UNITED
FOR THE GOOD OF THE CITY
MAYOR WILLIAM A. BELL, SR.
710 NORTH 20TH STREET
BIRMINGHAM, AL 35203

October 4, 2013

Alabama Department of Environmental Management
Permits & Compliance Section
Municipal Branch, Water Division
c/o Marla S. Smith
Post Office Box 301463
Montgomery, Alabama 36130-1463

RE: ***NPDES Permit No. ALS000001 – Storm Water Management Authority, Inc.***
City of Birmingham Municipal Separate Storm Sewer System (MS4) Monitoring Program
Letter Report

Dear Ms. Smith;

The subject National Pollutant Discharge Elimination System (NPDES) permit may be modified in part during its term for cause, including but not limited to the need for modification and reissuance being requested by the permittee where cause exists (Permit Condition Part VIIA.1.c.) and subject to a determination by the Director that the modification has cause and will not result in a violation of federal or state law, rules, or regulations (Permit Condition Part VIIA.2.j.) or change portions of the Storm Water Management Program that are considered permit conditions (Permit Condition Part VIIA.2.l.). This request is primarily related to the water quality screening methodology, which in accordance with Permit condition Part IIA.11.a. and Part IIG.2.c. may be modified based on experience gained during actual field screening activities and substitutions may be made for just cause during the term of the permit (Permit Condition Part VA.1.c.).

The purpose of this letter report is to outline a request by the City of Birmingham to modify the following permit conditions for Alabama Department of Environmental Management (ADEM) approval, including:

1. **Part IIA.11.c.** – Industrial & high risk runoff monitoring requirements.
2. **Part IIG.2.c.** – Specific to this permit condition, please find enclosed a response to each of three listed requirements.
3. **Part V.A.1.a.** –Attachments II (Representative Monitoring Requirement for Outfalls) & III Representative Monitoring Requirements for New Outfalls) are modified and attached as same.
4. **Part V.A.3.c.** – Grab samples collected bimonthly to replace wet weather storm event sampling.

The following letter report sections will:

1. Confirm impairment based on the State of Alabama's antidegradation standards
2. Identify limited useful data results to identify sources of impairment and, at least in one case, samples being collected from an inappropriate location
3. Identify a significant quantity of outfalls not being adequately monitored to identify stream impairment
4. Identify a large quantity of very costly analytical data being collected while consistently demonstrating below limits of detection, and finally
5. Identify a concern for worker safety

These reasons for change identify the City's need to amend the current monitoring program design because it does not achieve adequate protection of the beneficial uses of the City's natural water resources. Therefore modifications are being recommended for State approval to the current City water quality monitoring program, in accordance with Permit Condition Part IIG.2.c. Further, this request anticipates implementation on or before October 20, 2013, as City Council approval is anticipated on October 15, 2013. Details consistent with the permit condition are further elaborated below.

PART IIG.2.C.(1) - ANALYSIS OF WHY BMP IS INEFFECTIVE OR INFEASIBLE:

Attachment I provides a summary of all water quality data collected for Village Creek, Valley Creek, Shades Creek, Five Mile Creek, and the Cahaba River Watershed including Lake Purdy and the Little Cahaba River from 2009 to the Spring of 2013. This data has been collected consistent with the current NPDES MS4 City Permit.

Within the City of Birmingham, impairment has been determined for all or portions of Village Creek, Valley Creek and the Cahaba River[1]. In large part this appears due to the removal of riparian vegetation, channelization, and related alteration of the natural aquatic habitat. According to the 2010 Alabama §303(d) list, the causes of impairment include pathogens and pesticides from urban runoff and collection system failure, metals from atmospheric deposition, and siltation from urban runoff.

[1] 2010 Integrated Water Quality Monitoring and Assessment Report. April 1, 2010. Appendix D

The City of Birmingham's stormwater quality monitoring program has been defined as a descriptive study program specifically designed to gather data and document the state of stormwater quality within the storm sewer system[2]. Typically, descriptive monitoring programs measure the distribution of various constituents within a waterbody at different times and against different formal guidelines. Over time, a measure of change is expected to be observed that will eventually allow for the assessment of trends, or more importantly provide some indication of relatively poor water quality from inflows that may generate a suspicion of illicit discharges. Unfortunately though, the City of Birmingham's existing water quality monitoring program does not lend itself to resolving illicit water quality impairments because the water quality program is designed with the water resources of the entire Birmingham Area of Jefferson County in mind, not just for discovering resource impacts within the City of Birmingham. However, the intent of the City of Birmingham's water quality sampling program through the National Pollutant Discharge Elimination System (NPDES) regulatory control program is required to improve those water resources within City MS4 jurisdiction such that delisting those streams and rivers from the impaired waters list might be considered in the future where substantial water quality improvement can be demonstrated.

In accordance with the City of Birmingham's NPDES Permit (No. ALS000001), the City has conducted a 47 month investigation of water quality in six Birmingham rivers and streams, including the Cahaba River, Five Mile Creek, Little Cahaba River, Shades Creek, Valley Creek and Village Creek. Sampling has also been done at the Lake Purdy outfall. These waterways and their associated drainage basins and sampling locations are illustrated in Attachment IV. Water quality data specific to each creek is provided in Attachment 1. Each waterbody was sampled consistent with conditions imposed by the City's NPDES Permit, Part V-A, and associated Phase I Municipal Separate Storm Sewer System (MS4) Program Manual. Water column samples were analyzed for major ions, nutrients, fecal bacteria, trace and minor elements, and pesticide constituents.

Table 1 compares the results of Birmingham's sampling efforts to the State's Antidegradation requirements. That shaded in blue represents systems having a public water supply use while that highlighted in tan is classified as Swimming/Body Contact. Those in green are classified as Fish & Wildlife and/or Agriculture or Industrial Water Supply. Where two numbers are shown, the first number is the average concentration of all instream values while the second number is the highest concentration reported. Where NS is noted, there is no antidegradation criteria; where NM is noted, that parameter was not measured as part of the City of Birmingham's monitoring program.

[2] N:\URBANDES\Thomas Miller\Stormwater Management\NPDES\2012 Annual Report\14 Water Quality Monitoring.doc FY2011-2012 MS4 Annual Report. December 2012

Stream	BOD_5 Mean/Max	Ammonia Mean/Max	D.O. Mean/Max	pH Mean/Max	Temperature Mean/Max	E-Coli Mean/Max	Turbidity Mean/Max
Cahaba	N_S	N_S	N_M	8.1/8.1	79.5/79.5	N_M	3.6/3.6
Little Cahaba	N_S	N_S	N_M	7.9/9.1	73.1/77.2	N_M	2.8/4.8
Lake Purdy	N_S	N_S	N_M	8.0/8.0	79.5/79.5	N_M	6.4/7.2
Five Mile	N_S	N_S	N_M	8.1/8.6	60.1/76.3	N_M	93.7/1350.0
Village	N_S	N_S	N_M	7.9/8.8	63.7/79.9	N_M	24.7/320.0
Valley	N_S	N_S	N_M	7.4/8.4	68.0/79.5	N_M	19.6/110.0
Shades	N_S	N_S	N_M	7.4/8.5	62.2/81.0	N_M	20.3/155.0

Table 1

*N_S is No Standard; N_M is Not Measured

Based on the Antidegradation Standard, the Little Cahaba River appears to exceed the maximum pH level for streams designated as Public Water Supply, as well as the requirement that pH to not deviate 1-unit from "normal" stream pH. In this case, if it is assumed that "normal" pH is the average level, than the Little Cahaba River also exceeded that criterion as well. Five Mile Creek and Village Creek also exceeded the pH requirement not to exceed 8.5 units; Five Mile Creek only once while Village Creek exceeded 8.5 pH units on two occasions. The maximum pH observance in Five Mile Creek was in 2009 while in Village Creek it was in 2010. There has not since been a recurrence of similar high levels of pH in either creek.

Again, based on the Antidegradation Standard for Alabama, all stream segments were below the 90^0 F maximum. Although the maximum stream temperature did rise above ambient (i.e. average annual) temperature levels by more than 5^0 F at some stream locations, the data record for those sites does not include a complete annual record for each of the four years sampled. Therefore, it is not possible to use the 5^0 F variance above ambient where the ambient is defined as the annual average temperature for lack of sufficient data.

Turbidity, as was anticipated given the 303(d) impairments list, did exceed the 50 NTU standards for Five Mile, Village, Valley, and Shades Creeks. For these streams, maximum NTU levels were recorded on occasion to exceed the average instream total turbidity levels. This was particularly noticeable when sampling occurred during wet periods. The average turbidity levels were considerably higher during wet periods. Five Mile Creek had the highest recorded average turbidity levels of all streams sampled (Figure 1).

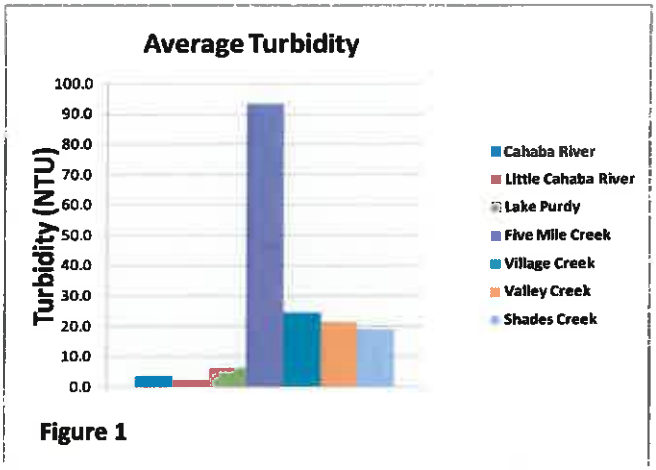

Figure 1

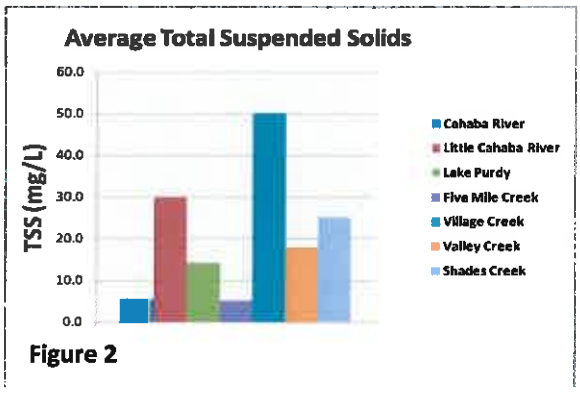

Figure 2

Alternately, instream average total suspended solids (Figure 2), both wet and dry periods, were low in the Five Mile Creek with an average solids concentration of 5.2 mg/L. The highest average concentration of solids was at Village Creek (50.2 mg/L). Likewise for total suspended solids, concentrations averaged higher during the wet periods than during dry periods.

Total suspended solids and turbidity levels both measure the levels of particulates associated with a given monitored waterbody. Given the very small dataset, it is not possible to produce a measure of correlation coefficient between total suspended solids and turbidity for the Cahaba River, the Little Cahaba River, and Lake Purdy. The Cahaba River and Lake Purdy both had less than 5 measurements and the Little Cahaba River only had dry period data. However, comparing the coefficients of correlation (Pearson Product Moment) between total suspended solids and turbidity for Five Mile Creek (R=0.999), Village Creek (R=0.893), Valley Creek (R=0.977), and Shades Creek (R=0.632), there is a high degree of similarity for all but Shades Creek.[3] The correlation coefficient provides a measure of the strength of the linear relationship between two sample sets. Unlike the slope of a line, the correlation coefficient "R" is scaleless, with the value always being the absolute value between -1 and +1. The closer to 1 the result is,

[3] Statistics Calculator

the stronger the relationship. The closer to 0, the implication is little or no linear relationship exists.[4] The correlation coefficient between turbidity and total suspended solids was weaker for Shades Creek. This data suggests that both parameters may not be needed to be sampled when one would suffice. If either requires laboratory sampling, that one may be recommended for discontinued sampling and the other continued as a field measure where required by State guideline.

The State of Alabama also addresses toxic pollutants, many of which have been sampled by the City of Birmingham. Examples, which have been sampled by the City include: (1) Arsenic; (2) Chromium III; (3) Nickel; (4) Silver; (5) Cyanide, and (6) Mercury. The standards for each of these parameters are shown in Attachment 1 and have been adjusted for average instream hardness concentrations where appropriate in accordance with the antidegradation requirements for toxicity. As a side, hardness concentrations in those streams within the City of Birmingham can be represented as being low to moderately hard with the highest average instream hardness concentrations being recorded at the Five Mile Creek Site FMC-3 (Figure 3). The lowest instream average hardness levels were recorded at instream monitoring locations within the Cahaba River System. After having been adjusted for hardness, in every case the above mentioned metals were below the federal and state toxicity thresholds and were consistently lower than each limit of detection. Other parameters that were measured and found to be below the federal and state criteria and also below the limit of detection at all water quality monitoring stations, included: (1) Hexavalent Chromium; and Cyanide (Total and Dissolved). Therefore, at a minimum, these parameters are not being recommended for continued sampling.

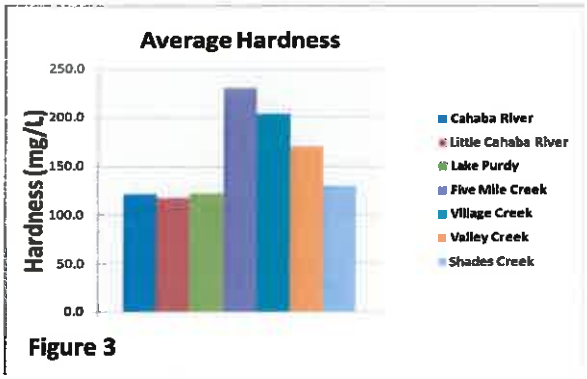

Figure 3

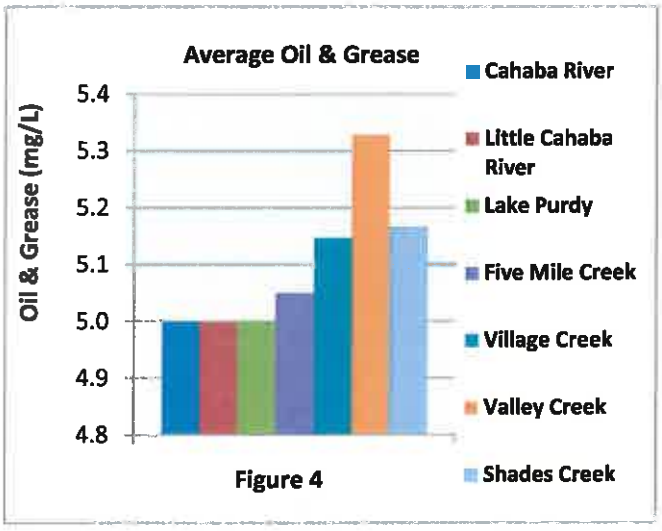

Figure 4

Throughout this study, oil and grease

[4] Sincich, Terry. 1993. *Statistics by Example*. 5th Edition. Pgs. 556-557.

concentrations were rarely above the limits of detection, which those limits also changed during this study. The limits of detection ranged from a low of 5.0 mg/L at most instream sampling locations (wet & dry) to a high limit of detection of 6.5 mg/L from the Valley Creek data set. Interestingly enough, the highest detection limit concentrations were consistently reported from the February 25-27, 2009 sampling dates. The other detection limits reported greater than 5.0 mg/L seemed to correspond to earlier sampling dates, also in the 2009 and 2010 record. Overall though, average oil & grease levels remained consistently low, less than 5.4 mg/L at all instream sampling locations collected from both wet and dry periods. The highest recorded concentration of oil and grease was recorded at Valley Creek Station VC-1 (7.9 mg/L) during a wet period, but was not highly correlated with ammonia concentrations (-0.11), which if the Pearson Moment had approached an absolute value of either -1 or +1 may have been indicative of sanitary sewer overflows concurrent with high rainfall conditions. Figure 4 depicts higher average concentrations of oil and grease at Valley Creek, Shades Creek, Village Creek, and Five Mile Creek during this study period.

Total phenol was not sampled at screening locations during this study, except in Village Creek and then, only occasionally. Total phenol was sampled primarily at instream locations during both wet and dry periods (Figure 5). Sample site segments within the Cahaba River System, for purposes of this study, were all considered as screening locations and therefore were not monitored for total phenol. Of the four remaining screening segments, all were at or slightly above the limit of detection, which for this study was 0.05 mg/L. The highest average instream concentration of total phenol was measured in Village Creek (0.0517 mg/L) and included both wet and dry periods. Both Five Mile Creek and Shades Creek were consistently at the limit of detection (both wet and dry periods) during this study period.

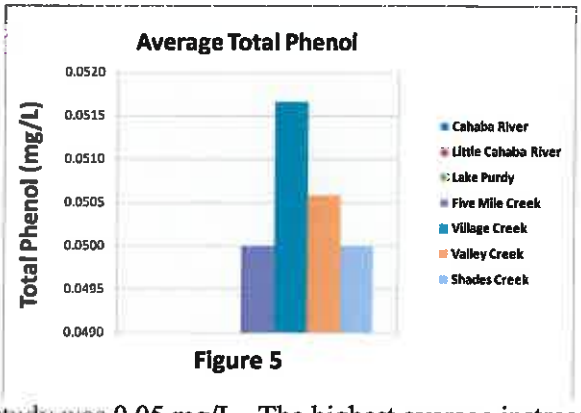

Figure 5

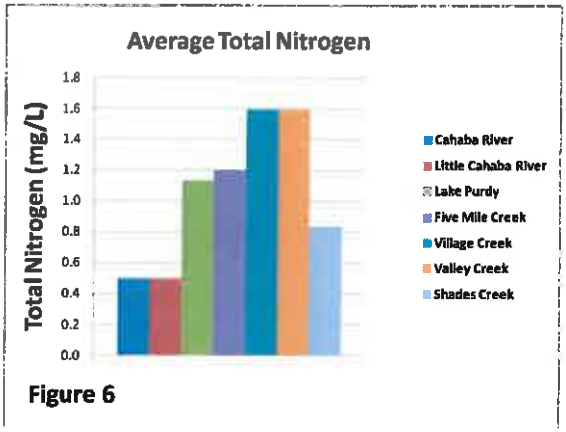

Figure 6

Average total nitrogen concentrations recorded throughout this study from among all instream monitoring sites, both wet and dry periods, ranged from a low of 0.50 mg/L at the Cahaba and Little Cahaba River sites to a high of 1.6 mg/L in Village

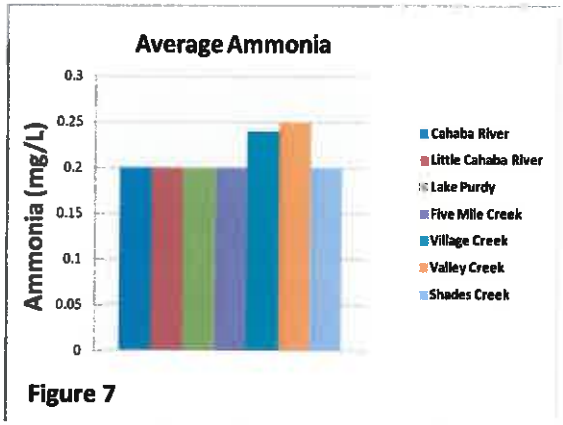

Figure 7

and Valley Creeks (Figure 6). Figure 7 demonstrates that the higher nitrogen trend was similarly displayed in Village and Valley Creeks for ammonia nitrogen (NH3-N).

While it might have been anticipated that trends with total phosphorus concentrations would also have been similar to nitrogen, in fact the average concentration of total phosphorus was higher in the Five Mile Creek basin (0.15 mg/L) and the Valley Creek basin (0.14 mg/L) (Figure 8). The sampling location at Five Mile Creek Site FMC-3 is being collected from within the mixing zone within close proximity to the outfall from the Five Mile Creek Waste Water Treatment Facility and therefore may not be representative of nutrient concentrations from Five Mile Creek proper, as was discussed earlier. Therefore, it will be a recommendation of this report that a new sampling station upstream from the Five Mile Creek Waste Water Treatment Plant be introduced to better represent the quality of Five Mile Creek. The lowest average concentration of total phosphorus was collected from the Cahaba River System (0.05 mg/L).

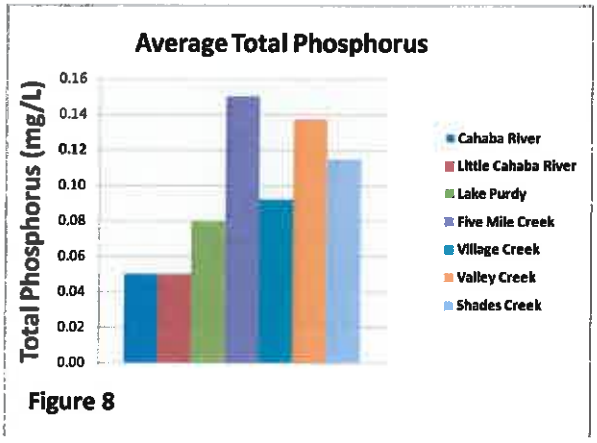

Figure 8

In Summary: Throughout the duration of this monitoring program in the City of Birmingham, all of the metals sampled, including: Arsenic, Chromium (III), Chromium (Hexavalent), Total and Dissolved Cyanide, Dieldrin, Mercury, Nickel, and Silver were consistently below the limits of detection. Given the cost of collection and analyses for these parameters from all water quality stations, to continue sampling for these parameters is excessive in light of the fact that they have been consistently reported below the limits of detection during the past 4-years of sampling. Furthermore, the City's water quality monitoring focus will become total suspended solids (TSS) based to move away from monitoring dissolved constituents, except where use of the field StormKit® is advised at flowing outfalls. In time as TSS is reduced in the outfalls there will be anticipated a similar reduction to TSS levels in stream and to all associated particulate fractions as well (e.g. particulate nutrients, metals, etc.). Attachment VII depicts the changes, which will reduce the quantity of laboratory sampled parameters (for cost) and increase in-field monitoring using electronic and monitoring strip technologies. eColi will be added to replace fecal

coliforms to reflect changes in ADEM's focus as well.

Recommendation: Drop these parameters for cost (PartIIG.2.c.(1)) and to change the monitoring focus to dry weather flows and illicit discharge identification.

Sampling to achieve "wet-period" water quality data has been a hit-or-miss proposition given that the only reported rainfall data available to the City has been that measured at the Birmingham International Airport, at the northern boundary of the City limits and is not necessarily indicative of all locations in Birmingham, particularly in the southern and eastern basins. In addition, many rainfall events, when they do occur, occur after work hours and are not collected because the City does not authorize overtime to collect samples beyond the typical work week. Therefore, many sampling periods have not been collected. Other times, when samples could have been taken, field conditions were unsafe for access due to their present locations being in-stream and extreme flow velocities and stage elevations. As a result, introduction of bias seems evident with considerable dry period data, but little representative wet period data available for comparison.

In the case of the Cahaba River System, there has been no instream sampling performed, only screening samples have been collected. This makes comparing streams based on instream sampling difficult without representative instream samples to compare.

Most importantly though, 750 outfalls having been identified within all of Birmingham's creek segments and only one or a few instream sampling points being actively measured, it is not possible to do anything more than collect water quality samples. It has not been possible for existing staff to identify the sources of contamination from outfall influences, let alone identify specific watershed problem areas or illicit discharge activity within those problem areas – and that is a specific requirement of the Clean Water Act – to prohibit non-stormwater discharges into the MS4 (PartI.B.2 and PartII.A.6.a).

Recommendation: Sampling will be routinely collected bi-monthly at all sites, instream and screening, regardless of rainfall condition; rainfall measures will be identified and reported for each three day period prior to sampling and on the day of sampling to ensure data development can be characterized based on antecedent and actual rainfall conditions at the time of collection.

PART IIG.2.C.(2) - EXPECTATIONS ON THE EFFECTIVENESS OF THE REPLACEMENT BMP:

As was stated earlier, the City of Birmingham's water quality monitoring program has largely been limited to a descriptive study program. While this is appropriate for newly created stormwater programs, as those programs become more mature, they need to become more proactive for it ever to address pollution abatement within its MS4. To date the City of Birmingham Stormwater Management Program

has identified 750 outfalls to its streams. Of that total, 566 have been inventoried during dry periods and observed for flow, although only 98 of those inventoried were found to be flowing. The remainders have either not been identified as flowing during dry periods or have not yet been observed. The City's desire is to become more proactive and substantially improve stormwater quality in City creeks and streams. To that end the City of Birmingham is recommending for approval a revised monitoring program that includes changes to:

1. **OUTFALL MONITORING STRATEGY**
2. **ADJUST STREAM LOCATIONS & MONITORING COVERAGE**
3. **MEASURE OF PERFORMANCE**

Together these changes are intended to become the City's revamped, overarching NPDES MS4 monitoring strategy with a focus going forward on solving water quality problems, not just to monitor.

OUTFALL MONITORING STRATEGY, Current Direction: The City of Birmingham's water quality monitoring stations (i.e. Instream and Screening Sites) were selected by its predecessor, the Jefferson County Stormwater Management Authority (SWMA). There were a total of 5-instream water quality stations, 25-screening sites, and many outfall sites have been located and added during the course of this study. These sites have been retained in accordance with the City's NPDES Permit since 2009. Of the 5-instream water quality locations, one site was located in Five Mile Creek, one in Shades Creek, one in Valley Creek, and two sites were located in Village Creek even thought the total linear distance of each creek is measured in miles. For example, in Village Creek alone the Creek is nearly 15-miles long and has more than 324 stormwater outfalls capable of discharging into the Creek, many of them are more than 36" in diameter or are box culvert locations. Furthermore, upstream from those outfalls in Village Creek for example, the City is also aware of approximately 142 NPDES permitted facilities and perhaps countless more that may not have applied for a NPDES Permit from the state. Some of the existing outfalls are located downstream of any instream monitoring location, which as a result may underestimate the true water quality condition of the waterbody. Given the number of outfalls and the limited number of instream monitoring stations that have been established and in some cases, monitoring sites that are located too close in proximity to point source outfalls (e.g. wastewater treatment plants), it is not possible to determine which of the outfalls, with any degree of certainty are contributing to instream water quality problems given also other programmatic constraints (e.g. frequency of monitoring, outfall reconnaissance accessibility, employee safety, etc.) Furthermore, City staff has observed that during dry periods, most outfalls appear dry. When they are not, a stormwater field kit is used to determine whether or not a pollution problem may exist. In other words, appearance, odor, sheen, etc. are considered with some limited field measurements being taken, but no action is being taken to identify the source of the water or otherwise discover if any other pollutants might exist to narrow down the pollution source. That is true

regardless of the size of the outfall. Therefore, there is a need to increase the number of instream monitoring sites to be better able to discern where instream pollution peaking may be occurring. There is also a need to reduce the number of potential outfalls between instream monitoring sites to better facilitate identification of significant pollutant sources. In order to further increase the sampling benefit, targeting outfalls greater than 36" in diameter or box culverts flowing during dry periods would reduce the number of outfalls needing investigation and where problems may exist and illicit inflows are noted, their elimination would greatly reduce both the volume of water and pollutants into the City of Birmingham creeks.

For example, Figure 9 depicts a hypothetical stream flowing between County A and City B, with the City of Birmingham between the dashed political boundaries. Draining into the stream are two screening site locations, one bisected with County A and representing primarily an industrial land usage, the other and located wholly within the City of Birmingham draining primarily residential land usage. Several outfalls to the City portions of the stream, both greater than and equal to 36" in diameter are evident, with some being less than that size. All of the outfalls are shown located within the City of Birmingham. If the City of Birmingham only had one or two active instream monitoring sites, depending upon the actual location of those sites the water quality impacts from downstream outfalls could be missed, wasting both time and money with limited opportunity to demonstrate water quality improvement that otherwise could be achieved by a more proactive program. By placing a water quality site at the headwaters, the tailwaters, and other strategically located instream locations and targeting larger outfalls as a priority for further investigation will facilitate improvement in stream quality, which will be discussed later as performance measures are discussed. Unlike Village Creek, both Shades Creek and Valley Creek have instream monitoring sites located in the headwaters. While that will certainly be useful over time to determine contributory impacts from upstream sources outside of the City, there is not a way to determine water quality degradation from outfalls downstream. The only instream monitoring location for Five Mile Creek is at the end of the Creek and there are no instream samples in the Cahaba River System at all and also in Birmingham to be able to determine that impacts even exist let alone try to turn illicit discharges from even occurring.

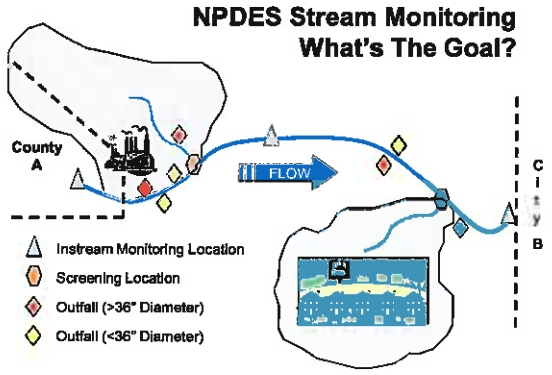

Figure 9

As a result of this monitoring program strategy, the City Stormwater Management Program is unable to identify the sources of pollution being discharged into its creeks in many cases without increasing the number of instream sampling sites. Furthermore, all sampling now requires the Stormwater Program staff

to put on waders, climb down in many areas very steep stream embankments and walk to current site locations. At a minimum, this is very time consuming just to reach many of the instream and screening site locations; not to mention safety concerns with climbing down unstable embankments in cumbersome boots and at times also wearing coats, backpacks, and carrying sampling equipment (e.g. bottles, preservatives, recording instruments and clipboards, etc.). The current strategy adds significant sampling time between locations and in some cases; the streams cannot even be accessed at all due to extreme stage elevations and velocities.

PART IIG.2.C.(3) –WHY THE REPLACEMENT BMP IS EXPECTED TO ACHIEVE THE GOALS OF THE BMP TO BE REPLACED:

New Direction: The City requests approval to pursue a more proactive approach to investigate flowing outfalls into the City's natural water resources during dry periods. Culverts greater than thirty-six inches (36") in diameter or box culverts will be investigated for flow, regardless of the physical quality of that flow. While it is hoped that flow would be only groundwater intrusion into the system, it is also likely that any flow could be an illicit discharge that needs to be addressed. In essence, when a priority outfall is discovered to be flowing during dry periods, the instream monitoring staff would evaluate the stream concentration peaks upstream and downstream of that particular inflow to determine whether or not a consistent pattern of pollution is emerging at that instream location. If so, the inflow would be identified as a potential pollutant source and evaluated throughout the associated sub-basin(s) to discover its source. This would involve a team of researchers that would include two staff dedicated to this effort and with access to additional tools that will include a contract video crew, biodegradable dyes, and a stormwater protection ordinance that will allow access within the City of Birmingham onto private property for the purpose of investigating pollutant sources and seeing that they are eliminated. The strategy therefore becomes, "During dry periods, if it's wet- it shouldn't be! If it looks bad, smells bad, it probably is", and a pollutant source that needs to be turned off. So follow the water in all pipes 36" or greater and all box culverts to the source of the water." The result over time will be demonstrated by improved water quality within the corresponding stream segment. When that stream segment positively responds with improved water quality, the next segment demonstrating diminished quality will be evaluated as the former was until that water quality segment is also improved; and so forth. Overall stream water quality will be expected to continue to improve over time until the entire system can be removed from the state impaired waters list (303d).

ADJUST STREAM LOCATIONS & MONITORING COVERAGE: The City of Birmingham's current stream locations are presented in Attachment IV. The new water quality monitoring sites being recommended

for approval are illustrated in Attachment V. The rationale for the selection of the new sites is presented in Attachment VI. Sample site selection was based on the following overarching requirements:

1. Selection of instream and screening sites needed to be easily accessible and safe, without having to climb up and down stream embankments, yet could easily and safely be sampled from above on a bridge having adequate pedestrian crosswalk space, a dock or footbridge cross-over, a water control structure, or other type of fixed access not too high above the water to safely monitor with existing equipment and cable length restrictions in mind.
2. Screening sites must represent land usage where in all likelihood significant pollution might persist, such as for commercial, industrial, and manufacturing.
3. Selection of instream locations needs to appreciably reduce the number of outfalls per stream segment so as to favorably produce instream data trends with the opportunity to identify source connections of pollution.

MEASURE OF PERFORMANCE: The State of Alabama has established water quality procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the discharge, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity) and where appropriate the dilution of the effluent in the receiving water shall be considered when determining whether a discharge will cause, have reasonable potential to cause, or contribute to an exceedance of a narrative or numerical water quality standard[5]. Given due consideration of the current sampling program in its entirety (i.e. sampling locations, parameters, frequency), the City Stormwater Program anticipates revisions that will ultimately define the measure of success for its streams to demonstrate a reduction in annual total suspended solids (TSS) loadings from each City stream before continuing to flow downstream to the next local government jurisdiction. The selection of TSS is due to the fact that most of Birmingham's stream segments are impaired for sediment and therefore needs to be addressed. Furthermore, many others parameters, such as metals for example, persist in the environment as a particulate fraction in association with TSS. As can be seen in Figure 10, by focusing on reducing the peak instream pollutant concentration, either the inflow volumes and/or

Performance Measure of Success

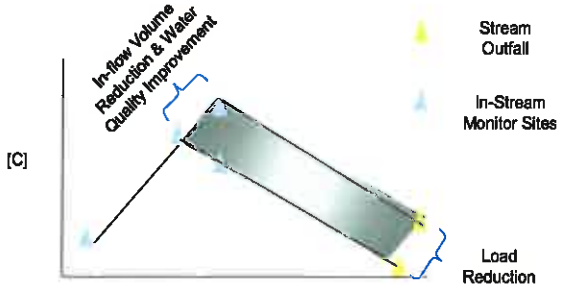

Figure 10

[5] ADEM Admin. Code r. 335-6-x-.xx; pg. 6-29

mass concentrations, pollution will be abated in the outfalls that will cause a pollutant reduction within the stream segment. That will cause improvement in the overall stream resulting in a load reduction at the terminus of the creek segment before leaving the City. This can be done not only with TSS, but other parameters, which may be selected for consideration as the State may find desirable. Attachment VII provides a comparison of current parameters being measured and those being recommended in the future program. Presently the City measures 20 parameters using laboratory services to provide the analytical data. Three parameters are measured in the field and during outfall dry weather flows. The outfalls are measured using the stormwater kit. The new program will now measure eight parameters through the use of laboratory services and nine parameters will be measured in the field. The stormwater kit will continue to be used as it was before.

In summary then, the City of Birmingham is requesting State approval for:

1. A change to the method of sampling from dry and wet periods (i.e. Grab Samples taken within the first two hours of discharge resulting from a storm event that is greater than 0.1" in magnitude and that occurs at least 72-hours from the previously measureable storm event); (Part V.A.3.b. & c.) to sampling bimonthly, regardless of weather conditions. Focus shall now become sampling for flow during dry periods, especially in stream segments having elevated total suspended solids mass concentration levels and also having flowing outfalls 36" or greater or from box culverts.
2. A change in measurable constituents, as depicted in Attachment VII.
3. A change in water quality monitoring stations, as depicted in Attachment V.

Thank you for your every consideration to this request to modify City water quality monitoring locations, frequency, and constituent coverage. The City has taken steps to approve contracts for services with Arcadis-US, Inc to continue to perform minor peer review support to continued NPDES MS4 services and to utilize the Birmingham Water Works Board to not only continue sampling in portions of the Cahaba River in support of the City's NPDES MS4 sampling efforts but to also provide analytical services as outlined herein. These contracts are anticipated for City Council review and approval at their meeting on October 15, 2013. Furthermore, the City is moving forward with additional significant steps that include:

- Budget approval to add a stormwater infrastructure video independent contractor
- Stormwater Protection Ordinance giving the City legal authority to control discharges to and from portions of the MS4 over which it has jurisdiction (Part IIE.)
- Citywide stormwater inlet cover stenciling
- Preparation of a Watershed Management Plan for the Village Creek Watershed, subject also to the approval of the Jefferson County Personnel Board and the City Council.

Sincerely yours,

Thomas H. Miller, Administrator
City of Birmingham
Stormwater Management Program

Cc: Andre Bittas, Director of Planning, Engineering and Permits
Edwin Revell, Assistant Director of Planning, Engineering and Permits

By my signature below;

" I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Duly Authorized Representative:	**Date:**
	October 4, 2013
Thomas H. Miller, Birmingham Stormwater Administrator	
Approval Signature:	**Date:**
Marla S. Smith, ADEM MS4 Coordinator