

Mayor Shirley Franklin  
City of Atlanta  
55 Trinity Avenue  
Atlanta, Georgia 30303

October 9, 2002

Dear Mayor Franklin,

Attached hereto is the final report of the Mayor's Clean Water Advisory Panel. Pursuant to your administrative order in June, we have studied the issues carefully, investigated all options available to the City and have recommended what we collectively believe is the appropriate plan of action to satisfy the federal consent order and generally improve the city's waste and storm water systems.

While we have made every effort to make the report concise and readable for you or any audience, the following is a brief synopsis of our recommendations:

We recommend the City adopt and implement Refinement Option 1. As stated in the report, this option uses well-established technology, exceeds the water quality expectations in the Consent Decree, can most likely be completed by 2007, has the second lowest cost of all options (\$150 million less than the approved plan), and will cause a relatively low level of construction disruption. Also, Refinement Option 1 eliminates two CSO facilities including the McDaniel facility, which has been deemed "the worst violator" by the federal EPA.

Other recommendations include 1) hiring a person whose sole responsibility is to make sure the proposed construction is successfully completed 2) hiring a community relations director whose responsibility is to inform the community, develop support for the project and help minimize any disruption and inconvenience to all citizens 3) ensure that newly constructed facilities are properly maintained by trained and capable personnel 4) improve water quality monitoring, so the city can demonstrate empirically that new facilities are improving water quality 5) take advantage of greenspace opportunities that are created with decommissioning and demolition of CSO facilities and 6) consider alternative revenue sources to fund improvements.

We appreciate the opportunity to have been of service to the venerable City of Atlanta and gratefully acknowledge all those who assisted us in our work. We stand ready to answer any questions and/or assist in any follow-up you deem appropriate.

Finally, let me say that it has been my honor to work with the members of this panel. They have worked diligently to understand all of the issues, provided a wealth of highly informed experience, and at all times demonstrated the highest professional standards.

Respectfully submitted,

Wayne Clough

**The Mayor's Clean Water Advisory Panel**

**Final Report to**

**The Honorable Shirley Franklin  
Mayor of The City of Atlanta**

**October, 2002**

## **Introduction**

The Mayor's Clean Water Advisory Panel was created by Mayor Shirley Franklin in June 2002 to provide objective, expert advice for improving Atlanta's storm and wastewater systems. The specific charge as outlined in the administrative order (Appendix I) was to review the city's sewer improvement plan, particularly the "technical and scientific merit of the plan and any modifications, as well as the reasonableness of cost estimates and completion times..."

Members of the panel were chosen for their expertise and experience in various aspects of water and sewer systems, urban infrastructure, science and environmental issues. All agreed to work at no cost to and not seek any contracts associated with this project. A listing of the panel members and their affiliations is enclosed with this report (Appendix II). The panel organized its activities to ensure the optimum access to relevant information needed to complete its charge. This included study of relevant documents, review of public hearings held by the city, hearings with informed parties including citizen groups, city engineering staff and its consultants, and deliberations of the panel members themselves.

A sense of urgency was placed on the proceedings of the panel because it was asked to address choices that must be made by the City of Atlanta within a limited time frame. The City has been mandated by a federal court Consent Decree (Appendix III) to develop and implement a plan to improve the water quality of the effluent from its Combined Sewer Outfall (CSO) system to meet federal and state standards by no later than 2007. The Consent Decree was issued after delays by the City in meeting expected water quality standards, heightening a sense of distrust between the parties involved. Since 1994 fines of \$19 million have been levied against the City of Atlanta by the Georgia Environmental Protection Division. These actions reflect a system that is viewed as having fundamental problems as exhibited by:

- Frequent overflows of sewage that contaminate the Chattahoochee River and its feeder streams, creating problems for aesthetics and recreation as well as for downstream users.
- Overflows during rain events in Atlanta that flood streets and back up into homes and businesses.
- Inadequate monitoring frustrating rational analysis of the issues.
- A serious problem with public perception, both locally and nationally, that stands to damage Atlanta's economic future and its reputation and aspirations.

Even with an approved plan, Atlanta's task is considerable given the magnitude of construction required, the large amount of funds that must be expended, the complexity of the effort involved, and the political will that must be mobilized. As one member of the panel noted, Atlanta is 20 years behind where it should be, and it stands out as an exception to dozens of other major U.S. cities that took action years ago.

## **Panel Activities**

The panel held four day-long meetings from June through September, 2002 with the majority of the sessions open to the public. Detailed records of the meetings are provided in the minutes that are included with this report (Appendix IV). Extensive documentation and materials were provided for review to the panel by consultants, city engineers and interested third parties. A listing of these is also provided with this report (Appendix V). The panel is grateful to all who participated and the high degree of professionalism exhibited during the course of the proceedings.

## **Present Conditions**

Atlanta has 2,200 miles of sewers of which 85% are separated, principally in the residential areas, which leaves 15%, or 330 miles of combined sewers concentrated in the Central Business District. The system includes six combined sewage treatment facilities (CSO's) that treat overflows during rain events. The CSO's provide basic screening of debris and treatment through the addition of chlorine to the wastewater.

The estimated combined sewer area population is 106,400 of the City's total population of 416,000. However, the population of the Central Business District greatly increases Monday through Friday during business hours when office buildings are full of workers from surrounding suburban areas and principal convention facilities are in use. Although the City's residential population has actually decreased since 1970, the business and metro population has risen steadily. From 1998 through July 2002, 1,317 permits for new sewer service were issued.

Increased demands on the combined sewer system continue to cause overflows into streams and tributaries of the Chattahoochee River, which sometimes back up into homes and businesses. In dry weather, the collection system conveys all wastewater flow to a water reclamation center for treatment. During wet weather, the combined flows (wastewater and stormwater) exceed the collection system capacity, resulting in combined sewer overflows that bypass the sewage treatment plants and pass through the City's six CSO's. On average, the overflows occur about 60 times per year on the western side of the City, and about 20 times on the eastern side of the City. Overflows on the eastern side are fewer than on the western side because of a 34 million gallon storage tunnel constructed in 1983.

## **The Authorized CSO Plan**

The City submitted the CSO Remedial Measures Report to the U.S. Environmental Protection Agency (EPA) and the Georgia Environmental Protection Division (EPD) in March 2001, and was authorized to implement the plan in July 2001. During wet weather, stormwater volumes are to be captured in deep tunnels with subsequent treatment to near secondary levels prior to discharge to the receiving streams. The benefit of this approach is that it allows the City to treat the predominate majority of its

wastewater, both sanitary and stormwater, and bring it to high standards before it is returned to the Chattahoochee River.

Under the plan, approximately 27% of the existing combined sewer area is to be separated. Some separation is provided in each of the combined basins but none of the combined basins are fully separated. As a result, none of the existing CSO control facilities are eliminated. Separating 27% of the combined sewer area achieves 90% separation of the City's total service area.

The West Area and East Area tunnel storage and conveyance systems are to be constructed with dedicated CSO treatment facilities, to serve 100% of the existing combined sewer system. The tunnel storage system reduces overflows to an average of 4 per year according to the expectation of the Consent Decree and national EPA standards. The CSOs are screened, chlorinated (disinfected) and dechlorinated. The CSO Remedial Measures Report evaluated the costs and water quality benefits associated with implementing stormwater management (treatment and detention) within separated basins, but the authorized plan does not include their implementation since they are not required to achieve Consent Decree compliance.

The estimated capital cost of the Authorized CSO Remedial Measures Plan is stated at \$989 million.

### **Lessons Learned from Other Cities**

Atlanta is only one of many cities in the United States attempting to develop an effective approach to the complex issue of combined sewer overflow control. Over 800 U.S. cities, including many large, older cities, are in some stage of development of plans to address CSOs. While each city must deal with unique circumstances and challenges, it is possible to gain some general knowledge and background from the experiences of other cities, particularly if the size of the areas served by combined sewers and the overall magnitude of the challenge are similar to Atlanta's. Based on information already known to panel members and data gathered during the panel's work, a summary of experience of representative cities is provided in Appendix VI. Key conclusions drawn from this review include:

- The complex projects required to address CSOs are rarely completed within a ten-year time frame, and may require several times that duration for full implementation.
- Separation of sewers is a less frequent approach, and is usually successfully employed in predominantly residential areas and smaller systems.
- Because of the disruption of streets and other facilities during sewer separation, the opportunity to add attractive streetscapes and improve external appearances should ideally be incorporated when possible.
- Design of underground facilities requires careful attention to local geological and hydrogeological conditions.

- Watershed management approaches that result in the reduction of runoff quantities can have long-term advantages.
- Coordination with other municipal initiatives can help to reduce project costs.
- All approaches to CSO control have considerable costs.

## **Criteria for Evaluation of Options**

Multiple criteria were used to evaluate the options for the systems that were proposed. Among these are: state and federal water quality standards, schedule for construction, cost, and degree of disruption during construction. Degree of disruption is not only important to citizens who might live nearby, but also to businesses in that the option chosen should minimize limitations to customer access. Also, the panel (and many others who testified) feels there is merit and value in reducing the number of combined sewer overflow facilities within the system. Of these criteria, the panel judged the first two as pre-eminent in satisfying the Consent Decree and the expectations of the regulatory bodies and the Upper Chattahoochee Riverkeeper. The panel believes that any option that is to be seriously considered must meet these tests first.

## **Evaluation of Options**

In evaluating options, the panel considered the Authorized Plan, all four new refinement options examined by the City and recommendations made by citizen groups. The City classified its four refinement options based on degree of sewer separation within the CSO area, with percentages ranging from Refinement Option 1 at 27% to Refinement Option 4 at 80%. Details for the options are provided in reports by the City.

Although the percentage of separation for Refinement Option 1 is the same as that of the Authorized Plan, it is achieved using a full basin approach where possible. This avenue of investigation was recommended in instructions received from the EPA and EPD, and as will be discussed subsequently, provides several advantages. To complete evaluation of the separation issue, two other baseline options were requested to be analyzed, 0% and 100% separation of the CSO area.

While some who presented to the panel considered separation as a goal in itself, the panel does not agree. With separation, treatment of stormwater becomes a larger issue and stormwater in the densest urban areas often carries large pollutant loads. Even though an argument can be advanced that the CSO Consent Decree does not require treatment of stormwater, this misreads the situation. First, federal and state standards will shortly require cities to ensure that their storm runoff does not pollute streams and rivers, so the issue will have to be faced sooner or later. Second, neither downstream constituencies nor regulatory agencies will accept an arbitrary decrease in water quality in the rivers. In the end, pollution is pollution, and the City needs to step up and address the issue.

To facilitate discussion of the relative merits of the options, Table 1 was prepared to compare the Authorized Plan, the four refinement options investigated by the City, and 0% and 100% separation of the CSO area. Where possible numerical values are provided, including cost, annual pollutant load to the environment and number of CSO facilities eliminated. Other criteria are expressed in relative terms, such as likelihood of meeting the 2007 completion date and degree of disruption associated with construction.

Table 1  
Comparison of Alternative Proposals

Evaluation Option	Estimated Capital Cost	Water Quality Annual Pollutant Load (1,000 lbs) To Environment	Number of CSO Facilities	Construction Disruption	Level of Certainty for Completion by Consent Decree
Authorized CSO Remedial Plan (July 2001)	\$989 million	5,545	6	Reasonable	High
0% Separation (100% Tunnel / Treatment)	\$829 million	3,293	6	Low	High
Refinement Option No. 1 (27% Separation)	\$834 million	4,687	4	Reasonable	High
Refinement Option No. 2 (40% Separation)	\$912 million	5,119	4	Reasonable	Reasonable
Refinement Option No. 3 (50% Separation)	\$906 million	5,500	3	Reasonable	Reasonable
Refinement Option No. 4 (80% Separation)	\$1,264 million	8,223	2	High	Need 3rd Party Review
100% Separation (Entire Combined System)	\$1,047 million	7,796	0	High	No likelihood

In making comparisons with the Authorized Plan, it is important to note that the sewage treatment technology factored into the refinement options and the 0% separation case is more advanced than the technology anticipated in the Authorized Plan. This reflects work during design to improve the recommended solution.

**Refinement Options 2-4 and 100% Separation.** These options rely on increasing degrees of sewer separation above those in the Authorized Plan. In comparing them to the other options in Table 1 it is assumed the stormwater effluent created from the

separated system flows directly into the streams and rivers. Thus no increment has been added to the cost of the option that would be required to treat stormwater effluent. To provide best management practices or other treatment systems for stormwater would increase the cost above that shown in Table 1, in some cases significantly.

Pollutant loads increase steadily with percentage of separation, because no allowance is made for treating the stormwater effluent coming from the separated sewers. Construction costs also climb with degree of separation, as does disruption as a result of the construction. On the positive side, the numbers of CSO facilities decline with percentage of separation.

Based on all factors, the panel concludes that Refinement Options 2-4 and 100% separation should not be pursued by the City. Simply put, the cost of these approaches will be higher than others that produce smaller pollution levels, and this does not consider any extra cost required to treat the stormwater effluent. They also will produce more disruption to the community during construction, causing inconvenience to the citizens and loss of income to businesses. Separation of the sewers serving the central business district would particularly be difficult. In terms of schedule, neither Refinement Option 4 and 100% separation are judged as capable of meeting of completion within the required time limits.

***Plans Presented by Citizen Groups.*** The plans presented to the panel by citizen groups contained useful, well-intentioned ideas and deserve careful consideration for features that can be adopted in either the short or long term. The so-called “Wiedeman” proposal provides for refinements in the City’s plans that can be helpful. Where appropriate, these refinements should be adopted.

The proposal calling for 100% separation and use of extended greenways and retention ponds to treat stormwater has a strong appeal in the abstract. However, it does not meet the critical tests required. First, its cost would be well above those of other options, since the cost of constructing greenways, as well as the price of purchasing the land required, would have to be added to that of the 100% separation option, which is already estimated to be more than \$200 million higher than that of Refinement Option 1 or 0% separation. Second, the time needed for implementation is judged to exceed that required by the Consent Decree. Finally, there are practical issues with the maintenance required for open water areas that would be subject to periodic large flows of polluted water, and mosquito borne disease. While small scale successful examples of this approach exist, as was seen by the visitors on the field trip to Austin, Texas, applications on a scale that would be needed in Atlanta are unprecedented. Nevertheless, future success in improving water quality in developed areas will depend on finding more sustainable development practices, including use of greenways. The City has committed to the concept in its Consent Decree, and the panel recommends that the City explore additional applications, possibly through a pilot project in the area where sewers are separated.

The panel also heard a proposal addressing stormwater through the use of stormwater management as a tool in lieu of physical infrastructure. While it is essential that the City

and the region engage in active development of a comprehensive approach to stormwater management, and that this will be of considerable benefit, this approach by itself, will not solve either the short or long term issues facing the City. Stormwater management is both a local and a regional challenge and it will call on multiple entities to work together to develop the right approach. In the long term it will help reduce reliance on physical infrastructure and will rightfully place needed responsibility back onto homeowners, business owners and local governments to work together to reduce stormwater runoff and associated pollution.

Finally, a presentation was made advocating use of a septic treatment system that would be required for all homeowners and business owners. While septic systems have merit in some residential or low-density industrial areas for sanitary sewage, the proposed system is not practical for already sewered areas and does not address the CSO issue that was the charge of the panel.

**Acceptable Plans.** After considering the options in terms of the essential criteria, what remains as acceptable are the Authorized Plan, 0% separation and Refinement Option 1. Each meets the test of water quality expected by the Consent Decree and the likelihood of being complete in 2007. The technical feasibility of each is also well established since the technology proposed has been used elsewhere and is tested. Given that each of these have comparable merits on the basic criteria, other factors should be considered to choose between them.

Estimated construction cost provides one clear distinction because the estimate for the Authorized Plan is over \$150 million higher than that of the other two (Table 1). Added to this, the annual pollutant load for both 0% separation and the Refinement Option 1 are lower than the Authorized Plan. The reason for this lies mainly in the use of technological improvements in water treatment in the former versus the latter. The bottom line is that either 0% separation or Refinement Option 1 would appear to offer an improved solution over that of the Authorized Plan.

Although the estimated cost of the 0% separation plan is slightly less than that of Refinement Option 1, they are close enough for working purposes to be the same given the level of confidence at this stage of design. The distinction between 0% separation and Refinement Option 1 lies mainly in three areas:

- Refinement Option 1 separates two full and one partial drainage basins and eliminates two CSO facilities while 0% separation would require all existing CSO facilities to remain in operation.
- 0% separation produces less annual pollutant load because it treats more of the stormwater.
- There is more tunnel construction disruption associated with the 0% separation option than Refinement Option 1.

## Panel Recommendation

Considering all factors, the panel recommends Refinement Option 1. This option uses well-established technology, exceeds the water quality expectations in the Consent Decree, can most likely be completed by 2007, has the second lowest cost of all options, and will cause a relatively low level of construction disruption. Also, Refinement Option 1 eliminates two CSO facilities including the McDaniel CSO facility, which has been deemed “the worst violator” by the federal EPA. Finally, the panel believes it will be acceptable to the parties involved in the Consent Decree.

In recommending Refinement Option 1 the panel recognizes that it requires some major tunnel construction and that there has been, and continues to be, community debate about tunnels. Some have argued there might be leakage from the tunnels that will contaminate the ground water. Others have expressed concern about noise and increased traffic by heavy trucks during construction. All of these issues need to be appreciated and addressed upfront in a forthright manner by the City.

In the panel’s experience, leakage should not be a problem in a well-designed tunnel system. If precedent is desired, one has only to look to the hundreds of tunnels that have been built successfully in other major urban areas and the great cities of the world. Also, in Atlanta there is little use of groundwater since the geology does not lend itself to developing significant quantities of water from this source.

Construction of tunnels will cause some degree of disruption in local areas, but it is far less than that which would occur if many miles of the existing system had to be dug up to separate the sewers. The contrast between options needs to be made to help citizens understand that no system is built without some inconvenience.

## Additional Recommendations

The Panel believes there are several issues that need attention beyond the building of the physical system. Additional recommendations include:

- Hire full-time, high-level personnel to (1) direct design and construction, and (2) provide expert community relations.
- Provide for operations and maintenance of the system.
- Monitor water quality.
- Take advantage of greenspace opportunities.
- Explore additional revenue sources.

**Sewer Construction Director.** The Panel recommends that the City immediately take steps to assign or hire a full-time Director to manage the proposed construction projects group in the newly organized Watershed Management Department. The projects that are underway to meet the requirements of the Consent Decree by November 2007 and the anticipated continuation of storm and sanitary sewer separation, rehabilitation, operation and maintenance are complex, extensive and expensive. Bringing onboard a person to

manage this huge undertaking at the earliest time will greatly enhance program implementation and increase the likelihood of successful project delivery.

**Community Relations Director.** The panel also recommends that the city bring onboard immediately a Community Relations Director who would be assigned to the Mayor's office and work directly with the Watershed Management Department. Testimony before a previous panel emphasized the importance of public involvement. This panel believes that having an expert dedicated to community relations and education is crucial to public acceptance of the projects and, therefore, to successful implementation.

**Operations and Maintenance.** It is acknowledged that the City has taken steps to reorganize the Department of Public Works and establish a Watershed Management Department. However, the Panel would like to emphasize the need to develop written policies and procedures for the operation and maintenance of the new facilities as well as of the existing facilities. The new and upgraded components of the sewer system will employ new technology and unfamiliar equipment. Special effort should be undertaken to ensure that operations and maintenance personnel are trained and equipped to manage the new and upgraded system. The City should plan for annual budgets to accommodate the needs.

**Water Quality Monitoring.** Ultimately, the success of the City's actions to meet the Consent Decree will be gauged in terms of how the rivers flowing through Atlanta have improved as a result of the recommended plan. Thus, implementation of a sound monitoring program is essential. While the information provided on the existing Water Monitoring Program (WMP) is limited in its scope, it is sound in its outlook and promising in its direction. The panel therefore wishes to endorse the City's plans in this respect. However, there needs to be more substance provided as to the costs of installing and operating the WMP, and to plans for training personnel. Costs of monitoring can be significant, but the payoffs from a well-designed system can be orders of magnitude higher.

**Greenspace Opportunities.** The panel recommends that the City take advantage of greenspace opportunities that are created by the elimination of two CSO facilities and one CSO regulator (associated with refinement option 1). Closing and demolishing these facilities will provide approximately 30 acres of greenspace that can be reclaimed by neighborhoods for parks, walking trails and other recreation.

**Additional Revenue Sources.** Implementing the recommendations of this report will require significant funding in a time of economic uncertainty and waning revenues. Therefore, the City should explore all avenues and sources of revenue both existing and new. The City should analyze the potential of current water and sewer fees as a base, then pursue additional sources of funding including:

- *State and/or federal assistance.* This is an extraordinary project and impacts state water quality, therefore the City should feel justified in accessing any and all grants and loan programs available.
- *Local Option or SPLOST sales taxes.* This revenue source targets non-resident users and exports some of the burden.
- *Stormwater Utility District.* Other cities around the U.S. and in Georgia have successfully implemented these utilities as a significant source of revenue. Usually based on the amount of impervious surface, these utilities are viewed as a fair and equitable way to assess those who cause the most run-off, particularly many non-profits who are exempt from paying taxes.

Organizations that collectively represent and assist cities such as the National League of Cities and the Georgia Municipal Association should be consulted for their expertise and experience.

## **Epilogue**

In conclusion, the panel believes the City of Atlanta has both a challenge and an opportunity. The challenge is substantial because of the long delays in tackling the important issues. Further delay is not acceptable, not only due to the terms of the Consent Decree, but also because of the large scale efforts needed to address sanitary sewers and stormwater management that are coming close on the heels of dealing with the combined sewer system. If these “run together” it will make the overall task much more difficult. Seizing the opportunity now to bring its infrastructure up to standard will go a long way in helping Atlanta achieve its aspirations of becoming one of the great cities of the world.

# Appendix I

## Mayor Shirley Franklin's Administrative Order #2002-5

**OFFICE OF THE MAYOR  
ADMINISTRATIVE ORDER 2002-5  
AN ADMINISTRATIVE ORDER ESTABLISHING THE MAYOR'S  
CLEAN WATER ADVISORY PANEL TO PROVIDE TO THE  
MAYOR TECHNICAL ADVICE REGARDING THE CITY'S  
"AUTHORIZED PLAN" TO REDUCE COMBINED SEWER OVERFLOWS.**

**WHEREAS**, in 1995 a federal lawsuit was filed against the City of Atlanta alleging, amount other things, that the City was violating water quality standards due to spills from its combined sewer system; and

**WHEREAS**, approximately 15% of the sewer system of the City of Atlanta – located primarily in the central core of the city and surrounding areas – is a combined system in which sanitary sewage and storm water are combined into one sewer pipe; and

**WHEREAS**, presently the City's combined system overflows about 60 times per year, resulting in spills of screened and chlorinated sewage and storm water directly into neighborhood streams and, ultimately, the Chattahoochee and South Rivers; and

**WHEREAS**, the federal district court has entered an order (known as the Consent Decree) directing the City to reduce the number of combined sewer overflows to an average of four or less per year, bringing Atlanta into compliance with federal and state water quality standards, as well as national Environmental Protection Agency policy; and

**WHEREAS**, the Consent Decree requires the City to meet water quality standards and to reduce overflows no later than November, 2007; and

**WHEREAS**, from 1998-2001 the City developed a comprehensive Remedial Measures Report and identified a preferred option to meet all requirements of the Consent Decree, including water quality standards and time limitations; and

**WHEREAS**, the Remedial Measures preferred option was authorized in July, 2001 by the Environmental Protection Agency and the Environmental Protection Division of the State of Georgia; and

**WHEREAS**, the "Authorized Plan" calls for (1) the construction of two deep tunnels to store combined sewer overflows and convey them to dedicated treatment facilities for near secondary treatment prior to discharge into the Chattahoochee and South Rivers and (2) the separation of at least 27% of the presently combined sewer system (resulting in a City-wide sewer system that is 90% separated); and

**WHEREAS**, the Authorized Plan is estimated to cost approximately \$950 million, representing a substantial investment on the part of the City; and

**WHEREAS**, the implementation of the Authorized Plan has significant impacts on the City's water quality; on the City's long-term sewer and storm water infrastructure; on water and sewer rates; on the overall affordability of living in the City; and on the ability of the City to accommodate long term growth; and

**WHEREAS**, the City considered numerous alternative plans in the course of developing the authorized plan, each with its own benefits and costs; and

**WHEREAS**, the Mayor seeks an independent review of the Authorized Plan by a panel of nationally known experts to provide a technical evaluation of the Plan;

**NOW, THEREFORE, BY THE POWER VESTED IN ME AS MAYOR OF THE CITY OF ATLANTA**, pursuant to the City of Atlanta Charter, 1996 Ga. Laws p. 4469 et seq., Appendix IV, Section 4(1), it is hereby ordered as follows:

1. I hereby establish an independent review panel to be known as "The Mayor's Clean Water Advisory Panel" (hereafter, "the Panel"). The panel shall consist of nine members known for expertise in municipal water or wastewater issues, environmental engineering, civil engineering or public health related sciences.
2. Dr. Wayne Clough, president of The Georgia Institute of Technology, shall chair The Mayor's Clean Water Advisory Panel. Dr. Clough shall select all members of the Panel consistent with the criteria listed above.
3. The Panel shall advise the Mayor on technical issues related to the City's Plan to address its combined sewer overflows.
4. The Panel shall thoroughly review all aspects of the City's current Plan for meeting the requirements of the federal Consent Decree regarding combined sewer overflows, including its effectiveness in meeting federal and state water quality requirements and the time for implementation. The Panel shall also thoroughly review the cost of the Plan and its effectiveness in meeting the City's long-term infrastructure needs.
5. The Panel shall thoroughly review any modifications to the Plan that may be proposed by the City as a result of its current pre-design (refinement) process. Such review shall focus on the technical and scientific merit of the modifications, as well as the reasonableness of cost estimates and completion times.
6. The Panel shall compare the City's current Plan to alternative methods of achieving the requirements of the federal Consent Decree, including full sewer separation. Alternatives shall be compared to the current plan in terms of cost, water quality standards, time of implementation and effectiveness in meeting the City's long-term infrastructure needs.
7. The Panel shall consider any non-technical issues related to the Plan and its alternatives as deemed appropriate by the Panel.
8. The Panel shall meet periodically as determined by the Chair, and findings shall be communicated to the Mayor as the Panel deems appropriate. A preliminary report shall be made no later than September 15, 2002.

9. The Panel shall provide notification of its meetings to the public, and minutes of the meetings shall be made available to the public through a web site or other means of distribution designed to make them readily accessible. Any presentations of information to the Panel shall be made by invitation of the Panel.
10. The Panel shall conclude its work no later than one year from the date of this Administrative Order.

SO ORDERED this 26 day of June, 2002.

Shirley Franklin

Mayor

## Appendix II

### The Mayor's Clean Water Advisory Panel Members

#### **G. WAYNE CLOUGH**

In September, 1994, Dr. G. Wayne Clough became the tenth President of the Georgia Institute of Technology and the first alumnus to serve as president. Dr. Clough received his B.S. and M.S. in Civil Engineering from Georgia Tech in 1964 and 1965, and a Ph.D. in 1969 in Civil Engineering from the University of California, Berkeley.

Dr. Clough was a member of the faculty at Duke University, Stanford University, Virginia Tech, and the University of Washington. He served as Head of the Department of Civil Engineering and Dean of the College of Engineering at Virginia Tech, and as Provost and Vice President for Academic Affairs at the University of Washington.

Dr. Clough has been recognized for his teaching and research, including a total of seven national awards from the American Society of Civil Engineers. He is one of a handful of civil engineers to have been twice awarded Civil Engineering's oldest recognition, the Norman Medal, in 1982 and in 1996. Other recognitions by the American Society of Civil Engineers include the 1991 State of the Art Award and the 1994 Karl Terzaghi Lectureship. He received the George Westinghouse Award from the American Society of Engineering Education in 1986 for outstanding teaching. In 1990, he was elected to the National Academy of Engineering (NAE).

#### **M. BRUCE BECK**

Bruce Beck is Professor and Eminent Scholar in the Warnell School of Forest Resources at the University of Georgia, where he holds the Wheatley-Georgia Research Alliance Chair of Water Quality and Environmental Systems. He is also Visiting Professor in the Department of Civil and Environmental Engineering at the Imperial College of Science, Technology and Medicine in London. Dr. Beck holds a first degree in Chemical Engineering from the University of Exeter (1970) and a PhD in Control Engineering from King's College, Cambridge (1973). His current research interests include environmental systems analysis, structural change and the identification of model structure, applications of process control in biological systems of wastewater treatment, control in microbial ecosystems, and infrastructure requirements for sustainable cities. Since taking up his appointment at the University of Georgia in 1993 he has commissioned the Environmental Process Control Laboratory, which forms part of a graduate program in Environmental Informatics and Control.

Bruce Beck has been a Visiting Scientist at the US Environmental Protection Agency (1990-94) and a Visiting Scholar at the Isaac Newton Institute for Mathematical Sciences in Cambridge (1998). In 1999 he was one of three winners of the EPA's national competition to develop a Visionary Paper under the Agency's program on "Sustainable Urban Water Resources Infrastructure: A Vision of the Future." He held an appointment (2001) as Technical Advisor to Judge Marvin H. Shoob, US Federal District Court, under the Sierra Club et al versus EPA lawsuit (the "Georgia TMDL" lawsuit). From 1993 through 1998 Dr. Beck led the International Task Force on Forecasting Environmental Change. Two of his books — *Environmental Foresight and Models: A Manifesto* (of which he is Editor) and *Modelling, Simulation, and Control of Urban Wastewater Systems* (of which he is co-author) — have been published in 2002.

Dr. Beck has been elected to serve a three-year term of office (2001-2004) as a member of the Strategic Council of the International Water Association (IWA). He is founder and presently Chair of the Specialist Group on Systems Analysis and Integrated Assessment of the IWA. He is also Director of the IWA's

Sustainability Program, in which capacity he is responsible on behalf of the Association for developing and running the annual Leading-edge Symposium Series on Integrated Urban Water Management.

## **John H. Hall**

John H. Hall received his B.S. in Chemistry from Morehouse College and his Ph.D. in Theoretical Chemistry from Harvard University, where he was a student of Nobel Laureate, William N. Lipscomb.

Dr. Hall was a member of the research faculty at Georgia Institute of Technology, where he served as Principle Research Scientist in the School of Earth and Atmospheric Sciences and Director of the Dolphus E. Milligan Science Research Institute at the Atlanta University Center. He was most recently Associate Vice President for Research and Executive Director of the Ohio State University Research Foundation. He is also President and founder of Transformational Consultants International, Inc., a corporation specializing in maximizing organizational and personal productivity.

His research has included environmental and atmospheric chemistry, in particular the mechanisms of tropospheric and stratospheric chemical reactions, and computer modeling of the electronic structures of molecules.

## **JEFFERSON M. HILLIARD**

### **Education**

BS, Civil Engineering, University of California, Berkeley, 1963

MS, Civil Engineering (Geotechnical), UC Berkeley, 1975

### **Registration**

Civil Engineer, California C16814

Geotechnical Engineer, California GE401

Mr. Hilliard has 39 years of diversified civil and geotechnical engineering experience and provides consulting services in transportation, water and geotechnical engineering. He offers special expertise in the design and evaluation of pavements for airports, marine terminals and other heavy duty applications, as well as for streets, roads and highways. Mr. Hilliard also provides consultation in design, cost estimating and construction management for these transportation systems.

Prior to opening his consulting practice, Mr. Hilliard was the Vice President and Manager of Operations for John T. Warren & Associates, responsible for the enhancement and implementation of scheduling, cost control and quality management programs for the design of transportation projects.

Before that he was the Manager of Water Supply Improvements, Design, and Engineering Services divisions for the East Bay Municipal Utility District. He managed the planning and environmental studies to provide an adequate, secure and high quality water supply. Prior assignments included the management of civil, mechanical and electrical engineering design of District facilities, including reservoirs, power plants, aqueducts, and filter plants. He was also responsible for construction specifications and cost estimating, drafting services, geotechnical engineering, dam safety, materials testing and computer-aided mapping and drafting.

## **CECIL LUE-HING**

Dr. Cecil Lue-Hing is the retired Director of Research and Development (R&D) for the Metropolitan Water Reclamation District of Greater Chicago, (District) and is currently Principle of the Environmental Engineering Consulting firm of Cecil Lue-Hing and Associates Inc., in Chicago, Illinois. During his 28

year tenure at the District, Dr. Lue-Hing provided R&D direction for the combined sewer overflow (CSO) and Tunnel and Reservoir Plan (TARP), the Sidestream Elevated Pooled Aeration System in the Chicago River, and established and directed a comprehensive water quality monitoring program for the Greater Chicago Waterway System and the upper Illinois River, from Chicago to Peoria. Dr. Lue-Hing played a key role in the restoration of the Chicago River System.

As Director of R&D, Dr. Lue-Hing served as the Director of all analytical laboratory services, wastewater research, biosolids research, and air quality research programs. He also directed the District's environmental regulatory enforcement program for the control of industrial effluents and the Industrial User Charge Program. Dr. Lue-Hing is nationally recognized as a Biosolids Management expert, has written extensively, and authored, co-authored, or edited two reference texts on Biosolids Management; two on Industrial Wastewater control; and two on Sewage Microbiology. He has also published extensively in the peer reviewed and open professional literature.

Dr. Lue-Hing has given freely of his time in the service of the profession. He currently serves as President Elect of The Environmental and Water Resources Institute of The American Society of Civil Engineers. He also served as Past President of The Association of Metropolitan Sewerage Agencies, and former Board Member of The American Academy of Environmental Engineers and Water Environment Research Foundation. He is also a Past Chairman of the Board of Editorial Review Water Environment Research.

Dr. Lue-Hing is a registered professional engineer, a Diplomat of the American Academy of Environmental Engineers, and a Member of the National Academy of Engineering.

#### **MICHAEL S. MARCOTTE**

On September 2, 1997, Mike Marcotte became the first Chief Engineer of the District of Columbia Water & Sewer Authority, where he is responsible for five operating divisions and the implementation of the Authority's \$1.6 billion, ten-year Capital Improvements Program. The Authority provides water service within the District of Columbia and operates the world's largest advanced wastewater treatment plant -- Blue Plains -- to serve the needs of the District and approximately two million residents of surrounding areas in Maryland and Virginia.

Previously, Mike was Director of the City of Dallas Economic Development Department, Director of Dallas Water Utilities, Acting Director of Houston's Department of Planning & Development, and Chief of Maintenance and Chief Engineer for the City of Houston's Water Division/Department of Public Works. Prior to City of Houston employment, Mike was a Senior Manager with Turner Collie & Braden, Inc., a Houston Consulting Engineering firm.

Mike is a graduate of Rice University (Bachelor's and Master's degrees), and in 1986 he completed the Program for Sr. Executives in State and Local Government conducted by Harvard University/John F. Kennedy School of Government. Continuing education courses have been completed at University of Pennsylvania/Wharton School, University of Texas-Austin, University of Wisconsin, and Trinity University. Mike is a registered Professional Engineer in the District of Columbia and the states of Texas and Colorado, a Diplomat of the American Academy of Environmental Engineers, a Fellow of the American Society of Civil Engineers, a past member of the Boards of the American Water Works Association Research Foundation and the Texas Water Conservation Association, and a current member of the Board of Trustees of the American Academy of Environmental Engineers.

#### **LAWRENCE H. ROTH**

As the Deputy Executive Director and Chief Operating Officer of the American Society of Civil Engineers (ASCE), Lawrence H. Roth manages the Society's annual operating budget, which exceeds \$43 million. He is responsible for ASCE's professional, technical, educational, and international activities, and directs its commercial operations, which

includes publications, conferences, and continuing education programs. Mr. Roth joined ASCE after a thirty-year career in consulting where he was a nationally recognized leader in civil and geotechnical engineering practice. He practiced engineering for more than 20 years with CH2M Hill, San Francisco, where he was senior vice president of the firm's environmental business line. He was also vice president and manager of the San Francisco office of Haley and Aldrich. Prior to joining ASCE, he was vice president and principal engineer for Subsurface Consultants in Lafayette, California, where he was responsible for marketing, business development, and project management. He is a registered professional engineer in six states and a registered geotechnical engineer in California.

Mr. Roth earned his bachelor's and master's degrees in civil and environmental engineering from the University of Wisconsin-Madison, and has served on the Curriculum Advisory Committee of the Department of Civil and Environmental Engineering there. In the fall of 2000, Mr. Roth received the Distinguished Service Citation from the University of Wisconsin-Madison College of Engineering.

### **BILLY G. TURNER**

Mr. Turner currently serves as President of the Columbus Water Works, which is the agency in the Consolidated City-County Government of Columbus, Georgia that provides for water and wastewater services.

He is a 1961 graduate of the Department of Environmental Science and Engineering program of the School of Public Health at the University of North Carolina – Chapel Hill. He received the Master of Science in Public Health. Mr. Turner is a native of Whitwell, Tennessee and possesses a Bachelor's Degree in Chemistry from the University of Tennessee at Chattanooga. He has also studied at the University of Illinois in Civil Engineering and at Cornell University in Water Resources Engineering.

Mr. Turner's career spans more than 40 years in the water quality area working both in the public and private sector. After several years with the seven-state Tennessee Valley Authority, Mr. Turner joined a large pulp and paper company as the Manager of Environmental Programs. After 15 years with an Atlanta based consulting firm, Mr. Turner started his public service career in Spartanburg, SC, managing two agencies ? one water and one wastewater.

Mr. Turner is a past president of the Water Environment Federation. He has served and continues to serve on many Board of Directors on the local, state and national levels including the United Way, American Red Cross, Chamber of Commerce, Georgia Water and Pollution Control Association, American Water Works Association and the Water Environment Research Foundation.

### **NANCY J. WHEATLEY**

Nancy J. Wheatley is a consultant providing strategic environmental consulting services to assist clients in planning environmentally responsible and cost effective programs. She provides services that incorporate technical planning, legal requirements and project cost. Successful planning of environmental projects to comply with Clean Water Act and state regulatory requirements requires balance of all of these issues.

Ms. Wheatley's two decades of experience in environmental and public utility strategic program and project work provide a unique mix of experience with utility operations, program management, and regulatory services. Her experience includes senior management positions in the public and private sectors and consulting experience with both public and private agencies. Highlights include participation in EPA Federal Advisory Committees on both CSO (Combined Sewer Overflow) and SSO (Sanitary Sewer Overflow) regulation; development of an alternative biosolids management program; negotiation of a major NPDES discharge permit which included provisions from Section 301(h) of the Clean Water Act, as well as, an innovative and flexible ocean monitoring program; negotiation and implementation an environmental

compliance program for a major cruise line, under terms of a settlement agreement for criminal violations of the of the Clean Water Act; and certification of the cruise line's environmental program under the International Standards Organization Environmental Management Standard (ISO 14001).

Ms. Wheatley has been recognized for regulatory successes by the Vice President of the United States through the Hammer Award, given to the group which developed the US EPA National CSO Policy and by the California Department of Parks and Recreation which presented the California Poppy Award for innovative solutions to beach pollution. She is active in the Water Environment Federation, having served on the Board of Directors and Executive Committee, as Chair of Government Affairs, and represented WEF in numerous proceedings.

Ms. Wheatley holds a B.S. Degree from the Massachusetts Institute of Technology and a J.D. Degree from Suffolk Law School. She is a member of the bars of the Commonwealth of Massachusetts, the State of Hawaii and the Federal District Court for the District of Hawaii.

## Appendix III

### Consent Decree Excerpts



25. "Wastewater Treatment Facility" (WWTF) shall mean devices or systems used in the storage, treatment, recycling, and reclamation of municipal sewage. For purposes of this Consent Decree, this definition includes the following WWTFs owned, managed, operated, and maintained by the Defendant: R.M. Clayton Water Reclamation Center, South River Water Reclamation Center, Utoy Creek Water Reclamation Center, and the Intrenchment Creek Water Reclamation Center.

## VII.

### REMEDIAL ACTIONS FOR THE COMBINED SEWER OVERFLOW FACILITIES

Upon entry of this Consent Decree, the Defendant shall fully meet and comply with all conditions of this Consent Decree, the Clean Water Act, the Georgia Water Quality Control Act and the NPDES permits for all of its CSO Control Facilities, as such Permits are now and may hereafter be in effect.

#### A. Evaluation Programs

##### 1. System Evaluation

a. By July 1, 1998, the Defendant shall enter into a contract with a Qualified Consultant to develop and implement a program to evaluate each Combined Sewer Overflow (CSO) Control Facility. The Defendant shall undertake a twelve (12) month program to: 1) determine the overall effectiveness of the existing CSO controls in achieving compliance with the Clean Water Act, the Georgia Water Quality Control Act, and the NPDES

permits for the CSO Control Facilities; 2) evaluate the pollutant removal efficiencies of the facilities; 3) determine dry and wet weather flows from the Combined Sewer Systems to the Wastewater Treatment Facilities; 4) determine the storage capacity of the current Collection System under dry and wet weather conditions; and 5) evaluate the response of the Combined Sewer System to rainfall events. The program will also include whole effluent toxicity testing.

b. By October 1, 1998, the Defendant shall develop and submit, for EPA/EPD's and the Citizen Plaintiff's review and comment, and EPA/EPD's approval, a program for the evaluation of each of the Defendant's CSO Control Facilities over a twelve (12) month period titled "The CSO Control Facility Evaluation Program." The Defendant agrees to perform the following tasks or their EPA/EPD approved equivalent for each CSO Control Facility in the Evaluation Program:

(i) Describe the Pollutant Parameters to be sampled and analyzed for each CSO Control Facility, which at a minimum shall include: ammonia, biochemical oxygen demand, fecal coliform bacteria, total residual chlorine, pH, phosphorus, temperature, total suspended solids, oil and grease, total and dissolved cadmium, total and dissolved lead, total and dissolved zinc, total and dissolved nickel, total and dissolved copper, and any other Pollutant Parameters in the monitoring requirements of the effective NPDES permit.

(ii) Describe the CSO Control Facility and how

pollutant removal efficiencies, where applicable, will be calculated.

(iii) Describe sampling locations for each CSO Control Facility, which shall include at a minimum, the facility influent, the facility effluent, and a location in the receiving stream that is downstream from the CSO Control Facility.

(iv) Describe sampling procedures, equipment, and analytical methods to be used for each CSO Control Facility, consistent with 40 CFR Part 136, or other standard operating procedures agreed upon by EPA/EPD and the Defendant, and quality assurance and quality control procedures. The analytical methods for metals analysis shall be capable of detecting concentrations down to or below the Georgia Water Quality Standard for each metal being evaluated.

(v) Monitor continuously all flow to the associated Wastewater Treatment Facility, and describe the flow monitoring equipment and its location.

(vi) Monitor all flow discharged, including bypass flow, from the CSO Control Facility to the receiving stream, and describe the flow monitoring equipment and its location.

(vii) Describe the techniques and methods for measuring the flow of the receiving stream at the instream sampling location(s).

(viii) Monitor rainfall continuously at a representative location(s) within each Combined Sewershed at no longer than 15 minute intervals, with gauges located so that no

point in a Sewershed is more than 6 kilometers from a rain gauge.

(ix) Monitor a minimum of ten overflows, representative of the intensity and duration of a range of storm events, for each CSO Control Facility during the twelve (12) month evaluation period. Monitoring shall be conducted as described in Section VII.A.1.b.xi and xii.

(x) Sample storm water runoff from streets or parking lots at two locations, runoff from yards or parks at two locations, and runoff from two other land uses typical of the Sewershed, all prior to entering the Collection System, that contributes to the first five overflows sampled under Section VII.A.1.b.ix above. In lieu of sampling, provide documentation that demonstrates the expected range for each of the Pollutant Parameters in storm water runoff from the land uses listed above and describe how the ranges were determined.

(xi) For each of the overflows in Section VII.A.1.b.ix, collect and analyze a minimum of four grab samples at a single sampling location, selected and approved for each Pollutant Parameter, in a manner that characterizes each Pollutant Parameter over the CSO hydrograph. At a minimum, grab samples must be collected during the first 30 minutes of overflow and every thirty minutes thereafter for the first 6 hours of overflow. Sampling at minimum intervals of 60 minutes may be used for the remaining portions of the storm. Sampling should continue until the overflow ceases or the overflow duration exceeds 24 hours.

(xii) For each of the overflows monitored under Section VII.A.1.b.ix, collect and analyze flow proportional samples from the overflow and downstream location for each Pollutant Parameter, except fecal coliform, pH, oil and grease, and temperature. The flow proportional samples shall be composited from the grab samples referenced in Section VII.A.1.b.xi.

(xiii) Collect and analyze twenty-four (24) hour flow proportional samples of the dry weather flows to the Wastewater Treatment Facility during two weekends (4 days total) and four weekdays. The samples shall be collected at least 48 hours after the last CSO discharge has ceased, or when the flow is clearly not influenced by surface runoff as determined by the continuous flow monitoring in place.

(xiv) Conduct whole effluent toxicity testing for at least one overflow at each CSO Control Facility. Sample collection shall be representative of the CSO Control Facility discharge hydrograph and shall include, at a minimum, a sample within the first 30 minutes of overflow and during the declining limb of the hydrograph. The Defendant shall perform acute static toxicity tests using daphnid (*Ceriodaphnia dubia*) and fathead minnow (*Pimephales promelas*). The Defendant shall at a minimum perform all of the tests on grab samples of 100 percent CSO and a control (0 percent CSO) based upon an agreed upon protocol, attached hereto as Exhibit I, for the purposes of examining exposure that represents the CSO discharge situation. If control

mortality exceeds 10 percent for either species in any test, the test(s) for that species (including the control) will be repeated. A test will be considered valid only if the control mortality does not exceed 10 percent for either species. All test species, procedures and quality assurance criteria used shall be in accordance with *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*, EPA/600/4-90/027F, or the most current edition. The dilution/control water used will have a total hardness of less than 100 mg/l (expressed as CaCO<sub>3</sub>). A standard reference toxicant quality assurance test shall be conducted at least monthly on each species used in the toxicity tests. All tests shall begin within 36 hours of the time the last grab sample was taken. If residual chlorine is present in the final effluent from a treatment and/or disinfection process, a prechlorination or dechlorinated sample shall be tested. If residual chlorine is present, a 48 hour acute static toxicity test shall be performed with the test organisms using the chlorinated sample of 100 percent CSO effluent from the first 30 minutes of the overflow and using a control.

(xv) Describe all hydrological, hydraulic and water quality model(s) which will be used for data analysis.

(xvi) Describe chain of custody procedures for all collected samples.

(xvii) Provide a map of the watershed above the instream sampling location that shows the Sewershed, the Combined

Sewer System, pipes that are thirty-six (36) inches in size and greater, the location of rain gauges, the location of flow monitoring stations, the location of storm water sampling, and the location of all discharges permitted under the Defendant's pretreatment program.

(xviii) Describe the location(s) of data/information storage for all information collected pursuant to this Section.

c. Within thirty (30) days of receiving EPA/EPD's comments, the Defendant shall modify the CSO Control Facility Evaluation Program accordingly, and submit the modified program to EPA/EPD for final approval. Upon receiving EPA/EPD's final approval, the Defendant shall implement the program.

d. Within six (6) months of EPA/EPD's final approval of the program, the Defendant shall submit for EPA/EPD's and the Citizen Plaintiffs' review and comment, and EPA/EPD's approval, an uncertified report which shall include:

(i) the results of the whole effluent toxicity testing program;

(ii) a map of land use in the Combined Sewershed and a table of runoff coefficients for each land use to be used to develop the flow hydrographs;

(iii) an estimate of the storage capacity of each Combined Sewer System;

(iv) the monitoring results from at least four of the overflows monitored under Section VII.A.1.b.ix;

(v) all flow and rainfall data collected up to that

time;

(vi) a characterization of each permitted pretreatment discharger's contribution of the sampled pollutants;

(vii) a characterization of the storm water runoff based upon land use, runoff coefficients, and estimates of pollutant loadings, based upon sampling data or the documentation submitted in lieu of sampling; and

(viii) a deficiencies report identifying system deficiencies (design, structural, process, operations and maintenance) and performance limiting factors which may limit the overall effectiveness of the existing CSO controls in achieving compliance with the Clean Water Act, the Georgia Water Quality Control Act and the NPDES permits for the CSO Control Facilities.

e. Within fifteen (15) months of EPA/EPD's final approval of the program, the Defendant shall submit for EPA/EPD's and the Citizen Plaintiffs' review and comment, and EPA/EPD's approval, a report titled "CSO Control Facility Evaluation Report" which shall include:

(i) the monitoring results from the remaining six overflows monitored under Section VII.A.1.b.ix;

(ii) an analysis of the CSO removal efficiency for each pollutant evaluated, including summaries of all sample analyses and flow measurements, and graphs of influent, effluent, and downstream pollutant loadings;

(iii) a graph of the flow monitoring data for each overflow and rainfall hydrographs for each overflow;

(iv) a graph(s) of the flow monitoring data for flow to the Wastewater Treatment Facilities and a table comparing the flow to the Wastewater Treatment Facilities, the total CSO discharge flow, the flow either captured, screened or bypassed, and the rainfall amount;

(v) predicted CSO discharge hydrographs for rainfall events of 0.25, 0.50, and 1.00 inch per hour for durations of 1, 2, 4, and 8 hours (hydrographs shall be calibrated and verified from field data);

(vi) for each sampled overflow, a comparative analysis of the sampling data and the applicable Georgia Water Quality Standards;

(vii) for each sampled overflow: the date, time and intensity of the last rainfall in the Sewershed; a description of the last overflow prior to the sampled overflow; a description of all Best Management Practices undertaken (e.g., sewer cleanings, street cleanings, installation of structural controls) since the last rainfall; and minimum and average daily flow in the sanitary sewer since the end of the last rainfall;

(viii) an analysis of the response of the associated Wastewater Treatment Facility to wet weather flows from the Combined Sewer System, including compliance with effluent limits, capacity of individual unit processes, and any limiting factors or processes;

(ix) a characterization of the dry weather flow to each Wastewater Treatment Facility;

(x) an update of all information submitted under Section VII.A.1.d.

f. Within thirty (30) days of receiving EPA/EPD's comments, the Defendant shall modify the CSO Control Facility Evaluation Report accordingly, and submit the modified report to EPA/EPD for final approval.

g. All data and information collected and analyses performed by the Defendant or the Defendant's consultant pursuant to this System Evaluation shall be available during regular business hours to EPA/EPD and Citizen Plaintiffs for review and inspection. The EPA/EPD and Citizen Plaintiffs may request meetings with the Defendant and the Defendant's consultant to discuss aspects of this evaluation. The Defendant shall make available its consultant for such discussions on a reasonable basis, and the EPA/EPD and Citizen Plaintiffs shall provide the Defendant with two (2) days notice prior to such discussions.

## **2. Remedial Measures Report**

a. Within six (6) months of EPA/EPD approval of the CSO Control Facility Evaluation Report, the Defendant shall submit a document titled "Remedial Measures Report" for EPA/EPD's and the Citizen Plaintiff's review and comment and EPA/EPD's authorization to proceed with the implementation of remedial measures. The report shall provide a detailed analysis of the steps the Defendant shall undertake to bring all the CSO Control Facilities into compliance with the Clean Water Act, the Georgia Water Quality Control Act and the NPDES permits then in effect

for the CSO Control Facilities. This report, titled "CSO Control Facility Remedial Measures Report," shall:

(i) Evaluate all appropriate alternatives with preliminary cost estimates for each alternative and detailed cost estimates for the selected remedial measure(s). Alternatives shall be compared in life cycle costs, implementation time, and environmental benefits. Alternatives shall include, at a minimum, chlorination/dechlorination, alternative disinfection methods, sewer separation, storage to reduce overflows to no more than four per year, relocation of the CSO, Best Management Practices, and Primary Treatment of all flows.

(ii) Provide schedules and cost estimates for designing, constructing, and implementing each alternative or combination of alternatives which meet the objectives of this Consent Decree. The Defendant shall indicate the preferred alternative. Schedules shall be established so that compliance shall be achieved as quickly as sound engineering and construction practices permit. All construction necessary to meet the requirements of this Consent Decree pertaining to CSOs shall be completed by July 1, 2007, unless EPA and EPD jointly agree to a longer schedule. The proposed schedule shall include interim milestones (e.g., initiation of design, completion of preliminary engineering, one-third and two-thirds of design completion, submittal of plans and specifications to the State), as well as deadlines for completing design, advertising for bids, issuing a notice to proceed, completing construction, and

initiating operation. The interim milestones shall be at a sufficient frequency to ensure the ability of EPA and EPD to maintain oversight and to ensure compliance with the final compliance date. The report shall include descriptions of the resources necessary to fully support operation and maintenance of the alternatives and a schedule of when the resources will be required.

(iii) Evaluate environmental, financial and other impacts, taking into account Best Management Practices which have been or will be implemented.

b. Within thirty (30) days of receiving EPA/EPD's comments, the Defendant shall modify the report accordingly, and submit the modified report to EPA/EPD for final approval. Unless the modified report requires further revision, EPA/EPD shall review the modified report and (1) authorize the Defendant to implement the alternative preferred by the Defendant according to the schedule in the modified report, or (2) reject the preferred alternative and authorize the Defendant to implement one or more other alternatives according to the schedule(s) in the modified report. The Defendant shall implement the authorized alternative(s) according to the schedule approved by EPA/EPD.

### **3. Short Term Remedial Measures**

a. By June 1, 1998, the Defendant shall submit for EPA/EPD's and the Citizen Plaintiffs' review and comment, and EPA/EPD's approval, a Short Term Remedial Measures Plan. In this plan, the Defendant shall:

<u>Period of Violation</u>	<u>Penalty Per Day</u>
1-7 days	\$0/day
8-14 days	\$500/day
15-30 days	\$2,000/day
31-60 days	\$5,000/day
Over 60 days	\$8,500/day.

A submittal shall be timely if the Defendant submits it by the due date and the submittal substantially complies with the requirements of the Consent Decree.

C. Failure to Meet Other Schedules

1. For each affected CSO Control Facility, the Defendant shall be subject to the following stipulated penalties if it fails to advertise for construction bids or to complete construction by the dates set forth in the schedule approved by EPA and EPD:

<u>Period of Violation</u>	<u>Penalty Per Day For Each Affected CSO Control Facility</u>
1-14 days	\$2,000/day
15-30 days	\$5,000/day
Over 30 days	\$8,500/day.

These penalties apply to the schedules for the Short Term Remedial Measures Report (Section VII.A.3) and the Remedial Measures Report (Section VII.A.2).

2. For each affected CSO Control Facility, the Defendant shall be subject to the following stipulated penalties if it fails to meet any other approved Section VII schedule date,

## **Appendix IV**

**Meeting Minutes from June 28, July 15, August 23 and  
September 13, 2002 meetings**

The Mayor's Clean Water Advisory Panel  
Minutes  
June 28, 2002

Advisory Panel members in attendance were Wayne Clough, John Hall, Cecil Lue-Hing, Mike Marcotte, Larry Roth, Billy Turner and Nancy Wheatley. Bruce Beck joined the first hour and a half of the meeting via conference call. Jeff Hilliard could not attend.

Dr. Wayne Clough called the meeting to order at 8:30 AM by welcoming the panel members and thanking them for their willingness to give their time and talents to this effort. He then asked each of them to introduce themselves and give a brief bio of their education and work in water and sewer systems. (Bios available from Lynn Durham at [ldurham@earthlink.net](mailto:ldurham@earthlink.net).)

After the introductions Dr. Clough reiterated that the panelists are working pro bono on this and have agreed not to be involved in any City of Atlanta projects so they can remain unbiased.

Dr. Clough stated that the Advisory Panel is to provide advice to Mayor Shirley Franklin while being mindful of constraining parameters such as making sure the recommendations are technically feasible, economically feasible and can fit into the time constraints imposed by the consent decree (which mandates work to be finished by November 2007).

Greg Giornelli, Mayor Franklin's policy advisor, then thanked the panel on behalf of Mayor Franklin. He said the Mayor wants to find the best method for the City to address water quality because it has a huge impact on Atlanta's future. She is looking to this panel for technical advice that is independent. She wants the panel to review alternatives to the City's plan – including alternatives proposed by City consultants as well as outside ideas. She wants them to look at the time, cost and water quality considerations of the City plan and let her know if it is "off base" or on target. She also wants them to take quality of life factors for city residents and workers into consideration.

Mr. Giornelli added that the City has a wonderful opportunity because of all the expertise on this Advisory Panel and he invited the Panel to look beyond the issue of the combined sewer system if they would like to.

Dr. Clough then explained that the panel would spend the first meeting primarily as listeners to learn as much as they can about the history and design of Atlanta's combined sewer system.

John Griffen, the deputy commissioner of the City's Public Works Department, began his presentation on the history of Atlanta's sewer system. He said that Atlanta has an old sewer system which dates back to the 1880s. The sewers in the combined sewer system were completed in the 1920's. The Atlanta community grew from Five Points outward and the combined sewers go about three and a half to four miles out from Five Points. Some of Atlanta's sewers are at least 100 years old. Atlanta has 2,200 miles of sewer and 85% of those are separated, which leaves 15% or 330 miles, of combined sewers.

In dry weather, the collection system conveys all wastewater flow to a water reclamation center (WRC) for treatment. During wet weather, the combined flows (wastewater and stormwater) exceed the collection system capacity, resulting in combined sewer overflows (CSOs) at the City's six CSO facilities. The CSOs occur about 60+ times per year at the West area CSO facilities, and about 20+ times per year at the East area CSO facilities. An existing storage tunnel in the East area (about 30 million gallons of storage) is the reason that the East area CSOs are reduced from 60+ to 20+ per year. The existing CSO facilities provide screening and chlorination prior to discharge to local streams. During heavy rainfalls, the peak rate of the CSOs sometimes exceed the screening

capacity of the facilities, at which point some flow bypasses the screening, but all flow is chlorinated.

The CSO area population area is 106,400 and the city's population is 416,000 but the CSO's are in the central business district where sewers were constructed in stream beds.

In the 1980s, low dissolved oxygen in the South River led to CSO improvements and those improvements worked. In 1988 the City of Atlanta funded a CSO management study and in 1989 the EPD issued an order mandating that CSOs be controlled or eliminated. In 1990, the EPD approved of the city's CSO plan that included screening and disinfection facilities at Tanyard, Clear Creek, Greensferry, North Avenue and Utoy Creek.

Billy Turner asked what effect changes to the combined sewer system would have on older buildings in the area and Mr. Griffin answered that the changes would be very disruptive and expensive for older buildings because they would have to make changes on the inside to work with the changes that would be taking place on the outside.

Nancy Wheatley asked if they had looked at the possibility of taking the creeks out of the sewers and Mr. Griffin said that there is no opportunity to do that in the urban area.

Mike Marcotte asked about leveraging the separation projects into something else such as major street reconstruction and Mr. Griffin said that there was currently no opportunity to do that and they were trying to minimize impact.

Mitchell Griffin, project manager -- CSO Remedial Measures (PMT), continued the presentation by discussing the consent decree, public concerns and the authorized remedial measures plan. The Georgia Legislature passed a law in 1989 targeted at Atlanta that required water discharges to meet water quality standards by December 31, 1993. In 1995, Chattahoochee Riverkeeper and downstream property owners filed a lawsuit against the City claiming that the CSOs did not meet water quality standards. In 1997, the EPA audited the CSOs, plants and sewers and a judge ruled that the CSOs caused violations of water quality standards. In 1998, the City entered into a CSO consent decree.

The City held more than 100 public meetings. The number one public concern expressed in those meetings was to separate the sewers. A one-year CSO System Evaluation defined the water quality issues and improvement needs. The findings included that wastewater characteristics differ at each CSO, disinfection reliability improvements were needed, the first flush effect was not always pronounced, the overflows were not toxic ? except for residual chlorine ? zinc and copper were the metals of concern and the stormwater had elevated fecal coliform and metals concentrations.

(At this point in the meeting there was a prolonged break for a press conference by Mayor Shirley Franklin in which she introduced the panel and announced her goals for the group.)

Mitchell Griffin resumed his presentation after the press conference. He stated that many CSO control technologies were reviewed including sewer separation, inflow reduction techniques, source controls, sewer system optimization, storage systems and treatment systems.

There were three options presented to the EPA/EPD: Sewer separation in all six basins excluding the urban core (80% separation); Tunnel storage and treatment system (0% separation); and Combination of separation and tunnel storage and treatment (27% separation).

Option A would separate all the combined sewer area, except the downtown urban core – resulting in separation of about 80% of the total combined sewer area. The downtown urban core is located in three basins (North Avenue, Tanyard, and Clear Creek). These basins would be partially separated; therefore the three CSOs associated with these basins

would remain in service. The other three basins (Greensferry, McDaniel and Custer) would be fully separated, and their respective three CSOs eliminated. A smaller tunnel storage system would be implemented for the downtown core, and the combined sewage stored in the tunnels would be treated at a new treatment facility (at R.M. Clayton site) or possibly could be routed through the existing R.M. Clayton WRC. The combined sewage overflows from the storage tunnel (average four per year) would be routed to the existing three CSO facilities for screening, chlorination and dechlorination. The RMR concluded this option could not be implemented by November 2007.

Option B, the tunnel storage and treatments system, would capture 98% of sanitary flow and 85% of stormwater flow. It would store and carry the combined flow to new treatment facilities and discharge the treated flow to the Chattahoochee or South Rivers. This option would comply with the limit of four overflows per year average and can be constructed by 2007. The average four overflows per year would be routed to the six CSO facilities for screening, chlorination and dechlorination.

Option C is the hybrid option of a combination of separation and tunnel storage and treatment. It would capture 98% of sanitary sewage flow and 85% of stormwater flow. It stores and carries the combined flow to new treatment facilities and discharges the treated flow to the Chattahoochee or South Rivers. It complies with the four overflows per year average. It includes some separation in each basin, totaling approximately 27% of the combined area. Because no full basins are separated, none of the existing six CSO facilities are eliminated. The average of four overflows per year of combined sewage would be routed to the six CSO facilities for screening, chlorination and dechlorination. Option C was authorized by EPA/EPD July 2001.

Each plan must be reviewed while looking at factors including the consent decree deadline, affordability, water quality standards and quality of life considerations. (Charts in PowerPoint presentation (page 25) compare the three options in the above mentioned categories and another chart compares the three options for pollutant reduction.) Option C was chosen because it achieves all federal and state water quality standards, it is the most cost effective overall approach, it can be completed by 2007, it reflects citizen advisory group opinion by initiating sewer separation and it reduces overall pollutant load to local streams.

Ms. Wheatley asked about the perceived benefit of separation by the community. Joe Basista, program manager (PMT), answered that the members of the citizen's advisory group are passionate that sewer separation is a quality of life issue. And the City has said that complete separation is the ultimate goal, so the consensus is that the City should just go ahead and separate fully.

Mr. Basista then led the presentation to discuss the authorized plan and the next steps that are being taken. The EPA/EPD authorized the City's plan in July 2001 and the City began its predesign process in August 2001. The tunnel predesign was submitted in May 2002, the East Area CSO Treatment Facility plan and the dechlorination for CSO Facilities are due in July, the West Area CSO Treatments Facility begins in December 2002 and the sewer separation plan is due in September 2002.

City consultants are now in the process of refining the authorized plan. The focus of the refinement is on the separation of multiple full CSO basins. The City's plan did not fully separate any basins or eliminate any CSO control facilities and the EPA authorization specifically requested that the City consider separation of full basins. Consultants are currently examining separation of multiple full basins to eliminate several neighborhood CSO facilities. The refinement plan needs to be completed by September 2002.

They are comparing sewer separation versus tunnel storage on the criteria of cost, schedule, water quality and quality of life. They have completed separation studies of three basins – Clear Creek, Greensferry and Stockade. This means about 35% of the basins have separation plans.

Cost is a high priority but the schedule is the “gatekeeper.” The City is determined to meet the consent decree schedule of November 2007 for completion. The City has no intention of paying fines until the work is complete.

Mr. Basista compared sewer separation versus tunnel storage. Sewer separation treats 100% wastewater and 0% of stormwater. That meets the criteria of the consent decree but must be approved by the EPA. Tunnel storage treats 98% wastewater (with an average of four overflows per year) and 85% of stormwater. You give up treatment of stormwater with full separation.

There are other possible refinement scenarios to the authorized plan from City consultants and citizen activists. Some of those include plans by Justin Weideman and Dr. Brooks. Mr. Basista said that all of them deserve to be looked at.

The consent decree does not address the total cost, the sources of funding or stormwater management. The City faces a significant financial challenge. It has invested \$1.1 billion to date and it would have to invest an estimated \$3 billion between 2002 and 2014 for the CSO Remedial Plan, the SSO Remedial Plan and regulatory and other plans. There is no funding mechanism in place to pay for this.

Stormwater management is also part of the City’s long-term watershed enhancement program but improvements will not be implemented under the refined authorized plan. It is not required by the consent decree. Using water and sewer revenue funds places an unfair burden on residential ratepayers, especially senior citizens, fixed and low income families. Plus, the City Legal Department has said that water and sewer revenue funds cannot be used for stormwater improvements.

The next step in the process is for the complete predesign to be finished in September 2002. Then the refinements must be approved by the EPA/EPD. The final design schedule would begin in December 2002. Construction must start by March 2004 to meet the November 2007 consent decree date.

The Advisory Panel and a few staff members then adjourned to take a tour of the Clear Creek CSO facility.

Upon returning from the tour, Dr. Clough launched a discussion of the panel’s objectives and charge. It was determined that the Mayor needs the panel’s recommendations by the end of September. The panel will meet a total of four times to craft those recommendations. Dr. Clough said he expects the report to be relatively brief and concise – perhaps fewer than 10 pages.

Mike Marcotte asked whether “the policy of the City is separation.” He was told that is the long-term ambition of the City but that the Panel is not limited in any way regarding that issue.

Cecil Lue-Hing asked how much does the City’s long-term policy of separation impact the panel’s charge. Mr. Basista answered that the separation policy evolved over time but it has always been a goal. The City would like to see the rest of the combined sewer system separated and it has committed to 27% separation of the existing combined sewers. If there is a higher percentage of separation recommended by the Panel for the same cost, the City would certainly be ok with that. But without other funding options, the City will have to raise the residential rates 10% per year through 2014 and that will triple costs. There is no option that is “a magic panacea” of costs.

Mr. Basista said there is uncertainty about the viability of whether the downtown core can ever be separated. And Nancy Wheatley said that any plan has to address that part of the system.

Dr. Clough asked Mr. Basista if there is enough cost data to analyze and Mr. Basista said they are working on it and hope to have something in July.

The Panel then discussed which alternative plans they should hear. Joe Basista suggested they hear from the citizen’s advisory committee. They primarily advocate complete separation.

Panel members would also like someone from Minneapolis to talk about that city's experiences going to complete separation. Larry Roth said he would work on finding someone from Minneapolis who could speak to the Panel at the next meeting. It was also suggested that someone from Milwaukee come to speak about the tunnel that was constructed there.

Dr. Clough said he would like to hear about most of the alternatives at the next meeting so the Panel can move on so it's final two meetings can be more deliberative in nature.

Other possible groups or speakers to hear from include what Joe Basista refers to as "the Justin Weideman plan." The Panel may also want to hear from Dr. Brooks about his plan. Cleanstreams, an environmental group, would also like to make a presentation.

Nancy Wheatley agreed with letting the citizens advisory group make a presentation but she cautioned that only groups with substantive proposals be invited to present their ideas. The Panel can't allow every group with a proposal in.

Dr. Lue-Hing said that he believes any group that has attended this first meeting should be given the opportunity to talk.

Billy Turner suggested that a representative from the North Georgia Water District be invited to speak about where they are going and how it interacts with Atlanta.

Andrew Harris of Georgia Tech's President's Office suggested inviting Harold Reheis of the state EPD so the Panel can hear his perspective.

Greg Giornelli advised the Panel that the local chapter of the Urban Land Institute (ULI) has volunteered to do an independent review of certain City of Atlanta estimates of land costs to purchase the land needed to allow for handling stormwater under some citizen activist full separation alternatives that uses retention ponds and streams.

To close the meeting, Dr. Clough said that the next meeting will be held on Monday, July 15 at GCATT. An agenda will be compiled for the next meeting and will be sent to everyone as soon as possible. With that he adjourned the meeting.

The Mayor's Clean Water Advisory Panel  
July 15, 2002

Panel members in attendance are Wayne Clough, Cecil Lue-Hing, Mike Marcotte, Larry Roth and Nancy Wheatley. Participating via conference phone were Billy Turner and Jeff Hilliard.

Dr. Clough called the meeting to order at 9:00 AM. He announced that minutes from each meeting will be available to public. Dr. Clough then introduced Clair Muller, a member of the Atlanta City Council. She thanked the panel for the work they are doing.

Dr. Clough asked everyone in the room to introduce themselves and say which group they were representing.

The Panel had a few questions that they would like for Joe Basista and Mike Mynhier of the PMT to respond to before the next meeting.

- 1) The Panel wants to understand all the players and how they fit, such as consultants, city engineers, city employees, etc.
- 2) Thoughts on delivery issues and how they are going to organize themselves to deliver the systems that were discussed at the June 28 meeting.
- 3) What has been done in the way of public education and information? Is there a summary?
- 4) What has been done on the studies of disruption issues associated with separation?
- 5) What kind of capabilities do we have in the workforce to carry out construction, because it has to be done in a short period of time. The Panel wants the PMT's best assessment of capability to get everything built.
- 6) What will be done with stormwater issues if they do go to separation?
- 7) Has the question of separating conveyance and storage been considered? Particularly where they might look at storage downtown as opposed to storage in tunnels out in the suburbs.

Dr. Clough listed speakers whom the Panel would like to hear from at the next meeting. They include a Region 4 EPA representative, Harold Reheis or one of his people from EPD, someone from the Upper Chattahoochee Riverkeeper, someone representing Metro North Georgia Water Planning District, someone from Minneapolis/St. Paul and someone from Milwaukee.

Regarding today's presentations, Dr. Clough reminded the presenters that the Panel needs to understand questions relating to cost, water quality issues and standards, feasibility (must get done by 2007), quality of life, and public acceptance of their system.

Dr. Jackie Echols, representing the Clean Streams Task Force, was the first presenter. She is a resident of Atlanta and has taught public management at Clark Atlanta University for eight years. Dr. Echols said that Clean Streams is comprised of informed citizens that support complete sewer separation and stormwater greenways. She noted that Clean Streams is supported by more than 13 community groups.

It is their sincere belief that separating the last 15% of Atlanta's combined sewer system is the most efficient and effective way to handle the CSO problem. Atlanta should fix its CSO problem once and for all with 100% sewer separation and stormwater greenways.

Dr. Echols said that the setting of a 2007 deadline to get all the work done has resulted in an option – the tunnel – that is not the best nor the most cost effective. She said that currently the cost analysis for sewer separation is \$500 million and the cost of the tunnel is estimated to be \$627 million. She said the data shows that complete separation is the most cost effective option and provides the best water quality.

Separation alone is not enough. It is critical that the City recognizes that failure to integrate stormwater greenways in the sewer separation scenario will only exacerbate the water pollution problem in Atlanta.

Her presentation focused on explaining why they support sewer separation with stormwater greenways, review cost and benefit data, and provide visual support for the practicality and beauty of separation and greenways.

She said that one consultant estimates the cost for stormwater greenways at \$300 million and another estimates it at \$1.2 billion. The City promotes the \$1.2 billion approach and has brushed aside serious evaluation of a more cost effective stormwater greenways option.

She said that stormwater greenways will help to rebuild the crumbling city infrastructure. It brings the sewer systems in the oldest 15% of the City to modern standards currently enjoyed by 85% of the City.

It also eliminates raw sewage flooding homes, parks, streets and streams, reduces raw sewage disease sources, and eliminates chlorine disinfecting which adds priority pollutants to streams and rivers. It eliminates disruptions caused by collapsing sewers and overflows. It also brings 600 acres of new parkland and greenways with spring and rainwater ponds, which revitalizes the face of the City with redevelopment opportunities.

She contends that the City's consultants say 611 acres are needed, of which 272 acres would be stormwater ponds and the balance would be park land. Clean Streams has identified 631 acres for this and will work to identify more.

Environmental advantages – the complete separation and stormwater greenways option produces cleaner water faster. It removes three million pounds more pollution per year than tunnels and it eliminates 100% of human sewage from urban streams. It also eliminates heavy chlorinating which creates priority pollutants. It also reduces flooding – greenways will capture a 10-year rain event and maybe a 25-year rain event. The tunnel does not address localized flooding.

Sanitary sewage is a source of 77% of the pollution flowing from Atlanta's CSOs into urban streams and rivers. Only 23% comes from stormwater. Greenways will remove 83% of stormwater pollution.

Dr. Echols said there are economic benefits to this plan. It is a point of revitalization that the stormwater greenways can be a catalyst that spawns redevelopment in the center city. It could lower property tax rates because of an increased tax base, create more unskilled and semi-skilled jobs, lower capital and O&M costs, thus moderating sewer rates. Other economic benefits would be to have more time to raise federal, state and private funding, moderating sewer rate increases, and eliminating financial risk. She said complete sewer separation is the only solution to meet the mandates of the Clean Water Act.

She contends that, from a cost standpoint, it makes more sense to commit funds to the solution that will not only solve the problem but will also pay dividends to the City and its citizens.

Joe Basista asked Dr. Echols to tell him the total estimated capital cost to implement their plan. She said it is their belief that it can be done within the \$950 million budget. Their estimate says that 100% separation will cost \$500 million and stormwater greenways will cost \$300 million.

When asked what would be the proposed schedule to implement this plan, Dr. Echols said that most of it could be done by 2010 or 2012.

Mike Marcotte asked about their assumptions regarding land issues including the cost and time to acquire land. Dr. Echols said much of the land is owned by the City already and several other parcels are in very depressed areas. Land acquisition costs are included in the \$300 million.

Her plan calls for the existing CSOs to be used as stormwater screening devices only for some of the water. The upstream ponds would have their own screening facilities. That cost is built into the estimates.

She was asked by the Panel if she believed disruption to businesses can be managed while separating the urban core. She responded that this would be problematical.

Joe Basista said that by the next meeting they will have a comparative analysis summarizing the status of the stormwater management refinement evaluations to date that will raise some questions and stimulate discussion.

The next presentation was by Edith Ladipo on behalf of the NPU (Neighborhood Planning Unit) Environmental Advisory Committee.

The Environmental Advisory Committee was established by the Atlanta Planning and Advisory Board (APAB) to address this issue. The APAB is a charter-mandated citizen-involvement and participation program. It was established in the 1975 charter and was approved by the state legislature. It was established by city ordinance in 1977 by the City of Atlanta.

The ordinance provides for the preservation of information. It says that the Bureau of Planning should make available to NPU's basic information including, but not limited to, the areas of land use, transportation, community facilities, environmental quality, open space and parks, and citizen involvement in planning and zoning to assist them in neighborhood planning activities.

APAB has 24 NPUs. Within in the NPUs are neighborhood associations – citizens, businesses, faith-based organizations. Each NPU represents approximately 16,000 people.

In October 2001, the NPUs began working on this issue and a resolution was developed by the APAB and it voted to support the idea or concept of sewer separation. The Environmental Committee was established in order to educate the general public about sewer separation.

During nine meetings held thus far, the committee has reviewed the CSO Remedial Measures Report Volumes 1 and 2, CSO Court Order, Water Quality of Georgia 1998-1999 Planning Report, Environmental Justice Presentation from USEPA, Affordability Analysis, CSO Geo-Technical Report, W.L. Jordan Pre-Design, Maps and Graphics, Environmental and Constitutional Laws, Statutes and Executive Orders, Presentation by Dr. Thomas Debo entitled "Using Natural Systems to Control Stormwater" and other supporting documentation.

In their examination of these documents, the APAB found a lack of communication with the City because the preferred option the City was considering did not include complete sewer separation. They found inconsistencies with the time analysis, cost analysis, and technical analysis, as well as inadequate funding strategies which did not include other funding sources. There was a failure to include the organized citizens in the planning process, unintended environmental justice issues, limited access to pertinent information, no consideration for the importance of best management practices (BMP), no evidence of an Environmental and Health Impact Assessment, no environmental education or outreach and no pollution prevention program.

To date, they have informed the NPU's of the Consent Decree, the Remedial Measures Report, the sewer separation resolution, the BMP for stormwater control, refinements of Option C and 100% sewer separation, new pre-design options and affordability of all options. She contends there is continued refinement to the City's option because of citizen involvement.

The Committee wanted to know the evaluation criteria and determined that they needed to look at cost, schedule, water quality and quality of life. They didn't want a plan that is effective for today but not tomorrow.

Regarding cost, they wanted to look at capital cost, annual O&M costs and life-cycle cost. Regarding the schedule, can the CSO Consent Decree be met by 2007 and can the SSO Consent Decree be met by 2014? The Consent Decree deadlines can be adjusted by agreement of EPA/EPD and the federal court.

Regarding water quality, the NPUs looked at reduction in pollutant load to downstream streams and rivers, total suspended solids (TSS), the biological oxygen demand (BOD), fecal coliform, phosphorus, ammonia and metals (copper and zinc).

They looked at quality of life issues including impact of CSOs along miles of streams through neighborhoods, health and safety impacts, risk of pollution to aquifers, impact of combined sewer system backups into businesses and residences, mental health impact, short-term construction impact, long-term operation and maintenance impact, impact to property valuation, impact to rate payers, construction jobs creation, O&M jobs creation, creation of jobs in impacted neighborhoods, stormwater as a resource, economic development opportunities associated with stormwater management, and creation of live/work/recreation areas through stormwater management.

The next steps for the Environmental Committee include continued open dialogue between the Clean Water Advisory Panel and APAB's Environmental Committee, follow-up presentations as the pre-design phase continues, timely notice as selection criteria evolves, study of health and environmental justice issues, study of stormwater utilities, continued study of BMP's for stormwater management, continued study of funding options and Clean Water Act review and training.

Ms. Ladipo emphasized that citizens need to be involved – the City must include stakeholders. Education and community involvement is vitally important. Having accurate information – making sure everything you read and all the decisions that are made are based on accurate information – that is something they haven't had in the past.

She was asked by the panel if there are any metrics for the Quality of Life criteria. Ms. Ladipo indicated that there are none yet, but that is the next step for them to do so.

She was asked if they have methods for assessing impacts on small businesses. She indicated more work is necessary to do this.

The panel asked her suggestions on moving forward. Ms. Ladipo responded that the citizens need to be involved, and that accurate and timely technical information needs to be provided to them.

The next presentation was by Dr. James Brooks, pastor of Grace Lutheran Church, which is in the affected area. His congregation became interested in this issue when former Mayor Bill Campbell said that their sewer bills could go up \$100 per month. He is joined in his plan by James Aton, a professional engineer, and Haywood Currie, who owns his own engineering firm in Marietta. They are collectively known as the ABC Group.

The ABC Group idea is the installation of an aerobic system that will solve the City's CSO problem. Since not much money has changed hands so far toward the tunnel plan, Rev. Brooks thinks the table should still be open to other plans.

The aerobic option would cost less than 5% of the current \$3 billion plan. It would be a \$150 million maximum expenditure. No streets would need to be torn up and it would take care of Atlanta's civic waste.

In his explanation of aerobic bacteria, he said there is a family of microscopic bacteria that has an enormous appetite for human waste. These aerobic bacteria are in our waste and need only the city's sewer system (which is already in place) to thrive. These bacteria separate all the components of our waste into its original state which results in a "slightly stained, but otherwise completely clear and odor-free water" in four and a half hours.

There is no separate installation required for the system. The bacteria need three things – a safe setting, a constant type of protection from their enemies, one of which is chlorine, and a supplemental source of fresh oxygen. We would aerate the sewer.

Everyone could have a system installed on the property for \$7,500 – 1/20th of the tunnel plan cost. There are three tanks underground – a settlement tank, a treatment tank where the bacteria go to work and a disposal tank where the odorless and colorless water would be. Then it could be expelled to the sewer system or through underground emitters that would fertilize the yard.

Regarding runoff, the same rules apply. They would be biodegraded by bacteria. Fast food wrappers, cigarette butts, etc., should be picked up in advance by school children – or prisoners – who could be given a reward for how much they bring in. Also, motorized vehicles could vacuum gutters regularly and make the City look very clean.

They would use aerobic bacteria in the sewers up to the center part of the city. Then at about six miles out from the rivers, we would begin to have aerobic tanks. In general, the estimate would be below a \$100 million range for the entire city.

Pictures in the presentation materials are from Dr. Brooks' own experiment. Mr. Marcotte asked him where the solid material went in the third picture. There were some large particles – he thinks they are minerals – that went to the bottom, which he disposed of before the picture was taken. He got cloudy water instead of absolutely clear water.

Rev. Brooks introduced Randy Chelette, president of Southern Aerobic Systems. He said Houston, Texas has many on-site aerobic wastewater treatment plants. This technology is the same thing they do in most municipal wastewater treatment plants; they are just doing it on site. He said installation would actually run about \$4,500 without a disposal bill because you're treating the water on-site and putting it back in your existing sewer.

This probably won't work for the downtown area with high-rise buildings and this area would need to be handled in a more traditional approach. Jim Aton, a consulting engineer, said of the 12,000 acres in the City which has combined sewers, 32% of that is residential. There is a good deal of greenspace in these basins and that greenspace can be used to locate the on-site treatment plants. Each plant comes with a computer that can be called and told when to pump and when not to pump.

This is highly adjustable storage. Mr. Marcotte pointed out that, in effect, instead of building a big tunnel, you build little increments of a tunnel at everybody's house. Mr. Chelette said that you aren't dealing with the sewer water – only with water coming from the home. Leaving the aerobic tank is a clear, odorless fluid that can be directly discharged to rivers and streams because it meets EPA requirements.

The presenters clarified that these systems would achieve advance secondary treatment, but not tertiary.

Nancy Wheatley asked how sensitive the bacteria are to household chemicals that include chlorine, such as Clorox. Mr. Chelette said a small amount won't hurt the system but a large amount would kill the good bacteria.

Mr. Aton said the major downtown district where we have combined sewers needs to be dealt with in a traditional approach, but that is only 12% of the total service area.

Dr. Clough invited a few visitors to speak to the Panel. Steve Carr, a resident of Grant Park who has been involved with the Neighborhood Planning Units for many years and is the former chairman of APAB's Environmental Committee, spoke first.

At his own building, which is a former industrial building, he has tanks set up, including screening and filtration, and he catches stormwater from the roof and uses this water in a variety of applications. He suggested that this can be used in the core of the City particularly for landscaping, window washing, etc. The water in these on-site storage tanks, which can be put in parking lots, can be used on-site or can be metered out into a separate stormwater collection system or a tunnel or whatever.

He is 100% in favor of full separation. He has grandfathered into an aerobic system in his building and uses enzymes. He puts as few solids into his system as possible.

He says the distrust between the City and its citizens is still ongoing, but citizens groups are getting more information now than in the past. They have had problems with wrong numbers, including wrong land figures in which the City's \$1.2 billion equates to \$330,000 per acre for greenspace. They are not looking for prime land; they are looking for the "scrap" land – for the low land in the flood plains because that is where gravity forces water to go. This is unbuildable land that could be used for greenspace.

Mr. Carr said that they have repeatedly asked for accountability on the CH2MHill contracts and have not gotten that. Regarding the time issue, he said the City should have immediately started mappings of the entire sewer system when Bill Campbell signed the Consent Decree in 1998, but that has only been done recently. He charged that the City has delayed the process to the point that they now say they are out of time and must make a decision and the quickest way is with the tunnel.

His group was presented with information about the Bain Report – they have not been given the actual report, which evaluates four separate areas of City operations. They are sewer, stormwater, greenways and parks. He thinks they are all interconnected.

Dr. Harry Leon, a professional engineer and citizen activist, said the tunnel storage system does not solve the CSO problem. It extends the combined sewer another thousand feet or more. He outlined the specifications and why 100% sewer separation is the best option. It meets the clean water standards, it corrects deteriorated sewer pipes, it conserves stormwater as a natural resource, it poses no potential hazards to aquifers, it makes neighborhood creeks safe for children, and there are low maintenance and operation costs.

He contends the problem is a political problem instead of an engineering problem and said that certain politicians have been influenced by companies that will directly benefit from the tunnel solution. "They have told consultants to obscure the data to make tunnels to appear to be the lowest cost and quickest to build. They don't let the consultant even talk about solving all the CSO problems."

Nashville separated its downtown section of sewers – which is built on solid rock. They did it in less than two and a half years and the system had over 100,000 square feet, which is comparable in size to Atlanta's Clear Creek area. Nashville did it for less than \$300 per foot. The consultants in Atlanta estimated \$1,400 per foot.

Dr. Leon said the ultimate question for the Panel is, do they want to side with "greedy contractors who don't care about what happens to our City but only look for their maximum profit, or to keep your integrity and side with the citizens and common sense for 100% sewer separation?"

Lunch Break

The next presentation was by Justin Wiedeman, an engineer and NPU "A" Board Member, and PMT Program Manager Joe Basista. They presented a conceptual modification to the City's Authorized CSO Plan. It gives an option on sewer separation and stormwater management with an emphasis on flood control.

This came about because in discussing Mr. Wiedeman's refinement, the PMT found that the plan is similar to the original 80% separation option in the Remedial Measures Report (RMR) in that it looks at sewer separation and stormwater management (flood control). The PMT has been advancing their refinement options and one of the options they have explored is 80% separation. While reviewing the PMT's refinement plans and Mr. Wiedeman's plan, Mr. Basista found differences but also found similarities, including the combination of full and partial separation in the West Area, a smaller West Area tunnel system and flexibility to offer relief to existing Peachtree sanitary trunk sewers.

Based on all these similarities, they agreed to identify a single integrated refinement option. It is not yet known how much it will cost or if it can be completed by 2007. They are still working on that.

It consists of two refinement options. The important points were to prioritize public health with a focus on eliminating sanitary overflows and provide adequate protection against flooding upstream and downstream of existing CSO facilities, establish a system of components that provide flexibility to adapt management schemes, meet future regulatory standards, minimize risk, provide incremental benefits and clean water, consider a phased program that is flexible and can accommodate time requirements for additional data needs, and promotes fair and equitable rate structuring.

The Wiedeman/PMT refinement option for 80% separation would separate all combined sewers except for in the downtown core.

Currently, the six CSO facilities discharge to small streams that flow through neighborhoods and recreational areas for miles, prior to reaching rivers. A fair amount of urban drainage runs through small streams and neighborhoods. There are 60+ CSO discharges per year on the West side and 20 per year on the East side.

There is insufficient stormwater capacity within the combined system that contributes to localized flooding, impaired quality of life, impacts to public health, threatened economic development and real estate values. Mr. Wiedeman contends that you have to look at stormwater management upstream and downstream of CSOs. Also, the Consent Decree does not address significant flooding problems downstream of the CSOs.

They agreed to evaluate full separation of the East Area and partial separation of the West Area with a target to provide separated conveyance infrastructure for all but the urban core. If the East Area is separated, no deep tunnel system is needed. If a smaller West Area tunnel system is constructed – if only sewage from the urban core is handled, which is about 20% of the combined sewer area – the tunnel system would be about 40% smaller than in the current authorized plan. Mr. Wiedeman's plan is that you could look at the possibility of future tie-ins with existing Peachtree sanitary trunk sewers.

Mr. Wiedeman also looked at constructing a West combined sewage treatment facility for ultimate incorporation into the R.M. Clayton WRC. The existing CSO facilities would be utilized for treating stormwater. Where sewers are separated, it's a great opportunity to coordinate separation construction with planned construction from other agencies – water, streets, parks, etc.

It is generally believed that with separation you get two new systems. Generally, in the smaller diameter combined sewer they would make that a sanitary sewer, and downstream where there is the larger combined sewer, it seems to be working pretty well as a storm sewer. However, some of the combined sewer is converted into some sanitary and some storm sewer is converted into some new sanitary and some new storm sewer.

Each refinement plan includes about \$100 million for rehabilitation and capacity improvements of the existing combined system.

Mr. Wiedeman's plan would address surcharging and flooding in combined areas upstream of existing CSO facilities and as a result also address downstream flooding. It would determine the magnitude of recurrence and water quality issues for overflows upstream of CSO facilities and develop hydrologic models to simulate conditions downstream of CSOs and coordinate flood control infrastructure both upstream and downstream.

Regarding separation on the East Side (ultimately to the Ocmulgee), this option would focus the separation effort on the non-urban core and the combined urban core, which may be easier served by an extended West Side tunnel system. The plan would convert combined sewers to storm sewers (downstream) and sanitary sewers (upstream) within each basin, beginning downstream. The plan would coordinate separation construction with planned construction from other agencies and utilize existing CSO facilities as stormwater screening facilities.

On the East side, Mr. Wiedeman is stressing stormwater management and flood control. Mr. Wiedeman's plan would require determination of the scope, magnitude and water quality issues of overflows upstream of CSO facilities and development of a hydrologic model to evaluate constraints and downstream controls (upstream and downstream of CSO). Given the relative locations of the combined sewer basins within the larger Ocmulgee basin, downstream flooding does not appear to be an issue for separation.

The plan would construct limited detention upstream of McDaniel and Custer CSO facilities based on hydrologic concerns and construct energy dissipation and detention as appropriate adjacent to CSO and/or downstream of existing CSO facilities.

The West side is more complicated. The West tunnel storage and conveyance system would be much smaller and would serve the combined flow for the entire urban core – about 20% of the combined sewer area and 3% of the total City's area.

Mr. Wiedeman's original thought was that if the West tunnel could be aligned to provide future tie-ins with the sanitary system, it could provide relief to the Peachtree sanitary sewer trunks. The alignment of the West tunnel should consider extension options to serve the small portion of the urban core on the East, allowing easier full separation of East basins.

Mr. Wiedeman's option looks at making the flexibility of a smaller West tunnel and looking at the option of any separate treatment facility at the R.M. Clayton site - that could ultimately be incorporated into the WRC there. This is different than the RMR option, which provides a separate wet weather treatment facility. It is not yet determined if there is available treatment capacity available at the R.M. Clayton WRC to accomplish this.

In the plan both the East and the West side have a hybrid separation issue. The plan would need to address stormwater capacity limitations upstream of the CSO facilities. There may be "targets of opportunity" – the non-urban core combined sewer areas in the downtown area that they could be separated after the plan is implemented. There are developments throughout the combined sewer areas that are actually separated that "discharge" back into the combined sewer system.

The emphasis on flood control in the West looks a little different. His plan would develop a hydrologic model and constraints to coordinate stormwater flows in the larger Peachtree Creek basin and incorporate conditions downstream of CSOs and upstream into DeKalb County (not addressed by current plan).

The current authorized plan does not address downstream flooding in Peachtree Creek, based on upstream flows outside City of Atlanta. Mr. Wiedeman's plan considers this earlier than the PMT plan. He would also construct limited detention upstream of West CSOs based on hydrologic concerns and upgrade downstream conveyance capacity, energy dissipation and additional detention.

Mr. Basista characterized Mr. Wiedeman's plan as a holistic plan that is oriented toward flood management instead of stormwater treatment. Mr. Wiedeman agreed saying that they would still be mechanically treating some component of the stormwater, but in the future, if there are opportunities to separate, it may get to a point where it is possible to selectively treat storm flows and concentrate on first flush. There is some stormwater treatment and some limited decentralized detention facilities.

Mr. Basista reiterated that he doesn't know if we can do this plan but he thinks it is worth pursuing to see what it would cost and how much time it would take.

In summary, the Weidman option is to separate all but the urban core – which is about 80% separation. That would be done by separating the entire East side and Greensferry on the West, and partially separating North Avenue, Tanyard and Clear Creek. These are the three basins that comprise the urban core. Instead of fully separating those basins, the plan would partially separate them, which hasn't been looked at before. This could achieve 97% separation of the entire City.

The smaller West tunnel may allow use of R.M Clayton WRC to treat combined sewage. If this is possible, the plan would eliminate the new treatment plant for the West. If the West side is discharged to that smaller tunnel to the WRC for advanced treatment, all the sanitary flow can possibly be routed to the three partially separated basins.

Mr. Basista said that our separate sanitary system also has capacity limitations that we are addressing in a separate consent decree. If this smaller tunnel runs the flow to the WRC, this would eliminate the flow that goes from North Avenue and Clear Creek going to the Peachtree trunk. That would significantly relieve the Peachtree trunk. This is potentially a solution that could solve two problems.

Dr. Clough asked about the life span of this system. Mr. Basista answered that it has the same life span as any other scenario. The design life of the PMT plan is 25 years but the tunnel is 50 or 100 years.

The Plan refinement options the PMT is evaluating differs from the Wiedeman plan in that under the Consent Decree the sizing of the storm sewers and the sanitary sewers does address some surcharging and flooding upstream of CSO facilities. That's \$100 million of additional work. The refinement would utilize the CSO screening facilities for stormwater. And any additional stormwater management improvements will require a future stormwater utility.

The benefits/impacts of an 80% separation refinement:

- Achieves 97% separation of total City system
- Eliminates East tunnel system; eliminates East CSO treatment facility and possibly West CSO treatment facility; and eliminates three CSOs (McDaniel, Custer and Greensferry)
- Possibly offer significant relief to existing Peachtree Trunk sewers (if West tunnel flow can be routed to WRC) – eliminate current sanitary and combined sewage flow from Tanyard and Clear Creek
- Possibly provides advanced treatment (at WRC) for combined sewage from urban core (arguably the most polluted 20% of combined area)
- Three remaining CSOs (North Avenue, Tanyard and Clear Creek) see an average of four CSOs per year, but total sanitary flow is much reduced due to partial separation. Possibly screen storm flow during 60+ smaller storms per year.
- Tradeoff – captures 99%+ of total annual sanitary flow from combined area; but captures and treats only 20% of total annual storm flow
- Schedule (meets 2007 deadline?) and cost (less than Authorized Plan?) are yet to be determined

Mr. Basista indicated that in general, the ongoing pre-design of the remedial plan will develop complete separation plans for each basin and it includes a stormwater management plan for each basin to develop ideas of schedule and costs. Nothing precludes stormwater management from being implemented with any of these separation plans.

When asked if they have looked into the disruption all this would cause, Mr. Basista said it is one of the parameters they are trying to understand. They will be able to identify shortly the number of crews in a basin, the hours they will be working, etc. They will be able to show what level of disruption they will face if a separation option is chosen.

By the end of September, the PMT will deliver complete separation plans, cost, schedule and complete stormwater management plans for each basin.

Mike Mynhier and Joe Basista then updated everyone on the status of the refinement process. This week has several Consent Decree milestones that are being met by the City – the pre-design reports for the Intrenchment Creek CSO treatment facility and the pre-design report for the dechlorination facilities. These reports will be completed and submitted on schedule.

Joe Basista distributed a summary of where the refinement process stands. This handout is an attempt to put the basic issues of each refinement option on one sheet of paper.

The authorized plan is tunnel storage and treatment in both the East and West areas. 100% of the combined sewer area would get tunnel storage and treatment to the three partially separated basins, and in addition we would separate 27% of the combined sewer.

Refinement Option 1 would still provide 27% separation by separating multiple full basins. That way it would be possible to downsize the tunnel accordingly. This would be accomplished by separating Greensferry in the West and McDaniel in the East and the Stockade sub-basin in the East. This would result in reduced tunnel length and volume. Two CSOs and one regulator would be eliminated. The estimated cost is less than the current authorized plan and it is currently believed that it can be finished by 2007 deadline.

Under this plan, wherever sewers are separated, they will not treat stormwater. That is the downside of these plans. But all of these scenarios provide better water quality than today.

Refinement Option 2 is 40% separation of multiple full basins. Fully separate the East area – McDaniel and Custer basins. This would eliminate the East tunnel system, the East area combined sewage treatment facility, two existing CSO facilities and two regulators. The estimated cost of that would be about the same as the authorized plan and it is likely that it can be implemented by November 2007.

Refinement Option 3 is 50% separation of multiple full basins. It is basically the same as Option 2 but separation of the Greensferry basin is added. That may even bring the cost down a little from Option 2. This is also likely to be implemented by November 2007.

Refinement Option 4 is 80% separation of multiple full and partial basins. This will be evaluated as described in Justin Wiedeman's proposal that was outlined earlier in the meeting. The costs and schedule are not yet known.

Dr. Clough then talked about guests and speakers for the August 23 meeting of the Advisory Panel.

The Panel would like to hear from:

- Harold Reheis of the EPD
- Scott Gordon or other representative from EPA Region 4
- Representative from the Upper Chattahoochee Riverkeeper
- Joel Cowan of the Metro North Georgia Water Planning District
- Representative from Minneapolis (to describe their separation experience)
- Representative from Milwaukee (to describe their experience with tunnels and treatment)
- Someone from the PMT or City to talk about the City's stormwater plan
- Update from Joe Basista on refinement options
- Metro Chamber of Commerce Representative (to discuss status of their evaluation of the City's CSO Plan)

Minneapolis and Milwaukee representatives may make phone presentations. A panel of people from the EPA, EPD, Metro North Georgia Water Planning District, and Upper Chattahoochee Riverkeeper will come together to form a discussion group instead of having individual presentations.

Dr. Clough then adjourned the meeting until the Advisory Panel meets again August 23, 2002.

The Mayor's Clean Water Advisory Panel  
August 23, 2002

Panel members in attendance are Wayne Clough, John Hall, Jeff Hilliard, Cecil Lue-Hing, Mike Marcotte, Billy Turner and Nancy Wheatley. Unable to attend were Bruce Beck and Larry Roth.

Dr. Clough called the meeting to order and asked Greg Giornelli of the Mayor's Office to introduce Linda DeSantis, the new City Attorney, and Jack Ravan, the Mayor's nominee to become the Commissioner of Watershed Management, which is a newly reorganized department. The new department will have responsibility for all water issues and will include a Bureau of Water, a Bureau of Wastewater Services and a Bureau of Stormwater Management.

Dr. Clough then asked the members of the regulatory panel to introduce themselves. Harold Reheis, director of the Georgia Environmental Protection Division, began by saying that the EPD administers 21 state environmental laws and it has been delegated all the "delegable" federal permitting programs under the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, the Resource Conservation Recovery Act and so on. EPD's programs span every aspect of environmental regulation in Georgia, including water allocation permits. The EPD has been working with Atlanta and its issues since it was created in 1965.

Scott Gordon, the program management officer of at EPA Region IV, has been with the EPA for 19 years. He is currently the chief of the Permits and Technical Assistance Branch in the Water Division. He led the consent decree negotiations with the City's team in 1999. The EPA evaluates the state's implementation of programs, the effectiveness of programs and sometimes advises on implementation of programs.

Sally Bethea, executive director of Upper Chattahoochee Riverkeeper, said that her group was established in 1994 with the goal of protecting the Chattahoochee River Basin and its tributaries. She detailed the timeline of her group's lawsuit against the City. She said that Upper Chattahoochee Riverkeeper has had one goal throughout this process - and that is clean water in urban tributaries and the Chattahoochee, as soon as possible, at a reasonable cost.

Joel Cowan, chairman of the Metropolitan North Georgia Water Planning District (MNGWPD), introduced himself and said that the MNGWPD was created by the state legislature two years ago. It covers 16 counties around the City of Atlanta. All 16 counties are represented on their board, plus the Mayor of Atlanta, plus 10 citizen members appointed by the Governor, Lt. Governor and Speaker of the House. The MNGWPD'S legislative mandate is to have a report and recommendations for improving water quality in the North Georgia water planning district ready by May 2003. MNGWPD's concerns are divided into treated drinking water, waste water and stormwater. There are about 300 people involved in this process. They are a planning body and don't have regulatory authority.

Dr. Clough then invited the Mayor's Clean Water Advisory Panel to pose questions to the regulatory panel. Billy Turner began the questions by asking Scott Gordon if he could describe the national CSO policy and how it relates to the situation in Atlanta.

Mr. Gordon said that the national CSO policy was established in 1994 and because it was believed that the policy said that national CSOs were being underregulated in their application, which were having had a bad effect on water quality standards. Through that process of policy development, the EPA created the nine minimum controls that to govern operation of CSOs were supposed to implement. The controls were intended to work from a presumptive basis, meaning that, if those the controls were in place, the CSOs would meet water quality standards. As a presumptive standard, the national policy is not monitored in many situations. In 2000, Congress mandated the nine minimum controls. As it relates to Atlanta, there is a unique situation because of Judge Robert Thrash's earlier decision from the initial Riverkeeper lawsuit. Atlanta's CSOs are required to meet end-of-pipe water quality limits so; therefore, the EPA did not have to implement the controls from a presumptive standpoint since they were implemented from a monitoring standpoint.

Mr. Turner asked Harold Reheis to relate Georgia law and its relationship to the overall situation. Mr. Reheis answered that the legislature passed a law in 1990 or 1991 that said cities with CSOs need to meet special requirements by dealing with combined sewers. Six Georgia cities were affected by the new law – Atlanta, Augusta, Albany, Cedartown, Rome and Columbus. Atlanta, which had a CSO control program in progress, was given a 1993 deadline to bring its CSO operations into compliance. The other cities were given until 1995 to comply. That applied to the other five cities and those cities met the deadline of the requirements. Atlanta did not meet its deadlines. The EPD fined the City heavily, and the fines continued until the City completed work in 1998. Atlanta paid more than \$19 million in fines, which were placed into an Environmental Trust Fund used to fund hazardous waste clean-ups.

Mike Marcotte asked regulatory panel members to describe their views of the linkages between CSOs and discharges from the MS4-permitted – the separate stormwater system – and how they view that phenomenon and the City's efforts in storm sewer discharges. He observed that separation moves a good bit of pollution load from one system to another without necessarily doing anything about it.

Mr. Reheis said the Georgia EPD has taken an aggressive stance against sanitary sewer overflows (SSOs) by fining cities that have them. The objectives are straightforward – they think sewage needs to be kept inside the pipe until it gets to the sewage treatment plant and it should be kept there until it meets the permit limits. If a city is not able to keep the sewage inside the pipe, that's a problem that needs to be fixed. The EPD has instituted a zero-tolerance strategy. Whenever there are SSOs, the EPD responds by taking an enforcement action. In the first amended consent decree, the EPA, EPD and the City of Atlanta negotiated specific stipulated penalties so that if the City has an SSO, it is going to pay a fine for that. Some high-volume spills warrant actions separate from the provisions in the first amended consent decree. EPD has taken action seven times since the signing of the decree for high volume spills, and those needed to be dealt with differently than what was in the decree. The City has paid \$194,000 for those seven incidents. With regard to the connection between these two, the City of Atlanta and many other communities are also covered by the MS4 permitting program. Atlanta is doing about the same as everybody else. That program is getting more stringent.

Mr. Gordon said he thinks the CSO expectation and the MS4 expectation are the same – water quality standards. Right now they have a little better handle on the technology and expectations of the CSOs as they build toward water quality standards. On MS4s, they are just beginning the journey. On first generation permits, they expect municipalities to go out and start collecting data to find out what is happening to stormwater in their watershed. Stormwater creates a heavy pollution load on waterways in the United States. First generation permits are supposed to evolve over time. Through best management practices (BMPs,) the EPA will have greater influence on the pollutant load coming off impervious surfaces. Ultimately, by the third or fourth generation, EPA will expect water quality standards to be met through demonstration, so the endpoint is the same. So it is the same endpoint, but we're a decade away in this country of having that expectation.

The EPA is moving toward having another SSO rule in December 2002, shifting the pressure to the sanitary side of the sewers.

Sally Bethea stated that the precursor to Joel Cowan's group was an effort called the Clean Water Initiative in 2000. It was started by the Metro Atlanta Chamber of Commerce, a regional business coalition of businesses and others who looked at the water quality problem. They determined that 80% of the water quality problems in the urban streams and the river were from polluted stormwater runoff. In terms of potential solutions for the CSO situation, it is very important to look at the consequences to the areas that are separated in terms of unleashing the polluted stormwater, and at how the streams might be impacted as well.

Joel Cowan said it was disheartening to see the correlation between the fecal coliform and the stormwater runoff. The second issue is IN& I (inflow and infiltration). Gwinnett County is finding that upwards of 20% of what it is treating comes from IN& I. Mr. Cowan said that is a big number. The science of controlling that much inflow is incomplete. The EPD agrees that stormwater runoff is the problem. There is a lesson in the Peachtree Creek situation. No one has been able to tell Mr. Cowan the percentage of impervious surface in the Peachtree Creek water basin. He has heard it is 38% or 42%, but it is an impossible result to allow

that much impervious surface without some treatment. Gov. Barnes recognized that and created a Greenspace Commission, which set a target to achieve 20% greenspace in all new developments. The counties have jumped in and adopted that and it is a highly popular plan. He said the water quality cannot be resolved without addressing land use.

Dr. Clough asked how the regulatory panel members see the current level of monitoring that's available and the data it generates versus what they think is necessary.

Mr. Cowan said all the water systems independently monitor what comes out of the pipe for their own standards. One cheap and easy way to do that is to have a system to capture all the data that is already being gathered now. There are monitoring systems already in place on the Chattahoochee. The data is already there. We just need to capture it and put it in a system that will highlight it.

Ms. Bethea said that there was actually very little water quality data currently being taken in the urban streams and in the Chattahoochee. The consent decree states that there is a significant amount of monitoring that needs to occur, and Bethea suggested that the Panel hear from the USGS, which is working with the City on that issue. It is critical to have monitoring so we know what is and what isn't working.

Mr. Reheis added that the water quality monitoring data that we have and the water quality monitoring that we do now is woefully inadequate. He said the EPD is trying to increase the magnitude and effectiveness of all that. It has been improved in recent years, but is still inadequate. He said that they need a lot more money to be able to do it right and that is hard to get.

Mr. Gordon said, "You can't get enough monitoring." The amount of information needed to keep the public generally knowledgeable about whether or not a water body is safe or bad, is pretty one dimensional. He said efforts to get basin information out have been effective, but when you're talking about data for decision-making purposes, you're talking about a whole evolution of data.

Ms. Wheatley asked Mr. Gordon how comfortable the EPA is with the data used in modeling for the City's plan. He said that, at the time the plan was presented, they thought it was the best information available. He said that when the EPA has to move forward on what appears to be a generally good engineering practice, they make those decisions. He continued, "On a scale of one to good, I saw closer to good."

Cecil Lue-Hing asked a question regarding issues that arise when we target watershed as an option. How does MNGWPD feel about the watershed concept? How does the Riverkeeper group feel about it?

Mr. Cowan said that his group is approaching improving water quality as a series of building blocks and the key block is watersheds. Georgia is a home rule state, meaning each city and each county has constitutional home rule powers. When you say "by watershed," you also have to say "and by jurisdiction." The only way public policy can deal with that is to set targeted limits. They approach it by watershed because that is the way it is tested and monitored.

Ms. Bethea said the Riverkeeper group has an excellent relationship with the City and its current administration. Riverkeeper does a lot of work with community workshops, Adopt-a-Stream programs, soil erosion workshops, clean-ups, etc. They are a watershed organization. She said that they look for every opportunity to help Atlanta within the confines of the consent decree, which has deadlines and requirements that they strongly believe in.

Mr. Reheis said it is a very hard thing to get North Georgia working with Metro Atlanta. The people from the headwater counties of the Chattahoochee – upstream from Lake Lanier – don't feel like they cause any problems for Metro Atlanta and they have good water quality up there. They don't feel like they need to be part of a watershed solution. Mr. Reheis said that those people in the headwater counties could buy into being part of a watershed solution to keep their local streams and Lake Lanier clean. The greatest opportunity for local governments working together on watershed solutions would be those downstream of Buford Dam. The home rule culture of this state – where each local government works within its own

boundaries – dictates that they will take care of their own problems, but they don't necessarily want to help anyone else take care of their problems. It's difficult to get everyone to work together.

Mr. Gordon said that the EPA has always supported watersheds – mostly from a grassroots, non-point source solution. The EPA is rekindling the concept of effluent trading from a watershed perspective. That approach has been fraught with conflict historically and this process is following the same track as the old. He said they still believe that effluent trading makes sense, even in a NPDES (National Pollutant Discharge Elimination System) permitting scheme where you're dealing with a finite number of pollutants.

Ms. Wheatley asked how the community currently uses the water resources. Ms. Bethea replied that the streams that feed the Chattahoochee run through neighborhoods and parks and are currently posted with signs that warn they are hazardous. The streams should be made suitable for kids to play in. Regarding the river, it is used for fishing, canoeing, and kayaking, with a national park along the way. She said that Atlanta had turned its back on the river but now realizes it is a beautiful resource.

Mr. Reheis said that the one thing that would probably make all these solutions easier to achieve would be if Atlanta had a different geography than it has. About 75% or more of the people in Metro Atlanta get their drinking water from the Chattahoochee River. That is the most important use made of the Chattahoochee River. All the drinking water intakes are above where Peachtree Creek comes into the river. The water supply intakes are in the cleanest part of the river. They are in the part of the river that is upstream of all the CSOs and the largest sewage treatment plants. The urbanized streams we have are small and don't lend themselves to recreation. All these streams are valuable as a resource. He said that, perhaps if all the water intakes were downstream of the whole Metro Atlanta area, we would be more mindful of land use and how important it is not to build combined sewer systems in the cities. He continued to say that we are dealing with the legacy of something that is 100 years old and people just weren't as enlightened then as we are now.

Mr. Turner asked for a good explanation of the current situation regarding the consent decree and the specific plan that the City of Atlanta has agreed to. In terms of any modifications to the plan that might be proposed, what would be the process or how would you evaluate any changes that are proposed?

Mr. Gordon said that in the consent decree is a very narrow band of expectations for Atlanta. The EPA's test for whether Atlanta had complied was going to be a combination of processes, in technology, treatment and timing that would meet the EPA's expectations. In the consent decree, the EPA/EPD gave Atlanta about 10 years, which is about the same length of time that every other city with CSOs in the country had to implement controls. In the implementation of that requirement, Atlanta provided an alternative that the EPA looked at and determined that it was an acceptable plan. Regarding change, what the EPA has always said is that there are abilities in the consent decree to make fundamental changes. The first test is to convince the plaintiffs themselves that it is something that actually works. If that happens, they can move the judge to accept that process or move that the judge change the consent decree. For example, Atlanta has begun to evaluate its ability to have extensions to the consent decree deadlines.

Mr. Gordon said that early in the process, when they were trying to figure out the costs, Atlanta officials chose to evaluate the affordability of the CSO remediation process. The affordability analysis is a standard process in which the EPA allows local governments to evaluate their tax base and whether their ratepayers can actually handle the financial load in the time frames that are set out. The first affordability analysis was not accepted, but the second submittal for this review was accepted and the national EPA office determined that Atlanta was not in the highest category of financial burden but instead met the standards for medium burden. If a city is in the high burden category, the agency may need to extend the timeline. Atlanta did not meet that standard with its proposal. He said that the EPA has told Atlanta officials that on a case-by-case scenario, if they run into short-term financial burdens that EPA and EPD are available to consider extensions related to those situations. For example, there is a motion in front of the judge now to change a major component of the consent decree as it relates to Nancy Creek. Atlanta was able to prove a substantial burden, from both an engineering basis and an economic basis, to meet the mandated deadline, and the EPA agreed to present the request for an extension to the judge, and the extension was granted.

Mr. Reheis said that EPD would need to see four things for them to be willing to support a request to the judge that it would be ok for a time extension. One of those would be that the extension would have to be project specific – it couldn't be for the entire range of what is covered in the consent decree. Second, any time extension should result in a lower project cost. He said, "If we're going to extend the time, wouldn't it be nice if the ratepayers could end up saving money in that either from capital or operational costs?" Third, there ought to be significant compliance with the water quality standards in the interim if the schedule is going to be extended by a year or two years. And finally, he would hope that we would end up with better protection of the environment and public health as a result of an extension. If those tests can be met, then EPD is willing to advocate for more time. Mr. Reheis said that maybe there is something else that works that would be attractive enough to get EPD to look at criteria other than these, but these four criteria seem to be the minimum criteria.

Ms. Bethea said the people in her organization and other plaintiffs from downstream are expecting timeliness.

Ms. Wheatley asked about changes in technology. She said that the Panel has been hearing from the community that there is a great belief that sewer separation is the solution. She added that she thinks about three things when she thinks of separation – first is time to do it and how you schedule it, the second is the cost, and the third is what it means for water quality.

Mr. Reheis said that in an ideal world, he wished there were no combined sewers in America. In the case of Atlanta's strategy, which was presented to and approved by EPD, it is going to have a number of benefits for water quality. Stormwater that runs off these 19 square miles of densely developed urban land will be treated. Street runoff is going to be treated, and there is benefit from that. The current plan is not to separate 100 percent of the combined sewer areas – it is 27 percent – but the rest of that area is going to have treatment. Mr. Reheis said that if we were to have a system whereby 100 percent of the sewers were separated and you didn't have any stormwater getting into the sewer system, that would be good for operating sewage treatment plants and there would be some benefit to the receiving streams in that they wouldn't see combined sewer overflows again. But they would still see a whole lot of urban runoff. That's going to continue to happen. Urban runoff would receive no treatment. It would receive only the best management practices that may ultimately come out of the MS4 permits. He said that he knows now that stormwater is going to get some treatment out of the plan Atlanta proposed and the EPD approved. He continued by saying that it's possible if you separate 100 percent of the sewers and you do something else with some of that urban runoff, you'll end up with a better overall water quality situation. But he thinks that it will take more money to do it and he doesn't know how much more time it will take to get there. He said that he is not sure that EPD's four criteria would be met under that scenario.

Mr. Gordon said that had it not been for Atlanta's dramatic history of failure to comply with regulations, it might be perfectly reasonable to start from the drawing board and evaluate what would be best for Atlanta's infrastructure. The EPA's goals in the consent decree were to get Atlanta back on target with clean water expectations as quickly as possible. He said, "Let's continue to march forward having water quality expectations met at the major discharge points of Atlanta's system." Mr. Gordon said that in reality, we are halfway through the first CSO consent decree and we have assured the population of Atlanta that water quality will be met in Atlanta and that CSOs will be greatly reduced in flow and pollution level. He has not seen a plan yet that would make the EPA take a lot of pause. They entertained a number of concepts in the negotiation of the consent decrees, as well as after the consent decrees were entered. They have routinely met with members of the public who have different ideas about better solutions. The EPA can't turn its back on better solutions, but Mr. Gordon said those have not been afforded to them – certainly not ones that meet the basic expectations of timing and water quality. It's tough for the EPA to walk away from something that's halfway done right now from the CSO perspective and extend that time line by some unknown factor.

Mr. Reheis held up a chart that showed the annual frequency of CSOs in Atlanta. The chart showed an average of 200 to 250 overflows per year from the six CSO facilities. The current plan would take that down to no more than four overflows and eliminate some of those, and all would meet water quality standards. He said that is a pretty good deal.

Dr. Clough asked Program Manager Joe Basista what his folks have done to keep the EPA and EPD up to date with the status of any plan refinements and modifications. Mr. Basista answered that right now the authorized plan currently calls for 27 percent separation but no separation of full basins. The EPA asked the City to look at separating multiple full basins and that request began the refinement process. He said that the consultants decided to look at all basins and develop a separation plan for each of the six full basins. That process evolved into examining how much of the combined sewer area could be separated and within the consent decree deadline and what benefits, if any, would be derived from that separation. There have been no formal discussions or resubmittals to the EPA or EPD.

Ms. Wheatley asked why the EPA asked the City to look at separating multiple full basins. Mr. Gordon answered that the consent decree limits the overflows to four and that Atlanta came in with a plan – proposing 27 percent separation, and , storage offline and additional treatment –that met objectives, they were happy with that. However, EPA made an editorial comment that, by looking at a map and overlaying drainage basins, you could eliminate CSOs if you concentrated the areas of separation. The EPA chose to make that editorial comment because it is was justified, but the City could have maintained that its plan still was viable and that the EPA and EPD had accepted the EPA/EPD authorization on the plan as it stood. The EPA and EPD would have had to agree with the City. He said that they applaud the City in continuing to move toward long-term full separation.

Dr. Lue-Hing asked Ms. Bethea if her group has any preference in how to fix the problem. She replied that Riverkeeper has no preference on technology. It is up to the City to determine how they want to fix the problem. Riverkeeper’s goal is to have clean water standards met by a certain deadline. They don’t want to micromanage what the City does in terms of technology.

Ms. Bethea also said that she thinks this lawsuit and enforcement action are being asked to resolve all wastewater and stormwater problems in the entire city of Atlanta, and they can’t. She said a stormwater utility and a stormwater management plan are needed, along with many other things. She contended that we also need to focus on the 85% of the city that is separated and has terribly polluted streams.

Mr. Marcotte asked what the process is for reexamining water quality standards.

Mr. Reheis answered that there is a well defined process in federal regulations on how to do a use attainability analysis – what has to be included to justify choosing a water quality standard or classification. Water quality standards have to be reviewed every three years under federal law and there is a process for changing a water quality standard. However, changes in stream classification for streams have to be done by use attainability analysis. You have to show that it is impractical or impossible to meet a standard in order to reduce an existing classification. The Chattahoochee is classified as drinking water and recreational. All streams in Georgia are classified as fishing streams if they are not classified as recreational or drinking water. The Georgia EPD has no problem with anyone asking for a stream to be reclassified, but the EPD is not going to initiate that process in Metro Atlanta and probably not anywhere in Georgia. He said that if someone requests a reclassification, the EPD will study it with all seriousness and fairness, but they won’t initiate it themselves. Regarding fecal coliform, he said the EPD is in the process of changing over its fecal coliform standard to an e-coli standard, which he thinks is a more meaningful standard. They have started the process of working with the public to change the standard – which is the first time a standard has been changed in 12 or 13 years.

Mr. Turner asked Mr. Gordon if the current requirements for stormwater meet the MS4 rules. He said that in Atlanta’s current plan it provides some treatment for stormwater that is captured in the combined sewer area, and he questioned the requirements’ consistency.

Mr. Gordon answered that the water quality standards and the end points are the same. Under the consent decree, we will have controls over the CSOs. In the long-term, the state of Georgia, through the MS4 process, will have equal controls over anything that is separated. He said he doesn’t see an inherent conflict.

Mr. Reheis said that the EPD wants all streams to meet all quality standards every time. He thinks we will have better water quality by having treated urban stormwater runoff in treatment plants under this approved CSO plan than if we were to leave the same amount of runoff to the devices of best management practices through the MS4 permits. He said he doesn't think we're going to end up with a treatment facility to treat urban stormwater runoff, and a treatment plant is going to give superior quality water to that urban runoff, resulting in better water quality. He said, "We have a better chance of doing that with the plan that has been approved."

Mr. Gordon said that he thinks we're stuck with known technology with the CSOs versus some long-term approach involving the BMPs to evaluate the same thing. Those things are unknown. That is the dichotomy here. He said, from a Clean Water Act standpoint, the national agency has two different concepts – CSOs and stormwater – that we believe will ultimately get to the same end point, but right now we have much more control over one than the other.

The Panel then held a conference call with Mr. Roger Puchreiter who is the former director of the Saint Paul Sewer Separation Program. He retired as the division manager of the sewer utility. He led the sewer separation program in Saint Paul.

Mr. Puchreiter gave a brief history of Saint Paul and why it went to complete separation of its sewer system. Saint Paul sits on the Mississippi River and all the regional sewers drain directly to the river and some of the other natural rivers. The average age of its sanitary sewer system is about 80 years old. There was concern about the direct flow of sewage into the river even in the 1920's. The first treatment plant was built in 1938. In 1967 a conference was convened, as the first of many steps, to find ways to clean up the river and control the number of CSOs. That was the beginning of Saint Paul's sewer separation program. After the Clean Water Act was approved by Congress, the first permits were issued in 1975. It called on the city to have some studies regarding the clean up of the river. A regional planning council then did a 201 planning study. One part of that study was improvements of the CSO. The consultants came up with proposal for storage and conveyance in 1981. The cities of Saint Paul and Minneapolis objected to that report because combined storage and treatment couldn't capture everything so there would still be some overflows occurring. Saint Paul officials decided they wanted to eliminate all sewage flow to the Mississippi River and take care of local needs including health concerns. A state CSO task force was formed by the EPA with representatives of the cities, the state, the EPA and the Minnesota Pollution Division and some of the larger environmental groups. That started the sewer separation program.

When asked about the size of Saint Paul, Mr. Puchreiter said that Saint Paul is about 260,000 people and Minneapolis has about 430,000. Approximately 50 percent of Saint Paul (55 square miles) was separated and now it is 100 percent separated. Minneapolis still has some combined system overflows, principally in the downtown area. He also said that stormwater is not treated in Saint Paul.

Mr. Marcotte asked Mr. Puchreiter to talk about specific improvements in water quality since going to separation. Mr. Puchreiter said that fecal coliform has dropped considerably. The return and resurgence of the May Fly is also an indication of the health of the Mississippi River. Bald eagles have returned to the river and the fish population and its diversity is much better. In the 1970's there were only three species of fish in the river and now there are 25 species of fish.

Mr. Marcotte asked if the problem of basement flooding has improved since sewer separation. Mr. Puchreiter said it has improved dramatically and the only sewer backups seen now are if there is a collapsed sewer or other major happening.

Mr. Turner asked about the stormwater utility in Saint Paul. Mr. Puchreiter said that a stormwater utility charge was established. That charge was a financing mechanism to pay for separation. The city annually assesses a charge to every property owner in Saint Paul for stormwater control. It is paying off the bond that was issued for the separation program. It is slowly being utilized for the maintenance of a storm sewer system and it pays for the cost of the stormwater discharge permit.

Mr. Turner asked what the Metropolitan District does and what do the cities do regarding sewer issues. Mr. Puchreiter said the Metropolitan District owns and operates the treatment plants and the large interceptor sewers throughout the region. Each municipality owns its internal sewer system and is responsible for it. The Metropolitan Council doesn't have any responsibility for stormwater. That is the responsibility of each municipality. Saint Paul does not have a stormwater utility agency – he referred earlier to the stormwater utility charge. The sanitary sewers, the stormwater sewers, and the flood wall control are all the responsibility of the sewer utility manager.

Dr. Lue-Hing asked about the design of the system in Saint Paul and if he would recommend the design outside his area. Mr. Puchreiter said they designed a stormwater system that would take a five-year rain storm – 3.6 inches in 24 hours. Mike Mynhier of the PMT clarified Dr. Lue-Hing's question by saying he was interested in the two-tiered interceptors that had sanitary system flowing below and the stormwater above. That was an initiative by the Metropolitan Council, not by Saint Paul. Mr. Puchreiter said it is not a design that he is totally in favor of, but sometimes it has to be utilized. They recommended the pipe inside the pipe because of extensive construction under freeways and other situations such as a very deep combined sewer. They came up with a design that split the pipe in half and a pipe for sanitary sewage went inside the stormwater pipe. With this there is always a danger of leakage from the sanitary sewer into the storm sewer. That concept was only used in a few places.

Mr. Turner asked about disruptions involved in the program. Mr. Puchreiter said that the program was much better than their highest expectations. It was extremely difficult to schedule all the projects. They had to do it like a big puzzle. The idea was to look at coordination with all the other agencies in the city and look at traffic concerns. There was disruption, but it worked well. He also said that when the city did its report on sewer separation and came up with the cost of about \$180 million over 10 years, it also recommended that the city use the disruption as an opportunity to make improvements in the infrastructure. They combined a street paving program and a water utility replacement program with the sewer separation. They installed 150 miles of storm sewer, seven miles of sanitary sewers, paved 168 miles of streets, installed about 26 miles of water main, 238 miles of gas mains and replaced about 4,000 lead water sewers. The utilities saw it as an opportunity since the streets were already ripped up. They also installed about 7,000 new street lights and 11,000 new trees.

Next, Kevin Shafer, executive director of the Milwaukee Metropolitan Sewerage District, was contacted via conference call. He was the chief engineer for the district from 1998 until March of 2002 and is now the executive director. In the 1980's the Milwaukee district was sued by the state of Illinois following the adoption of the Clean Water Act because of overflows from Milwaukee's combined sewers into the rivers and Lake Michigan. Milwaukee averaged 8 million gallons of overflows per year (between 50 and 60 overflows per year) into the rivers and Lake Michigan. In the 1980's they began designing a system to minimize the overflows. Milwaukee has both a separate sewer system and a combined sewer system – about 5 percent of the entire area has combined sewers (the entire area is approximately 420 square miles). The system serves about 1.2 million people (28 communities). The MMSD is a regional sewage agency. On a dry weather day they have two treatment plants (South Shore and Jones Island) that handle about 100 million gallons per day each. That can spike up to almost triple that amount on wet weather days.

Ms. Wheatley asked what alternatives they considered, what costs they were looking at and how long it took to complete the construction program. Mr. Shafer said they looked at separation of the combined sewer system and the tunnel system. Cost estimates revealed that it would cost about \$500 million more to separate than to build a tunnel treatment system. He said that it came down to a decision that separation would cause a huge economic blow to the city of Milwaukee because of disruption and it would cost a half a billion dollars more as well. Based on the design criteria, they determined that a tunnel system was the best way to go.

Mr. Shafer reiterated that Milwaukee was experiencing 50 to 60 overflows per year at the time the analysis was being conducted. At a conceptual level, they estimated they would have 1.4 overflows per year after the tunnel. They have operated their tunnel system since 1994 after starting construction in 1984 or 1985. The first five years of operating the tunnel system they averaged 1.4 overflows per year. The "1.4 overflows per year" figure was determined before there was any state or federal guidance on how many

overflows a system could have. During the design of the system, the national CSO policy was adopted, with six overflows per year as the guiding range. Since the tunnel has been under operation, they have never exceeded the permitted level of six overflows per year. They were at an average of 1.4 per year for the first five years; in 1999, there were six overflows, and in 2000, there were five overflows (two of the wettest years on record). In 2001, there were three overflows; there have been two so far in 2002.

Dr. Clough asked about the geologic conditions in Milwaukee. Mr. Shafer said there is primarily limestone below the ground in Milwaukee. The tunnel is 19.4 miles long and the diameter ranges from 12-feet to 30-feet; 45-50% is unlined. It holds 400 to 500 million gallons. Milwaukee's plants are brought to full capacity during a wet weather event. Any flow that spills into the tunnel is collected there and conveyed to a treatment plant. So, during a wet weather event, once the tunnel gets to the 200 million gallon level – which is about half full – they start looking at the weather radar to determine if the storm is over. If the radar shows a major event still coming toward the city, they would close the gate from the combined sewer system to the tunnel system and have a combined sewer overflow at that point. They reserve that extra 200 million gallons so that they don't have a second sewer overflow.

Mr. Shafer said the cost of the system was \$2.3 billion. Out of that, \$705 million was the tunnel. They also had major improvements to the treatment plants, all the connecting structures, and they also installed a control system. A recent legislative audit found that, in the eight years of tunnel operation, there was an improvement in water quality in the combined sewer area. The audit found little or no improvement in the separated sewer area. The auditors said that urban runoff is still a major pollutant. They have had 13.5 billion gallons of overflow in eight years – they used to have 8 billion gallons per year – and of those 13.5 billion gallons, about 92 or 93 percent of that has been targeted CSO allowances, and the majority of that overflow is permitted. They have had 12.6 billion gallons of combined sewer overflow since 1994 and the water quality in the combined sewer area has improved. That tells you that the pollutants in the overflow are much lower than they were before. An analysis showed that BOD, TSS, and fecal coliform have all been reduced by at least 91 percent since the tunnel went online.

Mr. Marcotte asked about the operation and maintenance experience of the tunnels and the cost associated with “running” the tunnels. Mr. Shafer said they do not go into the tunnels to clean them because they are 300 feet deep. They operated the system without ever entering it until February 2001. At that time they dropped cameras into the tunnel to see how it looked upstream and downstream. The original O&M plan called for them to go into the tunnel every five years. At the beginning of this year – year eight of operation – they sent a cleaning crew into the tunnel system who also took video. During the inspection, they found a very clean tunnel except for some small pockets of fine sediment in some locations, but they believed that sediment was just washing through. They found one rock the size of a basketball that had fallen and that was the only structural change found in the system. When the system was designed, they estimated infiltration to be about 4.8 million gallons per day – this is not a totally lined system. When they inspected this fall, they found about 2.7 million gallons, so the infiltration to the tunnel is about half of what they expected it to be. When looking at the video of the inspection, they noticed that the cracks in the tunnel wall were calcified over so it had done a self-healing process. They did not see any major change in the structure. One issue that has been raised is exfiltration from the tunnel system. When the tunnel was designed they expected there to be a stronger inflow current from the surrounding groundwater than there would be from exfiltration in the tunnel. After the tunnel was online they started to see, during a major tunnel event when it was filled to the brim, e-coli in the monitoring data. The e-coli went away quickly when they started pumping the tunnel down. They hired a consultant from Boston to do their groundwater monitoring and they determined that if the tunnel system is overflowed, they do get exfiltration from the tunnel, but once they pump the tunnel down, it infiltrates back into the tunnel. That is why the e-coli numbers were going up and down. Since that determination was made they have modified the operation procedure so they do not fill the tunnel more than the highest point of the crown of the tunnel. Some modeling was done for the worst case scenario with a full tunnel for two full days and it showed that the bacteria counts would go back down in three to five days. They have stopped overflowing the tunnel.

Dr. Lue-Hing asked Mr. Shafer if the tunnel was functioning the way it was designed. Mr. Shafer said the tunnel was designed to minimize overflows to the waterways. The system has come from an average of 50 or 60 overflows per year to an average of 2.6 and the water quality has improved because of that. Mr.

Shafer said he believes the tunnel has operated as it was designed and that it has done a very good job. He said the tunnel needs to operate a while before you can see major improvements in some of the other areas.

Dr. Clough then thanked Mr. Shafer for his help and introduced the next presentation from the Metro Atlanta Chamber of Commerce.

Mr. Bill Stanley, who jointly chairs the Chamber's Atlanta CSO/SSO Business Task Force with A.J. Robinson, is a partner in the architecture firm of Stanley, Love-Stanley P.C. He was aided in the presentation by Mark Baumgartner of the Boston Consulting Group.

(The audio portion of the meeting is unavailable through almost one-third of Mr. Stanley's presentation. The following notes were derived from his PowerPoint presentation notes.)

The Task Force was led jointly by The Boston Consulting Group and the Metro Atlanta Chamber of Commerce. It included participation from the Mayor's Office and the Atlanta Wastewater System Improvement Program management team. The recommendations of the task force will focus on successful funding, implementation, and communication of whatever plan is chosen. Mr. Stanley emphasized that the task force is not passing judgment on the best technical plan to fix Atlanta's CSOs – they are not the technical experts.

The task force is primarily interested in maintaining a vibrant economy and a high quality of life for Atlanta's businesses and residents, both of which are seriously threatened by Atlanta's sewer challenges. He contends that the City must select and implement a plan that will work and achieve the greatest long-term benefit for the least cost. The City cannot afford to gamble on possibilities or unknowns.

Mr. Stanley showed a chart of planned sewer and water expenditures of \$3.6 billion by 2015, which he says extends well beyond the CSO consent decree requirements. This spending puts Atlanta in a unique situation compared with other cities because Atlanta has a small ratepayer base, the lowest per capita income, but the highest projected cost and the shortest expected construction period. Atlanta is under a consent decree to fix a problem in a very short time period. He stated that, based on these unique constraints, there were no truly comparable cities.

It has been estimated that sewer rates must triple by 2014 to fund this project; the impact to residents and businesses will be substantial. The average monthly bill for a resident now is \$40 per month. It will be \$120 by 2014. The average industrial user's bill now is \$1,510 per month. It will increase to \$4,530 per month. These high rates will continue for at least another 30 years to 2044.

Atlanta is already at the high end of the sewer rate spectrum when compared to other cities. Mr. Stanley emphasized that cost does matter and that includes the cost of operating, maintaining, complying, future regulations, indirect costs, and all the unknown costs. He said that time also matters because there are five years to get this done. Atlanta has already paid tens of millions of dollars in fines and that is just money wasted.

He said that we must be realistic about tunnels – miles of tunnels that will be hundreds of feet under the ground. This is a massive project with a lot of risks, potential delays and cost fluctuations. He said the panel heard from Milwaukee earlier about some of the challenges of tunnels. We must consider those as well as those from other regions. Atlanta relies on 98 percent surface water and only 2 percent is groundwater. He said that needs to be compared to Milwaukee because Atlanta doesn't have to worry about leakage and infiltration of the groundwater. He said the Chamber is not picking on tunnels – we have to be realistic about everything.

He said we have to be realistic about ponds too. "Will we build duck ponds or muck ponds? What will be in the ponds?" He said that it is a very difficult issue to deal with. It's very difficult to make people feel comfortable about spending \$1 billion on a sewer system that is underground and they can't see.

Atlanta's first priority is to fix the sewer, but he doesn't want us to ignore other opportunities to make physical improvements where it makes sense. He encouraged the Panel to make any recommendations they may have on this topic. Physical improvements will help rally the public to support this issue.

Mr. Stanley asked the Panel to consider what this construction means to a business or neighborhood. They must consider all the costs to the business and residents – not just the cost of construction. Those costs include road closings and traffic jams, business interruption with no access, neighborhood disruption and noise, and the risk of unforeseen costs and delays.

He said that we also have to consider future water quality requirements. There is a court order that we cannot forget. Georgia is one of 38 states that have been sued because of TMDLs and one of about 20 states under a court order.

He said that over 80 percent of the quality water impairments in this region are because of non-point pollutants. Implementation of these pollutant budgets will require a higher treatment of stormwater. Mr. Stanley said there are significant economic and other ramifications that follow whatever technical decision is made. The Atlanta business community and homeowner community has a sizable stake in whatever decisions are made. The Chamber's message is to choose a plan that keeps our quality of life high and all costs low. They ask the Panel to consider "what can be done in our short timeframe, be realistic about what we're going to get for the price, disclose the risks associated with each plan, account for indirect costs such as "construction disruption" and ongoing operation and maintenance costs, and choose a plan that minimizes the cost of meeting water quality regulations both now and in the future."

Mr. Baumgartner from the Boston Consulting Group discussed lobbying for federal funds. He said that Atlanta needs to demonstrate to the federal government that it is taking steps and making progress in attacking the timeline aggressively. He asked the Panel to choose a plan that shows some quick wins and that we are making progress to the ultimate goals.

Mr. Marcotte asked what the Chamber's position would be on a system that might get some of the costs to deal with the CSO problem from heavily paved areas – knowing that's more likely to fall on businesses. Mr. Stanley said the Chamber knows that a lot of its members have large parking lots all over Metro Atlanta. He said there may be some wisdom in levying a tax for bringing the car into town and parking it on that surface. That may be something the Chamber would consider, but it won't be very popular.

Regarding technology preferences, Mr. Baumgartner said that they are interested in technology to the extent that it drives cost. They would like to know, in addition to construction costs, how various plans compare on operations and maintenance costs.

Ms. Wheatley asked how they can capture the cost of disruption to businesses. Mr. Stanley said you have to "get out in front of the problem." Disruption is a cost of making improvements, but it is lost income. They have to talk to people early on so they know what their options are. Mr. Baumgartner said that they have not done enough analysis yet to understand the impact. They have anecdotal evidence from other cities.

Mr. Turner asked if they had given any consideration to the use of a local option sales tax so it doesn't have to all be rate-based. Mr. Stanley said that is certainly a possibility and it needs to be discussed. Mr. Baumgartner said they are looking at a whole host of options and they are in the process of looking at a sales tax.

Next was a presentation on stormwater management by Steve Sheets of HDR/WLJ, who is part of the design team putting together a stormwater quality plan for Atlanta. He said that stormwater management has evolved quite a bit since the beginning of the century, when you put it in the pipe and it went away. Today, urban stormwater is not ready to go back into the stream yet. We have to capture that water and treat it before it goes back into the creeks – getting rid of hydrocarbon, salts, metals, etc.

They have been pursuing two basic philosophies in this process. One is the QMF plan (formerly know as the BMP plan), the water quality plan (put together by HDR/WLJ), which focuses solely on pulling out

pollutants. There is another plan going forward under TOC's direction and that is referred to as the greenways plan. That plan takes water quality improvement and enhances it further to incorporate other attributes.

Stormwater management technology falls into two categories – nonstructural (measures aimed at preventing the pollution from getting into the runoff such as ordinances, zoning and planning restrictions, general housekeeping like street sweeping) and structural (those steps taken after the pollution is in the runoff but before it hits the creek). The QMF plan has stormwater ponds. Wet ponds were chosen because because dry detention ponds don't achieve much in the way of benefits. Micropools, another form of wet detention pond, are small pools with large overbanks that can be developed for other uses. Bioretention areas – sometimes referred to as rain gardens – are BMPs that capture stormwater and are good for moderate, level areas of drainage. These bioretention areas are good for site construction next to parking decks and parking lots. There are also other structural measures like sand filters. These are great for small drainage areas and highly impervious areas. Enhanced swales, like bioretention zones, are good for site construction along roadways and other large impervious areas.

They primarily considered three engineering factors when putting together their plan. The first is hydrology and hydraulics – that is, how much runoff they will be dealing with, where that water is going to go once it hits the ground and how much we are going to try to capture and treat. The second aspect is land use and development density – what is the character of your drainage basin? What is putting the pollution in the groundwater and what is causing the runoff? From that you determine what type of QMF is needed. The third is available space. Where is it going to be? What is the immediate area land use?

For hydrology/hydraulics, they opted to address the first flush – the first 1.2 inches of rainfall in any rain event. They defined the flow path using topography maps and considered the current stormwater system that is in place today. Their goal is an 80 percent reduction in total suspended solids. That is an ARC guideline. It is a general rule that if you can get an 80 percent reduction, you are going to meet water quality goals.

Land use and development density were evaluated using aerial photos of the basins and actual visits to the sites. In highly commercial areas they went for underground features like sand filters. In residential areas they went for ponds, and in right-of-ways, they are thinking about retention zones. The QMF is sized based on how much runoff you are going to have and what kind of development you have in your basin. Then they looked in that immediate area to see what land was available. They ranked naked lands first, inactive but developed, next, then residential/commercial and parks. The QMF plan says to keep them out of the parks because Atlanta has so little park space and we can't afford to give that up.

So far they have developed 10 QMF plans. The PowerPoint presentation showed an example of the Greensferry Basin. It includes underground features, bioretention zones, ponds and micropools. They went for 80 percent coverage of the basin which means that they kept things small and scattered with small QMFs throughout the basin. That keeps the treatment next to the point of generation and it keeps them small, which means you are more likely to find a vacant or low level usage property to put it on.

Quality of life issues also have to be taken into effect. This plan has to be part of the larger, bigger plan. These quality of life issues include connecting a basin-wide system, amenities like parks and trails and restoring above ground streamways, smart growth planning around these features, getting rid of eyesores, and flooding reduction by using larger catch basins.

Mr. Sheets then asked Quentin Remy, an architect with TOC (a PMT consultant team member), to speak about greenways planning. Mr. Remy said that one of TOC's tasks was to "oversight" the approach that Steve Sheets just explained. TOC also trailed behind HDR/WLJ at Greensferry and studied the basin with respect to a greensway approach.

The greenways approach is a series of above-ground features and the vacated combined sewer pipe that is collecting, detaining, treating and retaining a great deal of the water coming through the basin – which today is not collected. The approach calls for a few bigger ponds in the basin instead of the multiple ponds

Mr. Sheets spoke of. It consolidates the stormwater features and by doing so, costs are allocated in other ways for the greenways project. In that regard, they have attempted to develop a connection linking greenspaces through the Greensferry watershed. Part of a larger plan for downtown Atlanta shows how park space could be connected. The current start of a greenways plan addresses non-point source pollution.

Mr. Remy said that parks are an integral part of the plan. Atlanta has only 3 percent of its gross land area as greenspace, which is the smallest of any metropolitan area in the United States. Through the treatment of stormwater, looked at in a creative way, there is an opportunity to increase the greenspace while we are dealing with stormwater. They have designed their plans with the understanding that they will not deduct the amount of greenspace that is currently available. In fact, they would add to it. Park replacement is one of their line items.

Mr. Remy showed charts, photos and drawings of what “could be” in Greensferry. They haven’t looked at any of the other basins yet. They have two major concerns with this approach – the future availability and accessibility of sites and the commitment to operating the system and maintaining it. Greensferry is approximately 700 acres and is located on the West side of the city. Their water collection method in Greensferry would be through abandonment and replacement of catch basins. They would be capturing surface drainage, but they would detain it to get it into the system. The system won’t hold a 10-year flood, but the greenways will have adequate capacity to retain that amount of water.

In answering a question from Mr. Turner about costs, Joe Basista said they are farther ahead on refining capital costs than they are on the O&M of stormwater management and sewer separation. They intend to customize it for their latest sewer separation and stormwater management plans and they will get that information to the Panel prior to the next meeting.

Dr. Lue-Hing asked the presenters to clarify if the ponds were flow-through ponds or detention ponds. Mr. Remy answered that they do have draw-down pipes to lower the level of the pond. Dr. Lue-Hing also asked about the holding capacity of the ponds once they are all built. Mr. Remy said the detention is based on a 10-year flood (a 10 percent chance of it occurring in any given year), which amounts to 5 percent of gross land area. If the rainfall is more than the capacity of the pond, they have overflow structures that would take the excess back to stormwater pipes rather than holding it and flooding the neighborhood.

Ms. Wheatley asked if implementation of this plan would reduce existing flooding conditions in the areas discussed. Mr. Remy said you will get either detention or flooding. It is a matter of making a choice of where you want it to happen versus keeping it away from areas where it might go into people’s homes. The plan now is when you get rain, it will run in the streets to the curbs and the catch basins. They plan to put restrictors on the catch basins so water won’t be allowed to rush in and flood in uncontrolled areas. They will be able to control where the water comes to the curbs until it has time to get into the system and to the ponds. He said this will improve street flooding because they will be able to regulate where the flooding will happen and at what level it will happen because the catch basins will have the regulators.

Mr. Turner asked about mosquito concerns in the ponds. Mr. Remy responded that they would stock the ponds with a species of fish that eat mosquito larvae – like those already in the ponds at the Carter Center.

The next item on the agenda was a report from Mike Mynhier of the PMT, Greg Giornelli of the Mayor’s Office and Andrew Harris of Georgia Tech regarding visits they made to Saint Paul, Minnesota, Nashville, Tennessee and Austin, Texas from August 7 -10 to learn about those cities’ recent experiences with sewer separation and stormwater management programs.

They visited Minneapolis/Saint Paul first and met with the general manager of the Wastewater Services Division of the Metropolitan Council of Environmental Services (MCES). MCES is the regional provider of water and serves about 103 municipalities. The Council’s main goal in separation was to provide separation of the interceptors that remove the wastewater from the city. The overall program was about \$395 million. Of that, MCES spent about \$102 million separating interceptors and the remaining \$293 million was incurred by Saint Paul (\$217), Minneapolis (\$67 million) and South Saint Paul (\$9 million).

Mr. Mynhier said an impressive aspect of Saint Paul's program was the streetscaping and coordinating the separation with other improvements – street lights, tree planting, etc. It was a \$217 million program that was accomplished in 10 years. The concept was to take sewers that were less than 36 inches in diameter and turn those into sanitary sewers; those larger than 36 inches would remain storm sewers. They broke the project into about 100 individual design construction projects and did about 10 projects per year. The sewer work was generally shallow – from 5 to 15 feet deep. Although it is not a comprehensive program, they have done some stormwater management in the area. For instance, in areas where they could not do anything about the flooding, they created a park that can be used during dry weather. There were both wet and dry detention areas.

The next visit was to the city of Austin. They talked about the Central Park project that the Panel saw as part of a presentation during its second meeting. A stormwater utility was established in 1993 and has generated about \$12 million (\$1 to \$1.5 million per year), of which \$7 to \$8 million has been encumbered for specific projects. They have 14 stormwater management ponds in the urban drainage area (one of those in the downtown urban core) that they have developed in the last 10 years.

They have done a combination of sand filters and some wet retention ponds. The Central Park project is a 20 or so acre site that has been developed and includes a 4 to 5 acre treatment pond. It also includes greenspace, recreation, shopping, apartments and a hospital. The project was a partnership between the city, the state and the developer.

In addition to their stormwater utility, Austin also raised funds through an Urban Development Construction Fund. When a developer comes in with a project, they have the option to either provide some sort of stormwater remediation or pay a fee to this fund. Currently more developers pay into the fund than not, so they are readjusting those fees to encourage developers to provide stormwater remediation.

Officials from Austin say that this type of program takes a while and that they have had to be opportunistic in the way they implement projects and take advantage of land as it becomes available.

The team's final visit was to Nashville. Nashville is undertaking an overflow abatement program to address both SSOs and CSOs. It is an \$850 million program – about 54 percent for SSO abatement and about \$384 million for CSO abatement. The combined sewer service area is between 5,000 and 6,000 acres and they expect that, when completed, the program will separate about 40 percent of the combined service area. The remaining 60 percent will be handled through storage and treatment. Their design criteria are eight overflows per year.

They visited the Demonbreun CSO basin. It is a 700 acre site. City officials wanted to get the big sewer improvements done before the new arena and football stadium were built, so they separated that 700 acres in about two years. They used a different approach than they had previously heard about in Saint Paul. They had the design engineer develop drawings, they went to the state for approvals, and then turned the drawings over to the contractor. They followed that process for each phase, then they would start to construct that phase. They believe the benefit of that was having the contractor assume responsibility for unforeseen things that inevitably happen.

The Nashville project (about 88,000 linear feet of piping) was quite a bit smaller than what we have in Atlanta, but they did it for about \$24 million in construction costs.

Mr. Mynhier said overall they were very well received on each of their visits and everyone was very helpful and more than willing to share information. He has a draft written report but it is not finalized.

Mr. Turner asked about contacting Boston regarding its program. Mr. Mynhier said he made phone contacts with someone from Boston and also talked to someone from Portland, Oregon about their situation and he has written notes regarding both of those conversations that he will share with the Panel.

Mr. Mynhier reported that David Kubiak from Boston said they have a \$620 million CSO program – about 25 projects make that up – that includes hydraulic relief, storage and pump stations, sewer separation, and

CSO treatment. It is a 10-year program scheduled to be completed in 2008. About \$210 million of the \$620 million is for sewer separation in local communities. They have had some interesting happenings in some of their projects such as a sewer separation project that was much more difficult than initially thought so they now have to look at other options.

In Portland, Oregon, they have a \$1 billion program. They serve about 300,000 of the City's 530,000 residents in the combined sewer system. They have a combination plan as well, with about \$190 million for sewer separation, \$670 million for storage and treatment, and \$145 million for improvements to the Columbia Slough. The separation will separate seven basins, which is about 25 percent of the combined sewer area. Their downtown was separated about 20 years ago so most of the combined sewers are in residential areas. Their storage and treatment includes two large tunnels – one is about four miles in length and 14 feet in diameter and the other is about four or five miles in length and 14 to 17 feet in diameter. Portland is seeing a pretty severe financial impact with this program. Sewer rates will go from about \$11.40 per month in 1999 to \$66 per month in 2011.

Ms. Wheatley, acting as chair, said that Dr. Clough and others had questions regarding the cost of land for the greenway program, so Dr. Clough had contacted the Urban Land Institute, which in turn contacted the Appraisal Institute, to assist in getting realistic land costs. Dr. Henry Wise of the Appraisal Institute was invited to speak for a few minutes about what they will do to help pin down some land costs.

Dr. Wise said the Appraisal Institute was asked to provide some advice on some of the land costs that the PMT had been working with – under the assumption that land will be required whether talking about the separation process or stormwater drainage abatement. He believes that within the Greensferry basin, they should be able to put together a team to go out to the site and look at the types of land that have been identified as land that might be required. With the information from the PMT, appraisal information and appraisal volunteers, they will try to make some judgment about the valuation issues for the specific types of property that we are speaking about within the Greensferry basin.

Regarding overall costs, Mr. Turner said that they need to have something that can be used to compare the costs of the options and alternatives. Ms. Wheatley asked Mr. Giornelli if the City is looking at independent verification of the costs. He said that the City needs to have 100 percent confidence in the costs estimates, so they are looking at that. He said that it may make sense for the Panel to ask an independent group to verify costs.

Mr. Basista said that right now there are two sources of cost data – one is the pre-design consultants who are hired independently of the program team. The program management team is reviewing those costs and independently developing a parallel set of costs. He said those costs are tracking pretty well right now. He said that if the Panel wants another estimate, he thinks the PMT should have a “hands off” approach so they would not supervise the reviewer.

Mr. Basista said that they will have construction and capital costs refined, O&M costs refined, water quality data for each of the refinement options, some opinions of the schedule required for those options, and quality of life comparisons by the next meeting.

The last meeting is scheduled for September 13. A brief public session will be held from 9:30 AM until 11:30 AM and the Panel will go into private session after that to write the report. There are no presentations planned for the next meeting.

With that, the meeting was adjourned.

The Mayor's Clean Water Advisory Panel  
September 13, 2002

Panel members in attendance are Bruce Beck, Wayne Clough, John Hall, Jeff Hilliard, Cecil Lue-Hing, Mike Marcotte, Larry Roth, Billy Turner and Nancy Wheatley.

Dr. Clough called the meeting to order and asked Joe Basista of the PMT to introduce Mr. Henry Wise of the Atlanta Chapter of the Appraisal Institute and to put his work regarding land cost appraisals in the Greensferry basin in context of the plan refinement process. Mr. Basista explained that Mr. Wise's work has been to review the cost estimating approach for land costs associated with implementing the stormwater quality improvement and greenway projects. As has been previously described, these improvements are related to stormwater management being considered outside of the requirements of the CSO consent decree. These improvements are not part of the Authorized Plan and refinement options being analyzed and thus any adjustments in land costs will not affect these evaluations of CSO options to meet the consent decree. In fact, even if the cost of land were free, there would still be a very significant cost, several hundred million dollars, to implement stormwater management and greenway projects. Mr. Wise began by stating that the assessments performed for the purpose of this meeting were done pro bono. He then began his presentation and said they reviewed the methodology the City's consultants HDR/WL Jordan (HDR/WLJ) used to make the land acquisition cost estimate. He said that the Appraisal Institute believes it is important to pay attention to market value because lands that would be acquired (for greenways) can be acquired for market value. The City has the right – under the use of eminent domain – to take the parcels that they need after paying just and adequate compensation. In Georgia, the “just and adequate rule” means fair market value for the part taken, plus any damage to the remainder property. So, any potential pond or storage facility that requires all of four parcels and part of three other parcels, has to be examined to determine if the part taken from three parcels damages those properties to the extent that it diminishes their value. If so, you have to pay for the balance.

The methodology initially used by HDR/WLJ was to estimate a price per acre. According to Mr. Wise, this concept works well only when discussing vacant land. Most of the affected parcels in the Greensferry Basin are .10 or .15 acres – these are long, skinny “garden” parcels. For example, if most of these tracks currently sell for \$10,000 per parcel for a vacant tract, then it is reasonable to say that \$100,000 for a vacant acre is the expected acquisition cost. When you put a house on the parcel, it's selling for \$80,000 to \$160,000 – most of them in the \$125,000 range. That is still for .10 of an acre, but now you have a \$250,000 per acre cost. This process of trying to find a per acre price introduces an upward bias to the entire methodology used by the consultants.

According to Mr. Wise, the second problem they addressed was that HDR/WLJ used the Fulton County assessment in order to get a reasonable price per acre or acquisition price. The assessor's job is to make a judgment about market value – 100 percent value – and then 40 percent of that is the assessed value. HDR/WLJ paid attention to the market value on the parcels that must be taken. For each BMP, they identified it using a GIS system and they superimposed the tax map on that and identified the parcels that would be affected. They know the assessed value of each parcel, but because the assessment may not be correct, their method was to draw a group of sales data in each of the drainage basins and they compared the sales price to the assessed value and applied a factor.

Mr. Wise said that there was a mathematical problem in the most recent revision by HDR/WLJ because they divided by the sales price instead of the assessed value. In Greensferry, the reported 34 percent factor should have been a 76 percent factor. Redoing the calculation using the average of 176 percent is about \$1.2 million upward from what was previously thought for Greensferry acquisition. The beginning point, after correcting the math, was \$5,410,438 to acquire about 16 acres and 16 BMPs in Greensferry. The HDR/WLJ estimate was \$4,591,503.

The next aspect the Appraisal Institute questioned was the PMT's method of averaging within a BMP. HDR/WLJ identified parcels that would be affected, applied a factor that would turn the assessor's value into market value – so now the group of properties is inflated by 176 percent. HDR/WLJ averaged those

prices, used the average and multiplied by the size of the acreage, and that gives the foundation of their judgment. We now have an average of properties – some of which are improved, some of which are vacant, some of which are taken in full, some of which are barely nicked – and the process of averaging adds another layer of error between market value and the statistic that has been calculated.

Mr. Wise said his most important point is that land's value is based on its function and utility. If we were in any typical neighborhood, the most desirable land to the marketplace is land that is generally level and has good access. The type of land that is most suitable for storm drainage control structures is low-lying land, and their research shows that it is rare that an acre of low-lying land has the same value as the land with the highest function and utility. Often it is 5 to 25 percent of the value of the good land. They looked at actual transactions and characterized them by type of transaction – vacant land, fixer-uppers, a typical house, and a high-priced house. They wanted to see whether or not the factor that one might apply to the assessed value was the same. He said it is ok to use assessed values if the assessor's "error" is constant but, if you look at the data, the assessors generally overestimated the value of vacant land by about 22 percent. They overestimated fixer-uppers by 43 percent, underestimated the typical house by 78 percent and underestimated the high-priced house by 169 percent. If you average all of these, you have no reason to believe a single factor can be applied to the assessed values to lead you to a reasonable conclusion of market value. There was nothing they found in their research to say that it is possible to rely on the assessor's valuations as a foundation for market value.

The Appraisal Institute suggests using general appraisal methodology. A group of volunteers from the Appraisal Institute looked at the various parcels for each BMP and typed them in broad categories. Then they did the same thing with a group of sales for that neighborhood. According to Mr. Wise, if you can determine the typical price of a vacant lot that is like the type of property you are going to acquire – in three or four big categories – then you can see what it is that has to be acquired and apply that price to it. You don't need to use the assessor's data at all. You don't need to divide by size; you just need to know what a vacant lot is selling for. Vacant land divided by acreage is a very useful tool to work with per square foot prices. Once you are dealing with improved parcels, the price of the entirety is a good variable to use because most houses are likely to be very similar to each other. You will be able to see the expected price for a typical house, a fixer-upper, and the most expensive houses. Then you need to do the same thing for commercial property because some of the BMPs were designed in areas where the property's highest and best use is commercial. The Institute volunteers looked at each BMP, the properties that affected each BMP and identified the character of the property that was affected and a reasonable estimate of what it is likely to sell for.

Mr. Wise gave examples of BMPs where he thought HDR/WLJ's estimates were seriously flawed either with estimates that were too high or too low because they were based on the assessor's valuations. For the acquisition of 16 parcels in Greensferry, the Appraisal Institute's methodology would estimate \$2.7 million. That is compared to the \$5.5 million estimate from HDR/WLJ. They only studied Greensferry, so they cannot comment on the other basins except to say that HDR/WLJ's methodology has no foundation that would allow you to come to a market value or acquisition price estimate. However, they think it would be possible to do that by typing the properties that are affected and generating basic sales data to find the market value. He also suggested that they talk to land acquisition experts with the Department of Transportation (DOT) to get an idea of how much overhead cost there is when property has to be acquired by eminent domain.

Dr. Clough then asked Greg Giornelli of the Mayor's Office to discuss an independent review of cost data that was requested by the Advisory Panel. Mr. Giornelli reminded everyone that the Panel had asked at its last meeting for the City to conduct an outside, independent review of the cost estimates for sewer separation and tunnel construction—basically the capital costs associated with the CSO improvements – and an outside assessment of the water quality calculations under the various options proposed by the PMT.

Regarding the review of water quality impacts, the City has contracted with Dr. Michael Saunders, a professor of Environmental Engineering at Georgia Tech, to conduct that review. The review will be completed by September 25<sup>th</sup> and the results will be given to the Panel immediately upon completion. They will also make the results available to the public at that time.

The City has adopted a two-pronged approach to reviewing the cost estimates. They have contracted with a cost estimating firm – the firm of Atkins Hanscomb – an international construction management firm with expertise in cost estimates and value engineering. They have also issued a RFC (Request for Critique) and packaged all the information the City consultants used for their cost estimates and made it available to the public. They advertised that package and invited anyone from the public to review that entire set of information and give them a critique. Mr. Giornelli said it will be very useful to the City to have real world contractors look at the information and tell them how good that information is for coming up with a cost estimate. It is a little unusual, but they feel it is worth doing. The Mayor's Office expects to have all the cost estimate information from the firm and the public by September 25, and they will forward the results to the Panel and make it available to the public.

Mr. Giornelli told the Panel that these reviews will not bring a different set of numbers or come up with an entirely new cost. The goal is to provide an independent opinion regarding the confidence level the Panel and the City should have with the process that came up with the cost estimates. They hope to come back with a report that says they either have a high degree of confidence in the PMT's numbers, a reasonable degree or a low level of confidence.

Next, Joe Basista of the PMT, distributed a packet of information that contained estimated costs for all the sewer separation and tunnel options. He said that in the beginning of this process, he predicted that the cost of tunnels would slightly increase as they learned more about the risks associated with tunnels and the treatment technology. He also said that the cost of separation would likely come down as they better understood the physical layout of separate sewers. In general, both of those predictions came true. They are almost finished on the pre-design level; in fact, on the tunnel storage and treatment systems – the treatment plants and pump stations associated with these options – the pre-design reports are completed and submitted and those costs were incorporated in the packet he distributed. On sewer separation and stormwater management costs; that is still a very active process. They will get more plans from the design consultant next week, so the numbers he presented today are still extrapolated. The City staff still has a good deal of confidence that the numbers are being refined in the right direction and that they won't change drastically.

Mr. Basista explained that he would not go over all the costs estimates but would select those in which they have seen changes from previous estimates. He began with the authorized plan and said that it had been priced at \$953 million in July 2001; and today it would cost about \$989 million. The cost of refinement Option 1 (27 percent separation with a one mile extension to the existing tunnel system) has gone down recently because of extending the existing tunnel system instead of constructing a new tunnel system. It also eliminates two CSO facilities – Greensferry and McDaniel. The cost for that is \$834 million.

There have only been minor modifications to Options 2 and 3. Option 2 (40 percent separation) is separation of the entire East basin and that would eliminate the East tunnel altogether and still eliminate two CSOs and two regulators. Option 3 (50 percent separation) eliminates the Greensferry CSO along with the East basin tunnel. That eliminates three CSOs. Those costs are \$912 for Option 2 and \$906 million for Option 3.

The PMT just completed the evaluations and the worked out the costs for Option 4 (80 percent separation). Mr. Basista said he had hoped that this option would offer a different look at the ability to offer more separation including the urban core, for a lower cost, but the costs did not move that way. He said that the problematic issue is that they can separate everything but the core, but they can only partially separate North Avenue, Tanyard and Clear Creek. That has been more difficult than anticipated. In this plan, the West tunnel is reduced but it cannot be eliminated and it still has to hold a volume of 95 million gallons. So this option means that we are faced with an expensive tunnel system and moving the combined sewage out of the core and to the CSOs. The estimated capital cost right now is \$1.2 billion and that is at the high end of any costs they have looked at.

Mr. Basista's packet of information included a summary sheet with estimated capital costs, pollutant load, quality of life factors and anticipated completion schedules. It also included estimated capital costs (with

and without land costs) for stormwater management improvements. These costs continue to be reviewed and adjusted as the refinement process continues.

Mr. Basista was asked what contributed to the cost increase in the authorized plan. He said most of that cost increase is from water quality improvements in the plan. The PMT now has included a high rate clarification and a high rate filtration process, which he said gives significant water quality improvements at a modest price –about \$20 to \$25 million.

Dr. Clough allowed members of the audience to ask questions to Mr. Basista. The first question was about the inclusion of operating and maintenance costs (O&M) in the estimates. Mr. Basista said that in a week or two, the PMT would have O&M and life cycle costs for all the refinement options. They don't anticipate that those costs will change any fundamental decisions.

Another question from the audience concerned disruption caused by the building of tunnels and the fixing of old, broken and leaking pipes (also required by consent decree, as part of the City's Sewer System Evaluation Survey project). Mr. Basista explained that the options with lower amounts of separation contain about \$140 million of capacity relief and repairs that will be done on the combined sewer system. He agreed that will cause disruption.

Another audience member asked for a figure that shows the amount of pollution removed by using 100 percent separation with the greenways approach. Mr. Basista didn't have those figures with him, but said he believed they were about the same or perhaps a little lower than those with the authorized plan. He also said that construction costs for the greenways approach are under review right now. The costs given in the information packet are for the pre-design consultant's stormwater quality management plans. They have already developed a greenway plan for Greensferry. The capital cost for that is very similar to the capital cost of the stormwater quality management plan primarily because they saw cost savings associated with grouping smaller ponds together to make them bigger ponds. They are moving ahead with adapting the Stockade and Greensferry basins so they can extrapolate costs from those two basins.

Dr. Clough then updated everyone on the process ahead for closing out the activities of the Clean Water Advisory Panel. He said that the Advisory Panel may be meeting for the last time depending on the outcome of the final cost estimates. If those estimates change significantly, the Panel may meet again.

At this point, the Panel will begin writing its report while it is awaiting the final cost estimates. Their objective is to review the Mayor's Administrative Order to make sure they are addressing the issues she asked them to address so they can give their best advice based on their experience and what they have heard throughout the meetings.

Dr. Clough said he does not think the Panel will have a final report until mid-October because of the information they are awaiting from the City's reviews. He also said that the Panel does intend to include a section in the report on long-term issues the City needs to address. He said the City has a set of issues that needs to be dealt with today, but there should be a strategic, long-term view about how to address water issues regionally. Dr. Clough thanked Lynn Durham and Marla Rawls Hill for all the fine work they have done assisting the panel and handling the logistics of the meetings.

Councilwoman Clair Muller thanked the Panel for traveling to Atlanta so many times to help the City work through these sewer issues and she thanked Dr. Clough for his leadership.

With that, the meeting was adjourned.

## Appendix V

### List of Reports and Materials Given to Clean Water Advisory Panel Members

Disciplinary members with bios
Mayor's Administrative Order, June, 2002
CSO Consent Decree, September, 1998
Remedial Measures Plan, Vol. 1, April, 2001
Remedial Measures Plan, Appendix A, April, 2001
City Council June briefing presentation, June, 2002
"Paying for the Cost of Growth" – History of Atlanta's Wastewater System
AWSIP Briefing book, May 2002
EPA Authorization Letter, July 20, 2001
Riverkeeper Response to RMR, May 26, 2001
Supplemental Financial Impacts and Affordability Analysis, July 2001
EPA response to Affordability Analysis, May 6, 2002
U.S. Cost Peer Review Report, February, 2001
MS4 Stormwater Permit, April 20, 1999
EPA Review of Environmental Justice Concerns, July 20, 2001
CSO Control Facility Evaluation Report (aka "System Evaluation Report") Executive Summary, August, 2000
Response to July 15 Panel Request - 1 <sup>st</sup> , 2 <sup>nd</sup> and 3 <sup>rd</sup> Public Involvement Summary Reports from the CSO Citizen Advisory Groups
CSO Consolidated Storage and Tunnel, Predesign & Geotechnical Report (CD), May 2002
Predesign for Sewer Separation & Stormwater Management
Letter from EPA to Congressman John Lewis, in response to an inquiry on time extension, July 9, 2002 *
Draft CSO Dechlorination Predesign Report, June, 2002
Draft Intrenchment Creek CSO TP Upgrade Predesign Report (CD), June, 2002
Response to July 15 Panel Request - Update on PI activities – 2/2001 through present, date
Trip Report CSO and Stormwater Cities Site Visits August 7-9, 2002, PMT (CD)

Refinement Options for Authorized CSO Remedial Measures Plan, PMT, Updated 9/12/02
Review of the HDR/WL Jordan Cost Estimates for the Greensferry Drainage Basin BMP Impacted Parcels and Related Comments, The Atlanta Chapter of the Appraisal Institute, September 13, 2002
Pre-design Process for Authorized CSO Plan – Refinement Options Identified to Date, PMT, July 15, 2002
Long-Term Watershed Monitoring Program Summary, PMT, August 16, 2002 (e-mail)
City-PMT Organization Description, PMT, August 14, 2002 (e-mail)
Response to Question No. 6 from Clean Water Advisory Panel – Sewer Separation Versus Stormwater Mgmt., PMT, August 18, 2002
Response to Question No.2 from Clean Water Advisory Panel – Assured Delivery System, PMT, August 18, 2002
Response to Question No. 7 from Clean Water Advisory Panel – Separating Conveyance from Storage, PMT, August 18, 2002
Draft TM - Estimation of Pollutant Loads for CSO Refinement Plans, PMT, August 22, 2002
PowerPoint presentation by Clean Streams Task Force, Jacqueline Echols presenting, July 15, 2002
PowerPoint presentation by NPU Environmental Advisory Committee, Edith Ladipo presenting, July 15, 2002
Presentation by ABC Group, Rev. James Brooks presenting, July 15, 2002
PowerPoint presentation “Proposed Conceptual Modification to City’s Authorized CSO Plan,” Justin Wiedeman presenting, July 15, 2002
PowerPoint presentation, “Stormwater Management Evaluation Status,” Quentin Remy presenting, August 23, 2002
PowerPoint presentation by Atlanta Metro Chamber of Commerce, Bill Stanley presenting, August 23, 2002
Cost Estimate Review by The Appraisal Institute, Henry Wise presenting, September 13, 2002
Follow-up cost information from Clean Streams Task Force (Jackie Echols)

## Appendix VI

### Lessons Learned From Other Cities

It's important to recognize that Atlanta is not the only city in the United States attempting to develop an effective approach to the complex issue of combined sewer overflow control. Over 800 U.S. Cities<sup>1</sup>, most of them in the northeast, middle Atlantic, midwest and northwest sectors of the country, are also in some stage of development of plans to address CSOs. While each city presents unique circumstances and challenges (among the notable ones in Atlanta's case are the limited time available in view of legal constraints and the relatively low flow and assimilative capacity of the intermittent streams receiving discharges), it is possible to gain some general knowledge and background from the experiences of other cities, particularly if the size of the areas served by combined sewers and the overall magnitude of the challenge are similar to Atlanta's. Based on information already known to Committee members and data gathered during the Committee's work, the following brief summary of experience of representative cities is provided:

#### Boston, Massachusetts

Boston's combined sewer system serves approximately 19 square miles and includes 84 outfall points. Since 1994, dramatic reductions (approximately 70%) in the volume of discharges and associated pollutants have occurred as a result of a coordinated program of improvements which includes targeted separation, storage and treatment facilities, and monitoring. The program was re-evaluated and modified in 1994 based on updated data, and estimated program costs are approximately \$530 million.

- "Lessons Learned"      -- storage and treatment predominant  
   -- continuing evaluation required  
   -- complex projects require extensive implementation time

#### Chicago, Illinois

The combined sewer area in Chicago metropolitan area is one of the nation's largest – 375 square miles, including 230 square miles within the Chicago city limits. When completed, the Chicago tunnel system, known as TARP ("Tunnel and Reservoir Plan), will consist of 109 miles of tunnels and storage reservoirs with cumulative capacity of over 15 billion gallons when completed in 2009. Initial tunnel construction was completed in 1976. There are approximately 400 outfall points to the Chicago River, Des Plaines River and Little Calumet River. Estimated total program cost is in excess of \$4 billion. No sewer separation is being contemplated in Chicago, but some targeted separation may occur in suburban areas.

- "Lessons Learned"      -- storage and treatment predominant  
   -- complex projects require extensive implementation time

#### Milwaukee, Wisconsin

Milwaukee's system includes approximately 111 outfall points serving an area of over 25 square miles. A 17-mile tunnel system, designed to reduce overflow events by approximately 90%, was completed in 1993 at a cost of \$540 million. While the volume and frequency of overflows has been dramatically reduced, concerns have been expressed about groundwater leakage and potential groundwater contamination associated with unlined tunnels.

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<sup>1</sup> "Wastewater Management: Controlling and Abating Combined Sewer Overflows", USEPA Office of Inspector General Evaluation Report No. 2002-P-00012, August 26, 2002.

- “Lessons Learned” -- storage and treatment predominant
- design/lining of tunnels raise technical issues

### Minneapolis/St. Paul, Minnesota

The cities of Minneapolis, St. Paul and South St. Paul have embarked on one of the nation’s most ambitious sewer separation programs from 1983 through 1995. In St. Paul, an area of approximately 20 square miles was separated, at least partly in conjunction with an overall infrastructure improvement program. Minneapolis has also completed considerable separation, but has stopped short of separating its downtown/commercial center. The \$300+ million cost in St. Paul was supported by approximately one-third state funding. Marked improvements in the quality of the Mississippi River, which previously received CSOs, have accompanied the separation program and overall improvements in wastewater treatment effectiveness.

- “Lessons Learned” -- large-scale separation may be feasible if coordinated with other urban improvement projects
- complex projects require extensive implementation time

### Portland, Oregon

Portland has passed the halfway mark of a 20-year program to reduce combined sewer overflows (CSOs) to the Columbia Slough and Willamette River. There are 55 outfall points to the Columbia River and Willamette River, and the CSO area is approximately 45 square miles. Projects to date have reduced total CSO volume by more than three billion gallons a year. Construction of major CSO projects will continue until 2011, when an overall reduction in discharge volume of 96% is anticipated. Major features of the program include new pipelines, tunnels, and pump stations, targeted separation and watershed management. Total cost for the 20-year program is approximately \$1 billion.

- “Lessons Learned” -- coordinated watershed approach has advantages
- complex projects require extensive implementation time

### Richmond, Virginia

Richmond is well into implementation of over \$500 in improvements to address CSOs from a 19-square mile area. The major feature of the program is a tunnel storage system, constructed in part in association with a James River riverfront redevelopment project. There are 32 outfall points to the James River, and reductions of discharge volume and contaminant loadings in the range of 85% are anticipated.

- “Lessons Learned” -- storage and treatment predominant
- coordination with other urban initiatives provides benefits

### Washington, DC

Washington, DC has completed an extensive study of alternatives to addressing CSOs from 59 points in a 20-square mile area, and has submitted a long-term control plan for EPA review and approval recommending construction of three deep tunnels and targeted separation in less than 5 percent of the area currently served by combined sewers. Planned improvements will reduce average annual discharges by 96% and limit discharges to 2 in an average year. Estimated cost is approximately \$1.3 billion (in

current dollars), and implementation schedule ranges from 15 years to 40 years, depending on funding availability.

“Lessons Learned”      -- storage and treatment predominant  
   -- complex projects require extensive implementation time

In summary, we offer the following common themes from an admittedly unscientific review of the efforts of seven large cities to address combined sewer overflows:

- The overwhelming majority of systems are considering or implementing tunnel/storage systems as a major feature of their CSO control efforts.
- The complex projects required to address CSOs are rarely completed within a ten-year time frame, and may require several times that duration for full implementation.
- Separation of sewers is a less frequent approach, and is usually successfully employed in predominantly residential areas.
- Design of underground facilities requires careful attention to local conditions.
- Approaches that involve watershed management and resulting reduction in runoff quantities can have long-term advantages.
- Coordination with other municipal initiatives can help to reduce project costs.
- All approaches to CSO control have considerable cost.