



*Timothy Hanson  
Director  
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VIA ELECTRONIC TRANSMISSION

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March 29, 2012

Illinois Environmental Protection Agency  
Division of Water Pollution Control  
1021 North Grand Avenue East  
P.O. Box 19276  
Springfield, Illinois 62794-9276

Attention: Compliance Assurance Section

Subject: NPDES Permit No. ILS000001

Dear Sir or Madam:

The City of Rockford hereby submits its annual report for the subject stormwater permit. If you have any questions please contact our Storm Water and Environmental Program Manager, Brad Holcomb, at 815-967-7061 or by email at [brad.holcomb@rockfordil.gov](mailto:brad.holcomb@rockfordil.gov).

Very truly yours,

A handwritten signature in black ink, appearing to read "Tim Hanson". The signature is written in a cursive style with a long horizontal line extending to the right.

Tim Hanson  
City of Rockford  
Public Works Director



**ANNUAL REPORT**  
**Calendar Year 2012**  
**CITY OF ROCKFORD, ILLINOIS**  
**MUNICIPAL SEPARATE STORM SEWER SYSTEM**

**NPDES Permit No. ILS000001**

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## 1. INTRODUCTION

This report is prepared in compliance with the City of Rockford's NPDES Storm Water Permit No. ILS000001. The report contains information for calendar year 2012. Part V.C of the NPDES permit requires a system-wide report containing the following sections:

| <b>Required Information</b>  | <b>See Herein</b> |
|--|-------------------|
| 1. Status of SWMP  | Chapter 2         |
| 2. SWMP Modifications  | Chapter 3         |
| 3. Revisions to the Assessments of Controls and Fiscal Analysis              | Chapters 3        |
| 4. Overall Summary of Data   | Appendices B & C  |
| 5. Annual Expenditures   | Chapter 3         |
| 6. Summary of Enforcement Actions, Inspections and Public Education Programs | Chapters 2 & 3    |
| 7. Identification of Water Quality Improvements or Degradation               | Appendices B & C  |
| 8. Locations of Monitoring Outfalls  | Appendix A        |
| 9. Summary of SWMP Experiences   | Chapter 3         |
| 10. Summary of Effectiveness and Accuracy of Monitoring Program              | Chapter 3         |

## 2. STATUS OF SWMP

Part III in the permit, Schedules for Implementation and Compliance, requires the City to provide summaries of implementation components of the storm water management program (SWMP):

- Structural Controls
- Erosion and Sedimentation Controls, Construction Site Runoff and Post-
- Construction Storm Water Management Program
- Roadways
- Flood Control
- Pesticide, Herbicide, and Fertilizer Application
- Illicit Discharge and Improper Disposal
- Industrial and High Risk Runoff
- Public Education, Pollution Prevention and Good Housekeeping

The activities undertaken in these areas and status of compliance with permit conditions are described in this chapter of the report.

During 2012, the City's storm water management program accomplished a myriad of new and continuing objectives, most notably:

- Completing scope of procedures for the following areas:
  - Erosion and Sedimentation Control Inspection
  - Illicit Discharge and Improper Disposal
  - Detention Basin Inspection
  - Public Education
- Completed steady and unsteady state hydraulic models of Keith Creek as part of ongoing master planning efforts
- Furthered flood control efforts in the Harmon Park neighborhood by constructing two additional basins and a grassed waterway
- 100 site development permit applications were received and reviewed, including Storm Water Pollution Prevention Plans (where the developments required them)
- Performed 59 construction site erosion and sedimentation control inspections
- Received no complaints from citizens regarding erosion controls (or the lack thereof)
- 175 storm water inlets and 3,583 feet of storm drains were vacuumed to improve performance
- 55 inlets were repaired
- Removed over 450 tons of accumulated silt, debris, and floatables from open channels
- Prevented over 1,989 tons of solids from entering the storm water system through street sweeping
- Performed 22 inspections for illicit discharge and/or improper disposal
- The Fire Department's HAZMAT Response Team investigated four incidents where hazardous materials may have entered the storm water system
- Performed 55 inspections of industrial and potentially high risk runoff sites
- Distributed over 1,100 various pamphlets and brochures and gave numerous seminars or presentations to the general public, businesses, and civic groups
- Sampled four wet weather events for storm water pollutant load assessment

- Identified a high risk source of storm water pollutant loads (suspended solids, metals) and worked with the owner to initiate Best Management Practices
- Analyzed 20 tributary samples (base flow events) for 18 different pollutants
- Completed a biennial bioassessment of four streams in the City's storm water service area to evaluate long-term effects of storm water discharge on aquatic health

## 2.1 STRUCTURAL CONTROLS

This section addresses Parts II.A.2 and III.A of the Permit.

The City continues to inspect and maintain data on basins and other features of the storm water system. The City regularly updates its spatial and tabular databases that record inspections, complaints and maintenance items, master planning, and compliance with NPDES permit conditions. Details from a January 2013 overview of the most important databases for structural controls are tabulated below.

**Table 1**  
**CITY OF ROCKFORD STORM SEWER INFORMATION SYSTEM**

| <b>Theme</b>        | <b>Database Fields / Features</b>  | <b>Comment</b>   |
|---------------------|--|--|
| Detention Structure | Location, current water depths (wet ponds), area, ID link to inspections   | Documents detention structures, all but 13 of which are privately owned and maintained |
| Pond Inspection     | Detention structure no., crew, date, last rainfall, sediment present, floatables present, water present, inspection ID | 350 records  |
| Culvert             | Location, material type, ID, shape, length, upstream and downstream invert elevations, size, other                     | 3,294 records  |
| Storm Sewer         | Location, ID, shape, size  | 26,541 records   |
| Manholes            | Installation date, diameter, frame material, condition, inspection date, inspector                                     | 8,239 records  |
| Inlets              | Installation date, type, inspection date, inspector  | 20,343 records   |
| Outlets             | Size, material, end structure, drainageway   | 848 records  |

Per the permit, the City must operate and maintain any storm water structural controls for which they are the owner or operator in a manner so as to reduce the discharge of pollutant loading. In compliance with the permit, the City of Rockford continually maintains their storm water system, including basin improvements. The following is a list of City-owned or City-operated storm water control basins including an update of recent maintenance activities and improvements:

1. Page Park Dam is on Kent Creek in Anna Page Park. This structure was built in 1980. The City owns the structure, and the Park District performs maintenance. The U.S. Army Corps of Engineers (USACE) inspected the Page Park Dam in 2012 and recommended additional mowing. Maintenance performed by the Rockford Park District in 2012 had included mowing, but wet soil conditions during the mowing event would have caused significant damage and mowing was postponed. In 2012 the City of Rockford inspected the dam on behalf of the Illinois Department of Natural Resources (IDNR) and subsequently, the Park District removed some beaver dams from the stream.
2. Alpine Dam is on North Keith Creek, in Aldeen Park. This dam is also owned by the City. Plans and specifications for dam repairs were prepared several years ago. The plans included modernizing the trash rack to facilitate future cleaning operations. The City is currently waiting on funding and construction permits for the improvements. The USACE also inspected Alpine Dam in 2012, as did the City of Rockford on behalf of IDNR. Maintenance performed in 2012 included mowing of the embankments and removal of 70 tons of accumulated silt, debris, and floatables.
3. Levings Lake Dam is on South Kent Creek. This structure was built in 1935. It is owned by the City, and the Park District performs routine maintenance. The USACE inspected the Dam in 2012, as did the City of Rockford on behalf of IDNR. Maintenance performed in 2012 included mowing of the embankments.
4. Arden Court Basin is owned by the City, which also maintains this storm water control structure. This structure is maintained and mowed regularly through a contractor. In 2012,  $\frac{3}{4}$  ton of accumulated sediment was also removed. City evaluated Arden Court Basin as a retrofit pilot study to meet the requirements of the Permit Part II.A.2.c., but in 2010 their storm water planning consultant recommended against it.
5. Lowes Distribution Detention Basin is relatively new, built on a tributary of South Kent Creek. The basin has a multi-stage outlet structure. The City owns the structure but Lowes performs routine maintenance (i.e. mowing).
6. Greater Rockford Industrial Park Basin is also owned by the City. This is a wet detention basin.
7. Elliot Golf Course Regional Detention Facility is mowed by the Rockford Park District, but the City performs inspections and maintenance. In 2012, mowing and some reseeding were performed.
8. In recent years, in the aftermath of flooding events, the City has planned and built multi-stage flood control structures in the Harmon Park neighborhood. In 2011, 1623 Log Cabin and 1740 Colorado basins were constructed. In 2012, two new basins (2003 Montana & 2208 Colorado) were built. Additional information on the Harmon Park projects is in Section 2.4.

The City regularly evaluates the storm sewer system for opportunities to improve water quality and reduce the discharge of pollutants from the system. In 2012, these efforts included:

- 175 inlets deducted
- 55 inlets were repaired
- 3,583 feet of storm drains were cleaned
- Over 450 tons of accumulated silt were removed from open channel drains

Per Permit Part II.A.2.b, the City must establish and implement a program to monitor basins on a periodic basis to assess maintenance efforts. In 2011 and 2012, the City of Rockford storm water staff visually inspected all detention and retention basins. The City is using this information to identify maintenance needs, and satisfy requirements of the permit. In 2012, the City sent letters basin owners requesting they address any maintenance deficiencies. Neighborhood associations regularly request technical assistance from the Department of Public Works to improve their facilities, and to the extent possible, the City provides it at no cost to the associations.

Part II.A.2.d of the permit requires the City to identify eroding stream channels in its jurisdiction and remediate them. In 2012 the City worked with, and continues to work with, the Rock Island District US Army Corps of Engineers to address some identified sections of bank erosion on Kent Creek. In addition, the City installed gabion baskets for streambank stabilization along Keith Creek and Buckbee Creek which is also noted in table 7.

## **2.2 EROSION AND SEDIMENTATION CONTROL, CONSTRUCTION SITE RUNOFF AND POST-CONSTRUCTION STORM WATER MANAGEMENT PROGRAM**

This section addresses Parts II.A.3 and III.A of the Permit.

September 5, 2006, the City of Rockford passed Ordinance No. 2006-157-0, adopting the "Surface Water Management Ordinance of the City of Rockford, Illinois" (details available at <http://library.municode.com/index.aspx?clientId=14387>, Chapter 109 Flood Hazard Reduction. Among other activities, this ordinance requires construction site erosion controls as well as post-construction runoff quantity and quality controls. Adoption of Ord. No. 2006-157-0 demonstrates the City's compliance with the permit's requirement at Part II.A.3.a.i. NPDES Permit Parts II.A.3.a.ii through a.iii requires preparation of erosion control plans by developers, and review and approval of plans by the City. Ord. No. 2006-157-0 requires this, and the City has improved the review process, including documentation of plan review.

The City is expecting to update Ord. No. 2006-157-0 as well as its technical manuals in 2013 or shortly thereafter in response to anticipated revisions to IEPA's General Construction Permit (ILR10) as well as the State and Federal post construction management requirements. .

In 2012, 100 site development permit applications were received and reviewed by Department of Public Works staff for application of proper construction site erosion controls. Most projects did not require storm water pollution prevention plans (SWPPP), but erosion and sedimentation control plans were reviewed. Many projects were not built. But, staff reviewed all permit applications for compliance with the ordinance. Table 2 lists the project reviews that had or needed to have SWPPPs.



Photograph 1. The site of an ESC inspection by City Storm Water staff in 2012.

In 2012 the City performed 59 erosion control plan implementation inspections. Table 3 gives the dates of these inspections and generalities of follow-up actions. These inspections are performed in compliance with Permit Parts II.A.3.a.iii.

Permit Parts II.A.3.a.vi and a.vii require the City to develop a field guide for inspection of construction site BMPs and to provide appropriate soil erosion education and training for developers, development engineers, and construction site operators. The City has adopted the Illinois Urban Manual and IDOT's Erosion and Sediment Control Field Guide for Construction Inspections, as their primary field guides for doing inspections.

The City also sent to letters to sites with active general construction permits (ILR10) that have either been completed and final stabilized or had never started. The intent is to terminate these permits if no further construction activity is planned. Many of the owners of these projects are no longer in the area and/or are unreachable. The City will continue trying to make contact with these permittees.

Table 2

## STORM WATER POLLUTION PREVENTION PLAN REVIEWS IN 2012

| Date      | NPDES Permit | Facility Name   | Facility Owner                    | Facility Location                    | SWPPP available for review | Notes   |
|-----------|--------------|---|-----------------------------------|--------------------------------------|----------------------------|---|
| 3/16/2012 | P921         | Faith Christian Retirement Center auxiliary parking lot | Faith Christian Retirement Center | NW corner of N. Alpine & Garden Lane | Yes                        | SWPPP located on sheet 3 of plans. Plans do not designate where stabilized construction entrance is and straw bales for inlet protection are not allowed. |
| 3/16/2012 | P641         | Dial Machine  | Dial Machine                      | 2902 East Rock Dr., Rfd, IL          | Yes                        |   |
| 3/1/2012  | P689         | Day Avenue  | COR                               |                                      | Yes                        |   |
| 3/20/2012 | NA           | Colorado Avenue   | COR                               |                                      |                            | milling & resurfacing   |
| 3/25/2012 | P808         | West Side Building Partnership                          | West Side Building Partnership    | Simpson Rd.                          | Yes                        | SWPPP good  |
| 4/12/2012 | P820         | Downtown Rockford, Dollar Tree                          | Dyn Rockford, LLC                 | 526 E. Jefferson St.                 | Yes                        | Several items noted on SWPPP and Engineering plans that need to be addressed before approval. 4/13/2012, all items addressed (BH)                         |
| 4/13/2012 | P787         | Kelly Williamson Gas Station                            | Kelly Williamson                  | N. Alpine & Turner                   | Yes                        | Minor changes. Spoke with Arc Design, reviewed suggested changes on 06/04/2012, everything was good.  |
| 4/18/2012 | P788         | Regional Cancer Center                                  | Swedish American Hos.             | Bell School & Spring brook           | Yes                        |   |
| 4/24/2012 | P964         | Guilford High School Field turf                         | Rockford School District          | 5620 Spring Creek Road               | Yes                        | Entire excavation is below surrounding grade.   |

Table 2

## STORM WATER POLLUTION PREVENTION PLAN REVIEWS IN 2012

| Date      | NPDES Permit | Facility Name                                   | Facility Owner                                | Facility Location                           | SWPPP available for review | Notes   |
|-----------|--------------|---|---|---|----------------------------|---|
| 4/24/2012 | P965         | Auburn High School Field turf                   | Rockford School District                      | 5110 Auburn St.                             | Yes                        | Entire excavation is below surrounding grade.                                 |
| 5/2/2012  | P201         | Com Ed Training Facility                        | Com Ed  | 123 Energy avenue                           | Yes                        |   |
| 5/30/2012 | Q058         | State Street Market parking lot                 | MB Rockford State, LLC                        | 6280 E. State St.                           | Yes                        | mill & resurfacing no permit or SWPPP was required                            |
|           | K586         | Canis Major                                     | Spring Creek Development Co.                  | Bell School North of Rote Rd.               | Yes                        | Reviewed changes to previously approved plan                                  |
| 6/4/2012  | NA           | Winnebago County parking lot renovations        | Winnebago County                              | SE Elm St. & Chestnut St./SE State & Church | NA                         | both areas less than one acre and not contiguous. No NPDES permitting needed. |
| 6/19/2012 | Q183         | Parking Lot Reconstruction                      | First Evangelical Free Church                 | 2223 N. Mulford Rd.                         | Yes                        |   |
| 7/9/2012  | Q073         | BSLBV Parking lot improvements                  | Barrick, Switzer, Long, Balsey, and Van Evera | 6833 Statler Dr.                            | Yes                        |   |
| 7/11/2012 | Q356         | Riverbluff Nursing Home Parking lot renovations | Winnebago County                              | 4401 N. Main St.                            | Yes                        |   |
| 7/11/2012 | P719         | Sinnissippi Riverfront Parking                  | Rfd Park District                             | 1300 N. Second St.                          | Yes                        |   |
| 7/16/2012 | NA           | State St. retail redevelopment                  |   | State & Mulford                             | NA                         | less than 1 acre, ESC plan approved   |

Table 2

## STORM WATER POLLUTION PREVENTION PLAN REVIEWS IN 2012

| Date       | NPDES Permit | Facility Name                                | Facility Owner                          | Facility Location        | SWPPP available for review | Notes  |
|------------|--------------|--|---|--------------------------|----------------------------|--|
| 7/26/2012  | Q491         | Jefferson High School                        | Rockford School District                | 4145 Samuelson Rd.       | Yes                        | Permitting wasn't applied for until after project started. SWPPP and plans were reviewed after meeting with school district.       |
| 8/3/2012   | Q250         | Rockford Solar Farm                          | Rockford Solar Partners, LLC            | 7201 Beltline Rd.        | Yes                        | SWPPP was previously submitted. No changes   |
| 8/17/2012  | Q339         | Huffman Property                             | Dyn Office Investments                  | 2001 N. Bell School Road | Yes                        | fill is being added to area  |
| 8/24/2012  | Q543         | Alpine Hills                                 | Rockford Park District                  | 4402 Larson Ave.         | Yes                        | 5-hole golf course regrading   |
| 8/28/2012  | Q651         | Rfd commercial former Manuf. Gas Plant       | Environmental contractors Inc., (ComEd) | 300 S. Avon St.          | Yes                        | Site remediation project. Contaminated soil to be removed & water treated before discharge   |
| 9/17/2012  | Q755         | Unitarian Universal Church Parking lot       | Unitarian Universalist Church           | Turner St.               | Yes                        | Site requires IEPA permitting. SWPPP is being developed and will be submitted for review. 09/20/2012 - SWPPP reviewed and approved |
| 10/5/2012  | Q669         | Rockford Heat Treat parking lot improvements | Rockford Heat Treators                  | 4704 American Road       | Yes                        |  |
| 10/10/2012 | P898         | RRWRD excess flow station                    | RRWRD                                   | 3333 Kishwaukee St.      | Yes                        |  |
| 10/31/2012 | Q792         | Anjali Perryville Sub.                       | 555 Partnership                         | 555 S. Perryville Rd     | Yes                        |  |

Table 2

**STORM WATER POLLUTION PREVENTION PLAN REVIEWS IN 2012**

| <b>Date</b> | <b>NPDES Permit</b> | <b>Facility Name</b>         | <b>Facility Owner</b> | <b>Facility Location</b> | <b>SWPPP available for review</b> | <b>Notes</b>  |
|-------------|---------------------|------------------------------|-----------------------|--------------------------|-----------------------------------|---|
| 11/26/2012  | Q684                | Rockford College Parking lot | Rockford College      | 5050 E. State St.        | Yes                               |   |
| 12/20/2012  |                     | Dayton Freight               | Dayton Freight        | 3465 American Road       | No                                | SWPPP & NPDES permit required. Specs based on Ohio manuals some of which doesn't comply with IUM. Approval withheld until SWPPP reviewed and corrections to ESC plan completed. |

Table 3

## EROSION CONTROL INSPECTIONS AND CORRECTIVE ACTIONS PERFORMED IN 2012

| Date      | Construction Site                      | Permit # ILR10                                  | Follow-Up Needed | Date of Follow-up | Corrective Actions Addressed | Submit To Code Enforcement |
|-----------|--|---|------------------|-------------------|------------------------------|----------------------------|
| 3/16/2012 | Campus of Care                         | N728  | Yes              | 4/27/2012         | Yes                          | No                         |
| 3/16/2012 | MPEC HQ                                | O827  | Yes              | 4/27/2012         | Yes                          | No                         |
| 3/16/2012 | Rockford VA                            | O971  | Yes              | 4/27/2012         | Yes                          | No                         |
| 3/16/2012 | OSF Health care                        | O965  | Yes              | 3/26/2012         | Yes                          | No                         |
| 3/16/2012 | Wesley Willows, 7 & 10                 | D336  | Yes              | 3/26/2012         | Yes                          | No                         |
| 3/16/2012 | Wesley Willows, PI 2                   | N723  | No               | NA                | NA                           | NA                         |
| 3/16/2012 | COR Road Improvements @ Campus of Care | N728  | Yes              | 4/27/2012         | Yes                          | No                         |
| 5/17/2012 | Dial Machine                           | P641  | No               | NA                | NA                           | NA                         |
| 5/25/2012 | Regional Cancer Center                 | P788  | Yes              | 6/7/2012          | Yes                          | No                         |
| 5/29/2012 | Hampton crossing                       | 5804  | Yes              | 6/21/2012         | Yes                          | No                         |
| 6/6/2012  | Lyford crossing                        | I983  | Yes              | 7/12/2012         | Partially                    |                            |
| 6/8/2012  | Com Ed Training facility               | P201  | No               | NA                | NA                           | NA                         |
| 6/8/2012  | West Side Sub.                         | P808  | Yes              | 6/11/2012         | Yes                          | No                         |
| 6/8/2012  | Downtown Rockford, Dollar Store        | P820  | Yes              | 06/11/2012        | Yes                          | No                         |
| 7/10/2012 | Jefferson HS, Rfd. School District     | no permit/<br>(7/26/2012 permit<br>applied for) | Yes              | 7/26/2012         | Yes                          | No                         |
| 7/12/2012 | BE Aerospace                           | P320  |                  |                   |                              |                            |
| 7/12/2012 | Dial Machine                           | P641  | No               | NA                | NA                           | NA                         |
| 7/12/2012 | Fairhaven                              | P921  |                  |                   |                              |                            |
| 7/12/2012 | Kelly Williamson                       | P787  | Yes              | 8/2/2012          | Yes                          | No                         |
| 7/12/2012 | Behr                                   | P121  | No               | NA                | NA                           | NA                         |
| 7/12/2012 | MPEC HQ                                | O827  | No               | NA                | NA                           | NA                         |
| 7/12/2012 | Redington Chase                        | G918  | No               | NA                | NA                           | NA                         |

Table 3

## EROSION CONTROL INSPECTIONS AND CORRECTIVE ACTIONS PERFORMED IN 2012

| Date      | Construction Site  | Permit # ILR10 | Follow-Up Needed | Date of Follow-up  | Corrective Actions Addressed | Submit To Code Enforcement |
|-----------|--|----------------|------------------|--------------------|------------------------------|----------------------------|
| 7/12/2012 | Rockford VA  | O971           | No               | NA                 | NA                           | NA                         |
| 7/12/2012 | Steven's Ridge   | I409           | No               | NA                 | NA                           | NA                         |
| 7/12/2012 | Regional Cancer Center   | P788           | Yes              | 8/1/2012           | Yes                          | NA                         |
| 7/12/2012 | Rockford Christian   | O541           | No               | na                 | NA                           | NA                         |
| 7/13/2012 | Wesley Willow, Plat 10   | D336           | Yes              | 8/2/2012           | Yes                          | No                         |
| 7/13/2012 | Wesley Willows, Plat 2   | N723           | Yes              | 8/2/2012           | Yes                          | No                         |
| 7/29/2012 | Turnberry Ridge  | E599           | Yes              | 8/7/2012           | Yes                          | No                         |
| 8/2/2012  | Red Oak Estates  | G769           | Yes              | 8/14/2012          | Yes                          | No                         |
| 8/2/2012  | Bell School - Guilford fill site                               | K292           | No               | NA                 | NA                           | NA                         |
| 8/7/2012  | Jefferson H.S. , Rfd. School District (drive thru observation) | Q491           | No               | NA                 | NA                           | NA                         |
| 8/15/2012 | First Evangelical free Church Parking Lot Renovation           | Q183           | No               | NA                 | NA                           | NA                         |
| 8/16/2012 | Auburn H.S. Field Turf (drive thru observation)                | P965           | No               | NA                 | NA                           | NA                         |
| 8/16/2012 | Guilford H.S. Field Turf (drive thru observation)              | P964           | No               | NA                 | NA                           | NA                         |
| 9/14/2012 | Lyford Crossing  | I983           | Yes              | 10/16 & 11/05/2012 | NA                           | NA                         |
| 9/14/2012 | Com Ed Training  | P201           | Yes              | 9/20/2012          | Yes                          | NA                         |
| 9/14/2012 | Sinnissippi Parking Lot  | P719           | No               | NA                 | NA                           | NA                         |
| 9/14/2012 | Jane Addams Apartments   | O962           | Yes              |                    |                              |                            |
| 9/14/2012 | Downtown Rockford (drive thru observation)                     | P820           | No               | NA                 | NA                           | NA                         |
| 9/14/2012 | Dial Machine (drive thru observation)                          | P641           | No               | NA                 | NA                           | NA                         |
| 9/14/2012 | Kelley Williamson (drive thru observation)                     | P787           | No               | NA                 | NA                           | NA                         |

Table 3

## EROSION CONTROL INSPECTIONS AND CORRECTIVE ACTIONS PERFORMED IN 2012

| Date       | Construction Site                               | Permit # ILR10 | Follow-Up Needed | Date of Follow-up | Corrective Actions Addressed | Submit To Code Enforcement |
|------------|---|----------------|------------------|-------------------|------------------------------|----------------------------|
| 9/17/2012  | Wesley Willows Plat 2, 7 & 10 (on-site meeting) | D336, N723     | No               | NA                | NA                           | NA                         |
| 9/20/2012  | Rockford Solar Farm (drive through observation) | Q250           | No               | NA                | NA                           | NA                         |
| 10/18/2012 | Turnberry Ridge                                 | E599           | Yes              | 10/25/2012        | Yes                          | No                         |
| 10/30/2012 | Regional Cancer Center (drive through)          | P788           | No               |                   | NA                           | NA                         |
| 10/30/2012 | Wesley Willows (drive through)                  | D336           | No               | NA                | NA                           | NA                         |
| 10/30/2012 | Nicholas Conservatory (drive through)           | O542           | No               | NA                | NA                           | NA                         |
| 11/5/2012  | Rockford Heat Treat                             | Q669           | No               | NA                | NA                           | NA                         |
| 11/6/2012  | Maywood Evangelical Parking Lot                 | NA             | Yes              |                   | Yes                          | No                         |
| 11/8/2012  | Dial Machine                                    | P641           | No               | NA                | NA                           | NA                         |
| 11/8/2012  | Wesley Willows                                  | D336           | Yes              |                   |                              |                            |
| 11/8/2012  | Red Oaks  | G769           | No               | NA                | NA                           | NA                         |
| 12/11/2012 | Jane Addams Apartments                          | 962            | No               | NA                | NA                           | NA                         |
| 12/13/2012 | Com Ed Remediation                              | Q651           | No               | NA                | NA                           | NA                         |
| 12/14/2012 | Anjali Perryville Sub.                          | Q792           | Yes              | 12/19/2012        | Yes                          | No                         |
| 12/14/2012 | Huffman Property                                | Q 339          | Yes              | 12/18/2012        | Yes                          | No                         |
| 12/17/2012 | 6785 Mill Road                                  | NA             | Yes              | 12/24/2012        | Yes                          | No                         |
| 12/19/2012 | West Side Sub.                                  | P808           | No               | NA                | NA                           | NA                         |

In 2012, selected City staff and others participated in numerous storm water erosion control (and related) training opportunities (Table 4). This demonstrates the City's compliance with Permit Parts II.A.3.a.vi and a.vii. Table 4 includes training activities in other aspects of storm water management, included here for conciseness.

**Table 4**  
**STAFF TRAINING IN 2012**

| <b>Training</b>  | <b>Date</b>       | <b>Sponsor</b>  | <b>Staff</b>   |
|--|-------------------|---|--|
| Storm Water Permitting Requirements  | 1/26/2012         | City of Rockford (Brad Holcomb presenting)                            | City of Rockford Public Works Supervisors (33 attending)   |
| Understanding Water Chemistry for Practical Application                              | March 5-6, 2012   | University of Wisconsin-Madison                                       | B. Holcomb, D. Kurth   |
| Sediment and Erosion Control Workshop  | 3/7/2012          | Winnebago & Boone County Soil and Water Conservation Districts        | J. Applegate, J. Carter, C. Englund, B. Holcomb, D. Kurth, R. Lundberg, K. Nokes, M. Ruvulo, M. Vitner |
| Erosion and Sediment Control Seminar (presenter & attendee)                          | 3/14/2012         | APWA, Stetson Building Products, City of Rockford, City of Loves Park | D. Kurth, D. Black, H. Noble, J. Rott, R. Lundberg, (B. Holcomb - presenter)                           |
| EPA's 2012 Construction General Permit   | 3/21/2012         | USEPA - Webcast   | B. Holcomb, D. Kurth, R. Lundberg  |
| Sustainability Workshop  | 3/30/2012         | Rockford Park District  | B. Holcomb   |
| Recharge – A Sustainable Solution, Green Streets, Stormwater BMP's - Lessons Learned | 5/24/2012         | APWA  | B. Holcomb   |
| Essentials of Hydraulics for Civil Engineers and Designers                           | October 2-4, 2012 | University of Wisconsin-Madison                                       | M. Leach, M. Vitner, J. Rott   |
| Water Quality Standards Academy Web Presentation: Water Quality Standards 101        | 10/4/2012         | USEPA - Webcast   | B. Holcomb, D. Kurth   |
| Erosion Control BMP Workshop   | 10/10/2012        | APWA & Hampton Lenzini & Renwick Inc.                                 | B. Holcomb, D. Kurth, N. Hailey, E. Bergstrom  |
| Post Development Stormwater Runoff Performance Standards Work Group Public Meeting   | 10/23/2012        | IEPA & Association of Illinois Soil and Water Conservation Districts  | Brad Holcomb, Marcy Leach, Dean Kurth  |
| Illinois EPA Rockford Region MS4 Seminar   | 12/12/2012        | Illinois EPA  | B. Holcomb, D. Kurth, E. Bergstrom, J. Irving, O. Santos, M. Montana, N. Hailey                        |
| Flood Plain Manager certifications received  | 2012              | ASFM & Illinois Association for Floodplain & Stormwater Management    | M. Latner (03/13/2012), M. Leach (12/12/2012)  |
| Managing Flood Plain Development through the NFIP                                    | 6/11-14/2012      | FEMA  | M. Leach   |

The City is also required by the permit to continue to respond to citizen complaints. In 2012, the City did not receive any complaints from citizens regarding erosion controls (or the lack thereof); these complaints are typically logged and responded to by staff.

Permit Part II.A.3.b requires the City to use a comprehensive master planning approach to minimize the discharge of pollutants from areas of development and redevelopment after construction is completed. Further, paragraph (i) of this section specifically requires the City to use the master planning approach to identify storm water management issues on a watershed scale. A storm water assessment has been completed, and the master planning process continues. In 2012, the City's master planning consultant completed steady and unsteady-state models of Keith Creek. The design of any projects recommended through these modeling studies will include applicable portions of the Illinois Urban Manual, consistent with Part II.A.3.b.ii of the permit conditions.

Permit Part II.A.3.b.iii requests that the City require multi-stage detention control to protect channel stability from erosion. In 2012, the City made additional progress on the Harmon Park Flood Control Project (Figure 1) which includes multi-stage detention control. Two additional basins and a grassed swale were constructed in 2012.

Permit Part II.A.3.b.v requests that the City monitor facilities during dry weather, conduct field surveys, and work with private owners of existing facilities and neighborhood organizations to assess performance. In 2012, the City completed their storm water basin inspection program and increased the frequency of inspections of privately owned detention facilities. The City sent letters to each basin owner requesting they address any maintenance deficiencies. These activities demonstrate compliance with Part II.A.3.b.v.

## **2.3 ROADWAYS**

This section addresses Parts II.A.4 and III.A of the Permit.

Street sweeping records for 2012 are tabulated below (Table 5). In 2012, the City of Rockford outsourced street sweeping. In total, the contractor performed sweeping on 2,284 miles of roads, removing 1,989 tons of debris, keeping these pollutants out of the MS4.

**Table 5**  
**CITY OF ROCKFORD 2012 STREET SWEEPING PROGRAM**

| <b>Month</b> | <b>Quantity (tons)</b> | <b>Street Sweeping Miles (Outside Central Business District)</b> | <b>Central Business District Miles</b> |
|--------------|------------------------|--|--|
| January      |                        |  |  |
| February     |                        |  |  |
| March        | 0                      | 0  | 0                                      |
| April        | 495.6                  | 306  | 24                                     |
| May          | 583.2                  | 416  | 95.9                                   |
| June         | 2                      | 0  | 48                                     |
| July         | 25.6                   | 51.9   | 48                                     |
| August       | 0                      | 26.7   | 48                                     |
| September    | 19.3                   | 80.5   | 48                                     |
| October      | 327.8                  | 253.5  | 48                                     |
| November     | 404.6                  | 276.8  | 48                                     |
| December     | 131.2                  | 465.7  | 0                                      |
| <b>Total</b> | 1989.2                 | 1,877.0  | 407.7                                  |

Salt is used for deicing in preference to sand, the latter only being used when the salt supply is exhausted. Table 6 provides details for the City's deicing program for the last four years.

**Table 6**  
**CITY OF ROCKFORD DEICING PROGRAM**

| <b>Year</b> | <b>Snow Accumulation</b> | <b>Salt Used</b> | <b>Salt/Snow</b> | <b>Sand Used</b> | <b>Mixed Salt &amp; Sand</b> |
|-------------|--------------------------|------------------|------------------|------------------|------------------------------|
| 2009        | 37 inches                | 16,150 tons      | 436 tons/in      | 800 tons         | 0                            |
| 2010        | 43 inches                | 22,900 tons      | 533 tons/in      | 0                | 100 tons                     |
| 2011        | 32.6 inches              | 7,200 tons       | 221 tons/in      | 0                | 0                            |
| 2012        | 25.1 inches              | 8,100 tons       | 323 tons/in      | 0                | 0                            |

Deicing material use varies not only with snow accumulations, but with ice, freezing rain, and ambient temperatures.

Permit Part II.A.3.d., requires the City to conduct a study of alternate side parking. During the first NPDES permit period, the City evaluated alternate side parking. The decision was made that alternate side parking will only be in effect for snow emergencies: parking on odd days will be on odd sides of the street and vice versa. This ordinance is enforced through ticketing. A second alternate side parking study was written into the last NPDES permit. The study was not performed and the City has requested that this language be removed from the new permit. Discussions have been held regarding alternate side parking for street sweeping and it was agreed that this would increase street sweeping times, decrease efficiency and increase costs. The City is in the process of completing a document stating such.

## 2.4 FLOOD CONTROL

This section addresses Parts II.A.5 and III.A of the Permit.

### 2.4.1 Narrative Evaluation

The City has an ongoing flood and storm water control program as part of its Capital Improvement Program (CIP), its public works engineering activities, and as part of its development ordinances. Tables 7 and 8 lists some of the flood control and drainage projects completed in 2012.

The City continues to exert effort in the Harmon Park Project (Figure 1). This phased project includes multi-stage detention control. Basins were completed in 2011 and 2012 at these addresses:

- 1623 Log Cabin
- 1740 Colorado
- 2003 Montana
- 2208 Colorado

Additionally, a grassed swale was constructed in 2012 connecting the 2208 Colorado Basin with an existing downstream drainage channel.

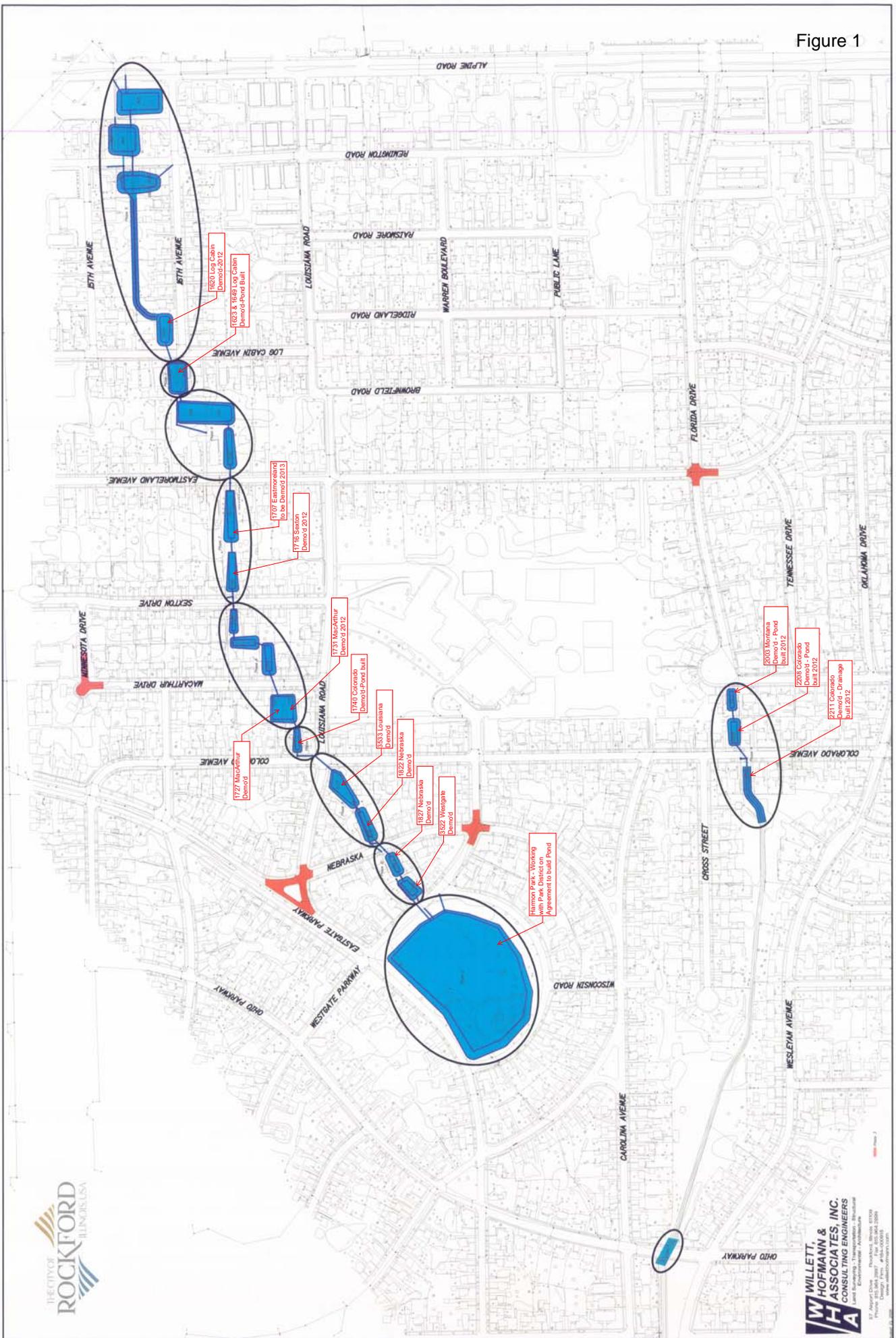
**Table 7**

#### FLOOD CONTROL AND DRAINAGE PROJECTS COMPLETED IN 2012

| <b>Project</b>                            | <b>Description</b>                               |
|---|--|
| Parmele Storm Sewer                       | Removal of combined sewer connection             |
| Harmon Park Phase 4b Storm Sewer          | Storm sewer, grassed swale, and detention basins |
| Clover Avenue Drainage Swale              | Regrading of drainage swale                      |
| Yale Drive Ditch                          | Madigan Creek gabion basket installation         |
| Hampton Avenue/Weaver Road                | Storm sewer extension                            |
| Marshall Street/Reed Avenue               | Storm sewer extension                            |
| Alley between Deborah Ave/N Church Street | Dry well installation                            |
| Lapey Street                              | Curb installation                                |
| Shelford Lane                             | Paved ditch extension                            |
| Logli, Charles Street                     | Gabions installed on Keith Creek                 |
| Cloisters Apts.                           | Storm sewer extension                            |
| 306 Palm                                  | Storm sewer extension and structure installation |

Significant effort was also put forth in 2012 to improve local drainage by clearing channels of debris and accumulated silt that were known to restrict flood conveyance. Table 8 tabulates these projects.

Figure 1



**Table 8**  
**SILT AND DEBRIS REMOVAL FROM DRAINAGEWAYS IN 2012**

| <b>Date</b> | <b>Address</b>                            | <b>Silt/Debris Removed (tons)</b> | <b>Operation</b>                                     |
|-------------|---|-----------------------------------|--|
| 8/8/2012    | NW Ditch Gilbert to Kishwaukee            | 132.4                             | Clean out silt build up                              |
| 9/20/2012   | SE Ditch Kishwaukee to 7th St             | 29.0                              | Clean out silt build up                              |
| 9/26/2012   | SE Ditch Kishwaukee to 7th St             | 79.2                              | Clean out silt build up                              |
| 9/27/2012   | SE Ditch Kishwaukee to 7th St             | 51.5                              | Clean out silt build up                              |
| 11/12/2012  | Behind Rockton Ave Logli's                |                                   | Cut out and repour trough to accommodate outlet pipe |
| 5/18/2012   | Behind 4108 Shirley - west to box culvert |                                   | Clean up and reshape bottom                          |
| 6/27/2012   | Spring Creek – by Guilford High           | 100                               | Remove silt & recontour                              |
| 7/17/2012   | Elliot Golf Course                        |                                   | Repair detention area washout                        |
| 11/21/2012  | Clover Ave (at dead end)                  | 50                                | Remove overgrowth and reshape for proper drainage    |
| various     | Various other                             | 11.75                             | Silt removal from ditches                            |



In 2012 (or in recent years), the City has also:

- Become a pilot community in the Resilient Neighbors Network (RNN) of the National Hazard Mitigation Association. RNN is a peer-to-peer sharing network intended to strengthen and expand local hazard mitigation programs, including flooding.
- Performed reconstruction of 55 inlets to improve the storm drainage system and enable more efficient flow.
- Completed Keith Creek bank stabilization at Charles Street (Logli's).
- Performed channel clearing on Kent Creek, removing 120 tons of debris.
- City of Rockford and the Rockford Local Development Corporation (RLDC) have acquired over 100 properties in the Keith Creek floodplain and demolished over 90 structures.
- Prepared a detailed hydraulic analysis of Keith Creek from Alpine Dam downstream to the Rock River.
- Working with Illinois State Water Survey on a hydrologic and hydraulic study of the Rock River and sub-watersheds in the City's jurisdiction.
- Continued twice annual cleaning of floatables and other debris from Alpine Dam trash racks and other storm water structures and channels.
- City acquired and demolished 14 properties in Harmon Park area, and constructed additional localized detention ponds (Figure 1).
- Ongoing maintenance of storm sewers, inlets, outfalls, stream channels and other structures.

Along Keith Creek at Kishwaukee Avenue the City completed a large flood control project in 2010. The channel was relocated to improve performance, and pools and riffles were installed. At this park, the City has removed two industrial buildings, six residential buildings, and a parking lot from the floodplain. Elsewhere in the Keith Creek floodplain, the City and RLDC have purchased and demolished over 100 properties, and relocated residents, all in an ongoing effort to restore the flood plain and reduce future flood damages.

Per Permit Part II.A.5.a, the City must review and revise as appropriate its Design Criteria Manual, Subdivision Ordinance, and Flood Hazard Reduction Ordinance to include water quality standards with respect to flooding and storm water detention/control facilities. Upcoming regulatory changes will require an update of the City's manual and ordinance, as mentioned earlier.

Per Permit Part II.A.5.b, the City must continue to study the incorporation of trash racks on the outlet structure of Alpine Dam. It must also conduct and document feasibility studies of retrofitting the City's existing flood control devices to provide additional pollutant removal. Alpine Dam has a trash rack, but plans and specifications have been prepared for repairs to the dam. And the Corps of Engineers is continuing its design process for modernization of the structure.

The permit condition at Part II.A.5.c., requires the City coordinate regional flood control planning with surrounding communities. These efforts continued in 2012. A regional detention facility, the I-90/Riverside detention pond, was constructed in 2011 through a public-private partnership led by the Village of Loves Park, but included City of Rockford, Winnebago County, Boone County, and the Rockford Memorial Hospital. The Winnebago County Watershed Improvement Plan Steering

Committee (WCWIPSC) is a consortium of municipalities that include the City of Rockford. The WCWIPSC aims to effectively reduce nonpoint source pollution inputs in the watershed, attain water quality standards; improve habitat, and engage a wide range of audiences in their efforts. WCWIPSC is undertaking a study of the Buckbee and Madigan Creeks watershed, with an aim of preparing an action plan for nonpoint source pollution control. In another regional effort, FEMA is funding a hydrologic and hydraulic study to update flood maps of the lower Rock River, including large portions of the City's MS4 area. This work is being performed by the Illinois State Water Survey and continues as of the date of this report.

Permit Part II.A.5.d., requires the City to investigate ways to significantly reduce "nuisance" flooding. Under the Inlet Reconstruction Program, City crews and contractors continued to reconstruct problem inlets, having rebuilt 55 in 2012. Additionally, catch basins and laterals are regularly deducted. In 2012, 175 inlets and 3,583 feet of laterals were cleaned. These efforts will help to reduce future nuisance flooding. Additionally, channel clearing activities on Keith Creek (2010-2011) and Kent Creek (2012) reduce nuisance flooding. Hundreds of tons of accumulated sediment and debris were removed from open channels in 2012. These activities demonstrate compliance with Part II.A.5.d.

A separate jurisdictional body, the Rockford Park District has a sustainability approach to storm water management in its development, construction, operation, and repair and replacement of parks and facilities. Recent redevelopment at Sinnissippi Park on Rockford's riverfront included the installation of pervious pavers in the parking lot, green roof, and bioswale at the Nicholas Conservatory and Gardens, and the installation of native plant buffers along the riverfront and to filter runoff at the Eclipse Lagoon.

## **2.5 PESTICIDE, HERBICIDE, AND FERTILIZER (PHF) APPLICATION**

This section addresses Parts II.A.6 and III.A of the Permit.

On October 31, 2011, the City of Rockford was issued an NPDES Permit for pesticide use (ILG870147). This permit is issued to operators who discharge to waters of the State from the application of biological pesticides that leave a residue. The City's activities in the areas of weed control, mosquito control, and other areas are subject to the limitation in this permit. The City of Rockford has sent letters to area applicators informing them of their obligations to comply with this regulation.

The City monitors the use and application of PHF by Public Works Department and its contractors. The City also monitors its storm water and streams for nutrients and the aquatic effects thereof. Only City personnel that are licensed by the State are allowed to apply PHF, consistent with State regulations and label instructions, but most herbicides used on City facilities are applied by contractors for the Streets Division. All herbicides and pesticides are mixed and applied at a rate not to exceed the recommended amounts on the MSDS sheets.

Based on present conscientious practices, the City has not seen the need to modify its ordinances or to initiate actions to control the use of PHFs on City lands. Each year, Street Maintenance Division contractors apply herbicides to raised medians, paved ditches, and sidewalks. In addition, cut brush and trees stumps are treated along areas being cleared to minimize regrowth. Table 9 lists the herbicide products used in 2012 by the Street Maintenance Division.

**Table 9**  
**CITY OF ROCKFORD HERBICIDE USAGE IN 2012**

| <b>Product &amp; Packaging</b>     | <b>Amount Used</b> | <b>Active Ingredient</b>              |
|------------------------------------|--------------------|---------------------------------------|
| Makaze (2.5-gal bottle)            | 85 gal             | Glyphosate                            |
| Evade (2.5 gal bottle)             | 4 gal              | Prodiamine                            |
| Oust (3-lb bottle)                 | 8 lbs              | Sulfometuron methyl                   |
| Perspective (1lb 4oz bottle)       | 12.5 lbs           | Aminocyclopyrachlor and Chlorsulfuron |
| Aqua Neat (2.5 gal containers)     | 30 gal             | Glyphosate                            |
| Milestone (1 qt containers)        | 29 qts             | Aminopyralid                          |
| LI-700 – 2.5 gal jug               | 17.5 gal           | Non-ionic non-foaming penetrant       |
| Pathfinder II (2.5 gal containers) | 77.5 gal           | Triclopyr                             |
| Attach (2.5 gal containers)        | 10.55 gal          | Non-ionic sticker-spreader agent      |

The City used additional herbicides in 2012 because of vegetation control in new areas and along selected ditches.

The Street Maintenance Division performed testing on medians along Charles Street in 2011 to assess efficacy of reduced herbicide application rates. Chemical usage was reduced by 50% along these medians; weed regrowth was apparent, but the Division received no complaints. In 2012, the Division treated the median area by reducing the application rate by only 25% and found no regrowth.

The City has printed and continues to distribute an educational brochure on PHF use around water bodies. The brochures are available to the general public in the lobby of City Hall, the Department of Public Works, at special events, and other public locations (library, coffee shops, etc.).

The Rockford Park District uses only state-certified applicators to maintain approximately 180 sites (golf courses, ball fields, parks), of which about 45 sites require PHF applications. The extracted narrative below is the Rockford Park District's PHF policy (see environmental policy statement at <http://www.rockfordparkdistrict.org/images/parks/envpolicy.pdf>)

“...to eliminate or restrict the use of pesticides and herbicides. We have determined that pesticides should only be used in critical areas. Critical areas are defined as:

- Circumstances where destructive pests (insects, diseases, fungi, etc.) either create health hazards for human beings or damage to the environment.
- High-use turf areas that require specific management practices for their intended use (irrigation, fertilization, weed control, aeration, reseeding, etc.) such as golf courses, athletic areas, special use facilities with high impact such as Magic Waters, riverfront esplanades and parks. However, general dandelion spraying is not performed in neighborhood parks unless it is part of a specific turf management program.

During the spring and fall when [we] normally receive calls from citizens requesting dandelion spraying in neighborhood parks or in other areas that will not be sprayed, staff should explain that we have adopted an environmental policy, will review their request and make a determination based on approved policy.”

According to their Environmental Policy the Park District performs comprehensive soil testing to accurately forecast PHF needs and prevent unneeded PHF application on golf courses. The District recently purchased a GeoTea compost tea brewer to use on turf and landscaping within the parks to reduce the use of synthetic fertilizers and chemicals. The Park District has added insect repellent to the suggested list for all child participants in outdoor programs, invested in public health education on this matter, and prioritized potential control/spray sites. High priority control sites are those high traffic facilities in deep woods settings where programs involve participants under the age of 18 (such as Getaway Playground).

**2.6 ILLICIT DISCHARGES AND IMPROPER DISPOSAL**

This section addresses Parts II.A.7 and III.A of the Permit.

In 2011 the Rockford City Council amended the City’s storm water ordinance to include specific requirements to prevent, control, and reduce storm water pollutants by the use of best management practices (Chapter 109 Storm Water and Surface Water Management, Article II). This amendment specifically demonstrates compliance with Part II.A.7 of the permit.

City storm water management staff has developed standardized procedures for investigation of illicit discharges and improper disposal. Figure 2 is taken from these procedures and illustrates the investigation process.

Public Works staff regularly performs inspections for illicit discharges and improper disposal (Table 10). Inspection data are recorded in field logs and electronic databases. Supplemental dry weather inspections are performed on an as-needed basis by the City during storm water quality monitoring and the Rock River Water Reclamation District during their operation and maintenance activities.

The City also performs quarterly water quality testing and biennial bioassessments of the MS4

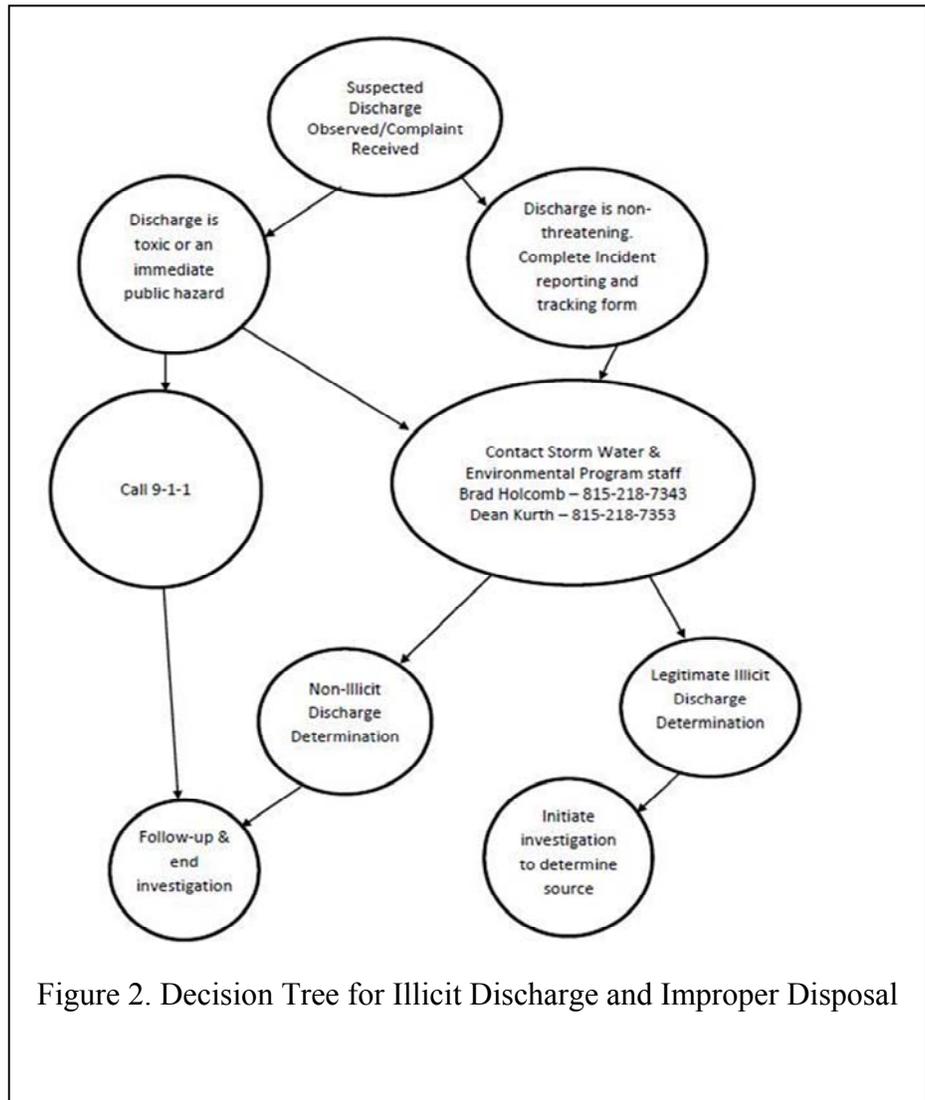


Figure 2. Decision Tree for Illicit Discharge and Improper Disposal

receiving streams as part of screening for illicit discharges and improper disposal under the presumption that the effects of such pollution would be evident in those chemical and biological surveys. The results of the water quality testing and bioassessment are provided in the appendices to this report. The bioassessments were completed in 2012.

The City, in cooperation with the Illinois EPA and Rock River Water Reclamation District, collects household hazardous wastes as well as PHF, used tires, and used motor oil. Aerosols, corrosives, oxidizers, solvents, oil-based and latex paints, waste oils, pesticides, batteries, fluorescent lamps, and insulin disposal service are all accepted. Radioactive wastes, compressed gases, and explosives are not accepted. The collection program is available to all City residents and is publicized on the Illinois EPA's web site (<http://www.epa.state.il.us/land/hazardous-waste/household-haz-waste/hhwc-schedule.html>). In 2012, there were approximately over 424,620 pounds of household hazardous waste collected at the Rockford site (1915 drums), but it is a regional facility and not all the waste was from Rockford. In 2012, about 76 % of the cars dropping off HHW were registered to Rockford residents.

The City and the Park District participate in civic clean-ups of streams and drainage ways to remove improperly disposed debris. Annually the District hosts EarthBeat Volunteers from a local church to assist with creek clean ups to remove trash and debris. In 2012, the crews cleaned up along Kent Creek at Lockwood Park and at Northwest Community Center down to School Street and at Tinker Cottage, as well as along Keith Creek within 10th Avenue Park.

**Table 10**  
**ILLCIT DISCHARGE AND IMPROPER DISPOSAL INSPECTIONS DURING 2011**

| <b>Date</b> | <b>Location</b>                         | <b>Type of Discharge</b>    | <b>Source Determined?</b>                 | <b>Nature of Follow-up</b>                           | <b>Submit to Code Enforcement</b> | <b>Notes</b>  |
|-------------|---|-----------------------------|---|--|-----------------------------------|---|
| 1/12/2012   | Jefferson & 6th                         | Mop water dumped into inlet | U.S. Post Office                          | Warning sent   | No                                | COR employee observed on way into work and reported incident                                  |
| 3/20/2012   | 5421 Forest Hills                       | Sanitary manhole overflow   | Yes                                       | RRWRD pumped manhole                                 | No                                | DK & BH checked storm inlets and creek to west and saw no indications of sewage               |
| 3/20/2012   | 3303 Constance                          | spilled paint along curb    | No/ fly dumped on garbage day             | Street dept. sent crew with oil dry to clean up      | No                                | cleaned up with oil dry and properly disposed of.   |
| 4/2/2012    | 4635 Olde Lyme Road                     | grass clippings in creek    | Yes                                       | warning sent   | No                                | warning sent along with yard waste brochure/spoke with property owner as well.                |
| 4/12/2012   | Red Oak Lane                            | yard waste                  | Suspect adjacent homeowners               | letter sent to adjacent homeowners                   | No                                | dumping of landscape material on vacant property.   |
| 5/2/21012   | 4008 Shirley                            | grass clippings in creek    | Yes                                       | warning sent   | NA                                | warning sent along with yard waste brochure   |
| 5/3/2012    | Spring Creek @ confluence of Rock River | oily sheen on creek         | Creosote from rail road bridge over creek | UPRR is onsite performing clean up                   | No                                | UPRR installed boom to soak up material and is replacing railroad ties.                       |
| 5/16/2012   | Springfield & School                    | soap from BP car wash       | Yes, plugged line from car wash           | Frinks onsite pumping lines and cleaning up material | No                                | Frinks was onsite next day pumping the lines and cleaning up. Manager said he would implement |

| Date      | Location                 | Type of Discharge   | Source Determined? | Nature of Follow-up  | Submit to Code Enforcement | Notes   |
|-----------|--------------------------|---|--------------------|--|----------------------------|---|
|           |                          |   |                    |  |                            | a more regular cleaning program.  |
| 6/4/2012  | 1021 Montague            | stormwater  | Yes                | none   | No                         | stormwater from downspouts flowing across street to R.O.W.  |
| 6/8/2012  | NW drainage channel      | flowing water   | Yes                | none   | No                         | Rockford Sand and Gravel Quarry pumping water. They are permitted through IEPA                      |
| 6/8/2012  | 4302 N. Main St.         | concrete waste  | Yes                | talked to building tenant (IEPA)                                 | No                         | IEPA contacted Central Management Services (Building owner) and instructed them to install washout. |
| 6/14/2012 | 1315 Brook Hill Close    | concrete waste  | Yes                | warning sent   | No                         | offer extended to Roscoe Ready mix to train drivers. Monitor their job sites.                       |
| 6/20/2012 | Market & Madison Street  | flowing water in storm sewer during dry conditions, appears clean | No                 | subsequent visit showed no additional discharge                  | No                         | Checked for possible water leaks and viewed adjacent properties but no source found.                |
| 7/20/2012 | NW Market & N. First St. | flowing water in storm sewer during dry conditions, appears clean | No                 | Subsequent visits have shown moisture but source not determined. | No                         | Appears to be coming from Trinity Lutheran Church but source inside could not be determined.        |
| 7/31/2012 | 5861 Shellford           | Clear jelly substance in detention basin                          | No                 | continue to monitor/<br>09/13/2012 no material was observed      | NA                         | Material had no odor and a visit to the site found no more of the substance.                        |

| Date       | Location                           | Type of Discharge             | Source Determined?                         | Nature of Follow-up  | Submit to Code Enforcement | Notes   |
|------------|------------------------------------|-------------------------------|--|--|----------------------------|---|
| 10/9/2012  | 650 Race St.<br>(Megafab facility) | sheen on river                | no, suspect<br>underground tank in<br>area | Booms have been installed<br>in river  | No                         | IEPA is reviewing the site<br>for Site Remediation<br>program. City is<br>monitoring booms.   |
| 10/31/2012 | Cloisters<br>(Sunnyside Dr.)       | Blowing leaves on<br>street   | suspect landscaper<br>for Cloisters Apt.   |  |                            | Message was left for Jerry<br>at Cloisters on 11/2/2012<br>regarding code violation.<br>Additional notice will be<br>sent if they don't respond.<br>11/03/2012 spoke with<br>Cloisters and they said<br>they would address it with<br>landscaper. Subsequent<br>visits have not shown any<br>additional problems. |
| 11/9/2012  | 2721 Sewell                        | Sediment tracked on<br>street | AA Construction                            | 12/27/2012 - Street has been<br>swept. Continue to monitor   | No                         | Contractor is driving over<br>curb to access mulch<br>piles. No stabilized<br>entrance. Letter sent.  |
| 11/27/2012 | near 4040 Morsay                   | running water                 | yes, leaking bleeder<br>valve              | City Water Department<br>repairing   | No                         |   |
| 11/30/2012 | 4815 Creek View<br>Rd.             | trash in drainageway          | yes, tenant in Apt. 4                      | Landlord is evicting due to<br>lease violations, code<br>enforcement notice is being<br>sent to tenant | Yes                        | Property owner has<br>cleaned up property and<br>continues to monitor.<br>They continue to work<br>with city regarding their<br>options with this tenant.<br>Code enforcement has<br>talked to tenant and<br>another notice is being<br>sent to tenant (versus the<br>owner) about violations.                    |

| <b>Date</b> | <b>Location</b>         | <b>Type of Discharge</b> | <b>Source Determined?</b>     | <b>Nature of Follow-up</b>                              | <b>Submit to Code Enforcement</b> | <b>Notes</b>  |
|-------------|-------------------------|--------------------------|-------------------------------|---|-----------------------------------|---|
|             |                         |                          |                               |   |                                   | Police are investigating tenant.  |
| 12/5/2012   | NW Rural & Tamarack St. | Salt dumped on inlet     | no                            | PW crew has been sent out to remove material from inlet | NA                                | approximately 5 gallons of salt was dumped on top of the inlet. Source is unknown, house adjacent to inlet is vacant. |
| 12/5/2012   | 427 Howard St.          | Paint dumped in inlet    | appears to be from 427 Howard | PW crew has cleaned inlet                               | NA                                | Warning sent to address. COR is also investigating address for improperly licensed business.                          |

## 2.7 SPILL PREVENTION AND RESPONSE

This section addresses Parts II.A.8 of the Permit. The Rockford Fire Department is the “First Emergency Responder” in the City. In compliance with Part II.A.8.a, the Fire Department’s records were searched for all incidents of a material spill that may have entered the storm sewer system within the MS4 service area (personal communication, Capt. Charles Barnes, Rockford Fire Department). In 2012, there were four spills encountered by the Fire Department that could have entered the storm sewer system within the MS4 service area (Table 11).

**Table 11**  
**HAZARDOUS MATERIAL RESPONSES**  
**BY THE ROCKFORD FIRE DEPARTMENT IN 2012**

| Date       | Location                 | Incident # | Chemical      | Incident Description  |
|------------|--------------------------|------------|---------------|---|
| 4/21/2012  | 200 N 2nd St             | 7127       | Diesel Fuel   | Fuel leak, unknown quantity. No fuel reported to enter the storm sewer.             |
| 5/4/2012   | N 2nd @Spring Creek      | 8017       | Unknown       | A sheen was noticed in a drainage duct. It appeared to be coming from railroad ties |
| 9/28/2012  | I-90/ Mile 14.75         | 18848      | Paint Pigment | 22# bag of pigment fell from a truck (mutual aid to Cherry Valley FPD)              |
| 10/12/2012 | 650 Race St / Rock River | 19804      | Unknown Oil   | Unknown hydrocarbon in the Rock River,  |

The 5/4/2012 incident was responded to by the railroad, who immediately replaced the ties and the sheen disappeared. The 10/12/2012 incident has also been responded to, and is discussed in detail in the following section.

Permit Part II.A.8.b requires the City to include a summary of ‘spill prevention’ activities in the Annual Report. Currently, most industries are responsible for their own training and education. Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) training is required by most industries; and, spill containment/prevention procedures have been developed by most industries. The Fire Department visits every industrial facility to develop a Pre-fire Plan Survey which includes such information as egress/ingress routes, location and types of chemicals on-site, combustible and flammable materials, special hazards, fire suppression methods, facility maps, emergency contact information, etc. The City has an active recycling campaign, thereby indirectly removing possible spill material from the environment. Overall, the City does not experience many industrial spills.

## **2.8 INDUSTRIAL AND HIGH RISK RUNOFF**

This section addresses Parts II.A.9 and III.A of the Permit.

The City of Rockford continued its Industrial and High Risk Facility Inspection Program (IHRI) in 2012. The program was developed using databases of locations of industries and potential high risk runoff, and industrial NPDES permit data. These databases provide likely locations for industrial and high risk runoff and are currently the basis for future inspections. Such inspections may also be triggered either by citizen complaints, City crew field reports, storm water monitoring data reviews, or other information suggesting a need for inspections or monitoring.

The Permit requires the City to review and evaluate industry SWPPPs (Storm Water Pollution Prevention Plans). The Illinois EPA is responsible for implementing industrial storm water permitting and for compliance with the associated SWPPPs. No SWPPPs are sent to the City for review by the permittees. However, during inspections the City staff request to see any SWPPPs, and record whether a SWPPP is present or missing from each facility.

Fifty-five (55) industrial inspections were performed by City storm water staff during 2012. Table 12 is a summary report on the findings and follow-up actions.

One notable activity in 2012 involved a site undergoing voluntary clean-up located at 650 Race Street in Rockford. IDNR Conservation officer first noticed an oily sheen on the surface of the Rock River on October 9, 2012, and reported the matter to Illinois EPA. The Agency forwarded this report to the City, and their storm water inspectors performed an industrial inspection on the Megafab facility at 650 Race Street on October 12. On this same day, the City's HazMat Response Team inspected the site (Table 11). Inspection revealed nothing to indicate the source of the sheen. Oil booms were immediately installed and a subsurface investigation begun. Subsequently, free petroleum product has been observed at the water table. A former industrial user apparently has left this contamination at the property. Remediation is underway and groundwater and surface water monitoring continues.



Photograph 2. City Storm Water Inspectors monitored a voluntary cleanup site along the Rock River in 2012 where oil seeped from an industrial property.

**Table 12**  
**INDUSTRIAL INSPECTIONS PERFORMED DURING 2012**

| <b>Date</b> | <b>Company/ Permit #<br/>ILR00</b> | <b>SIC<sup>†</sup></b> | <b>NPDES/High<br/>Risk/SIU<sup>††</sup></b> | <b>Follow-<br/>up Rq'd</b> | <b>Follow-up<br/>Date</b> | <b>Corrective Actions<br/>Addressed</b> | <b>Submit to Code<br/>Enforcement</b> | <b>Notes</b>   |
|-------------|------------------------------------|------------------------|---|----------------------------|---------------------------|---|---------------------------------------|--|
| 1/10/2012   | MNP Precision Parts/5866           | 3452                   | NPDES                                       | No                         | NA                        | NA                                      | No                                    |  |
| 1/12/2012   | Concentric (Haldex)                | 3541                   | NPDES, High risk                            | No                         | NA                        | NA                                      | NA                                    |  |
| 1/12/2012   | Barnes International               | 3541                   | NPDES, High risk                            | Yes                        | 3/28/2012                 | NA                                      | NA                                    |  |
| 2/29/2012   | Estwing                            | 3423                   | NPDES, High risk                            | Yes                        | 3/28/2012                 | Yes                                     | No                                    | Facility has changed filter cleaning procedures                      |
| 4/2/2012    | Androck Hardware                   | 3496                   | High Risk                                   | Yes                        | 3/28/2012                 | Yes                                     | No                                    |  |
| 4/2/2012    | First Rockford Group               | 6512                   | High Risk                                   | No                         | NA                        | NA                                      | NA                                    | Recommend removing from future industrial inspection lists           |
| 4/3/2012    | Sjostrom & Sons                    | 3273                   | NPDES?                                      | Yes                        | 6/5/2012                  | Yes                                     | No                                    | More sediment control needed. They agreed to implement some measures |
| 4/3/2012    | Fabricators & Manufacturers Ass.   | 2000                   | High Risk                                   | No                         | NA                        | NA                                      | NA                                    | Recommend removing from future industrial inspection lists           |
| 4/4/2012    | Spider Company, Inc.               |                        | High Risk                                   | No                         | NA                        | NA                                      | NA                                    | Site very clean.   |
| 4/11/2012   | Testor Corp, Inc.                  | 2891                   | NPDES/HR                                    | No                         | NA                        | NA                                      | NA                                    |  |
| 4/19/2012   | Joseph Behr & Sons                 | 3370                   | NPDES/HR                                    | No                         | NA                        | NA                                      | NA                                    | No protection at storm inlets but cleaned several times per day.     |

| <b>Date</b> | <b>Company/ Permit #<br/>ILR00</b> | <b>SIC<sup>†</sup></b> | <b>NPDES/High<br/>Risk/SIU<sup>††</sup></b> | <b>Follow-<br/>up Rq'd</b> | <b>Follow-up<br/>Date</b> | <b>Corrective Actions<br/>Addressed</b> | <b>Submit to Code<br/>Enforcement</b> | <b>Notes</b>                      |
|-------------|------------------------------------|------------------------|---|----------------------------|---------------------------|---|---------------------------------------|-----------------------------------|
| 5/30/2012   | Rosewood Care Center               | 8061                   | HR  | No                         | NA                        | NA                                      | NA                                    | nursing home                      |
| 5/30/2012   | St. Anne's Place                   | 8061                   | HR  | No                         | NA                        | NA                                      | NA                                    | assisted living facility          |
| 5/30/2012   | Fairview Nursing home              | 8061                   | HR  | No                         | NA                        | NA                                      | NA                                    | nursing home                      |
| 5/30/2012   | Ephraim LLC                        | 6000                   | HR  | No                         | NA                        | NA                                      | NA                                    | office building                   |
| 6/18/2012   | Phillips Automotive                | 7539                   | HR  | No                         | NA                        | NA                                      | NA                                    | automotive servicing,             |
| 6/26/2012   | Rockford Env. Science<br>Academy   | 8210                   | HR  | No                         | NA                        | NA                                      | NA                                    |                                   |
| 6/26/2012   | St. Ambrogio Society               | 7991                   | HR  | No                         | NA                        | NA                                      | NA                                    | social club                       |
| 6/26/2012   | Havoline Xpress Lube               | 7549                   | HR  | No                         | NA                        | NA                                      | NA                                    | Formerly Oil X Change             |
| 6/26/2012   | Auto Clinic of Rockford            | 4100                   | HR  | No                         | NA                        | NA                                      | NA                                    |                                   |
| 6/26/2012   | Park Strathmoor                    | 8050                   | HR  | No                         | NA                        | NA                                      | NA                                    | health care and<br>physical rehab |
| 6/26/2012   | Crash 1 Auto Repair                | 4100                   | HR  | No                         | NA                        | NA                                      | NA                                    | automotive servicing              |
| 6/27/2012   | Heartland Community<br>Church      | 7990                   | HR  | No                         | NA                        | NA                                      | NA                                    | church, community<br>services     |
| 6/27/2012   | Whitehead School                   | 8211                   | HR  | No                         | NA                        | NA                                      | NA                                    |                                   |
| 6/27/2012   | Swan Hillman School                | 8211                   | HR  | No                         | NA                        | NA                                      | NA                                    |                                   |
| 6/27/2012   | The Learning Center                | 7990                   | HR  | No                         | NA                        | NA                                      | NA                                    | Day care                          |
| 6/27/2012   | Swedish American Realty            | 8011                   | HR  | no                         | NA                        | NA                                      | NA                                    | Real estate buyers                |

| Date      | Company/ Permit #<br>ILR00              | SIC <sup>†</sup> | NPDES/High<br>Risk/SIU <sup>††</sup> | Follow-<br>up Rq'd | Follow-up<br>Date | Corrective Actions<br>Addressed | Submit to Code<br>Enforcement | Notes   |
|-----------|---|------------------|--------------------------------------|--------------------|-------------------|---------------------------------|-------------------------------|---|
|           | Corp                                    |                  |                                      |                    |                   |                                 |                               |   |
| 6/27/2012 | YMCA                                    | 7991             | HR                                   | No                 | NA                | NA                              | NA                            |   |
| 6/27/2012 | YMCA of Rock River<br>Valley            | 7991             | HR                                   | No                 | NA                | NA                              | NA                            |   |
| 6/27/2012 | Rockford, City of-Water<br>Div. Well#30 |                  | SIU                                  | No                 | NA                | NA                              | NA                            |   |
| 6/27/2012 | Anderson Toyota                         | 5511             | HR                                   | No                 | NA                | NA                              | NA                            | now located at the<br>corner of Riverside and<br>Perryville |
| 6/27/2012 | Sam's Wholesale #18-8297                | 5000             | HR                                   | No                 | NA                | NA                              | NA                            |   |
| 6/27/2012 | Radisson Hotel                          | 7015             | HR                                   | No                 | NA                | NA                              | NA                            |   |
| 6/27/2012 | Comfort Inn                             | 7011             | HR                                   | No                 | NA                | NA                              | NA                            |   |
| 6/27/2012 | Alden Debes                             | 8050             | HR                                   | No                 | NA                | NA                              | NA                            |   |
| 6/28/2012 | Family Medical Center                   | 8011             | HR                                   | No                 | NA                | NA                              | NA                            |   |
| 6/28/2012 | Wesley Willows                          | 8061             | HR                                   | No                 | NA                | NA                              | NA                            |   |
| 7/5/2012  | University Club                         | 8641             | HR                                   | No                 | NA                | NA                              | NA                            |   |
| 7/5/2012  | Midas Muffler Shop                      | 7533             | HR                                   | No                 | NA                | NA                              | NA                            |   |
| 7/5/2012  | River Bluff Nursing Home                | 8050             | HR                                   | No                 | NA                | NA                              | NA                            |   |
| 9/24/2012 | Advanced Auto Parts                     | 5000             | HR                                   | No                 | NA                | NA                              | NA                            | no permit needed based<br>on SIC, no concerns               |

| Date       | Company/ Permit #<br>ILR00       | SIC <sup>†</sup> | NPDES/High<br>Risk/SIU <sup>††</sup> | Follow-<br>up Rq'd | Follow-up<br>Date   | Corrective Actions<br>Addressed | Submit to Code<br>Enforcement | Notes  |
|------------|----------------------------------|------------------|--------------------------------------|--------------------|---|---------------------------------|-------------------------------|--|
| 9/24/2012  | OSF Center for Health            | 6513             | HR                                   | No                 | NA  | NA                              | NA                            | no permit needed based on SIC, no concerns   |
| 9/24/2012  | Oil X Change                     | 7549             | HR                                   | No                 | NA  | NA                              | NA                            | no permit needed based on SIC, no concerns   |
| 9/24/2012  | Rockford College                 | 8221             | HR                                   |                    |   |                                 |                               | no permit needed based on SIC, clean up trash around dumpsters in parking lot  |
| 9/24/2012  | AAA Quality Limousines           | 4100             | HR                                   | NA                 | NA  | NA                              | NA                            | facility is no longer in Rockford  |
| 9/24/2012  | OSF Saint Anthony Medical center | 8062             | HR/SIU                               | NA                 | NA  | NA                              | NA                            | no permit needed based on SIC, no concerns   |
| 10/4/2012  | Gunite                           | 3714             | HR/NPDES                             | Yes                | 12/12/2012  | Yes                             | No                            | Gunite has implemented sweeping program and cleaned out the inlets on their site.  |
| 10/12/2012 | Megafab (W.A. Whitney)           | 3544             | HR/NPDES                             | Yes                | site under continual observation due to remedial activities | site remediation continues      | No                            | Needs NPDES permit, unexplained petroleum based discharge entering river at wall on this site. Working with IEPA on issue. |
| 11/21/2012 | Trans Am Truck & Trailer         | 5013             | HR                                   | No                 | NA  | NA                              | NA                            | Facility is for wholesale truck and trailer parts.   |

| Date       | Company/ Permit #<br>ILR00 | SIC <sup>†</sup> | NPDES/High<br>Risk/SIU <sup>††</sup> | Follow-<br>up Rq'd | Follow-up<br>Date | Corrective Actions<br>Addressed | Submit to Code<br>Enforcement | Notes  |
|------------|----------------------------|------------------|--------------------------------------|--------------------|-------------------|---------------------------------|-------------------------------|--|
| 12/11/2012 | Fairview Shopping Center   | 9990             | HR                                   | No                 | NA                | NA                              | NA                            |  |
| 12/11/2012 | Pep Boys                   | 5000             | HR                                   | No                 | NA                | NA                              | NA                            | Facility is closed. No materials left onsite.  |
| 12/11/2012 | Rubloff Development        | 6000             | HR                                   | No                 | NA                | NA                              | NA                            | Rubloff is no longer there. 4 - unit center 2 of which are vacant. Site looks clean and well kept. |
| 12/11/2012 | Courtyard by Marriot       | 7011             | HR                                   | No                 | NA                | NA                              | NA                            | Site is well kept.   |
| 12/17/2012 | Rib Shak                   | 5815             | HR                                   | No                 | NA                | NA                              | NA                            |  |
| 12/17/2012 | Davita Dialysis            | 6513             | HR                                   | No                 | NA                | NA                              | NA                            | Medical facility, site is clean  |

## Notes:

<sup>†</sup> SIC: Standard Industrial Code is a United States government system for classifying industries by a four-digit code

<sup>††</sup> SIC: Significant Industrial User, as defined by the Rock River Water Reclamation District

## 2.9 PUBLIC EDUCATION, POLLUTION PREVENTION AND GOOD HOUSEKEEPING

This section addresses Parts II.A.10 and III.A of the Permit.

The City of Rockford continues to expand programs on public education, pollution prevention and good housekeeping. The City currently advertises these through brochures, workshops and speaking events, newspaper inserts, and its web site.

**Table 13**

### PUBLIC EDUCATION ON STORM WATER POLLUTION PREVENTION IN 2012

| Venue/ Audience                                       | Type of Presentation/Training              | Notes   |
|---|--|---|
| City Hall Training of Supervisors                     | Lecture on storm water permit requirements | 33 Supervisory staff in attendance  |
| Erosion and Sediment Control Seminar (coop with SWCD) | Various presenters                         | 9 City staff, 100 total attendees, open to public, brochures distributed      |
| Erosion & Sediment Control Seminar                    | Various presenters                         | 6 City staff, 90 total attendees, open to public, brochures distributed       |
| Rogers ready mix driver training                      | Concrete washout requirements              | 50 attendees  |
| Earth Day event, Rock Valley College                  | Green Energy & Storm Water Programs        | 200 at entire event (visited booth), 5 at presentation, brochures distributed |
| Ward 14 Neighborhood Mtg.                             | Neighborhood meeting                       | Presentation and brochures available  |
| Central City Neighborhood Meeting                     | Neighborhood meeting                       | Neighborhood citizens group, 40 attendees, brochures distributed              |
| Madigan Creek Homeowners Workshop                     | Improving water quality around the home    | Homeowners meeting, 40 attendees, brochures distributed                       |
| IEPA MS4 Seminar                                      | MS4 requirements                           | City staff attending  |
| Keith Creek Neighborhood Association                  | Neighborhood meeting                       | City staff attends for progress report  |
| RockSTAT  | Various                                    | Monthly meetings  |
| State of the City                                     | Display                                    | Annually  |

In 2012, the City distributed over 1,100 pamphlets or brochures. These included the following titles:

- Yard Waste
- Water Friendly Landscaping
- Recycling
- Residential Deicing
- Pet Waste

- Illicit Discharge
- Hazardous Materials
- Pesticide, Herbicide, Fertilizer
- Fats, Oils, Grease
- Erosion and Sediment Control
- Concrete Waste
- Stream Corridor Protection and Maintenance
- Rain Barrels

All of these brochures focus on protection of water quality and are available to the general public in the lobby of City Hall and in the Department of Public Works.

Additionally the following information will be included on the City’s website in the near future:

- Citizens Guide to Pest Control & Pesticide Safety
- Rain Gardens – A How-to Manual for Homeowners
- Illinois Urban Manual (<http://www.aiswcd.org/IUM/index.html>)
- IDOT Erosion and Sediment Control Field Guide for Construction Inspection

These demonstrate the City’s compliance with the permit condition to publicize, promote and facilitate improved storm water management in Rockford.

The City and the Park District participate in civic clean-ups of streams and drainage ways to remove improperly disposed debris. Annually the District hosts EarthBeat Volunteers from a local church to assist with creek clean ups to remove trash and debris. In 2012, the crews cleaned up along Kent Creek at Lockwood Park and at Northwest Community Center down to School Street and at Tinker Cottage, as well as along Keith Creek within 10th Avenue Park.

Recycling data for the last few years is tabulated below and suggests that residents are recycling a consistent portion of Rockford’s solid waste stream.

**Table 13**  
**CITY OF ROCKFORD RECYCLING PROGRAM**

| <b>Year</b> | <b>Refuse(tons)</b> | <b>Recycled (tons)</b> | <b>Yard Waste (tons)</b> | <b>Portion Diverted from Landfill</b> |
|-------------|---------------------|------------------------|--------------------------|---------------------------------------|
| 2008        | 53,875              | 7,239                  | 15,854                   | 30%                                   |
| 2009        | 51,786              | 6,830                  | 16,620                   | 31%                                   |
| 2010        | 49,739              | 6,736                  | 14,490                   | 30%                                   |
| 2011        | 48,038              | 6,886                  | 14,811                   | 31%                                   |
| 2012        | 45,497              | 6,604                  | 12,440                   | 30%                                   |

As mentioned earlier, the City cooperates with the Illinois EPA for the collection of household hazardous wastes (HHW) as well. In 2012, there were approximately over 424,620 pounds of household hazardous waste collected at the Rockford site (1915 drums), but it is a regional facility and not all the waste was from Rockford. In 2012, about 76 % of the cars dropping off HHW were registered to Rockford residents.

- Illicit Discharge
- Hazardous Materials
- Pesticide, Herbicide, Fertilizer
- Fats, Oils, Grease
- Erosion and Sediment Control
- Concrete Waste
- Stream Corridor Protection and Maintenance
- Rain Barrels

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| 2012        | 45,497              | 6,604                  | 12,440                   | 30%                                   |

As mentioned earlier, the City cooperates with the Illinois EPA for the collection of household hazardous wastes (HHW) as well. Statistics for 2012 were not available at the time of this writing, but in 2011, there were over 444,000 pounds of household hazardous waste collected at the Rockford site (1,520 drums).

### 3. SWMP FISCAL MATTERS, EFFECTIVENESS, AND OTHER ISSUES

#### 3.1 ANNUAL EXPENDITURES

City expenditures for 2012 for SWMP activities are tabulated below. Table 14 also includes budgeted costs for 2013.

**Table 14**  
**SWMP FISCAL INFORMATION**

| Item(s)                             | 2012 (Actual)           | 2013 (Budgeted) |
|-------------------------------------|-------------------------|-----------------|
| Street Sweeping                     | \$ 542,654              | \$ 428,878      |
| Sewer Repair                        | \$ 315,885              | \$ 408,780      |
| Bridge, Dam, Ditch Maintenance      | \$ 99,856               | \$ 91,000       |
| Inlet Cleaning                      | \$ 81,361               | \$ 173,133      |
| Storm Water City-Wide Drainage Fund | \$ 41,555               | \$ 175,000      |
| Storm Water Sampling and Testing    | \$ 34,816               | \$ 50,000       |
| Storm Water (Other Projects)        | \$ 997,397 <sup>1</sup> | \$ 300,000      |

#### 3.2 PROGRAM REVIEW

The status of Rockford's SWMP implementation and compliance is reviewed in Section 2. During 2012, the City's storm water management program accomplished a myriad of new and continuing objectives, most notably:

- Completing new scope of procedures for the following areas:
  - Erosion and Sedimentation Control Inspection
  - Illicit Discharge and Improper Disposal
  - Detention Basin Inspection
  - Public Education
- Completed steady and unsteady state hydraulic models of Keith Creek as part of ongoing master planning efforts
- Furthered flood control efforts in the Harmon Park neighborhood by constructing two additional basins and a grassed waterway
- 100 site development permit applications were received and reviewed, including Storm Water Pollution Prevention Plans (where the developments required them)
- Received no complaints from citizens regarding erosion controls (or the lack thereof)
- Performed 59 construction site erosion and sedimentation control inspections
- 175 storm water inlets and 3,583 feet of storm drains were vacuumed to improve performance
- 55 inlets were repaired
- Removed over 450 tons of accumulated silt, debris, and floatables from open channels
- Prevented over 1,989 tons of solids from entering the storm water system through street sweeping

<sup>1</sup> Includes grant funding

- Performed 22 inspections for illicit discharge and/or improper disposal
- The Fire Department's HAZMAT Response Team investigated four incidents where hazardous materials may have entered the storm water system
- Performed 55 inspections of industrial and potentially high risk runoff sites
- Distributed over 1,100 various pamphlets and brochures and gave numerous seminars or presentations to the general public, businesses, and civic groups
- Sampled four wet weather events for storm water pollutant load assessment
- Analyzed 20 base flow events for 18 different pollutants
- Completed a biennial bioassessment of four streams in the City's storm water service area to evaluate long-term effects of storm water discharge on aquatic health
- Identified a high risk source of storm water pollutant loads (suspended solids, metals) and worked with the owner to install Best Management Practices

The most recent five-year permit period expired in November 30, 2009. An application for a new permit was submitted to the Illinois EPA in June 2009, followed by supplemental correspondence in September 2009 and March 2012. A number of revisions to the draft permit revisions have been requested by the City, and continue to be reviewed by the Agency.

### **3.3 EFFECTIVENESS OF CONTROLS**

The current storm water monitoring program was started in the 1990s. Monitoring stations were constructed and automation equipment purchased. But routine monitoring did not begin until summer 2003. Storm event and dry-weather screening of water quality began in 2003 and continues through the present. Appendices A, B, and C contain these data and interpret their effectiveness.

Bioassessments of five streams fecal coliform bacteria concentrations regularly exceed the General Use Water Quality Standard and contact recreation use is not supported. Appendix C presents some evidence of improved macroinvertebrate communities in two streams receiving storm water discharges. Bioassessments at T-2, South Kent Creek, and T-4, Keith Creek at Dahlquist Park, indicate improving trends in biotic integrity. No other stream sites show indications of biotic improvement or degradation.

All of the programs implemented to improve water quality in the creeks and Rock River should provide some quantitative evidence of improvement in future years. This data will be reported, as it becomes apparent.

### **3.4 ENFORCEMENT ACTIONS**

In 2007 the US EPA began an audit of NPDES Permit ILS000001. A report was issued the following year (SAIC 2008). Implementation of the US EPA's recommendations continues. In December 2010, the US EPA again contacted the City regarding its follow-up activities for improving compliance with the NPDES Permit, and those discussions continue.

## **REFERENCES**

SAIC. 2008. Municipal Separate Storm Sewer System (MS4) Audit, Rockford, Illinois September 18-20 and October 2-3, 2007. Prepared for US EPA Region 5, Chicago, Illinois by SAIC, Lakewood, Colorado.

## **APPENDICES**

## APPENDIX A - WATER QUALITY MONITORING DATA

This appendix reprints all storm water quality monitoring data collected by the City from 2003 to date. A map is attached showing the five monitoring locations, and a table providing chemical and microbiological data.

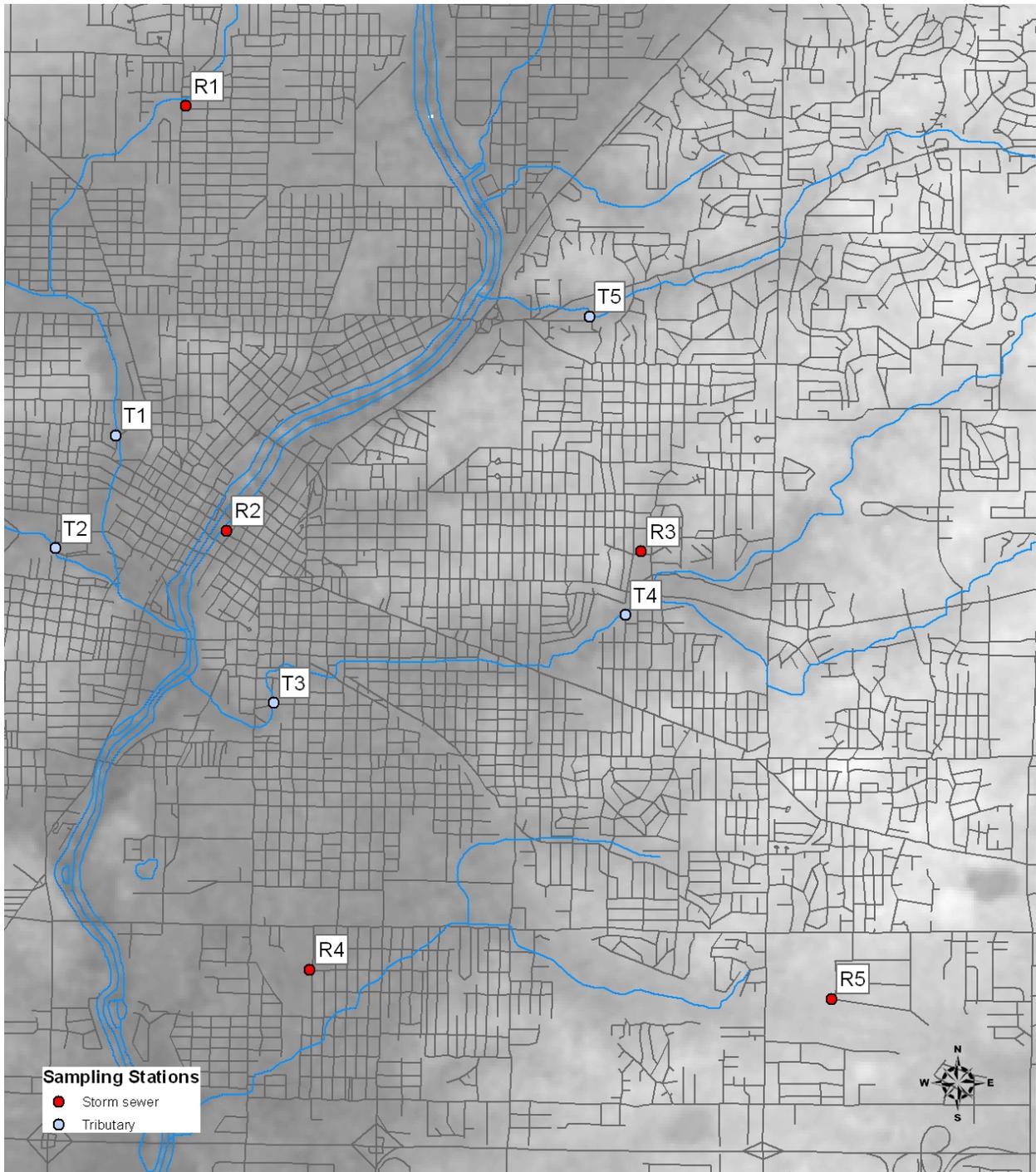
The City of Rockford's NPDES storm water permit cites five locations for monitoring. The City has prepared these locations and installed automatic samplers and rain gages. Much of the monitoring process is defined in the permit.

**Table A.1**  
**STORM WATER MONITORING LOCATIONS**

| <b>Outfall</b> | <b>Latitude</b> | <b>Longitude</b> | <b>Locations</b>   | <b>Watershed Description</b>                         |
|----------------|-----------------|------------------|--|--|
| R1 (001)       | 42.30576        | 89.09617         | Paradise Boulevard<br>Section 11, T44N, R1E                        | 225-ac residential and<br>open space                 |
| R2 (002)       | 42.27045        | 89.09043         | Market St & North First<br>Section 23, T44N, R1E                   | 50-ac commercial, offices,<br>and residential        |
| R3 (003)       | 42.26955        | 89.04381         | Fairview Blvd and<br>Crosby St<br>Section 19, T44N, R2E            | 510-ac residential                                   |
| R4 (004)       | 42.23405        | 89.07985         | 8 <sup>th</sup> St and Wills St<br>Section 36, T44N, R1E           | 780-ac industrial,<br>commercial, and<br>residential |
| R5 (005)       | 42.23266        | 89.02128         | Forest View Rd and<br>28 <sup>th</sup> Ave<br>Section 5, T43N, R2E | 80-ac light industrial                               |

In 2012, the City refurbished parts of the five storm water sampling stations. Two new automatic samplers were purchased. At R5, the rain gage was relocated to improve its accuracy.

Additionally, the wet weather screening requirements of the permit include two locations for monitoring and collection of floatables. These locations are at Alpine Dam and at the intersection of Kishwaukee and Sandy Hollow. The City hauled 2 tons from Kishwaukee and Sandy Hollow and about 70 tons from Alpine (including accumulated silt).



**Figure A.1. Map of Storm Sewer and Tributary Sampling Locations**

Appendix A  
MS4 STORM WATER QUALITY DATA, 2003-2012  
(results in mg/L unless otherwise indicated)

| Station | Outfall | Date       | FCB    | Qualifier | FCB_Units | BOD  | COD | TSS | TDS | FOG | Qualifier | Hardness | Qualifier | NH3 | Qualifier | NO3NO2 | Qualifier | TKN | Qualifier | P    | Qualifier | CN | Qualifier | Phenols | Qualifier | Cu    | Qualifier | Cd    | Qualifier | Zn    | Qualifier | Pb    | Qualifier |
|---------|---------|------------|--------|-----------|-----------|------|-----|-----|-----|-----|-----------|----------|-----------|-----|-----------|--------|-----------|-----|-----------|------|-----------|----|-----------|---------|-----------|-------|-----------|-------|-----------|-------|-----------|-------|-----------|
| R1      | 001     | 6/26/2003  | 15000  | B         | CFU/100mL | 44   | 297 | 422 |     | 10  | K         | 44       |           | 0.7 |           | 1      | K         |     |           | 1.2  |           | 3  | K         | 5       | S         | 0.04  |           | 0.005 | K         | 0.32  |           | 0.063 |           |
| R1      | 001     | 8/1/2003   | 2000   |           | CFU/100mL | 22   | 161 | 162 | 48  | 10  | K         | 40       |           | 1.2 |           | 0.5    |           |     |           | 0.6  |           | 3  | K         | 5       | S         | 0.03  |           | 0.008 |           | 0.17  |           | 0.027 |           |
| R1      | 001     | 8/4/2004   |        |           | CFU/100mL | 74   | 251 | 268 | 124 |     |           | 76       |           | 0.4 |           | 1      | K         | 7   |           | 1.4  |           |    |           |         |           | 0.03  |           | 0.005 | K         | 0.21  |           | 0.055 |           |
| R1      | 001     | 8/27/2004  |        |           | CFU/100mL | 9    | 61  | 61  | 78  | 10  | K         | 34       |           | 0.2 | K         | 1      | K         | 1.7 |           | 0.3  |           |    |           |         |           | 0.01  |           | 0.005 | K         | 0.07  |           | 0.012 |           |
| R1      | 001     | 5/11/2006  | 3100   |           | CFU/100mL | 18   | 91  | 17  | 128 |     |           | 47       |           | 0.2 |           | 1      | K         | 4.3 |           | 0.6  |           |    |           |         |           | 0.02  |           | 0.005 | K         | 0.13  |           | 0.005 | K         |
| R1      | 001     | 6/21/2006  | 15000  | B         | CFU/100mL | 14   | 105 | 122 | 80  | 10  | K         | 46       |           | 0.5 |           | 1      | K         | 4.1 |           | 0.5  |           |    |           |         |           | 0.02  |           | 0.005 | K         | 0.1   |           | 0.013 |           |
| R1      | 001     | 8/3/2006   | 15000  | B         | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R1      | 001     | 9/4/2008   | 9600   |           | CFU/100mL | 10   | 37  | 43  | 42  | 18  |           | 15.2     |           | 0.1 | K         | 0.8    | K         | 1.1 |           | 0.55 |           |    |           |         |           | 0.04  |           | 0.005 | K         | 0.08  |           | 0.007 |           |
| R1      | 001     | 8/27/2009  | 10000  |           | CFU/100mL | 7    | 28  | 26  | 38  | 10  | K         | 37.8     |           | 0.1 | K         | 1      | K         | 0.8 |           | 0.21 |           |    |           |         |           | 0.026 |           | 0.005 | K         | 0.03  | K         | 0.005 | K         |
| R1      | 001     | 9/23/2009  |        |           | CFU/100mL |      | 31  | 16  | 40  | 10  | K         | 8        |           | 0.2 |           | 1      | K         | 0.9 |           | 0.18 |           |    |           |         |           | 0.036 |           | 0.005 | K         | 0.074 |           | 0.005 | K         |
| R1      | 001     | 10/22/2009 | 30900  |           | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R1      | 001     | 6/28/2010  |        |           | CFU/100mL | 15   | 56  | 6   | 82  | 10  | K         | 45.8     |           | 0.1 | K         | 1      | K         | 2.7 |           | 0.28 |           |    |           |         |           | 0.243 |           | 0.094 |           | 0.276 |           | 0.228 |           |
| R1      | 001     | 9/1/2010   |        |           | CFU/100mL | 27   | 94  | 66  | 88  | 10  | K         | 43.4     |           | 1.2 |           | 1.2    |           | 2.2 |           | 0.45 |           |    |           |         |           | 0.021 |           | 0.005 | K         | 0.08  |           | 0.007 |           |
| R1      | 001     | 5/23/2011  |        |           | CFU/100mL | 64   | 159 | 60  | 112 | 10  | K         | 33       |           | 0.6 |           | 1      | K         | 5.3 |           | 1    |           |    |           |         |           | 0.12  |           | 0.005 | K         | 0.1   |           | 0.005 | K         |
| R1      | 001     | 9/26/2011  | 3100   |           | CFU/100mL | 7    | 24  | 2   | 38  | 10  | K         | 17       |           | 0.1 | K         | 0.5    |           | 0.6 |           | 0.1  |           |    |           |         |           | 0.01  |           | 0.005 | K         | 0.04  |           | 0.005 | K         |
| R1      | 001     | 6/1/2012   |        |           | CFU/100mL | 7    | 23  | 7   | 58  | 10  | K         | 28.4     |           | 0.2 |           | 1      | K         | 1   | K         | 0.21 |           |    |           |         |           | 0.037 |           | 0.005 | K         | 0.037 |           | 0.005 | K         |
| R1      | 001     | 12/20/2012 | 3400   |           | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R2      | 002     | 6/26/2003  | 10     | K         | CFU/100mL | 16   | 97  | 79  |     | 10  | K         | 80       |           | 0.2 |           | 1      |           |     |           | 3    |           | 3  | K         | 5       | S         | 0.04  |           | 0.005 | K         | 0.26  |           | 0.03  |           |
| R2      | 002     | 7/10/2003  | 4300   |           | CFU/100mL | 6    | 32  | 29  |     |     |           | 34       |           | 0.2 | K         | 1      | K         |     |           | 1.1  |           | 3  | K         |         |           | 0.02  |           | 0.005 | K         | 0.09  |           | 0.012 |           |
| R2      | 002     | 8/1/2003   | 4200   |           | CFU/100mL | 4    | 12  | 7   | 86  | 10  | K         | 30       |           | 0.2 | K         | 1      | K         |     |           | 1.3  |           | 3  | K         | 5       | S         | 0.02  |           | 0.005 | K         | 0.1   |           | 0.006 |           |
| R2      | 002     | 6/21/2004  | 1380   |           | CFU/100mL | 14   | 93  | 170 | 76  | 10  | K         | 56       |           | 0.4 |           | 1      | K         |     |           | 0.4  |           | 3  | K         |         |           | 0.03  |           | 0.005 | K         | 0.17  |           | 0.355 |           |
| R2      | 002     | 8/4/2004   | 5000   |           | CFU/100mL | 18   | 125 | 246 | 148 |     |           | 112      |           | 0.2 | K         | 1      | K         | 1.4 |           | 0.6  |           |    |           |         |           | 0.05  |           | 0.005 | K         | 0.19  |           | 0.055 |           |
| R2      | 002     | 8/27/2004  |        |           | CFU/100mL | 7    | 90  | 262 | 48  | 10  | K         | 25       |           | 0.2 | K         | 1      | K         | 2.1 |           | 0.5  |           |    |           |         |           | 0.06  |           | 0.005 | K         | 0.27  |           | 0.103 |           |
| R2      | 002     | 5/11/2005  | 1500   | B         | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R2      | 002     | 11/7/2005  |        |           | CFU/100mL | 11   | 37  | 23  | 70  |     |           | 28       |           | 1   |           | 1.3    |           | 3   |           |      |           |    |           |         |           | 0.03  |           | 0.005 | K         | 0.12  |           | 0.009 |           |
| R2      | 002     | 5/11/2006  | 8000   |           | CFU/100mL | 14   | 83  | 8   | 504 | 10  | K         | 147      |           | 0.4 |           | 1.2    |           | 3   |           | 0.3  |           |    |           |         |           | 0.03  |           | 0.005 | K         | 0.17  |           | 0.007 |           |
| R2      | 002     | 6/21/2006  | 15000  | B         | CFU/100mL | 4    | 16  | 18  | 10  | 10  | K         | 16       |           | 0.2 |           | 1      | K         | 0.9 |           | 0.1  |           |    |           |         |           | 0.01  | K         | 0.005 | K         | 0.07  |           | 0.005 | K         |
| R2      | 002     | 6/28/2006  | 500    |           | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R2      | 002     | 8/3/2006   | 15000  | B         | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R2      | 002     | 9/5/2006   | 1440   |           | CFU/100mL | 6    | 32  | 38  | 44  | 11  |           | 26       |           | 0.1 | K         | 1      | K         | 1.2 |           | 0.23 |           |    |           |         |           | 0.02  |           | 0.005 | K         | 0.1   |           | 0.016 |           |
| R2      | 002     | 8/5/2008   | 20     |           | CFU/100mL | 3    | 28  | 26  | 44  |     |           | 25       |           | 1.6 |           | 1      |           | 1.4 |           | 0.11 |           |    |           |         |           | 0.03  | K         | 0.005 | K         | 0.099 |           | 0.007 |           |
| R2      | 002     | 9/4/2008   | 109000 |           | CFU/100mL | 5    | 37  | 33  | 12  | 18  |           | 46       |           | 0.1 | K         | 0.7    | K         | 0.7 |           | 0.35 |           |    |           |         |           | 0.03  | K         | 0.005 | K         | 0.134 |           | 0.009 |           |
| R2      | 002     | 10/8/2008  |        |           | CFU/100mL | 14   | 56  | 16  | 78  | 10  | K         | 34       |           | 0.2 |           | 1.2    |           | 1.1 |           | 0.18 |           |    |           |         |           | 0.103 |           | 0.005 | K         | 0.113 |           | 0.007 | K         |
| R2      | 002     | 8/27/2009  | 9600   |           | CFU/100mL | 3    | 10  | 20  | 32  | 10  | K         | 20.1     |           | 0.1 | K         | 1      | K         | 1.2 |           | 0.07 |           |    |           |         |           | 0.04  |           | 0.005 | K         | 0.03  |           | 0.006 |           |
| R2      | 002     | 10/2/2009  |        |           | CFU/100mL | 14   | 44  | 22  | 114 | 10  | K         | 29.8     |           | 0.2 |           | 1.1    |           | 1.6 |           | 0.12 |           |    |           |         |           | 0.021 |           | 0.005 | K         | 0.059 |           | 0.005 |           |
| R2      | 002     | 10/22/2009 | 2100   |           | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R2      | 002     | 10/23/2009 |        |           | CFU/100mL | 10   | 38  | 8   | 72  | 10  | K         | 19.6     |           | 0.4 |           | 0.6    |           | 0.4 |           | 0.2  |           |    |           |         |           | 0.015 |           | 0.005 | K         | 0.049 |           | 0.005 | K         |
| R2      | 002     | 9/1/2010   | 29600  |           | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R2      | 002     | 6/9/2011   | 19000  |           | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R2      | 002     | 7/22/2011  |        |           | CFU/100mL | 13   |     | 8   | 112 | 9   |           | 48       |           | 0.2 |           | 1      | K         |     |           | 0.15 |           |    |           |         |           | 0.04  |           | 0.005 | K         | 0.09  |           | 0.007 |           |
| R2      | 002     | 9/26/2011  | 1000   |           | CFU/100mL | 3    | 10  | 10  | 10  | 19  |           | 11       |           | 0.1 |           | 0.5    |           | 0.4 |           | 0.1  | K         |    |           |         |           | 0.01  |           | 0.005 | K         | 0.03  |           | 0.005 | K         |
| R2      | 002     | 7/19/2012  |        |           | CFU/100mL | 8    | 43  | 46  | 62  | 10  | K         | 40.8     |           | 0.2 |           | 1      |           | 1   | K         | 0.18 |           |    |           |         |           | 0.028 |           | 0.005 | K         | 0.093 |           | 0.009 |           |
| R2      | 002     | 12/20/2012 | 600    |           | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R3      | 003     | 6/26/2003  | 290    |           | CFU/100mL | 4    | 97  | 24  |     | 10  | K         | 16       |           | 0.3 |           | 1.1    |           |     |           | 0.3  |           | 1  |           | 5       | S         | 0.01  | K         | 0.005 | K         | 0.01  | K         | 0.005 | K         |
| R3      | 003     | 7/10/2003  | 15000  | B         | CFU/100mL | 2    | 12  | 17  |     | 10  | K         | 16       |           | 0.1 | K         | 1      |           |     |           | 0.16 |           | 1  |           | 5       | S         | 0.01  |           | 0.005 | K         | 0.01  | K         | 0.005 | K         |
| R3      | 003     | 8/1/2003   | 15000  | B         | CFU/100mL | 6    | 19  | 23  | 42  | 10  | K         | 32       |           | 0.1 | K         | 1      |           |     |           | 0.2  |           | 1  |           | 5       | S         | 0.01  |           | 0.005 | K         | 0.1   |           | 0.005 | K         |
| R3      | 003     | 8/4/2004   | 43000  |           | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R3      | 003     | 8/27/2004  |        |           | CFU/100mL | 2    | 16  | 33  | 24  | 10  | K         | 10       | K         | 0.1 | K         | 1      | K         | 0.9 |           | 0.2  |           |    |           |         |           | 0.01  | K         | 0.005 | K         | 0.05  |           | 0.007 |           |
| R3      | 003     | 5/11/2005  | 1500   | B         | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R3      | 003     | 5/11/2006  | 8200   |           | CFU/100mL |      |     | 90  | 294 |     |           | 106      |           | 1   |           | 1      |           |     |           |      |           |    |           |         |           | 0.03  |           | 0.005 | K         | 0.17  |           | 0.008 |           |
| R3      | 003     | 5/24/2006  | 900    |           | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R3      | 003     | 6/21/2006  | 15000  | B         | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R3      | 003     | 8/3/2006   | 15000  | B         | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R3      | 003     | 9/5/2006   | 1040   |           | CFU/100mL | 4    | 36  | 168 | 24  | 10  | K         | 17       |           | 0.2 |           | 1      | K         | 2   |           | 0.81 |           |    |           |         |           | 0.02  |           | 0.005 | K         | 0.08  |           | 0.02  |           |
| R3      | 003     | 9/11/2006  | 30000  |           | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R3      | 003     | 8/5/2008   |        |           | CFU/100mL | 7    | 71  | 44  | 74  |     |           | 37       |           | 2   |           | 1.2    |           | 2.3 |           | 0.33 |           |    |           |         |           | 0.03  | K         | 0.005 | K         | 0.081 |           | 0.007 |           |
| R3      | 003     | 9/4/2008   | 9400   |           | CFU/100mL |      |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |
| R3      | 003     | 10/24/2008 |        |           | CFU/100mL | 56</ |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |       |           |       |           |       |           |       |           |

**Appendix A**  
**MS4 STORM WATER QUALITY DATA, 2003-2012**  
(results in mg/L unless otherwise indicated)

| Station | Outfall | Date       | FCB   | Qualifier | FCB_Units | BOD | COD | TSS | TDS | FOG | Qualifier | Hardness | Qualifier | NH3 | Qualifier | NO3NO2 | Qualifier | TKN | Qualifier | P    | Qualifier | CN | Qualifier | Phenols | Qualifier | Cu   | Qualifier | Cd    | Qualifier | Zn    | Qualifier | Pb    | Qualifier |  |
|---------|---------|------------|-------|-----------|-----------|-----|-----|-----|-----|-----|-----------|----------|-----------|-----|-----------|--------|-----------|-----|-----------|------|-----------|----|-----------|---------|-----------|------|-----------|-------|-----------|-------|-----------|-------|-----------|--|
| R4      | 004     | 8/1/2003   | 15000 | B         | CFU/100mL | 3   | 91  | 820 | 94  | 10  | K         | 40       |           | 0.2 | K         | 1.8    |           |     |           | 0.7  |           | 3  | K         | 5       | S         | 0.04 |           | 0.005 | K         | 0.4   |           | 0.344 |           |  |
| R4      | 004     | 10/28/2003 | 240   |           | CFU/100mL | 27  | 180 | 623 | 146 | 10  | K         | 120      |           | 0.5 |           | 4.8    |           |     |           | 0.4  |           | 3  | K         | 5       | S         | 0.04 |           | 0.005 | K         | 0.45  |           | 0.093 |           |  |
| R4      | 004     | 6/21/2004  |       |           | CFU/100mL |     |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |      |           |       |           |       |           |       |           |  |
| R4      | 004     | 8/4/2004   | 16000 |           | CFU/100mL | 25  | 133 | 646 | 120 |     |           | 96       |           | 0.1 | K         | 1.2    |           | 1.8 |           | 0.9  |           |    |           |         |           | 0.05 |           | 0.005 | K         | 0.22  |           | 0.125 |           |  |
| R4      | 004     | 8/27/2004  |       |           | CFU/100mL | 3   | 25  | 38  | 132 |     |           | 72       |           | 0.1 | K         | 1      |           | 0.8 |           | 0.3  |           |    |           |         |           | 0.01 |           | 0.005 | K         | 0.4   |           | 0.007 |           |  |
| R4      | 004     | 11/2/2004  |       |           | CFU/100mL | 5   | 36  | 10  | 162 | 10  | K         | 108      |           | 0.1 | K         | 1.1    |           | 0.8 |           | 0.3  |           |    |           |         |           | 0.02 |           | 0.005 | K         | 0.17  |           | 0.005 | K         |  |
| R4      | 004     | 11/7/2005  |       |           | CFU/100mL | 19  | 62  | 24  | 96  |     |           | 36       |           | 0.3 |           | 1.4    |           | 3   |           | 0.03 |           |    |           |         |           | 0.03 |           | 0.005 | K         | 0.14  |           | 0.094 |           |  |
| R4      | 004     | 5/11/2006  | 10800 |           | CFU/100mL | 19  | 94  | 19  | 94  | 10  | K         | 44       |           | 0.7 |           | 1.2    |           | 2.2 |           | 0.3  |           |    |           |         |           | 0.02 |           | 0.005 | K         | 0.12  |           | 0.009 |           |  |
| R4      | 004     | 6/21/2006  | 15000 | B         | CFU/100mL | 8   | 43  | 51  | 42  | 10  | K         | 35       |           | 0.5 |           | 1      | K         | 2   |           | 0.2  |           |    |           |         |           | 0.02 |           | 0.005 | K         | 0.12  |           | 0.015 |           |  |
| R4      | 004     | 9/5/2006   | 980   |           | CFU/100mL | 121 | 100 | 448 | 226 | 14  |           | 137      |           | 0.1 | K         | 1.5    |           | 2.1 |           | 0.69 |           |    |           |         |           | 0.03 |           | 0.005 | K         | 0.23  |           | 0.055 |           |  |
| R4      | 004     | 9/11/2006  | 20000 |           | CFU/100mL |     |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |      |           |       |           |       |           |       |           |  |
| R4      | 004     | 8/27/2009  | 9200  |           | CFU/100mL |     |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |      |           |       |           |       |           |       |           |  |
| R4      | 004     | 10/2/2009  |       |           | CFU/100mL | 40  | 109 | 132 | 156 | 10  | K         | 39.2     |           | 0.1 | K         | 1      | K         | 2.1 |           | 0.53 |           |    |           |         |           | 0.08 |           | 0.005 | K         | 0.167 |           | 0.029 |           |  |
| R4      | 004     | 10/22/2009 | 8700  |           | CFU/100mL |     |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |      |           |       |           |       |           |       |           |  |
| R4      | 004     | 6/9/2011   | 9600  |           | CFU/100mL |     |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |      |           |       |           |       |           |       |           |  |
| R4      | 004     | 7/22/2011  |       |           | CFU/100mL | 9   |     | 414 | 162 | 15  |           | 60       |           | 0.3 |           | 2      |           |     |           |      |           |    |           |         |           | 0.05 |           | 0.005 | K         | 0.21  |           | 0.057 |           |  |
| R4      | 004     | 10/12/2011 | 1320  |           | CFU/100mL | 11  | 38  | 77  | 80  | 10  | K         | 70       |           | 0.4 |           | 2.6    |           | 1.3 |           | 0.22 |           |    |           |         |           | 0.02 |           | 0.005 | K         | 0.06  |           | 0.013 |           |  |
| R4      | 004     | 8/9/2012   |       |           | CFU/100mL | 3   | 22  | 54  | 76  | 10  | K         | 53.1     |           | 0.3 |           | 1      |           | 1   | K         | 0.29 |           |    |           |         |           | 0.02 |           | 0.005 | K         | 0.06  |           | 0.016 |           |  |
| R4      | 004     | 12/20/2012 | 2100  |           | CFU/100mL |     |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |      |           |       |           |       |           |       |           |  |
| R5      | 005     | 6/19/2003  |       |           | CFU/100mL | 16  | 109 | 220 |     |     |           | 52       |           | 1   |           | 1      | K         |     |           | 0.4  |           | 3  | K         |         |           | 0.05 |           | 0.005 | K         | 0.27  |           | 0.019 |           |  |
| R5      | 005     | 6/26/2003  | 15000 | B         | CFU/100mL | 8   | 20  | 142 |     | 10  | K         | 24       |           | 0.3 |           | 1      | K         |     |           | 0.2  |           | 3  | K         | 5       | S         | 0.05 |           | 0.005 | K         | 0.28  |           | 0.015 |           |  |
| R5      | 005     | 7/10/2003  |       |           | CFU/100mL | 8   | 24  | 35  |     | 10  | K         | 20       |           | 0.2 | K         | 0.6    |           |     |           | 0.1  |           |    |           |         |           | 0.01 |           | 0.005 | K         | 0.07  |           | 0.005 |           |  |
| R5      | 005     | 8/1/2003   | 15000 | B         | CFU/100mL | 6   | 27  | 34  | 32  | 10  | K         | 22       |           | 0.2 | K         | 0.6    |           |     |           | 0.1  |           | 3  | K         | 5       | S         | 0.01 |           | 0.005 | K         | 0.1   |           | 0.005 | K         |  |
| R5      | 005     | 6/21/2004  | 10    | K         | CFU/100mL |     |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |      |           |       |           |       |           |       |           |  |
| R5      | 005     | 8/4/2004   | 7000  |           | CFU/100mL | 10  | 44  | 41  | 42  |     |           | 48       |           | 0.3 |           | 1      | K         | 1.2 |           | 0.3  |           |    |           |         |           | 0.02 |           | 0.005 | K         | 0.08  |           | 0.008 |           |  |
| R5      | 005     | 5/11/2006  | 15000 | B         | CFU/100mL |     |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |      |           |       |           |       |           |       |           |  |
| R5      | 005     | 9/11/2006  | 10300 |           | CFU/100mL |     |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |      |           |       |           |       |           |       |           |  |
| R5      | 005     | 8/27/2009  | 9100  |           | CFU/100mL |     |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |      |           |       |           |       |           |       |           |  |
| R5      | 005     | 10/22/2009 | 3000  |           | CFU/100mL |     |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |      |           |       |           |       |           |       |           |  |
| R5      | 005     | 6/9/2011   | 10400 |           | CFU/100mL |     |     |     |     |     |           |          |           |     |           |        |           |     |           |      |           |    |           |         |           |      |           |       |           |       |           |       |           |  |
| R5      | 005     | 12/20/2012 | 2800  |           | CFU/100mL | 3   | 16  | 6   |     | 10  | K         |          |           | 1.2 |           | 0.6    |           |     |           | 0.1  | K         |    |           |         |           | 0.01 |           | 0.005 | K         | 0.067 |           | 0.005 | K         |  |

## APPENDIX B – STORM WATER POLLUTANT LOADS

This appendix summarizes the storm water pollutant concentrations and loads from the City of Rockford's MS4.

### B.1 Storm Water Pollutant Concentrations

During 2012, four storm events were sampled and runoff was analyzed for one or more pollutants. Figure A.1 maps the sampling locations. To compute event mean concentrations of storm water pollutants, data collected in 2012 were merged into the greater dataset that the City has assembled from prior year's monitoring efforts. The dataset represents MS4 sampling back to 2003. The entire storm water quality dataset was examined graphically and analytically to test for normality, equality of means, and variances. The storm water concentrations with normal distributions were tested by one-way ANOVA (Analysis of Variance), while those groups that were non-normal (nor could be transformed to approximate normality) were tested using the non-parametric Kruskal-Wallis test. The grand means were generally used as estimates of event mean concentrations (EMC). For all inference tests, the significance level,  $\alpha$ , was 0.05.

In general, the grand means are assumed to be our best current estimate for event mean concentrations. Table B-1 includes the results of the testing for the null hypothesis,  $H_0$ , that all means,  $\mu$ , are equal among the five monitoring stations. In those instances where the sampling station means were found not to be equal, multiple pairwise comparisons were performed. The ANOVA testing and multiple pairwise comparisons allowed the City to identify those drainage areas having higher storm water pollutant concentrations than other drainage areas.

**Table B-1**

#### MEAN STORM WATER POLLUTANT CONCENTRATIONS (2003-2012)

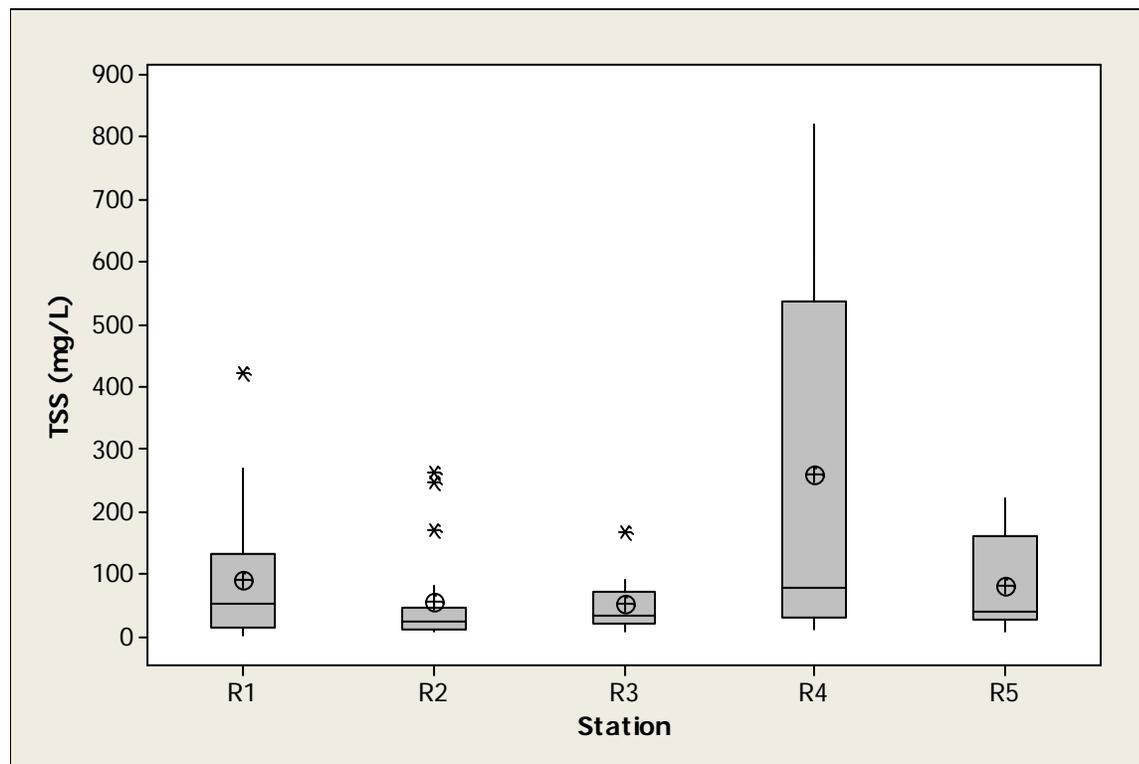
| Pollutant                 | Grand Mean        | Test of Equality of Means |
|---------------------------|-------------------|---------------------------|
| Total Suspended Solids    | 109 mg/L (N=61)   | p-value = 0.080           |
| Total Dissolved Solids    | 92 mg/L (N=52)    | p-value = 0.092           |
| Biochemical Oxygen Demand | 16 mg/L (N=59)    | p-value = 0.138           |
| Chemical Oxygen Demand    | 67 mg/L (N=58)    | p-value = 0.075           |
| Fats, Oils, Grease        | 7.9 mg/L (N=48)   | p-value = 0.571           |
| Ammonia                   | 0.36 mg/L (N=61)  | p-value = 0.851           |
| Nitrate+nitrite           | 0.67 mg/L (N=61)  | p-value = 0.002           |
| Total Kjeldahl Nitrogen   | 1.79 mg/L (N=42)  | p-value = 0.514           |
| Total Nitrogen            | 2.38 mg/L (N=42)  | p-value = 0.211           |
| Total Phosphorus          | 0.465 mg/L (N=56) | p-value = 0.140           |
| Copper                    | 0.037 mg/L (N=61) | p-value = 0.496           |
| Zinc                      | 0.134 mg/L (N=61) | p-value = 0.029           |
| Lead                      | 0.033 mg/L (N=61) | p-value = 0.016           |
| Hardness                  | 45 mg/L (N=60)    | p-value = 0.014           |

Below are discussions of each pollutant. Following that are estimates of storm runoff volume for the MS4 area and storm water pollutant loads for 2012.

### B.1.1 Total Suspended Solids

The boxplot is a convenient method to display medians, quartiles, means, maxima, minima and outliers. Figure B.1 is a boxplot of all total suspended solids (TSS) concentrations observed at the five automated storm sewer stations. The vertical (or interquartile) ranges of the “boxes” reflect the 25th and 75th quartiles of the distribution. The lines, or whiskers, extend upward to the maximum concentration observed at each site and downward to the minimum. The median is shown as a horizontal line within the shaded box; the average is indicated by the circled cross. Potential outliers are shown as asterisks.

Station R3, which reflects the drainage of a 510-acre watershed that is largely residential, has the lowest mean TSS concentration, 51 mg/L. Station R4, reflecting a 780-acre industrial, commercial and residential area had the highest mean TSS concentration, 275 mg/L. A large storage yard adjacent to the sampling station at R4 has been identified as a significant source of TSS and is likely responsible for the high concentrations observed there. This property was identified for inspection under the IHRR Program in 2011 and inspected in 2012. Shortly thereafter the owner installed sediment control devices to reduce total suspended solids.



**Figure B.1. Boxplot of TSS Concentrations**

In spite of the occasional high concentrations of TSS at R4, the medians are much closer and ANOVA using the ln-transformed concentrations at the five stations indicates that the means are equal, although near the  $\alpha$  level ( $p$ -value = 0.08). The grand mean TSS concentration is 109 mg/L and will be used as the event mean concentration (EMC) in the estimation of pollutant loads.

### B.1.2 Total Dissolved Solids

Total dissolved solids (TDS) in storm water are plotted in Figure B.2. ANOVA indicates that the log-transformed means are statistically the same at all monitoring sites ( $p$ -value = 0.092), supporting use of the grand mean, 92 mg/L, for the EMC. None of the samples reflect winter runoff events.

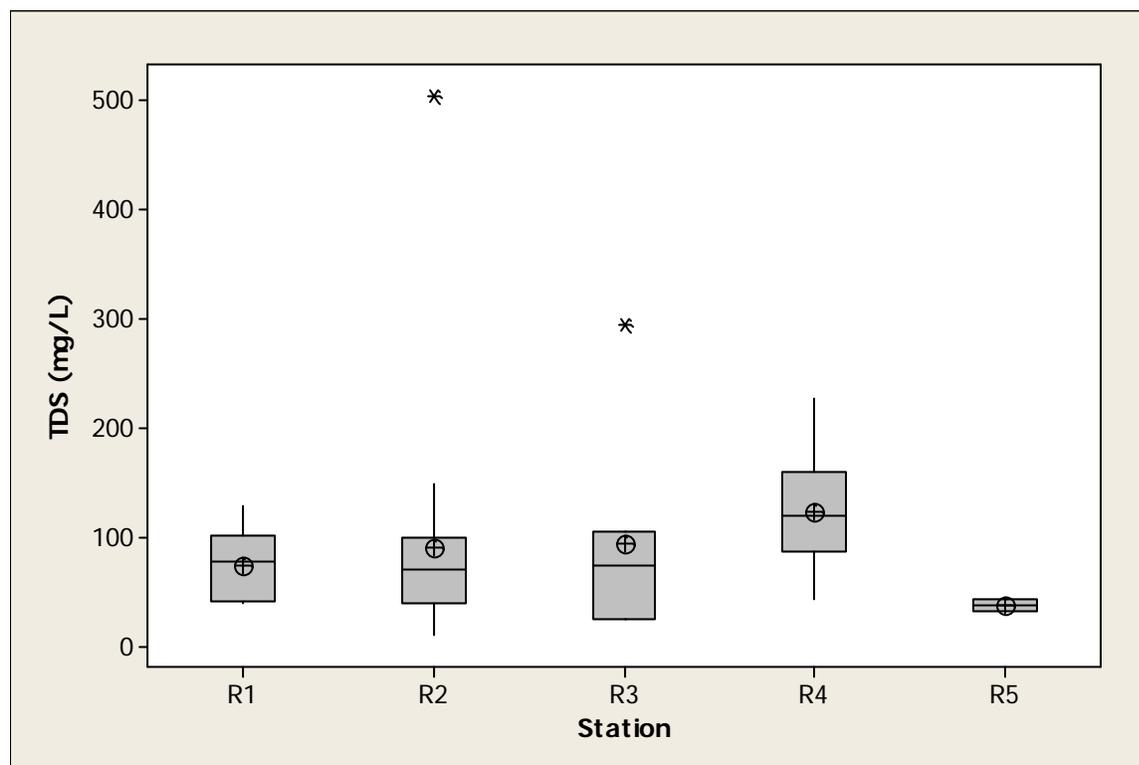


Figure B.2. Boxplot of TDS Concentrations

### B.1.3 Oxygen Demand

The monitoring program included analysis of 5-day biochemical oxygen demand (BOD) and COD, chemical oxygen demand. Figures B.3 and B.4 illustrate these data, combining data from all prior years of storm water monitoring. ANOVA testing of BOD concentrations found that the station means are equivalent ( $p=0.138$ ). The grand mean BOD concentration is 15.8 mg/L and is our best estimate of event mean BOD concentration in the Rockford MS4.

ANOVA testing of log-transformed COD concentrations found that the station means are not equivalent ( $p=0.075$ ), although very near the alpha level for this study. The grand mean COD is 67 mg/L and is a reasonable estimate of event mean concentration in the Rockford MS4. Individual station means are tabulated below.

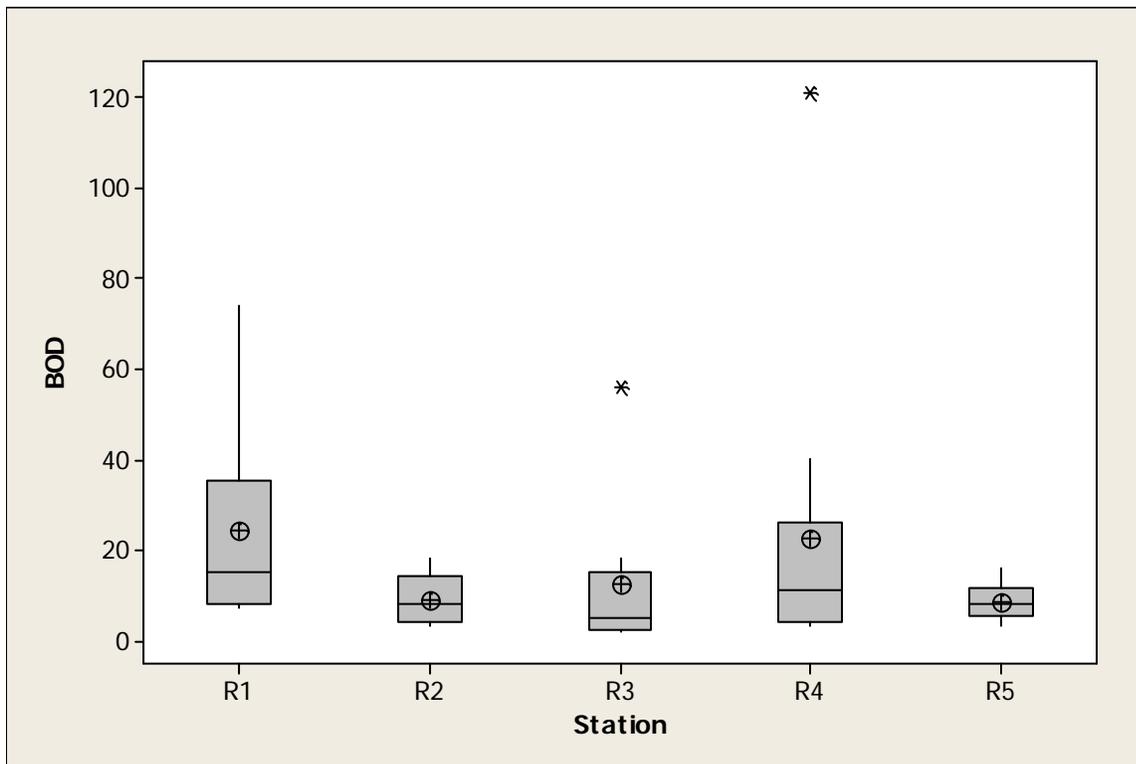


Figure B.3. Boxplot of Biochemical Oxygen Demand Concentrations

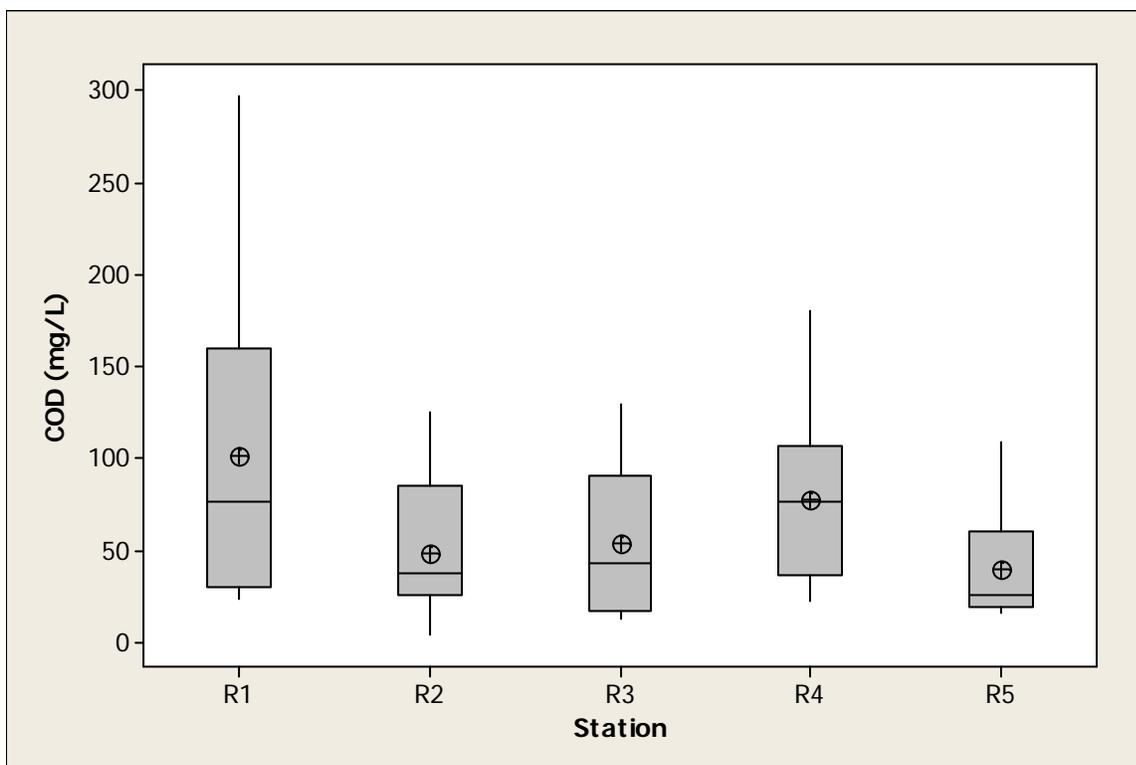
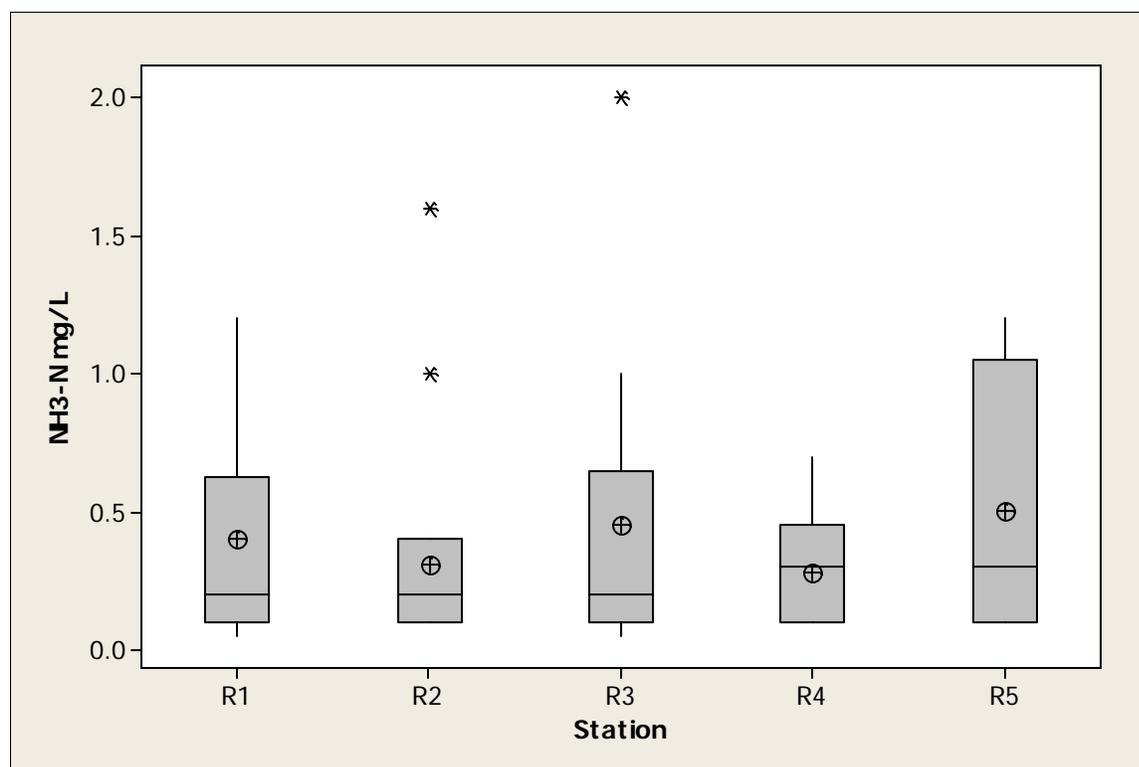


Figure B.4. Boxplot of Chemical Oxygen Demand Concentrations

### B.1.4 Nitrogen and Phosphorus

Nutrients analyzed as part of monitoring storm water quality included ammonia, nitrate-nitrite, total Kjeldahl N (TKN) and total phosphorus. Total nitrogen is computed. Ammonia and nitrate-nitrite each had several observations that were less than the detection limits, and in those cases, we replaced the detection limits with values that were 50% of the MDL.

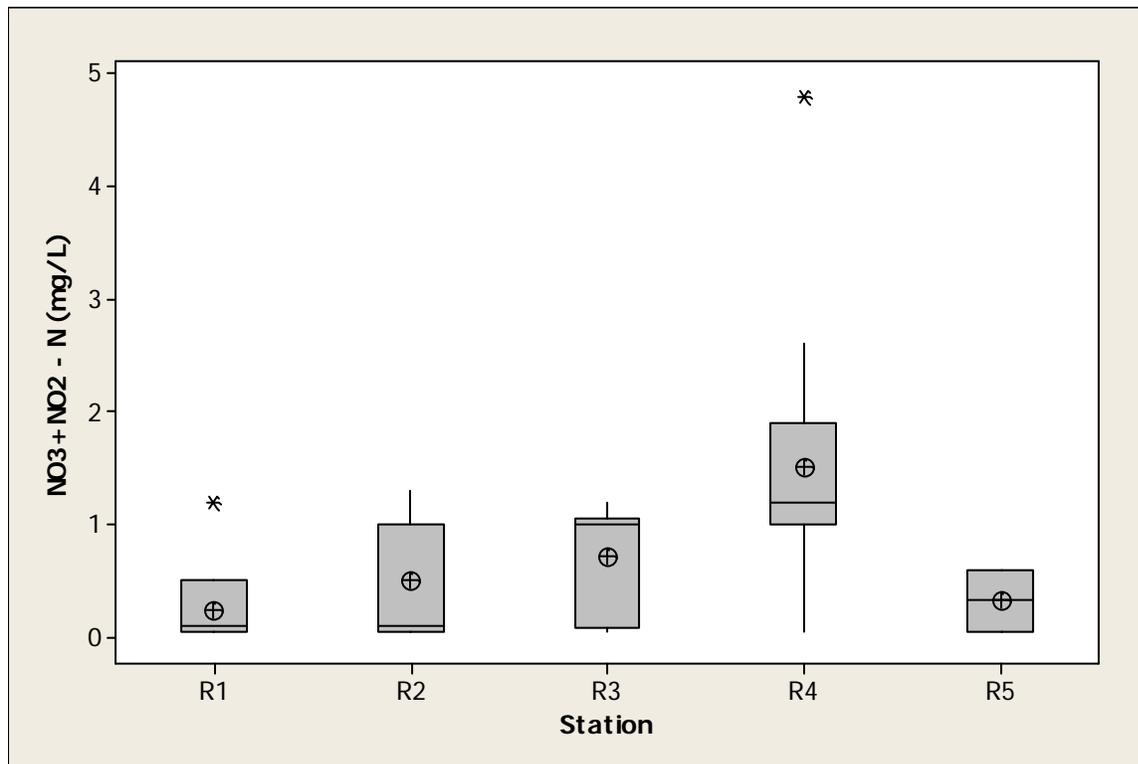
Boxplots of ammonia, nitrate-nitrite, TKN, total nitrogen, and total phosphorus are shown in Figures B.5 through B.9.



**Figure B.5. Boxplot of Ammonia Nitrogen in Storm Water**

Ammonia can be an indicator of sewage, so the City continues to utilize this contaminant in assessing potential illicit connections in the MS4. ANOVA using ln-transformed ammonia concentrations indicates that means of the five stations are equal ( $p$ -value = 0.851); the grand mean, 0.36 mg/L as N, is therefore the estimate of ammonia EMC.

Table B-2 gives summary statistics for nitrate-nitrite in storm water. Highest concentrations have been observed at R-4, near 8<sup>th</sup> and Wills Street where nitrate+nitrite nitrogen concentrations average 1.52 mg/L. ANOVA and Krustal-Wallis (non-parametric) tests indicate that mean nitrate-nitrite concentrations are not equal among the five stations. Multiple pairwise comparisons indicate that the mean ln-transformed nitrate concentration at R4 is higher than all other stations except R3 and R5. The R4 sampling station reflects runoff from a 780-ac mixed-use watershed, including some heavy manufacturing businesses. Lowest concentrations have been observed at R1 and R5.



**Figure B.6. Boxplot of Nitrate+Nitrite in Storm Water**

**Table B-2**

**MEAN NITRATE+NITRITE (mg/L) IN STORM WATER (2003-2012)**

| Station      | N  | Mean |
|--------------|----|------|
| R1           | 14 | 0.24 |
| R2           | 19 | 0.50 |
| R3           | 9  | 0.72 |
| R4           | 13 | 1.52 |
| R5           | 6  | 0.32 |
| All stations | 61 | 0.67 |

TKN in the storm water quality database has 42 measurements. Figure B.7 is a boxplot of TKN measurements at the five storm water stations. ANOVA testing using ln-transformed values indicates that station means are equivalent (p-value = 0.514). The grand mean TKN concentration will be used as the EMC (1.79 mg/L).

Mean total nitrogen concentrations (Figure B.8) are not statistically different between the five stations (p-value = 0.211). The grand mean in storm water is 2.38 mg/L and will be used as the EMC for load estimates.

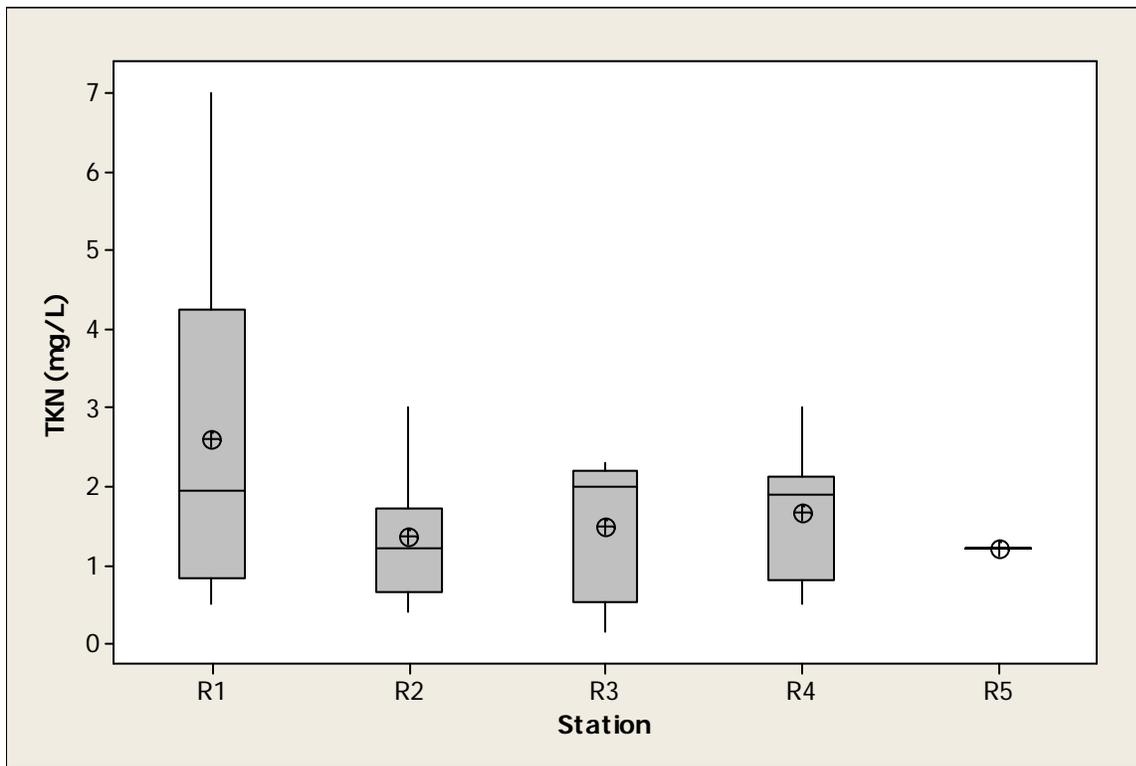


Figure B.7. Boxplot of TKN in Storm Water

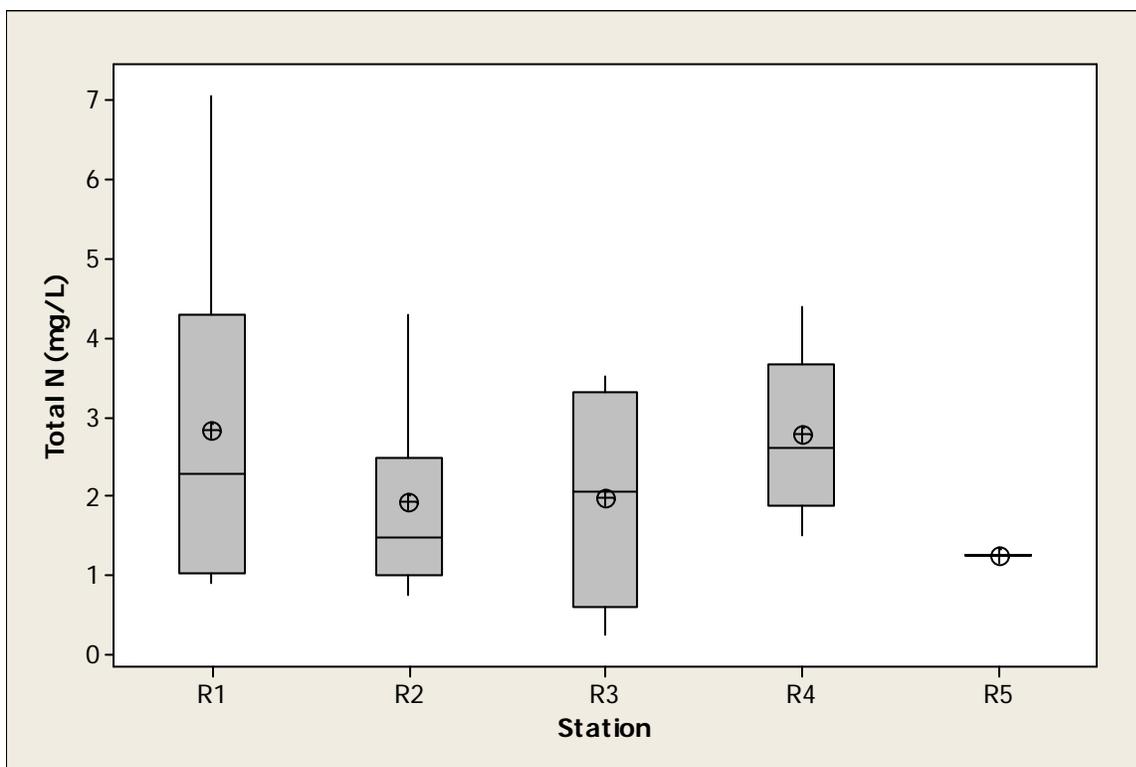
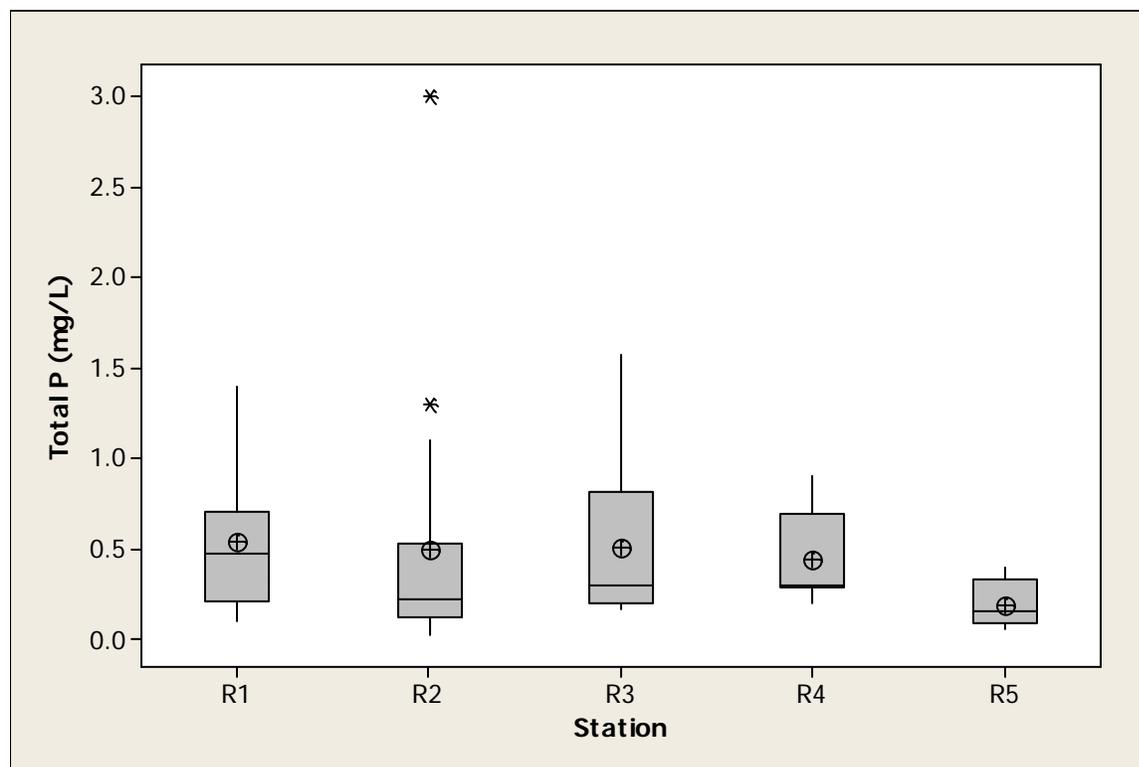


Figure B.8. Boxplot of Total Nitrogen in Storm Water

Figure B.9 is a boxplot of total phosphorus measurements in storm water. ANOVA testing of 56 ln-transformed total phosphorus values indicates that there is no statistical difference among the five station means ( $p$ -value = 0.140). The grand mean phosphorus concentration in storm water is 0.46 mg/L.



**Figure B.9. Boxplot of Phosphorus in Storm Water**

### B.1.5 Heavy Metals

The metals analyzed in storm water samples include copper (Cu), cadmium (Cd), lead (Pb), and zinc (Zn). All analyses were for total metal concentrations; the samples were not filtered prior to analysis.

All 61Cd measurements in storm water samples have been less than the method detection limit (MDL) except two measurements at R1. Descriptive statistics for Cd were therefore not computed. On Aug. 3, 2003 Cd was measured to be 0.008 mg/L at R1, and on June 28, 2010 Cd was measured to be 0.094 mg/L at R1.

Concentrations of other metals with observations less than the MDL were replaced by one-half of the MDL. Boxplots of the observations are shown in Figures B.10 through B.12. Table B.3 summarizes the metals data.

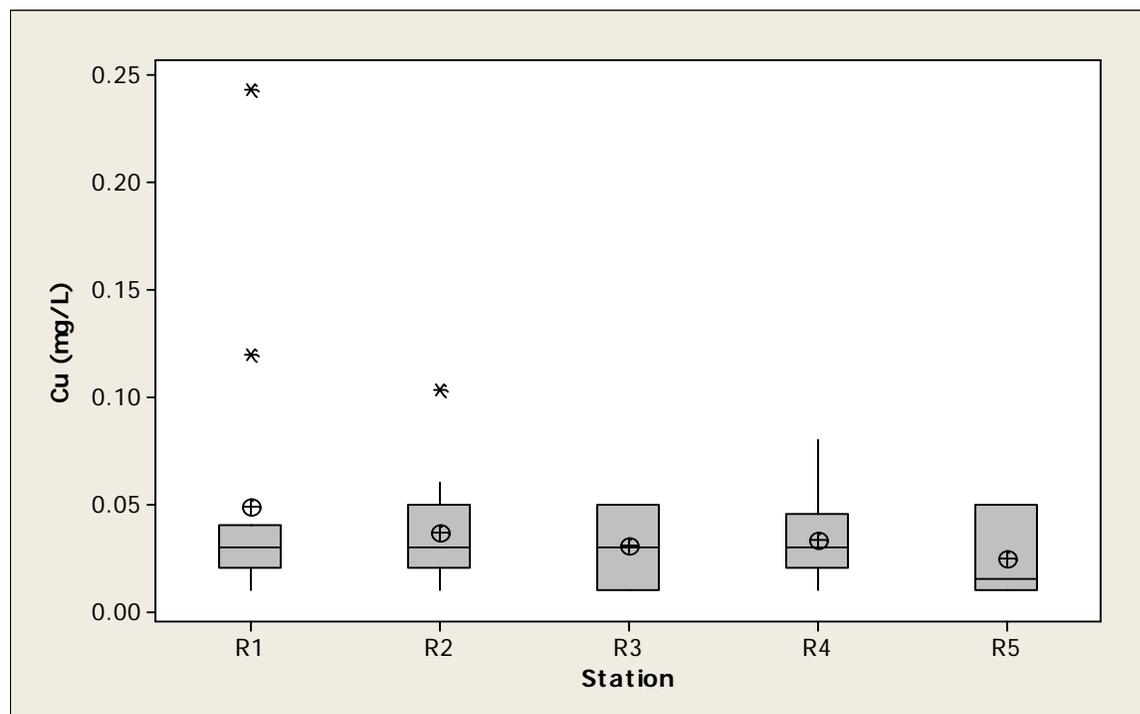
Station R4, adjacent to a storage yard and tool manufacturing facility, has been identified as a potential source of lead and zinc (Figures B.11 and B.12). As mentioned earlier, this industrial property was inspected in 2012 and has changed their practices on cleaning filters to reduce storm water pollutant loads.

| <b>Metal</b> | <b>N</b> | <b>Mean</b> | <b>Minimum</b> | <b>Maximum</b> |
|--------------|----------|-------------|----------------|----------------|
| Copper       | 61       | 0.037       | 0.010          | 0.243          |
| Zinc         | 61       | 0.134       | 0.005          | 0.450          |
| Lead         | 61       | 0.033       | 0.002          | 0.355          |

ANOVA testing of the ln-transformed copper concentrations indicates no difference between station means (p-value = 0.496). Copper in Rockford MS4 storm samples averages 0.037 mg/L, which will be used as the EMC for estimating Cu loads.

Non-parametric Krustal-Wallace testing indicates the zinc concentration medians are not equal among all five stations (p-value = 0.029). Median Zn concentrations measured at R4, near 8<sup>th</sup> and Wills Street, are the highest of the five stations (0.17 mg/L). The lowest concentrations of Zn have been observed at station R3 (median = 0.080 mg/L).

ANOVA testing indicates the ln-transformed lead concentration means are not equal among all five stations (p-value=0.016). The lowest concentrations of Pb have been observed at station R3 (0.006 mg/L). And like Zn, the highest concentrations of Pb have been observed at Station R4, near 8<sup>th</sup> and Wills Street (0.066 mg/L).



**Figure B.9. Boxplot of Copper in Storm Water**

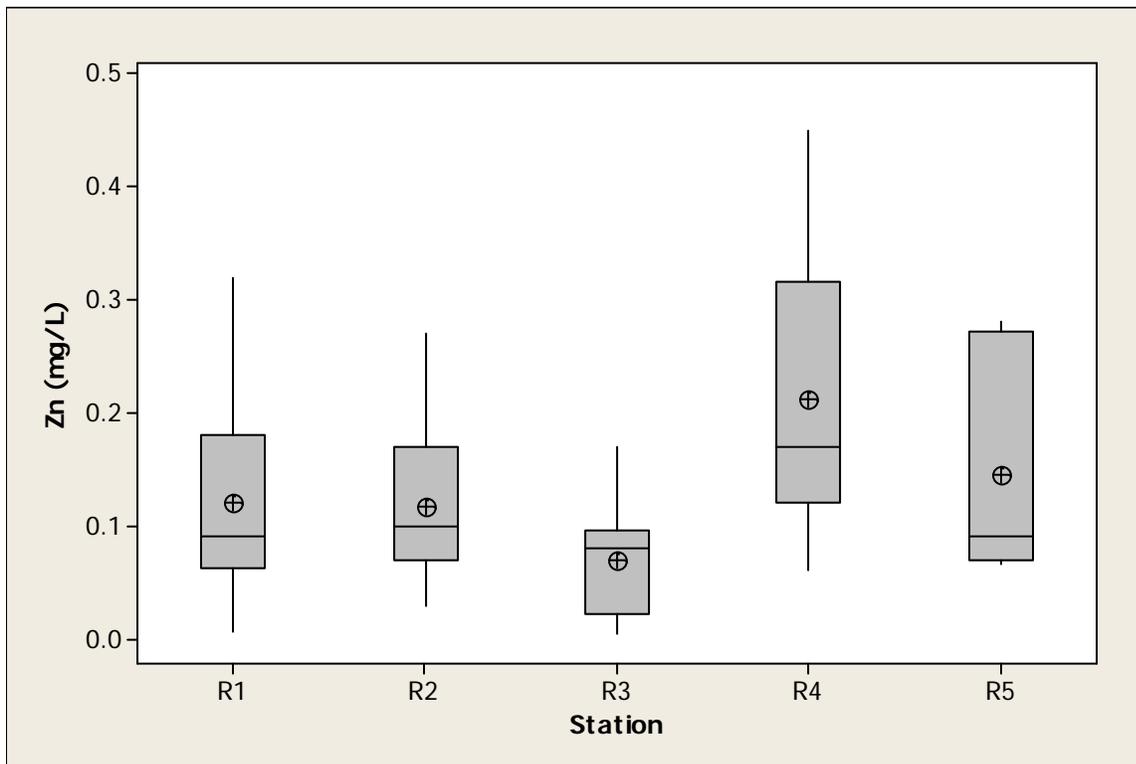


Figure B.10. Boxplot of Zinc in Storm Water

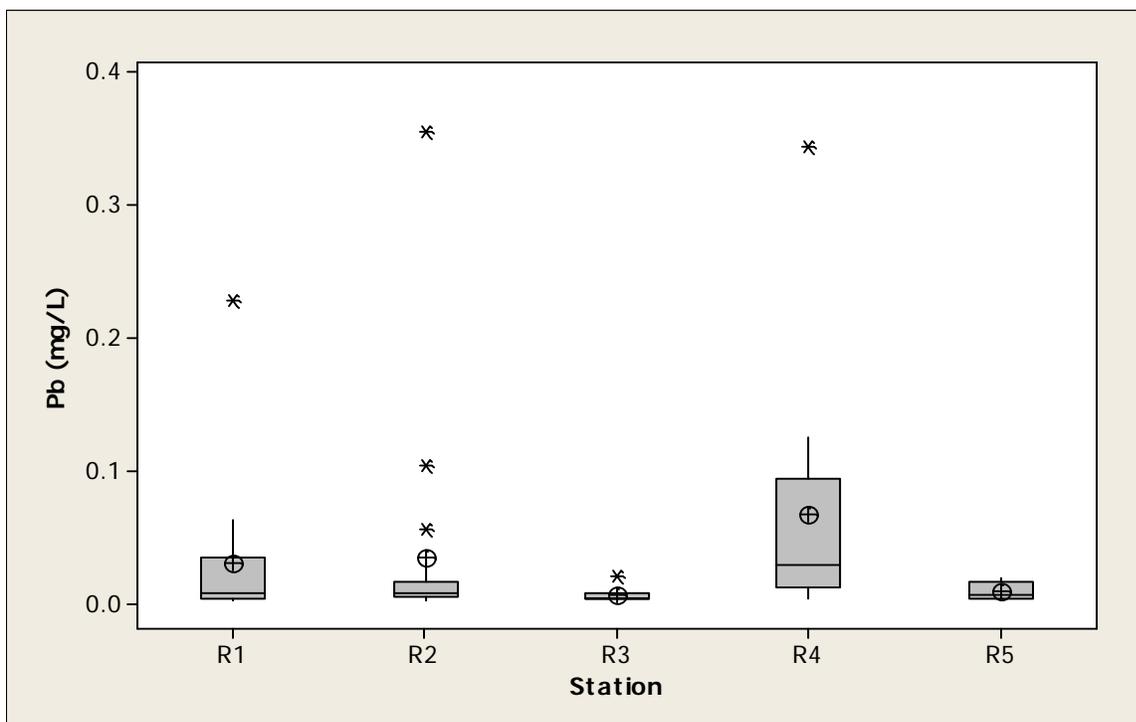


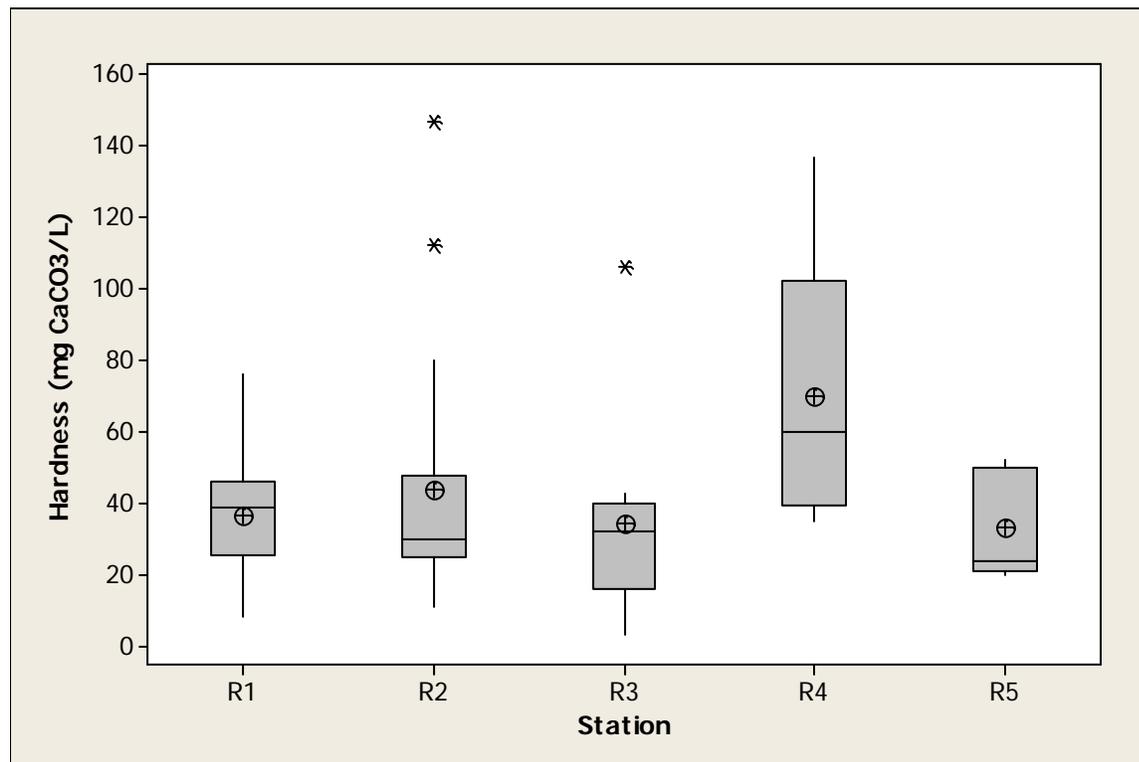
Figure B.11. Boxplot of Lead in Storm Water

### B.1.6 Bacteria

In some years, there are several fecal coliform bacteria results flagged as being greater than the serial dilution series was able to quantify. Therefore, were used nonparametric statistics to analyze these data. We have 67 observations of fecal coliform bacteria in storm water grab samples. Krustal-Wallis testing indicates that the medians among the stations are equal (p-value = 0. 541). The grand median is 9,200 CFU/100 mL.

### B.1.7 Hardness

Hardness is routinely analyzed because the toxicities of many metals are hardness-dependent and a hardness value is required to evaluate compliance with surface water quality standards. Hardness in storm water had a grand mean concentration of 45 mg/L, however ANOVA indicates that ln-transformed hardness concentrations are not equal among the five sampling stations (p-value = 0.014). Pairwise comparisons indicate that the ln-transformed mean of hardness at R4 is significantly higher than R3; other pairwise comparisons are not significantly different from each other.



**Figure B.12. Boxplot of Hardness in Storm Water**

### B.1.8 Fats, Oil, Grease

Analysis of fats, oil and grease (FOG) in storm water is included in the monitoring program as well. We have 48 measurements of FOG. We were unable to transform the FOG data to remove heteroscedasticity, so nonparametric statistical tests were performed. The Krustal-Wallis test indicated that median concentrations of FOG were equivalent among the five stations (p-value = 0.571). The grand mean FOG is 7.9 mg/L; this value will be used as the EMC.

## **B.2 Storm Events and Runoff**

Forty years of precipitation at the Rockford Airport average 36.3 inches annually. In 2012 Rockford received only 23.3 inches of precipitation, over 106 days of the year. In comparison to the long term average, 2003, 2005 and 2012 were dry years, 2008, 2009 and 2011 were wet years, and 2004, 2006, 2007 and 2010 had precipitation amounts closer to the long-term average (Table B.4).

Daily precipitation records for 2003 through 2012 are plotted in Figures B.13 through B.17. These plots also show the dates that storm water was sampled, as does Table B.5.

The automatic sampling stations are triggered by rain gages at each location. They are tipping bucket-type gages and do not record rain amounts other than the number of tips since the meter was last reset. The samplers are programmed to sample after the first 0.10-inch of rain is measured, and then to pump storm water into the sample bottle in proportion to the amount of rainfall (i.e., the number of bucket tips), thereby collecting a precipitation-weighted sample. Data in Tables B.4 and B.5 and Figures B.13 through B.17 are from the recording gage at the Rockford International Airport. Rainfall across the MS4 area is not necessarily consistent with that measured at the airport. Because rainfall is not evenly distributed across Rockford, not all stations are triggered during all storm events. And, from time to time, the samplers have mechanical problems and water samples may not be collected or have to be discarded. Mechanical problems most commonly arise from flooding of the underground vault that house the samplers, from battery outages, or failures of fuses.

**Table B.4**  
**PRECIPITATION AT ROCKFORD AIRPORT**

| <b>DAYS OF PRECIPITATION, 0.01 INCHES OR MORE</b> |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|   | <b>Yrs</b> | <b>Jan</b> | <b>Feb</b> | <b>Mar</b> | <b>Apr</b> | <b>May</b> | <b>Jun</b> | <b>Jul</b> | <b>Aug</b> | <b>Sep</b> | <b>Oct</b> | <b>Nov</b> | <b>Dec</b> | <b>Ann</b> |
| 1961-93   | 43         | 9          | 8          | 11         | 12         | 11         | 10         | 10         | 9          | 9          | 9          | 9          | 10         | 118        |
| 2003  | 1          | 6          | 4          | 13         | 8          | 14         | 9          | 9          | 6          | 6          | 7          | 12         | 7          | 101        |
| 2004  | 1          | 7          | 7          | 19         | 6          | 17         | 9          | 10         | 10         | 1          | 13         | 14         | 5          | 118        |
| 2005  | 1          | 13         | 11         | 9          | 10         | 12         | 9          | 6          | 7          | 9          | 4          | 10         | 11         | 111        |
| 2006  | 1          | 8          | 6          | 14         | 11         | 16         | 12         | 11         | 9          | 13         | 11         | 5          | 8          | 124        |
| 2007  | 1          | 10         | 10         | 11         | 9          | 11         | 11         | 8          | 17         | 6          | 11         | 5          | 15         | 124        |
| 2008  | 1          | 13         | 15         | 10         | 11         | 10         | 15         | 11         | 6          | 8          | 8          | 8          | 16         | 131        |
| 2009  | 1          | 9          | 7          | 9          | 11         | 9          | 10         | 9          | 11         | 5          | 17         | 8          | 15         | 120        |
| 2010  | 1          | 5          | 9          | 9          | 11         | 11         | 16         | 13         | 9          | 10         | 5          | 2          | 14         | 114        |
| 2011  | 1          | 14         | 12         | 8          | 16         | 13         | 11         | 8          | 10         | 9          | 9          | 7          | 11         | 128        |
| 2012  | 1          | 9          | 8          | 12         | 10         | 11         | 4          | 12         | 8          | 7          | 10         | 3          | 12         | 106        |
| <b>MONTHLY PRECIPITATION (inches)</b>             |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|   | <b>Yrs</b> | <b>Jan</b> | <b>Feb</b> | <b>Mar</b> | <b>Apr</b> | <b>May</b> | <b>Jun</b> | <b>Jul</b> | <b>Aug</b> | <b>Sep</b> | <b>Oct</b> | <b>Nov</b> | <b>Dec</b> | <b>Ann</b> |
| 1961 - 90   | 40         | 1.28       | 1.14       | 2.46       | 3.65       | 3.66       | 4.52       | 4.12       | 4.15       | 3.80       | 2.88       | 2.57       | 2.05       | 36.3       |
| 2003  | 1          | 0.34       | 0.16       | 1.45       | 2.33       | 4.20       | 1.98       | 3.71       | 0.48       | 1.89       | 1.30       | 3.70       | 3.20       | 24.7       |
| 2004  | 1          | 0.46       | 0.79       | 4.04       | 1.79       | 8.21       | 3.40       | 3.25       | 6.89       | 0.08       | 2.56       | 3.03       | 0.61       | 35.1       |
| 2005  | 1          | 3.29       | 1.51       | 0.43       | 1.71       | 1.78       | 2.45       | 1.45       | 5.10       | 1.86       | 0.24       | 2.81       | 0.98       | 23.6       |
| 2006  | 1          | 2.98       | 0.66       | 4.05       | 4.30       | 3.72       | 3.32       | 3.64       | 3.55       | 2.91       | 3.52       | 2.69       | 2.52       | 37.9       |
| 2007  | 1          | 0.79       | 1.43       | 3.25       | 2.73       | 1.25       | 4.1        | 2.4        | 14.0       | 2.04       | 1.44       | 0.4        | 3.27       | 37.1       |
| 2008  | 1          | 1.14       | 3.06       | 2.23       | 5.42       | 3.12       | 6.27       | 7.35       | 1.91       | 6.36       | 1.68       | 1.39       | 4.18       | 44.1       |
| 2009  | 1          | 0.81       | 2.22       | 5.8        | 4.6        | 3.35       | 7.4        | 2.6        | 7.19       | 1.69       | 5.94       | 1.44       | 3.55       | 46.6       |
| 2010  | 1          | 0.85       | 0.66       | 1.41       | 2.78       | 5.82       | 4.8        | 9.4        | 1.96       | 1.89       | 3.02       | 0.25       | 1.73       | 34.6       |
| 2011  | 1          | 0.88       | 1.90       | 3.41       | 3.40       | 3.18       | 3.39       | 8.0        | 4.47       | 5.33       | 1.58       | 4.1        | 2.06       | 41.7       |
| 2012  | 1          | 1.23       | 1.31       | 2.09       | 4.13       | 1.62       | 0.61       | 2.69       | 2.38       | 1.74       | 2.42       | 0.6        | 2.49       | 23.3       |

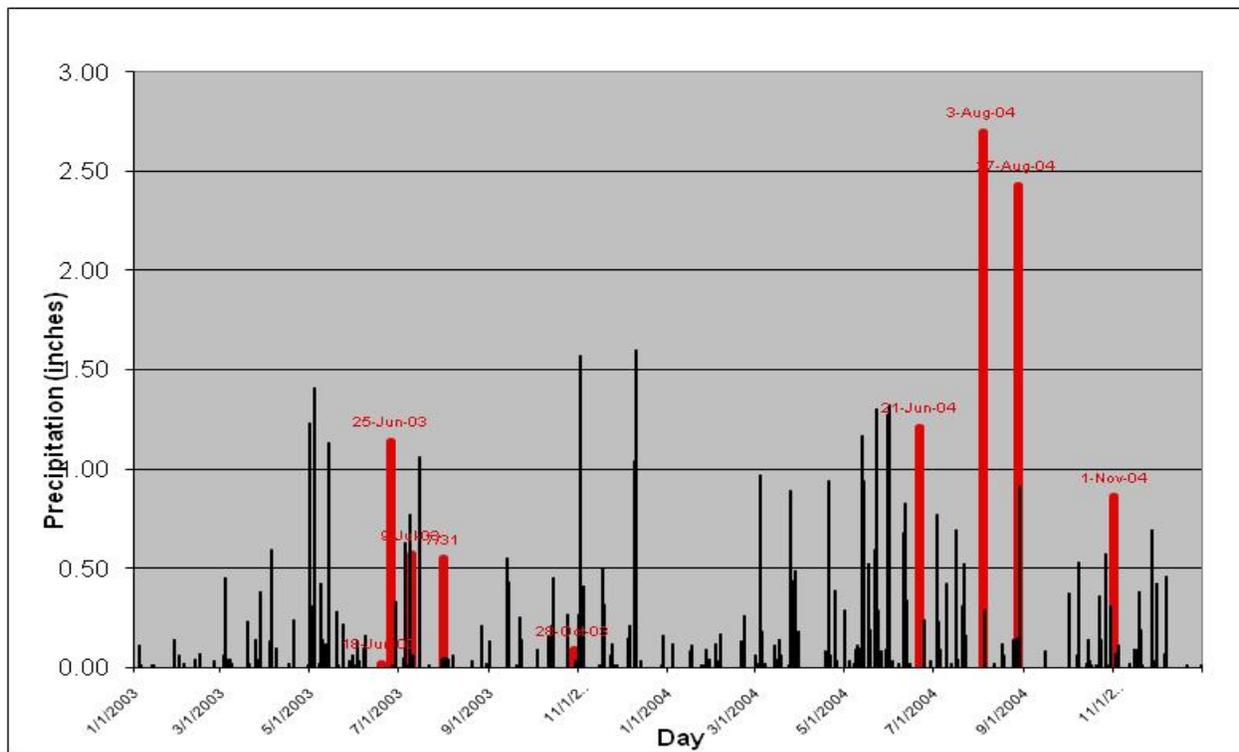


Figure B.13. Daily Precipitation and Sampling Events, 2003-2004

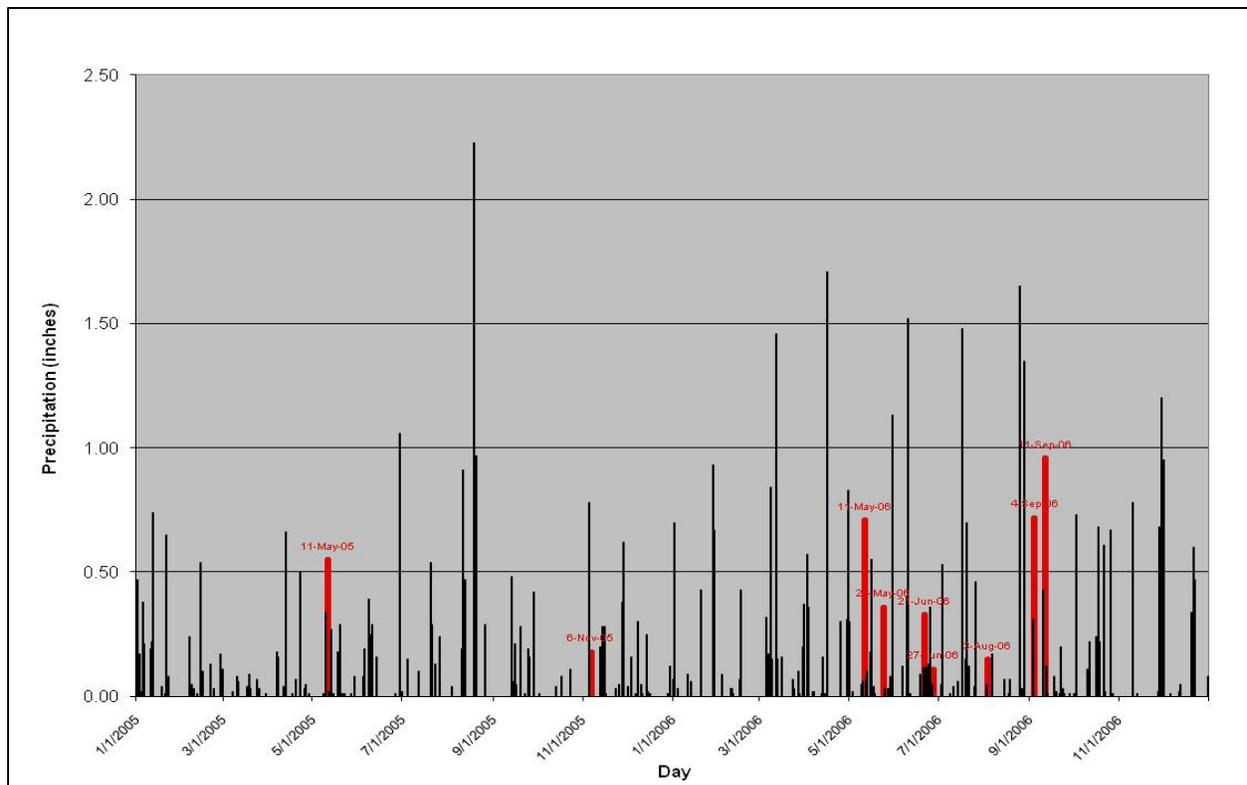


Figure B.14. Daily Precipitation and Sampling Events, 2005-2006

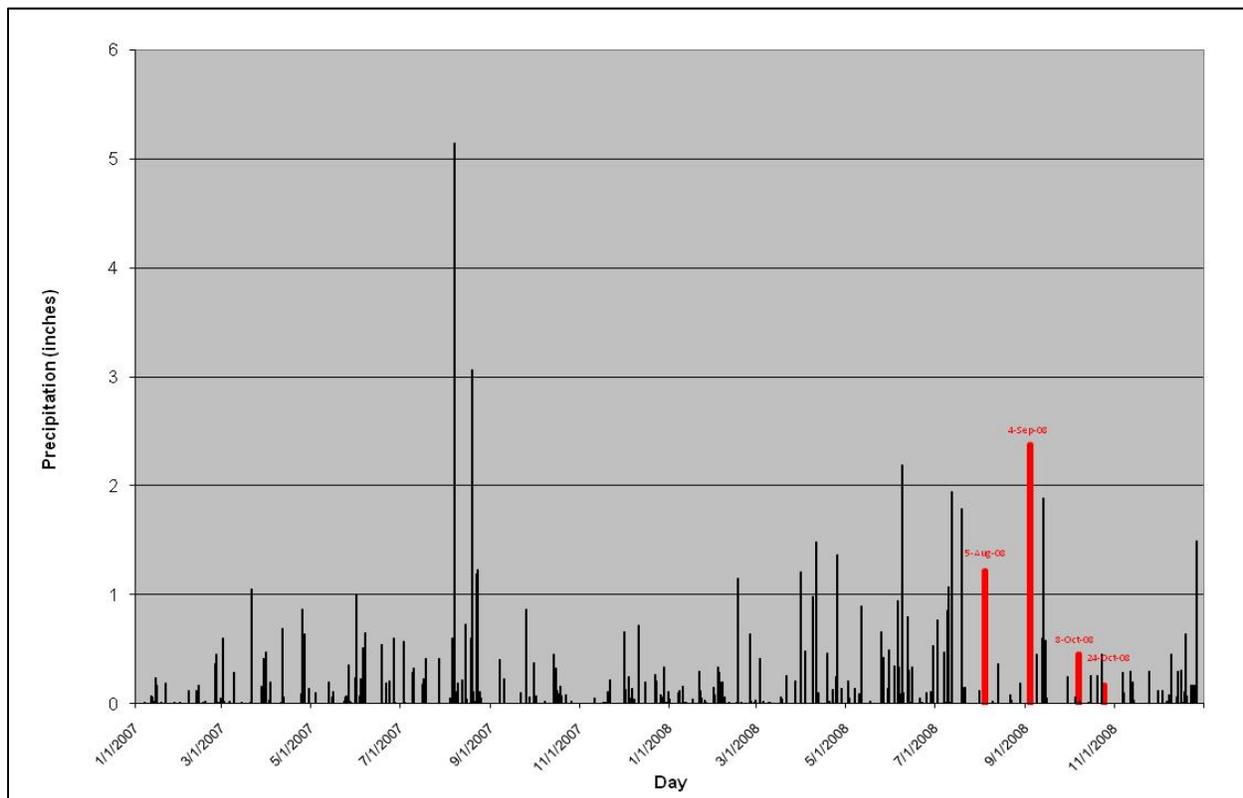


Figure B.15. Daily Precipitation and Sampling Events, 2007-2008

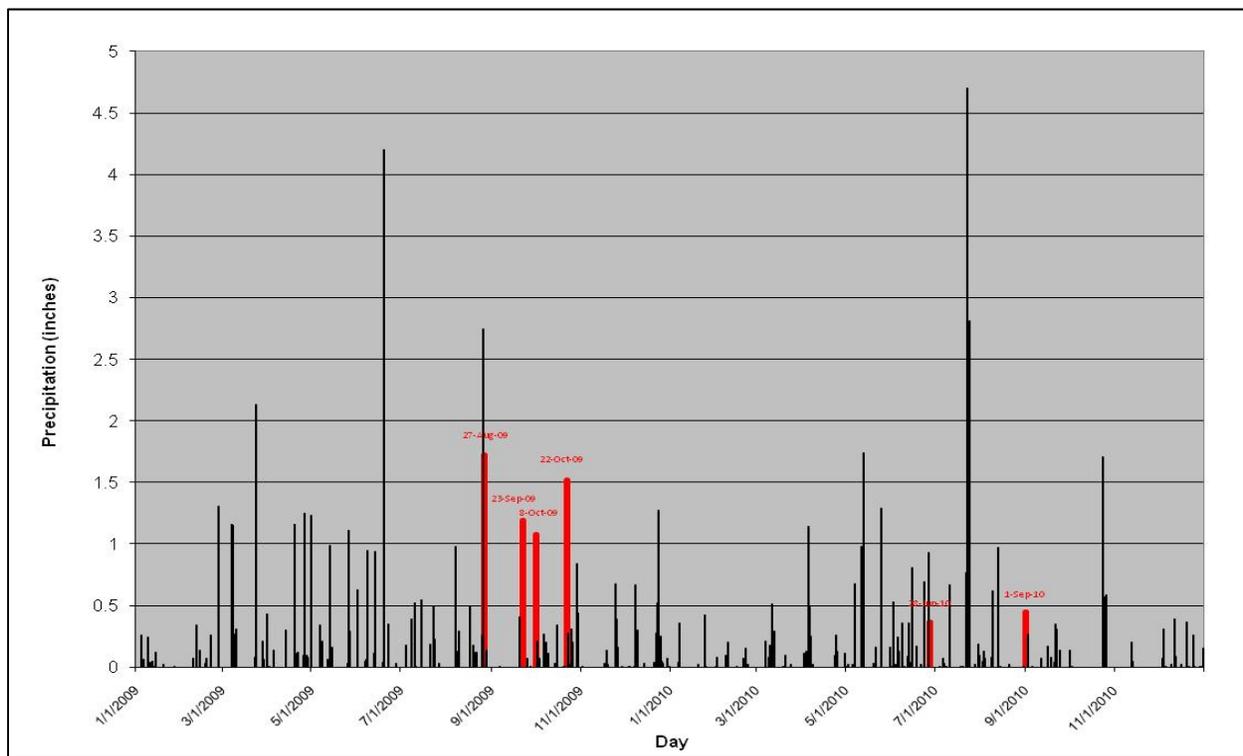
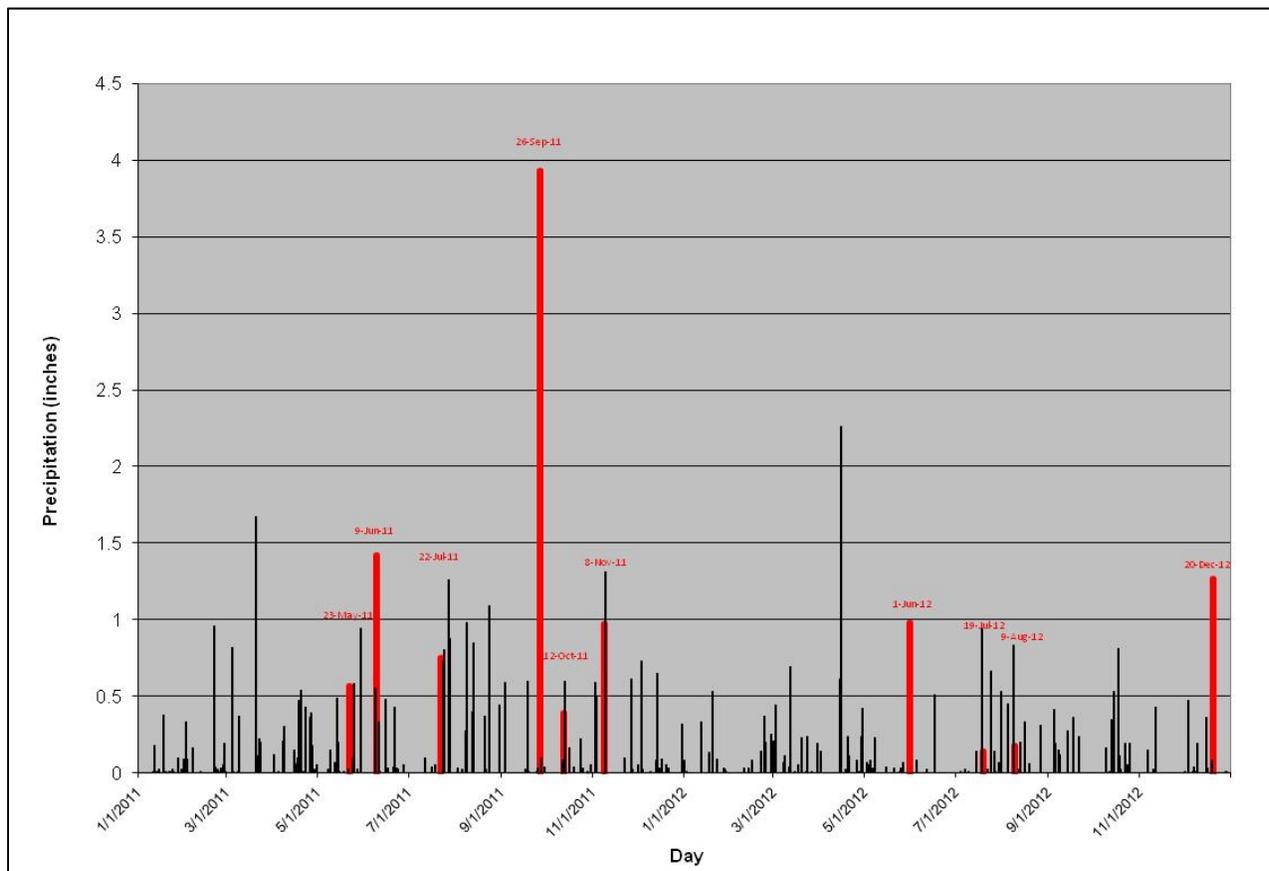


Figure B.16. Daily Precipitation and Sampling Events, 2009-2010



**Figure B.17. Daily Precipitation and Sampling Events, 2011-2012**

**Table B.5****STORM EVENTS, DATES SAMPLED, AND ANTECEDENT CONDITIONS, 2003 - 2012**

| <b>Antecedent Day's Rain (in)</b> | <b>Date of Sample</b> | <b>Day of Sampling Rain (in)</b> |
|-----------------------------------|-----------------------|----------------------------------|
| 0.02                              | June 19, 2003         | 0.00                             |
| 1.14                              | June 26, 2003         | 0.01                             |
| 0.57                              | July 10, 2003         | 0.06                             |
| 0.55                              | August 1, 2003        | 0.03                             |
| 0.00                              | October 28, 2003      | 0.09                             |
| 0.00                              | June 21, 2004         | 1.21                             |
| 2.70                              | August 4, 2004        | 0.29                             |
| 0.15                              | August 27, 2004       | 2.43                             |
| 0.86                              | November 2, 2004      | 0.07                             |
| 0.00                              | May 11, 2005          | 0.55                             |
| 0.18                              | November 7, 2005      | 0.00                             |
| 0.06                              | May 11, 2006          | 0.71                             |
| 0.00                              | May 24, 2006          | 0.36                             |
| 0.09                              | June 21, 2006         | 0.33                             |
| 0.11                              | June 28, 2006         | 0.00                             |
| 0.05                              | August 3, 2006        | 0.15                             |
| 0.72                              | September 5, 2006     | 0.00                             |
| 0.43                              | September 11, 2006    | 0.96                             |
| 1.22                              | August 5, 2008        | 0.00                             |
| 0.16                              | September 4, 2008     | 2.38                             |
| 0.45                              | October 8, 2008       | 0.02                             |
| 0.45                              | October 24, 2008      | 0.17                             |
| 2.75                              | August 27, 2009       | 1.72                             |
| 1.19                              | September 23, 2009    | 0.00                             |
| 1.08                              | October 2, 2009       | 0.21                             |
| 0.01                              | October 22, 2009      | 1.52                             |
| 1.52                              | October 23, 2009      | 0.28                             |
| 0.27                              | June 28, 2010         | 0.00                             |
| 0.00                              | September 1, 2010     | 0.45                             |
| 0.57                              | May 23, 2011          | 0.00                             |
| 0.55                              | June 9, 2011          | 1.42                             |
| 0.00                              | July 22, 2011         | 0.75                             |
| 0.03                              | September 26, 2011    | 3.93                             |
| 0.08                              | October 12, 2011      | 0.39                             |
| 0.00                              | November 8, 2011      | 0.97                             |
| 0.98                              | June 1, 2012          | 0.00                             |
| 0.94                              | July 19, 2012         | 0.14                             |
| 0.83                              | August 9, 2012        | 0.18                             |
| 0.08                              | December 20, 2012     | 1.27                             |

### **B.3 Storm Water Pollutant Loads**

The EPA Simple Method was used to develop storm runoff volumes and associated pollutant loads. The method is discussed in the EPA guidance manual<sup>2</sup>. In the Simple Method, annual pollutant loads are estimated as the product of storm runoff volume and event mean pollutant concentrations, summed over the course of one year. Annual runoff was estimated as the product of rainfall, a runoff coefficient, and the fraction of annual rainfall events that produce runoff (recommended by USEPA guidance as 0.9). The runoff coefficients account for imperviousness and were estimated from 30-m pixel satellite imagery from the Illinois GAP Project<sup>3</sup>.

Table B.6 provides the updated event mean concentrations (EMC) and estimates for 2012 storm water pollutant loads. These loads do not include areas outside City limits or any baseflow (or natural background) pollutant loads. EMC values used in 2012 have been updated using the most recent data (Table B-1).

Figures B.18 through B.21 plot annual storm water pollutant loads from the MS4 for several key parameters. Trends in these plots are a function of not only changes in EMC but changes in annual runoff volumes.

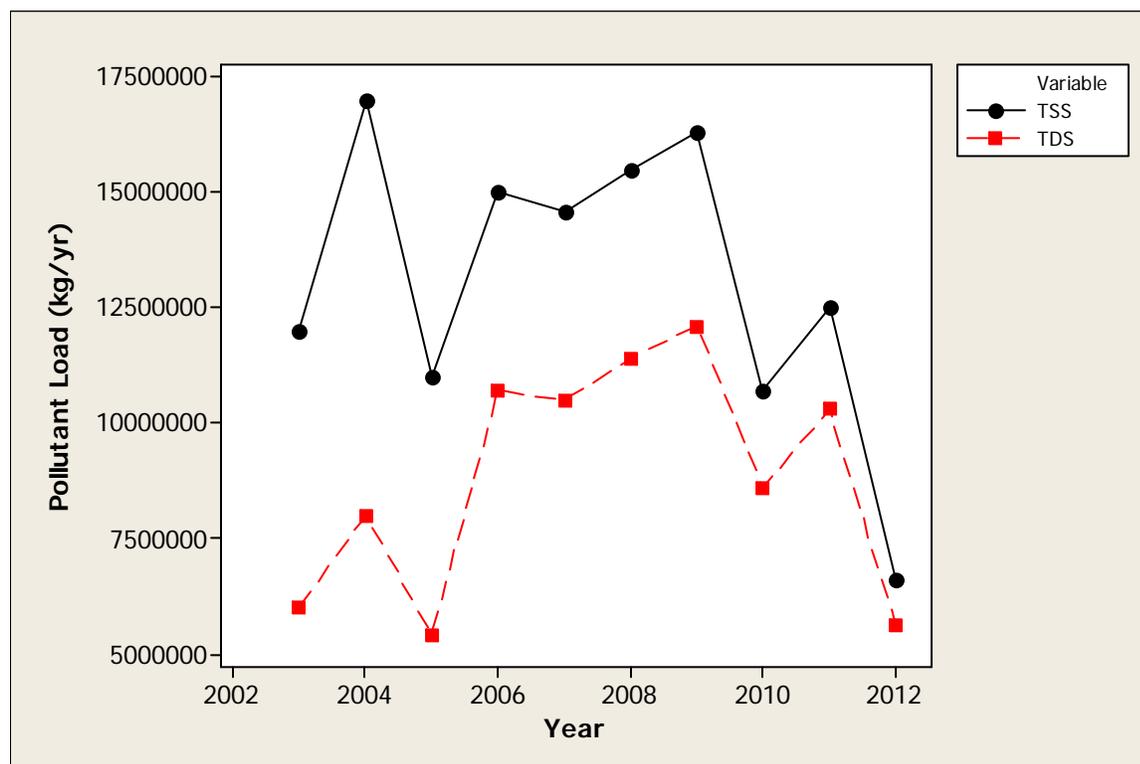
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<sup>2</sup> Guidance Manual for the Preparation of Part 2 of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems. EPA-833-B-92-002. November, 1992.

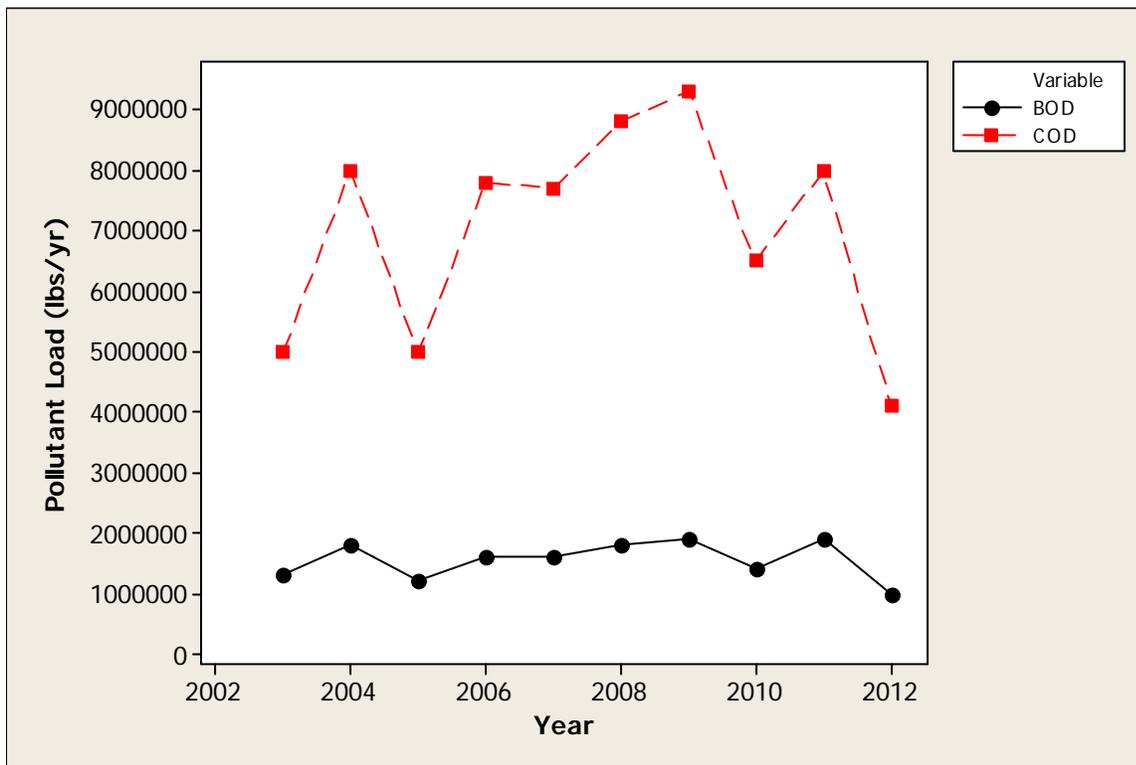
<sup>3</sup> Illinois Natural History Survey's 1999-2000 1:100,000 Scale Illinois Gap Analysis Land Cover Classification, Version 2.0, September 2003.

**Table B.6  
STORM WATER POLLUTANT LOADS FOR 2012**

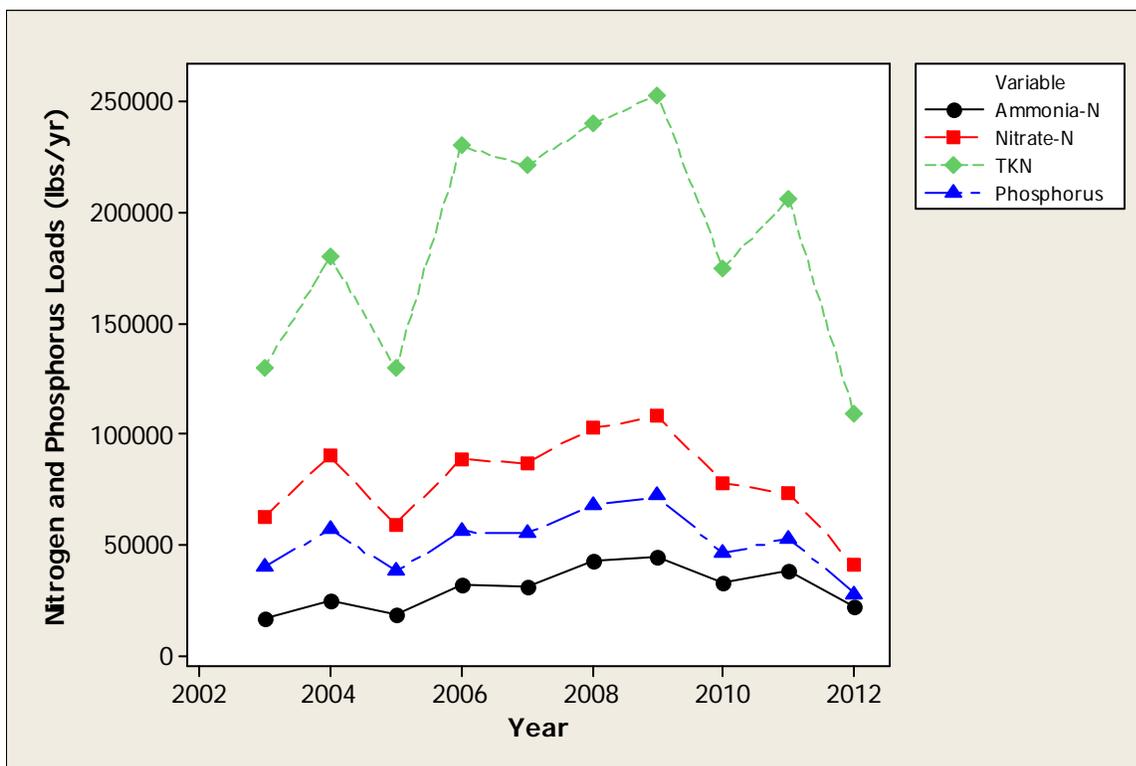
| Pollutant                 | Event Mean Concentration | Pollutant Load           |
|---------------------------|--------------------------|--------------------------|
| Total Suspended Solids    | 109 mg/L                 | 6,600,000 lbs/yr         |
| Total Dissolved Solids    | 92 mg/L                  | 5,600,000 lbs/yr         |
| Biochemical Oxygen Demand | 15.8 mg/L                | 1,000,000 lbs/yr         |
| Chemical Oxygen Demand    | 67.1 mg/L                | 4,100,000 lbs/yr         |
| Ammonia Nitrogen          | 0.36 mg/L                | 22,000 lbs/yr            |
| Nitrate Nitrogen          | 0.674 mg/L               | 41,000 lbs/yr            |
| Total Kjeldahl Nitrogen   | 1.794 mg/L               | 109,000 lbs/yr           |
| Total Nitrogen            | 2.38 mg/L                | 145,000 lbs/yr           |
| Total Phosphorus          | 0.465 mg/L               | 28,000 lbs/yr            |
| Copper                    | 36.8 µg/L                | 2,200 lbs/yr             |
| Cadmium                   | 3.87 µg/L                | 200 lbs/yr               |
| Zinc                      | 133.9 µg/L               | 8,200 lbs/yr             |
| Lead                      | 33.4 µg/L                | 2,000 lbs/yr             |
| Fecal Coliform Bacteria   | 9,200 CFU/100mL          | 2,600,000 billion CFU/yr |
| FOG                       | 7.89 mg/L                | 481,000 lbs/yr           |
| Cyanide                   | 1.39 µg/L                | 80 lbs/yr                |
| Total Phenols             | 1.5 µg/L                 | 90 lbs/yr                |



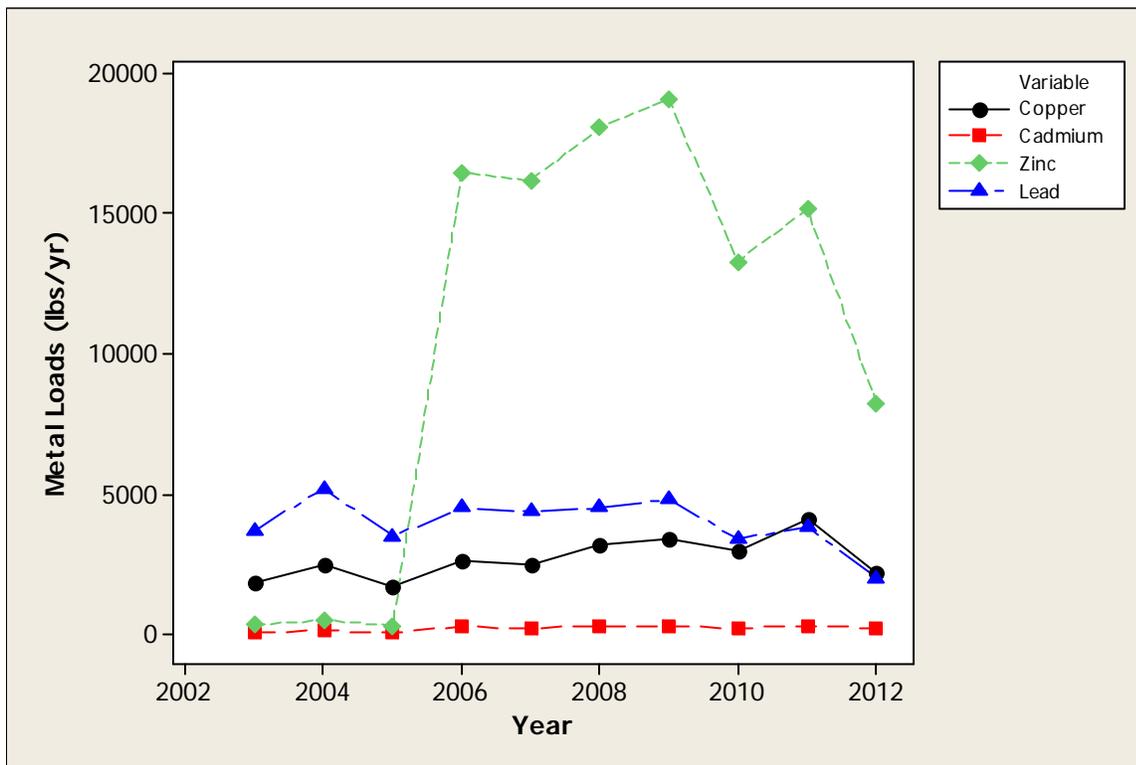
**Figure B.18. Annual Solids Loads from Storm Water, 2003-2011**



**Figure B.19. Annual BOD and COD Loads from Storm Water, 2003-2012**



**Figure B.20. Annual Nitrogen and Phosphorus Loads from Storm Water, 2003-2012**



**Figure B.21. Annual Loads of Metals from Storm Water, 2003-2012**

## APPENDIX C – MS4 STREAM ASSESSMENTS

This appendix presents the details of assessing the effects of storm water pollutant loads on water quality and aquatic health of streams in the City of Rockford. The stream bioassessment process is repeated biennially and was performed in 2012.

The bioassessment also includes stream water quality monitoring as part of the City's dry weather screening of the MS4.

### C.1 Macroinvertebrate Communities

Macroinvertebrates and physical habitat were monitored at tributary monitoring stations T1 through T5 (Figure A-1 and Table C.1). These are the main receiving waters for the MS4. Macroinvertebrates were collected twice in 2003, and once each in 2006, 2008, 2010 and 2012. Stream macroinvertebrates were collected using the methods approved in the QAPP. The multi-habitat sampling approach was followed.

**Table C.1**

#### STREAM MONITORING AND BIOASSESSMENT LOCATIONS

| Station ID | Stream and Location                                     |
|------------|---|
| T1         | North Kent Creek at Fairgrounds                         |
| T2         | South Kent Creek near intersection of Tay and Corbin St |
| T3         | Keith Creek at Tenth Avenue Park                        |
| T4         | Keith Creek at Dahlquist Park                           |
| T5         | Spring Creek at Starkweather Avenue                     |

Table C.2 lists several of the metrics studied and the expected response of the macroinvertebrate community to increasing disturbance. Table C.3 summarizes the findings of the benthic surveys, including the Hilsenhoff Biotic Index (HBI) and the newer Stream Condition Index<sup>4</sup>. Keith Creek at Tenth Ave Park, T3, tends to dry up in late summer and had no flow in September 2003. Also, Tenth Avenue Park was under construction in 2009 and 2010, so the 2010 measurements of macroinvertebrate community quality may be more reflective of construction activities and an unstable stream bed than watershed storm water loads and flows.

<sup>4</sup> Illinois Benthic Macroinvertebrate Collection Method Comparison and Stream Condition Index Revision. Prepared for the Illinois EPA by Tetra Tech, Inc., Owings Mills, Maryland. Revision of March 2007.

**Table C.2****SELECTED MACROINVERTEBRATE METRICS AND EXPECTED RESPONSE TO STRESS**

| <b>Metric</b>    | <b>Definition</b>   | <b>Response to Perturbation</b> |
|------------------|---|---------------------------------|
| Richness*        | Number of distinct taxa   | Decrease                        |
| HBI*             | Hilsenhoff Biotic Index, modified for Illinois, reflects tolerance to pollution | Increase                        |
| Inds             | Number of individuals   | Variable                        |
| Cole_Taxa*       | Number of distinct taxa in the order Coleoptera                                 | Decrease                        |
| Ephe_Taxa*       | Number of distinct taxa in the order Ephemeroptera,                             | Decrease                        |
| Tric_Taxa        | Number of distinct taxa in the order Tricoptera                                 | Decrease                        |
| EPT_Taxa         | Number of distinct taxa in the orders Ephemeroptera, Plecoptera, and Tricoptera | Decrease                        |
| %_EPT*           | Relative abundance of Ephemeroptera, Plecoptera, and Tricoptera                 | Decrease                        |
| Ephemer          | Number of Epheropteran individuals  | Decrease                        |
| Intolerant_Taxa* | Number of intolerant taxa   | Decrease                        |
| %_Dip            | Relative abundance of dipterans   | Increase                        |
| %_Chiron         | Relative abundance of Chironomidae  | Increase                        |
| %_Scrapers*      | Relative abundance of the scraper feeding group                                 | Decrease                        |
| SCI              | Stream Condition Index  | Decrease                        |

Note: \* indicates the metric is part of the SCI

The HBI ranges from 0 to 11 with lower scores indicating better quality biotic communities. Figure C.1 is a box-and-whisker plot of these scores. Computation of the HBI includes a pollutant tolerance value for each taxon, and in this manner, the lower HBI scores indicate that the community is generally less tolerant of water pollution. An examination of the statistical significance of trends in HBI found two sites to have statistically significant changes since bioassessment began ( $p\text{-value} \leq 0.05$ ). T2, South Kent Creek and T4, Keith Creek at Dahlquist Park, have a negative trend, or slope, indicating the macroinvertebrate community is showing increased numbers and types of pollution intolerant species (Figures C.2 and C.3). The other three sites do not show any statistically significant trends in measured HBI ( $p\text{-values} > 0.05$ ).

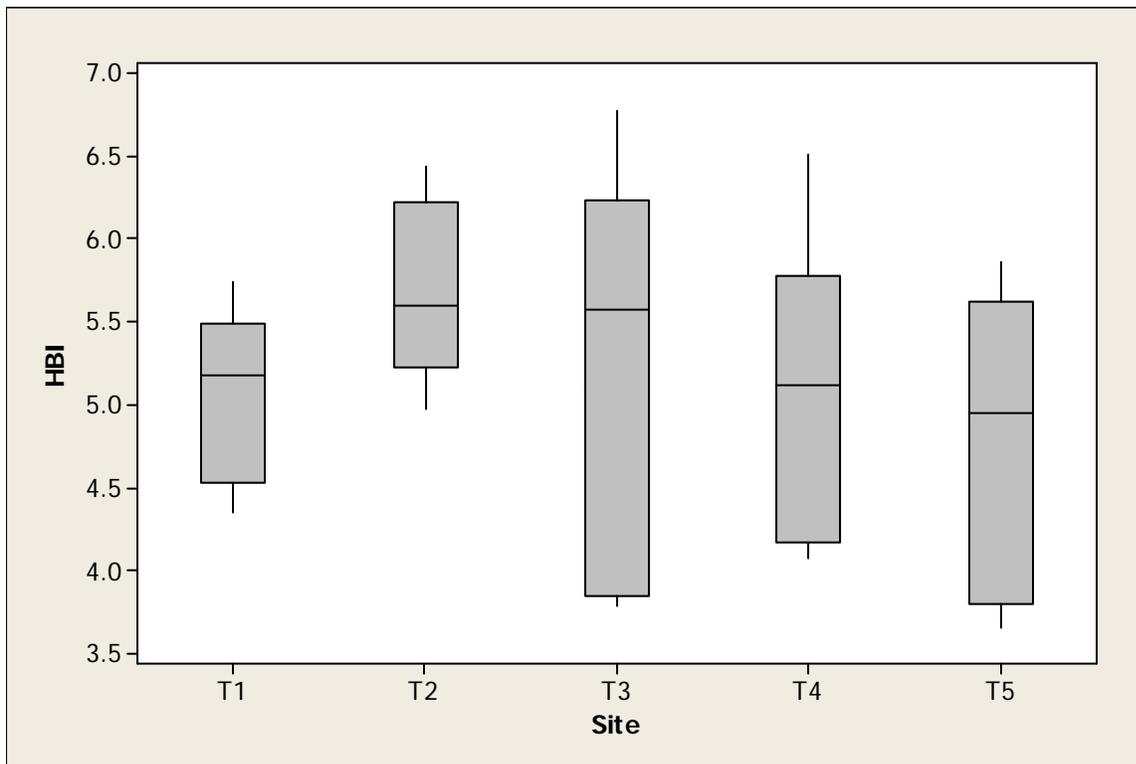
**Table C.3**  
**SUMMARY OF MACROINVERTEBRATE COMMUNITY DATA, 2003-2012**

| Year | Month | Site | Richness | Inds | HBI  | Cole_Taxa | Ephe_Taxa | Plec_Taxa | Tric_Taxa | Predators | Filterers | Shredders | Scrapers | Dipterans | Chironomidae |
|------|-------|------|----------|------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|-----------|--------------|
| 2003 | 6     | T1   | 29       | 168  | 5.11 | 1         | 1         |           | 3         | 27        | 9         | 44        | 12       | 36        | 33           |
| 2003 | 9     | T1   | 29       | 254  | 4.59 | 4         | 2         |           | 3         | 31        | 50        | 8         | 17       | 9         | 8            |
| 2006 | 9     | T1   | 29       | 178  | 5.74 | 2         | 3         |           | 3         | 52        | 75        | 11        | 18       | 18        | 16           |
| 2008 | 7     | T1   | 45       | 418  | 5.41 | 6         | 5         |           | 6         | 52        | 187       | 67        | 53       | 93        | 65           |
| 2010 | 8     | T1   | 29       | 410  | 4.35 | 2         | 5         | 1         | 3         | 26        | 161       | 12        | 30       | 32        | 28           |
| 2012 | 7     | T1   | 28       | 223  | 5.25 | 5         | 6         |           | 3         | 66        | 35        | 4         | 52       | 22        | 21           |
| 2003 | 6     | T2   | 35       | 380  | 6.44 | 3         | 2         |           | 3         | 57        | 80        | 34        | 62       | 61        | 48           |
| 2003 | 9     | T2   | 30       | 264  | 5.62 | 4         | 4         |           | 3         | 100       | 77        | 8         | 38       | 11        |              |
| 2006 | 9     | T2   | 30       | 242  | 6.15 | 2         | 3         |           | 3         | 127       | 23        | 18        | 19       | 20        | 19           |
| 2008 | 7     | T2   | 36       | 637  | 5.57 | 3         | 5         |           | 3         | 72        | 380       | 6         | 33       | 304       | 17           |
| 2010 | 8     | T2   | 24       | 421  | 5.31 | 4         | 3         |           | 4         | 33        | 201       | 3         | 85       | 29        | 22           |
| 2012 | 7     | T2   | 20       | 272  | 4.97 | 3         | 1         |           | 3         | 140       | 62        | 1         | 68       | 8         | 1            |
| 2003 | 6     | T3   | 32       | 372  | 6.78 | 2         | 1         |           | 3         | 79        | 10        | 17        | 139      | 70        | 67           |
| 2006 | 9     | T3   | 22       | 646  | 3.89 | 5         | 2         |           |           | 78        | 1         | 2         | 12       | 1         |              |
| 2008 | 7     | T3   | 31       | 451  | 5.58 | 4         | 3         |           | 2         | 60        | 18        | 9         | 109      | 45        | 39           |
| 2010 | 8     | T3   | 22       | 747  | 3.79 | 2         | 3         |           | 2         | 49        | 37        | 2         | 33       | 26        | 25           |
| 2012 | 7     | T3   | 31       | 249  | 5.68 | 5         | 4         |           | 2         | 109       | 50        | 3         | 60       | 1         |              |
| 2003 | 6     | T4   | 37       | 427  | 6.51 | 1         | 2         |           | 2         | 52        | 61        | 14        | 59       | 109       | 89           |
| 2003 | 9     | T4   | 29       | 378  | 5.53 | 2         | 2         |           | 4         | 33        | 107       | 9         | 55       | 41        | 36           |
| 2006 | 9     | T4   | 33       | 334  | 5.35 | 4         | 2         |           | 1         | 42        | 59        | 13        | 45       | 37        | 30           |
| 2008 | 7     | T4   | 35       | 578  | 4.88 | 8         | 2         |           | 4         | 34        | 128       | 78        | 34       | 150       | 103          |
| 2010 | 8     | T4   | 22       | 734  | 4.20 | 2         | 2         |           | 3         | 29        | 114       | 5         | 52       | 65        | 45           |
| 2012 | 7     | T4   | 18       | 334  | 4.07 | 1         | 1         |           | 3         | 25        | 12        | 1         | 55       | 5         | 4            |
| 2003 | 6     | T5   | 26       | 266  | 5.54 | 3         | 2         |           | 3         | 35        | 48        | 21        | 27       | 82        | 31           |
| 2003 | 9     | T5   | 27       | 460  | 4.63 | 2         | 2         |           | 4         | 49        | 24        | 1         | 9        | 133       | 117          |
| 2006 | 9     | T5   | 24       | 282  | 5.86 | 1         | 1         |           | 2         | 100       | 3         | 2         | 11       | 47        | 45           |
| 2008 | 7     | T5   | 31       | 657  | 5.28 | 2         | 1         |           | 3         | 24        | 90        | 23        | 9        | 144       | 75           |
| 2010 | 8     | T5   | 13       | 425  | 3.85 | 1         | 2         |           | 4         | 23        | 19        |           | 15       | 9         | 4            |
| 2012 | 7     | T5   | 8        | 469  | 3.65 | 1         | 1         |           | 2         | 66        | 21        | 1         |          |           |              |

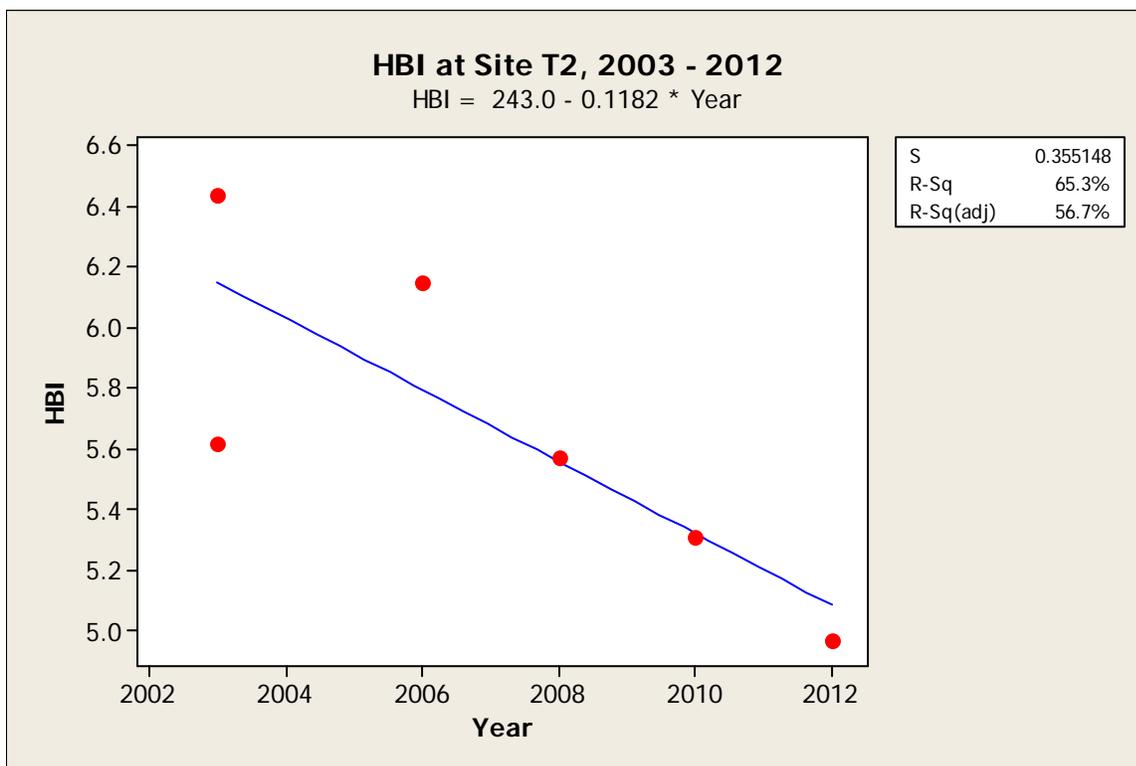
Table C.3 (continued)

## SUMMARY OF MACROINVERTEBRATE COMMUNITY DATA, 2003-2012

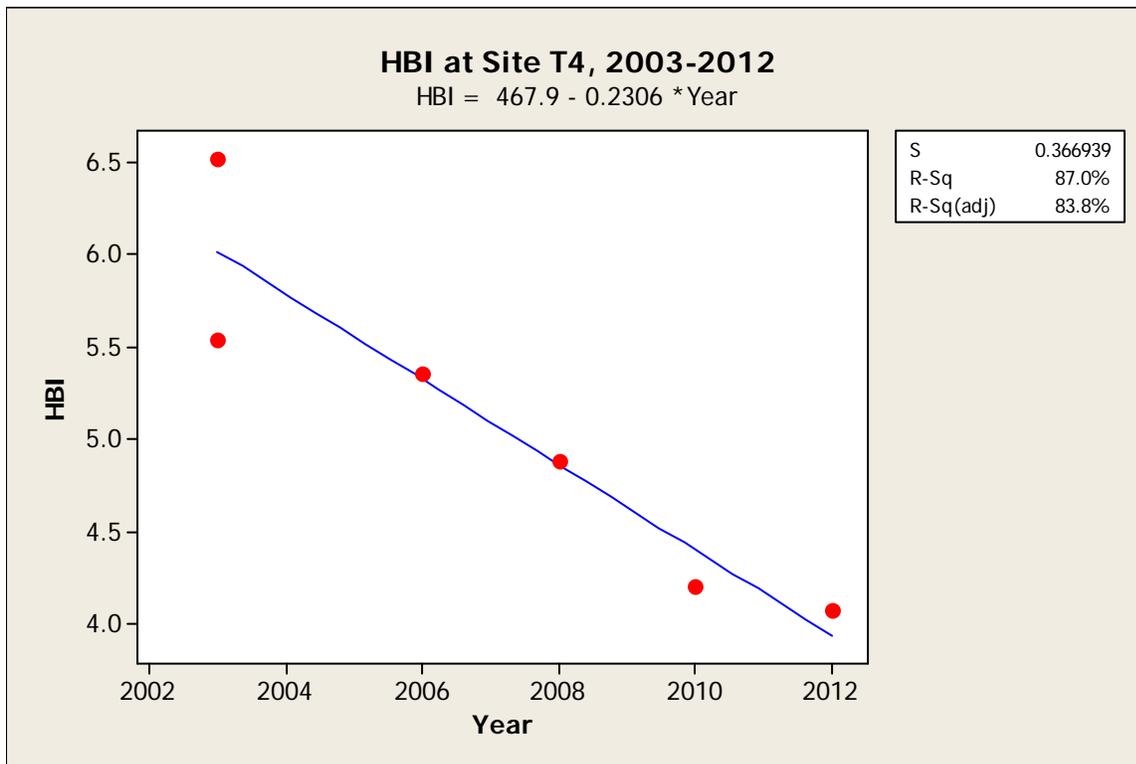
| Year | Month | Site | Ephemer | Plecop | Trichop | Intolerant_Taxa | EPT_Taxa | %_Dip | %_Chiron | %_EPT | %_Scrapers | SCI    | Stream_Class |
|------|-------|------|---------|--------|---------|-----------------|----------|-------|----------|-------|------------|--------|--------------|
| 2003 | 6     | T1   | 2       |        | 6       | 1               | 4        | 0.214 | 0.196    | 0.048 | 0.071      | 31.998 | Fair         |
| 2003 | 9     | T1   | 5       |        | 48      | 5               | 5        | 0.035 | 0.031    | 0.209 | 0.067      | 49.679 | Fair         |
| 2006 | 9     | T1   | 9       |        | 77      | 3               | 6        | 0.101 | 0.090    | 0.483 | 0.101      | 40.856 | Fair         |
| 2008 | 7     | T1   | 36      |        | 162     | 11              | 11       | 0.222 | 0.156    | 0.474 | 0.127      | 74.741 | Exceptional  |
| 2010 | 8     | T1   | 55      | 1      | 149     | 6               | 9        | 0.078 | 0.068    | 0.500 | 0.073      | 50.979 | Fair         |
| 2012 | 7     | T1   | 28      |        | 34      | 7               | 9        | 0.099 | 0.094    | 0.278 | 0.233      | 67.129 | Good         |
| 2003 | 6     | T2   | 6       |        | 70      | 4               | 5        | 0.161 | 0.126    | 0.200 | 0.163      | 47.370 | Fair         |
| 2003 | 9     | T2   | 11      |        | 61      | 3               | 7        | 0.042 |          | 0.273 | 0.144      | 50.562 | Fair         |
| 2006 | 9     | T2   | 5       |        | 23      | 2               | 6        | 0.083 | 0.079    | 0.116 | 0.079      | 37.605 | Fair         |
| 2008 | 7     | T2   | 89      |        | 93      | 6               | 8        | 0.477 | 0.027    | 0.286 | 0.052      | 51.401 | Fair         |
| 2010 | 8     | T2   | 36      |        | 183     | 4               | 7        | 0.069 | 0.052    | 0.520 | 0.202      | 52.455 | Fair         |
| 2012 | 7     | T2   | 8       |        | 43      | 3               | 4        | 0.029 | 0.004    | 0.188 | 0.250      | 47.142 | Fair         |
| 2003 | 6     | T3   | 33      |        | 9       | 2               | 4        | 0.188 | 0.180    | 0.113 | 0.374      | 48.600 | Fair         |
| 2006 | 9     | T3   | 2       |        |         | 2               | 2        | 0.002 |          | 0.003 | 0.019      | 45.976 | Fair         |
| 2008 | 7     | T3   | 39      |        | 12      | 5               | 5        | 0.100 | 0.086    | 0.113 | 0.242      | 57.425 | Good         |
| 2010 | 8     | T3   | 48      |        | 8       | 1               | 5        | 0.035 | 0.033    | 0.075 | 0.044      | 38.933 | Fair         |
| 2012 | 7     | T3   | 8       |        | 16      | 4               | 6        | 0.004 |          | 0.096 | 0.241      | 59.834 | Good         |
| 2003 | 6     | T4   | 21      |        | 38      | 5               | 4        | 0.255 | 0.208    | 0.138 | 0.138      | 42.540 | Fair         |
| 2003 | 9     | T4   | 16      |        | 108     | 3               | 6        | 0.108 | 0.095    | 0.328 | 0.146      | 42.020 | Fair         |
| 2006 | 9     | T4   | 5       |        | 54      | 3               | 3        | 0.111 | 0.090    | 0.177 | 0.135      | 48.853 | Fair         |
| 2008 | 7     | T4   | 146     |        | 83      | 5               | 6        | 0.260 | 0.178    | 0.396 | 0.059      | 61.721 | Good         |
| 2010 | 8     | T4   | 45      |        | 93      | 2               | 5        | 0.089 | 0.061    | 0.188 | 0.071      | 38.628 | Fair         |
| 2012 | 7     | T4   | 1       |        | 12      | 4               | 4        | 0.015 | 0.012    | 0.039 | 0.165      | 41.330 | Fair         |
| 2003 | 6     | T5   | 25      |        | 21      | 4               | 5        | 0.308 | 0.117    | 0.173 | 0.102      | 43.369 | Fair         |
| 2003 | 9     | T5   | 100     |        | 27      | 4               | 6        | 0.289 | 0.254    | 0.276 | 0.020      | 39.361 | Fair         |
| 2006 | 9     | T5   | 2       |        | 4       | 5               | 3        | 0.167 | 0.160    | 0.021 | 0.039      | 33.483 | Fair         |
| 2008 | 7     | T5   | 148     |        | 25      | 5               | 4        | 0.219 | 0.114    | 0.263 | 0.014      | 38.648 | Fair         |
| 2010 | 8     | T5   | 18      |        | 16      | 2               | 6        | 0.021 | 0.009    | 0.080 | 0.035      | 32.751 | Fair         |
| 2012 | 7     | T5   | 5       |        | 21      | 3               | 3        |       |          | 0.055 |            |        | Poor         |



**Figure C.1. Hilsenhoff Biotic Indices for Streams in the MS4, 2003-2012**

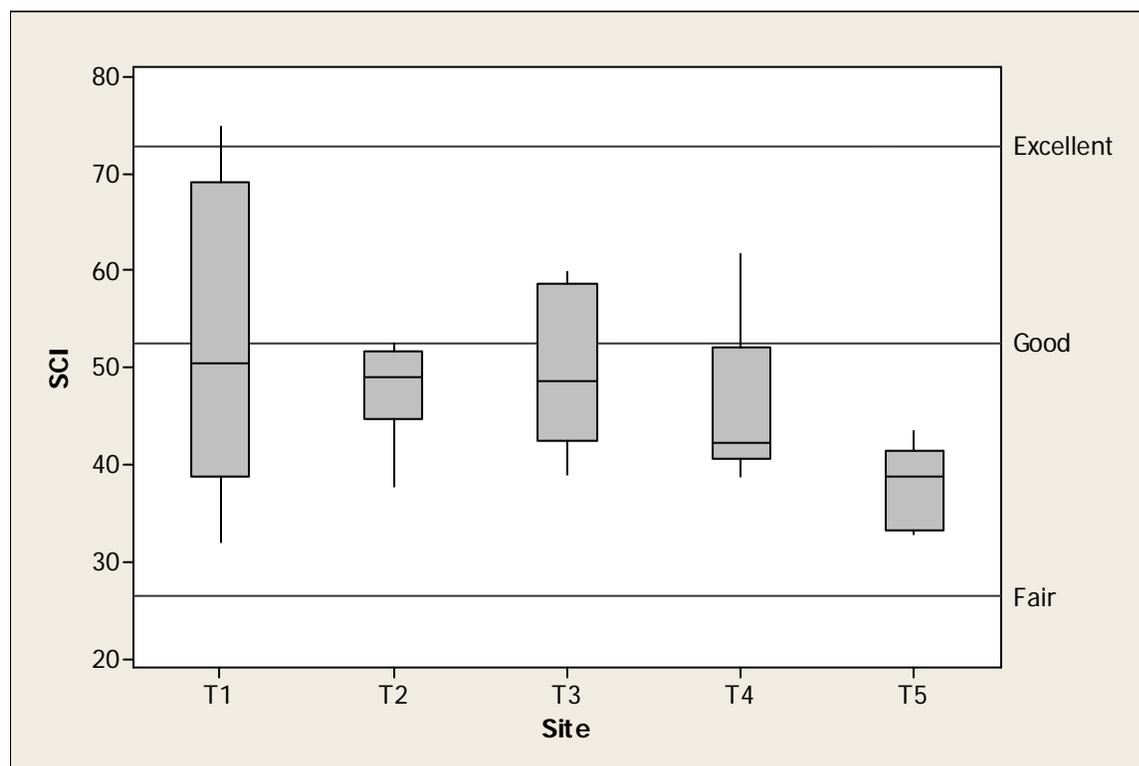


**Figure C.2. Improvement in Hilsenhoff Biotic Index at Site T2, 2003-2012**



**Figure C.3. Improvement in Hilsenhoff Biotic Index at Site T4, 2003-2012**

Seven macroinvertebrates metrics are averaged to estimate the Stream Condition Index, SCI. Table C.3 includes the SCI, while Figure C.4 is a box-and-whisker plot of these scores. Streams with SCI cores between 26.4 and 52.6 are rated as fair, while streams with scores between 52.6 and 72.9 are rated as good. The Illinois EPA considers streams with a SCI less than 41.8 to be impaired, and not supportive of aquatic life uses.



**Figure C.4. Stream Condition Indices, 2003-2012**

ANOVA was performed on the SCI dataset to assess the differences between and among bioassessment sites. There are no significant differences between the five stream SCI scores ( $p$ -value = 0.152); in short, the SCI are similar among these urban streams. Further, trends in SCI were tested using regression methods, but no significant trends over the period 2003 to 2012 were found.

## C.2 Dry Weather Screening in the MS4 Tributaries

Water quality at five stream stations in the MS4 service area are monitored quarterly by the City to assess potential dry weather water quality effects of the MS4. Figure A.1 maps the tributary sampling sites.

Since mid-2008, the stations have been monitored quarterly regardless of weather conditions, but the data since that time reflect ambient conditions, largely dry weather (base flows). Prior to 2008, stream monitoring was biased towards wet weather sampling, per the QAPP. Stream water quality data collected before 2008 have been excluded from the discussion and conclusions below.

We provide summary statistics for the tributary water quality data, compare the data to the applicable water quality standards given in 35 Ill. Admin. Code 302, and interpret the data as indicators of illicit connections in the MS4 per the dry weather screening program required in the permit (Part V.B). And as we did with the storm water quality data, analytical values less than detection limits have been transformed to 50% of the method detection limit for summarization.

### C.2.1 Dissolved Oxygen and other Field Measurements

Dissolved oxygen (DO), pH, conductivity and temperature are measured on every occasion that samples are collected. DO summary statistics are given in Table C.4.

**Table C.4**  
**DISSOLVED OXYGEN (mg/L) IN THE MS4 RECEIVING STREAMS**

| Location | N  | Mean | Minimum | Median | Maximum |
|----------|----|------|---------|--------|---------|
| T1       | 15 | 9.4  | 6.7     | 9.1    | 15.2    |
| T2       | 15 | 9.6  | 6.9     | 9.1    | 19.0    |
| T3       | 15 | 10.1 | 5.9     | 9.0    | 17.4    |
| T4       | 15 | 9.6  | 7.2     | 9.6    | 12.9    |
| T5       | 15 | 9.4  | 7.8     | 9.1    | 12.7    |

The General Use Water Quality Standard applicable to all these streams is given in 35 Ill. Admin. Code 302.206:

- 1) *During the period of March through July,*
  - A) *5.0 mg/L at any time; and*
  - B) *6.25 mg/L as a daily mean averaged over 7 days.*
- 2) *During the period of August through February,*
  - A) *4.0 mg/L at any time;*
  - B) *4.5 mg/L as a daily minimum averaged over 7 days; and*
  - C) *6.0 mg/L as a daily mean averaged over 30 days.*

There are no continuous DO measurement stations for evaluating use support in these streams. None of the tributaries in the City's MS4 service area (T1-T5) have had a DO measurement less than 5.9 mg/L during the 2008 – 2012 study period.

While Illinois' water quality standards do not address high DO levels, we routinely observe these in many of the tributaries. High DO is the result of photosynthesis occurring in the streams. Like many streams in Illinois, this is the result of nutrient enrichment, and occurs in rural and urban streams throughout the Midwest.

The lack of any low DO measurements (including the pre-2008 data) indicates that the MS4 does not contain illicit connections for sewage.

Summary statistics on pH values measured in the MS4 tributaries are given in Table C.5. The General Use Water Quality Standard applicable to all these streams is given in 35 Ill. Admin. Code 302.204:

*pH shall be within the range of 6.5 to 9.0 except for natural causes.*

While none of the tributaries exceeded the upper pH standard, one measurement in Keith Creek (site T3) had a measurement less than the pH 6.5 lower limit in November 2010. This could be a natural phenomenon in the region or there may be anthropogenic reasons.

**Table C.5**  
**pH IN THE MS4 RECEIVING STREAMS**

| Site | Name                       | N  | Minimum | Median | Maximum |
|------|----------------------------|----|---------|--------|---------|
| T1   | North Kent Creek           | 15 | 7.2     | 7.7    | 8.2     |
| T2   | South Kent Creek           | 15 | 7.0     | 7.7    | 8.4     |
| T3   | Keith Creek at 10th Ave Pk | 15 | 6.2     | 8.0    | 8.5     |
| T4   | Keith Cr at Dahlquist Pk   | 15 | 7.3     | 7.8    | 8.8     |
| T5   | Spring Creek               | 15 | 7.1     | 7.7    | 7.9     |

### C.2.2 Solids

Summary statistics for total suspended solids and total dissolved solids are tabulated below. Among the five streams in the Rockford MS4 service area, the TSS levels are generally lowest in Keith Creek, T3 and Spring Creek, T5, and are highest in South Kent Creek, T2. ANOVA testing indicates that there are significant differences between TSS means ( $p$ -value = 0.025); Tukey's multiple pairwise comparisons indicate that mean TSS at T2 is higher than T3.

**Table C.6**  
**SUSPENDED SOLIDS (mg/L) IN THE MS4 RECEIVING STREAMS**

| Site | Name                      | N  | Mean | Minimum | Median | Maximum |
|------|---------------------------|----|------|---------|--------|---------|
| T1   | North Kent Creek          | 15 | 19   | 2       | 8      | 58      |
| T2   | South Kent Creek          | 15 | 30   | 9       | 22     | 72      |
| T3   | Keith Creek at 10th Av Pk | 15 | 12   | 0.5     | 8      | 56      |
| T4   | Keith Cr at Dahlquist Pk  | 15 | 18   | 2       | 16     | 56      |
| T5   | Spring Creek              | 15 | 14   | 1       | 10     | 48      |

Illinois has no numerical standards for suspended solids or dissolved in general use waters for comparison to these data. The Illinois EPA uses the 85<sup>th</sup> percentile of statewide stream TSS measurements as a threshold value to assess potential aquatic life impairment in streams; this value is 116 mg/L. Maximum values measured in the 2008 to 2012 program did not approach this threshold in any stream.

Dissolved solids are highest in Keith Creek and lowest in North Kent Creek. In fact, ANOVA indicates that mean TDS in streams draining areas west of the Rock River (North Kent and South Kent Creeks) are less than the streams draining areas east of the Rock River (Keith and Spring Creeks), and that the differences are significant ( $p=0.000+$ ).

**Table C.7****DISSOLVED SOLIDS (mg/L) IN THE MS4 RECEIVING STREAMS**

| Site | Name                      | N  | Mean | Minimum | Median | Maximum |
|------|---------------------------|----|------|---------|--------|---------|
| T1   | North Kent Creek          | 15 | 408  | 268     | 424    | 492     |
| T2   | South Kent Creek          | 15 | 476  | 378     | 482    | 550     |
| T3   | Keith Creek at 10th Av Pk | 15 | 557  | 406     | 560    | 704     |
| T4   | Keith Cr at Dahlquist Pk  | 15 | 600  | 492     | 588    | 732     |
| T5   | Spring Creek              | 15 | 548  | 382     | 548    | 630     |

**C.2.3 COD**

Chemical oxygen demand (COD) was also measured in streams draining the MS4 service area. Summary statistics are given in Table C.8. There is no water quality standard for COD.

The streams have low COD levels and do not have depressed DO concentrations. This is evidence that there are no significant illicit discharges in the MS4 above the monitoring stations.

**Table C.5****CHEMICAL OXYGEN DEMAND (mg/L) IN THE MS4 RECEIVING STREAMS**

| Location | N  | Mean | Minimum* | Median | Maximum |
|----------|----|------|----------|--------|---------|
| T1       | 15 | 11   | 5        | 5      | 42      |
| T2       | 15 | 12   | 5        | 12     | 27      |
| T3       | 15 | 13   | 5        | 5      | 54      |
| T4       | 15 | 13   | 5        | 10     | 43      |
| T5       | 15 | 10   | 5        | 5      | 35      |

\* The method detection limit for COD is 10 mg/L. Prior to statistical analyses, results that were less than the MDL were replaced by values equal to 50% of the MDL.

**C.2.4 Nitrogen and Phosphorus**

Nutrients analyzed as part of dry weather screening and tributary water quality assessment include ammonia, nitrate+nitrite, and total phosphorus. Table C.9 summarizes total phosphorus concentrations measured in the streams. There are currently no total phosphorus water quality standards to compare these values with, but they are typical of streams in north central Illinois. The Illinois EPA uses the 85<sup>th</sup> percentile of statewide stream measurements as a threshold value to assess potential aquatic life impairment in streams; this value is 0.61 mg/L. The only measurement approaching this was made in August 2010 at T3 (0.55 mg/L).

**Table C.9**  
**TOTAL PHOSPHORUS (mg/L) IN THE MS4 RECEIVING STREAMS**

| Site | Name                      | N  | Mean | Minimum | Median | Maximum |
|------|---------------------------|----|------|---------|--------|---------|
| T1   | North Kent Creek          | 15 | 0.11 | 0.03    | 0.11   | 0.27    |
| T2   | South Kent Creek          | 15 | 0.11 | 0.03    | 0.10   | 0.27    |
| T3   | Keith Creek at 10th Av Pk | 15 | 0.13 | 0.02    | 0.09   | 0.55    |
| T4   | Keith Cr at Dahlquist Pk  | 15 | 0.13 | 0.05    | 0.14   | 0.20    |
| T5   | Spring Creek              | 15 | 0.13 | 0.04    | 0.11   | 0.23    |

Table C.10 summarizes nitrate concentrations measured in the streams between 2008 and 2012. There are no water quality standards to compare these values with, but, again, they are typical of streams in north central Illinois. Mean nitrate levels in the two branches of Kent Creek are significantly higher than the other two streams in the monitoring program (p-value=0.000+) and can perhaps be attributed to higher proportions of agricultural land use in the Kent Creek watershed.

**Table C.10**  
**NITRATE (mg/L) IN THE MS4 RECEIVING STREAMS**

| Site | Name                      | N  | Mean | Minimum | Median | Maximum |
|------|---------------------------|----|------|---------|--------|---------|
| T1   | North Kent Creek          | 15 | 6.9  | 2.2     | 7.2    | 9.4     |
| T2   | South Kent Creek          | 15 | 5.0  | 1.4     | 4.8    | 7.1     |
| T3   | Keith Creek at 10th Av Pk | 15 | 1.5  | 0.5     | 1.3    | 2.5     |
| T4   | Keith Cr at Dahlquist Pk  | 15 | 1.7  | 0.5     | 1.6    | 2.8     |
| T5   | Spring Creek              | 15 | 1.8  | 0.5     | 1.6    | 3.5     |

High ammonia concentrations can indicate sewage contamination. Ammonia in the MS4 receiving streams is always below the 0.1 mg/L detection level.

### **C.2.5 Tributary Fecal Coliform Concentrations**

Summary statistics on fecal coliform bacteria concentrations measured in tributaries are given in Table C.11. The General Use Water Quality Standard applicable to all these streams is given in 35 Ill. Admin. Code 302.209:

*During the months May through October, based on a minimum of five samples taken over not more than a 30 day period, fecal coliform shall not exceed a geometric mean of 200 per 100 ml, nor shall more than 10% of the samples during any 30 day period exceed 400 per 100 ml in protected waters.*

Summary data for concentrations of fecal coliform bacteria at the MS4 tributary stations sampled between 2008 and 2012 are tabulated below. Direct comparison with the water quality standard is not possible due to the quarterly sampling.

High coliform bacteria can indicate illicit sewer connections, but there are other sources, such as wildlife, failing septic systems, and pet wastes. Earlier load duration analyses by the City strongly suggested that the coliform are primarily wet weather sources such as land runoff (e.g. pet wastes, Canada goose wastes) and not dry weather sources (such as an illicit connection).

**Table C.11**

**FECAL COLIFORM BACTERIA (/100mL) IN THE MS4 RECEIVING STREAMS**

| <b>Site</b> | <b>Name</b>               | <b>N</b> | <b>Mean</b> | <b>Minimum</b> | <b>Median</b> | <b>Maximum</b> |
|-------------|---------------------------|----------|-------------|----------------|---------------|----------------|
| T1          | North Kent Creek          | 15       | 2,006       | 10             | 350           | 15,800         |
| T2          | South Kent Creek          | 15       | 807         | 10             | 300           | 3,320          |
| T3          | Keith Creek at 10th Av Pk | 15       | 1,380       | 5              | 500           | 7,500          |
| T4          | Keith Cr at Dahlquist Pk  | 15       | 2,143       | 50             | 830           | 11,200         |
| T5          | Spring Creek              | 15       | 1,625       | 20             | 250           | 9,000          |