

**SCOPE OF SERVICES
NPDES STORMWATER
WET WEATHER MONITORING PROJECT
(PERMIT NO. 4PI00000*CD)**

The successful consultant shall furnish all labor, materials, equipment and supervision necessary to complete the wet weather monitoring requirements specified in the City's MS4 permit. Tasks associated with this project include outfall sampling, laboratory analysis, laboratory data evaluation, report generation, and project management. Part IV of the City's MS4 permit specifies the sampling and analytical procedures that are to be used to perform the sampling and analytical tasks needed to successfully complete this project. Work under this project, at a minimum, will continue through four years (permit Years 2 through 5) of the City's 5-year MS4 permit cycle. A fifth year of monitoring and reporting services may be performed if authorized by the City.

After the permit was finalized, Ohio EPA authorized monitoring activities at three different outfall locations, at the City's request, for permit Years 2 through 5 in lieu of the five outfalls specified under the original permit language. The locations of the three alternate outfalls are shown in Figure 1. **Work specified under this scope of services is to be performed at the three outfall locations shown in Figure 1.**

The consultant shall perform the following tasks to meet the requirements of Part IV and Part V of the City's MS4 permit.

Task 1 – Quality Assurance Project Plan

Prior to any sampling work, the Engineer shall prepare a Quality Assurance Project Plan (QAPP) that describes the activities that will be performed to complete the sampling, analytical, monitoring, and reporting tasks under this project. The QAPP shall document the results of the project's technical planning process, provide a clear, concise, and complete plan for task performance, identify quality assurance/quality control objectives and procedures, and identify key project personnel that will be responsible for performing each task. At a minimum, the QAPP shall address and/or include each of the elements listed in the following table that are relevant to this project.

QAPP Elements¹

Project Management	Data Generation and Acquisition	Assessment and Oversight	Data Validation and Usability
Title and Approval Sheet	Sampling Process Design (Experimental Design)	Assessments and Response Actions	Data Review, Verification, and Validation
Table of Contents	Sampling Methods	Reports to Management	Verification and Validation Methods
Distribution List	Sample Handling and Custody		Reconciliation with User Requirements
Project/Task Organization	Analytical Methods		
Problem Definition and Background	Quality Control		
Project/Task Description	Instrument/Equipment Testing, Inspection, and Maintenance		
Quality Objectives and Criteria	Instrument/Equipment Calibration and Frequency		
Special Training/Certifications	Inspection/Acceptance of Supplies and Consumables		
Documentation and Records	Non-direct Measurements		
	Data Management		

More information on these elements is provided in the U.S. EPA’s Guidance for Quality Assurance Project Plans (EPA QA/G-5, 2002). Information pertaining to quality assurance practices and procedures used by the City’s Surveillance Laboratory are available from the City and shall be incorporated into the final QAPP for this project.

Procedures outlined in the QAPP shall be followed during the completion of each task and throughout the duration of the project. The City recognizes that there may be instances where procedures specified in the QAPP may require revision due to circumstances that were unknown at the beginning of the project. In instances where it is found that a procedure(s) specified the QAPP is impracticable, the QAPP shall be revised to incorporate an alternative procedure and justification of the change shall be provided. In no instance shall changes be made within the QAPP without prior approval by the City.

Task 2 – Permits and Maintenance of Traffic

The following tasks shall be performed to comply with City permitting requirements and to ensure the safety of the Engineer’s sampling/monitoring crews and traveling public.

¹ Adapted from U.S. EPA Guidance for Quality Assurance Project Plans (EPA QA/G-5, 2002)

Task 2.1: The Engineer shall procure the necessary right-of-way permits from the City's Transportation Division where any dry weather or wet weather field screening or sampling tasks are to be performed within city right-of-way.

Task 2.2: The Engineer shall provide for the maintenance of vehicular and pedestrian traffic to ensure that any dry weather or wet weather field screening or sampling tasks are conducted safely where such tasks are to be performed in or around vehicular and pedestrian traffic.

Task 3 – Dry Weather Flow Characterization, If authorized

The following tasks shall be performed to characterize the constituents present in dry weather discharges. The results of this characterization shall be used by the Engineer to adjust the amount of constituents that are reported for wet weather flows.

Task 3.1: **If authorized**, the Engineer shall field screen each of the three sampling locations shown in Figure 1 for the presence of dry weather flow and report his/her findings to the City. Dry weather flows shall be defined as discharges from stormwater outfalls that are occurring 72-hours from the end of the last precipitation event. Dry weather screening shall be performed quarterly at each of the three monitoring locations during the first year of the project.

Task 3.2: **If authorized**, the Engineer shall characterize the constituents present in dry weather flows where applicable. The Engineer shall collect at least one dry weather sample per dry weather field screening visit from each outfall that was identified during field screening as having dry weather flow. The Engineer shall collect, maintain records of, and report on the amount of dry weather flow (if present) discharged from each outfall at the time when the dry weather samples were collected. Samples collected during dry weather flow events shall be analyzed for the constituents listed in Table 5.1 and Table 5.2. The Engineer shall evaluate the dry weather sampling data and prepare a summary report that characterizes the constituents that were observed in the dry weather samples. The Engineer shall use the findings of the dry weather characterization report to adjust sampling data that will be collected to represent wet weather events.

For budgeting purposes, the Engineer shall assume that tasks associated with dry weather flow characterization will be performed at each of the three monitoring locations for this project. The Engineer shall also assume that only one dry weather characterization report will be prepared to include all of the dry weather information for all three of the monitored outfalls. The Engineer shall assume that an initial draft report will be prepared and submitted to the City and that two separate revisions to the draft report will be made by the Engineer based on City review before the final report is accepted.

Work under this sub-task shall only be performed "if authorized" in writing by the City prior to any execution of work. Such work would be performed only upon the approval of a cost estimate for dry weather flow characterization services prepared by the Engineer (under the rates and costs established by the agreement) and subsequent written authorization by the City.

In instances where the Engineer observes the occurrence of an illicit dry weather discharge (e.g. visible oil sheen, odor, color, etc.) during field screening, the Engineer shall immediately report the discharge to the City's Stormwater and Regulatory Management Section at (614) 645-0362.

Task 4 – Wet Weather Monitoring

The following tasks shall be performed to collect the necessary water quality samples, precipitation information, and flow information as required in the City’s MS4 Permit. No additional compensation will be considered beyond the negotiated cost of services for after-hours sampling.

Task 4.1: The Engineer shall collect, maintain records of, and report on the following information for each wet weather event that is monitored at each of the three outfalls that are to be monitored as part of this project:

- a. Date and duration (in hours) for all storm event(s) sampled. The Engineer may use City rainfall gages to acquire this information.
- b. The rainfall measurements (in inches) of the storm event which generated each sampled runoff.
- c. The duration (in hours) between the storm event sampled and the end of the previous measurable storm event for all storm events that are sampled. A written justification for the lag time between storms that was used must be provided in the summary report generated under Task 6.
- d. Total runoff volumes (in gallons) of all discharges that are sampled.

The Engineer shall perform any necessary hydrologic and hydraulic analyses on the monitored storm sewer systems to accomplish this task and to demonstrate the water quantity and quality responses for each monitored storm sewer system. Such analyses may include, but is not limited to, the development of rating curves, land use analysis, and sewer system modeling.

Task 4.2: The Engineer shall collect wet weather samples from the three City-owned outfalls that are located throughout the City of Columbus as shown in Figure 1. Samples collected for composite sampling shall be collected and flow proportioned as described in the Engineer’s May 25, 2012 proposal. The sampling frequency at these outfalls shall be every quarter of the year to coincide with the winter, spring, summer, and autumn seasons. In instances where the Engineer is unable to collect samples for seasonal characterization due to adverse climatic conditions, the Engineer shall submit a written submission of why samples could not be collected, including documentation of the event.

The City is interested in comparing flow-weighted composite data generated using the methodology specified in the Engineer’s May 25, 2012 proposal against flow weighted composite data generated using auto sampler equipment. The Engineer shall collect flow-weighted composite samples using both methods during same sampling events, at one sampling location, for the duration of the project. Collected samples shall be analyzed in accordance with Section 5 except for oil & grease and total Cyanide. Current automated sampling equipment prevents accurate collection of these parameters. All remaining parameters can be collected with an automatic sampler.

Wet weather sampling activities shall be performed early in a given quarter, rainfall conditions permitting, to allow sufficient time for re-sampling of a monitoring location within the same quarter. Re-sampling may be required in instances where sampling activities or generation of data are deemed “suspect” following review under the guidelines provided in the QAPP. Conditions of Section IV in the contract will apply in situations where re-sampling is required due to negligence by the Engineer.

In instances where it is determined that erroneous data is not the result of the Engineer's negligence (e.g. flow monitoring equipment damaged by debris during a storm event, etc.), re-sampling may be performed if authorized by the City. Costs for re-sampling activities where it is agreed the Engineer is not negligent shall be reallocated from project contingency funds upon written authorization by the City.

In instances where the Engineer observes the occurrence of an illicit wet weather discharge (e.g. visible oil sheen, odor, color, etc.) during sampling, the Engineer shall immediately report the discharge to the City's Stormwater and Regulatory Management Section at (614) 645-0362.

Task 4.3: **If authorized**, the Engineer shall relocate wet weather sampling locations. Conditions for which alternative sampling locations may be justified include:

- a. The amount or depth of flow in the storm sewer system at the sampling point makes sample collection or flow monitoring impracticable,
- b. Geometry of the structure at the sampling location makes installation of sampling or flow monitoring equipment impracticable,
- c. Repeated vandalism or theft of monitoring equipment at a sampling location,
- d. The City and/or Ohio EPA identify an alternative monitoring location.

The Engineer shall provide written justification to relocate a sampling location in instances where the Engineer feels that an alternative sampling location is required. The written justification shall include an explanation for why the current sampling location is unfeasible, provide a recommended alternative sampling location, and provide justification for why the recommended sampling location was selected.

In addition to removing, transporting, and reinstalling monitoring equipment at an alternative location, work under this task shall also include the field screening and constituent characterization for dry weather flows (where present) as described in Task 3.

Work under this task shall only be performed "if authorized" in writing by the City prior to any execution of work. Such work would be performed only upon the approval of a cost estimate for sampling relocation services prepared by the Engineer (under the rates and costs established by the agreement) and subsequent written authorization by the City. For budgeting purposes, the Engineer shall assume that each of the three city-wide sampling/monitoring locations will be relocated once within the time frame of this project.

The Engineer shall also assume that the performance of dry weather characterization tasks prescribed under Task 3 and flow monitoring, precipitation monitoring, and hydrologic and hydraulic analysis prescribed under Task 4.1 will be required for each new outfall location. Costs associated with Task 3 and Task 4.1 on relocation sites, including revisions to the dry weather characterization report based on the new sampling/monitoring sites, shall be included under this subtask.

Task 5 – Laboratory Analysis

The following tasks shall be performed to determine the amount of constituents that are present in the water quality samples collected in Task 4.

Task 5.1: Table 5.1 lists the constituents and minimum detection limits for which the Engineer shall deliver samples to the City's Surveillance Laboratory for analysis.

Table 5.1 – Constituents for City Surveillance Lab Analysis

Constituent Name	Detectible Limit
Alkalinity	1.2 mg/l
Hardness (as CaCO ₃)	1.7 mg/l
Total Phosphorus	0.05 mg/l
Total suspended solids	1.0 mg/l
NH ₃	0.02 mg/l
Oil and grease	1.0 mg/l
pH	0.1
Temperature (°C)	N/A
Dissolved Oxygen	1.0 mg/l
Copper	0.00075 mg/l
Chromium	0.005 mg/l
Cadmium	0.00011 mg/l
Lead	0.00034 mg/l
Nickel	0.00055 mg/l
Zinc	0.001 mg/l
Total cyanide	0.002 mg/l

Samples shall be prepared for analysis of the constituents listed in Table 5.1 and delivered to the following address by the Engineer:

City of Columbus
Surveillance Laboratory
1250 Fairwood Avenue
Columbus, Ohio 43206

Drop-off times for the City’s Surveillance Laboratory shall be between 7:00 a.m. and 4:00 p.m., Monday through Friday.

Task 5.2: Table 5.2 lists the constituents and minimum detection limits for which the Engineer shall deliver samples to the Engineer’s laboratory for analysis.

Table 5.2 - Constituents for Engineer’s Lab Analysis

Constituent Name	Detectible Limit
Dissolved Phosphorus (dissolved ortho-phosphate, lab filtered)	0.05 mg/l
Nitrite	0.05 mg/l
Fecal Coli form*	1.0 (#/100 ml)
E. coli*	1.0 (#/100ml)
5-day CBOD	2.0 mg/l
5-day BOD	1.0 mg/l
COD	1.0 mg/l

***Part IV of the City’s MS4 NPDES permit only requires that grab samples be collected and analyzed for bacteria parameters. The City requires that flow-weighted composite samples be estimated for bacteria parameters as well under this contract. Costs associated with generating flow-weighted composite results for bacteria parameters shall be included under this task.**

No additional compensation will be considered beyond the negotiated cost of services for after-hours laboratory analysis.

The Engineer shall supply the City of Columbus with the sampling results that were generated by the Engineer’s laboratory for inclusion into the City LIMS system.

Task 6 – Laboratory and Flow Monitoring Data Evaluation and Report Preparation

The following tasks shall be performed to evaluate the data generated from Task 4 and Task 5 and to report findings of the evaluation for incorporation into the City’s annual report to the Ohio EPA.

Task 6.1: If applicable, the Engineer shall use the findings in the dry weather characterization report developed under Task 3 to adjust the data generated under Task 5 so that the constituent loadings for wet weather events are accurately represented. Once adjusted, the Engineer shall evaluate the wet weather monitoring data and characterize the seasonal quality of stormwater discharges. At a minimum, observed data from each of the three outfalls shall be compared to values generated during years prior at each of the locations as well as the respective values provided in the most current version of the National Stormwater Quality Database (NSQD). Graphical comparison of median constituent values from collected samples against box and whisker plots of NSQD data shall be performed.

Task 6.2: The Engineer shall prepare and submit a report annually that summarizes the sampling, analysis, and evaluation of data collected at the three city-wide outfalls shown in Figure 1. The summary reports shall be submitted for incorporation into the City’s annual report to Ohio EPA and shall meet the requirements specified in Part II.C.4.a of the City’s MS4 Permit. The Engineer shall perform statistical analyses of the data generated under Task 5 to identify any long term and short term trends in results obtained. The engineer shall prepare a report that summarizes the results of the analyses as well as the results of the comparisons performed under Task 6.1. For budgeting purposes, the Engineer shall assume that an initial draft report for each reporting year of the MS4 Permit shall be prepared and submitted to the City. The Engineer shall assume that the initial draft report will require two separate revisions by the Engineer based on City review before the final report is accepted. The final report must

be submitted to the City by March 1 of each year. A copy of the City's 2011 wet weather monitoring report is available in Exhibit G for reference.

Task 7 – Project Management

The Engineer shall provide the necessary project management to schedule, coordinate, and manage the necessary equipment and personnel to perform the services required by the Scope of Services and the City's MS4 Permit. Project management services shall include, but are not limited to, scheduling, invoicing, and participating in quarterly progress meetings with the City. Within fourteen (14) days of contract award, the Engineer shall prepare and submit a schedule that includes all meeting and deliverable dates associated with this project. The Engineer shall participate in one kick-off meeting at the beginning of the project.

Task 8 – If Authorized One Year Program Extension

If Authorized, the Engineer shall continue quarterly monitoring and reporting services for one additional year. Specifically, the Engineer shall perform Tasks 2, 4, 5, 6, and 7, including all subtasks listed there under, for a period of one year immediately after fourth year monitoring activities under this contract are complete.

Work under this task shall only be performed "if authorized" in writing by the City prior to any execution of work. Such work would be performed only upon the subsequent written authorization by the City. Hours and costs associated with this service are included in Exhibits B.1 and C, respectively.

Task 9 – If Authorized Additional Services

If Authorized, the Engineer shall perform additional tasks associated with this project that are not included in the scope of services. Due to the uncertain nature of various work elements in this contract, it may be necessary to authorize additional work beyond the scope as written. Such work would be performed only upon the approval of a cost estimate for such services prepared by the Engineer (under the rates and costs established by the agreement) and subsequent written authorization by the City.