CITY COUNCIL
ATLANTA, GEORGIA

01-R-2032

A RESOLUTION BY

CITY UTILITIES COMMITTEE

A RESOLUTION AUTHORIZING THE MAYOR TO ENTER INTO AN INTERGOVERNMENTAL AGREEMENT WITH THE UNITED STATES DEPARTMENT OF THE INTERIOR OFFICE OF THE UNITED STATES GEOLOGICAL SURVEY; TO ESTABLISH A WATER QUALITY AND QUANTITY LONG-TERM MONITORING NETWORK; IN AN AMOUNT NOT TO EXCEED TWO HUNDRED NINETY TWO THOUSAND NINE HUNDRED DOLLARS AND NO CENTS ($292,900.00); PAYMENT SHALL BE CHARGED TO AND PAID FROM FUND, ACCOUNT, CENTER NUMBER: 2J01-524001-M51001.

WHEREAS, this resolution authorizes the United States Department of the Interior Office of the United States Geological Survey to begin the first portion of this long-term monitoring program totaling Two Million Two Hundred Thirty-Three Thousand Three Hundred Dollars and No Cents ($2,233,300.00) in order to preorder equipment so that construction may begin in early 2002; and

WHEREAS, the proposed project is intended to create both a water quality and quantity monitoring network in the City of Atlanta that will establish current and ongoing water-quality constituent levels, permit the calculation of annual constituent loads, evaluate the efficacy of significant capital improvements that are being made to the City of Atlanta's water treatment facilities, and facilitate the management of the major watersheds in the City of Atlanta; and

WHEREAS, the program design entails long-term monitoring at twenty (20) fixed sites and a one-time-high- and low-flow synoptic sampling program at up to forty (40) additional sites; five (5) real-time continuous water-quality and quantity streamflow stations will be installed on Peachtree, Nancy, Proctor, and Utoy Creeks and South River; the stations will collect and record continuous date on discharge, conductivity, temperature, pH, dissolved oxygen, rainfall, and turbidity; and

WHEREAS, the Commissioner of the Department of Public Works and the Director of the Bureau of Purchasing and Real Estate have recommended that the United States Department of the Interior Office of the United States Geological Survey provide these services to the City of Atlanta; and

NOW, THEREFORE, BE AND IT IS RESOLVED BY THE COUNCIL OF THE CITY OF ATLANTA, that the Mayor be and is hereby authorized to enter into an

appropriate contractual agreement with the United States Department of the Interior Office of the United States Geological Survey, to establish a water quality and water quantity long-term monitoring network in an amount not to exceed Two Hundred Ninety Two Thousand Nine Hundred Dollars and No Cents ($292,900.00);

BE IT FURTHER RESOLVED, that the Director of the Bureau of Purchasing and Real Estate be and is hereby directed to prepare an appropriate contractual intergovernmental agreement to be approved by the City Attorney, as to form for execution by the Mayor.

BE IT FURTHER RESOLVED, that this contractual agreement shall not become binding on the City, and the City shall incur no liability upon same until such contract has been executed by the Mayor and delivered to the contracting party.

BE IT FURTHER RESOLVED, that all services for said contracted work shall be charged to and paid from Fund, Account, and Center Number: 2J01-524001-M51001.

A true copy,

Deputy Clerk

ADOPTED as amended by the Council DEC 03, 2001
APPROVED by the Mayor DEC 11, 2001

PROPOSAL FOR A WATER-QUALITY MONITORING NETWORK FOR THE CITY OF ATLANTA, GA

Submitted by the U.S. Geological Survey (USGS) to the City of Atlanta via

CH_2M Hill, Incorporated

Federal Interest Statement

An important part of the U.S. Geological Survey's (USGS) mission is to provide scientific information to assist in the management of the water resources of the Nation. To effectively assess the Nation's surface-water resources, the USGS operates more than 7,000 streamgaging stations, monitors lakes and reservoirs, makes periodic flow measurements on rivers and streams using standardized methods, and maintains the data from these stations in a national data base. The data are made available on the World Wide Web (WWW) and are published annually for each State. Substantial amounts of data also are available on the WWW, on a near real-time basis, to cooperators, customers, and the public; this is important for effective management of the Nation's water resources. Surface-water data on stage/discharge are used by various entities planning and managing diverse water-resources projects and programs. These programs include, but are not limited to: flood warnings; flood assessments; reservoir operations; water-quality monitoring, establishing water-quality standards; designing infrastructure (e.g., bridges, culverts, dams); evaluating the effects of changing land use; detecting long-term climate change; and administering compacts, decrees, and/or treaties on interstate and international water bodies. The stream gaging, and lake and reservoir monitoring stations operated in Georgia are an integral part of the USGS nationwide surface-water data program.

To assess the quality of the Nation's surface and ground water resources, the USGS collects data from rivers, lakes, estuaries, and aquifers. Water-quality data are published in annual data reports and an increasing amount of real-time and historical water-quality data are available on the WWW. This information, collected using standardized instruments and procedures, contributes to a nationally consistent data base for assessing water quality. Long-term data-collection programs characterize the

physical, chemical, and biological changes in water resources in response to natural processes (e.g., climatic variations, storms, floods, droughts, volcanic eruptions) as well as to anthropogenic activities. The data are useful in designing programs to protect watersheds, sensitive aquatic habitats, biota, and drinking water sources from urban and agricultural runoff, sewage, and industrial and mining wastes. The data also are useful in designing programs to maintain waterways for other beneficial uses such as navigation, aesthetics, contact recreation, and to meet national and international treaty obligations. The water-quality data collected in Georgia are an integral part of the USGS nationwide water-quality data program.

Project Objectives

(1) Assess baseline conditions.

(2) Identify sources of impairment.

(3) Document stream improvement in response to capital improvements.

(4) Consolidate water-quality program requirements.

(5) Provide public education on water quality issues.

(6) Recommend/design changes based on the results of the monitoring program.

(7) Provide data and interpretations to facilitate remediation, if required.

Project Approach

The City of Atlanta (COA) encompasses an area of approximately 134 mi^2 (341 km^2). It includes the headwaters for several streams (tributaries to Peachtree, Utoy, and Proctor Creeks) that drain to the Chattahoochee River, as well as streams (e.g., Intrenchment, Federal Prison, and Poole Creeks) that drain to the South River, and ultimately, into the Ocmulgee/Altamaha Rivers. Generally, the greatest amount of urbanization (generation of large amounts of impervious surface) is in the most upstream areas. Numerous studies have demonstrated that large population centers, along with their associated infrastructure and industrial activity, exert a significant effect on water quality. This accrues as a result of the presence of impervious surfaces as well as the discharge of a wide variety of chemical constituents (e.g., trace elements, nutrients, sediment, organic compounds). The combination of urbanization and excessive point and non-point

discharges is expected to produce deleterious effects on water quality. The proposed project is intended to create both a water quality and quantity monitoring network in the COA area that will establish current and ongoing water-quality constituent levels, permit the calculation of annual constituent fluxes (loads), and facilitate the management of the major watersheds in the COA. Further, this network is intended to evaluate the efficacy of significant capital improvements that are being made to the COA's water-treatment facilities.

In brief, the program design entails long-term monitoring at twenty (20) fixed sites and a one-time high- and low-flow synoptic sampling program at up to forty (40) additional sites. Five (5) real-time continuous water-quality and quantity streamflow stations will be installed on the major streams traversing the COA (Peachtree, Nancy, Proctor, and Utoy Creeks and South River; see map). These stations will collect and record continuous data on discharge, conductivity, temperature, pH, dissolved oxygen (DO), rainfall, and turbidity. Site locations will remain within the COA, but will be as far downstream as practicable to better quantify the export of a variety of chemical constituents. To improve the collection efficiency of event samples/measurements, automatic samplers will be installed at all five (5) real-time continuous water-quality and quantity streamflow stations to augment the real-time water-quality data probes. These five (5) sites will be phased into operation during the first few months of the project [within 45 days of final equipment delivery].

In addition, continuous stage/discharge monitors will be installed at five (5) other sites to facilitate the determination of discharge and the movement of water and associated chemical constituents throughout the COA watersheds (see map). Lastly, ten (10) additional, uninstrumented long-term water-quality and quantity sites will be established at key locations throughout the COA watersheds (see map). These additional sites will be selected to help produce a comprehensive picture of the movement of water and chemical constituents throughout the COA watersheds. Possible re-siting for these ten (10) uninstrumented long-term monitoring sites may occur based on the results from the high- and low-flow synoptic sampling programs (see later).

Representative water column samples will be collected at all twenty (20) sites, on a hydrologically based schedule, and analyzed for a variety of water-quality parameters.

Discharge may be measured at the time of sampling. These samples will be used to: (1) establish both low- and high-flow water-quality baseline (prior to capital improvements) conditions; (2) calibrate the water-quality probes, (3) calibrate the automatic samplers; and (4) calibrate non-representative grab samples at the ten (10) uninstrumented long-term monitoring and five (5) continuous discharge sites. The samples collected at the twenty (20) long-term monitoring sites will be distributed throughout the year in an attempt to cover at least 80% to 85% of normal annual discharge conditions. The samples will be analyzed for various constituents including trace elements, nutrients, suspended sediment concentration, sewage tracers, bacteria, and other selected constituents.

Sample collection and subsequent analyses will be used for calibrating the real-time water-quality monitoring probes and automatic samplers at the five (5) real-time monitoring sites, and the grab samples at the other fifteen (15) long-term monitoring sites, against representative cross-sectional samples. This will be done in an attempt to establish relations between the discrete measurements/samples and the continuous water-quality monitoring data or grab samples, with the expectation that eventually, discrete representative depth- and width-integrated sampling could be scaled back.

Ideally, the discrete monthly samples will be replaced by real-time water-quality monitoring surrogates and non-representative grab samples. If no usable relations can be established with the real-time measurements (e.g., turbidity, DO, conductivity), then at a minimum, the five (5) automatic samplers and fifteen (15) grab samples will be calibrated to reflect representative cross-sectional concentrations. Experience has indicated that it will take between twenty (20) and thirty (30) paired data points, collected over a ramge of typical flow conditions (80 – 85% of a typical annual hydrograph) to develop the requisite relations. Once these surrogates/relations have been finalized, discrete representative depth- and width-integrated sampling will be limited to ensuring the continued utility/validity of the surrogates/relations.

Finally, during the first two (2) years of the monitoring program, two (2) major synoptic sampling programs will be conducted, one during low flow and one during high flow. The rationale for the dual synoptics is based on the fact that water-quality conditions are hydrologically linked. During low-flow periods, point sources exhibit

maximum influence, whereas during high flow periods nonpoint sources exhibit maximum influence, on water-quality conditions. Data from both synoptics may be used to relocate the ten (10) uninstrumented long-term monitoring sites. Further, these synoptics should provide a consistent basinwide framework for utilizing and understanding the long-term continuous monitoring data collected from all twenty (20) monitoring sites. Finally, these synoptic studies also are intended to identify relatively localized sources of impairment. Such areas may require subsequent evaluative sampling and/or monitoring.

Storm/event sampling is a major issue in urban water-quality studies. This accrues because significant short-term changes in chemical and suspended sediment concentration typically occur during rainstorms. Hence it is important to track these changes to: (1) estimate the fluxes and concentrations of the various constituents; (2) determine the uncertainty in the flux estimates generated from the relations between constituent concentration and a continuously measured surrogate (e.g., turbidity, conductivity, discharge); (3) identify potential contaminant sources (typically nonpoint), and (4) evaluate the real-time performance of the water-quality probes by comparing the probe-generated data with that from the automatically collected samples. Further, stormflow may account for the majority of annual chemical (dissolved, sediment-associated) and suspended sediment transport. In extreme cases, some 90% of the annual transport can occur during as little as 10% of the time.

Storm sampling experience from other USGS programs in the Atlanta area indicate that precipitation driven stormflow typically occurs outside of normal working hours, with the highest magnitude thunderstorms occurring during the evening or night. To limit manpower costs, and to ensure adequate sample coverage of these events, automatic samplers will be used *in lieu* of manually collected samples. However, automatic samplers, like the real-time water-quality probes, only are capable of collecting non-representative point samples. Hence, the data from the automatically collected samples must be corrected in the same way as the probe data. This will be accomplished using appropriate corrections determined from the analyses of the 'monthly' representative depth- and width-integrated and non-representative grab (point) samples.

Work Elements

I. Fixed Sites

A: Fully Instrumented Sites (5): A site will be selected, at a location to be determined by consensus between the COA, CH_2M Hill, and the USGS, on each of the five (5) major streams draining the COA (Peachtree, Nancy, Proctor, and Utoy Creeks, and South River). These sites will be located at their most practical downstream point and will be fully instrumented (itemized equipment costs and vendors are listed in Appendix A) with the following:

(2) Stage sensor

(3) Satellite telemetry (for connection with real time data collection platform; supplied by USGS) and a land-line or cell phone (for connection with the automatic sampler and related data collection platform; supplied by COA)

(4) Continuous water-quality probes

(2) Conductivity

(3) pH

(4) Temperature

(5) Dissolved oxygen (DO)

(6) Turbidity

(7) Rain gage

(5) Refrigerated automatic sampler (AC power supplied by COA)

USGS personnel routinely will measure discharge [at least six (6) times per year concurrently with sample collection and augmented with high-flow measurements] at each site until a stage-discharge relation has been well established. This relation will be used to convert real-time stage to discharge data. The time to develop a site-specific stage-discharge relation usually takes about one year. This assumes that all ten (10) sites have a standard stage-discharge relation, with no backwater, or other unusual hydrologic factors to complicate the computations.

Continuous water-quality data at the five (5) real-time stations will be collected using *in situ* probes. Each probe will be checked using a pre-calibrated field probe during each site visit. In an attempt to develop a correlation between sediment concentration and turbidity, monthly depth- and width integrated suspended sediment samples will be

collected and analyzed for each site by USGS personnel. Current technological limitations for the collection of continuous pH, turbidity, and dissolved oxygen data require weekly site inspections; any requisite cleaning or calibration will take place during these visits. Seasonally, site-specific analyses also will be performed for all network stations to ensure that each cross-section is homogeneous, and that the *in situ* probes are functioning adequately.

On a weekly basis, USGS field personnel will analyze all the continuous data, and apply any necessary corrections (e.g., deleting outliers, editing data; correcting for variable shifts in the real-time data and/or the stage/discharge relation). The data will be stored in the USGS National Water Information System (NWIS) data base, which will be linked to the Georgia District WWW StormWatch page for real-time data display. These data will be permanently archived as a matter of public record. On an annual basis, all the data will be checked and reviewed by qualified USGS hydrologists in preparation for publication. The USGS also will perform an external review at least once every three years, to ensure national consistency through the use of approved techniques and protocols.

Real-time data will be either publicly accessible, or cooperator limited, through the USGS NWISWeb Internet website, which will automatically display all parameters collected and transmitted from each continuous monitoring site. Additionally, two copies of a GIS-based software package, that permits the spatial display of water-quality/water-quantity data, will be provided one each to the City of Atlanta and CH_2M Hill, so that all Georgia real-time data can be viewed in a GIS-based display. This software package is standard to all USGS cooperators to provide a redundant means of accessing real-time data. USGS personnel will install the client software packages on networked desktop PC's, one provided by the City of Atlanta and one by CH_2M Hill. Discrete water-quality data will be uploaded every quarter to the USGS NWISWeb Internet website. More frequent retrievals can be made, upon request.

All data also will be published annually in a CD-ROM based report entitled "Water Resources for Georgia, Water Year xxxx". This CD-ROM report is a GIS-based product that incorporates maps, photos, and GIS coverages to help place hydrologic data in a spatial context.

The automatic sampling equipment will require 120-volt AC power, which will be provided by the COA. The remote operation of the automatic samplers requires either a cell or land-based telephone connection, which will be provided by the COA. The telephone line also will be used for real-time data transmission when the COA assumes responsibility for the operation and maintenance of the real-time monitoring network.

Year One Cost Summary (7 months)

Installation: $247,100

Labor: $30,100

Equipment: $171,500

Construction: $45,500

Operation & Maintenance: $58,300

Labor (1.25 FT), Vehicles, and Supplies (4 months):$59,000

COST 10/1/01 – 4/30/02: $305,400

Year Two Cost Summary

Operation & Maintenance: $260,000

Labor (0.75 FT), Vehicles, and Supplies (12 months):$260,000

COST 5/1/02 – 4/30/03: $260,000

B: Continuous Discharge Sites: At five (5) additional sites, to be determined by consensus between the COA, CH_2M Hill, and the USGS, typical continuous discharge stations will be established. Equipment will include (itemized equipment costs and vendors are listed in Appendix A):

(1) Stage sensor

(2) Satellite telemetry

(3) Data logger

(4) Rain gage

USGS personnel routinely will measure discharge at each site so that a stage-discharge relation can be established. This relation will be used to convert real-time stage to discharge data. The time to develop a site-specific stage-discharge relation usually takes about one year. This assumes that all five (5) sites have a standard stage-

discharge relation, with no backwater or other unusual hydrologic factors, to complicate the computations.

On a weekly basis, USGS field personnel will analyze all the continuous data, and apply any necessary corrections (e.g., correcting for variable shifts in the stage/discharge relation). The data will be stored in the USGS National Water Information System (NWIS) database, which will be linked to the Georgia District WWW StormWatch page for real-time data display. These data will be permanently archived as a matter of public record. On an annual basis, all the data will be checked and reviewed by qualified USGS hydrologists in preparation for publication. The USGS also will perform an external review at least once every three years, to ensure national consistency through the use of approved techniques and protocols.

Year One Cost Summary

Installation: $121,900

Labor: $30,100

Equipment: $66,300

Construction: $25,500

Operation & Maintenance: $17,900

Labor (0.75 FT), Vehicles, and Supplies (4 months): $17,900

COST 10/1/01 – 4/30/02: $139,800

Year Two Cost Summary

Operation & Maintenance: $53,800

Labor (0.75 FT), Vehicles, and Supplies (12 months): $53,800

COST 5/1/02 – 4/30/03: $53,800

C: Periodic Water-Quality Sampling and Hydrologic Measurements at Fixed Sites: At twenty (20) sites [the same ten (10) sites described in A and B above, and at an additional ten (10) sites to be selected by consensus] periodic hydrologically-based water-quality sampling will be performed at an average rate of one (1) per month. In addition, discharge measurements will be made at the ten (10) ungaged sites.

All sampling will be performed following the USGS parts per billion (ppb) clean protocol. USGS representative Equal Width Increment/Equal Discharge Increment (EWI/EDI) samples will be collected concurrently with non-representative grab (point) samples from the automatic samplers and measurements from the water-quality probes at the five (5) fully-instrumented sites, and with grab samples from the fifteen (15) other sites, in an attempt to develop appropriate correction factors for the point samples/measurements, to facilitate long-term data comparability and to reduce the future need for the collection of representative depth- and width-integrated samples. Although twelve (12) samples/year will be collected at all twenty (20) sites, the sampling schedule will be modified to better encompass hydrologic variability and will include 10% additional sampling and analyses for QA/QC purposes. USGS Georgia District Office personnel will analyze samples for many of the constituents. Bacterial analyses will be performed in the USGS Georgia District Office by contractor-supplied personnel (Southeast Water). The USGS National Water-Quality Laboratory (NWQL), Denver, Colorado will analyze sample aliquots for sewage tracers and dissolved trace elements.

The periodic samples will be analyzed for a variety of water-quality constituents (see Appendix B for analytes listed by category and costs) including:

(3) Dissolved trace elements (Appendix B1)

(4) Suspended trace elements (Appendix B4)

(5) Nutrients (Appendix B2, B4))

(6) Bacteria (Appendix B3)

(7) Sewage tracers (Appendix B6)

There are specific rationales for the selection of these parameters.

Trace elements [e.g., Ag, Pb, Zn, Cu, Cd, Hg, (Appendix B1, B4)] typically are associated with point- and non-point source urban and stormwater runoff including treated wastewater, and have been identified as a cause for stream reach impairment in COA basins. For example, Ag is associated with photography and has been found in treated wastewater. Cu, Pb, and Zn are associated with plumbing and plumbing fixtures. Further, Zn comes from automobile tires and from asphalt shingle roof runoff where it is used as an algaecide and to prevent mildew.

Nutrients [e.g., nitrogen, phosphorus, and carbon compounds; Appendix B2, B4)] typically are associated with point- and non-point source urban and stormwater runoff including treated and untreated sewage. These constituents can derive from the break-down of organic waste (e.g., lawn clippings, kitchen waste) as well as from fertilizer applications on residential and commercial sites. Excess nutrient loadings can lead to eutrophication in downstream impoundments and to problems with dissolved oxygen levels.

Bacteria [fecal coliform, *E. coli*; Appendix B3)] are typically associated with point- and nonpoint-source urban and stormwater runoff including treated wastewater, as well as leaking sanitary sewer lines and septic systems. Bacteria have been identified as a cause for stream reach impairment in a number COA basins. Lastly, bacteria have been used for a number of years as surrogates for human pathogens; as such, excess levels can indicate a potential human health hazard.

Suspended sediment (Appendix B4), in excess, represents a major physical cause of impaired stream reaches in COA basins. In addition, suspended sediment represents a significant carrier for a wide variety of chemical constituents including trace elements, nutrients, and persistent hydrophobic organic compounds.

Sewage tracers (Appendix B6) typically are associated with treated wastewater as well as with leaking sanitary sewer lines and septic systems. This group of constituents is far more indicative of these types of inputs than bacteria, which can be extremely high in point- and nonpoint-source urban and stormwater runoff.

Year One Cost Summary

Labor (0.875 USGS FT, plus 1.17 FT from SE Water): $59,500

Vehicles/Supplies: $21,000

Analytical (Representative Samples): $192,500

(Appendix B1) Dis. T.E. (140): $22,400

(Appendix B4) Sus. T.E.(140):$77,000

(Appendix B2) Majors and Nutrients (140):$21,000

(Appendix B3) Bacteria (140): $4,200

(Appendix B6) Sewage Tracers (140): $50,400

Quality Control (14): $17,500

Analytical (Point Samples): $137,100

(Appendix B1) Dis. T.E. (140): $22,400

(Appendix B4) Sus. T.E.(140): $77,000

(Appendix B2) Majors and Nutrients (140): $21,000

(Appendix B3) Bacteria (140): $4,200

Quality Control (14): $12,500

COST 10/1/01 – 4/30/02: $410,100

Year Two Cost Summary

Labor (1.5 USGS FT plus 2 FT from SE Water): $102,000

Vehicles/Supplies: $36,000

Analytical (Representative Samples): $330,000

(Appendix B1) Dis. T.E. (240): $38,400

(Appendix B4) Sus. T.E.(240):$132,000

(Appendix B2) Majors and Nutrients (240):$36,000

(Appendix B3) Bacteria (240): $7,200

(Appendix B6) Sewage Tracers (240): $86,400

Quality Control (24): $30,000

Analytical (Point Samples): $234,600

(Appendix B1) Dis. T.E. (240): $38,400

(Appendix B4) Sus. T.E.(240): $132,000

(Appendix B2) Majors and Nutrients (240): $36,000

(Appendix B3) Bacteria (240): $7,200

Quality Control (24): $21,000

COST 5/1/02 – 4/30/03: $702,600

D: Storm/Event Sampling: At each of the five (5) long-term real-time sites equipped with automatic samplers, ten (10) storm/event samples (six (6) samples per storm/event) will be collected during the second year for a partial suite of chemical analyses; a subset of these will be analyzed for all constituents.

The typical procedure for sampling stormflow is to oversample. The automatic samplers are controlled by dataloggers, and triggered by real-time, *in situ*, conditions at

each site. The number of samples collected per storm will vary depending on the storm's characteristics, but on average, each storm can be charaterized by six (6) samples [one (1) sample at the onset of the storm to represent pre-event conditions, three (3) samples during the hydrographic rise, and two (2) samples during the hydrographic recession].

A subset of the samples will be selected for chemical analysis based on the real-time characteristics of the streamwater (i.e., discharge, turbidity, conductance and temperature). It is expected that fifteen (15) to twenty (20) rainstorms will be sampled, and that the streamwater samples from ten (10) of these events will be analyzed for a subset of chemical constituents (pH, conductivity, SSC, and nutrients). A further subset of these samples [three (3) rainstorms at six (6) samples per rainstorm] will be analyzed for all constituents (major ions and nutrients, suspended sediment-associated and dissolved trace elements, bacteria, and sewage tracers). Suspended sediment concentration (SSC) will be determined on all samples. However because it is determined as part of the suspended sediment trace element analysis, only forty (40) SSC-only analyses per site are listed as a separate analytical cost. Likewise, the major ion and nutrient analysis includes the determination of pH, conductivity, and nutrients, hence, only forty (40) pH, conductivity, and nutrient-only analyses per site are listed as a separate analytical cost.

Refrigeration is required to maintain sample integrity for the subsequent analysis of nutrients and bacteria. This will require 120-volt AC power that will be supplied by the COA.

As noted above, the storm/event samples will be analyzed for a variety of water-quality constituents (see Appendix B for analytes listed by category and costs) including:

(1) Dissolved trace elements (Appendix B1)

(2) Suspended trace elements (Appendix B4)

(3) Majors and nutrients (Appendix B2, B4))

(4) Conductivity , pH, and nutrients

(5) Total suspended sediment (TSS) concentration

(6) Bacteria (Appendix B3)

(7) Sewage tracers (Appendix B6)

Year Two Cost Summary

Labor: $45.000

Vehicles/Supplies: $12,000

Analytical (Automated storm Samples): $157,600

(Appendix B1) Dis. T.E. (90): $14,400

(Appendix B4) Sus. T.E.(90):$49,500

(Appendix B2) Majors and Nutrients (180):$27,000

Conductivity, pH, and Nutrients (120): $12,000

Total Suspended Sediment (TSS) Concentration (210): $5,300

(Appendix B3) Bacteria (90): $2,700

(Appendix B6) Sewage Tracers (90): $32,400

Quality Control (variable): $14,300

COST 05/01/021 – 04/30/03: $214,600

II. Synoptic Sampling

A: Late in the first year (October 10, 2001 – April 30, 2002) during the wet season, a high-flow synoptic sampling and analysis program will be performed over a period of approximately two weeks (weather permitting). During the high-flow synoptic, only water column samples will be collected from approximately forty (40) sites , selected by consensus, throughout the COA watersheds.

All sampling will be performed following the USGS parts per billion (ppb) clean protocol. USGS representative Equal Width Increment/Equal Discharge Increment (EWI/EDI) samples will be collected at all forty (40) sites. USGS Georgia District Office personnel will analyze these samples for many of the constituents. Bacterial analyses will be performed in the USGS Georgia District Office by contractor-supplied personnel (Southeast Water). The USGS National Water-Quality Laboratory (NWQL), Denver, Colorado will analyze sample aliquots for sewage tracers and dissolved trace elements.

The synoptic samples will be analyzed for a variety of water-quality constituents (see Appendix B for analytes listed by category and costs) including:

(1) Dissolved trace elements (Appendix B1)

(2) Suspended trace elements (Appendix B4)

(3) Nutrients (Appendix B2, B4))

(4) Bacteria (Appendix B3)

(5) Sewage tracers (Appendix B6)

Year One Cost Summary

Labor: $18,000

Vehicles/Supplies: $4,000

Analytical (Representative Samples): $55,000

(Appendix B1) Dis. T.E. (40): $6,400

(Appendix B4) Sus. T.E.(40):$22,000

(Appendix B2) Majors and Nutrients (40):$6,000

(Appendix B3) Bacteria (40): $1,200

(Appendix B6) Sewage Tracers (40): $14,400

Quality Control (4): $5,000

COST 5/1/02 – 4/30/03: $77,000

B: During the summer/fall of the second year (May 1, 2002 – April 30, 2003) during the dry season, a low-flow synoptic sampling and analysis program will be performed over a period of approximately two weeks (weather permitting). During the low-flow synoptic, both water column and bed sediment samples will be collected from approximately forty (40) sites, selected by consensus throughout the COA watersheds (see map). Water column samples will be analyzed for various dissolved (filtered-water) parameters including: trace elements, major ions, nutrients, sewage tracers, and bacteria. The surface (upper 1 to 2 cm) bed sediment samples will be used as surrogates for suspended sediment, as such they will be pre-screened at 63-µm. The <63-µm bed sediment aliquots also will be analyzed for a variety of water-quality parameters including: trace elements and nutrients.

All sampling will be performed following the USGS parts per billion (ppb) clean protocol. USGS representative Equal Width Increment/Equal Discharge Increment (EWI/EDI) water samples will be collected at all forty (40) sites. USGS Georgia District Office personnel will analyze these samples for many of the constituents. Bacterial

analyses will be performed in the USGS Georgia District Office by contractor-supplied personnel (Southeast Water). The USGS National Water-Quality Laboratory (NWQL), Denver, Colorado will analyze sample aliquots for sewage tracers and dissolved trace elements.

The synoptic samples will be analyzed for a variety of water-quality constituents (see Appendix B for analytes listed by category and costs) including:

(1) Dissolved trace elements (Appendix B1);

(2) Bed sediment trace elements (Appendix B5);

(3) Nutrients (Appendix B5, B4);

(4) Bacteria (Appendix B3)

(5) Sewage tracers (Appendix B6)

Year Two Cost Summary

Labor: $11,000

Vehicles/Supplies: $4,000

Analytical (Representative Samples): $55,000

(Appendix B1) Dis. T.E. (40): $6,400

(Appendix B5) Bed sediment. T.E.(40):$22,000

(Appendix B2) Majors and nutrients (40):$6,000

(Appendix B3) Bacteria (40): $1,200

(Appendix B6) Sewage tracers (40): $14,400

Quality Control (4): $5,000

COST 5/1/02 – 4/30/03: $70,000

USGS Role in Proposal

The USGS proposes to procure all the equipment needed for the installation of the five (5) real-time water-quantity and quality/automatic sampler monitoring stations and the five (5) continuous stage/discharge stations; oversee and coordinate the construction of shelters and stilling wells for equipment protection at each site; survey the elevation at each site to establish an accurate water elevation; set up real-time data displays both at the NWISWeb Internet site and in the client's database software; and perform routine maintenance of the monitoring stations. Further, the USGS will supply and pay for the satellite telemetry for the five (5) real-time water-quality sites and for the five (5) con-

tinuous discharge sites. USGS personnel also will collect and analyze all water-quality samples at each of the twenty (20) sites, on an approximately monthly basis. The USGS routinely will monitor the quality of the real-time data, in accordance with the Georgia District Office's approved quality assurance plan. Additionally, the USGS will publish all collected hydrologic information in its annual CD-ROM data report.

City of Atlanta Role in Proposal

The City agrees to assist with benchmark locations within the City boundaries and, if necessary, to grant permission to install monitoring stations on/at city-owned locations. Further, the City will be responsible for providing lines carrying 120V A.C. power and phone lines to all five (5) long-term monitoring sites and for actual power and phone usage. Also, the City will be responsible for the cost of replacement of any inoperable equipment. The City will be responsible for providing a PC with a Windows operating system, MS Office 2000, and Internet connection to have access to Storm-Watch software displays. Finally, the City will be responsible for paying all installation, operation and maintenance, sampling, and analytical costs associated with this project.

Appendix A

Equipment, Installation, Operation, and Maintenance Costs

PROJECT: Atlanta Real-Time Hydrologic Monitoring Network
COOPERATOR: City of Atlanta
PURPOSE: To real-time monitor water quality parameters in the metro Atlanta basins
PLAN: Install 5 real-time SW/QW monitor/auto sampler sites and 5 RT Q sites
REVISED 09-27-01

INSTALL 5 REAL-TIME STREAMFLOW, CONTINUOUS QW, AND AUTOMATIC SAMPLING SITES

INSTRUMENTATION

	Part #		Unit Cost	Quantity	SUBTOTAL	TOTAL	TOTAL (w/OH)
Vaisala							
555A DCP	555A	$1,653.00	$1,487.70	5	$7,438.50		
Internal mounting plate	555-7038	$79.00	$71.10	5	$355.50		
GOES radio (100/300 baud)	555-7031	$2,000.00	$1,800.00	5	$9,000.00		
Incremental encoder	436BD-2	$928.00	$835.20	1	$835.20		
Encoder cable	555-3029	$134.00	$120.60	1	$120.60		
Float wheel assembly	436-7001	$257.00	$231.30	1	$231.30		
Antenna	443A	$427.00	$384.30	5	$1,921.50		
Antenna cable	530-3507	$172.00	$154.80	5	$774.00		
VENDOR SUBTOTAL						$20,676.60	$24,325.41
Applied Power							
Solar Panel (20-watt)			$250.00	12	$3,000.00		
Regulator			$50.00	12	$600.00		
VENDOR SUBTOTAL						$3,600.00	$4,235.29
Power Sonic							
Battery			$100.00	12	$1,200.00		
VENDOR SUBTOTAL						$1,200.00	$1,411.76
Design Analysis							
Non submersible pressure transducer	H350/355 XL		$3,650.00	5	$18,250.00		
SDI-12 Raingage, 0.01 inch tipping bucket	H340-SDI		$595.00	5	$2,975.00		
VENDOR SUBTOTAL						$21,225.00	$24,970.59
YSI							
Multi-sonde	6820		$3,105.00	8	$24,840.00		
Field Cable (100')	6093		$180.00	6	$1,080.00		
SDI-12 flying leads cable	6096		$66.60	6	$399.60		
DO probe	6562		$450.00	12	$5,400.00		
Turbidity probe	6026		$1,206.00	12	$14,472.00		
ph probe	6561		$180.00	12	$2,160.00		
Calibration cable	6067B		$153.00	1	$153.00		
Multiparameter display systems (high memory, barometer)	650		$2,250.00	1	$2,250.00		
VENDOR SUBTOTAL						$50,754.60	$59,711.29
ISCO							
Automatic Sampler, SDI-12, refrigerated	6712 FR		$5,195.00	6	$31,170.00		
Stage sensor, to trigger sampler	bubbler		$1,795.00	6	$10,770.00		
Bottle configuration	1 x 15L		$90.00	6	$540.00		
Suction Line	100 ft		$125.00	6	$750.00		
VENDOR SUBTOTAL						$43,230.00	$50,858.82
DELL							
laptop		1.00	$1,800.00	2.00	$3,600.00	$3,600.00	$4,235.29
DIAD							
StormWatch licenses (one-time cost for client software)		1.00	$750.00	2.00	$1,500.00	$1,500.00	$1,764.71
	Instrumentation subtotal				**$171,513.18**		

CONSTRUCTION

Materials						
Aluminum angle (for gage house structure)	1.00	$100.00	5	$500.00		
Gage house (DCP and sampler)	1.00	$4,000.00	5	$20,000.00		
Gage house (DCP only)	1.00	$500.00	0	$0.00		
Raingage mount (vandal proof)	1.00	$200.00	4	$800.00		
6" PVC pipe (for sonde deployment)	1.00	$250.00	5	$1,250.00		
1" aluminum conduit (for bubbler orifice)	1.00	$150.00	4	$600.00		
2" aluminum pipe (for antennas/raingages)	1.00	$40.00	5	$200.00		
2" steel pipe (for gage house structure, bank install)	1.00	$100.00	5	$500.00		
Lock (for gage house, raingage cover)	1.00	$10.00	10	$100.00		
Misc. tools (handtools, power tools)	1.00	$1,000.00	1	$1,000.00		
Misc. materials (nuts, bolts, threaded rod, etc.)	1.00	$400.00	5	$2,000.00		
QW van outfitting (see attached list of equipment	1.00	$11,000.00	1.00	$11,000.00		
Vehicle mileage	1.00	$0.30	2,500.00	$750.00		
SUBTOTAL					$38,700.00	$45,529.41

LABOR

Personnel	Persons	Unit Price	Quantity	Total		
Project planning	3.00	$50.00 (per hour)	8.00 (hours)	$1,200.00		
Site recon (8 hours/site)	2.00	$50.00 (per hour)	40.00 (hours)	$4,000.00		
Preparation time (1 USGS person/4 hours per site)	2.00	$30.00 (per hour)	20.00 (hours)	$1,200.00		
Construction time (2 USGS person/3 days each per site)	2.00	$30.00 (per hour)	120.00 (hours)	$7,200.00		
Overtime (2 hours/site/person)	2.00	$30.00 (per hour)	10.00 (hours)	$600.00		
Installation time (1 day/site/person to install instrumentation)	2.00	$30.00 (per hour)	40.00 (hours)	$2,400.00		
Database setup (ADAPS, DECODES, web, StormWatch)	1.00	$50.00 (per hour)	5.00 (hours)	$250.00		
SUBTOTAL					$16,850.00	$30,089.29
TOTAL (w/o overhead)					$180,659.60	$247,131.87

Installation cost **$250,000.00**

Appendix B

Analytical Parameters and Associated Costs

(B1): Trace Elements in Water ($160)

aluminum
cadmium
chromium
copper
lead
manganese
nickel
silver
zinc
pH, laboratory
specific conductance, laboratory

(B2): Major Ions and Nutrients in Water ($150)

Nitrogen, ammonia
Nitrogen, ammonia and organic nitrogen
Nitrogen, nitrite
Nitrogen, nitrate
Phosphorus, orthophosphate
Dissolved phosphorus
Total phosphorus
Sulfate
Chloride
Bromide
Fluoride
Sodium
Calcium
Magnesium
Potassium
Iron
Manganese
Strontium
Barium
Silica
Alkalinity (gram titration)
pH, laboratory
specific conductance, laboratory

(B3): Bacteria ($30)

Fecal coliform
E. coli

(B6): Sewage Tracers in Water

Price: $ 360.00

1,4-Dichlorobenzene
1-Methylnaphthalene
17-beta-Estradiol
2,6-Dimethylnaphthalene
2-Methylnaphthalene
3-beta-Coprostanol
3-Methyl-1(H)-indole (Skatole)
3-tert-Butyl-4-hydroxy anisole (BHA)
4-Cumylphenol
4-n-Octylphenol
4-tert-Octylphenol
5-Methyl-1H-benzotriazole
Acetophenone
Acetyl hexamethyl tetrahydronaphthalene (AHTN)
Anthracene
Anthraquinone
Benzo[a]pyrene
Benzophenone
beta-Sitosterol
beta-Stigmastanol
Bisphenol A
Bisphenol A, d3 (surrogate)
Bromacil
Bromoform
Caffeine
Caffeine-C13 (surrogate)
Camphor
Carbaryl
Carbazole
Chlorpyrifos
Cholesterol
Cotinine
d-Limonene
Decafluorobiphenyl (surrogate)
Diazinon
Dichlorvos
Equilenin
Estrone
Ethynyl estradiol
Fluoranthene
Fluoranthene, d10 (surrogate)
Hexadydrohexamethylcyclopentabenzopyran (HHCB)
Indole
Isoborneol
Isophorone
Isopropylbenzene
Isoquinoline
Menthol
Metalaxyl
Methyl salicylate
Metolachlor
N,N-diethyl-meta-toluamide (DEET)
Naphthalene
Nonylphenol, diethoxy- (total)
Octylphenol, diethoxy-
Octylphenol, monoethoxy-
p-Cresol
para-Nonylphenol (total)
Pentachlorophenol
Phenanthrene
Phenol
Prometon
Pyrene
Tetrachloroethylene
Tri(2-butoxyethyl)phosphate
Tri(2-chloroethyl)phosphate
Tributyl phosphate
Triclosan
Triethyl citrate (ethyl citrate)
Triphenyl phosphate
Tris(dichlorisopropyl)phosphate

Appendix C

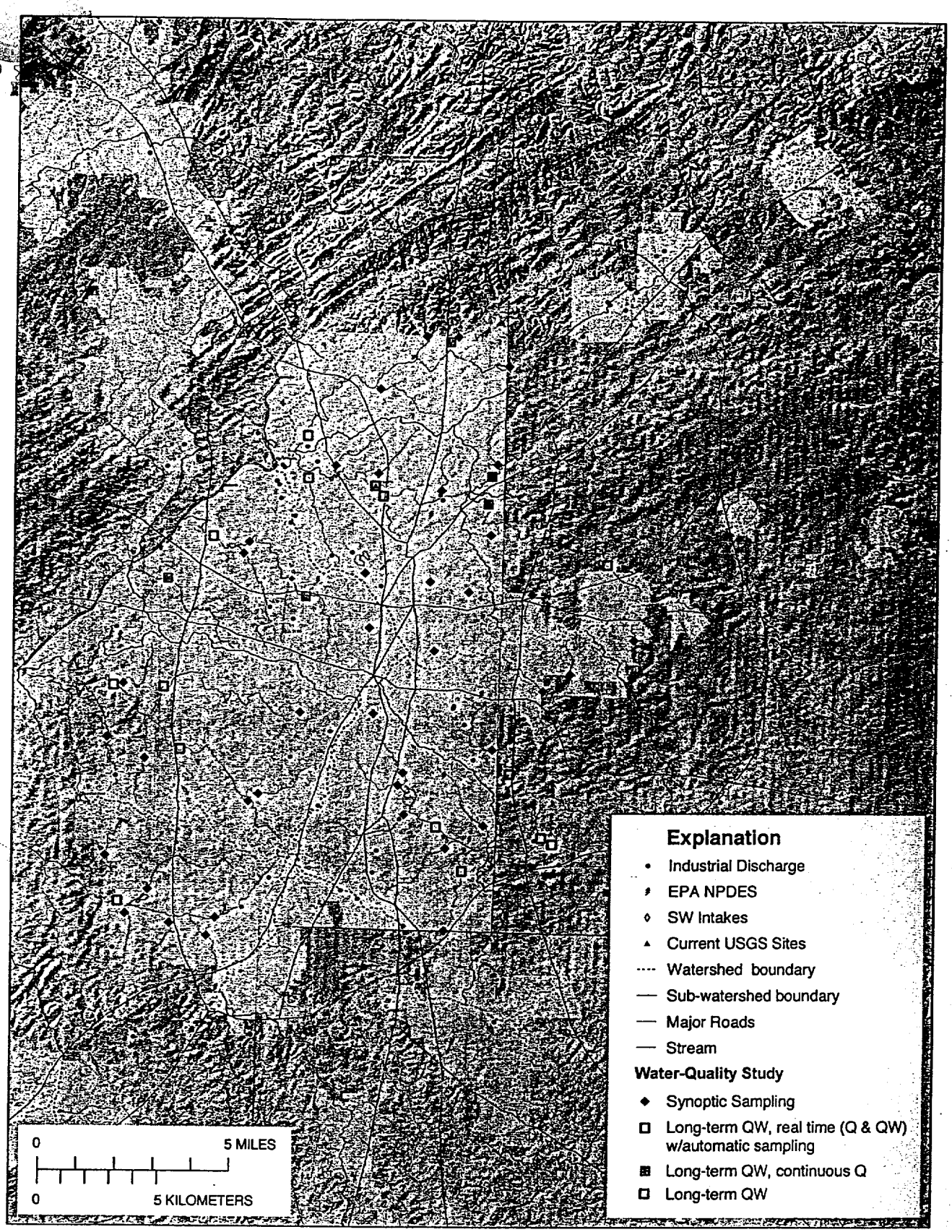
Budget Summaries

COA Proposal - Total Project Costs
Year 1

Item	Sub/Sub Costs	Sub Cost	Total Cost
FULLY INSTRUMENTED SITES			305,400
Installation		247,100	
Labor	30,100		
Equipment	171,500		
Construction	45,500		
O & M		58,300	
Labor	58,300		
CONTINUOUS DISCHARGE SITES			139,800
Installation		121,900	
Labor	30,100		
Equipment	66,300		
Construction	25,500		
O & M		17,900	
Labor	17,900		
PERIODIC SAMPLING/HYDRO MEASUREMENTS			410,100
Labor		59,500	
Vehicles/Supplies		21,000	
Analytical (representative)		192,500	
Dissolved Trace Elements	22,400		
Suspended Trace Elements	77,000		
Dissolved BacteriaMajors and Nutrients	21,000		
Bacteria	4,200		
Sewage Tracers	50,400		
Quality Control	17,500		
Analytical (point)		137,100	
Dissolved Trace Elements	22,400		
Suspended Trace Elements	77,000		
Dissolved Majors and Nutrients	21,000		
Bacteria	4200		
Quality Control	12,500		
HIGH FLOW SYNOPTIC SAMPLING			77,000
Labor		18,000	
Vehicles/Supplies		4,000	
Analytical		55,000	
Dissolved Trace Elements	6,400		
Suspended Trace Elements	22,000		
Dissolved Majors and Nutrients	6,000		
Bacteria	1,200		
Sewage Tracers	14,400		
Quality Control	5,000		
TOTAL COSTS			932,300

Year 2

Item	Object Costs	Sub Cost	Total Cost
FULLY INSTRUMENTED SITES			260,000
O & M		260,000	
Labor	260,000		
CONTINUOUS DISCHARGE SITES			53,800
O & M		53,800	
Labor	53,800		
PERIODIC SAMPLING/HYDRO MEASUREMENTS			702,600
Labor		102,000	
Vehicles/Supplies		36,000	
Analytical (representative)		330,000	
Dissolved Trace Elements	38,400		
Suspended Trace Elements	132,000		
Dissolved Majors and Nutrients	36,000		
Bacteria	7,200		
Sewage Tracers	86,400		
Quality Control	30,000		
Analytical (point)		234,600	
Dissolved Trace Elements	38,400		
Suspended Trace Elements	132,000		
Dissolved Majors and Nutrients	36,000		
Bacteria	7200		
Quality Control	21,000		
STORM SAMPLING			214,600
Labor	45,000		
Vehicles/Supplies	12,000		
Analytical (representative)	157,600		
Dissolved Trace Elements	14,400		
Suspended Trace Elements	49,500		
Dissolved Majors and Nutrients	27,000		
Conductivity, pH, and Nutrients	12,000		
TSS	5,300		
Bacteria	2,700		
Sewage Tracers	32,400		
Quality Control	14,300		
LOW FLOW SYNOPTIC SAMPLING			70,000
Labor		11,000	
Vehicles/Supplies		4,000	
Analytical		55,000	
Dissolved Trace Elements	6,400		
Suspended Trace Elements	22,000		
Dissolved Majors and Nutrients	6,000		
Bacteria	1,200		
Sewage Tracers	14,400		
Quality Control	5,000		
TOTAL COSTS			1,301,000
TOTAL PROJECT COSTS (10/01/01-04/30/03)			2,233,300



Synoptic, long-term, and real-time sampling sites for the USGS/City of Atlanta water-quality study. The location of the synoptic and routine water-quality (QW) monitoring sites may differ from those shown as more information is used in the final sighting criteria.

COUNCIL PRESIDENT PROTEM MICHAEL BOND PRESIDI

RCS# 3311
12/03/01
4:01 PM

Atlanta City Council

Regular Session

CONSENT

Pages 1 through 9

YEAS:	14
NAYS:	0
ABSTENTIONS:	0
NOT VOTING:	2
EXCUSED:	0
ABSENT	0

SEE ATTACHED LISTING OF ITEMS ADOPTED/ADVERSED ON CONSENT AGENDA

Y McCarty	NV Dorsey	Y Moore	Y Thomas
Y Starnes	Y Woolard	Y Martin	Y Emmons
Y Bond	Y Morris	Y Maddox	Y Alexander
Y Winslow	Y Muller	Y Boazman	NV Pitts

ITEM (S) REMOVED FROM CONSENT AGENDA
01-O-1464
01-O-1997

CONSENT

ITEMS ADOPTED ON CONSENT AGENDA

1. 01-O-1452
2. 01-O-1827
3. 01-O-1645
4. 01-O-1867
5. 01-O-2009
6. 01-O-2010
7. 01-O-1857
8. 01-O-1928
9. 01-O-1929
10. 01-O-1979
11. 01-O-1983
12. 01-O-1992
13. 01-O-1996
14. 01-O-1998
15. 01-O-1999
16. 01-O-2000
17. 01-O-1985
18. 01-O-1986
19. 01-O-2011
20. 01-O-2020
21. 01-O-1801
22. 01-O-1938
23. 01-O-1939
24. 01-O-2017
25. 01-O-1175

ITEMS ADOPTED ON CONSENT AGENDA

26. 01-R-1873
27. 01-R-1957
28. 01-R-1989
29. 01-R-2005
30. 01-R-2006
31. 01-R-2032
32. 01-R-2033
33. 01-R-1954
34. 01-R-1956
35. 01-R-1990
36. 01-R-1943
37. 01-R-1974
38. 01-R-1975
39. 01-R-2030
40. 01-R-2031

01- R -2032

(Do Not Write Above This Line)

A RESOLUTION BY

CITY UTILITIES COMMITTEE

A RESOLUTION AUTHORIZING THE MAYOR TO ENTER INTO AN INTERGOVERNMENTAL AGREEMENT WITH THE UNITED STATES DEPARTMENT OF THE INTERIOR OFFICE OF THE UNITED STATES GEOLOGICAL SURVEY: TO ESTABLISH A WATER QUANTITY LONG-TERM MONITORING NETWORK: IN AN AMOUNT NOT TO EXCEED TWO HUNDRED NINETY TWO THOUSAND NINE HUNDRED DOLLARS AND NO CENTS ($292,900.00); PAYMENT SHALL BE CHARGED TO AND PAID FROM FUND, ACCOUNT, CENTER NUMBER: 2J01-524001-M5001.

ADOPTED BY

DEC 03 2001

COUNCIL

- ☐ CONSENT REFER
- ☐ REGULAR REPORT REFER
- ☐ ADVERTISE & REFER
- ☐ 1st ADOPT 2nd READ & REFER
- ☐ PERSONAL PAPER REFER

Date Referred

Referred To:

Date Referred

Referred To:

Date Referred

Referred To:

First Reading

Committee

Date

Chair

Referred to

Committee	Committee
Date 11-27-01	Date
Chair	Chair
Action: Fav, Adv, Hold (see rev. side)	Action: Fav, Adv, Hold (see rev. side)
Other:	Other:
Members	Members
Refer To	Refer To

Committee	Committee
Date	Date
Chair	Chair
Action: Fav, Adv, Hold (see rev. side)	Action: Fav, Adv, Hold (see rev. side)
Other:	Other:
Members	Members
Refer To	Refer To

FINAL COUNCIL ACTION

☐ 2nd ☐ 1st & 2nd Readings ☐ 3rd

☐ Consent ☐ V Vote ☐ RC Vote

CERTIFIED

CERTIFIED DEC 03 2001

COUNCIL PRESIDENT PROTEM

CERTIFIED DEC 03 2001

MUNICIPAL CLERK

MAYOR'S ACTION

DEC 2001

2032