, impact fees, plan review and inspection fees, in-lieu of construction fees) tend to be less stable but this should present no problems provided the local storm water authority does not depend on them to fund large storm water programs.

Special Assessments

This funding mechanism consists of a mandatory charge on selected properties for an identified improvement that benefits the property owners and is undertaken in the public interest. Special assessment projects may be undertaken by general-purpose governments or special purpose districts. The authority to levy special assessments is obtained through enabling state legislation. Special assessments are initiated in one of the following ways:

- By local government legislative body action with consent of property owners (i.e. petition);
- By local government action, which may be stopped by opposing petition or remonstrance; and
- By local government action without property owner consent and without possibility of remonstrance.

The basis for levying a special assessment is the benefit that accrues to each property as a result of the project. The amount of the special assessment must be proportional to and not more than the benefits received, and must not exceed the cost of the project. Typical

problems with special assessments include determining who is specifically benefitted and determining the amount of special benefit to be received by each property owner. Like service charges, special assessments may be made on properties normally non-taxable. The types of benefits that can be identified for special assessment in relation to storm water include:

- Handling the discharge of surface waters from uphill properties through lower properties in a quantity greater than would naturally flow because the uphill owners made some of their property impermeable;
- Adaptability of property to a more profitable use;
- Alleviation of health and sanitary hazards;
- Reduction in property maintenance costs;
- Increase in convenience or decrease in inconvenience; and
- Recreational improvements.

Bonds

Bonds create an equivalent liability that must be met with pledged future revenues; therefore, they are not really an additional source of revenue. Bonds provide the means for local governments to borrow necessary capital to finance public works improvements. Generally, the electorate must authorize bonds. General obligation bonds are backed by the full faith and credit of the government entity issuing the bonds, and they may be repaid from fees or general tax revenues if the fees are insufficient. As opposed to general obligation bonds, revenue bonds are repaid entirely from revenues generated by service charges or fees and are not guaranteed by the issuing authority. General obligation bonds have lower interest rates than revenue bonds and thus are usually more attractive to the issuing authority.

Storm Water Utilities

Storm water utilities operate in much the same way as other utilities such as electric, water, and telephone in that they provide a service to their customers. This increasingly popular concept has been adopted by cities throughout the United States including Cincinnati, Louisville-Jefferson County, Metro-Dade County (Florida), Tulsa, Seattle, Oklahoma City, Charlotte, Des Moines, and Chattanooga. A storm water utility constructs capital improvements and operates and maintains the storm water management facilities. Operations are financed by regular customer billing with fees based on one of the criteria discussed above. The storm water utility has provisions for administrative appeals and formal variance procedures. The reasons for the attractiveness of a storm water utility are that it provides:

- A single unit with staff dedicated to storm water management;
- A uniform set of regulations; and
- A budget and sources of revenue focused on solutions to storm water problems.

Development Fees and Developer-Provided Facilities

For flood management projects, one way of financing is to spread the costs of required new storm water facilities over the entire watershed. This method primarily affects developers who have typically been required to provide on-site drainage facilities (e.g. curbs and

gutters, inlets, storm sewers, and detention ponds), but who have not been required to provide major storm water control facilities. The rationale is that a development should finance those regional improvements that are necessitated by the cumulative development. Project financing is accomplished using a development fee that is based upon acreage involved for all developments in the watershed. The amount of the fee depends on the cost of the facilities (including right-of-way) and will vary from watershed to watershed. The fees are charged only to finance projects required as a result of the development and not to resolve previously existing problems in the watershed. Before development fees can be enacted, a master drainage plan must be developed for each watershed to determine the amount of the fee. Because drainage improvement projects may need to be constructed before adequate development fees are collected, loans may need to be taken out by the local government to fund the projects. There is also the possibility that the local government may not recover their money if the projected development in the watershed goes unrealized.

Fee in Lieu of On-Site Detention/Retention

In-lieu-of fees are derived from system development charges specific to storm water management. These fees can be enacted as a regulatory requirement. Alternately, a development option can be offered that provides the opportunity to construct on-site detention/retention facilities in accordance with established design criteria or pay a fee into a fund dedicated to the construction of a regional detention facility serving multiple properties. This approach is used where it is more desirable to promote regional as opposed to on-site detention facilities. There are cases, such as in West Lafayette, Indiana, where regional detention facilities have been used to guide development patterns within a watershed and to encourage comprehensive storm water management. The problems with fee-in-lieu construction involve cash flow and construction timing. The fee for construction of a single property or development is often insufficient to fund the construction of a regional facility. Therefore, either multiple developments must be constructed simultaneously, or the project must be initially funded from alternative sources.

Plan Review and Inspection Fees

Plan review and inspection fees are intended to recoup the expense of examining development plans to insure consistency with comprehensive or master plans, and to ensure that design and construction standards are met. These fees are not primary revenue-generating sources.

Dedications

Developers must consider the expense of meeting floodplain requirements for new developments that infringe on a floodplain. An economic analysis needs to be performed to measure the costs of avoiding the floodplain against the costs of structural improvements. If the cost of structural improvements is too high, the developer may choose to dedicate the floodplain area to a public entity. Some jurisdictions promote the dedication of floodplain areas by granting density credits for land so dedicated and by allowing cluster development on the remainder of the tract. Although dedications are not a specific funding alternative, they do provide for storm water management through the acquisition of floodplains.

SECTION 8 — OPERATION AND MAINTENANCE COSTS

The extent, location, and condition of the storm water management infrastructure are not fully available for the three counties of Northern Kentucky. Therefore, the creation of a storm water inventory will be necessary and an important asset to a well-organized storm water management program.

Nevertheless, an estimate of the operations and maintenance costs is desirable in the development of a storm water management program. The recently prepared facility plan for the Sanitation District No. 1 indicates that there is approximately 140 square miles of urbanized area in Northern Kentucky that needs to be maintained. For comparison purposes, two other storm water management programs that are proactive in their storm water maintenance programs were studied. One program has a gross area of 196 square miles; the other has an area of 78 square miles.

Based on this limited data and without the benefit of a storm water infrastructure inventory, a rough approximation of a proactive operation and maintenance program in the three county area of Northern Kentucky will cost within the range of $2,500,00 to $3,000,000 per year.

Table 2 provides additional annual revenue and average residential fee data for a variety of storm water management programs affecting various population sizes throughout the United States.

TABLE 2
SUMMARY OF EXISTING STORM WATER MANAGEMENT
REVENUES AND ANNUAL RESIDENTIAL FEES

Community	Population Served	Annual Revenues	Percent of Funds Used for Maintenance	Percent of Funds Used for Storm Water Quality	Average Annual Household Storm Water Fee
City of Concord, CA	113,000	$1,413,000	41	N/A	$26.00
City of Freemont, CA	185,000	$1,200,000	13	17	$13.50
Contra Costa Co., CA	N/A	$1,634,300	28	72	$16.20
City of Modesto, CA	180,000	$4,200,000	90	10	$38.76
Riverside Co. Flood Control and Water Conservation, CA	1,250,000	$1,838,100	0	100	$4.00
City of Sacramento, CA	385,000	$24,019,000	61	3.5	$131.76
Sacramento Co., CA	650,000	$8,500,000	40	25	$25.68
City of San Diego, CA	1,300,000	$5,000,000	80	20	N/A

TABLE 2
SUMMARY OF EXISTING STORM WATER MANAGEMENT
REVENUES AND ANNUAL RESIDENTIAL FEES

Community	Population Served	Annual Revenues	Percent of Funds Used for Maintenance	Percent of Funds Used for Storm Water Quality	Average Annual Household Storm Water Fee
City of Stockton, CA	250,000	$4,000,000	48	0	$25.20
San Joaquin Co., CA	50,000	$400,000	20	80	$25.00
Vallejo Sanitation & Flood Control District, CA	100,000	$1,000,000	40	4.5	$10.92
Metro-Dade Co., DERM, FL	1,000,000	$15,000,000	35	8	$24.00
Hillsborough Co., FL	850,000	$3,500,000	0	11	$12.00
City of Des Moines, IA	200,000	$6,700,000	30	3	$4.00
City of Wichita, KS	310,000	$4,000,000	50	50	$14.52
Louisville & Jefferson Co. MSD, KY	685,000	$14,546,000	35	11	$34.32
City of St. Paul, MN	260,000	$8,500,000	2	1	$50.00
City of Charlotte, NC	500,000	$13,370,000	78	6	$35.04
City of Durham, NC	140,000	$5,000,000	15	25	$39.00
City of Greensboro, NC	195,000	$5,700,000	N/A	N/A	$29.38
Cincinnati Stormwater Management Utility	358,170	$5,700,000	30	0	$25.32
City of Columbus, OH	650,000	$12,000,000	50	N/A	$19.68
City of Forest Park, OH	18,500	$510,000	20	N/A	$36.00
City of Oklahoma City, OK	N/A	$5,000,000	20	80	$32.76
City of Tulsa, OK	375,000	$10,000,000	64	15	$33.12
City of Portland, OR	460,000	$15,383,000	69	20	$63.07
City of Chattanooga, TN	150,000	$0	N/A	N/A	$2.50

TABLE 2
SUMMARY OF EXISTING STORM WATER MANAGEMENT
REVENUES AND ANNUAL RESIDENTIAL FEES

Community	Population Served	Annual Revenues	Percent of Funds Used for Maintenance	Percent of Funds Used for Storm Water Quality	Average Annual Household Storm Water Fee
City of Arlington, TX	280,000	$2,200,000	20	25	$15.60
City of Austin, TX	500,000	$13,600,000	32	41	$3.30
City of Dallas, TX	1,000,000	$17,300,000	74	26	$2.65
City of Garland, TX	190,000	$2,700,000	35	30	$2.40
City of Lubbock, TX	200,000	$1,800,000	N/A	N/A	$20.52
City of Norfolk, VA	260,000	$6,336,075	N/A	N/A	$54.00
City of Seattle, WA	500,000	N/A	N/A	N/A	$85.00
City of Spokane, WA	120,000	$1,000,000	20	N/A	$10.00
City of Tacoma, WA	185,000	$11,470,000	16	1.5	$106.44

SECTION 9 — COMMUNITY OUTREACH

No storm water management program will be effective unless there is an understanding by the public at large of the necessity of such a program. Public awareness and education are the key building blocks in a successful storm water program.

The first step in developing a community outreach program is defining who is the public that needs to be involved in the program. Experience with other municipalities has shown that a variety of entities need to be considered in defining the public:

- The residential, commercial, and industrial development community;
- The environmental community including regulators and private interest groups;
- Specific neighborhoods where storm water problems have been experienced;
- Design professionals;
- Tax exempt and government properties;
- School children;
- Clubs or social organizations;
- Social classes; and
- Commercial and industrial concerns.

The involvement of these groups varies including an interest in a cleaner environment, concerns over utility fees and charges, an interest in technical criteria and regulatory requirements, and an interest in financial aspects.

The public awareness and involvement understanding can be illustrated as a pyramid, Figure 1. The top of the pyramid is the Storm Water Management Utility Staff. Theirs is a full time job to implement the storm water management program. Supporting the storm water management utility staff are Specialized Consultants. The specialized consultants can either be part of the storm water management utility staff or consultants specialized in GIS applications, engineering, legal matters, financial matters, billing systems, or other functions directly related to the operation of a storm water management program.

The two groups at the top of the pyramid represent the persons responsible for the administrative, technical, legal, and financial operations of a storm water management program. The three bottom layers of the pyramid represent the persons who are not directly employed or contracted by the storm water management agency. The persons in these levels still have a very important role in the definition of the storm water management agency's responsibilities and the acceptance of a storm water management program at the community level.

The "stakeholders" are a small group of individuals representing the development community, large institutions or industries, environmental groups, and socio-economic groups dedicated to the implementation of a storm water management program. They are proponents of storm water management and exert influence on the direction that a storm water program will take. They are the sounding board for proposed decisions by the storm water management agency and act to carry information between the storm water management agency and the general public.

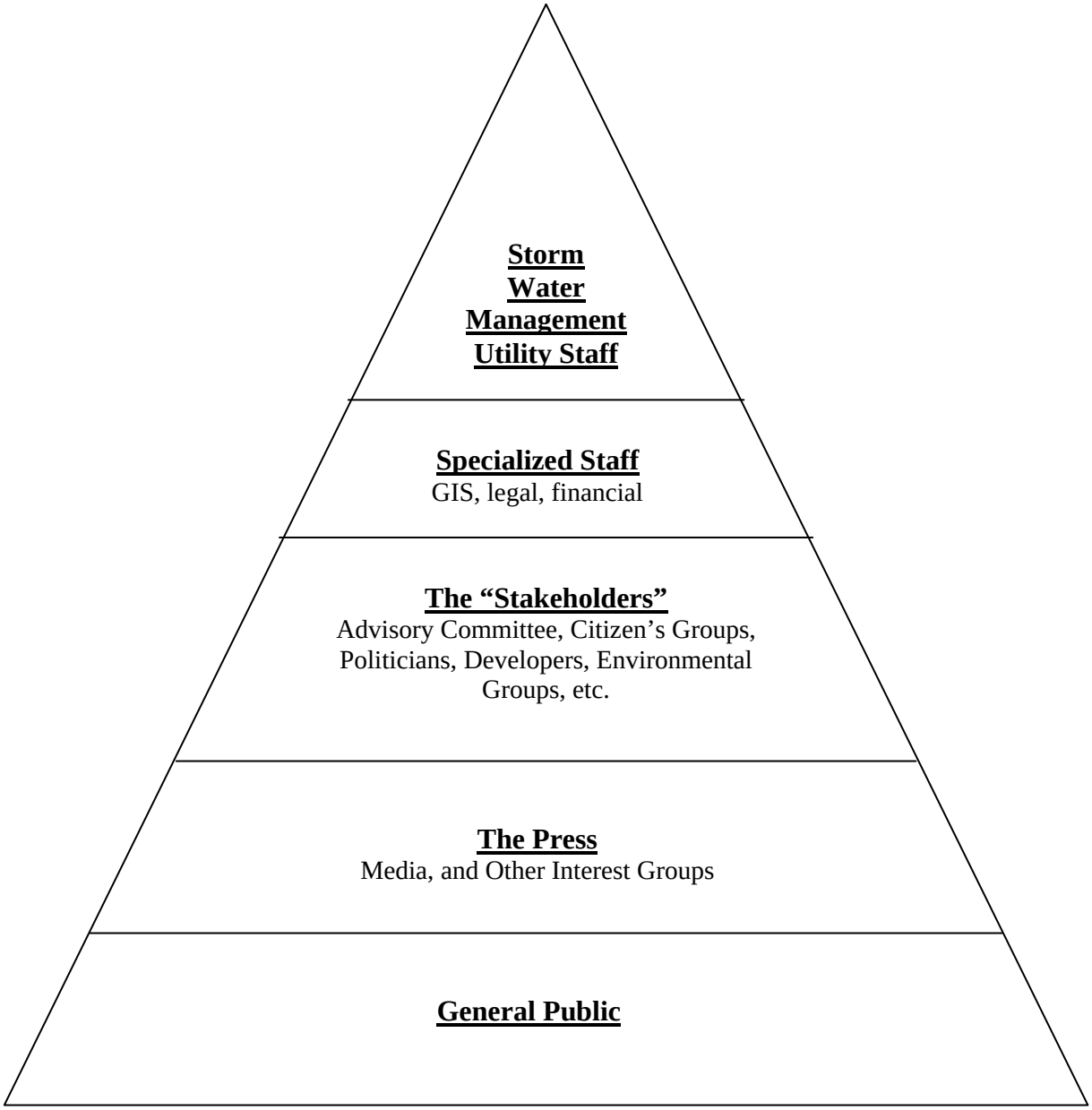


Fig. 1. Community Involvement Strategy

The press has the role of informing the general public through existing media including newspapers, radio, and television. It can be a great asset to a storm water management program by publicizing the rational behind various storm water management measures and highlighting the successes of the storm water program. The press can also provide a forum for discussing the public's reaction to state and federal storm water management programs.

The foundation for any community storm water management program is the general public. The general public will usually view any storm water management program in terms of the costs borne by the individual and not the overall purpose of such a program. Unless

persons in a community have experienced drainage problems or flooding, the overall interest level in storm water control by the general public is low. It is the purpose of a community outreach program to educate and raise the level of awareness of the importance of storm water management on both a water quantity and water quality basis.

Public Involvement Plan

Before a storm water management program is launched, a carefully constructed, step-by-step public involvement plan should be crafted. This plan should communicate to the public that their opinions are vitally important to the storm water management program and that the storm water agency is committed to working with the public and involving them in the planning process. The plan should analyze how the public fits into the storm water program. The entities or departments that will be involved in the storm water management program should direct the formulation of the plan.

The components of a public involvement program include:

- The history of the events, players, regulations, etc. that have led to the need to discuss a storm water management program.
- The objectives and goals of the storm water management program and an identification of the major issues likely to arise in a public awareness program.
- An estimate of the likely level of public interest and the development of methods to gage that interest, public reaction, or program effectiveness.
- The identification of major potential stakeholders in a storm water management program and the types of concerns likely to be voiced by these stakeholders.
- A list of the stages of the storm water management program development that must be supported by the public awareness program.
- An outline of activities and products to support each of the stages identified by the preceding item.
- An identification of milestones that when reached will result in a reassessment of the public awareness program and corrections if needed.
- A cost and level of effort estimate for each phase of the public awareness program.

The public involvement plan should be generated as a group participation activity at the beginning of the planning efforts for the storm water management program. Potential stakeholders should be identified and a screening process used to avoid uncompromising, unreasonable, and otherwise unsuitable participants. The stakeholders must be willing to work with each other and to listen and respect each other's opinions. They must develop a vision of the objectives of the storm water management plan.

Lastly, the storm water management program needs to have a small group of respected proponents to work within the public awareness plan. This group of proponents should consist of a political leader, a storm water management agency leader, and a respected

community leader. The proponents must be well versed on the issues surrounding storm water management and articulate in explaining the goals of the program.

SECTION 10 — REGIONAL IMPLEMENTATION ISSUES

One of the first steps in the establishment of a regional storm water management agency will be to define the mission, goals, and objectives of the proposed agency. Development of the agency's mission, goals, and objectives requires the identification of specific storm water management needs, including future needs, of the community and a thorough understanding of the applicable regulatory requirements. The community's storm water management needs can be determined through a comprehensive needs assessment (as described in Section 6) while the regulatory requirements are those authorized in current and anticipated federal, state, and local statutes.

Once the mission, goals, and objectives of the storm water program are acknowledged and accepted by all stakeholders, it will provide the framework for development of the strategies and specific activities necessary to accomplish the agency's mission. The development of appropriate strategies and activities to achieve the goals of the program also requires an awareness of the potential issues likely to impact the implementation of a regional storm water agency. The identification of these potential implementation issues will be a significant factor in defining the management structure, operational procedures, and resources required for the agency. Likewise, the ability of a regional storm water agency to manage all of the potential implementation issues will primarily depend upon: 1) the extent of the authority granted to the agency; 2) the resources available to the agency (as determined by the level of community support); and 3) the availability of political and administrative support mechanisms for identifying and resolving conflicts during the implementation phase. Some of the more significant implementation issues specific to local conditions are discussed hereinafter.

Definition of Service Area and Responsibilities

The starting point for determining the magnitude of a regional storm water management agency is to define the specific responsibilities of the agency and the geographic limits of the agency's authority. The agency's prime responsibilities should be a mirror image of the community's needs supplemented by the responsibilities imposed by applicable regulatory requirements. For every responsibility delegated to the agency there must be granted the corresponding authority to act.

There is a wide range of potential storm water related responsibilities that could be delegated to a regional storm water management agency, including any or all of the following activities:

- Planning and construction of regional storm water facilities, such as detention basins;
- Flood control and protection;
- Erosion control;
- Review of plans and specifications for proposed storm water related projects and the associated permitting process;
- Inspection of construction of storm water control facilities;
- Maintenance and rehabilitation of storm water infrastructure, including response to complaints and inquiries;
- Collection of attribute and operational information on the storm water system;
- Maintenance of infrastructure mapping and attribute data systems;

- Management of mandated regulatory programs, such as the anticipated federal Phase II storm water permits;
- Management of wetlands;
- Management of storm water grant and loan programs;
- Management of related storm water programs, such as the FEMA flood insurance program;
- Emergency spill response;
- Management of local (water) pollution prevention programs and local public information services;
- Monitoring of the water quality of local receiving streams; and
- Coordination with other regulatory agencies such as the Corps of Engineers, FEMA, ORSANCO, the Kentucky Division of Water, the Kentucky Department of Highways, and USEPA.

A possible strategy for establishment of a regional storm water management agency could be to implement the defined responsibilities of the agency over some period of time, thus allowing the agency time to develop the necessary management structure and resources to fulfill its mission. This approach would require that some initial minimum level of service be defined, possibly using applicable regulatory requirements as a starting point. A schedule could then be developed which would provide for the assumption of additional responsibilities as the resources of the agency permit.

The acceptable geographic limits of any storm water management agency will ultimately depend upon the willingness of local political jurisdictions to delegate all or a portion of their statutory authority and also upon the granting of any necessary supplemental authority by legislative bodies. The experience of other storm water management agencies affirms the desirability of defining jurisdictional limits on a watershed basis. It has been demonstrated that watershed-based controls that can bridge local political boundaries also provide the most effective and efficient mechanism for managing storm water issues. It is also significant to note that, on a national level, storm water regulations and programs are beginning to align around a watershed-based control approach.

Ideally, the boundaries of a regional storm water management agency would be defined by watershed limits and would include, as a minimum, the developed and developing areas of the region. For this reason, a logical approach to defining the geographic limits for Northern Kentucky would be to initially include Boone, Kenton, and Campbell Counties in a regional agency. These three counties also have a history of successful cooperation in providing public services. However, if institutional or financial issues preclude the formation of three-county agency, consideration could still be given to a one-or-two-county agency. Obviously, any economies of scale and other potential benefits may diminish as the geographic size of the agency is decreased.

In Northern Kentucky, one of the biggest obstacles to implementation of a watershed approach is the disparity in storm water control capabilities of the various local political jurisdictions. This is most apparent with Boone County and the City of Florence, both of which have made significant investments in management resources and infrastructure for storm water management in recent years. In order for these two entities to be included in a regional agency, there should be some mechanism to credit the equity they would bring to a consolidation with other systems. If these two entities are not included in a regional

system, then there needs to be a mechanism to coordinate their respective efforts with those of the regional system.

Coordination with Other Agencies/Jurisdictions

Because the implementation of a regional storm water management program would cross many political, regulatory, institutional, and operational boundaries, there will be considerable opportunity for conflict and ineffectiveness if the process is not well planned. For example, the Kentucky Department of Highways is responsible for designing, constructing, and maintaining the entire storm water infrastructure associated with state highway systems. Although the Department of Highways would be exempt from local controls in accordance with current statutory authority, it would still be necessary for close coordination between the Department and the regional storm water agency if the regional goals are to be achieved.

Other agencies which currently seem to have common or overlapping responsibilities for various facets of storm water management includes:

- U.S. Army Corps of Engineers — permitting of construction along navigable streams and the design and construction of flood protection works;
- FEMA — management of floodplain areas and the federal flood insurance program;
- ORSANCO — promulgation of standards and regulations for water quality and monitoring of water quality in the Ohio River;
- Kentucky Division of Water — promulgation and enforcement of water quality standards in the streams of Kentucky;
- Kentucky Department of Highways — design, construction, and maintenance of state highway drainage structures;
- USEPA — promulgation and enforcement of rules and regulations for management of public and private storm water systems, including open channels;
- Local emergency preparedness agencies — mitigation of spills of toxic and hazardous materials into storm sewers and streams;
- Local planning agencies — the development and application of local design standards for storm water infrastructure, sometimes including the inspection of construction; and
- Local fiscal courts, municipalities, and public works agencies — the construction, operation, and maintenance of various elements of storm water systems.

There can also be conflicts between related storm water management functions such as flood control and pollution abatement. One of the important advantages of a regional management agency is that it provides the opportunity, through centralized planning, to prioritize goals and mitigate conflicts between respective functions.

Identification of Storm Water Infrastructure

In Northern Kentucky, one of the most challenging tasks that is essential to implementation of a regional agency will be that of identifying and locating the existing storm water infrastructure system, collecting attribute information, and determining the ownership of those facilities. This will be a difficult task because much of the data on existing storm water infrastructure, if available at all, is in the form of paper records. It is well accepted that the best tool for management of storm water data is a geographic information system (GIS). Northern Kentucky has two such systems, one serving Boone County (Boone County Planning and Zoning Commission) and one serving Kenton and Campbell Counties (Northern Kentucky Area Planning Commission). The GIS serving Kenton and Campbell Counties has no storm water infrastructure layer except for the mapping of water bodies while the Boone system does include a significant portion of the existing storm water infrastructure. In addition, the City of Florence has done an extensive study of its storm water system as part of an on-going repair and rehabilitation program.

While it will be possible through field investigation and review of available documents to locate and identify the structural components of the existing system, such as pipes, culverts, and headwalls, it cannot be assumed that all of these elements are part of the publicly-owned system, especially where the facilities may be located on private property. In some cases, it may take a search of public records to establish ownership (and responsibility) for storm water systems. This determination of ownership is also important in establishing the right of access to storm water facilities. Where existing storm water facilities are discovered to be under private ownership, there must either be a mechanism for merging those facilities into the public system or providing some coordination or regulatory control by the regional agency.

An equally difficult issue will be the collection of data on streams, ditches, and other open channels. While open channels can be identified and located by aerial photography, it is often necessary to have more specific attribute information that must be obtained in the field. The more specific information is frequently required for hydraulic analysis and the planning of infrastructure projects.

Development of O & M Programs

The part of a storm water management program that is most visible and most vital to local residents and users of the system is the operation and maintenance (O & M) program. Ultimately, the amount of public support for a regional agency will depend upon the ability of the agency to meet the needs and expectations of the public. It is important that the initial O & M program of a regional agency focus on mitigation of known problems in the storm drainage system. These problems can be revealed through a review of complaint records, where available, or by means of public surveys or interviews of local officials to supplement available records. Where investigation of complaints reveals chronic problems, such as defective or inadequate infrastructure, which cannot be resolved by O & M efforts, the problem must be deferred until an appropriate rehabilitation or capital improvement program can be initiated.

The process of defining the overall responsibilities of a regional storm water agency will also define the content of the agency's O & M programs. The O & M programs must incorporate the specific tasks essential to completing the mission of the agency. In some cases, there may be overlapping responsibility with other jurisdictions. For example, a

program of frequent street sweeping has been demonstrated to provide water quality benefits by reducing pollutant loadings to receiving waters but the reason most communities provide street sweeping is for litter control and enhancement of aesthetics. Therefore, for street sweeping and other similar activities having multiple benefits and value, it will be necessary to determine the appropriate agency for uniform delivery of that public service. It is also important to recognize that all of the political jurisdictions that might be included in regional storm water agency do not currently provide the same level of service to their constituents, thus further complicating the assignment of responsibility for specific O & M functions.

Typical storm water O & M activities require significant amounts of light construction and maintenance equipment such as backhoes, trucks, portable pumps, catch basin and sewer cleaning machines, and personal safety equipment. A large initial capital investment would be necessary for start-up of a regional storm water agency unless: 1) the agency could temporarily contract out routine maintenance to other local public or private entities; 2) the agency could temporarily rent the necessary equipment; or 3) the agency selected for storm water management already possessed the necessary equipment (such as the Sanitation District No. 1). The inventory of available equipment within the local area from potential public and private sources is probably adequate to meet the initial needs for a routine storm water system maintenance program and arrangements could likely be made for rental of such equipment on a scheduled basis. However, the long-term rental of equipment would probably be more costly than ownership and would certainly require more management effort and skill, particularly in times of emergencies.

Similarly, the personnel required for start-up of storm water O & M activities would have to be hired and trained unless one of the three alternatives described above were to be utilized. In order to provide continuity in the O & M program, it is necessary that the agency have a core group of personnel with the specialized skills and knowledge of the storm sewer system vital to efficient operation, effective response to emergency situations, and resolution of customer problems.

Development of Standards and Regulations

An initial step in the development of uniform area-wide standards and regulations for management of storm water issues could be the adoption of a blend of current local requirements, utilizing the common elements of the local codes and adding other requirements considered critical to meeting the short-term goals of the regional agency. In general, the existing design standards and regulations for storm water management have been established by the respective planning and zoning bodies, fiscal courts, and municipalities. While these existing codes have much in common, there are differences; for example, some local entities have comprehensive requirements for storm water detention for new development while others limit the requirements to only certain types of development or else have a different basis for computing detention requirements. Thus, most local political jurisdictions would probably experience some modification of their storm water standards and regulations but it should be possible to formulate a blended set of standards and regulations that would have minimal impact for most jurisdictions and would provide for a uniform interpretation and application across the entire region.

Another important consideration in the development of standards and regulations will be the establishment of conditions for use of the storm sewer facilities. These conditions would include, among other things, provisions for regulating the discharge of pollutants

into the storm sewer system, prohibitions against the interconnection of sanitary sewage with storm water facilities, and procedures for obtaining permits and making connections to the public storm sewer system.

Management of Permitting Processes

A permitting process will be a necessary component for storm water management to: 1) provide the information necessary for evaluation of proposed facilities and management of storm water facility inventory; 2) to assure compliance with applicable design and construction standards; and 3) to control the access and use of existing facilities. The permitting process should not be viewed as a major source of operating revenue for the agency; any proposed fees associated with permits should be designed to cover only the cost of the service provided.

Currently, in Northern Kentucky, the permitting process consists primarily of the review and approval of proposed storm water facilities and the inspection of construction. For proposed private development projects, the administrative functions of plan review for storm water facilities and the inspection of construction is generally the responsibility of the local planning and zoning agencies while the approvals are provided by the appropriate local political jurisdiction. For proposed public projects, the design and construction of storm water facilities is generally the responsibility of the local political jurisdiction. In some cases, a project may also require approval and permitting by the Corps of Engineers or the Kentucky Division of Water. In addition, construction projects involving more than five acres of land (this threshold size is likely to be reduced in the new federal storm water regulations) require a storm water discharge permit from the Kentucky Division of Water.

An option available to a regional storm water agency for management of the permitting process would be to have the planning and zoning agencies continue the review and inspection services they now provide for private development projects, which could be done on a contractual basis. This would free staff of a regional storm water agency to focus on public projects of a more area-wide significance.

Design Review and Construction Inspection

The review of plans for proposed storm water facilities and inspection of the construction of those facilities is one of the most important tasks in management of a storm water system. As discussed above, these tasks are usually part of the permitting process for private development projects and are currently performed by staff of the respective local planning agencies. In Boone County, the responsible agency is the Boone County Planning and Zoning Commission, except for the City of Florence, which has a separate storm water utility. In Kenton County and parts of Campbell County, the responsible agency is the Northern Kentucky Area Planning Commission. For areas not otherwise served by these two agencies, the local political jurisdiction is responsible.

The design review and construction inspection task is a very fundamental function of any regional storm water agency and would have to be one of the first activities implemented. The two options available for initiating this service would be to either provide personnel and support for internal management or to contract the service, perhaps on an interim basis, to the local planning agencies or to private consultants.

Private Property Issues

It is essential to the operation and maintenance of storm water control facilities that there be adequate right-of-access to public facilities when they are located on private property. Where platted or deeded easements to public facilities cannot be verified, the regional agency may need some type of prescriptive rights to assure uninhibited access. It may require special legislative authority to establish such rights.

For a variety of reasons, some private entities may prefer to construct and maintain their own private storm water facilities. Examples of these private systems would be airports, college or hospital campuses, industrial parks, and residential communities acting through homeowner associations. Some of these private systems (for example, airports) may be exempt from local regulations. In these cases, the regional storm water management agency must establish a cooperative working arrangement with the other entity to assure attainment of local goals.

An implementation issue related to private property is that of determination of property ownership. Currently, the two GISs in Northern Kentucky do not contain enough comprehensive property information to permit the identification of owners of specific parcels throughout the three-county area. This information is necessary to the development of a system for calculation of storm water runoff from specific parcels as well as for the implementation of a billing system if charges are to be based upon the size of individual parcels (as is customary). Additionally, the daily operation and maintenance of the system will be greatly enhanced by a property ownership database since much of the storm water system infrastructure will be located on private property and it will frequently be necessary to contact the owners of private property.

Enforcement Mechanisms

An essential component of a storm water management program is the ability of an agency to enforce the rules and regulations for use of the public storm water facilities. It is preferable for reasons of efficiency that this enforcement authority be of an administrative nature (with proper safeguards, limits, and rights of appeal for those affected) rather than depend upon a judicial process for routine enforcement of regulations. The establishment of an administrative enforcement process may require special legislative authority for any regional management agency.

Enforcement mechanisms could include the customary penalties, fines, and denial or revocation of permits. Depending upon how a regional storm water management agency might be funded, an especially troublesome issue could be the collection of delinquent user charges. Since no commodity is being furnished to users, the discontinuation of service is not an option as a control. Again, administrative remedies would be preferred as an enforcement mechanism and it may require special legislative authority to implement such a system. The provision of an enforcement mechanism that assures payment of customer charges will also be necessary to guarantee the cash flow required for the issuance of revenue bonds to finance future capital improvement projects.

Regional Resource Allocation

It should be recognized that a storm water management program, even if it has an independent revenue stream, must compete with other regional and community programs for available resources. Thus, it is desirable that any regional storm water authority should submit to a higher controlling authority (such as the county fiscal courts) or at least to a local review process in the planning, implementation, and funding of its operations. This review process should: 1) assure accountability in that the mission and goals of the agency are being fulfilled in a responsible manner; 2) provide a mechanism for cooperation and coordination among all agencies having overlapping or related responsibilities; and 3) facilitate the sharing of resources, such as personnel

SECTION 11 — OTHER STORM WATER MANAGEMENT PROGRAMS

Boone, Campbell, and Kenton Counties are not alone in their consideration of a regional storm water management agency. Other cities and counties throughout the United States have undertaken the task of establishing a storm water management agencies including the City of Cincinnati. A wealth of information can be found on the Internet regarding individual storm water management agencies including the summary of existing programs that is included in Table 3. The agencies identified in Table 3 can be contacted by the storm water management agency discussed in the recommendations to gain insight into the establishment of a regional storm water management program.

TABLE 3
SUMMARY OF EXISTING STORM WATER MANAGEMENT PROGRAMS
IN THE UNITED STATES

Agencies	Stormwater Regulation	Non-structural Control	Structural Control	E/S Control During Construction	Design Manuals	Stormwater Control Administration	WQ Management Plan	Contact
Orange Co., California	Water Quality Ordinance	Education, Runoff Minimizing Landscape, Litter Control, Street Sweeping, Facility Maintenance	Filtration, Inlet Trash Racks	E/S controls & NPDES requirements for >5 acre developments	None	Environmental Resources of the County of Orange's Environmental Management Agency	NPDES Regulation,Drainage Area Management Plan	Richard Boon, Administrator 1-714-567-6371
Santa Clara County, California	None	Community Education	None	E/S controls & NPDES requirements for >5 acre developments	California SW BMP Handbooks: Municipal, Construction Activities, Industrial and Commercial	Santa Clara ValleyNPS Pollution Control Program	Santa Clara Storm Water Quality Management Plan	Bill Springer 1-408-265-2607 x2640
Boulder, Colorado	None	None	None	Various Devices and Inspection	BMP Vol. III, Urban Storm Drainage Criteria Manual Erosion Control Manual	Regional Plan - Urban Drainage and Flood Control District	Comprehensive Drainage Master Plan (1988) – calls for Storm WQ measures	Donna Scott 1-303-441-3251
Denver, Colorado	Not Specific, some control in development	Education, Sweepers, Pavement Maintenance	Detention, Infiltration, and Retention Ponds	Many devices: hay bales, traps, silt fences	BMP Vol. III – Urban Storm Drainage Criteria Manual	Denver Water/Wastewater Management Division	Many Plans, differ for all watersheds: most have water quality components	Ben Urbonas 1-303-455-6277
Fort Collins, Colorado	Stormwater Ordinance, City Code	Public Education, riparian habitats instead of concrete channels	N/A	Silt fences, swales, and others	N/A	Stormwater Division	Yes	Gail Miller 1-970-221-6681 Bob Smith 1-970-224-6021
Washington, D.C.	Stormwater Ordinance, Erosion Control Ordinance	Pollution Prevention Education	Underground sand filters	Various devices	Several	Regional Planning Association	None	Jim Shell 1-202-962-3342

Agencies	Stormwater Regulation	Non-structural Control	Structural Control	E/S Control During Construction	Design Manuals	Stormwater Control Administration	WQ Management Plan	Contact
Gainesville, Florida	SW Management Ordinance, Environmental Management SW Section	Inlet stenciling, Public Awareness Program, Daily Construction Inspections	Natural (as is possible) control that captures 1" runoff and allows percolation into soil (an approved control)	Submit E/S Plan: Various devices possible	Engineering Design Manual	Engineering Division/Public Works & Code Enforcement	Florida mandates a policy plan w/ water quality criteria	Allison Fetner, Development Design Engineer 1-352-334-2051
Tallahasee, Florida	Environmental Mgmt. Ordinance, Ch. 28, Part 1 City Code & Aquifer-Wellhead Protection Ordinance	Facility Inspections (Auto, etc.), Buffer zones for undisturbed areas	Prefer wet detention ponds or sand filter, to treat 1/2" (or 3/4" in designated Florida watersheds)	Construct pond first before further construction + other devices: Silt fences, Tree Barricades	Florida Development Manual	Environmental Services Division	None	John Buss, Stormwater 1-904-891-8232
Tampa, Florida	Stormwater Ordinance Ch. 21of City Code, Landscaping Ordinance	Education, Inlet Stenciling	Detention or Filtration Ponds	None specifically unless disharges cause problems	Stormwater Technical Standards Manual	Storm Water Management Division/Sanitary Sewer	NPDES Regulation	M. Burwell, SW Planner 813-274-8736, Bob Welch 1-813-274-8948
Dover, Delaware	Delaware Sediment and Storm Water Law	Public Education, Certification for Inspectors and Developers	Not Specified but are required with a performance of 80% settleable solids removal	No specified controls, >5000sq ft Sediment & Stormwater Plan necessary, must use approved practices	Handbook of Practices for E/S for Construction	Conservation District/Storm Water NPDES Division	None, site by site basis	Randy Greer 1-302-739-4411
Louisville, Kentucky	401 Kentucky Administritive Regulations, Ch 3 of Sanitary Code, County Health Ordinance	Public Education Programs	Controls must be approved by permit, generally detention ponds are used	Straw Bales, Silt Fences	Metropolitan Sewer District Design Manual	Metropolitan Sewer District	None	Sara Lynn Cunningham 1-502-540-6118
Arlington, Texas	Industrial Waste Ordinance	Inspections, Monitoring of stream conditions	Certificate of Building Occupancy Process, can request for some permanent controls	Various Devices under Building Ordinance	Reg'l Plan: N. Central Texas Council of Governments	Water Resources	NPDES Regulation, other	Dr. Kathy 1-817-459-6568

Agencies	Stormwater Regulation	Non-structural Control	Structural Control	E/S Control During Construction	Design Manuals	Stormwater Control Administration	WQ Management Plan	Contact
Austin, Texas	Comprehensive Watershed Ordinance, Construction Plan Review, Texas Water Code	Impervious Cover Limits, 100' Buffer Zone, Community Education, Spills/Complaint Program, Facility Inspections	Sand Filtration or Alternative	Various Devices and Inspection	Environmental Criteria Manual	Drainage Utility Department	Retrofit Plan NPDES Regulation Others	George Chang, WQ Monitoring Section Manager, 1-512-499-2888
Dallas, Texas	Yes	Inspection/Illicit Discharge Program, BMP Maintenance	Rock Berms, Inlet Protection, Channel Improvements	>3ac Erosion Control Plan necessary, >5ac SWPP necessary No specific controls	Drainage Design Manual, Storm WQ BMPs for Construction Activities, Reg'l Plan: N. Central Texas COG	Stormwater Management/Public Works	Yes	B. Cernosek 1-214-948-4688 Larry McDaniels 1-214-670-8559
El Paso, Texas	Flood Prevention Ordinance, Grading Ordinance	None	Silting basins on perimeters of new developments, retention and detention ponds	Silt fences, swales, and silting basins	Subdivision Design Improvement Standard	Engineering Department of the City of El Paso	None	Tony Flores 1-915-541-4418
Fort Worth, Texas	Art. 5 of the Fort Worth Environmental Code, Sectio 12	Education, Complaints Program	None	No requirements but disharges cannot cause any receiving water problems	Reg'l Plan: N. Central Texas Council of Governments	Department of Environmental Management/Water Quality Division	None, developing now	Jeff Coffey 1-817-871-5450
Houston, Texas	Water Quality Ordinance #4733, Health Ordinance #10451, Texas Water Code	Education, Complaints Program, Inspectors	None	Temporary Controls required for industrial construction activities >5ac	SW Management Handbk for Construction Activities, SW Quality Guidance Manual	Environmental Health Division	NPDES Regulation	B. Buxton (WQ) 1-713-640-4273 T. Rolen (NPDES) 1-713-751-5400
San Antonio, Texas	Pollution Prevention Ordinance of the City Code, Clearing and Grading Ordinance (coming soon)	Household Hazardous Waste Prog., mnthly assessment based on imp. cover	Performance based, may require sand filter or detention pond	Water Pollution Abatement Plan required, >5ac silt fences, block inlets	None	Watershed Protection	Sampling Program, flood tunnels under S.A. has bar screens and catch basins	Frank Salazar, Martin Miller 1-210-704-7467

Agencies	Stormwater Regulation	Non-structural Control	Structural Control	E/S Control During Construction	Design Manuals	Stormwater Control Administration	WQ Management Plan	Contact
Alexandria, Virginia	Virginia Preservation Act (Legislative Basis)	100' Buffer Zone, Auto-related Business Handbook modeled after Santa Clara's Program	D.C. Sand Filter	Stringent E/S Controls and Manual, Daily inspections by a certified reviewer	Northern Virginia BMP Handbk, Auto-Related Business Handbk (derived from Santa Clara's Program)	Department of Transportation and Environmental Sciences	CSO-NPDES Regulation	Warren Bell 1-703-838-4327
Fairfax County, Virginia	Designated Water Protect. Overlay Dist. (1981), Cheasapeake Bay Preserv. Ordinance (1993)	Stream Buffers, Re-zoning towards lower densities	Not Specified but are required with a performance of 50% phosphorous removal	2 Phase - clear area for controls first, later modify controls as needed, time limits on denuded areas	Public Facilites Manual	Environmental Management Department	3 Plans Primary: Regional SW Management Plan	John Friedman, Chief of WQ 1-703-324-1773
Seattle, Washington	Stormwater Grading & Drainage Control Code	Education, Problem Investigations, Inspections, Street Sweeping	Grass Swales, Catch Basins, Detention Ponds, Wet Ponds	Various Devices	Seattle Water Quality BMP Manual, Seattle E/S Control Manual	Drainage & Water/Wastewater Utility / Department of Construction & Land-use	Comprehensive Drainage Plan - includes policies, regulations, basin planning, etc. for the next 15 years	Neil Thibert (Drainage) 1-206-684-7589

Source: Chang, G.C. (1996). *BMP and Storm Water Quality Control Information.* Presented at the June 1996 Statewide Storm Water Quality Task Force Meeting, American Public Works Association – Texas Chapter.

SECTION 12 — CONCLUSIONS

There is no comprehensive storm water management program that is currently in place in Boone, Campbell, and Kenton Counties, Kentucky. Boone County has initiated a program to inventory their storm water drainage system and several of the individual communities in the region have moderate storm water management programs in place. However, the implementation of the Phase II rules by the USEPA will likely require a more comprehensive organization to manage storm water drainage.

The Kentucky Revised Statutes do not have a specific reference to a separate storm water management utility. The establishment of such an entity under the existing statutes would require the granting of authority by the individual counties with the agreement of every municipality. Alternately, under the newly revised statute under which the Sanitation District No. 1 is organized (KRS 220), the Sanitation District No. 1 is permitted to develop and implement plans for the collection and disposal of storm water that can be interpreted as providing authority for storm water management. A new statute could also be passed by the Kentucky legislature specifically addressing regional storm water management agencies.

Woolpert's survey of the 39 cities in the three counties as well as the Cincinnati/Northern Kentucky International Airport and Northern Kentucky Area Planning Commission indicated a low level of awareness of the NPDES Phase II rules and their impact. The survey results indicate that there is generally a positive response to the organization of a storm water management agency; however, there is no consensus on who that agency should be. The Sanitation District No. 1, the Northern Kentucky Area Planning Commission, and a new independent agency were named as possible candidates to take on a storm water management function. There is a concern about the overlapping levels of responsibility as it relates to storm water. For example, how will a highway drainage project be impacted by a storm water utility review of the project.

The basic components of a storm water management program exist in parts throughout the three-county region. There are several GIS systems currently being used in the region; however, none of these systems is currently in a state that would be responsive for the management of a storm water infrastructure system.

The equipment to construct, operate, and maintain a storm water drainage system exists throughout the region; however, it is distributed among the various municipal and county highway and public works departments and the Sanitation District No. 1.

In order for a regional storm water management program to be implemented, the mission, goals, and objective of such an agency need to be established. This definition process should include input from the public through an advisory committee or other group of stakeholders. An agency needs to be identified to carry on the tasks of storm water management. In Northern Kentucky, the Sanitation District No. 1 is most closely organized along the lines needed for a storm water management utility. However, a new organization could also be established. This new agency could either start from scratch and acquire the physical plant, staff, billing system, and GIS necessary to construct, operate, and maintain the storm water drainage system, or it could rely on inter-government agreements with local municipalities and the counties for the various services necessary.

If the Sanitation District No. 1 is deemed most qualified to handle storm water management in Northern Kentucky, a major reorganization of the District's administration will be necessary. A separate storm water division will likely need to be established with its own record keeping, legal, and financial functions. Much of the equipment and staff dedicated to the maintenance of the sanitary sewer system can also be used for storm sewers; however, additional equipment and personnel will be necessary due to a volume increase in the construction, maintenance, and operation functions. Specialized equipment related to the operation and maintenance of the flood control system along the Ohio River will also be necessary. The Sanitation District's GIS system will require an upgrade with one or two additional staff to handle the attribute information for the storm sewer system. Alternately, several functions could be contracted with the NKAPC including maintenance of the GIS and storm drainage construction project plan review.

The service area needs to be defined along with the responsibilities of the storm water agency. The existing storm water infrastructure needs to be inventoried along with a compendium of problem areas. Storm water standards and regulations need to be formulated in accordance with the provisions of the NPDES Phase II rules.

SECTION 13 —RECOMMENDATIONS

This report identified the extent of the storm water management problem in Boone, Campbell, and Kenton Counties, Kentucky; the issues driving the establishment of a regional storm water management program; and the obstacles to the establishment of such an entity. Based on the information developed for this report, Woolpert offers the following recommendations to move forward to the establishment of a regional storm water program.

1. It is recommended that a storm water management program under a single agency be established for the Boone, Campbell, and Kenton Counties region.

2. It is recommended that the Sanitation District No. 1 assume the responsibility of moving forward with the organization of a new storm water management utility.

3. It is recommended that funding be provided for the Sanitation District No. 1 to initiate development of the necessary administrative structure for a storm water management utility.

4. It is recommended that the Sanitation District No. 1 formulate the mission, goals, and objectives of a regional storm water management agency.

5. It is recommended that the Sanitation District No. 1 build upon the authority granted under the recently revised KRS 220 that allows the development of a storm water management utility.

6. The storm water advisory committee that was organized to review the activities of this feasibility study should be continued and their role expanded. This committee should provide review and recommendations to the Sanitation District No. 1 for a public awareness program including newsletters, press releases, and presentations. The Sanitation District No. 1 should administer funding for this committee's activities as part of the development of a storm water management utility.

7. It is recommended that the Sanitation District No. 1 meet with the NKAPC and Boone County Planning Commission to explore avenues for cooperation and GIS management under agreement with the Sanitation District No. 1.

The establishment of a single storm water management agency will require political consensus, a legal foundation, and public awareness of the impact of storm water on the quality of Kentucky's waters. Once a single agency is named to coordinate the storm water management program, the organizational work can begin. This work will include:

- The establishment of an administrative structure;

- Determination of a rate structure and funding mechanism;

- Preparation of a storm water infrastructure inventory;

- Set-up of a GIS;

- Determination of staff, building, and equipment needs;
- Development of a storm water drainage manual with the appropriate standards and regulations;
- Set-up of a billing system;
- Development of a project priority list; and
- Development of a permitting process with enforcement authority.

SECTION 14— REFERENCES

Livingston, E.H. and Shaver, E. (____). *Institutional Aspects of Urban Runoff Management: A Guide for Program Development and Implementation.* Watershed Management Institute for the U.S. Environmental Protection Agency.

National Association of Flood and Stormwater Management Agencies. (1996). *Survey of Local Stormwater Utililties.* 2nd Ed. Washington, D.C.

Ponzani, L. (ed.). (1995). *Stormwater Permit Manual.* Thompson Publishing Group. Washington, D.C.

The Urban Water Resources Research Council of the American Society of Civil Engineers and the Water Environment Federation. (1992). *Design and Construction of Urban Stormwater Management Systems.* American Society of Civil Engineers and Water Environment Federation. New York, NY, and Alexandria, VA.

APPENDIX A

U.S. ENVIRONMENTAL PROTECTION AGENCY
STORM WATER PHASE II PROPOSED RULE
12/15/97

PART 122 -- EPA ADMINISTERED PERMIT PROGRAMS: THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

1. The authority citation for part 122 continues to read as follows:

Authority: The Clean Water Act, 33 U.S.C. 1251 et seq.

2. In § 122.26, revise paragraphs (a)(9), (b)(4)(i), (b)(7)(i), (b)(8)(i), (b)(14) introductory text, (b)(14)(xi); redesignate paragraph (b)(15) as paragraph (b)(17) and add new paragraphs (b)(15) and (b)(16); revise paragraph (c) introductory text, paragraphs (c)(1) first sentence, (c)(1)(i) introductory text, (c)(1)(i)(C) first sentence, (c)(1)(i)(E) introductory text, (c)(1)(ii) first sentence of introductory text, (e)(1)(ii); add paragraph (e)(1)(iii); revise paragraphs (f)(4), (f)(5), and (g) to read as follows:

§ 122.26 Storm water discharges (applicable to State NPDES programs, see § 123.25).

(a) * * *

(9) (i) On and after October 1, 1994, for discharges composed entirely of storm water, that are not otherwise already required by paragraph(a)(1) of this section to obtain a permit, owners or operators shall be required to obtain a NPDES permit if:

(A) The discharge is from a small municipal separate storm sewer system required to be regulated pursuant to § 122.32;

(B) The discharge is a storm water discharge associated with other activity pursuant to paragraph (b)(15) of this section;

(C) The Director determines that storm water controls are needed for the discharge based on:

(1) Wasteload allocations that are part of "total maximum daily loads" (TMDLs) that address the pollutants of concern; or

(2) A comprehensive watershed plan, implemented for the waterbody, that includes the equivalents of TMDLs, and addresses the pollutants of concern; or

(D) The Director determines that the discharge contributes to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States.

(ii) Owners or operators of municipal separate storm sewer systems designated pursuant to sub-paragraphs (a)(9)(i)(A), (a)(9)(i)(C), and (a)(9)(i)(D) of this section, shall seek coverage under an NPDES permit in accordance with §§ 122.33 through 122.35. Owners or operators of non-municipal sources designated pursuant to sub-paragraphs (a)(9)(i)(B), (a)(9)(i)(C), and (a)(9)(i)(D) of this section, shall seek coverage under an NPDES permit in accordance with paragraph (c)(1) of this section.

(iii) Owners or operators of storm water discharges designated pursuant to sub-paragraphs (a)(9)(i)(C) and (a)(9)(i)(D) of this section, shall apply to the Director for a permit within 180 days of receipt of notice, unless permission for a later date is granted by the Director (see § 124.52(c) of this chapter).

* * * * *

(b) * * *

(4) * * *

(i) Located in an incorporated place with a population of 250,000 or more as determined by the 1990 Decennial Census by the Bureau of the Census (appendix F); or

* * * * *

(7) * * *

(i) Located in an incorporated place with a population of 100,000 or more but less than 250,000, as determined by the 1990 Decennial Census by the Bureau of the Census (appendix G); or

* * * * *

(8) * * *

(i) Owned or operated by the United States, a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;

* * * * *

(14) * * * For the categories of industries identified in this section, the term

includes, but is not limited to, storm water discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at 40 CFR part 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water. The term excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with storm water drained from the above described areas. * * *

* * * * *

(xi) Facilities under Standard Industrial Classifications 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 285, 30, 31 (except 311), 323, 34 (except 3441), 35, 36, 37 (except 373), 38, 39, 4221-25;

* * * * *

(15) Storm water discharges associated with other activity means the discharge from any conveyance used for collecting and conveying storm water that needs to be regulated to protect water quality. For the categories of facilities identified in this

subsection, the term includes the entire facility except areas located at the facility separated from the plant's operational activities. Such separated areas may include office buildings and accompanying parking lots, as long as the drainage from the separated areas is not mixed with storm water drained from the plant's operational activities. The following types of facilities or activities are sources of "storm water discharges associated with other activity" for the purposes of this subsection:

(i) Construction Activities.

(A) Construction activities including clearing, grading, and excavating activities that result in land disturbance of equal to or greater than one acre and less than five acres. Sites disturbing less than one acre are included if they are part of a larger common plan of development or sale with a planned disturbance of equal to or greater than one and less than five acres. The NPDES permitting authority may waive the otherwise applicable requirements for a storm water discharge from construction activities that disturb less than five acres where:

(1) The rainfall erosivity factor ("R" in the Revised Universal Soil Loss Equation) is less than two during the period of construction activity. The owner/operator must certify that construction activity will take place during the period when the rainfall erosivity factor is less than two.;

(2) On a case-by-case basis the annual soil loss for a site will be less than two tons/acre/year. The owner or operator must certify that the annual soil loss for their site will be less than two tons/acre/year through the use of the Revised Universal Soil

Loss Equation, assuming the constants of no ground cover and no runoff controls in place.; or

(3) Storm water controls are not needed based on:

(i) Wasteload allocations that are part of "total maximum daily loads" (TMDLs) that address the pollutants of concern. The owner or operator must certify that the construction activity will take place, and storm water discharges will occur, within an area covered by the TMDLs.; or

(ii) A comprehensive watershed plan, implemented for the waterbody, that includes the equivalents of TMDLs, and addresses the pollutants of concern. The owner or operator must certify that the construction activity will take place, and storm water discharges will occur, within an area covered by the watershed plan.

(B) Any other construction activity designated by the NPDES permitting authority based on the potential for contribution to a violation of a water quality standard or for significant contribution of pollutants to waters of the United States.

(ii) Any other discharges, except municipal separate storm sewer systems, designated by the NPDES permitting authority pursuant to paragraph (a)(9) of this section.

Exhibit 1 to § 122.26(b)(15) -- Summary of Coverage of "Storm Water Discharges Associated with Other Activity"* Under the NPDES Storm Water Program
(*see definition in § 122.26(b)(15))

AUTOMATIC DESIGNATION: Required Nationwide Coverage	Construction activities that result in a land disturbance of equal to or greater than one acre and less than five acres. Sites disturbing less than one acre are included if part of a larger common plan of development or sale. (see § 122.26(b)(15)(i)(A))
POTENTIAL DESIGNATION: Optional Evaluation & Designation by the Permitting Authority	(1) Construction activities that result in a land disturbance of less than one acre based on the potential for adverse impact on water quality or for significant contribution of pollutants. (see § 122.26(b)(15)(i)(B)) (2) Any other non-municipal storm water discharges. (see § 122.26(b)(15)(ii))
POTENTIAL WAIVER: Waiver from Requirements as Determined by the Permitting Authority	Any automatically designated construction activity where the owner/operator certifies: (1) a rainfall erosivity factor of less than two, or (2) an annual soil loss of less than two tons/acre/year, or (3) that the activity will occur within an area where controls are not needed based on "waste load allocations" that are part of total maximum daily loads (TMDLs), or a comprehensive watershed plan. (see § 122.26(b)(15)(i)(A))

(16) Small municipal separate storm sewer system means all municipal separate storm sewer systems that are not designated as "large" or "medium" municipal separate storm sewer systems pursuant to paragraphs (b)(4) and (b)(7) of this section; or designated under paragraph (a)(1)(v) of this section.

* * * * *

(c) Application requirements for storm water discharges associated with industrial activity or storm water discharges associated with other activity ---

(1) Individual application. Dischargers of storm water associated with industrial or other activity are required to apply for an individual permit, apply for a permit through a group application, or seek coverage under a promulgated storm water general permit. * * *

(i) Except as provided in § 122.26(c)(1)(ii) through (c)(1)(iv), the operator of a

storm water discharge associated with industrial or other activity subject to this section shall provide:

* * * * *

(C) A certification that all outfalls that should contain storm water discharges associated with industrial or other activity have been tested or evaluated for the presence of non-storm water discharges which are not covered by a NPDES permit; tests for such non-storm water discharges may include smoke tests, fluorometric dye tests, analysis of accurate schematics, as well as other appropriate tests. * * *

* * * * *

(E) Quantitative data based on samples collected during storm events and collected in accordance with § 122.21 of this part from all outfalls containing a storm water discharge associated with industrial or other activity for the following parameters: * * *

* * * * *

(ii) The operator of an existing or new storm water discharge that is associated with industrial activity solely under paragraph (b)(14)(x) of this section or is associated with other activity solely under paragraph (b)(15)(i) of this section, is exempt from the requirements of § 122.21(g) and paragraph (c)(1)(i) of this section. * * *

* * * * *

(e) * * *

(1) * * *

(ii) For any storm water discharge associated with industrial activity from a facility that is owned or operated by a municipality with a population of less than 100,000 that is not authorized by a general or individual permit, the permit application must be submitted to the Director by August 7, 2001.

* * * * *

(iii) For any storm water discharge associated with other activity identified in paragraph (b)(15) of this section that is not authorized by a general or individual permit, the permit application made under paragraph (c) of this section must be submitted to the Director by {insert date 3 years and 90 days from date of publication of final rule in the FEDERAL REGISTER}.

* * * * *

(f) * * *

(4) Any person may petition the Director for the designation of a large, medium, or small municipal separate sewer system as defined by paragraphs (b)(4)(iv), (b)(7)(iv), or (b)(16) of this section.

(5) The Director shall make a final determination on any petition received under this section within 90 days after receiving the petition with the exception of petitions to designate a small municipal separate storm sewer system in which case the Director shall make a final determination on the petition within 180 days after its receipt.

* * * * *

(g) Conditional exemption for "no exposure" of industrial activities and

materials to storm water. Discharges composed entirely of storm water do not require an NPDES permit if the owner or operator of the facility satisfies the conditions of this paragraph concerning "no exposure." For purposes of this section, "no exposure" means all industrial materials or activities are protected by a storm resistant shelter so that they are not exposed to rain, snow, snowmelt, or runoff. Industrial materials or activities include, but are not limited to, material handling equipment, industrial machinery, raw materials, intermediate products, by-products, or waste products, however packaged. This exemption does not apply to storm water discharges from facilities identified in paragraphs (b)(14)(x) and (b)(15)(i) of this section and sources individually designated under paragraphs (a)(1)(v), (a)(9)(i)(B),(C)&(D) and (g)(3) of this section. Actions taken to qualify for this provision shall not interfere with the attainment or maintenance of water quality standards, including designated uses. To establish that the facility meets the definition of no exposure described above, an owner or operator must submit a written certification to the NPDES permitting authority once every five years.

(1) Any owner or operator claiming the no exposure exemption must:

(i) Notify the NPDES permitting authority at the beginning of each permit term or prior to commencing discharges during a permit term;

(ii) Allow the permitting authority, or the municipality where the facility discharges into a municipal separate storm sewer system, to inspect the facility and allow the permitting authority or the municipality to make such inspection reports

publicly available upon request;

(iii) Upon request, also submit a copy of the certification to the municipality in which the facility is located; and

(iv) Sign and certify the certification in accordance with § 122.22.

(2) If there is a change in circumstances which causes exposure of industrial activities or materials to storm water, the owner or operator must comply immediately with all the requirements of the storm water program including applying for and obtaining coverage under an NPDES permit.

(3) Even if an owner or operator certifies to no exposure under paragraph (g)(1) of this section, the NPDES permitting authority still retains the authority to require the owner or operator of a facility to apply for an individual or general permit if the permitting authority has determined that the discharge:

(i) Is, or may reasonably be, causing or contributing to the violation of a water quality standard; or

(ii) Is, or may reasonably be, interfering with the attainment or maintenance of water quality standards, including designated uses.

3. Revise § 122.28(b)(2)(v) to read as follows:

§ 122.28 General permits (applicable to State NPDES programs, see § 123.25).

* * * * *

(b) * * *

(2) * * *

(v) Discharges other than discharges from publicly owned treatment works, combined sewer overflows, municipal separate storm sewer systems, primary industrial facilities, and storm water discharges associated with industrial activity, may, at the discretion of the Director, be authorized to discharge under a general permit without submitting a notice of intent where the Director finds that a notice of intent requirement would be inappropriate.

* * * * *

4. Add §§ 122.30 through 122.37 to subpart B to read as follows:

* * * * *

General Purpose of the CWA Section 402(p)(6) Storm Water Program

§ 122.30 What is the purpose of the CWA section 402(p)(6) storm water regulations?

(a) Under the statutory mandate in section 402(p)(6) of the Clean Water Act, the purpose of this portion of the storm water program is to designate additional sources that need to be regulated to protect water quality and to establish a comprehensive storm water program to regulate these sources. (Since the storm water program is part

of the National Pollutant Discharge Elimination System (NPDES) Program, you should also refer to § 122.1 which addresses the broader purpose of the NPDES program.)

(b) Storm water runoff continues to harm the nation's waters. Runoff from lands modified by human activities can harm surface water resources in two ways: by changing natural hydrologic patterns and by elevating pollutant concentrations and loadings. Storm water runoff may contain or mobilize high levels of contaminants, such as sediment, suspended solids, nutrients, heavy metals, pathogens, toxins, oxygen-demanding substances, and floatables.

(c) EPA strongly encourages partnerships and the watershed approach as the management framework for efficiently, effectively, and consistently protecting and restoring aquatic ecosystems and protecting public health.

Tribal Role for the CWA Section 402(p)(6) Storm Water Program

§ 122.31 As a Tribe, what is my role under the CWA section 402(p)(6) storm water program?

As a Tribe you may:

(a) Be authorized to operate the NPDES program including the storm water program, after EPA determines that you are eligible for treatment in the same manner as a State under §§ 123.31 through 123.34 of this chapter. (If you do not have an

authorized NPDES program, EPA generally will implement the program on your reservation as well as other Indian country.);

(b) Be classified as an owner or operator of a regulated small municipal separate storm sewer system, as defined in § 122.32, to the extent the population within the urbanized area of the reservation is greater than or equal to 1,000 persons. (Designation of your Tribe as an owner or operator of a small municipal separate storm sewer system for purposes of this part is an approach that is consistent with EPA's 1984 Indian Policy of operating on a government-to-government basis with EPA looking to Tribes as the lead governmental authorities to address environmental issues on their reservations as appropriate. If you operate a separate storm sewer system that meets the definition of a regulated small municipal separate storm sewer system, your reservation would be subject to the requirements under §§ 122.33 through 122.35. If you are not designated as a regulated small municipal separate storm sewer system, you may ask EPA to designate you as such for the purposes of this part. Being regulated as a small municipal separate storm sewer system and having coverage under an NPDES permit may benefit you by enhancing your ability to establish and enforce certain requirements for facilities that discharge storm water into your separate storm sewer system.); or

(c) Be a discharger of storm water associated with industrial or other activity under §§ 122.26(b)(14) or (b)(15), in which case you must meet the applicable requirements. Within Indian country, the NPDES permitting authority generally would

be EPA, unless you are authorized to administer the NPDES program.

Municipal Role for the CWA Section 402(p)(6) Storm Water Program

Exhibit 2 to Part 122
Summary of Coverage
of Small Municipal Separate Storm Sewer Systems*
Under the NPDES Storm Water Program
(*see definition at § 122.26(b)(16))

WHO IS DESIGNATED/COVERED UNDER THIS PART?	
AUTOMATIC DESIGNATION: Required Nationwide Coverage	All owners or operators of small municipal separate storm sewer systems (MS4s) located within an "urbanized area." (see § 122.32(a)(1))
POTENTIAL DESIGNATION: Required Evaluation by the Permitting Authority for Coverage	All owners or operators of small MS4s located outside of an "urbanized area" with a population of at least 10,000 and a population density of at least 1,000. (see §§ 122.32(a)(2) and 123.35(b)(2)) All owners or operators of small MS4s that contribute substantially to the storm water pollutant loadings of a physically interconnected MS4 that is regulated by the NPDES storm water program. (see §§ 122.32(a)(2) and 123.35(b)(4))
POTENTIAL DESIGNATION: Optional Evaluation by the Permitting Authority for Coverage	Owners and operators of small MS4s located outside of an "urbanized area" with a population of less than 10,000 or a density of less than 1,000. (see §§ 122.32(a)(2) and 123.35(b)(3))
WHO IS ELIGIBLE FOR A WAIVER or AN EXEMPTION FROM THE SMALL MS4 PERMIT REQUIREMENTS?	
POTENTIAL WAIVER: Locally-Based Waiver from Requirements as Determined by the Permitting Authority	Owners or operators of small MS4s, located within an "urbanized area," with a jurisdiction of less than 1,000 persons and a system that is not contributing substantially to the pollutant loadings of a physically interconnected MS4 may certify that storm water controls are not needed based on: (1) waste load allocations that are part of "total maximum daily loads" (TMDLs) that address the pollutants of concern; or (2) a comprehensive watershed plan, implemented for the waterbody, that includes the equivalents of TMDLs, and addresses the pollutants of concern.

EXEMPTION: Not Defined as a Regulated Small MS4.	Federal Indian reservations where the population within the "urbanized area" portion of the reservation is less than 1,000 persons.

§ 122.32 As an owner or operator of a small municipal separate storm sewer system, am I regulated under the CWA section 402(p)(6) municipal storm water program?

(a) You are a regulated small municipal separate storm sewer system if you are the owner or operator of a small municipal separate storm sewer system, including but not limited to systems owned or operated by local governments, State departments of transportation, and State, Tribal, and Federal facilities; and you meet the following definition. Regulated small municipal separate storm sewer systems are defined as all small municipal separate storm sewer systems that are located in:

(1) An incorporated place, county (only the portion located in an urbanized area), or other place under the jurisdiction of a governmental entity, including but not limited to Tribal or Territorial governments, located in an urbanized area as determined by the latest Decennial Census by the Bureau of the Census, except for Federal Indian reservations where the population within the urbanized area of the reservation is under 1,000 persons;

(2) An incorporated place, county, or other place under the jurisdiction of a governmental entity other than those described in paragraph (a)(1) of this section that is designated by the NPDES permitting authority, including where the designation is

pursuant to §§ 123.35(b)(2) and (b)(4) of this chapter, or is based upon a petition under § 122.26(f).

(b) You may be the subject of a petition, by any person, to the NPDES permitting authority to require an NPDES permit for a discharge which is composed entirely of storm water which contributes to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States. Upon a final determination by the NPDES permitting authority, you would be required to comply with §§ 122.33 through 122.35.

(c) If you receive a waiver under § 122.33(b), you may subsequently be designated back into the municipal storm water program by the NPDES permitting authority if circumstances change. (See also § 123.35(b) of this chapter.)

§ 122.33 If I am an owner or operator of a regulated small municipal separate storm sewer system, must I apply for an NPDES permit? If so, by when do I have to seek coverage under an NPDES permit? If so, who is my NPDES permitting authority?

(a) If you are the owner or operator of a regulated small municipal separate storm sewer system under § 122.32, you must seek coverage under a general or individual NPDES permit, unless waived under paragraph (b) of this section, as follows:

(1) If you are seeking coverage under a general permit, you must submit a

Notice of Intent (NOI). The general permit will explain the steps necessary to attain coverage.

(2) If you are seeking coverage under an individual permit, you must submit an individual application to your NPDES permitting authority that includes the information required under § 122.21(f) and the following information:

(i) Estimate of square mileage served by your separate storm sewer system, and

(ii) Any additional information that your NPDES permitting authority requests.

(3) If there is an adjoining municipality or other governmental entity with an issued NPDES storm water permit that is willing to have you participate in its storm water program, you may jointly with that adjoining municipality or other governmental entity seek a permit modification to include your municipality or other governmental entity in the relevant portions of that NPDES permit. If you choose this option you will need to comply with the permit application requirements of § 122.26, in lieu of the requirements of § 122.34. You do not need to comply with the specific application requirements of §§ 122.26(d)(1)(iii), (iv) and (d)(2)(iii) (discharge characterization). You may satisfy the requirements in §§ 122.26 (d)(1)(v) and (d)(2)(iv) (identifying a management plan) by referring to the adjoining municipality's storm water management plan. (In referencing an adjoining municipality's storm water management plan, you should briefly describe how the existing plan will address discharges from your municipal separate storm sewer system or would need to be supplemented in order to adequately address your discharges, explain the role you will play in coordinating

storm water activities in your jurisdiction, and detail the resources available to you to accomplish the plan.)

(b) The NPDES permitting authority may waive the requirements otherwise applicable to you if you are an owner or operator of a regulated small municipal separate storm sewer system, as defined in § 122.32(a)(1), the jurisdiction served by your system includes a population of less than 1,000 persons, your system is not contributing substantially to the storm water pollutant loadings of a physically interconnected regulated municipal separate storm sewer system (see § 123.35(b)(4) of this chapter), and you have certified that storm water controls are not needed based on:

(1) Wasteload allocations that are part of "total maximum daily loads" (TMDLs) that address the pollutants of concern; or

(2) A comprehensive watershed plan, implemented for the waterbody, that includes the equivalents of TMDLs, and addresses the pollutants of concern.

(c) If you are an owner or operator of a regulated small municipal separate storm sewer system:

(1) Designated under § 122.32(a)(1), you must apply for coverage under an NPDES permit, or apply for a modification of an existing NPDES permit under paragraph (a)(3) of this section, by {insert date 3 years and 90 days from date of publication of final rule}.

(2) Designated under § 122.32(a)(2), you must apply for coverage under an NPDES permit, or apply for a modification of an existing NPDES permit under

paragraph (a)(3) of this section, within 60 days of notice, unless the NPDES permitting authority grants a later date.

(d) If you are located in an NPDES authorized State, Tribe, or Territory, then that State, Tribe, or Territory is your NPDES permitting authority. Otherwise, your NPDES permitting authority is the EPA Regional Office. (You should call your EPA Regional Office to find out who your NPDES permitting authority is.)

§ 122.34 As an owner or operator of a regulated small municipal separate storm sewer system, what will my NPDES municipal storm water permit require?

(a) Your NPDES municipal storm water permit will, at a minimum, require you to develop, implement, and enforce a storm water management program designed to reduce the discharge of pollutants from your municipal separate storm sewer system to the maximum extent practicable (MEP) and protect water quality. Your storm water management program must include the minimum control measures described in paragraph (b) of this section. For purposes of this section, narrative effluent limitations requiring implementation of best management practices (BMPs), are generally the most appropriate form of effluent limitations when designed to satisfy technology requirements, including reductions of pollutants to the maximum extent practicable, and water quality-based requirements of the Clean Water Act. Implementation of the best management practices consistent with the provisions of the

storm water management program required pursuant to this section and the provisions of the permit required pursuant to § 122.33 will constitute compliance with the standard of "reducing pollutants to the maximum extent practicable." Your NPDES permitting authority will specify a time period of up to 5 years from the date of permit issuance for you to develop and implement your program.

(b) Minimum Control Measures

(1) Public education and outreach on storm water impacts. You must implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on water bodies and the steps that can be taken to reduce storm water pollution. (You may use storm water educational materials provided by your State, Tribe, EPA, or, subject to the approval of the local government, environmental or other public interest or trade organizations. The materials or outreach programs should inform individuals and households about the steps they can take, such as ensuring proper septic system maintenance, limiting the use and runoff of garden chemicals, becoming involved in local stream restoration activities that are coordinated by youth service and conservation corps and other citizen groups, and participating in storm drain stenciling, to reduce storm water pollution. In addition, some of the materials or outreach programs should be directed toward targeted groups of commercial, industrial, and institutional entities likely to have significant storm water impacts. For example, information to restaurants on the impact of grease clogging storm drains and to garages on the impact of oil discharges.

You are encouraged to tailor your outreach program to address the viewpoints and concerns of all communities, particularly minority and disadvantaged communities, as well as children.)

(2) Public Involvement/Participation. You must comply with State, Tribal and local public notice requirements. (You should include the public in developing, implementing, and reviewing your storm water management program. The public participation process should make efforts to reach out and engage all economic and ethnic groups. You may consider impanelling a group of citizens to participate in your decision-making process, hold public hearings, or work with volunteers.)

(3) Illicit discharge detection and elimination. You must:

(i) Develop, if not already completed, a storm sewer system map, or equivalent, showing the location of major pipes, outfalls, and topography. In addition, if data already exist, show areas of concentrated activities likely to be a source of storm water pollution;

(ii) To the extent allowable under State or Tribal law, effectively prohibit, through ordinance, order, or similar means, illicit discharges into your storm sewer system and implement appropriate enforcement procedures and actions;

(iii) Implement a plan to detect and address illicit discharges, including illegal dumping, to your system; and

(iv) Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste. (Actions may include storm drain stenciling, a program to promote, publicize, and facilitate public reporting of

illicit connections or discharges, and distribution of outreach materials.)

(4) Construction site storm water runoff control. You must develop, implement, and enforce a program to reduce pollutants in storm water runoff to your municipal separate storm sewer system from construction activities that result in land disturbance of greater than or equal to one acre. You must use an ordinance or other regulatory mechanism that controls erosion and sediment to the maximum extent practicable and allowable under State or Tribal law. Your program must control other waste at the construction site that may adversely impact water quality, such as discarded building materials, concrete truck washout, and sanitary waste. Your program also must include, at a minimum, requirements for construction site owners or operators to implement appropriate BMPs, provisions for pre-construction review of site management plans, procedures for receipt and consideration of information submitted by the public, regular inspections during construction, and penalties to ensure compliance. (See § 122.44(s))

(5) Post-construction storm water management in new development and redevelopment. You must develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that result in land disturbance of greater than or equal to one acre and that discharge into your municipal separate storm sewer system. Your program must include a plan to implement site-appropriate and cost-effective structural and non-structural best management practices (BMPs) and ensure adequate long-term operation and maintenance of such BMPs. Your program must ensure that controls are in place that

would prevent or minimize water quality impacts. (If the involved parties consider water quality impacts from the beginning stages of projects, new development and potentially redevelopment allow opportunities for water quality sensitive projects. EPA recommends that municipalities establish requirements for the use of cost-effective BMPs that minimize water quality impacts and attempt to maintain pre-development runoff conditions. In other words, post-development conditions should not be different from pre-development conditions in a way that adversely affects water quality. The municipal program should include structural and/or non-structural BMPs. EPA encourages locally-based watershed planning and the use of preventative measures, including non-structural BMPs, which are generally lower in cost than structural BMPs, to minimize water quality impacts. Non-structural BMPs are preventative actions that involve management and source controls. Examples of non-structural BMPs include policies and ordinances that result in protection of natural resources and prevention of runoff. These include requirements to limit growth to identified areas, protect sensitive areas such as wetlands and riparian areas, minimize imperviousness, maintain open space, and minimize disturbance of soils and vegetation. Examples of structural BMPs include storage practices (wet ponds and extended-detention outlet structures), filtration practices (grassed swales, sand filters and filter strips), and infiltration practices (infiltration basins, infiltration trenches, and porous pavement). Storm water technologies are constantly being improved, and EPA recommends that municipal requirements be responsive to these changes.)

(6) Pollution prevention/good housekeeping for municipal operations. You must develop and implement a cost-effective operation and maintenance program with the ultimate goal of preventing or reducing pollutant runoff from municipal operations. Using training materials that are available from EPA, your State, or Tribe, or from other organizations whose materials are approved by the local government, your program must include local government employee training to prevent and reduce storm water pollution from government operations, such as park and open space maintenance, fleet maintenance, planning, building oversight, and storm water system maintenance. (EPA recommends that, at a minimum, you consider the following in developing your program: maintenance activities, maintenance schedules, and long-term inspection procedures for structural and other storm water controls to reduce floatables and other pollutants discharged from your separate storm sewers; controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, and waste transfer stations; procedures for properly disposing of waste removed from the separate storm sewer systems and areas listed above (such as dredge spoil, accumulated sediments, floatables, and other debris); and ways to ensure that new flood management projects assess the impacts on water quality and examine existing projects for incorporating additional water quality protection devices or practices. In general, the requirement to develop and implement an operation and maintenance program, including local government employee training, is meant to ensure that municipal activities are performed in the most appropriate way to

minimize contamination of storm water discharges, rather than requiring the municipality to undertake new activities.)

(c) The NPDES permitting authority may include permit provisions in your NPDES permit that incorporate by reference qualifying local, State or Tribal municipal storm water management program requirements that address one or more of the minimum controls of § 122.34(b). Qualifying local, State or Tribal program requirements must impose, at a minimum, the relevant requirements of paragraph (b) of this section.

(d) You must identify and submit to your NPDES permitting authority either in your notice of intent or in your permit application (see § 122.33) the following information: best management practices (BMPs) to be implemented and the measurable goals for each of the storm water minimum control measures at paragraphs (b)(1) through (b)(6) of this section, the month and year in which you will start and aim to complete each of the measures or indicate the frequency of the action, and the person or persons responsible for implementing or coordinating your storm water management program. Measurable goals to satisfy minimum control measures in paragraphs (b)(3) through (b)(6) of this section identified in a notice of intent will not constitute a condition of the permit, unless EPA or your State or Tribe has provided or issued a menu of regionally appropriate and field-tested BMPs that EPA or your State or Tribe believes to be cost-effective. (EPA will provide guidance on developing BMPs and measurable goals and modify, update, and supplement such guidance based on the

assessments of the NPDES municipal storm water program and research conducted over the next thirteen years.)

(e) You must comply with other applicable NPDES permit requirements, standards and conditions established in the individual or general permit, developed consistent with the provisions of §§ 122.41 through 122.49, as appropriate.

(f) Evaluation and assessment.

(1) Evaluation. You must evaluate program compliance, the appropriateness of your identified best management practices, and progress towards achieving your identified measurable goals. (The NPDES permitting authority may determine monitoring requirements for you in accordance with State/Tribal monitoring plans appropriate to your watershed. Participation in a group monitoring program is encouraged.)

(2) Record keeping. You must keep records required by the NPDES permit for at least 3 years. You must submit your records to the NPDES permitting authority only when specifically asked to do so. You must make your records, including your storm water management program, available to the public at reasonable times during regular business hours (see § 122.7 for confidentiality provision). (You may assess a reasonable charge for copying. You may require a member of the public to provide advance notice, not to exceed two working days.)

(3) Reporting. You must submit annual reports to the NPDES permitting authority for your first permit term. For subsequent permit terms, you must submit

reports in year two and four unless the NPDES permitting authority requires more frequent reports. Your report must include:

(i) The status of compliance with permit conditions, an assessment of the appropriateness of your identified best management practices and progress towards achieving your identified measurable goals for each of the minimum control measures;

(ii) Results of information collected and analyzed, including monitoring data, if any, during the reporting period;

(iii) A summary of the storm water activities you plan to undertake during the next reporting cycle; and

(iv) A change in any identified measurable goals that apply to the program elements.

§ 122.35 As an owner or operator of a regulated small municipal separate storm sewer system, what if another governmental or other entity is already implementing a minimum control measure in my jurisdiction?

(a) You may rely on another entity to satisfy your NPDES permit obligations to implement a minimum control measure if: the other entity is implementing the control measure; the particular control measure, or component thereof, is at least as stringent as the corresponding NPDES permit requirement; and you have requested, and the other entity has agreed to accept responsibility for implementation of the control

measure on your behalf to satisfy your permit obligation. You must note in your § 122.34(f)(3) reports when you are relying on another entity to satisfy your permit obligations. You remain responsible for compliance with your permit obligations if the other entity fails to implement the control measure (or component thereof). Therefore, EPA encourages you to enter into a legally binding agreement with that entity if you want to minimize any uncertainty about compliance with your permit.

(b) Where appropriate, the NPDES permitting authority may recognize existing responsibilities among governmental entities for the minimum control measures in your NPDES permit. (For example, a State or Tribe may be responsible for addressing construction site runoff and municipalities may be responsible for the remaining minimum control measures. You are not required to provide notice to the other governmental entity when your NPDES permit recognizes the entity and its existing responsibilities.) Where the permitting authority recognizes an existing responsibility for one or more of the minimum control measures in your permit, your responsibility to include such minimum control measure, or measures, in your storm water management program is waived so long as the other governmental entity implements the measure consistent with the requirements of § 122.34(b).

§ 122.36 As an owner or operator of a regulated small municipal separate storm sewer system, what happens if I don't comply with the application or permit requirements in §§ 122.33 through 122.35?

NPDES permits are federally enforceable. Violators may be subject to the enforcement actions and penalties described in Clean Water Act sections 309(b), (c), and (g) and 505, or under applicable State or local law. Compliance with a permit issued pursuant to section 402 of the Clean Water Act would be deemed compliance, for purposes of sections 309 and 505, with sections 301, 302, 306, 307, and 403, except any standard imposed under section 307 for toxic pollutants injurious to human health.

§ 122.37 Will the municipal storm water program regulations at §§ 122.32 through 122.36 and § 123.35 of this chapter change in the future?

EPA will evaluate the municipal storm water regulations at §§ 122.32 through 122.36 and § 123.35 of this chapter after {insert date 13 years from date of publication of final rule in the FEDERAL REGISTER} and make any necessary revisions. (EPA will conduct an enhanced research effort and compile a comprehensive evaluation of the NPDES municipal storm water program. EPA strongly recommends that no additional requirements beyond the minimum control measures be imposed on regulated small municipal separate storm sewer systems without the agreement of the owner or operator of the affected municipal separate storm sewer system, except where adequate information exists in approved TMDLs or equivalents of TMDLs to develop more specific measures to protect water quality, or until EPA's comprehensive evaluation is

completed. EPA will evaluate the regulations based on data from the NPDES municipal storm water program, from research on receiving water impacts from storm water, and the effectiveness of best management practices (BMPs).)

5. Add § 122.44(s) to read as follows:

§ 122.44 Establishing limitations, standards, and other permit conditions (applicable to State NPDES programs, see § 123.25)

* * * * *

(s)(1) For storm water discharges from construction sites identified in § 122.26(b)(15)(i), the Director may include permit provisions that incorporate by reference qualifying State, Tribal, or local sediment and erosion control program requirements. A qualifying State, Tribal, or local sediment and erosion control program is one that meets the requirements of a municipal NPDES separate storm sewer permit or a program otherwise approved by the Director. For the Director to approve such programs, the program must meet the minimum program requirements established under § 122.34(b)(4).

(2) For storm water discharges identified in § 122.26(b)(14)(x), the Director may include by reference State, Tribal or local requirements that meet the standard of "best available technology" (BAT) as defined, for example, in the storm water general

permit.

PART 123 -- STATE PROGRAM REQUIREMENTS

1. The authority citation for part 123 continues to read as follows:

Authority: The Clean Water Act, 33 U.S.C. 1251 et seq.

2. Section 123.25 is amended by adding paragraphs (a)(39) through (a)(46) to read as follows:

§ 123.25 Requirements for permitting.

(a) * * *

(39) Section 122.30 (What is the purpose of the CWA section 402(p)(6) storm water regulations?);

(40) Section 122.31 (For Indian Tribes only) (As a Tribe, what is my role under the CWA section 402(p)(6) storm water program?)

(41) Section 122.32 (As an owner or operator of a small municipal separate storm sewer system, am I regulated under the CWA section 402(p)(6) municipal storm water program?);

(42) Section 122.33 (If I am an owner or operator of a regulated small municipal separate storm sewer system, must I apply for an NPDES permit? If so, by when do I have to seek coverage under an NPDES permit? If so, who is my NPDES permitting authority?);

(43) Section 122.34 (As an owner or operator of a regulated small municipal separate storm sewer system, what will my NPDES municipal storm water permit require?);

(44) Section 122.35 (As an owner or operator of a regulated small municipal separate storm sewer system, what if another governmental or other entity is already implementing a minimum control measure in my jurisdiction?);

(45) Section 122.36 (As an owner or operator of a regulated small municipal separate storm sewer system, what happens if I don't comply with the application or permit requirements in §§ 122.33 through 122.35?);

(46) Section 122.37 (Will the municipal storm water program regulations at §§ 122.32 through 122.36 and § 123.35 of this chapter change in the future?);

* * * * *

3. Add § 123.35 to read as follows:

NPDES Permitting Authority Role for the CWA section 402(p)(6) Municipal Program

§ 123.35 As the NPDES Permitting Authority for regulated small municipal separate storm sewer systems, what is my role?

(a) You must comply with the requirements for all NPDES permitting authorities under parts 122, 123, 124, and 125 of this chapter. (This section is meant only to supplement those requirements and discuss specific issues related to the small municipal storm water program.)

(b) You must develop a process, as well as criteria, to designate incorporated places, counties, or other places under the jurisdiction of a governmental entity, other than those described in § 122.32(a)(1) of this chapter, as regulated small municipal separate storm sewer systems to be covered under the CWA section 402(p)(6) program. This process must include the authority to designate a small municipal separate storm sewer system waived under paragraph (d) of this section if circumstances change. EPA may make designations under this section if a State or Tribe fails to comply with the requirements listed below. In making your designations, you must:

(1) Develop criteria to evaluate whether a storm water discharge results in or has the potential to result in exceedances of water quality standards, including impairment of designated uses, or other significant water quality impacts, including habitat and biological impacts. (EPA recommends as guidance for determining other significant water quality impacts a balanced consideration of the following designation criteria on a watershed or other local basis: discharge to sensitive waters, high growth or growth potential, high

population density, contiguity to an urbanized area, significant contributor of pollutants to waters of the United States, and ineffective control of water quality concerns by other programs.);

(2) Apply such criteria, at a minimum, to any incorporated place, county, or other place under the jurisdiction of a governmental entity located outside of an urbanized area that has a population density of at least 1;000 people per square mile and a population of at least 10,000;

(3) Designate any incorporated place, county or other place under the jurisdiction of a governmental entity that meets the selected criteria by {insert date three years and 90 days from date of publication of final rule in the FEDERAL REGISTER}. You may have until {insert date five years from date of publication of final rule in the FEDERAL REGISTER} to apply the designation criteria on a watershed basis where there is a comprehensive watershed plan. You may apply these criteria to make additional designations at any time, as appropriate; and

(4) Designate any incorporated place, county, or other place under the jurisdiction of a governmental entity that contributes substantially to the storm water pollutant loadings of a physically interconnected municipal separate storm sewer system that is regulated by the NPDES storm water program.

(c) You must make a final determination within 180 days from receiving a petition under § 122.32(b) of this chapter (or analogous State or Tribal law). If a State or Tribe fails to do so, EPA may make a determination on the petition.

(d) You must issue permits consistent with §§ 122.32 through 122.35 of this chapter to all regulated small municipal separate storm sewer systems. You may waive the requirements otherwise applicable to regulated small municipal separate storm sewer systems, as defined in § 122.32(a)(1) of this chapter, if the jurisdiction of the regulated small municipal separate storm sewer system includes a population of less than 1,000 persons, its discharges are not contributing substantially to the storm water pollutant loadings of a physically interconnected regulated municipal separate storm sewer system (see paragraph (b)(4) of this section), and the owner or operator of the regulated small municipal separate storm sewer system has certified that storm water controls are not needed based on:

(1) Wasteload allocations that are part of "total maximum daily loads" (TMDLs) that address the pollutants of concern; or

(2) A comprehensive watershed plan, implemented for the waterbody, that includes the equivalents of TMDLs, and addresses the pollutants of concern.

(e) You must specify a time period of up to 5 years from the date of permit issuance for owners or operators of small municipal separate storm sewer systems to fully develop and implement their storm water program.

(f) You must include the requirements in § 122.34 of this chapter including as modified in accordance with §§ 122.33(a)(3), 122.34(c), or 122.35(b) of this chapter, in any permit issued for regulated small municipal separate storm sewer systems. (You may

include permit provisions in a regulated small municipal separate storm sewer system NPDES permit that incorporates by reference qualifying local, State or Tribal municipal storm water management program requirements that address one or more of the minimum controls of § 122.34(b) of this chapter (see § 122.34(c) of this chapter). Qualifying local, State or Tribal program requirements must impose, at a minimum, the relevant requirements of § 122.34(b) of this chapter.)

(g) If you plan to issue a general permit to authorize storm water discharges from small municipal separate storm sewer systems, you must provide or issue by {insert 2 years from date of publication of final rule in the FEDERAL REGISTER} a menu of regionally appropriate and field-tested BMPs that you believe to be cost-effective from which regulated small municipal separate storm sewer systems can select. Failure to issue the menu of BMPs would not affect the legal status of the general permit. If a State or Tribe fails to provide or issue the menu, EPA may do so.

(h) You must incorporate additional measures necessary to ensure effective implementation of your State storm water program for regulated small municipal separate storm sewer systems. (EPA recommends consideration of the following:

(1) You are encouraged to use a general permit for regulated small municipal separate storm sewer systems;

(2) To the extent that there is a dedicated funding source, you should play an active role in providing financial assistance to owners and operators of regulated small municipal separate storm sewer systems;

(3) You should support local programs by providing technical and programmatic assistance, conducting research projects, performing watershed monitoring, and providing adequate legal authority at the local level;

(4) You are encouraged to coordinate and utilize the data collected under several programs including water quality management programs, TMDL programs, and water quality monitoring programs;

(5) Where appropriate, you may recognize existing responsibilities among governmental entities for the control measures in an NPDES small municipal storm water permit (see § 122.35(b) of this chapter); and

(6) You are encouraged to use a brief (e.g., two page) reporting format to facilitate compiling and analyzing data from submitted reports under § 122.34(f)(3) of this chapter. EPA will develop a model form for this purpose.)

APPENDIX B

SUMMARY OF STORM WATER MANAGEMENT SURVEY RESULTS

Storm Water Management Activity Survey

Name of City/Organization _____
Name of Respondent_____

The Physical System

1. Please describe the geographical limits of your storm water-related jurisdiction, if different than municipal boundaries:_____
_____
_____

2. Does your community currently have erosion or sediment problems, such as in yards, along creeks or on construction sites?

Yes **No**

If so, please characterize the problem using the scale provided: **Minor** 1 2 3 4 5 **Major**

3. Does your community have storm water drainage problems, such as in streets, in yards or on construction sites?

Yes **No**

If so, please characterize the problem using the scale provided: **Minor** 1 2 3 4 5 **Major**

4. Does your community have storm water flooding problems, such as in streets, in homes/businesses or along creeks?

Yes **No**

If so, please characterize the problem using the scale provided: **Minor** 1 2 3 4 5 **Major**

5. Indicate your community's experience with property damage and/or personal hazard due to local flooding in terms of,

The number of episodes per year: _____ The number of properties affected per year: _____

Identify specific problems:_____
_____
_____
_____

6. Does your community have any toxic or hazardous material storage areas, on either public or private property which may pose a problem during flooding?

Yes **No**

7. Please circle each one of the following storm water infrastructure components your community is responsible for managing or maintaining:

Storm Sewers *Detention Ponds* *Ditches* *Creeks* *Catch Basins* *Dams*

Existing Storm Water Program Information

8. Does your community have someone with primary and/or secondary responsibility for storm water management?

Yes **No**

Primary:_____Phone:_____

Secondary:_____Phone:_____

9. Does your community maintain any of the following types of records related to the storm water system or program?

Yes **No**

If so, please circle:

Drawings (Plans) *Complaint Records* *O&M Records/Costs*

Attribute Info. (locations, elevations, etc.) *Easement Records* *Maps*

10. Does your community have a constituency supporting storm water management (i.e., local civic or business groups)?

Yes **No**

11. Does your community have any current plans to change, add to or in any way impact the existing storm water programs or activities?

Yes **No**

If so, please describe:

_____
_____
_____
_____
_____
_____
_____

12. Does your community have any storm water design standards, policies or guidance currently in use?

Yes **No**

13. Does your community have any existing planning studies which address storm water management?

Yes **No**

14. Does your community participate in the Federal Emergency Management Agency (FEMA) National Flood Insurance Program?

Yes **No**

Regulation and Enforcement

15. Does your community currently have a defined process, including forms, checklists, etc. for approval and control of private storm water projects?

Yes No

16. Does your community have a regulatory process for the control of grading and drainage?

Yes No

17. Does your community currently have periodic inspections to determine permit/ordinance compliance conditions?

Yes No

18. Who (individuals and titles) establishes and enforces storm water related regulations in your community?

Name:_____ Title:_____

Name:_____ Title:_____

Name:_____ Title:_____

Financial Management

19. How are your storm water related programs funded (please circle those which apply)?

General Fund Revenues *Property Assessments* *Special Fees/Charges*

If your program is funded by other means, please describe:

_____
_____
_____
_____
_____
_____

20. What is your estimate for the total annual budget of all aspects of the storm water program for your community?

$_____

21. Does your community have outstanding indebtedness related to storm water management projects or programs?

Yes No

Operations and Maintenance

22. Does your community have a current storm water infrastructure maintenance program?

Yes **No**

If so, indicate: The number of crews _____ The man hours per year for O&M _____

23. Is your community's maintenance program (please circle one):

Regularly Scheduled *Primarily Complaint-Driven*

24. If your community has retention or detention facilities, who maintains those structures?

Name:_____ Title:_____

Storm Water Quality Management Programs (Pollution Control)

25. Does your community currently have a street sweeping program?

Yes **No**

If so, how many times per month are the streets swept: _____

26. Does your community have a catch basin cleaning program?

Yes **No**

27. Does your community use road salt?

Yes **No**

If so, what is the estimated average tons per year: _____

28. Does your community have a wetlands protection ordinance?

Yes **No**

General

29. I feel the storm water drainage infrastructure in this community is adequate.

Strongly Agree **Strongly Disagree**
1 2 3 4 5

30. I feel the storm water management program in this community is adequate.

Strongly Agree **Strongly Disagree**
1 2 3 4 5

31. Would you support a regional storm water agency in Northern Kentucky?

Yes **No**

32. In your opinion, is there an existing organization suited for managing storm water in Northern Kentucky?

Yes **No**

If so, name the organization _____

If not, what is your recommendation for managing storm water in Northern Kentucky?

_____

_____

_____

_____

_____

_____

Summary of Storm Water Survey Results

Municipality or Agency	Survey Questions									
	2 Erosion: Y/N	2 Erosion: 1-5	3 Drainage: Y/N	3 Drainage: 1-5	4 Flooding: Y/N	4 Flooding: 1-5	5 Episodes	5 Properties	6 Toxic	7 Components
Cinci./No. KY Airport	Yes	2	No	N/A	No	N/A	N/A	N/A	No	SS, De, Di, C, CB & D
Alexandria	Yes	3	Yes	3	Yes	2	15	15	No	SS, CB, D
Bellevue	Yes	4	Yes	5	Yes	5	1-4	15	No	SS, Di, C & CB
Boone County	Yes	3	Yes	3	Yes	3	2	30	No	SS, De, Di, C, CB & D
Bromley										
California	Yes	5	Yes	5	Yes	5	N/A	N/A	No	Di
Campbell County	Yes	4	Yes	4	Yes	4	1	N/A	No	N/A
Cold Spring	Yes	2	Yes	2	Yes	4	3	50	No	S, De, Di, C & CB
Covington	Yes	5	Yes	5	Yes	5	2	100's	Yes	S, De, Di, CB & D
Crescent Springs	Yes	4	Yes	3	No	N/A	1-2	1-2	No	S, Di & CB
Crescent Park										
Crestview	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crestview Hills	Yes	2	Yes	2	Yes	1	2	6	No	S, Di, C & CB
Dayton	Yes	2	Yes	3	Yes	2	8	12	No	Di & CB
Edgewood	Yes	2	Yes	2	Yes	2	1-2	3-4	No	S & CB
Elsmere	Yes	1	Yes	1	Yes	1	0	0	No	S, Di, C & CB
Erlanger	Yes	2	Yes	3	Yes	1	2-3	20-25	No	S, De & CB
Fairview										
Florence	Yes	2	Yes	3	Yes	2	4	25	No	De, Di, C & CB
Ft. Mitchell										
Ft. Thomas	Yes	2	Yes	1	Yes	2	20	40	No	S, De, Di, CB & D
Ft. Wright	Yes	4	Yes	5	Yes	5	1-3	25-35	No	S, Di, C & CB
Highland Heights	Yes	1	Yes	1	Yes	1	1-2	6-8	No	S, Di & CB
Independence										
Kenton County	Yes	5	Yes	5	Yes	5	6-10	3,500	Yes	S, De, Di, C, CD & D
Kenton Vale										
Lakeside Park	No	N/A	Yes	2	Yes	2	2	10*	No	S, Di, C, CB & D*
Latonia Lakes										
Ludlow										
Melbourne										
Mentor										
Newport	Yes	4	Yes*	2	Yes*	2	N/A*	N/A*	No	S, De, Di, C & CB
No. KY Area Planning Comm	Yes	4	Yes	4	Yes	3	N/A	N/A	N/A	S, De & CB
Park Hills	Yes	2	Yes	3*	Yes	3*	8-12	N/A	No	S, Di & CB
Ryland Heights										
Silver Grove	No	N/A	Yes	3	No*	N/A	N/A	N/A	No	S & CB
Southgate	Yes	1	Yes	1	Yes	1	1-2	1	No	S, De, Di, C, CB & D
Taylor Mill	Yes	4	Yes	4	Yes	5	N/A	N/A	No	Di & CB
Union	Yes	5	Yes	5	Yes	5	2	30-50	No*	S, Di & CB
Villa Hills	Yes	4	Yes	5	Yes	4	4-5	8-10	No	S, Di & CB
Visalia										
Walton	Yes	1	Yes	1	Yes	1	1	4	No	S, Di & CB
Wilder	Yes	5	Yes	4	Yes	4	5	40	No	S, Di, C & CB
Woodlawn	Yes	1	Yes	3	Yes	3	6	10	No	S & CB

Notes:
N/A = No Answer or Not Applicable
* = Additional comments were written on the survey form concerning this question
Shading indicates that a complete survey was not submitted
The responses from Crestview Hills and Lakeside Park were included in the graphics, but not in the report text

Abbreviations for Question 7:
SS = Storm Sewers
De = Detention Basins
Di = Ditches
C = Creeks
CB = Catch Basins
D = Dams

Summary of Storm Water Survey Results

Municipality or Agency	Survey Questions									
	8 Responsible	9 Records: Y/N	9 Type of Records	10 Support	11 Future Plan	12 Standards	13 Studies	14 FEMA	15 Process	16 Regulations
Cinci./No. KY Airport	Yes	Yes	D & M	N/A	Yes	No*	No*	No	N/A	N/A
Alexandria	No*	No	E*	No*	No	Yes*	No	No	Yes	Yes
Bellevue	Yes	Yes	M	No	Yes	Yes	Yes	Yes	Yes	Yes
Boone County	Yes	Yes	D, CR, OM, E & M	No	Yes	Yes	Yes	Yes	Yes	Yes
Bromley										
California	No	No	N/A	No	Yes	No	Yes	Yes	No	No
Campbell County	No	Yes	D & CR	No	Yes	Yes	No	Yes	No	Yes
Cold Spring	No	No	N/A	No	No	No	No	No	No	No
Covington	Yes	Yes	D, CR, OM, A, E & M	N/A	No	Yes	Yes	Yes	Yes	Yes
Crescent Springs	No	Yes	CR	No	Yes	Yes	No	No	Yes	Yes
Crescent Park										
Crestview	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crestview Hills	Yes	Yes	CR, A & M	No	No	Yes	No	No	Yes	Yes
Dayton	Yes	Yes	CR, E & M	No	Yes	Yes	Yes	Yes	Yes	N/A
Edgewood	No	No	N/A	No	No	Yes	No	No	Yes*	Yes
Elsmere	Yes	Yes	D, CR & OM	No	No	Yes	No	No	Yes	Yes
Erlanger	Yes	Yes	D, CR, E & M	No	No	Yes*	No	Yes	No	Yes
Fairview										
Florence	Yes	Yes	D, CR, OM, A, E & M	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ft. Mitchell										
Ft. Thomas	Yes	Yes	D & M	No	No	Yes	No	Yes	No	No
Ft. Wright	Yes	Yes	CR & E	No	Yes	Yes	Yes	Yes	No	Yes
Highland Heights	No	Yes	M	No	No	Yes	Yes	No	No	Yes
Independence										
Kenton County	Yes	Yes	D, CR, OM, A & M	Yes	Yes	Yes	Yes*	Yes	Yes	Yes
Kenton Vale										
Lakeside Park	Yes	Yes	D, CR, E & M	No	No	Yes*	No	No	Yes*	Yes*
Latonia Lakes										
Ludlow										
Melbourne										
Mentor										
Newport	Yes	Yes	D, CR, OM, A, E & M	No	No	Yes	No	Yes	No*	No*
No. KY Area Planning Comm	Yes	Yes	D, CR, E & M	Yes	Yes	Yes	Yes	Yes	No	Yes
Park Hills	Yes	Yes*	D, CR, E & M	Yes*	Yes	No*	Yes*	No	Yes	Yes
Ryland Heights										
Silver Grove	Yes	Yes	E & M	No	Yes	No	No	Yes	No	Yes
Southgate	Yes	No	N/A	No	Yes	N/A*	No	No	No	Yes
Taylor Mill	No	No	N/A	No	Yes	No	No	Yes	No	Yes*
Union	No	Yes	D, OM & E	No	Yes	Yes*	No	Yes	No	No*
Villa Hills	Yes	Yes	CR & E	Yes	Yes	No	Yes	No	No*	No*
Visalia										
Walton	Yes	N/A*	N/A	No	Yes	Yes*	No	Yes*	No	Yes*
Wilder	No	Yes	D, CR, A, E & M	Yes	No	Yes	No	Yes	No	Yes
Woodlawn	No	Yes	CR	No	No	No	No	No	No	Yes

Abbreviations for Question 9:
D = Drawings
CR = Complaint Records
OM = Operation and Maintenance
A = Attribute Information
E = Easements
M = Maps

Summary of Storm Water Survey Results

Municipality or Agency	Survey Questions										
	17 Inspection	18 Enforce Regs.	19 Funds	20 Budget	21 Debt	22 Maintenance	23 Reg or Comp	24 Detention	25 Street Sweep	26 CB Cleaning	27 Road Salt
Cinci./No. KY Airport	N/A	N/A	GF*	N/A*	No	No*	N/A	Yes	Yes	Yes	Yes*
Alexandria	No	Yes	GF	$30,000	No	No	Complaint	None	No	No	Yes
Bellevue	Yes	No	N/A	N/A	Yes	No	Complaint	None	Yes	No	Yes
Boone County	No	Yes	GF	$200,000	Yes	No	Complaint	Yes	No	No	Yes
Bromley											
California	No	No	GF	N/A	No	No	N/A	None	No	N/A	No
Campbell County	Yes	Yes	N/A	N/A	No	No	Complaint	None	No	No	Yes
Cold Spring	Yes	No	N/A	N/A	No	No	N/A		No	No	Yes
Covington	Yes	Yes	GF & SF	N/A	No	Yes	Complaint	Yes	Yes	Yes	Yes
Crescent Springs	Yes	Yes	GF, PA & SF	N/A	No	Yes	Regular	None	Yes	Yes	Yes
Crescent Park											
Crestview	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A
Crestview Hills	Yes	Yes	GF	$2,000-$6,000	No	Yes	Both	None	No	Yes	Yes
Dayton	No	Yes	GF	$30,000	No	No	Complaint	None	Yes	No	Yes
Edgewood	Yes	Yes	GF	$10,000	No	Yes	Regular	Yes	Yes	Yes	Yes
Elsmere	Yes	Yes	GF	$180,000	No	Yes	Complaint	None	Yes	Yes	Yes
Erlanger	Yes	Yes	GF	$108,000	No	Yes	Complaint	Yes	Yes	Yes	Yes
Fairview											
Florence	Yes	Yes	GF & SF	$100,000	No	Yes	Regular	Yes	Yes	Yes	Yes
Ft. Mitchell											
Ft. Thomas	No	Yes	GF	$10,000*	No	Yes	Complaint	Yes	Yes	Yes	Yes
Ft. Wright	No	Yes	GF	Varies	No	Yes	Regular	None	No	Yes	Yes
Highland Heights	Yes	Yes	GF	$5,000	No	Yes	Regular	None	Yes	Yes	Yes
Independence											
Kenton County	Yes	Yes	GF	Unknown	No	No	Complaint	Yes	No	No	Yes
Kenton Vale											
Lakeside Park	No	Yes	GF	$25,000-$30,000	No	No	Complaint	None	Yes	No	Yes
Latonia Lakes											
Ludlow											
Melbourne											
Mentor											
Newport	Yes	Yes	GF	Varies	No	No*	Complaint		Yes	No	Yes
No. KY Area Planning Comm	Yes	Yes	N/A	N/A	No	No*	N/A		No*	No*	No*
Park Hills	Yes	Yes	GF & SF	$50,000	No	Yes	Both	None	Yes	Yes	Yes
Ryland Heights											
Silver Grove	Yes	Yes	GF	N/A	No	No	Regular	None	Yes	Yes	Yes
Southgate	No	Yes	GF & SF	$25,000	No	Yes	Complaint	Yes	Yes	Yes	Yes
Taylor Mill	No*	Yes	GF	$0-$1,000	No	No	Complaint	None	Yes*	No	Yes
Union	No	No	GF	$30,000-$50,000	No	No	Complaint	Private	No	No	Yes
Villa Hills	No	No	SF	$25,000	No	Yes	Complaint	None	No	Yes	Yes
Visalia											
Walton	Yes*	Yes	GF	$25,000-$50,000	No	No	Complaint	None	Yes	Yes	Yes
Wilder	Yes	Yes	GF	$2,000-$5,000	No	Yes	Regular	No	No	Yes	Yes
Woodlawn	No	No	GF	$2,000	No	No	Complaint	None	No	No	Yes

Abbreviations for Question 19:
GF = General Funds
SF = Special Fees

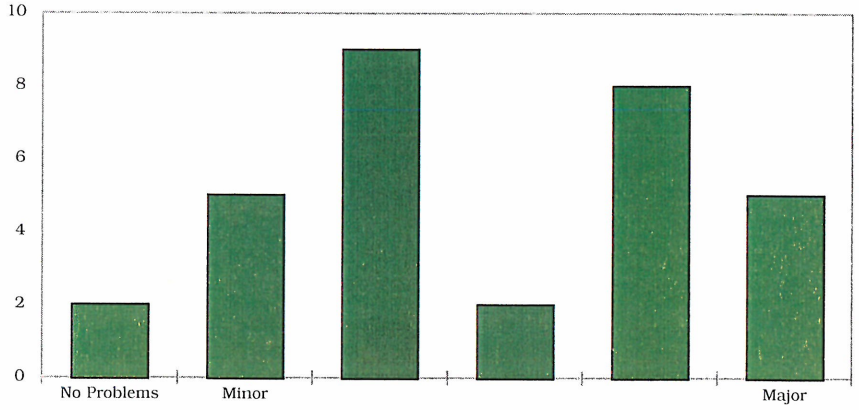
Summary of Storm Water Survey Results

Municipality or Agency	Survey Questions					
	28 Wetlands	29 Infrastructure	30 Management	31 Support	32 Agency: Y/N	32 Agency: Name
Cinci./No. KY Airport	No*	1	2	Yes*	N/A	N/A
Alexandria	No	3	3	No*	N/A*	N/A
Bellevue	No	5	4	Yes	Yes	SD No. 1
Boone County	No	3	3	Yes*	Yes	SD No. 1
Bromley						
California	No	5	5	Yes	N/A	N/A
Campbell County	No	4	4	Yes	No*	N/A
Cold Spring	No	2	2	Yes	No	N/A
Covington	No	5	4	Yes	N/A	N/A
Crescent Springs	No	3	2	Yes	No	N/A
Crescent Park						
Crestview	N/A	N/A	N/A	N/A	N/A	N/A
Crestview Hills	No	2	2	Yes	Yes	SD No. 1
Dayton	No	2	2	Yes	Yes	NKAPC
Edgewood	No	3	2	Yes	Yes	SD No. 1
Elsmere	No	1	1	No	Yes	Cities
Erlanger	No	2	2	Yes	Yes & No	SD No.1
Fairview						
Florence	No	2	1	No	No	N/A
Ft. Mitchell						
Ft. Thomas	No	3	3	Yes	Yes	SD No. 1
Ft. Wright	No	4	5	Yes	Yes	SD No. 1
Highland Heights	No	2	2	N/A	Yes	SD No. 1
Independence						
Kenton County	No	1	1	Yes	Yes	SD No. 1
Kenton Vale						
Lakeside Park	No	3	3	N/A	No	N/A
Latonia Lakes						
Ludlow						
Melbourne						
Mentor						
Newport	No	4	4	Yes	Yes	SD No. 1
No. KY Area Planning Comm	No	5	5	Yes	Yes	SD No. 1*
Park Hills	No	5	3	Yes*	No*	SD No. 1
Ryland Heights						
Silver Grove	No	3	3	No	No	N/A
Southgate	No	3	5	Yes	Yes	SD No. 1
Taylor Mill	No	5	5	Yes	Yes	SD No. 1
Union	No	5	5	Yes	No	New Agency
Villa Hills	No	5	3	Yes	Yes*	SD No. 1
Visalia						
Walton	No	2	2	N/A	N/A	N/A
Wilder	No	2	4	Yes	Yes	SD No. 1
Woodlawn	No	4	5	Yes	Yes	SD No. 1

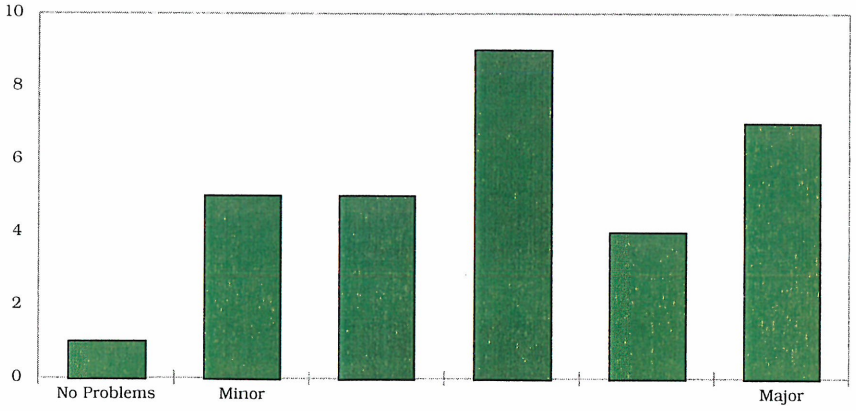
Geographic Limits of Storm Water Jurisdiction
Question 1

No Data

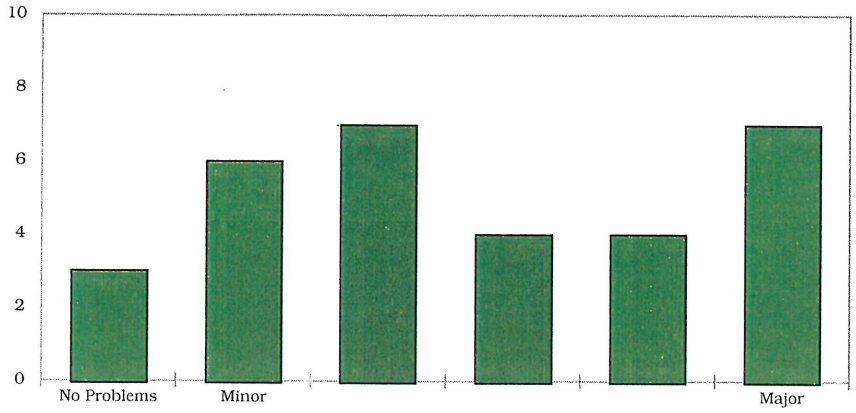
Problems with Erosion or Sediment
Question 2



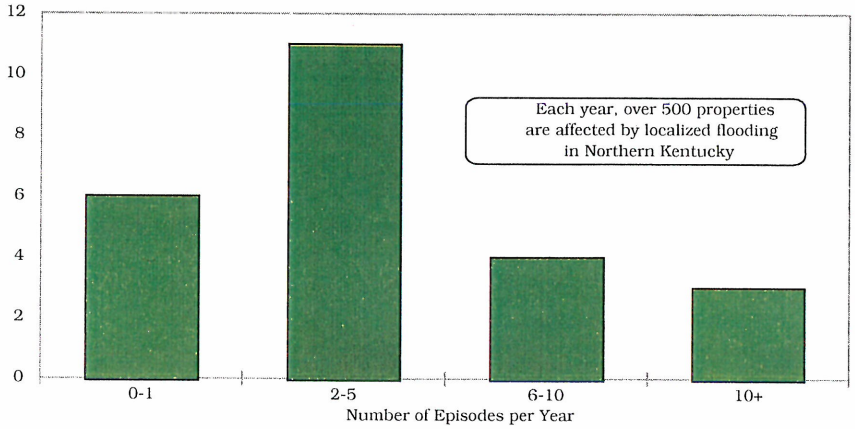
Problems with Storm Water Drainage
Question 3



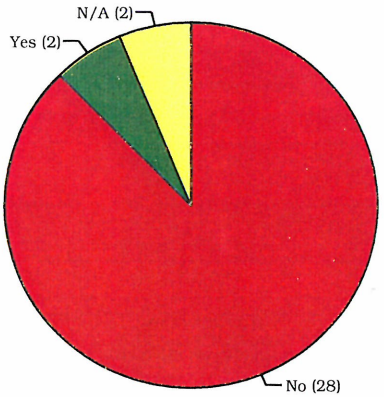
Problems with Storm Water Flooding
Question 4



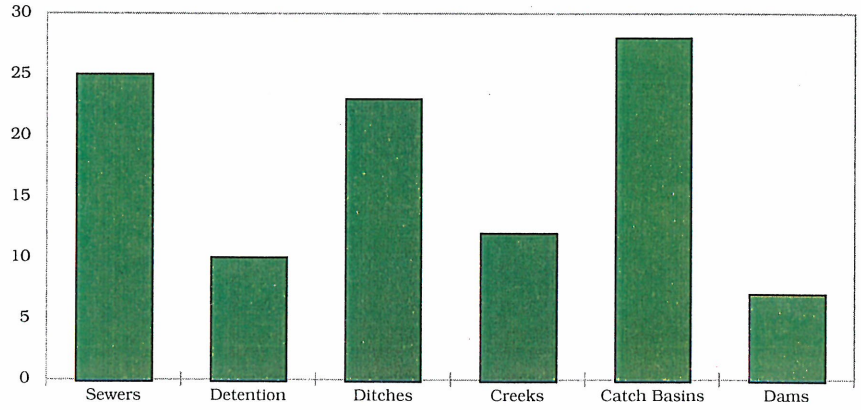
Property Damage & Hazard from Flooding
Question 5



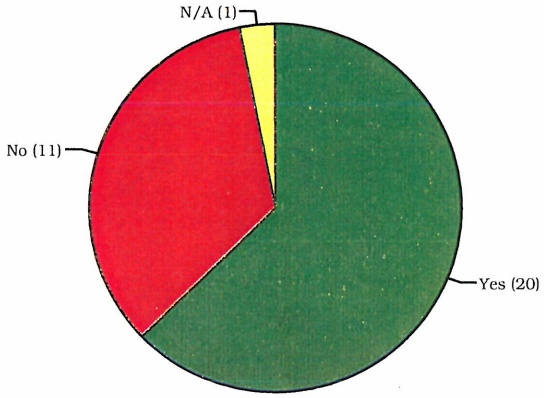
Toxic Material in Flood Prone Areas
Question 6



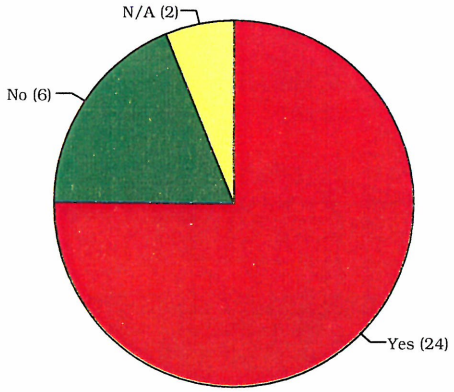
Infastructure Managed or Maintained
Question 7



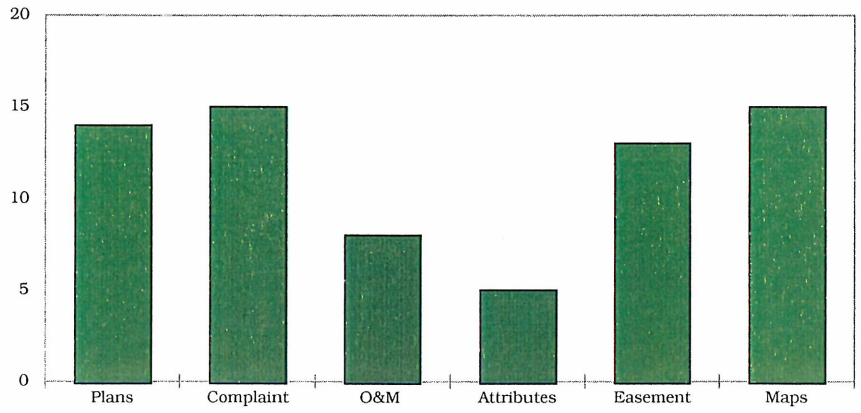
Someone with Responsibility for SW
Question 8



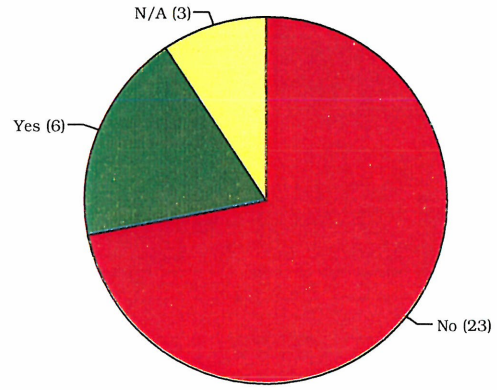
Maintain Storm Water Records
Question 9



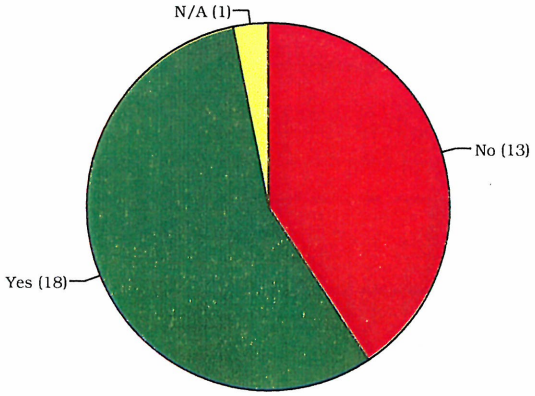
Types of Records Maintained
Question 9



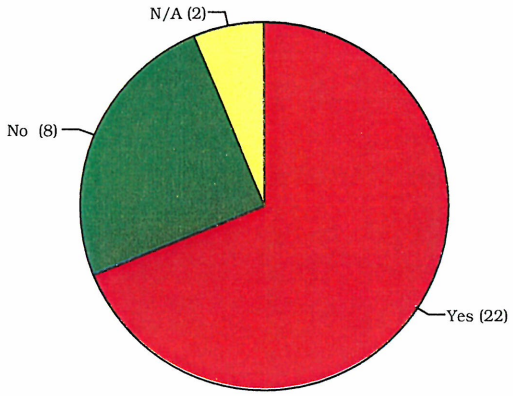
Groups Supporting Storm Water Programs
Question 10



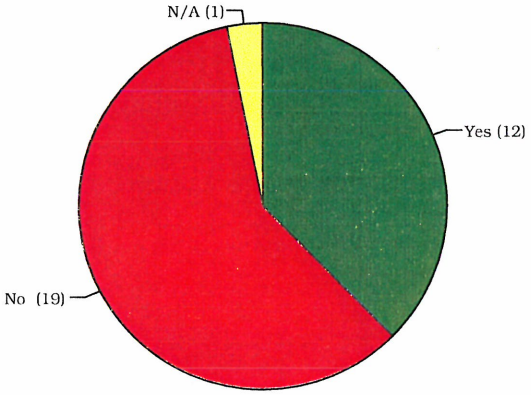
Plans for Storm Water Improvements
Question 11



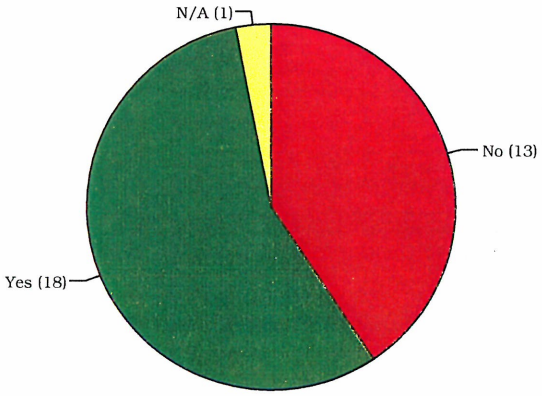
Design Standards and Policies in Use
Question 12



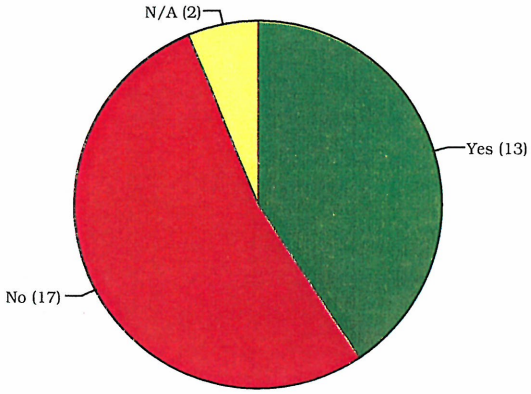
Exisiting Planning Studies for SW
Question 13



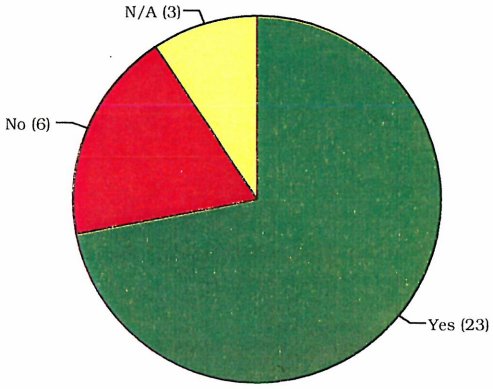
Participation in the FEMA NFIP
Question 14



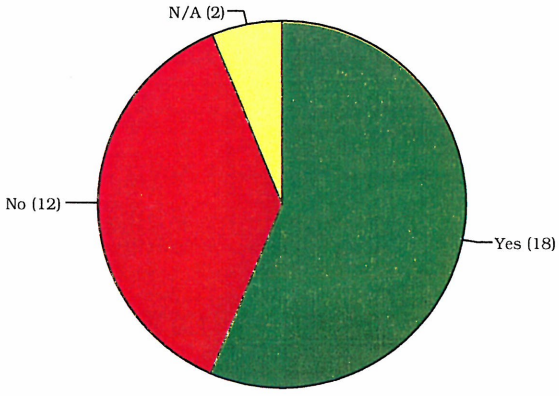
A Defined Process for SW Projects
Question 15



Regulations to Control Grade/Drainage
Question 16



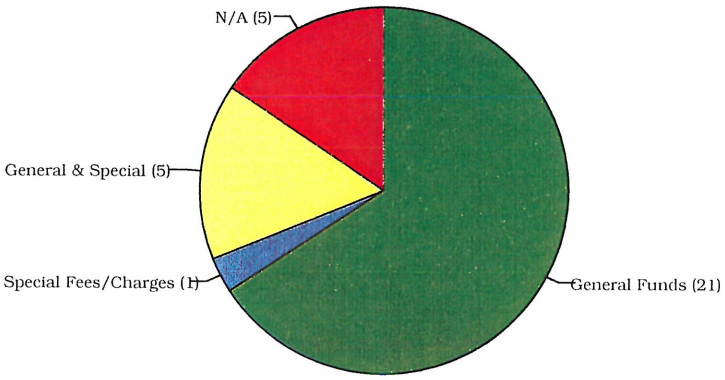
Inspections for Permit Compliance
Question 17



Establishes and Enforces SW Regulations
Question 18

No Data

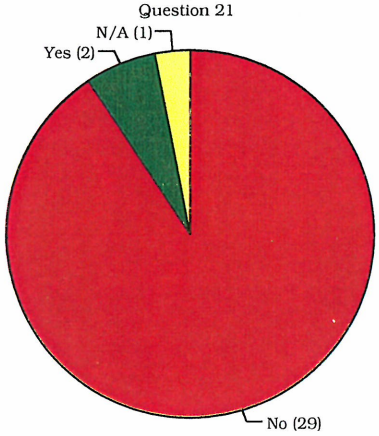
Funding Storm Water Related Programs
Question 19



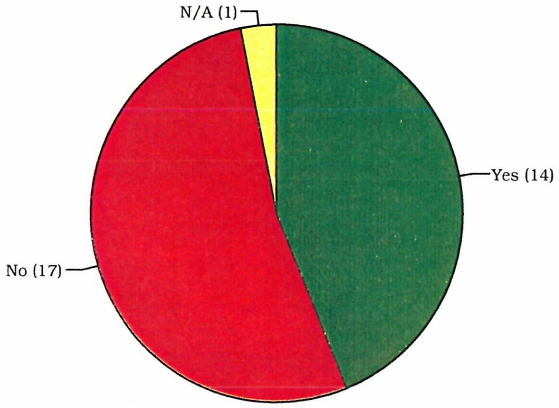
Total Annual Budget for SW Programs
Question 20

No Data

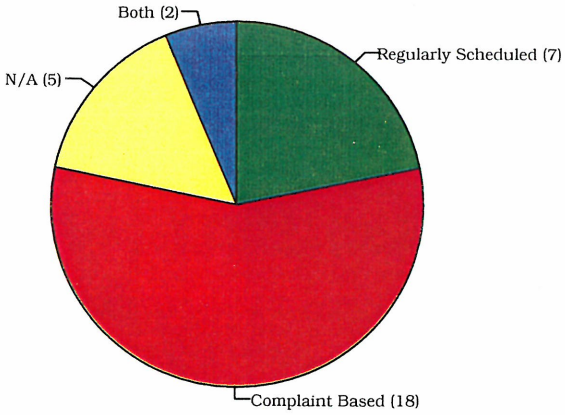
Storm Water Management Related Debt
Question 21



Storm Water Maintenance Program
Question 22



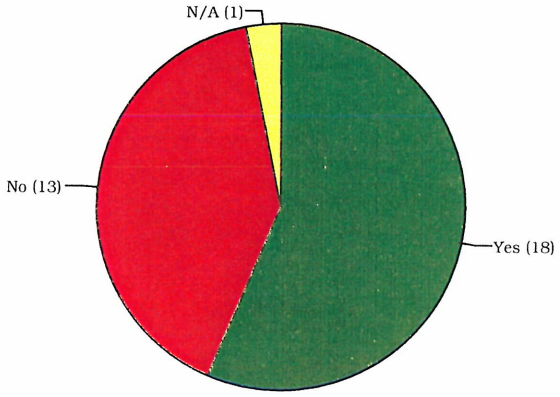
Maintenance Program Schedule
Question 23



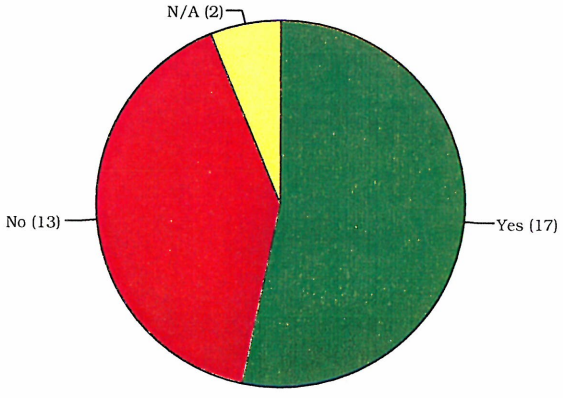
Detention/Retention Structure Maintenance
Question 24

No communities have their own wetland protection ordinance

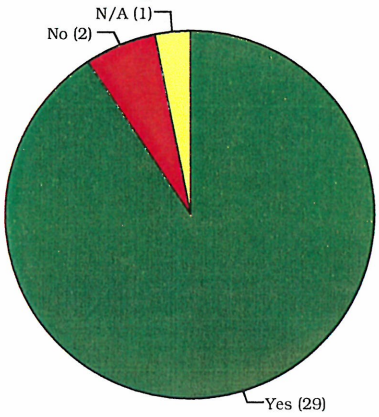
Street Sweeping Programs
Question 25



Catch Basin Cleaning Programs
Question 26



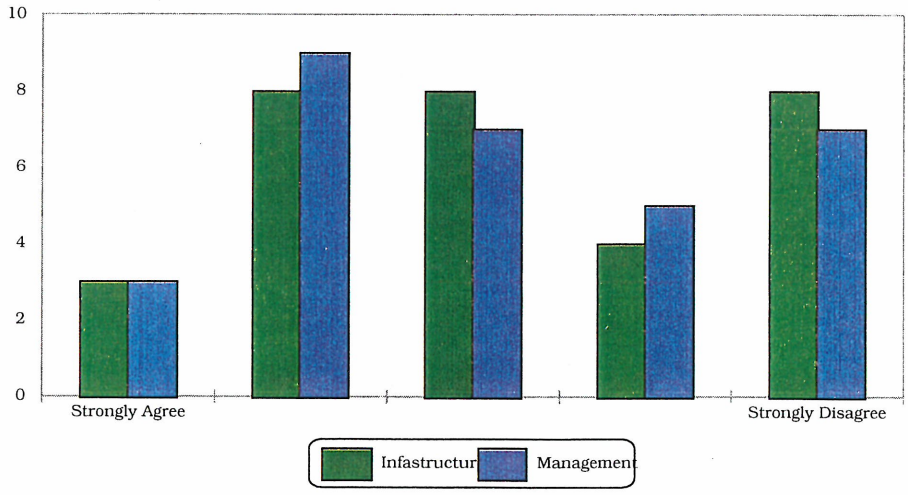
Application of Road Salt
Question 27



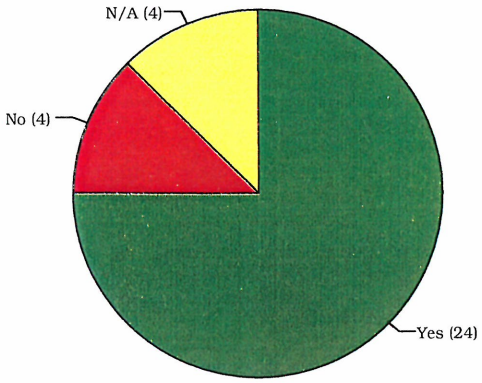
Communitty Wetland Protection Ordinance
Question 28

No communities have their own wetland protection ordinance

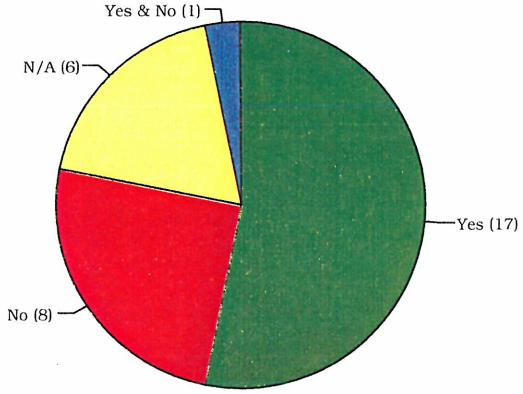
Infast. and Management is Adequate
Questions 29 & 30



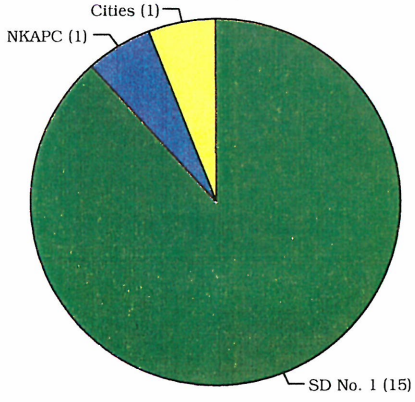
Support a Regional Storm Water Agency
Question 31



Is There an Existing Agency
Question 32-A



If Yes to 32-A, Recommed an Agency
Question 32-B



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