

**GOVERNMENT OF THE DISTRICT OF COLUMBIA  
WASHINGTON, DC**

**Municipal Separate Storm Sewer System  
NPDES Permit No. DC0000221**

**DISCHARGE MONITORING REPORT**

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DISTRICT OF COLUMBIA  
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WASHINGTON, D.C.

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**2003 Discharge Monitoring Report**

**TABLE OF CONTENTS**

<b>INTRODUCTION</b>	<b>1</b>
<b>MONITORING SITES</b>	<b>1</b>
<b>WEATHER INFORMATION</b>	<b>3</b>
<b>SAMPLE COLLECTION</b>	<b>4</b>
<b>RECORDKEEPING</b>	<b>4</b>
<b>MONITORING RESULTS</b>	<b>5</b>
<b>ESTIMATES OF CUMULATIVE LOADINGS</b>	<b>5</b>

**LIST OF TABLES**

<b>Table Number</b>	<b>Title of Table</b>	<b>Page</b>
1	Monitoring Sites	2
2	Precipitation Record for Washington, DC	3
3	Location of Six Rain Gauges Representing the District's Monitoring Stations	3
4	Storm Events Sampled at Six of the District's Rain Gauge Locations	4

## **APPENDICES**

- APPENDIX A**      **EPA APPROVAL OF ALTERNATIVE MONITORING LOCATIONS**
- APPENDIX B**      **STREET LEVEL MAP OF MONITORING LOCATIONS**
- APPENDIX C**      **LAND USE ASSOCIATED WITH MONITORING LOCATIONS**
- APPENDIX D**      **SAMPLING DATES OF MONITORING LOCATIONS**
- APPENDIX E**      **HICKEY RUN AMBIENT SAMPLING LOCATIONS**
- APPENDIX F**      **NARRATIVES OF STORM EVENTS**
- APPENDIX G**      **LIST OF PARAMETERS, DETECTION LIMITS, AND EPA APPROVED METHODS FOR MONITORING ACTIVITIES**
- APPENDIX H**      **QUALITY ASSURANCE PROJECT PLAN**
- APPENDIX I**      **COMPLETED DISCHARGE MONITORING REPORT (DMR) FORMS**
- APPENDIX J**      **EVALUATION OF COLLECTED DATA FOR ALL MONITORING LOCATIONS**
- **SUMMARY OF RESULTS FOR ALL SAMPLING SITES**
  - **RESULTS FOR STICKFOOT (SUITLAND PARKWAY) SAMPLING EVENTS**
  - **RESULTS FOR “O” STREET STORM WATER PUMP STATION SAMPLING EVENTS**
  - **RESULTS FOR MINNESOTA AND 17<sup>TH</sup> STREET (ANACOSTIA HIGH SCHOOL/ANACOSTIA RECREATION CENTER) SAMPLING EVENTS**
  - **RESULTS FOR GALLATIN AND 14<sup>TH</sup> STREET, N.E. SAMPLING EVENTS**
  - **RESULTS FOR VARNUM AND 19<sup>TH</sup> PLACE, N.E. SAMPLING EVENT**
  - **RESULTS FOR NASH RUN SAMPLING EVENTS**

- **RESULTS FOR EAST CAPITOL STREET SAMPLING EVENTS**
- **RESULTS FOR HICKEY RUN (“V” STREET AND 33<sup>RD</sup>) SAMPLING EVENT**

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**INTRODUCTION**

National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) – Permit No. DC 0000221 (the Permit) requires monitoring of storm event discharges to characterize the quality of storm water discharges, monitoring of dry weather flows to detect illicit connections and improper discharges, and wet weather screening to further investigate excessive levels of pollutants. Efforts are underway to develop these Permit requirements into a program that will provide confirmation of the District of Columbia’s overall progress in effectively managing storm water.

This report describes the monitoring sites, sample collection, record keeping, monitoring results, and estimates of loadings that have occurred since January 2002.

**MONITORING SITES**

The sites monitored for this period of the permit were approved by the U.S. Environmental Protection Agency (EPA) Region 3 Director in January 2001 (Appendix A). A listing of the sites and the acreage monitored at those sites is provided in Table 1. The acreage for each location was calculated by tracing the tributaries to the sampling location on a WASA sewer map, creating a grid based on the scale from the sewer map, and converting grid units to the desired unit of measurement. A street level map of the sites is provided in Appendix B. The land uses associated with the monitoring sites are provided in Appendix C.

Each of the sites is to be monitored for three (3) wet weather events per year. At sites with dry weather flows, samples are collected two (2) times per year. A dry weather sample was collected at Site 5. Samples are collected in accordance with the Permit and monitoring requirements at 40 CFR 122.26 (d)(2)(iii), by Maryland Environmental Services (MES), a contractor. The dates that samples were collected are provided in Appendix D.

**Table 1 – Monitoring Sites**

<b>Site Number</b>	<b>Sampling Location</b>	<b>Acres</b>
1	Stickfoot Sewer - 2400 block of Martin Luther King Jr. Ave., SE	367.31
2	O Street Storm Water Pump Station - 125 O St., SE	252.52
3	Anacostia High School - Corner of 17 <sup>th</sup> St. and Minnesota Ave., SE	413.22
4	Gallatin St. & 14 <sup>th</sup> Street, NE	619.83
5	Varnum St. & 19 <sup>th</sup> Place, NE	1216.71
6	Nash Run - Intersection of Anacostia Dr. & Polk St., NE	344.35
7	East Capitol Street - 200 Block of Oklahoma Ave. at intersection with D St., NE	91.83
8	Ft. Lincoln-Newtown BMP - wooded area before South Dakota St. Exit off of New York Ave., NE	229.56
9	Hickey Run - 33 <sup>rd</sup> and V Street, NE	149.22

After several failed attempts by the contractor to collect wet weather samples at the Ft. Lincoln-Newtown BMP, MES requested that the Department of Health (DOH) investigate the Best Management Practice (BMP). A January 2002 site visit by the Watershed Protection Division (WPD) staff that designed and monitored construction of the BMP found that the BMP is not functioning as designed. Consequently, there are no sampling events to report for Site 8 (Ft. Lincoln-Newtown BMP).

Ambient samples are collected monthly by DOH Bureau of Environmental Quality Water Quality Division (WQD) staff at two sites on Hickey Run (See Appendix E). These samples are only analyzed for nutrients, turbidity, alkalinity, hardness, pH, temperature, dissolved oxygen, oil and grease, fecal coliforms, and metals (quarterly). One site is located in the National Arboretum and the second is located in the headwaters of the stream. These samples are collected and analyzed according to the WQD's Quality Assurance Project Plan that is on file with U.S. EPA Region 3.

## WEATHER INFORMATION

Table 2 shows the actual, predicted normal, and average precipitation for the Washington, DC area for the period of January through June 2002.

**Table 2 – Precipitation Record for Washington, DC**

<b>Precipitation</b>			
<b>MONTH</b>	<b>ACTUAL (in.)</b>	<b>NORMAL (in.)</b>	<b>AVERAGE (in.)</b>
January 2002	1.32	3.21	2.8
February	0.47	2.63	2.6
March	3.37	3.60	3.4
April	3.47	2.77	2.8
May	2.17	3.82	3.9
June	3.81	3.13	3.3
Data is from Ronald Reagan National Airport; Source: NOAA, National Weather Service.			

Data logging rain gauges were installed at six of the District’s monitoring stations. Some rain gauges are able to describe the rainfall event for more than one monitoring station. Selected rain gauge site locations and the monitoring stations they represent are presented in Table 3. Rain events for which samples were collected are provided in Table 4. Narrative descriptions for storm events are provided in Appendix F.

**Table 3 – Location of Six Rain Gauges Representing the District’s Monitoring Stations**

<b>Rain Gauge</b>	<b>Location Description</b>	<b>Represented Monitoring Station(s)</b>
At MS-2	O- Street Pumping Station	MS-2
At MS-4	Gallatin Street and 14 <sup>th</sup> Street, NE	MS-4, 5, 8, 9
At MS-5	Varnum and 19 <sup>th</sup> Street	MS-3, MS-5
At MS-6	Nash Run – Intersection of Anacostia Drive and Polk Street, NE	MS –6, 8, 9
At MS-7	East Capitol Street – 200 Block of Oklahoma Avenue at intersection with D Street, NE	MS-1, 2, 3, 7, 9
At MS- 8	Ft. Lincoln – Newtown BMP	MS-6, 7, 9

**Table 4 – Storm Events Sampled at Six of the District’s Rain Gauge Locations**

<b>Date</b>	<b>Precipitation (in.)</b>	<b>Duration (hr)</b>	<b>Time to Previous (hr)</b>	<b>Gauge Location</b>	<b>Sites Sampled</b>
2/07/02	0.19	4.75	436	MS-5	MS-3, 5
3/02/02	0.8	14	86	MS-6	MS-2,3,6,9
3/26/02	0.37	4.5	123	MS-4	MS-1,4,5
4/09/02	0.27	8	304	MS-7	MS-1,2,3,7
4/18/02	0.31	0.67	185	MS-7	MS-1,7
6/06/02	0.38	0.3	224	MS-2	MS-2
6/13/02	2.04	>24	164	MS-4	MS- 4,5

**SAMPLE COLLECTION**

The list of sampled parameters, the detection limits, and EPA-approved methods utilized for monitoring activities are included in Appendix G. A Quality Assurance Project Plan (QAPP) for the wet and dry weather monitoring is provided in Appendix H.

**RECORDKEEPING**

DOH maintains the records of monitoring information which include the following:

- Description of Sampling
  - Location/Collection Time
  - Sampling Collection
  - Field Test
  - MES Personnel who collected samples
- Storm Event Data
  - Date and duration of the storm events samples
  - Rainfall measurements
  - Duration between storm event sampled and the end of the previous measurable storm event
  - Estimate of the total volume of the discharge sampled
- Sampling Difficulties/Field Notes



- QA/QC Review and Clarification
  - Field Test Results
  - Laboratory Results Tables
  - Atlantic Coast Laboratories Data
  - Lancaster Laboratories Data
  - Triangle Laboratories Data
  - Martel Laboratories Data

## MONITORING RESULTS

Monitoring results for the wet and dry weather sampling events are reported on discharge monitoring report (DMR) forms. Copies of the completed DMR forms for the monitoring results are provided in Appendix I.

## ESTIMATES OF CUMULATIVE LOADINGS

Due to the limited amount of data available, Appendix J is an evaluation of the data utilizing various statistical equations such as median and average. The median is a central tendency number in the middle of an ordered set of data. The mean is a numerical central tendency.

$$\text{Mean} = X = \frac{\sum x}{N}$$

The variance and standard deviation is the measure of the spread of data about the mean.

$$\text{Variance} = \frac{\sum (x-X)^2}{N-1} = s^2$$

$$\text{Standard Deviation} = \sqrt{s^2}$$

$$\text{Coefficient of the Variance} = \text{Standard Deviation} / \text{Average}$$

$$\text{Mean Runoff Event Concentration (M)} = T * \text{SQRT}(1 + \text{CV}^2)$$

Where M = Mean

T = Median

CV = Coefficient of the Variance

The mean event concentration will be 25% greater than the median value.

$$\text{Mean Storm Event Mass Load (lbs/acre)} = \frac{\text{Runoff Volume} * \text{Mean Runoff Event Concentration (mg/L)} * \text{Units conversion factor}}{\text{Area}}$$

Where Runoff Volume = Total runoff volume for a 24 hour storm (gallons)

Mean Runoff Event Concentration in either mg/L or  $\mu\text{g/L}$

Area = Watershed area (acres)

Conversion factor =  $8.3555 \times 10^{-9}$  for chemicals reported in  $\mu\text{g/L}$

Conversion factor =  $8.3555 \times 10^{-6}$  for chemicals reported in mg/L

$$\text{Annual Mass Load (ANMASS)} = \text{M(Mass)} * \text{NST}$$

Where ANMASS = Annual Mass Load (mass/yr)

M(MASS) = Mass Load for the Mean Event

NST = Number of Events per Year

A cursory review of the incomplete storm event data reveals minor or no loads of volatile organic compounds, acid extractable compounds, base/neutral extractable compounds, pesticides, polychlorinated biphenyls (PCBs), or dioxin. A number of metals are contributed in minor amounts; highest among these are copper and zinc. Moderate loads of nutrients were contributed, while significant loads of suspended and dissolved solids, fecal coliform, and fecal streptococcus should be noted. Oil and grease, even at the Hickey Run storm water monitoring site, is not a major pollutant of concern based on the limited available data. Appendix J includes the preliminary load calculations.

For the Hickey Run total maximum daily load (TMDL), the numeric criterion of 10 mg/L for oil and grease is used as a target value. That concentration was not exceeded; the only oil and grease concentration detected for the storms monitored is 7.3 mg/L. It should be noted that the 11.9 lb/day effluent limit was calculated on the assumption of low flow (base flow) and does not adequately consider the storm flows.