

Wet Weather Team Project

Meeting Materials

Summer 2007–Spring 2008

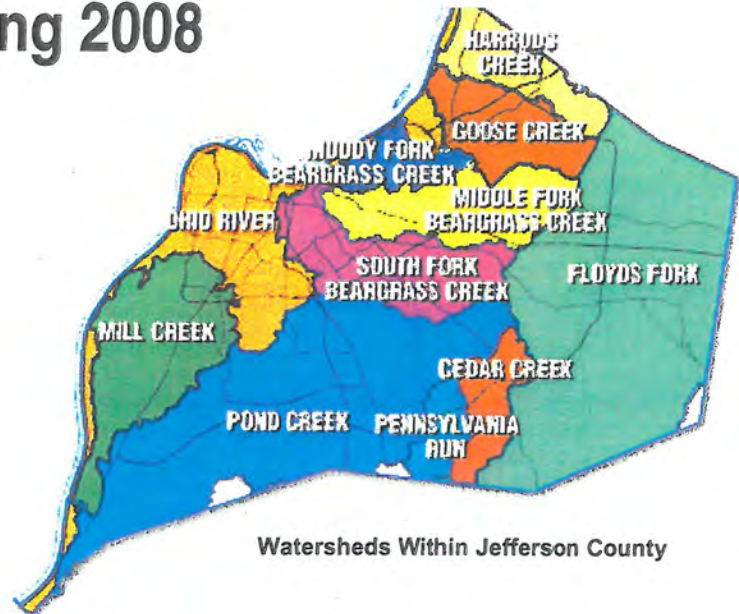
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WWT Stakeholders Meeting # 17 4/3/2008

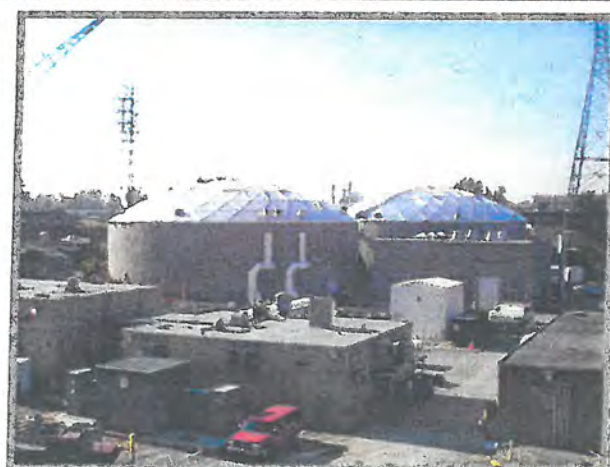


MSD

Louisville and Jefferson County
Metropolitan Sewer District



Watersheds Within Jefferson County



Agenda

Draft Agenda
Louisville and Jefferson County Metropolitan Sewer District (MSD)
Wet Weather Team Meeting #17
Thursday, April 3, 2008, 4:20-8:30 PM
MSD Main Office, Board Room
700 West Liberty St., Louisville

Meeting Objectives:

- Review and discuss potential changes to user fees and incentives in the funding plan for MSD's Integrated Overflow Abatement Plan.
- Review and discuss a draft vision for MSD's Integrated Overflow Abatement Plan.
- Review and discuss a draft document describing the Wet Weather Team's understanding of anticipated combined sewer overflow (CSO) control strategies in MSD's Integrated Overflow Abatement Plan.
- Review and discuss summary results and examples from the benefit/cost analysis of project alternatives.
- As time allows, review and discuss a draft Post-Construction Compliance Monitoring Plan.
- Identify next steps and expectations for the next meeting of the Wet Weather Team.

4:20 PM Participants Arrive and Get Settled

4:30 PM Introductions, Review Agenda and Ground Rules (10 minutes)

- Review meeting objectives and ground rules.

4:40 PM Wet Weather Project Updates and Observations (20 minutes)

- Updates on issues related to the Wet Weather Team Project and follow-up items from the last Wet Weather Team meeting.
- WWT stakeholder updates and announcements.

5:00 PM Funding Plan Discussion – User Fees and Incentives (30 minutes)

- Review the structure of MSD's user fees and the incentives that are currently built into MSD's fees and rates.
- Review and discuss potential changes or additions to MSD's user fees and incentives.

5:30 PM Vision and CSO Understandings Discussion (55 minutes)

- Review and discuss a draft document describing the Wet Weather Team's understanding of anticipated CSO control strategies in MSD's Integrated Overflow Abatement Plan.
- Review and discuss a draft vision for an approach to responding to the requirements outlined in MSD's Wet Weather Consent Decree.

4/3/08 Wet Weather Team Meeting Agenda, Continued

- 6:25 PM** **Dinner Break (20 minutes)**
Dinner will be provided for Wet Weather Team members.
- 6:45 PM** **Opportunity for Observer Comments (10 minutes)**
- 6:55 PM** **Benefit/Cost Analysis Results Summary (50 minutes)**
- Review and discuss summary results and examples from the benefit/cost analysis of project alternatives.
- 7:45 PM** **Monitoring Plan Discussion (25 minutes) (*as time allows*)**
- Review and discuss a draft Post-Construction Compliance Monitoring Plan.
- 8:10 PM** **Opportunity for Observer Comments (10 minutes)**
- 8:20 PM** **Wrap Up and Next Steps (10 minutes)**
- Review plans for the next Wet Weather Team meeting on Thursday, May 15, 2008.
- 8:30 PM** **Adjourn**

**Final Meeting Summary
Wet Weather Team Meeting #17
Thursday, April 3, 2008
MSD Main Office, Louisville**

The Wet Weather Team (WWT), chartered by the Louisville and Jefferson County Metropolitan Sewer District (MSD), met on April 3, 2008, at MSD's main office in Louisville. The objectives of the meeting were to:

- Review and discuss potential additions to the ground rules for the Wet Weather Team;
- Review and discuss potential changes to user fees and incentives in the funding plan for MSD's Integrated Overflow Abatement Plan;
- Review and discuss a draft vision for MSD's Integrated Overflow Abatement Plan;
- Review and discuss a draft description of the WWT's understanding of anticipated combined sewer overflow (CSO) control strategies in MSD's Integrated Overflow Abatement Plan; and
- Review and discuss summary results and examples from the benefit/cost analysis of project alternatives.

Potential Additions to Wet Weather Team Ground Rules

Rob Greenwood of Ross & Associates reviewed the ground rules that have been used since the beginning of the WWT stakeholder process, as well as a series of potential additions to the ground rules that concern procedures for sharing draft documents with sensitive, pre-decisional information. The proposed additions to the ground rules were as follows.

- Certain types of draft materials that contain pre-decisional information that is highly sensitive (e.g., potential sites for constructed facilities) will be labeled "draft: working documents not for release."
- Documents labeled "not for release" will not be shared during Wet Weather Team stakeholder meetings. Information from "not for release" documents may, however, be generalized or presented at a higher level of detail at WWT meetings if necessary to support WWT deliberations.
- If Wet Weather Team participants would like to review "not for release" documents individually outside of WWT meetings, MSD will make the documents available for WWT members to review at MSD's office in MSD's presence. WWT members will be asked to sign a confidentiality agreement before reviewing "not for release" documents at MSD.

WWT participants approved these additional ground rules, and they will be incorporated into an updated version of the ground rules.

Next, Rob Greenwood mentioned a suggestion that one WWT member had proposed for the group's consideration—the idea of potentially having an executive session of the WWT (i.e., a meeting without outside observers) to support the WWT's deliberations. This could be an opportunity for the WWT to discuss the specifics of project alternatives, including documents WWT members review at MSD's office.

WWT members discussed the executive session idea, and noted that if the WWT were to have an executive session, it would be important to be transparent about the timing, scope, and reasons for a special meeting. In addition, MSD and the WWT would need to be prepared to answer questions about the session. MSD agreed to look at whether MSD policies would allow a WWT executive session and will coordinate with the facilitation team to communicate that information to the WWT.

Wet Weather Project Updates and Announcements

The following Wet Weather Project updates and announcements were noted at the meeting.

- Beargrass Creek Study Comments: Rob Greenwood of Ross & Associates said that the technical team had received comments from WWT members on the Beargrass Creek ecological reach characterization study that was presented at the January WWT meeting. The technical team will send a written response to the WWT members and will copy the rest of the group on the e-mail message.
- WWT Schedule: Rob Greenwood and MSD Executive Director Bud Schardein stated that MSD would soon be requesting WWT stakeholder group members to participate in additional WWT meetings in summer and fall, to continue to provide input on MSD's consent decree response.
- Project WIN Meetings: Angela Akridge of MSD announced that there would be a half-page ad in the Sunday newspaper announcing the next series of Project WIN public meetings in May. MSD has changed some of the arrangements for these meetings based on the suggestions from WWT members, including announcing the meetings a month in advance, holding some meetings downtown in the middle of the day, and reducing costs by providing basic refreshments rather than full meals.
- WWT Idea Lists: Jennifer Tice of Ross & Associates said that the facilitation team would be working with the technical team to review the idea lists (solution idea list, education and outreach idea list, and data requests and monitoring suggestions list) to understand how and to what extent the WWT's suggestions have been considered and incorporated into the technical team's analytic work thus far.

Funding Plan Discussion—User Fees and Incentives

MSD Finance Director Marion Gee gave a presentation on MSD's current sources of revenues, user fees, and the incentives and discounts that MSD currently offers or could consider adopting in the future. Revenue sources include wastewater service, volume, and quality charges (73 percent of FY 2007 revenues); stormwater service and volume charges (23 percent of FY 2007 revenues); and other operating income (4 percent of FY 2007 revenues) from sources such as capacity charges and connection fees.

MSD's current incentives and discounts include an optional rate structure for high volume users, a credit for detention/retention basins, reduced quality charges for "cleaner" wastewater, and a senior citizens discount of 30 percent on wastewater billing and the Project WIN surcharge. Mr. Gee mentioned examples of incentives and discounts that other communities—including Portland, OR; Tulsa, OK; and Gwinnett County, GA—offer to encourage rain gardens, eco roofs, rain barrels, and other ways of reducing impervious surface area and stormwater runoff. He also noted that revenues lost from incentives granted to one customer class must be recovered from the remaining customer classes.

WWT members asked a few clarifying questions and offered some suggestions for incentives, as follows.

- A few WWT stakeholders identified additional activities that could be incentivized, including:
 1. Installing/using green roofs and permeable pavement;
 2. Increasing tree canopy, changing plantings, and other activities to reduce runoff from people's yards;
 3. Reducing use of lawn chemicals; and
 4. Controlling the spread of invasive species.
- Several participants commented on the idea of extending MSD's senior citizens discount program. A key interest expressed was helping people who face a financial hardship. Comments included:

1. Consider people's ability to pay, not simply their age. Provide assistance and/or discounts to low-income populations.
 2. Evaluate whether the square footage of people's homes could be used as an indicator of the need for financial assistance.
 3. Examine the verification process and criteria that LG&E uses for its Winterhelp program.
- Some WWT stakeholders suggested working with the Green City Partnership on potential incentives.
 - A few WWT members recommended charging higher rates for people with the ability to pay in order to provide resources to offer incentives to people who "do the right thing" and discounts to people who need financial assistance.

Emergent Vision of MSD's Consent Decree Response

Angela Akridge of MSD gave a presentation on the emergent vision of MSD's response to the wet weather consent decree—the Integrated Overflow Abatement Plan (IOAP). General principles of the consent decree response include the following.

- The approach is shaped by the community values identified by the Wet Weather Team stakeholder group and by direct engagement with the public.
- Community partnerships—including support for green infrastructure and control of private property infiltration and inflow (I&I)—are essential to the success of the program.
- MSD is considering a wide range of control alternatives, and these are being evaluated using a values-based benefit-cost analysis.
- Monitoring and adaptive management will allow MSD to evaluate the program's performance and design future projects that are "right sized" and build on initial successes.
- Program costs must be affordable to the community and allow for continued economic growth.

Ms. Akridge noted that MSD intends for the IOAP to serve as a centerpiece of water quality improvement efforts in the community. Sewer overflow control is essential to improving water quality, but overflow control alone is not enough to meet water quality standards. Therefore, the "affordability" of the IOAP must be viewed in the context of other future water quality initiatives and other service needs. Other specific elements of the draft vision included the following.

- Control Strategies: Control strategies in the IOAP will include source control, storage, transport, and treatment. The values-based benefit/cost analysis and site-specific considerations determine the application of specific approaches.
- Sizing of Gray Solutions: Gray infrastructure will be sized after considering anticipated benefits from green infrastructure, private property I&I reduction, and other source control approaches.
- SSO Protection Level: The values-based benefit/cost analysis will determine the protection level for sanitary sewer overflows (SSOs), with a two-year design storm (i.e., a storm that occurs once every two years on average) proposed as the minimum level of protection for SSOs.
- CSO Regulatory Strategy: Based on EPA's CSO Policy, MSD's strategy for controlling wet weather CSOs may require a temporary waiver or suspension of standards during wet weather.
- Offsets for New Development: A three-to-one offset ratio is proposed to address the increase in wet weather flows associated with new development (that is, flows entering MSD's sewer systems will need to be reduced at a ratio of three gallons for every new gallon added).
- Education: Education to foster a sense of personal responsibility and ownership is critical to the success of the program.

- Funding: Rates and fees for the program must pay MSD's operating costs and debt service, and adequately maintain MSD's bond rating.

WWT members asked several clarifying questions in response to the presentation, and also offered a number of comments, as follows.

- In response to a question about offsets, Brian Bingham of MSD noted that the flow reductions would be from the system at large, not necessarily from the specific location of the new development. In part, this will allow MSD the flexibility to address the worst problems first. In prioritizing sewer rehabilitation efforts, MSD examines where public exposure is greatest and where it can achieve the greatest reductions in overflow volume and frequency.
- A few WWT stakeholders suggested that it could be useful to consider incentives for developing in areas where there is less impact on the sewer system (i.e., encouraging lower impact development); there also could be a role for impact fees in addressing this issue. The Louisville Metro government has examined impact fees for new developers and builders in some areas of the community.
- Several WWT participants commented on the relationship of MSD's federally enforceable IOAP and other community green initiatives.
 - Some WWT members indicated an interest in having other entities share the responsibility for water quality improvement efforts along with MSD. MSD, Metro Louisville's Planning and Design Department, Jefferson County Public Schools, developers, and other entities all can contribute and encourage change (in the words of one participant, "good water quality is not a spectator sport").
 - Furthermore, WWT participants indicated an interest in enabling broader community water quality improvement efforts, including green initiatives.
 - MSD noted that anything included in MSD's consent decree response is very difficult to change, even minor modifications, and suggested that the municipal stormwater permit can play a role in assuring further community water quality improvements. (MSD is one of several permittees on the stormwater permit, which the State of Kentucky oversees.)

WWT members also commented on MSD's intent to use the vision presentation for the next set of Project WIN public meetings, as follows.

- A few WWT members suggested that MSD add visuals to the presentation and incorporate roles for individuals to be involved (e.g., show how individual efforts help the bigger picture of water quality improvement). In addition, these messages should be brought to builders and other contractors.
- Some WWT stakeholders said that MSD could consider developing direct ads to consumers (e.g., developing short public service announcements on rain barrels, pervious pavement, etc.).

Draft CSO Understandings Document

Rob Greenwood of Ross & Associates reviewed the draft document, "Wet Weather Team Stakeholder Group Draft Understanding of Combined Sewer Overflow Control Strategies in MSD's Integrated Overflow Abatement Plan," and asked each WWT participant whether he or she agreed with the document or thought changes were needed. WWT stakeholder group members approved the CSO understandings document without changes.

Benefit/Cost Analytic Process and Sample Results

The technical team gave two presentations that outlined and provided examples of the analytic process the technical team is using to evaluate project alternatives for controlling CSOs and eliminating SSOs.

CSO Long Term Control Plan Benefit-Cost Analysis

Tim Kraus of O'Brien & Gere described the technical team's overall analytic approach to identifying and evaluating project alternatives for MSD's Long Term Control Plan for CSOs (one component of the IOAP). For each CSO location, the technical team's analytic approach includes the following steps.

1. Evaluate alternatives to apply each type of technology (storage, treatment, transport, sewer separation, and green solutions) and select the best alternative for each type of technology.
2. Look at single projects as well as grouped projects (projects that affect multiple CSOs).
3. Identify and evaluate integrated gray-green alternatives.
4. Compare across the technologies and select the alternative with the highest benefit-cost ratio.
5. For the selected project alternative, evaluate whether different levels of overflow control achieve higher benefit-cost ratios (as compared to the base case of four overflows per year).

As part of this presentation, Mr. Kraus also reviewed conceptual project designs and results of the benefit-cost analysis for a couple of technology options for specific CSOs.

SSO Control Project Benefit-Cost Analysis

Gary Swanson of CH2M HILL gave a presentation on SSO control issues, how the technical team is evaluating SSO control alternatives, and sample results from the benefit-cost analysis. The technical team has calibrated and validated modeling results to accurately characterize MSD's sanitary sewer system, and the team has divided the system into segments or "branches" for the purpose of the analysis (these are analogous to CSO "clusters"). SSO control options incorporate anticipated I&I reduction from the Program as a whole. The technical team is also evaluating how future growth will affect SSO solutions; however, Mr. Swanson noted that MSD's Capacity Assurance Program, not the IOAP, addresses the issue of new sewers to transport future flows. Finally, Mr. Swanson said that benefit-cost results inform both the selection of project alternatives and the optimum level of protection for particular SSOs.

Rob Greenwood of Ross & Associates noted that there will be four key anchors of the group's understanding of MSD's consent decree response, including:

- The vision for the Program;
- The values evaluation framework, which the WWT approved earlier in the WWT process;
- The application of the evaluation framework; and
- The overall suite of projects and other program elements.

WWT members asked several clarifying questions in response to these presentations and also provided the following comments.

- WWT stakeholders asked why the analysis of green alternatives was the third step in the process. Mr. Kraus said that the analytic steps weren't necessarily sequential, and reminded the group that the technical team is analyzing green solutions in parallel to gray solutions. (The third step above refers specifically to the integration of gray and green alternatives, not the evaluation of green alternatives.)
- A few WWT members suggested that it could be useful to develop a flow diagram or decision tree showing the process for identifying and selecting projects.

- In response to a question, Gary Swanson of CH2M HILL said that the SSO control alternatives evaluation process uses a target for source control that is factored into other technologies (e.g., the size of gray solutions assumes a certain level of flow reduction from source control).

Observer Comments

An MSD employee noted that MSD is interested in learning about the activities that other organizations are doing to improve water quality in the community.

Wrap Up and Next Steps

- The facilitation team will incorporate the proposed additional procedures related to sharing draft documents with sensitive, pre-decisional information into a revised version of the ground rules.
- MSD will investigate the possibility of the WWT meeting in an executive session (without observers) and the conditions under which this could occur, if at all. The facilitation team will get back to the WWT with any new information about MSD's policy on this issue.
- WWT members are encouraged to send comments and feedback on the emergent vision for MSD's Integrated Overflow Plan to the facilitation team at Ross & Associates.
- The facilitation team will check in with WWT stakeholders who missed the meeting about the draft CSO understandings document.
- MSD will conduct the third series of Project WIN public meetings about MSD's Integrated Overflow Abatement Plan. Meetings are scheduled for May 5, 6, 13, 14, 27, 28, and 29, 2008. (Meeting locations and times are posted on MSD's Project WIN website, www.msdlouky.org/projectwin.)
- Potential topics for the WWT's next meeting on May 15, 2008 include:
 - Refinements to the vision for MSD's Integrated Overflow Abatement Plan;
 - Draft monitoring and evaluation plan;
 - Draft education and outreach plan; and
 - Update on additional results of the benefit/cost analysis of project alternatives.

Meeting Participants

Wet Weather Team Stakeholders

Steve Barger, Labor
 Susan Barto, Mayor of Lyndon
 Stuart Benson, Louisville Metro Council, District 20
 Charles Cash, Louisville Metro Planning & Design Services Department
 Allan Dittmer, University of Louisville
 Faye Ellerkamp, City of Windy Hills
 Arnita Gadson, West Jefferson County Community Task Force and Kentucky Environmental Quality Commission
 Mike Heitz, Louisville Metro Parks Department
 Tom Herman, Zeon Chemicals
 Rick Johnstone, Deputy Mayor, Louisville Metro Mayor's Office
 Bob Marrett, CMB Development Company
 Kurt Mason, Jefferson County Soil and Water Conservation District
 Judy Nielsen, Louisville Metro Health Department

Lisa Santos, Irish Hill Neighborhood Association
David Tollerud, University of Louisville, School of Public Health and Information Sciences
Tina Ward-Pugh, Louisville Metro Council, District 9
David Wicks, Jefferson County Public Schools

MSD Personnel

Angela Akridge, MSD Regulatory Policy Manager
Brian Bingham, MSD Regulatory Management Services Director
Derek Guthrie, MSD Director of Engineering/Operations and Chief Engineer
Bud Schardein, MSD Executive Director

Facilitation and Technical Support

Gary Swanson, CH2M HILL
Rob Greenwood, Ross & Associates Environmental Consulting
Jennifer Tice, Ross & Associates Environmental Consulting

Meeting Observers

Arnold Celentano, MSD Board	Clay Kelly, Strand Associates
Jim Bruggers, Louisville Courier-Journal	Tim Kraus, O'Brien & Gere
Vicki Coombs, MSD	Paul Maron, Strand Associates
Kristin Crumpton, Tetra Tech	Chad McCormick, Strand Associates
Henry Cubero, The Cubero Group	Julia Muller, MSD
Marion Gee, MSD	Bill Sanders, Heritage
Justin Gray, MSD	Phillip Scott, O'Brien & Gere
Sue Green, MSD	Wes Sydnor, O'Brien & Gere

Meeting Materials

- Agenda for the 4/3/08 WWT Meeting
- Summary of the 2/26/08 WWT Meeting
- WWT Ground Rules with Potential Additions Highlighted
- Solution Ideas List (Updated March 2008)
- Education and Outreach Ideas List (Updated March 2008)
- Data Requests and Monitoring Suggestions List (Updated March 2008)
- Consensus Items List (Updated February 2008)
- User Fees and Incentives Presentation (Note: This presentation was also distributed at the 2/26/08 WWT meeting.)
- Emergent Vision for MSD's Consent Decree Response Presentation
- Draft WWT Stakeholder Group Understanding of Combined Sewer Overflow Control Strategies in MSD's Integrated Overflow Abatement Plan
- Combined Sewer Overflow LTCP Approach Summary and Benefit/Cost Sample Presentation
- Benefit/Cost Evaluation Results for CSO Project Alternatives "L_SO_MF_097_M" Handout
- SSO Control Summary and Benefit/Cost Results Example Presentation
- Draft SSS Initial Solutions Development Summary Sheets for Two SSOs in Beargrass Creek Middle Fork, Branch #6 Handout
- Compliance Monitoring Presentation (Note: This presentation was distributed but not discussed at the meeting.)

Louisville and Jefferson County Metropolitan Sewer District
Wet Weather Team Ground Rules

Revised Version for Discussion at the 4/3/08 WWT Meeting [Potential Additions Highlighted]

A. Participants and Participation

1. Wet Weather Team (WWT) members are “participants.” The Wet Weather Team consists of MSD personnel and a subgroup of stakeholders that will provide guidance to MSD. MSD personnel may participate in WWT discussions, but will not be included in decisions regarding stakeholder guidance to MSD. All participants in the stakeholder subgroup have equal representation.
2. The facilitation team is a neutral third party with no stake in the outcome of the discussions. The facilitation team, although under contract to MSD, works for the process and treats all Wet Weather Team participants as equal “clients.”
3. To ensure an effective process, participants agree to make every effort to attend all meetings. If an alternate is needed, the suggested alternate will be recommended to and discussed with MSD in advance to ensure there will be appropriate balance and representation on the Wet Weather Team.
4. Observers are welcome at meetings, but are not participants in the Wet Weather Team’s deliberations. A portion or portions of each meeting (not to exceed 15 minutes each) will be dedicated to receiving observer comments. Each observer’s oral comments must not exceed two minutes, although written comments to the WWT and/or MSD will be welcome throughout the process.
5. MSD will consider requests from participants to invite outside experts to speak at Wet Weather Team meetings on relevant topics; however, MSD reserves the option of providing additional or alternative perspectives at meetings to ensure that the full range of perspectives and factual evidence is provided.
6. Wet Weather Team members are expected to participate through the entire process; however, any participant may withdraw from the process at any time without prejudice. In the event a participant chooses to withdraw, he or she should communicate the reasons for withdrawal and may be replaced by MSD with another representative with similar expertise and experience.

B. Meeting Discussions and Procedures

1. Each participant agrees to honest and direct communications.
2. Participants are encouraged to frame observations in terms of needs and interests, not in terms of positions; opportunities for finding solutions increase dramatically when discussion focuses on needs and interests.
3. Decisions will be made during meetings; if an alternate attends a meeting, he or she must be fully briefed on Wet Weather Team deliberations and able to participate in decision making.
4. The facilitator will manage the discussions, using more or less structure depending on the nature and tenor of the discussions.
5. Participants and/or the facilitator may request a caucus break at any time during the meeting. Individual caucus breaks are not to exceed 15 minutes.

6. A general summary of meeting discussions will be prepared; observations contained in the summary will not be individually attributed. Participants can, however, submit attributed comments directly to MSD and/or the MSD Board for consideration; all written comments will be made available publicly.
7. All meetings will start and finish on time.

C. Desired Outcomes

1. The stakeholder subgroup of the Wet Weather Team is a “consensus seeking” body. The desired outcome is one in which all stakeholder subgroup members support the products and are willing to say so publicly. Full consensus, however, is not necessary to enable the MSD Board to have a balanced and well-informed final decision process.
2. The perspectives of all WWT stakeholders—particularly in cases where consensus is lacking—will be gathered throughout the plan development process and made available to the MSD Board for consideration during their final decision making.
3. To help the process stay on track, agreed-upon, non-mainstream issues may be recorded and dealt with at a later date or referred to other, more appropriate forums.

D. Communications Outside of Wet Weather Team Meetings

1. Individual observations are not for attribution outside the meeting.
2. Participants are encouraged to refer inquiries from the press to the facilitation team or to final meeting summaries or other final Wet Weather Team materials. Individuals who choose to speak with the press agree to limit remarks to personal views and to refrain from characterizing the views of, or attributing comments to, other participants or the full Wet Weather Team.
3. Wet Weather Team participants may share information about the project’s process and activities with peers outside the Team, as long as the communications make clear that the information is not an official product of the Team.
4. Wet Weather Team participants may share draft documents and communicate about the project’s progress with managers and co-workers within their own organizations. Wet Weather Team participants agree to consult with the Team before sharing draft documents outside of the Team or their immediate co-workers and managers.

[The following proposed text is for discussion at the 4/3/08 WWT meeting.]

- o Certain types of draft materials that contain pre-decisional information that is highly sensitive (e.g., potential sites for constructed facilities) will be labeled “draft: working documents not for release.”
- o Documents labeled “not for release” will not be shared during Wet Weather Team stakeholder meetings. Information from “not for release” documents may, however, be generalized or presented at a higher level of detail at WWT meetings if necessary to support WWT deliberations.
- o If Wet Weather Team participants would like to review “not for release” documents individually outside of WWT meetings, MSD will make the documents available for WWT members to review at MSD’s office in MSD’s presence. WWT members will be asked to sign a confidentiality agreement before reviewing “not for release” documents at MSD.

Wet Weather Team Solution Ideas **Working Draft – March 19, 2008**

The following is a list of potential “solution ideas” identified by Wet Weather Team (WWT) members that will be considered in the design of the Wet Weather Program. The list will act as a resource for the technical team as they consider project and program alternatives. These ideas were identified both at WWT meetings and through individual communications with WWT members (e.g., via e-mail). This list will remain “live” throughout the remainder of the WWT effort to capture ideas as they are shared. WWT members are encouraged to send additional ideas to the facilitation team for inclusion in this list.

New ideas will be listed under a “What’s New” section at the beginning of the document for easy reference, as well as under the appropriate section later in the document. After the “What’s New” list, this document is organized into three sections:

- Section I, “Project Alternatives,” is organized into five sub-categories: Stormwater Best Management Practices (Non-Structural), Stormwater Best Management Practices (Structural), CSO and SSO Point Source Controls, General/Other Solutions, and Site-Specific Solutions.
- Section II, “Funding Ideas and Incentives,” is organized into three sub-categories: Cost Allocation Strategies, Financial Incentives, and Funding Sources/Options.
- Section III, “Ideas Partly or Completely Outside the Scope of MSD’s Wet Weather Consent Decree,” includes municipal government actions that are only partly within MSD’s control, MSD actions that are not related to sewer overflow issues, and green infrastructure ideas that are not directly related to sewer overflow issues.

What’s New (February / March 2008)

1. (II-C-2-a through b) – Offer incentives for developers to use cost-effective, eco-friendly solutions (e.g., low impact development techniques, stormwater best management practices).
 - a. One idea for an incentive is to offer drainage credits.
 - b. Develop incentives for developers to use the greenest and simplest solutions for new development (e.g., moving permit applications to the front of the review line).
2. (III-Development Projects-10) – Look at opportunities to incorporate green infrastructure into brownfield development (e.g., in Park Hill Corridor).
3. (III-Development Projects-11) – Prepare a draft best management practice for developers on using green infrastructure.
4. (III-Other Entities-10) – Form partnerships with people and agencies who work on climate change issues (e.g., the new committee in the Green City Partnership).
5. (III-Other Entities-11) – Network with partners on education activities.

I. Project Alternatives

A. Stormwater Best Management Practices (Non-Structural)

1. Influence behavior of residential and commercial landowners through education. [Note: See the Education and Outreach Idea List for more ideas about educational efforts to influence behaviors.]
 - a. Promote water conservation practices: rain gardens, rain barrels, and responsible alternatives for sump pumps and downspout connections.

- b. Encourage stewardship: removing invasive vegetation from riparian zones, planting wetlands, litter cleanups, etc.
 - c. Conduct education on environmentally sustainable ways of using fertilizer and weed killer, and other stormwater best management practices to neighborhood groups.
 - d. Discourage chemical treatment of and mowing near waterways to help keep debris from waterways.
- 2. Regularly distribute billing inserts (like LG&E's) to MSD customers with facts and tips to encourage certain behaviors (e.g., lawn chemical management, pet waste management, landscaping practices).
- 3. Conduct a baseline survey and follow-up surveys of residents to determine whether education and outreach efforts are effective in changing behavior and perceptions on issues related to the Wet Weather Program.
- 4. Hold "CSO Action Days" during or right after a hard rain to promote behavior change (e.g., don't use your dishwasher, wait to do your laundry, etc.).
- 5. Encourage the use of best management practices for chemical use in lawn management practices.
 - a. Inform greens keepers about best management practices (BMPs), since non-point source runoff is made worse by golf course chemicals.
- 6. Develop a pledge for customers that clearly lays out behaviors that will help MSD meet Consent Decree requirements. For an example, see <http://www.watershedpledge.org> (see also II-B-4).
- 7. Invite people to "join" Project WIN by installing rain gardens, rain barrels, reducing their use of lawn chemicals, etc.
 - a. Add a page to MSD's website where people can submit notes or pictures of their efforts.
 - b. Give out plaques or other awards to those who "join."

B. Stormwater Best Management Practices (Structural, including Green Infrastructure Solutions)

- 1. Use landscaped areas to control stormwater runoff.
- 2. Encourage homeowners to construct rain gardens and use rain barrels.
- 3. Install French drains along roads to accept stormwater runoff (see also detailed suggestions listed for Beechwood Village below).
- 4. Develop specific design parameters or standards for stormwater best management practices and low impact development techniques and include these in an MSD Design Manual. The Design Manual should provide guidance for approaches including, but not limited to, the following:
 - a. Pervious pavement
 - b. Level spreaders
 - c. Riparian buffers
 - d. Vegetated swales
 - e. Wet ponds
 - f. Wet ponds with forebays (small basins that settle out incoming sediment before it is delivered to a stormwater BMP)
 - g. Wetlands
- 5. Consider incorporating aspects of the LEED green building standards into MSD design manuals for structural BMPs.
- 6. Increase tree canopy.
 - a. Ensure that urban CSO areas have at least a 30 percent tree canopy.
 - b. Initiate a tree-planting program with a goal to increase tree canopy in neighborhoods.

7. Work with the community group "Women of Vision" to create a meditation garden in the West End that could also act as a rain garden or roof runoff demonstration.
8. Conduct demonstration projects. [Note: Overlaps with demonstration projects in Education and Outreach Ideas List.] Specific ideas for projects include:
 - a. Create a demonstration area in each Jefferson County watershed to demonstrate and interpret healthy stream habitats and what MSD is doing to study and protect them.
 - b. Create some sustainable lawns as pilot projects
 - c. Develop a green infrastructure best management practice site similar to SD1 (Sanitation District Number 1 of Northern Kentucky).
 - d. Add green demonstration/education facilities to old urban schools.
 - e. Use the Butchertown Greenway Pump Station that is offline for an education and demonstration facility.
9. Plant native plants with deep root systems.
10. Maintain existing detention/retention basins – many may not function properly due to lack of maintenance.
11. Design structural stormwater best management practices to be multiple use and eco-friendly.
 - a. Design detention ponds and stream buffers for recreational use.
 - b. Make use of detention facilities as sports fields
 - c. Incorporate trails along streams to provide recreational opportunities.
12. Convert alley stormwater systems into infiltration systems using pervious pavement.
 - a. Potential areas could include the central business district and the west end.

C. CSO and SSO Point Source Controls

1. Disconnect downspouts and/or sump pumps (e.g., by developing educational initiatives aimed at landowners).
 - a. One potential target for a downspout disconnection program could be school buildings.
 - b. Yard signs similar to those used in Portland's residential Downspout Disconnection Program could be useful for education and outreach about MSD's Wet Weather Program. [Note: This idea overlaps with the Education Ideas List.] Specific ideas for signs include:
 - i. Messages such as "I disconnected my downspout" and/or "I have a rain barrel."
 - ii. The bottom of the sign could invite readers to "ask me" for more information.
2. Increase enforcement and inspections of downspout and sump pump connections.
 - a. Incorporate inspections into the property-transfer process (e.g., as another inspection with the sale of existing homes). For example, MSD could deputize the state plumbing inspector, which has the authority to go into private property, to conduct inspections of downspouts. MSD could pay on a per building basis for those inspections.
3. Look at large parking lots as potential sites for wastewater storage facilities. Organizations might be willing to have a covered storage facility built below a ground-level parking lot. In addition, there could be opportunities to add value for the property owner, by building a parking garage as a replacement and/or by providing credit for any non-point source pollution reduction associated with the project.
4. Repair and seal all building laterals.
5. Act on any sump pump or other illegal connection issues uncovered during the course of MSD's regular operations and maintenance work on the sanitary and combined sewer systems.

D. General/Other Solutions

1. Leverage and coordinate the Wet Weather Program efforts with MSD's MS4 stormwater management permitting responsibilities.
2. Conduct green infrastructure demonstration projects with monitoring components built in, to help demonstrate the overall effectiveness of green infrastructure solutions.
 - a. Start with small, visible projects ("quick wins" – e.g., in a particular neighborhood, near a Rubbertown plant).
3. Preserve rural character where possible.
4. Create a localized resource database to support green infrastructure development efforts (e.g., provide information on contractors that install pervious pavements). Specific ideas include:
 - a. Develop a list of environmentally approved chemicals for use in lawn/landscape management.
 - b. Landscape architects could provide green options for projects and developments.
5. Do not rule out flow-reduction techniques to address SSOs for any watershed.
6. Look at combining different types of control options, including opportunities to reduce flows of water into the sewer system (e.g., from housing units) in tandem with other types of solutions. For example, combining storage and flow-reduction approaches could make it possible to use a smaller-sized storage facility.
7. Involve community members in addressing the root causes of SSOs (e.g., by working with the Metro Council, community organizers, and neighborhood groups).
8. Challenge preconceived notions of what U.S. EPA will accept in terms of the role of source control in an SSO elimination plan.
 - a. Use technical feasibility and cost effectiveness as the primary basis for deciding the level of source control to meet regulatory compliance obligations, and work with relevant regulatory bodies to justify the basis for this approach.
9. Consider wet weather sewer overflow control strategies that reduce future maintenance issues.

E. Site-Specific Solutions (Considered in Addition to the Solutions Listed Above)

Beechwood Village

1. Construct a park-like wet detention area in the wooded area of St. Matthews Park.
2. Install new sanitary lines and laterals to homes, and pumps for basement facilities when requested by the homeowner.
3. Install French drains on either side of roadways to accept stormwater runoff. The drains would be continuous trenches filled with gravel and covered by turf. The drains could also accept discharges from sump pumps and downspouts.
4. Install perforated pipe in the French drains so they can discharge more freely when they flood. The piped drain system would need to be a combination of gravity and pump depending on the topography and discharge point(s).
5. If a solid pipe system is used, the system could discharge to constructed wetlands designed to treat stormwater. Possible sites for constructed wetlands are the forest north of the Community Park and the detention pond for the bank on Shelbyville Road at the Beechwood Village entrance.
6. Restore natural stream banks for the Sinking Fork north of Shelbyville Road where the big pump now sits.

Beargrass Creek – Middle Fork

1. Restore the Middle Fork between Grinstead crossing and confluence.
 - a. Restore wetlands and improve aquatic health in the following areas:
 - i. The isolated quarry areas to the north of the interstate between Grinstead and Payne (which receives a small CSO discharge). One specific idea is to remove sediments from these areas.
 - ii. The old meander into which CSO 127 discharges and the wet meadow in its bend.
 - b. Work with the City of Louisville, the Parks, and the private sector to turn this area into a greenway that connects the waterfront with Cherokee and Seneca Parks, and eventually with parks in Saint Matthews, with a bikeway from Saint Matthews to downtown.
 - c. Close CSOs in this area using projects that reduce flooding and improve water quality.
2. CSOs 125, 126, 127, 144, and 166; and CSOs 86 and 140 could potentially be treated at one facility (some pumping would be required). This could be a visible project that could help link areas in the community.
3. Potentially develop the River Metals property (a brownfield near the Girl Scouts Building) as a storage or wetlands treatment area.
4. Establish wetlands at Seneca Park and Old Cannons Lane.
5. Consider locations/sites for storage solutions that are closer to the SSOs in the Anchor Estates Pump Station watershed than the potential location presented at the 9/20/07 WWT meeting.
6. Utilize parks property orphaned by I-64 as a detention basin for the Beals Branch sewershed CSO. Restore the sediment-filled wetland at the confluence of Beals Branch and the Middle Fork as a treatment wetland for the basin's discharge.

Beargrass Creek – South Fork

1. Restore the South Fork between I-264 and Eastern Parkway.
 - a. Restore the stream channel, along with the wet meadows and woods in the floodplain.
 - b. Coordinate with landowners (e.g., the City of Louisville and Bellarmine College) on the restoration of the stream segment, which is part of a “nature education” corridor and is subject to MSD conservation easements.
 - c. Potentially make this area into a bikeway as part of the solution.

Beargrass Creek – Muddy Fork

1. Restore Eva Bandman Park.
 - a. Convert the park into restored wetlands with a boardwalk for visitors.
 - b. Include the park as part of the solution for the CSOs that discharge at the confluence by having it receive their stormwater.
2. Tie the impaired section of Beargrass Creek to newly created wetlands, near Eva Bandman Park.
3. Incorporate green infrastructure into the Arts Center.
4. Turn the MSD pump station into an interpretive center.
5. For CSOs 132, 154, and 167:
 - a. Conduct a concentrated effort to disconnect downspouts in this area.
 - b. Use incentives to get people to help solve the problem in this area. In particular, educate people about ways to reduce non-point source pollution.
 - c. Acquire properties in flood-prone areas by paying more than fair market value for the homes (as compensation to homeowners for having to move). These areas could then be used to

create detention or retention basins, or other facilities/structures to reduce wet-weather sewer overflows. [Note: Purchasing properties in flood-prone areas is also listed in Section III.]

Floyds Fork Watershed

1. Look for opportunities for green infrastructure in the Floyds Fork watershed, as it is the last undeveloped area in Jefferson County.
2. Protect Floyds Fork with riparian buffers and other preservation efforts.

Other Watershed and Site-Specific Solutions

1. Create an 800-acre lake in the southwest portion of Jefferson County. Use a dam/flood wall to build it and include marshes around it.
2. Examine other sites for green infrastructure opportunities, such as:
 - a. Pond Creek Lake and the southwest pump stations (this area has been studied already by the Corp of Engineers)
 - b. The Bradley Property

II. Funding Ideas and Incentives

A. Cost Allocation Strategies

1. Equitably assign costs (focus areas for the financial equity value):
 - a. Consider the burden on fixed income and low-income populations.
 - i. Spread payments over a longer time period if this would reduce the burden on lower income residents.
 - b. Rates and fees that are linked to the cost to serve (i.e., the level of impact).
 - c. Consider how the community develops to make sure that everyone pays into the solution.
2. Charge residences differently depending on the area of impervious surfaces on properties (and therefore the amount of stormwater runoff that would be generated).
3. Require lower development fees for areas that already have sewer capacity (e.g., urban areas in need of re-investment).
4. Bill based on increased water usage—the more you use, the higher the rate.
5. Develop an equitable plan for joint funding for permeable pavement efforts.
6. General principles for funding and cost allocation:
 - a. Have higher rates in the near term to avoid future balloon payments.
 - b. Create balance between what the community pays now and what the community will pay later.
 - c. Do not increase rates so much that they drive companies or residents to move elsewhere.
 - d. Use the community's resources wisely. This will involved dealing with issues such as the Big 4 SSOs, but also working on long-term strategies to improve water quality such as promoting behavior change through education.

B. Funding Sources/Options

1. Consider using volunteers to reduce costs.
2. Consider solutions that could meet the objectives of multiple agencies (e.g., water quality and flood control improvements) and therefore could potentially receive funding from multiple sources.

3. Consider additional user charges that could be used as a result of adopting a different rate schedule.
4. Maintaining a certain level of bond rating could be a way of setting limits on how much money MSD borrows versus how much it generates in internal revenues.
5. Consider not borrowing any money.
6. Balance the impact of potential financial packages on MSD's bond rating, rates, and cash flow/liquidity.

C. Incentives *[Note: Incentives related to a potential ordinance to address private sources of infiltration and inflow are located in Section III-A-Regulatory Requirements/Policies]*

2. Provide incentives for "preferred" behaviors.
3. Offer incentives for developers to use cost-effective, eco-friendly solutions (e.g., low impact development techniques, stormwater best management practices).
 - a. One idea for an incentive is to offer drainage credits.
 - b. Develop incentives for developers to use the greenest and simplest solutions for new development (e.g., moving permit applications to the front of the review line).
4. Charge reduced wastewater rates to property owners that use eco-friendly techniques to reduce stormwater runoff.
5. Reduce fees for families or businesses who sign a pledge that clearly lays out behaviors that will help MSD meet Consent Decree requirements (see also I-A-5).
 - a. In critical CSO neighborhoods, provide free rain barrels to people who sign the pledge.
6. Develop compensation credits to help alleviate financial burden to developers and property owners.
7. Reduce rates for houses that are certified (i.e., through inspections) as eliminating inflow from their properties into the sewer systems.
8. Develop and administer a "forgivable loan" program that would cover the replacement of a private lateral line when an inspection reveals that it contributes to an SSO.
 - a. The loan would be up to a maximum amount set by MSD for the private contracting work and would be forgiven at the end of, for example, 20 years, if the homeowner made no illicit connections. If illicit connections were made, the loan would be due in its full amount, civil penalties would apply, and water would be disconnected after a grace period if the illicit connections weren't removed.
 - b. The loan program would require regular inspections.
 - c. The loan would come due via lien if the homeowner sold the property, but the new homeowner could negotiate with MSD for a new loan but with a new twenty year term.
9. Consider not charging based on winter water usage, as this could potentially remove an incentive to conserve water, since water usage varies more in the summer.

III. Ideas Partly or Completely Outside the Scope of MSD's Wet Weather Consent Decree

A. Municipal Government Actions (Only Partly within MSD's Control)

Regulatory Requirements/Policies

1. Improve the development review process for new subdivisions. Deny permits for subdivisions or any new homes if the plant in the area is above capacity.
2. Require that regional detention ponds in post-developed areas provide filtration for storms that occur every two years or less.
3. Require post-development runoff to be equal to pre-development runoff.

4. Develop mandatory or alternative green solutions for development projects (e.g., by changing development codes).
5. Determine impervious surface limits for individual watersheds.
6. Deny permits for sites within CSO or SSO sewersheds that have any incidents of illegal connections to the sewer system to limit impacts on already overloaded systems.
7. Use wet weather capacity (instead of dry weather capacity) of the sewer system as the baseline for approving new development.
8. Develop an ordinance to address private sources of infiltration and inflow. Ideas related to a potential ordinance include:

Authority and Responsibility for Inspections and Enforcement

- a. Develop an ordinance that would allow MSD or a plumbing inspector to enter homes to identify sources of infiltration and inflow (e.g., broken foundation drains). MSD could subsidize or help pay for the costs of the inspections.
- b. Require contractors and plumbers working on private property to check for sources infiltration and inflow.
- c. Adopt a requirement for inspections of private properties for sources of infiltration and inflow any time a building permit is issued (e.g., for an addition to an existing home).
- d. The ordinance should have the flexibility to allow people other than plumbing inspectors to conduct inspections of private properties.
 - i. Allow other types of inspectors to do the inspections.
 - ii. Allow property owners to make repairs themselves and then have certified inspectors inspect the repairs.
 - iii. It may be better from an accountability perspective to not have MSD do the inspections, repair work, and enforcement.

Trigger for Inspections

- e. Use a proactive approach to inspecting properties (such as the approach used in Johnson County, KS) that would allow MSD to target high-priority areas.
- f. Use two approaches for triggering property inspections: require inspections during the property transfer process, and also proactively target certain neighborhoods/areas for inspections.

Scope

- g. Have the ordinance address issues with the combined sewer system as well as the sanitary sewer system (e.g., look at ways to reduce runoff and limit impervious cover in the CSO area).
- h. Expand the scope of the ordinance to include:
 - i. An outright ban on downspouts, sump pumps, and basement drains.
 - ii. A requirement that new parking lots and parking lots that are going to be repaved have more stormwater controls.

Financial Assistance

- i. MSD should provide financial assistance to the community related to the ordinance.
- j. The ordinance should include a cost-sharing component.

Other

- k. Develop legislation related to private sources of infiltration and inflow that would:
 - i. Prohibit clear water connections to the sanitary system.
 - ii. Require homeowners to maintain the lateral line.

- iii. Provide for civil penalties for homeowners and plumbers for illicit connections or failure to repair the lateral line.
- iv. Disconnect water supply after a brief grace period if the problems aren't corrected.
- v. Give MSD the authority to inspect when an SSO occurs downstream of any sanitary connection.
- vi. Describe a process MSD would use when it must inspect sanitary connections upstream from an SSO, including notice and information about the program.
- vii. This new inspection process should begin immediately with the "Big 4" SSOs, but could be implemented when MSD detects others.
- l. A draft ordinance should be reviewed by a county/city attorney.

Opportunities to Encourage/Use Green Infrastructure in Development Projects

- 1. Utilize very large basins or lakes in new development areas and in rural areas. For new developments, create larger detention/retention basins.
- 2. Preserve existing natural systems, vegetation, and trees during development, rather than removing and rebuilding them. Take advantage of existing assets in development opportunities.
- 3. Look at green parking opportunities along business corridors.
- 4. Look at opportunities to develop more upward and infill already developed areas (i.e., increase density).
- 5. Develop a "complete streets" program policy to encourage "parkway-like" streets and reduce stormwater run-off.
- 6. Form partnerships with housing developers to minimize impervious surfaces.
- 7. The parking lot on Frankfort Avenue could utilize porous pavement for public parking.
- 8. Develop a recognition program for those who use green infrastructure.
- 9. Opportunities in schools:
 - a. Incorporate green elements into the three new research facilities being planned at the University of Louisville.
 - b. Turn school grounds into "ecological playgrounds" for neighborhoods.
- 10. Look at opportunities to incorporate green infrastructure into brownfield development (e.g., in Park Hill Corridor).
- 11. Prepare a draft best management practice for developers on using green infrastructure.

Opportunities to Link MSD Efforts to Existing Partnerships and Programs

- 1. Develop a "comprehensive solution" for local environmental improvement and education efforts.
 - a. Fund and staff a collaborative planning effort to link the environmental education programs of multiple local agencies (MSD, Louisville Water Company, Metro government departments, Mayor's Office, TARC, etc.) together, develop specific goals and assessment systems, and then hold agencies accountable to those goals.
- 2. Encourage local government agencies (e.g., Jefferson County Public Schools, Metro Parks) to adopt preventative practices to decrease stormwater runoff and wastewater volumes (e.g., low-flow toilets, pervious pavement, additional tree coverage, etc.).
- 3. Integrate green projects into planning efforts underway.
- 4. Work with the Green City Partnership (an initiative involving the Louisville Metro Government, Jefferson County Public Schools, and the University of Louisville) on green infrastructure efforts. The Metro Green Initiative should be a leader for the community's Green City Partnership.

5. Consider green infrastructure in the context of healthy activity improvement projects and projects that promote greater walk-ability in neighborhoods.
6. Make use of neighborhood plans. There could be opportunities to incorporate green infrastructure into the 14 neighborhood plans and 6 neighborhood assessments that are being developed, as well as in neighborhood plans that will be developed in the future.

Opportunities for MSD to Collaborate with Other Entities

1. Coordinate with planning and zoning departments and other governmental entities around the value of green infrastructure.
2. Partner with schools to relate students' community service efforts with green projects.
3. Coordinate with other regional entities to build a major treatment plant near the Salt River.
4. Consider linking Wet Weather Program construction projects to road construction efforts.
 - a. One potential place for such a linkage is the road construction occurring in the Goose Creek Pump Station area.
5. Work with governmental entities to "lead by example" by eliminating infiltration and inflow entering the sewer systems from government-owned properties.
6. Consider where development will occur in the future, in order to avoid having similar wet weather problems related to private sources of infiltration and inflow in the future.
7. Partner with other cities and states that have wet weather consent decrees to collectively ask federal representatives to seek additional government funds for wastewater and stormwater management improvement efforts.
8. Coordinate with other agencies to examine the total impacts of all utility costs (water, wastewater, energy, gas) on customers.
9. Help the community implement a watershed approach to improving water quality that includes addressing stormwater and non-point source pollution in addition to CSOs and SSOs.
10. Form partnerships with people and agencies who work on climate change issues (e.g., the new committee in the Green City Partnership).
11. Network with partners on education activities.

B. MSD Actions Not Related to Sewer Overflow Issues

1. Purchase properties within the floodplain.
 - a. Buy land that is flooded on a regular basis and turn it into parks.
 - b. When building a detention basin, buy properties in the floodplain that are most impacted.
2. Improve implementation and enforcement of the Sediment Control Act.
3. Partner with local lawn care companies to promote Louisville Green (MSD's organic fertilizer).
4. Do not give rebates during droughts and do not give special rates for irrigation meters for residential or commercial entities for lawn care, as this could be seen as encouraging lawns, which can contribute to water quality problems (e.g., runoff containing fertilizers and pesticides).

C. Green Infrastructure Ideas Not Related to Wet Weather Issues

1. Heine Brothers Coffee is looking for five acres for an urban farm to grow produce and sell to local restaurants.
2. The "86-64" community effort to remove portions of I-64 could be an opportunity to reclaim the waterfront and promote public transportation such as light rail.
3. Utilize the open space in parks for green infrastructure.

4. Develop and educate residents about urban farming opportunities.
5. Teach and promote sensible/responsible development.
6. Require parking lots to provide shaded areas.
7. Establish a tree ordinance to protect specific trees (identified based on species, age, etc.) and require mitigation if the protect trees are damaged or removed.
8. Protect or improve water quality and flood control for developments.

Wet Weather Team Education and Outreach Idea List

Working Draft – March 19, 2008

The following is a list of education and outreach ideas identified by Wet Weather Team (WWT) members for consideration for the Wet Weather Program. The list will act as a resource for MSD and the technical team as they develop and refine the draft education and outreach plan for MSD's Wet Weather Program. (The focus of this list is on long-term education, outreach, and public engagement efforts, rather than near-term activities such as public meetings occurring during the WWT process.) These ideas were identified both at WWT meetings and through individual communications with WWT members (e.g., via e-mail). This list will remain "live" throughout the remainder of the WWT effort, and WWT members are encouraged to send additional ideas for this list to the facilitation team.

New ideas will be listed under a "What's New" section at the beginning of the document for easy reference, as well as under the appropriate section later in the document. The remainder of the document is organized into two main sections, Section I, which focuses on MSD Wet Weather Program education and outreach efforts, and Section 2, which covers efforts that are only partly within MSD's control.

What's New (February / March 2008)

1. (1-B-5-q) – Educate people about the benefits of green projects that are the result of partnerships between MSD and other agencies.
2. (1-C-10-l) – Bring up the green aspects of the Wet Weather Program at public meetings in order to find more partners for MSD to collaborate with on green projects.

I. MSD Wet Weather Program Education and Outreach Efforts

A. Education/Outreach Program Characteristics

1. MSD should expand upon its existing education and outreach efforts, including Project WIN and other MSD programs such as Living Lands and Waters.
2. Education efforts should be comprehensive, adequately resourced, and human scale to encourage behavior changes (e.g., stewardship practices).
3. To be successful, public involvement efforts should include:
 - a. A corporate or programmatic identity: logo, leader, advisory board, budget, mission, goals, website, etc.
 - b. Communications: announcements, fliers, newsletters, radio/TV appearances, etc.
 - c. Stewardship: removing invasive vegetation from riparian zones, planting wetlands, [and yes] litter cleanups
 - d. Education: stream science, water quality monitoring
 - e. Conservation: promoting rain gardens, rain barrels, and responsible alternatives for sump pumps and downspout connections.
 - f. Coordination: linking the public involvement activity with MSD and the wet weather team
 - g. Celebration: festivals, canoe floats, and other events that call positive attention to the area's waterways.
4. Outreach efforts should show people that there is an open and transparent process within which MSD is making decisions on behalf of the community.

B. Audiences, Objectives, and Messages

1. Target education efforts in “critical CSO neighborhoods” and schools in those areas.
 - a. Use a targeted direct-mail approach to help address local, site-specific problems.
2. Involve commercial and industrial customers and solutions through PR and planning, not just residential customers.
3. Make a presentation to the full Metro Council.
4. Work with schools (in conjunction with Earth Day and river/creek cleanups) to involve both students and parents.
5. Message ideas:
 - a. Develop positive educational messages about the value of clean water to supplement other education and outreach messages. (CSO warning signs, river sweeps, and other elements of MSD’s outreach activities send a negative message about the community’s water resources.)
 - b. Can the “water is dirty, stay away from it” signs that EPA designated include a promise that the public can change the situation?
 - c. Translate Consent Decree activities into dollar impacts for residents.
 - d. Communicate that we have no choice but must comply with the requirements of the consent decree in a timely manner.
 - e. Help people understand how they are connected to the problem.
 - f. Help change the perception people have of streams to a positive one (people think that streams are “dead”).
 - g. Help people understand that green infrastructure can be incorporated into urban areas, since urban areas can be redeveloped.
 - h. Craft messages explaining the importance of addressing private sources of infiltration and inflow, and people’s personal responsibility for addressing it.
 - i. Create community ownership of the solutions.
 - j. Stress that there are two sides to EPA compliance, and note that programs will affect some people more directly than others because of the way the sewer system has developed over time:
 - i. What MSD is going to do with its infrastructure that will affect the whole community.
 - ii. What citizens and businesses will be asked to do.
 - k. Inform the community that EPA is targeting three parts of the sewer system: CSO sewersheds, the “Big 4” SSO sewersheds, and the other SSO sewersheds.
 - l. Help people understand that, even though MSD is paying the EPA Consent Decree rate surcharge, the community as a whole must help solve the problem.
 - m. Help people understand the differences between the combined sewer system and the sanitary sewer system.
 - n. Explain funding concepts and choices to the public. Showing side-by-side cost comparisons could be a particularly useful way of doing this.
 - o. Thoroughly explain the financial assistance component of any private infiltration and inflow reduction program.
 - p. Some information from MSD’s Sewer Overflow Response Protocol training (such as how MSD prepares for wet weather events) could be useful to share with the public, potentially during weather forecasts.

- q. Educate people about the benefits of green projects that are the result of partnerships between MSD and other agencies.
- 6. Involve neighborhoods in identifying potential green infrastructure solutions (e.g., by having a neighborhood competition to get grassroots ideas for potential solutions).
- 7. Develop education programs for schools that allow children to take information home.
- 8. Educate local leaders on the need for source reduction. One way to do this would be to show them the cost of specific solutions to SSO and CSO problems.
- 9. Explain problems and programs related to SSOs directly to homeowners (individually if necessary), and enlist neighborhood associations and other neighborhood institutions to help when appropriate.
- 10. Conduct an aggressive education effort before instituting any new requirement that would address private-side infiltration and inflow sources.
- 11. Develop and implement a public information and involvement strategy for each of the three parts of the sewer system that EPA is targeting: the "Big 4" SSO sewersheds, the other SSO sewersheds, and the CSO sewersheds.
 - a. Each area should be mapped and made publicly available on MSD's website.
 - b. Public information should roll out in consecutive waves so the different programs can be explained to the larger community and the direct effects can be explained to the parts of the community that may need to do more to make them work.
 - c. The first wave of public information should address the "Big 4" SSO sewersheds, followed by the other SSO sewersheds, and then the CSO sewersheds.
- 12. Communicate effectively with the community regarding rate increases.
 - a. Keep the message positive.
 - b. Include as part of the message that the alternative to the Wet Weather Program is having the federal courts impose requirements on the community.
 - c. Tell residents what they are getting for their money and how these efforts are improving public health.
 - d. Help people feel involved in the process and understand that they have some responsibility for helping solve the problem (e.g., through communications that ask, "can you help us?" instead of "we're going to do this").
 - e. Help residents understand what they are paying for and what the community has to do to improve water quality and comply with the Consent Decree.

C. General Outreach and Education Strategies and Techniques

- I. Use a variety of communication media to inform Louisville residents about issues, opportunities, and activities related to the Wet Weather Program and the Consent Decree. Examples include:
 - a. feature articles and/or advertisements in the Courier Journal
 - b. direct mail
 - c. public service announcements on television
 - d. radio (WLOU/WLLV 1350 and 101.3 FM for the west)
 - e. e-mail lists ("UofL announcements" to University of Louisville employees, e-mail lists for Metro Council members)
 - f. website(s) (provide information, as well as solicit input and questions)
 - g. community meetings ("piggy back" on other events/meetings such as the Mayor's Night Out, community association meetings, Metro Council meetings, etc.)

- h. media “groundbreaking” events
 - i. 5-minute DVD video (highlight the central issues and indicate the short and long-term consequences)
 - j. hold a “creek concert” to raise awareness of stream issues to young people
 - k. develop/use a Kentucky State Fair Exhibit (permanent or traveling)
 - l. hold a speaker’s forum and/or have a group of people available that could speak at community meetings and events
 - m. work with the Mayor’s press staff and the Louisville Metro Neighborhoods Department to get the word out
 - n. hold a press conference
2. Develop/use posters and visual displays to illustrate concepts to the public and provide context to Wet Weather Program activities. Specific suggestions include:
 - a. Schematic of a combined sewer overflow
 - b. Schematic of sump pumps and downspouts connected to sanitary sewers
 - c. Map of the combined sewer area and outfalls against blue line streams and landmarks (road system would do)
 - d. Map of SSO outfalls including the sewersheds of the “big four,” as above
 - e. Water Quality maps from the Beargrass Creek report card, also water quality info about Ohio River related to CSO outfalls
 - f. Comparison of city sewer rates indicating which cities have consent decrees
 - g. Time frames for the major deliverables in the Consent Decree
 - h. Create visible representations of the solution, since they can be helpful for explaining project concepts to the public. Use these visual representations when soliciting community input.
 3. Initiate a dialog with neighborhoods, potentially including door-to-door outreach, to better understand local water quality problems and to solicit local input on potential solutions.
 4. Develop a speakers bureau to attend chamber/business association meetings and other groups that use speakers.
 5. Conduct demonstration projects (Note: Overlaps with demonstration projects in Solution Ideas List). Specific ideas include:
 - a. Create a demonstration area in each Jefferson County watershed to demonstrate and interpret healthy stream habitats and what MSD is doing to study and protect them.
 - b. Strategically place demonstration projects (e.g., porous pavement) near neighborhoods.
 - c. Create some sustainable lawns as pilot projects
 - d. Develop a green infrastructure best management practice site similar to SDI (Sanitation District Number 1 of Northern Kentucky).
 - e. Add green demonstration/education facilities to old urban schools.
 - f. The Clifton neighborhood is motivated, so would be a good demonstration area to show the effects of behavior change.
 - g. Use the Butchertown Greenway Pump Station that is offline for an education and demonstration facility.
 6. Present “Where is your CSO or SSO?” information on-line: On the MSD or LOGIC website, have the ability to type in your address and have it call up the location of the CSO or SSO that the property owner’s waste goes to. The website could describe the watershed that contributes water and runoff to that individual CSO or SSO.

7. Support the identification of public watershed advocates for each Jefferson County watershed. Each watershed needs a public advocate. It could be connected with a nature center, or be an independent citizen advocacy group.
8. Make MSD facilities visitor friendly. For example, add educational exhibits around the flood wall, the history of flooding, etc. to the Beargrass Creek Pump Station and near the flood detention basins at the Fairgrounds.
9. Have MSD employees be educational ambassadors, as a way of making Louisville environmentally literate.
10. Public meeting ideas:
 - a. To increase attendance, consider latching onto other meetings.
 - b. Ideas for places/ways to advertise the public meetings:
 - i. Churches
 - ii. PTA meetings.
 - iii. Metro Council and neighborhood newsletters
 - iv. Channel 25 (Metro Louisville programming)
 - v. Short recorded messages on phones
 - vi. Send announcements about the public meetings through the Department of Neighborhoods distribution list to get word out to neighborhood groups.
 - vii. Listservs
 - viii. Get the word out at local schools so kids can take information home to their parents.
 - ix. Local TV or NPR piece
 - x. Homeowners Association newsletters
 - xi. Suburban city newsletters
 - c. Start public meeting presentations with information on rates to get people's attention.
 - d. At public meetings, consider the fact that people need time to digest information from presentations and written materials.
 - e. Avoid using acronyms in presentations and discussions with community members.
 - f. Conduct direct outreach to block watch groups, neighborhood associations, and business associations to identify neighborhood leaders.
 - g. Give people at least two weeks advance notice of the public meetings.
 - h. Have the Metro Council representative for the local area host the public meetings.
 - i. Hold public meetings at local schools, maybe in conjunction with other meetings that are already taking place.
 - j. Give information that is as specific in terms of location as possible at the public meetings.
 - k. Advertise some of the potential solutions being considered, and hold the meetings near some of the likely places of disruption, as a way to get people to attend public meetings.
 - l. Bring up the green aspects of the Wet Weather Program at public meetings in order to find more partners for MSD to collaborate with on green projects.
11. Add a portal to MSD's website where people can submit comments on Project WIN; run a public service announcement to inform people about the issues and the website address for submitting comments.
12. Develop and run an information booth at selected festivals in the community (similar to the booth used for Project XL).

13. Use the potential disruption along Hikes Lane (part of the Big Four SSO plan) as an opportunity for broader education of the public about wet weather sewer overflow issues.
14. Yard signs similar to those used in Portland's residential Downspout Disconnection Program could be useful for education and outreach about MSD's Wet Weather Program. [Note: Overlaps with CSO and SSO Point Source Controls in Solution Ideas List.] Specific ideas for signs include:
 - a. Messages such as "I disconnected my downspout" and/or "I have a rain barrel."
 - b. The bottom of the sign could invite readers to "ask me" for more information.
15. Invite people to "join" Project WIN by installing rain gardens, rain barrels, reducing their use of lawn chemicals, etc.
 - a. Add a page to MSD's website where people can submit notes or pictures of their efforts.
 - b. Give out plaques or other awards to those who "join."

D. Education to Change Behavior [Overlaps with Behavior Change Strategies in Solution Ideas List]

1. Influence behavior of residential and commercial landowners through education.
 - a. Promote water conservation practices: rain gardens, rain barrels, and responsible alternatives for sump pumps and downspout connections.
 - b. Encourage stewardship: removing invasive vegetation from riparian zones, planting wetlands, litter cleanups, etc.
 - c. Conduct education regarding fertilizer, weed killer, and other stormwater best management practices to neighborhood groups.
 - d. Develop and educate residents about urban farming opportunities
 - e. Teach and promote sensible/responsible development.
 - f. Discourage chemical treatment and mowing near waterways to help keep debris from waterways.
2. Regularly distribute billing inserts (like LG&E's) to MSD customers with facts and tips to encourage certain behaviors (e.g., lawn chemical management, pet waste management, landscaping practices).
3. Hold "CSO Action Days" (like Ozone Action Days) during or right after a hard rain to raise awareness and promote behavior change (e.g., don't use your dishwasher or clothes washer, wait to drain your bathtub, etc.).
4. Develop a pledge for customers that clearly lays out behaviors that will help MSD meet Consent Decree requirements. For an example, see <http://www.watershedpledge.org>
5. Encourage the use of best management practices for chemical use in lawn management practices.
 - a. Inform greens keepers about best management practices (BMPs), since non-point source runoff is made worse by golf course chemicals.
6. Provide technical assistance to support behavior-change efforts.
 - a. Develop a program in which residents could pay a small fee for MSD or another agency to conduct a water/wastewater audit on a house similar to the energy audits offered by LG&E.

E. Monitoring, Evaluation, and Accountability

1. Conduct a baseline survey and follow-up surveys of residents to determine whether education and outreach efforts are effective in raising awareness and in changing behavior and perceptions on

issues related to the Wet Weather Program. [Note: This is also included in the Solution Ideas List.]

- a. Develop a survey instrument (potentially with a coalition of cities) and use it every year.
2. Collect baseline data, monitor performance, and ensure “high stakes accountability” for all of the education and outreach objectives of the Wet Weather Program.
 - a. Evaluate the extent to which citizens value clean water, support MSD, understand best management practices for homes and businesses, and have a basic understanding of ecological conditions and processes.
3. Consider creating/supporting an evaluation center to evaluate and document the effectiveness of education and outreach programs.
4. Develop a “report card” for MSD’s Wet Weather Program to post on MSD’s Project WIN website and publish it in print format regularly (e.g., annually). This report card would report on performance measures related to the goals of MSD’s Wet Weather Program and implementation of the consent decree.
5. Support volunteer monitoring efforts, such as those practiced by the Salt River Watershed Watch program (<http://kywater.org/watch/salt/>).

II. Ideas Partly or Completely Outside the Scope of MSD’s Wet Weather Consent Decree

A. Municipal Government Actions (Only Partly within MSD’s Control)

1. Develop a “comprehensive solution” for local environmental improvement and education efforts.
 - a. Fund and staff a collaborative planning effort to link the environmental education programs of multiple local agencies (MSD, Louisville Water Company, Metro government departments, Mayor’s Office, TARC, etc.) together, develop specific goals and assessment systems, and then hold agencies accountable to those goals.
[Note: This is also included in the Solution Ideas List.]
2. Transform governmental facilities to be role models and learning laboratories—demonstrate how to do the right thing.
 - a. Encourage local government agencies (e.g., Jefferson County Public Schools, Metro Parks) to adopt preventative practices to decrease stormwater runoff and wastewater volumes (e.g., low-flow toilets, pervious pavement, additional tree coverage, etc.).
[Note: This is also included in the Solution Ideas List.]
3. Work with other building inspectors to raise awareness of wet weather issues during inspections.

Wet Weather Team Data Request and Monitoring Suggestions List Working Draft – March 19, 2008

The following is a list of data requests and monitoring suggestions made by Wet Weather Team (WWT) members for consideration for the Wet Weather Program. This includes requests for information to support the WWT's deliberations and suggestions for the research, monitoring, and evaluation efforts associated with MSD's Wet Weather Program. These ideas were identified both at WWT meetings and through individual communications with WWT members (e.g., via e-mail). This list will remain "live" throughout the remainder of the WWT effort, and WWT members are encouraged to send additional suggestions to the facilitation team. Requests that have been responded to will be kept on this list, but marked as "Addressed." New ideas will be listed under a "What's New" section at the beginning of the document for easy reference, as well as under the appropriate section later in the document.

Note: For monitoring and evaluation suggestions related to the Wet Weather Program public education and outreach plan, please see the Wet Weather Team Education and Outreach Idea List.

What's New (February / March 2008)

1. (1-A-9) – Data on community use of rain barrels over time in communities that have rain barrel programs.

I. Requests for Information to Support WWT Deliberations

A. Requests for Information on Current Conditions

1. Data on how fecal coliform levels change with flow volumes.
2. Data on where water quality sampling is currently done in relation to recreational areas.
3. Current data MSD has on water quality in stream reaches (as aquatic health is an issue in some, but not all, stream reaches).
4. How MSD's development fees compare to development fees in other places.
5. Specific information on the percentage of backups that are the result of MSD's activities as opposed to private property issues.
6. Cincinnati's rates before the community started to respond to its consent decree.
7. Information on the "root causes" of wet weather CSO and SSO problems (e.g., the CSO volume attributable to residential downspouts) to assist with Wet Weather Program decision making.
[Note: This is an ongoing request.]
8. Information on the differences between what is legal and required in the sanitary sewer system and the combined sewer system (e.g., whether or not it is legal to connect a sump pump to the combined sewer system).
9. Data on community use of rain barrels over time in communities that have rain barrel programs.

B. Requests for Information of the Effectiveness and Costs of Potential Solutions

1. Information on the long-term effectiveness of strategies that rely on source prevention (e.g., rain gardens).
2. Quantitative information on the benefits and/or effectiveness of eco-friendly solutions currently used by MSD.

3. Additional information on the benefits and challenges of different control approaches (e.g., why a storage solution might be preferable to a transport solution for a particular area). *[Note: This is an ongoing request.]*
4. Information on the costs and benefits of a regulatory approach to address private I&I as compared to other control strategies.
 - a. Include information showing how the marginal costs of this approach compare to costs of other approaches and overall program costs, as there could be a lot of opposition to a new private I&I reduction program because of costs.
 - b. One potential cost comparison could be comparing the costs of a private I&I reduction program using an ordinance to the costs of building a large underground storage facility to recover a similar amount of I&I.

C. Process Suggestions

1. Conduct assessments of different watersheds to find the best opportunities for green infrastructure.
2. Conduct additional analysis of the potential effects of behavior change and green infrastructure strategies at reducing flows into MSD's sewer systems.
3. Examine how choices about funding sources affect the total wastewater and stormwater rates that residents pay.
4. Provide examples illustrating the implications of different combinations of funding sources (e.g., loans, bonds, pay-as-you-go) for funding the Wet Weather Program, in order to better understand the tradeoffs. *[Addressed at the January 15, 2008 Wet Weather Team Meeting]*
5. Ask someone from the Kentucky Resources Council or one of the MSD consultants to look at the current Kentucky Plumbing Code to see if it is as strong as it needs to be as it relates to CSOs and SSOs.
6. Involve experts in making financial decisions, given the relationships among the timing of projects, cash flows, bond rating, and other factors.
7. Include information on the amount of debt remaining to be paid after the Consent Decree implementation period in future funding presentations.

II. Suggestions Related to the Wet Weather Program Monitoring, Evaluation, and Research Plan

A. Suggestions Related to Water Quality and Public Health Monitoring

1. Consider monitoring water quality and flow at additional locations, based upon the Wet Weather Program's objectives and the performance measures developed for the program. Potential new monitoring locations to consider include:
 - a. Intensely used public access sites within Beargrass Creek
 - b. Stream segments MSD does not monitor currently, such as Buechel Branch and upper South Fork of Beargrass Creek
 - c. Additional locations within the Floyds Fork watershed
2. Environmental performance data such as biological indexes of aquatic health (fish counts, macro-invertebrate sampling, etc.), nutrient sampling, downstream pollutant load, and tree cover or other measures of habitat restoration efforts.
3. Data on the public health impacts of polluted water (collected by the School of Public Health or the Health Department and included in an annual report).

4. Involve the research community (e.g., students at the University of Louisville's School of Public Health) in water quality monitoring and data analysis.
5. Consider whether to use EPA's quality control protocols for water quality monitoring efforts.

B. Suggestions Related to the Effectiveness of Green Infrastructure Projects

1. Build monitoring components into green infrastructure projects to help demonstrate the overall effectiveness of green infrastructure solutions.
2. Pick a CSO catchment area and study the effects of rain barrels and rain gardens.
3. In order to gain information on the long-term effectiveness of strategies that rely on source prevention, conduct a demonstration project in a small area, and compare the changes in pollutant loading and stormwater flows to those of other areas.

C. Suggestions Related to the Effectiveness of Behavior Change Efforts

1. Conduct separate research and data analysis to supplement any data collected through surveys about people's behavior.

D. Suggestions Related to the Presentation of Information in the Wet Weather Plan

1. Model the water quality benefits of stormwater reduction efforts and present this information to EPA along with the benefits of overflow abatement efforts.
2. Present the results of water quality monitoring so they show the benefits of overflow abatement (e.g., don't focus on bacteria levels only during rain events, as this obscures the fact that streams usually meet the bacteria criteria at other times).

E. Other Suggestions

1. Monitor customer satisfaction data (e.g., number of hits on MSD's website, number of requests for information, customer satisfaction surveys).

Wet Weather Team Consensus Items
Working Draft – February 29, 2008

The following is a list of items on which the Wet Weather Team (WWT) has come to consensus, organized by the date of the WWT meeting at which consensus was reached. The facilitation team will maintain and update this list throughout the remainder of the WWT effort.

Consensus Item	Wet Weather Team Meeting	Reference Document
1. Wet Weather Team Charter	Wet Weather Team Meeting #2 (August 15, 2006)	Wet Weather Team Charter (August 15, 2006)
2. Wet Weather Team Ground Rules	Wet Weather Team Meeting #2 (August 15, 2006)	Wet Weather Team Ground Rules (August 15, 2006)
3. Wet Weather Team Community Values	Wet Weather Team Meeting #6 (February 13, 2007)	Wet Weather Team Community Values
4. Performance Evaluation Framework for Project-Specific Values	Wet Weather Team Meeting #9 (May 22, 2007)	Final Draft Performance Measurement Matrices
5. Approach for Incorporating Programmatic and Project-Specific Values into Decision Making	Wet Weather Team Meeting #9 (May 22, 2007)	Values-Based Decision-Making Flowchart
6. Weights for Project-Specific Values	Wet Weather Team Meeting #10 (June 21, 2007)	See: Summary of the June 21, 2007 WWT Meeting (WWT Meeting #15)
7. Understanding of Sanitary Sewer Overflow Strategies and the Role of Source Control	Wet Weather Team Meeting #14 (December 6, 2007)	Wet Weather Team Stakeholder Group Understanding of Sanitary Sewer Overflow Strategies and the Role of Source Control (December 2007)
8. Understanding of Community's Anticipated Tolerance for Annual Rate Increases	Wet Weather Team Meeting #15 (January 15, 2008)	See: Summary of the January 15, 2008 WWT Meeting (WWT Meeting #15)

**Wet Weather Team Stakeholder Group
Draft Understanding of Combined Sewer Overflow Control Strategies in
MSD's Integrated Overflow Abatement Plan
(Draft for Discussion at the April 3, 2008 Wet Weather Team Meeting)**

This document aims to summarize the Wet Weather Team (WWT) stakeholder group's understanding of combined sewer overflow (CSO) control strategies, including the role of green and gray solutions, in MSD's Integrated Overflow Abatement Plan, based on the information presented by the technical team and the group's discussion at the WWT meeting on February 26, 2008.

WWT Understanding about High-Level CSO Control Strategies

The WWT stakeholder group understands that the technical team's plan for developing project alternatives for control of CSOs will be guided by the following high-level strategies.

- The goal of CSO control in MSD's Integrated Overflow Abatement Plan is compliance with the Clean Water Act and MSD's Wet Weather Consent Decree.
- CSO control options will include storage, treatment, source control (including green solutions), conveyance/transport, and sewer separation.
- The specific mix of control options for individual CSO locations will be driven by the benefit/cost analysis of how the project alternatives affect the WWT's community values and site-specific considerations.
- The technical team will use the benefit/cost tool to compare the CSO control projects and program elements that will be considered for inclusion in MSD's Integrated Overflow Abatement Plan.
- Project alternatives will be designed to be built around MSD's existing infrastructure (e.g., large diameter pipes and wastewater treatment plants) and will also look for synergistic benefits from sanitary sewer overflow elimination projects (e.g. the "Big Four" projects).
- Consistent with EPA's CSO control policy, the technical team will evaluate a wide range of levels of control, both greater and less than the "default" value of four overflows per year contained in EPA's CSO Policy.
 - The results of the benefit/cost analysis of project alternatives, which is driven by the WWT's community values, will determine the level of control recommended for any particular CSO.

WWT Understanding about the Role of Green CSO Control Solutions

The WWT stakeholder group understands that the role of green CSO control solutions in MSD's Integrated Overflow Abatement Plan includes the following components.

- Green solutions will be an integral part of CSO control in MSD's Integrated Overflow Abatement Plan.
 - In order to be successful, the green solutions will need to include:
 - Measurement and documentation of sustainable project effectiveness;
 - Partnerships between MSD and both public and private entities; and
 - Community education and participation.
 - Green solutions will include options such as green roofs, rain gardens, rain barrels, porous pavement, and bioretention, while gray solutions will include options such as storage, treatment, conveyance/transport, and sewer separation.

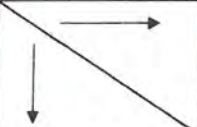
- Green solutions in MSD's Integrated Overflow Abatement Plan will include both programmatic green solutions and site-specific green infrastructure projects for individual CSOs. Programmatic green solutions are solutions that reduce flow at multiple CSO sites (e.g., a rain barrel program) that are developed through partnerships with both public and private entities that MSD will initiate or join.
- Both programmatic green solutions and site-specific green infrastructure projects will be identified and analyzed on the front end of the development of CSO control options.
 - For Programmatic Green Solutions: The technical team will assess the flow reduction potential of the programmatic green solutions for each CSO basin. This reduction will be factored into the sizing of site-specific projects.
 - For Site-Specific Green Infrastructure Projects: The technical team will also assess each CSO basin to determine the potential for implementable site specific green solutions. If viable site or basin-specific green solutions exist, the technical team will estimate the flow reduction the green solutions could provide, and then develop "right-sized" gray solution(s) that provide any remaining needed flow management. Each green solution and integrated green/gray solution that the technical team develops will be compared to other gray infrastructure project alternatives using the benefit/cost tool.
- The specific green solutions will be implemented as soon as possible, to allow data to be gathered on the sustainable flow reduction benefits that occur. Prior to final design of the supporting gray solution, the actual flow reduction performance will be documented and compared against the estimated target. The final sizing of the gray solution will be based on actual documented performance of the green solutions previously implemented.
- Green infrastructure projects and the investment in green infrastructure programs will be evaluated and prioritized using the same processes and tools as gray solutions. It is expected that the outcome of this evaluation will be an optimal blend of both green and gray approaches to effective CSO management.

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Values	Weights	Scores for Alternatives									
		09B_B_A		09B_B_B		09B_B_C		Alternative #4		Alternative #5	
		Raw	Weighted	Raw	Weighted	Raw	Weighted	Raw	Weighted	Raw	Weighted
Regulatory Performance	8	10	80	10	80	10	80	0	0	0	0
Public Health Enhancement	10	10	100	10	100	10	100	0	0	0	0
Asset Protection	6	0	0	0	0	0	0	0	0	0	0
Environmental Enhancement	8	13	104	15	120	15	120	0	0	0	0
Eco-Friendly Solutions	6	0	0	0	0	0	0	0	0	0	0
Total Weighted Score All Values		284		300		300		0		0	
Capital Costs ¹		\$10,246,923		\$56,141,329		\$39,772,843		\$1		\$1	
Total Present Worth Costs ¹		\$9,700,044		\$50,498,979		\$36,193,338		\$1		\$1	
Weighted Benefit/Cost Ratio (Capital Costs)		0.0277		0.0053		0.0075		0.0000		0.0000	
Weighted Benefit/Cost Ratio (Total Present Worth Costs)		0.0293		0.0059		0.0083		0.0000		0.0000	
Notes:											
1. Capital and Total Present Worth Costs are to be added from the Cost Model from the "Proj Summary" Page											

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L SO MF 097 M 09B B A Off-line Storage: CSO's 097, 106, 137														
Performance Measure	Reg. Perf.		Measure		Impact						Rationale		Measurement Method	
	Beargrass Creek CSOs	Untreated CSO or runoff discharge flow rate % of receiving stream flow		Discharge > 5%	Discharge 5% - 1%	Discharge 0.2 - 1%	Discharge 0.1 - 0.2%	Discharge <0.1%	No discharge	CSO Event Mean Concentration for Fecal Coliform in overflows estimated at 250,000/ 100 ml. Dilution factor 0.08% required to not exceed 200 FC/100 ml Water Quality Standard. For partial treatment such as wetland treatment or bioretention, use the comparison to equivalent primary plus disinfection to proportion flow.	Measurement method will be via hydraulic model to quantify the CSO. Spreadsheet calculation to determine mix concentration. The discharge flow rate percentage will be calculated as follows: (average discharge during event/avg event duration)/(avg annual flowrate at the upstream gauge station)			
		Untreated CSO Average Annual Overflow Volume (AAOV)		100 MG+ AAOV	20 - 100 MG AAOV	2 - 20 MG AAOV	1 - 2 MG AAOV	<1.0 MG AAOV	No discharge	100 MG AAOV (10 events) dilution factor in average Ohio River flow is 0.04%. 1.0 MG AAOV (1 event) dilution factor is 0.06%. Cumulative impact of multiple overflow locations may become significant for WQS exceedance.	Measurement methods will be via hydraulic models to quantify the CSO discharge. Spreadsheet calculation to mix concentration.			
	Frequency per location			Most Severe Impact				Least Impact	No Impact					
				5	4	3	2	1	0	Assumptions		Base Case Score	Alternative Score	Total Score
Frequency	>10 per year	Most Likely	5	25	20	15	10	5	0	Base Case Score: average overflow volume/duration = 5.4 cfs for 57 events; BGCSF/TG average annual Q = 23.9 cfs. SD= 22.6%.	25		25	
	5-10 per year		4	20	16	12	8	4	0				0	
	1-4 per year		3	15	12	9	6	3	0	Alternative Case Score: average overflow volume/duration = 7.9 cfs for 4 events; BGCSF/TG average annual Q = 23.9 cfs. SD= 33%.		15	-15	
	2-4 year recurrence interval		2	10	8	6	4	2	0				0	
	>4 year recurrence interval	Least Likely	1	5	4	3	2	1	0				0	
	Not possible	Not Possible	0	0	0	0	0	0	0	Total Score			10	
Note - This value sheet calculates the total benefit. Acronyms AAOV - Average annual FC - Fecal coliforms CSO - Combined sewer MG - Million gallons ml - Milliliters SSO - Sanitary sewer overflow WQS - Water quality standards WWTPs - Wastewater treatment plants														

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L SO MF 097 M 09B B A				Off-line Storage: CSO's 097, 106, 137											
Public Health Enhancement				Measure		Impact					Rationale		Measurement Method		
Performance Measures	CSOs		Release point		Untreated CSO discharge (or runoff in CSO area) where volume is > 0.08% of stream's flow	Greater than 0.04% stream flow dilution to water or ground in areas with high accessibility	Less than 0.04% stream flow dilution to areas with high accessibility or greater than 0.04% stream flow dilution discharge to areas with medium accessibility	Less than 0.04% stream flow dilution to areas with medium accessibility or greater than 0.04% stream flow dilution discharge to areas with low accessibility, discharge contained and cleaned up	Less than 0.04% stream flow dilution to areas with low accessibility, de minimus quantity	No discharge	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforcement Management System in Chapter X, titled "Setting Priorities for Addressing Discharges from Separate Sanitary Sewers." The assigned consequences follow the intent of the principles and priorities presented in the chapter. SSO Event Mean Concentration for Fecal Coliform estimated at 500,000/100ml. Dilution factor 0.04% required to not exceed 200 FC/100 ml Water Quality Standard.	Measurement methods will be via hydraulic models to quantify the CSO or SSO discharge and the GIS to establish relative distance from designated locations or objects. The CSO accessibility will be obtained from the "Beagrass Creek Ecological Reach Characterization Report", dated December 21, 2007, by Redwing Ecological Services. The report includes a Characterization Parameters/Rating Worksheet for each stream reach with the following ratings for accessibility: high (7-10), medium (4-6), low (1-3). Stream flow dilution is defined in the Regulatory Performance Value. The SSO accessibility will consider public access, proximity to parks & streams, and current land uses.			
	Frequency per location			Most Severe Impact					Least Impact	No Impact					
				5	4	3	2	1	0	Assumptions		Base Case Score	Alternative Score	Total Score	
Frequency	>10 per year	Most Likely	5	25	20	15	10	5	0	Base Case Score: average overflow volume/duration = 5.4 cfs for 57 events; BGCSF/TG average annual Q = 23.9 cfs. SD= 22.6%.	25		25		
	5-10 per year		4	20	16	12	8	4	0				0		
	1-4 per year		3	15	12	9	6	3	0	Alternative Case Score: average overflow volume/duration = 7.9 cfs for 4 events; BGCSF/TG average annual Q = 23.9 cfs. SD= 33%.		15	-15		
	2-4 year recurrence interval		2	10	8	6	4	2	0				0		
	>4 year recurrence interval	Least Likely	1	5	4	3	2	1	0				0		
	Not possible	Not Possible	0	0	0	0	0	0	0	Total Score			10		
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.															
Acronyms CSO - Combined sr HRT - Hydraulic retention tir WWTP - Wastewater treatment plant FC - Fecal coliform ml - Milliliter GIS - Geographic ir SSO - Sanitary sewer overflow															

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L SO MF 097 M 09B B A Off-line Storage: CSO's 097, 106, 137													
Value:	Asset Protection			Impact						Rationale	Measurement Method		
		Flood Damage		Homes or businesses are subject to severe structural damage	Homes or businesses are subject to minor to moderate structural damage	Flooding limits access to homes or businesses	Flooding limits access to recreational areas	Standing water on property, but access not affected and no damage expected	No standing water	Stormwater BMPs can reduce stormwater peaks and reduce extent of flooded areas, while sewer separation may increase localized stormwater peak flows and increase the flooding impacts of storms. Alternatively, purchase of highly impacted properties may be a cheaper way to reduce flood damage and create green space and buffer zones.	Drainage models where available, historic customer complaints from MSD Customer Information System, or historic observations of flood-prone areas combined with the expected relative impacts of sewer system modifications on storm water flows.		
		Basement Back-ups		Sewer surcharging within 6 feet of ground surface for more than 20% of manholes	Sewer surcharging within 6 feet of ground surface for 10 - 20% of manholes	Sewer surcharging within 6 feet of ground surface for 5 - 10% of manholes	Sewer surcharging within 6 feet of ground surface for 1 - 5% of manholes	Sewer surcharging within 6 feet of ground surface for 0 - 1% of manholes	No surcharging within 6 feet of ground surface	First floor levels are typically 1 - 2 feet above ground surface, and basement floors are typically 8 - 10 feet below the first floor. A sewer surcharge of 6 feet below ground surface is highly likely to cause back-ups in homes with basement service.	Measurement methods will be via hydraulic models to quantify the hydraulic grade lines compared to ground surface elevations at manholes.		
Performance Measures	Event Recurrence Interval	<div> <div></div> <div></div> </div>		Most Severe Impact					Least Impact	No Impact			
				5	4	3	2	1	0	Assumptions	Base Case Score	Alternative Score	Total Score
Frequency	6-10 per year	Most Likely	5	25	20	15	10	5	0	100% of manholes flooded; storage does not impact surcharging	25	25	0
	2-5 per year		4	20	16	12	8	4	0	100% of manholes flooded; storage does not impact surcharging	20	20	0
	1-2 year recurrence interval		3	15	12	9	6	3	0	100% of manholes flooded; storage does not impact surcharging	15	15	0
	3-5 year recurrence interval		2	10	8	6	4	2	0	100% of manholes flooded; storage does not impact surcharging	10	10	0
	>5 year recurrence interval	Least Likely	1	5	4	3	2	1	0				0
	Not Possible	Not Possible	0	0	0	0	0	0	0	Total Score	0		
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25. Acronyms BMPs - Best management practices													

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L SO MF 097 M 09B B A Off-line Storage: CSO's 097, 106, 137													
Value: Environmental Enhancement													
Scoring													
Aspect	-5	-4	-3	-2	-1	0	1	2	3	4	5	Assumptions	Score Per Aspect
Aquatic and Terrestrial Habitat Protection	Elimination of habitat for rare or endangered species	Elimination of significant amount of common habitat	Elimination of minor amount of common habitat	Significant habitat impairment	Minor impairment to existing habitat	No impact on habitat	Minor enhancement of existing habitat	Significant enhancement of existing habitat	Creation of minor amount of common habitat	Creation of significant amount of common habitat	Creation of critical habitat for rare or endangered species		2
Aesthetics - Solids and Floatables	75%+ reduction in volume of flow with no S&F capture	50 - 75% of flow with no S&F removal	25 - 50% of flow with no S&F removal	10 - 25% of flow with no S&F removal	Reduces efficiency of existing S&F control device, 0 - 10% of flow with no S&F removal	No change in S&F removal	0 - 10% of discharged flow treated with positive S&F removal (screens)	10 - 25 % of discharged flow treated with positive S&F removal (screens)	25 - 50% of discharged flow treated with positive S&F removal (screens)	50 - 75% of discharged flow treated with positive S&F removal screens	75%+ of discharged flow treated with positive S&F removal (screens)		5
Aesthetics - Odor and Air Emissions	Create annoying odor source affecting > 20 customers often	Create annoying odor source affecting > 20 customers often, or > 20 customers occasionally	Create annoying odor source affecting > 20 customers occasionally	Create detectable odor source affecting > 50 customers often	Create detectable odor source affecting < 50 customers occasionally	No impact on odors	Eliminate detectable odor source affecting < 50 customers occasionally	Eliminate detectable odor source affecting > 50 customers often	Eliminate annoying odor source affecting < 20 customers occasionally	Eliminate annoying odor source affecting < 20 customers often, or > 20 customers occasionally	Eliminate annoying odor source affecting > 20 customers often		0
Dissolved Oxygen Impacts	Reduction of in-stream DO by 2 mg/l during critical flow periods	Continuous reduction of in-stream DO of 2 mg/l	Continuous reduction of in-stream DO of 0 - 2 mg/l possible reduction of in-stream DO 0.2 - 1 mg/l during critical conditions	Intermittent reduction of in-stream DO 2 mg/l possible during non-critical conditions, reduction of DO 0 - 2 mg/l during critical conditions	Intermittent reduction of in-stream DO 0 - 2 mg/l possible during non-critical conditions	No DO impacts	Intermittent improvement of in-stream DO 0 - 2 mg/l	Intermittent improvement of in-stream DO 2 mg/l + intermittent critical condition improvements 0 - 2 mg/l	Continuous improvement of in-stream DO 0 - 2 mg/l	Continuous improvement of in-stream DO 2 mg/l +	Continuous improvement of critical condition in-stream DO 2 mg/l +		1
Downstream Impacts	75%+ increase in annual BOD or nutrient loads	50 - 75% increase in annual BOD or nutrient loads	25 - 50% increase in annual BOD or nutrient loads	10 - 25% increase in annual BOD or nutrient loads (CSO + runoff)	Potential 0 - 10 % increase in annual average BOD or nutrient loads (CSO + runoff)	No impact on BOD or nutrient loads (CSO + runoff)	0 - 10% reduction in annual BOD or nutrient loads (CSO + runoff)	10 - 25% reduction in annual BOD or nutrient loads (CSO + runoff)	25 - 50% reduction in annual BOD or nutrient loads (CSO + runoff)	50 - 75% reduction in annual BOD or nutrient loads (CSO + runoff)	75%+ reduction in annual BOD or nutrient loads (CSO + runoff)		5
Stream Flow Impacts (Peak flows)	25%+ increase in peak flows	10% - 25% increase in peak flows	Up to 10% increase in peak flows	Frequent increase in flow during critical conditions	Possible increase in average flow, or minor increase in high flow peaks	No impact on peak flows	Minor reduction in flow - no significant peak reduction	Minor reduction in peak flows under solid conditions	Up to 10% reduction in peak flows	10% - 25% reduction in peak flows	25%+ reduction in peak flows		1
Stream Flow Impacts (DWF only)	25%+ decrease in flow during critical conditions	10% - 25% decrease in flow during critical conditions	0-10% permanent decrease in flow during critical conditions	Frequent decrease in flow during critical conditions	Possible decrease in average flow	No impact on average or base stream flow	Intermittent increase in stream flow - not limited to critical conditions	Intermittent increase in stream flow - often improves critical conditions	0 - 10% permanent increase in stream flow during critical conditions	10 - 25 % permanent increase in stream flow during critical conditions	25%+ permanent increase in stream flow during critical conditions		-1
Instructions: (1.) Score each alternative for each of the seven aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "fatal flaw". Alternatives that score in this area should not be proposed.												Total Raw Score Calculated	13
												Corrected Score	13
Aspect	Rationale					Measurement Method							
Aquatic and Terrestrial Habitat Protection	Wet weather projects may affect both aquatic and terrestrial habitat through changes in base flow, peak flow, water quality, tree cover, channel shape and characteristics etc. Predictive models used to evaluate wet weather control measures have a limited ability to predict biological diversity changes, erosion impacts etc., so surrogate metrics must be used to estimate future positive and negative impacts.					Project definition may specifically address changes in channel shape and configuration, tree cover etc. Predictive models will address DO and other water quality impacts. Flow models will predict base flow and peak flow rates to allow estimates of changes in erosion and water surface area.					Note: The total score calculated may be more than 25. In the instances where this might occur, a default maximum score of 25 will be calculated.		
Aesthetics - Solids and Floatables	Most CSOs have some form of solids and floatables control baffles. Improvements in capture rates can be expected with screening or other advanced treatment options. Storm water retention, constructed wetlands, and other control systems may provide solids and floatables removal as well. While reduction in solids and floatables removal efficiency is not likely, penalty points will be assessed if this is possible with any alternative.					Current solids and floatables removal efficiency has been estimated for all sites with control technology. Improvements in removal efficiencies will be estimated for all alternatives that add screening or other advanced treatment technologies. Where treatment is proposed for storm water discharges removals will be estimated based on published removal data.							
Aesthetics - Odor and Air Emissions	Odors and air emissions can be generated in storage systems, pump stations, force mains, and long flat sewers. Odors are generally characterized by both the intensity and the quality of the odor. Detectable and annoying are two common descriptors of different intensities and qualities of odors from sewage handling facilities.					Odor emissions from sewage handling facilities can be modeled for intensity, quality, and geographic spread. For planning purposes this level of evaluation is not common, and will not be done except in very rare circumstances. The potential for odor and air emissions will be estimated based on typical applications and model predictions for storage time, number of events, average flow velocities etc.							
Dissolved Oxygen Impacts	Dissolved oxygen in streams is dependent on a variety of factors including BOD load, nutrient load, stream flow velocity, water temperature, etc.					For BGC the Water Quality Tool will be used to estimate the impacts of various loading conditions, flows, temperatures, etc. Probable impacts of individual projects will be estimated based on comparisons to the various stream condition scenarios.							
Downstream Impacts	Downstream impacts refer to conditions in the Ohio River below Jefferson County. Nutrient loadings in the Ohio (not just Jefferson County) have been identified as the source of 30 - 45% of the total nutrient loads reaching the Gulf of Mexico. BOD is not likely to persist in the river long enough to get to the Gulf, but can have detrimental impacts far downriver.					Pollutant removals will be estimated based on reductions in annual average loads, since the downstream impacts are primarily long-term and cumulative.							
Stream Flow Impacts (Peak flows)	Extremely high peak flows as are often caused by urbanization of a watershed can erode the streambed, damage aquatic and terrestrial habitat, make water based recreation unsafe or impractical.					Predictive models can estimate flow peaking factors from individual sources, and the Water Quality Tool has a hydraulic component to estimate stream flows during various storm events.							
Stream Flow Impacts (DWF only)	Diversion of flows away from a stream due to abandonment of a treatment plant etc. can reduce base flows in a stream. Alternatively, other control measures such as groundwater pumping can increase base flows with beneficial results.					Predictive models can estimate flows from individual sources, and the Water Quality Tool has a hydraulic component to estimate stream flows during various dry weather events.							
Acronyms BGC - Baargrass Creek BOD - Biological oxygen demand CSO - Combined sewer overflow DO - Dissolved oxygen DWF - Dry weather flow mg/l - Milligram per liter S&F - Solids and floatables													

DRAFT

L SO MF 097 M 09B B A Off-line Storage: CSO's 097, 106, 137													
Value:		Eco-Friendly Solutions											
Scoring													
Aspect	-5	-4	-3	-2	-1	0	1	2	3	4	5	Assumptions	Score Per Aspect
Non-Renewable Energy Consumption	Primary energy consumption is greater than secondary treatment	Primary energy consumption equal to 75 - 100% of secondary treatment	Primary energy consumption equal to 30 - 75% of secondary treatment	Primary energy consumption equal to 15 - 30% of secondary treatment	Primary energy consumption equal to 0 - 15% of secondary treatment	No energy consumption except for cleaning and maintenance	Cleaning and maintenance not needed, no primary consumption	NA	NA	NA	NA		-1
Use of Natural Systems	Constructed facilities permanently displace 5+ acres wetlands or 50% locally available green space	Constructed facilities permanently displace 3 - 5 acres wetlands or 25 - 50% locally available green space	Constructed facilities permanently displace 1 - 3 acres wetlands or 10 - 15% locally available green space	Constructed facilities permanently displace 0 - 1 acre wetlands or up to 10% locally available green space	Constructed facilities temporarily disrupt wetlands or green space	Alternative does not use or affect natural systems, wetlands, or green space	Alternative does not use natural systems, but enhances green space or wetland	Natural systems play a minor role in alternative function, up to 1 acre wetland or 10% additional green space created	Natural systems are significant part of alternative function, 1 - 3 acres of wetland created or 10 - 25% additional green space	Alternative fully uses natural systems, 3 - 5 acres of wetland created or 25-50% additional green space	Alternative results in multi-use natural system development, 5+ acres of wetland or 50% additional green space		-1
Multiple-Use Facilities	Constructed facilities permanently eliminate recreational opportunity	Constructed facilities significantly impair recreational opportunity	Constructed facilities moderately impair recreational opportunity	Constructed facilities have minor impacts on recreational opportunity	Construction temporarily impacts recreational opportunity	No impacts on recreational opportunities	Alternative improves access to existing recreational areas	Alternative has limited positive impact on recreation	Alternative significantly enhances recreational opportunities	Alternative increases recreational opportunities in area	Alternative results in multi-use facility		0
Source Control of subwatershed pollutant loads	Pollutant loadings are increased by 50%	Pollutant loadings are increased by 30 - 50%	Pollutant loadings are increased by 10 - 30%	End of pipe pollutant loadings are increased by 0 - 10%	End of pipe pollutant loadings impacts are inconsistent, but likely higher	End of pipe pollutant loadings are unchanged	Pollutant loadings impacts are inconsistent, but likely lower	Source control reduces pollutant loadings by 0 - 10%	Source control reduces pollutant loadings by 10 - 30%	Source control reduces pollutant loadings by 30 - 50%	Source control reduces pollutant loadings by more than 50%		5
Non-Obtrusive Construction Techniques	Permanent loss of green space or sensitive area disruption	Main thoroughfare closures, sensitive area temporary disruptions	Widespread dust and noise, blasting, secondary street closures	Localized dust, noise and local street closures	Minor dust and noise, traffic lane closures	No construction impacts	NA	NA	NA	NA	NA		-1
Consistent Land Use	Intrusive or nuisance facilities inconsistent with neighborhood or land use	Facilities inconsistent with neighborhood or land use	Facility characteristics mitigated to reduce impact on neighborhood	Facilities have significant impact on development density or land use	Facility has minor impact on development density or land use	No impact on land use or no above ground facilities	Alternative mitigates existing compatibility problem	Alternative removes facility inconsistent with neighborhood	Alternative removes nuisance facility from neighborhood	Alternative enhances property values in neighborhood	Alternative provides enhancements that significantly improve neighborhood		-1
Impermeable Surfaces	5 acres+ of impermeable surfaces are added	3 - 5 acres of impermeable surfaces are added	1 - 3 acres of impermeable surfaces are added	up to 1 acre of impermeable surfaces are added	Minor increase in impermeable surfaces added	No change in impermeable surface	Minor reduction in impermeable surfaces	Up to 1 acre of impermeable surfaces removed	1 - 3 acres of impermeable surfaces removed	3 - 5 acres of impermeable surfaces removed	More than 5 acres of impermeable surfaces removed		-1
LEEDS Performance	NA	NA	NA	NA	NA	LEEDS not applicable or LEEDS score <10	LEEDS Score 10 - 25	LEEDS Certified	LEEDS Silver	LEEDS Gold	LEEDS Platinum		0
Instructions: (1.) Score each alternative for each of the eight aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "fatal flaw". Alternatives that score in this area should not be proposed.											Total Raw Score Calculated		0
											Corrected Score		0
Aspect	Rationale					Measurement Method							
Non-Renewable Energy Consumption	Eco-friendly solutions would be expected to be low consumers of non-renewable energy. Benchmarking energy consumption against conventional secondary treatment provides penalty points for high energy consuming alternatives.					Evaluation of primary energy consumed per MG of flow treated, compared to the energy consumed at the WCWTP per MG treated.					Note: The total score calculated may be more than 25. In the instances where this might occur, a default maximum score of 25 will be calculated.		
Use of Natural Systems	Natural systems replace concrete and steel construction with wet bottom storage lagoons, constructed bioswales, rain gardens etc. that increase green space of various kinds. Options that reduce wetlands and green space get penalty points.					Acres of wetlands and other types of green space created or eliminated. Also includes subjective evaluation of the "basis" of the alternative - "green" or "grey".					<div>DRAFT</div>		
Multiple-Use Facilities	Eco-friendly solutions create recreational opportunities for both water-based and riparian recreation. Boating, canoeing, kayaking, fishing, wading, swimming etc. would be direct water-based recreation. Bird watching, hiking, biking, picnicing, camping etc. would be considered related riparian recreation.					Subjective evaluation of changes predicted in the aquatic or riparian environment as a result of better water quality, increased base flow or decreased flow peaks, increased tree cover or vegetated riparian areas etc.							
Source Control of subwatershed pollutant loads	Controlling pollutant loads at the source through behavior modification, product replacements or stormwater management BMPs that capture pollutants thereby avoiding end of pipe treatment requirements					Modeled land-side pollutant loading reductions as calculated by the BGC Water Quality Tool or by comparison to literature values or pilot program measurements.							
Non-Obtrusive Construction Techniques	Probable construction impacts on traffic, noise and dust are all measures of the friendliness of an alternative. Construction impacts get penalty points for creating nuisance conditions.					Subjective evaluation of probable construction impacts based on the type of construction envisioned for the alternative.							
Consistent Land Use	Alternative configuration can either enhance or detract from the surrounding property. For example, an extremely unfriendly pump station can be noisy, smelly, and ugly. The same pump station can be "disguised" as a residence that fits right in with the neighborhood. If a larger parcel of land is available, a pump station can be hidden from view by landscaping, and a community garden or other green space added to enhance the neighborhood.					At the planning level, projects can be defined to avoid negative impacts on the surrounding properties. Depending on the availability of land, enhancements are possible. This aspect encourages project definition and budgets to enhance, not detract.							
Impermeable Surfaces	Adding impermeable surfaces increases total runoff volume, peak runoff flowrates, and the total transport of any pollutant deposited on the surface from any source. Conversely, permeable surfaces can reduce flow volume and peaks, and provide filtering mechanisms for pollutants.					Acres of permeable surfaces created or eliminated.							
LEEDS Performance	LEED standards are applicable to alternatives that include above-ground building structures.					Application of LEED evaluation points.							
Acronyms BGC - Beargrass Creek LEEDS - Leadership in Energy and Environmental Design MG - million gallons WCWTP - West County Wastewater Treatment Plant													



MSD

Louisville & Jefferson County
Metropolitan Sewer District

MSD SSS Initial Solutions Development Summary Sheet DRAFT



DOCUMENTED SSO IDS: 00746, MSD0057

MOP IDS: 00735

SEWERSHED AREA: MIDDLE FORK

NETWORK BRANCH ID: MF # 6

OVERFLOW VOLUMES (MG)				
SSO ID	6-Month	1-Year	2-Year	5-Year
00746			0.58	
MSD 0057			0.13	
00735			0.06	

Cause(s) of Overflow: Both pump stations are not large enough to convey the excess wet weather discharges from this area. Overflow occurs by gravity out of rim of wet well and/or manhole.

Surrounding Area Land Use Description: The area surrounding both lots is residential with lot sizes of approximately 1 acre or less.

Apparent Utilities or Other Items in Vicinity:

Proposed Developments in Vicinity?: The area is built-out, and no new developments are currently proposed according to LOJIC.

Capital Projects: There is an assessment project with no year associated with it yet. This project could potentially be used to divert the pump stations to the new collection system.

Modeling Needs: No additional modeling needs at this time.

Alternatives

Storage Alternative: Storage around Anchor Estates 1 would be approximately 1,000 LF of large diameter pipe. It is an option, but could definitely lead to maintenance concerns. At Anchor Estates 2, there is a large lot which potentially has storage capability nearby.

Conveyance Alternative: To create sufficient conveyance at Anchor Estates 1 would require an upgrade to the wet well, pump station and approximately 1,500 LF of force main. To create conveyance at Anchor Estates 2 would require the upsizing of the wet well and pump station. The 6" force main has sufficient capacity.

Diversion Alternatives: The best diversion options would be to divert flow to the new assessment project areas. The extent of the solution will be dependent upon the assessment projects.

Other Alternatives: No other alternatives are currently proposed.



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Louisville & Jefferson County
Metropolitan Sewer District

MSD SSS Initial Solutions Development Summary Sheet DRAFT



DOCUMENTED SSO IDS: 01106 (VANNAH WAY)

MOP IDS:

SEWERSHED AREA: MIDDLE FORK

NETWORK BRANCH ID: MF # 6

OVERFLOW VOLUMES (MG)				
SSO ID	6-Month	1-Year	2-Year	5-Year
01106	0.00	0.00	0.01	0.02

Cause(s) of Overflow: Vannah Way pump station is not large enough to convey the excess wet weather discharges from this area. Overflow occurs at a 6" gravity bypass line into the storm sewer line. Peak bypass rate for a 2-year storm is .05 MGD.

Surrounding Area Land Use Description: The SSO is surrounded on all sides by an R-4 residential subdivision.

Apparent Utilities or Other Items in Vicinity: Not yet reviewed.

Proposed Developments in Vicinity?: None.

Capital Projects: Does not affect solutions for this SSO.

Modeling Needs: Pumping Rate is set as fixed based on design pumping rate of 0.02 MGD. Drawdown data is needed and has been requested.

Alternatives

Storage Alternative: The existing SSO is located in the middle of an existing cul-de-sac. Any underground storage would require approximately 50 L.F. of large diameter pipe.

Conveyance Alternative: Upgrades to the pump station is all that is required to convey peak overflow.

Diversion Alternatives: The pump station could be eliminated by installing approximately 400 L.F. of 8-inch gravity line to an existing 8-inch gravity sewer to the south.

Other Alternatives:

Summary of Scores for Conveyance Options for Middle Fork, Network Branch 06

Values	Weights	Scores for Alternatives					
		Raw Score All 1 year	Weighted Score All 1 year	Raw Score All 2 year	Weighted Score All 2 year	Raw Score All 5 year	Weighted Score All 5 year
Regulatory Performance	8	18	144	36	312	64	432
Public Health Enhancement	10	8	80	11	110	13	130
Asset Protection	6	1	6	0	0	1	6
Environmental Enhancement	0	3	24	3	24	3	24
Local Friendly Solutions	6	2	12	-2	-12	-2	-12
Total Weighted Score All Values		242		440		580	
Weighted Benefit/Cost Ratio (Total Present Worth Costs)		0.104		0.1522		0.1019	

Note: Capital and Total Present Worth Costs are to be added from the "Cost Model from the "Proj Summary" Page

Summary of Scores for Diversion Options for Middle Fork, Network Branch 06

Values	Weights	Scores for Alternatives						
		Raw Score All 1 year	Weighted Score All-1 year	Raw Score All 2 year	Weighted Score All-2 year	Raw Score All 5 year	Weighted Score All-5 year	Raw Score All All-5 year
Regulatory Performance	8	18	144	39	312	54	432	
Public Health Enhancement	10	6	60	11	110	13	130	
Asset Protection	5	1	5	1	10	1	10	
Environmental Enhancement	5	3	24	3	24	3	24	
Eco-Friendly Solutions	5	-4	-24	-4	-24	-4	-24	
Total Weighted Score All Values		230			432			
Weighted Benefit/Cost Ratio (Total Present Worth Costs)		0.1679			0.3153		5/2	0
							0.4116	0

Note: Capital and Total Present Worth Costs are to be added from the Cost Model from the "Proj Summary" Page



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Project WIN Funding Plan

User Fees and Incentives
Wet Weather Team Meeting
April 3, 2008



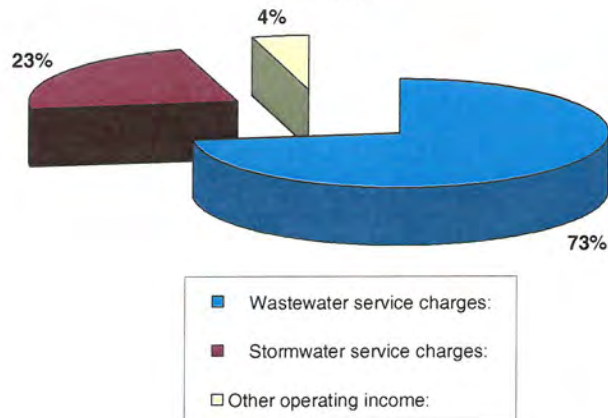
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Sources of FY 2007 Revenues

- Wastewater Charges - \$96.6 million
- Stormwater Charges - \$29.9 million
- Miscellaneous Income (connection fees, capacity charges, etc.) - \$6.0 million

Total FY 2007 Revenues = \$132.4 million

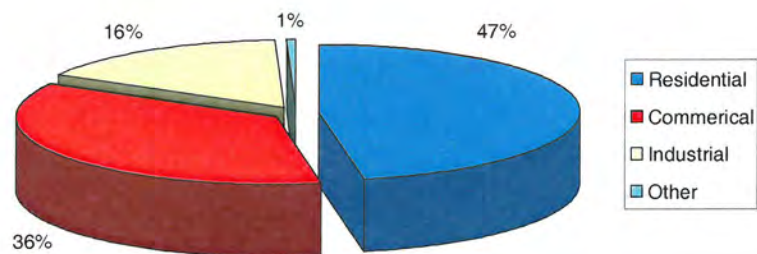
**Metropolitan Sewer District
Fiscal Year 2007
Revenues**



Note – MSD is self-supporting through service charges and other user fees. MSD does not receive financial support from Metro Government or the State.

3

**Overall Service Charge Revenues
FY 2007**



4



Wastewater Revenues

Totaled \$ 96.6 million in FY 2007

Consisted of:

- WW Service Charges (\$23.9 million)
- Volume Charges (\$61.4 million)
- Quality Charges (\$11.3 million)

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Wastewater Service & Volume Charges

- WW service charges are fixed charges based on water service meter sizes
- Regular volume rate – applicable to water usage.
- Optional volume rates – available to customers whose average water usage or sewer discharge exceeds 1,000,000 gallons per month
- Sewer only volume rates – applicable to metered sewer discharges.

6



Quality Charges

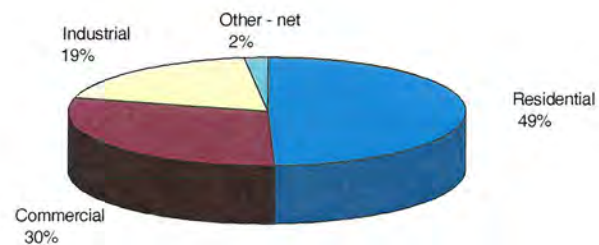
Applicable to wastewater strengths in excess of 250 mg/liter of biochemical oxygen demand (BOD) or 270 mg/liter of suspended solids (SS).

Paid by commercial and industrial customers.

7



Wastewater Revenues
FY 2007



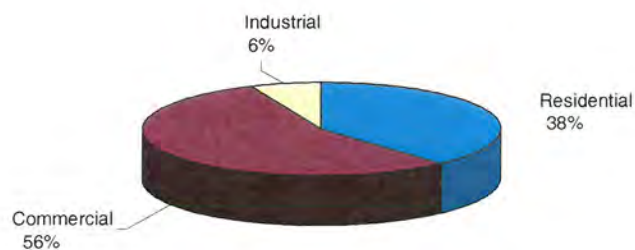
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Stormwater Charges

Current rate is \$5.02 per month for residential customers and \$5.02 per 2,500 square feet of impervious surface area for commercial and industrial customers

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**Stormwater Service Charges
FY 2007**



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Other Revenues

- Capacity Charges – fee paid by developers of property to help defray the future cost of providing Master Plan sewerage facilities
- Connection Fees – fee paid to connect to MSD sewers
- During the past 10 years, these fees have comprised 72% of other operating income

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Implementation of New Incentives

- The use of incentives will not provide immediate reductions in expenses but should be viewed as long-term initiatives.
- Revenues lost from incentives granted to one customer class must be recovered from the remaining ones.

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Current Incentives/Discounts

- Optional rate structure provides a discount for usage above 1,000,000 gallons per month
- Credit of up to 82% off stormwater billings for detention/retention basins
- Reduced quality charges for “cleaner” wastewater streams
- Senior Citizens Discount Program – 30% off consent decree and wastewater billing

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Potential Incentives / Discounts

- Drainage credit for use of pervious pavement
- Drainage credit for customers that use rain barrels or rain gardens
- Splitting of drainage fee into qualitative (cleanliness) and quantitative (volume) categories could result in reduced charges for some customers

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Potential Incentives / Discounts (cont'd)

- Temporary incentive for customers who disconnect downspouts from the sewer system (i.e., provide a discount off drainage or sewer bill)
- Expansion of discount program to include disabled individuals
- Create bill payment assistance program similar to L.G.&E.'s Winterhelp program.

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Discussion Questions



- What incentives do you believe MSD should offer?
- Are there incentives currently offered by MSD that you feel should be modified?
- What, if any, additional information would be helpful for future discussions regarding incentives?
- What additional information would be useful regarding MSD's revenue sources?
- Do you have any other questions or comments?

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Emergent Vision for MSD's Consent Decree Response



April 3, 2008



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1

Questions to Ponder

- Is this vision consistent with our community's key needs and interests?
- Is the message appropriate for general public discussion?
- How can we make the presentation more understandable for the general public?



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2

MSD's Consent Decree Based on EPA Enforcement Action

- Alleged violations of Clean Water Act
- Discharge Abatement Plans
 - Eliminate unauthorized discharges from sanitary sewer system and combined sewer system by December 31, 2024
 - Reduce and control CSOs in conformance with the CSO Policy by December 31, 2020

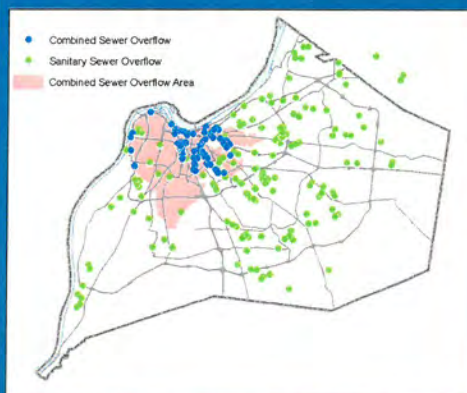


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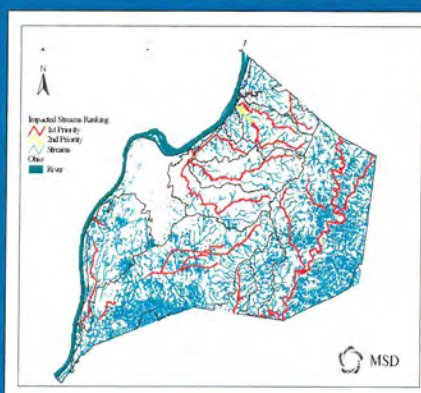


3

Impairment Issues County-Wide



Sewer overflows occur county-wide



Most Metro streams have some impairment



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4

Consent Decree Response Community Challenge - MSD Obligation

- MSD is independent special district, established under State statute
- Enterprise fund not linked to Metro Government finances or revenue generating ability
- Capital and operating costs paid for entirely by fees and user charges
 - Revenue bonds used to finance major capital
 - Grants and line-item appropriations historically less than 1% of total revenues



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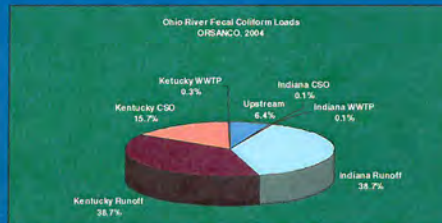
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Consent Decree Compliance Expected Water Quality Benefits

- Significant reduction in peak bacteria levels
- Reduction in duration of wet weather impairment
- Improvement greater in Beargrass Creek than Ohio River

Overflow control is essential to meeting WQ standards, but overflow control alone is not enough

"Affordability" must be viewed in context of other future WQ initiatives and other community service needs



CSOs are only 15.7% of pollutant load



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6

Path to Consent Decree Compliance Integrated Overflow Abatement Plan (IOAP)

- Federally enforceable action plan for overflow abatement
- Complementary to other wet weather and water quality programs managed both by MSD and by other community partners
 - Mayor's Green City Initiative
 - Partnership for a Green City
 - Community of Trees
 - Metro Louisville's Municipal Separate Storm Sewer (MS4) discharge permit
 - Many others by JCPS, private developers etc.

While these programs provide synergistic benefits, they are separate from the IOAP and do not fall under same level of federal enforcement



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7

Integrated Overflow Abatement Plan (IOAP) Successful Outcomes

CSOs are permitted discharges in wet weather, managed to avoid receiving stream water quality degradation

Design Strategy:

- Abatement targets in CSO Policy
- Achieve current water quality standards, or show discharges do not cause or contribute to exceedences

** Per CSO Policy, this approach may require a temporary waiver or suspension of standards during wet weather

SSOs and dry weather CSOs are unauthorized discharges and must be eliminated

Design Strategy:

- “design storm” level of protection is community decision (within reason)
- 2-year storm proposed as minimum level of protection (same as Atlanta, Cincinnati, Knoxville)
- Higher level of protection may be selected for site-specific locations where benefit/cost evaluation justifies



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8

Consent Decree Response Components

Capital Project Planning and Implementation

- Early Action Projects (all complete)
- Discharge Abatement Plans
 - ✓ Interim Long Term Control Plan (LTCP) Update
 - ✓ Updated Sanitary Sewer Overflow Plan
 - ✓ Interim Sanitary Sewer Discharge Plan
- Integrated Overflow Abatement Plan (IOAP) - December 31, 2008

On-going Operational Modifications

- Expanded Sewer Overflow Response Protocol (SORP)
- Capacity Management Operations and Maintenance Program (CMOM)
- Continued Improvement to "Nine Minimum Controls" (NMC) Activities



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9

IOAP "Tool Kit"

- Source Control
 - Infiltration and inflow (I&I) reduction
 - Combined sewer separation
 - Green infrastructure
- Storage
- Conveyance/Transport
- Treatment

Application of specific approaches driven by values analysis and site-specific considerations in structured decision process



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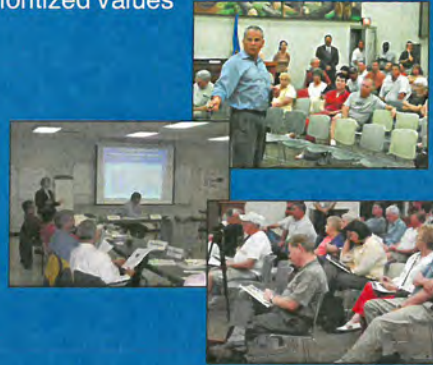
10

Structured Decision Process

Protecting Community Values

Broad-based group of community stakeholders identified and prioritized values

Public health enhancement	Environmental justice and equity
Regulatory performance	Economic vitality
Environmental enhancement	Financial stewardship
Asset protection	Financial equity
Eco-friendly solutions	Customer satisfaction
Education	



Series of open meetings provided related input from the general public



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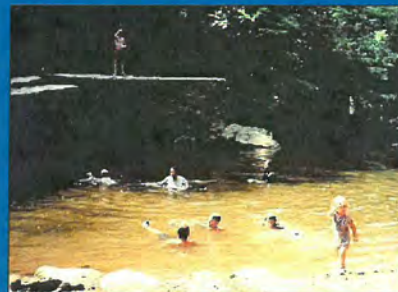


11

Structured Decision Process

Values-Based Benefit/Cost Analysis

- Overflow abatement control options developed and evaluated based on managing risks to these values
- "Benefits" determine how well the proposed solution manages the risks to these values
- Benefit/cost analysis utilization
 - site-specific abatement approaches (ie, technology)
 - site-specific levels of protection, within established boundary conditions
 - priority of implementation



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Overflow Abatement Strategy

Guiding Principles

- Maximize use of existing facilities
- Front-end consideration of source control and green infrastructure
- Gray infrastructure sized after considering:
 - Anticipated green infrastructure benefit
 - Anticipated effectiveness of other source control approaches, including private-side infiltration & inflow reduction
- Adaptive management implementation approach based on monitoring and evaluation efforts



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Adaptive Management Process

Performance Monitoring Requirements

- Sewer flow monitoring and overflow events analysis
- Major role in adaptive management relative to both CSO management and SSO elimination
 - Measure source control effectiveness
 - Re-calibrate models as necessary
 - Right-size gray solutions
- Performance monitoring includes measuring the effectiveness of behavior-change programs



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Role of Public Education Provide Sustainability

- Education has critical roles in program success
 - Promote voluntary participation in private-side I&I control
 - Increase and sustain participation in Green Infrastructure programs
 - Encourage support for other agency programs or legislation that supports overflow abatement efforts
- Education can help generate a sense of personal ownership and responsibility required for sustainability of critical voluntary programs
- Education can help to support financial investment required to achieve Consent Decree and CWA compliance



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Consent Decree Response Funding The Money Comes From All of Us

Funding

- Rates and fees must pay operating costs, debt service, and adequately maintain MSD bond rating
- Community ability to pay must consider follow-on programs
- Preliminary program estimates appear to be within community tolerance for rate increases
- Rates and fees must allow for continued economic development



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Consent Decree Response Must Consider Economic Vitality

- Strong local economy sustains affordability of solution
- Solutions consider future development based on land use plan
- Continued development requires MSD to implement wet weather flow reduction
 - 3:1 offset of wet weather flows proposed
 - Approach based on Knoxville's Capacity Assurance Program
 - Fee structure under consideration by MSD Board
 - MSD will track flow reduction "credits" to ensure appropriate geographic location of flow offsets



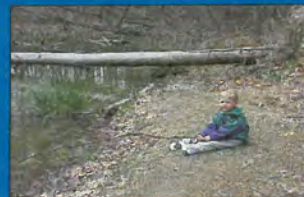
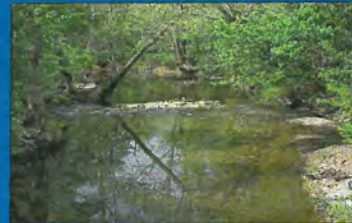
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In Summary Consent Decree Response Principles

- Approach shaped by community values and direct engagement
- Community partnerships essential to program success
 - Green infrastructure
 - Private Property I&I Control
- Wide range of approaches considered, evaluated through benefit/cost approach
- Adaptive management allows right-sizing as program successes are identified
- Program costs must be affordable to community, and allow continued economic growth



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Questions

- Is this vision consistent with our community's key needs and interests?
- Is the message appropriate for general public discussion?
- How can we make the presentation more understandable for the general public?



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Discussion Summary and Path Forward



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Combined Sewer Overflow LTCP Approach Summary and Benefit / Cost Sample

Wet Weather Team

Stakeholder Group Meeting No. 17
April 3, 2008



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Presentation Outline

- CSO Understandings Document Review
- Overview of Combined Sewer Service (CSS) Area
- Build - Out Approach and Methodology
- Project Technology Distribution
- CSO Conceptual Design Project Review (Clusters)
- CSO - Specific Technology Comparison
- Preliminary CSO Score Sheet



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CSO Understandings Document Review

- Comply with CWA
- Technologies include: Storage, Separation, Treatment, Source Control, Green Solutions
- Selection of project (mix, sizing etc) to be determined by Benefit / Cost Tool
- Initial project target of four overflows per year
 - Evaluating more overflows, e.g. four to seven and eight to twelve
 - Evaluating less overflows, e.g. zero and one to three



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3

Overview of Combined Sewer Service Area

- Combined Sewer System Overview Map
- Combined Sewer Overflow Average Annual Overflow volume (AAOV) Map Review



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Build-Out Approach and Methodology

- Dry Weather Flow
 - Considerable percentage of CSS is developed
 - Dry weather flow as a percentage of pipe capacity is very small
 - Dry weather flow trending downward (MFWTP data)
 - Wet Weather Flow
 - Considerable percentage of CSS is developed
 - MSD design standards require management of post development flow
 - Land Development Code requirements typically result in reduced run-off
- Therefore, impact of build-out is insignificant within the combined sewer system, and no adjustment is necessary.



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Project Technology Distribution

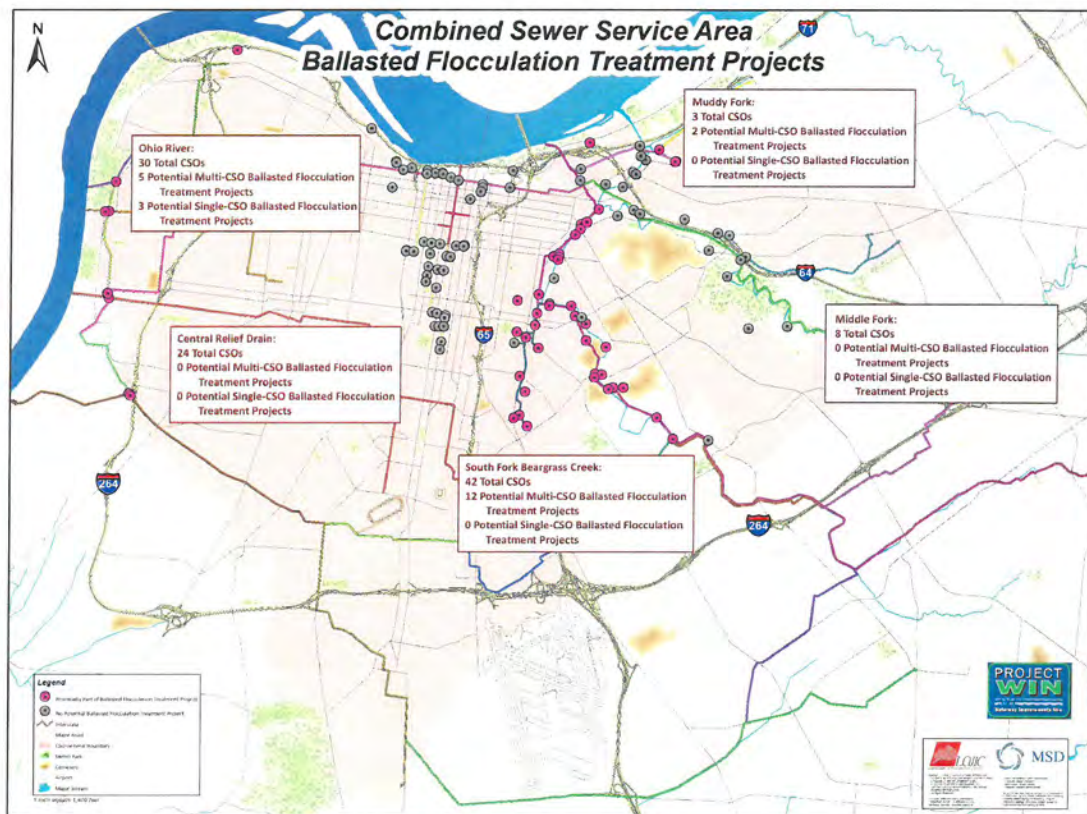
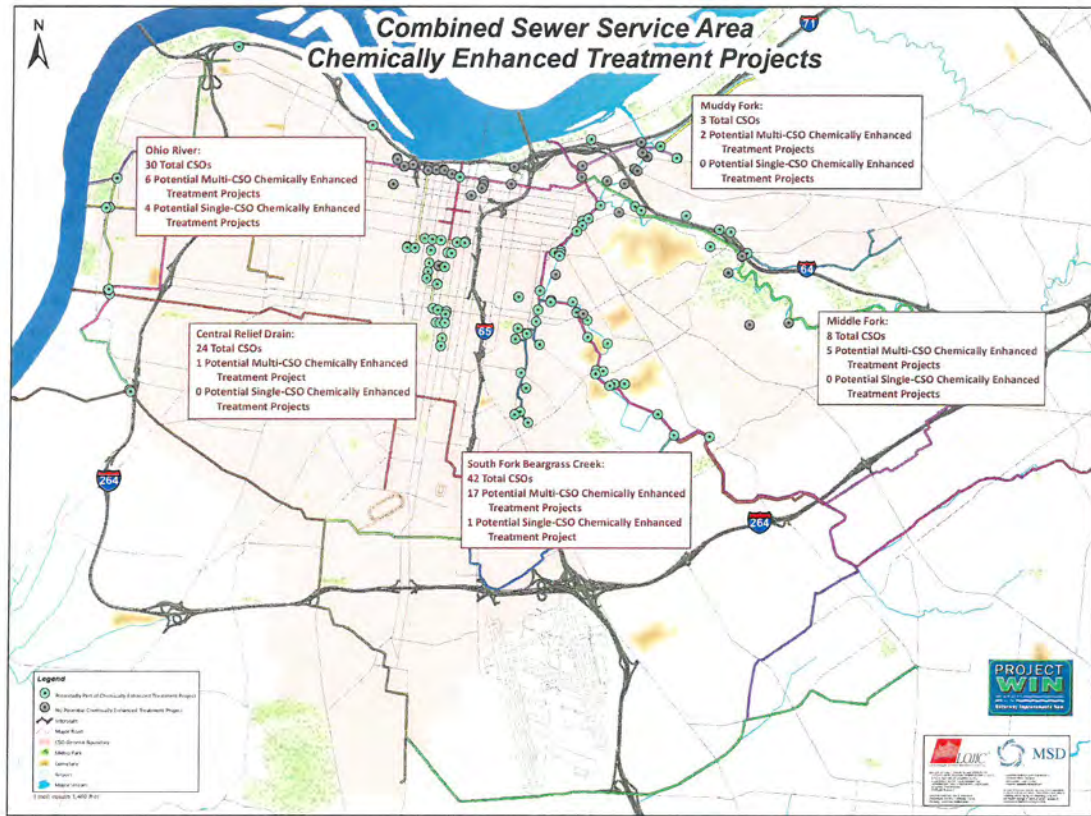
- Technologies evaluated for CSO include: Storage, Separation, Treatment, Source Control, Green Solutions
- Overview of CSO Technology Distribution for:
 - Off-Line Storage Projects
 - Sewer Separation Projects
 - Treatment Facility Projects
 - Chemically Enhanced > 0.5 MG
 - Ballasted Flocculation > 5 MG



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8



TIME

PLANNING

FOR EACH CSO

Gray Solutions – CSO LTCP Projects

- Multiple Technologies Evaluated
 - Initial Target Selected
 - Conceptual Design Prepared
 - Single Vs. Multiple
- Additional Targets Evaluated
 - Conceptual Design Prepared
- If a Viable Green Project and / or Program Solution Exists
 - Prepare “Right - Sized” Gray Alternative

Green Solutions – CSO LTCP Projects

- Assess Viability of Site – Specific Solutions
- If Viable Green Solution Exists
 - Conceptual Design Prepared

Green Solutions Program Elements

- Evaluate Opportunities
 - Public / Public Partnership
 - Public / Private Partnership
- Determine Green Solutions Program Reduction Potential
- Implement
- Document Green Solutions Program Items

EVALUATE WITH BENEFIT / COST TOOL

DESIGN / CONSTRUCTION

- Initial Design, Pre-Design Monitoring of CSO to Account for Green Success
- Finalize Design to Account for Green Solution (Project and Program Items)
- Post Construction Performance Monitoring of Projects
- Documentation of Success

1. Initial Design and Construction

2. Post Construction Performance Monitoring of Projects

3. Documentation of Success

December 31, 2008

MSD

PROJECT WIN

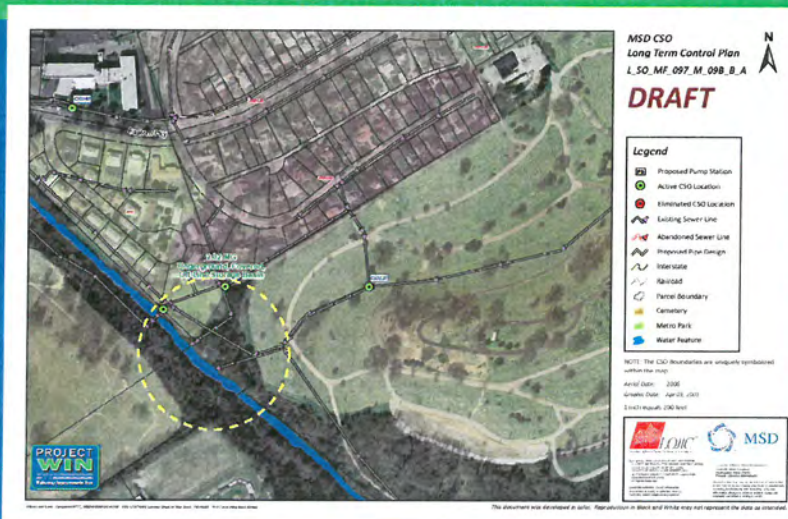
Sample CSO: 097

- Project Types: Multiple CSO Off - Line Storage
- CSO Locations: South Fork Beargrass Creek (Eastern Parkway area)
- **Option A:** CSOs 097, 106, and 137
 - Benefit / Cost Ratio (Capital Cost) = 0.0277
 - AAOV Captured = 42.67 Million Gallons / Year
- **Option B:** CSOs 097, 108, 109, 110, 111, 148, and 151
 - Benefit / Cost Ratio (Capital Cost) = 0.0053
 - AAOV Captured = 229.12 Million Gallons / Year
- **Option C:** CSOs 097, 110, and 151
 - Benefit / Cost Ratio (Capital Cost) = 0.0075
 - AAOV Captured = 180.20 Million Gallons / Year



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CSO Conceptual Design Project Review (Clusters)

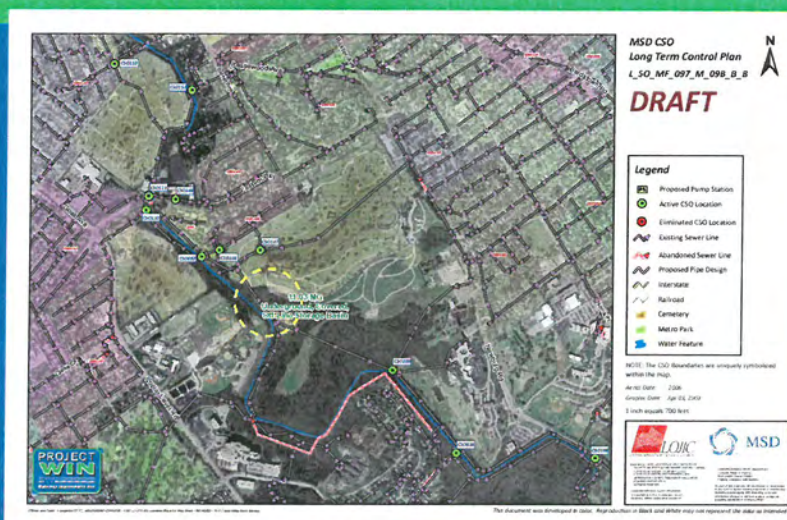


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CSO Conceptual Design Project Review (Clusters)

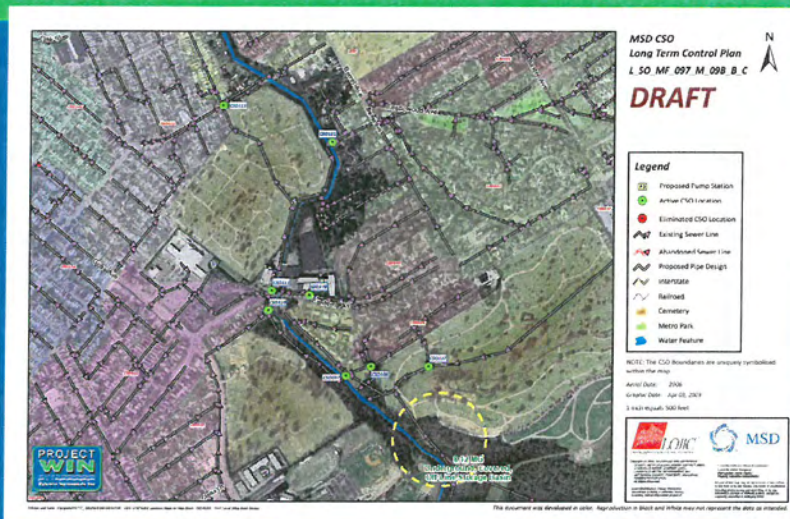


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CSO Conceptual Design Project Review (Clusters)



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CSO - Specific Technology Comparison

Sample CSO: 130

- Technology: Sewer Separation
 - Benefit / Cost Ratio (Capital Cost) = 0.1965
- Technology: Off - Line Storage
 - Benefit / Cost Ratio (Capital Cost) = 0.1154

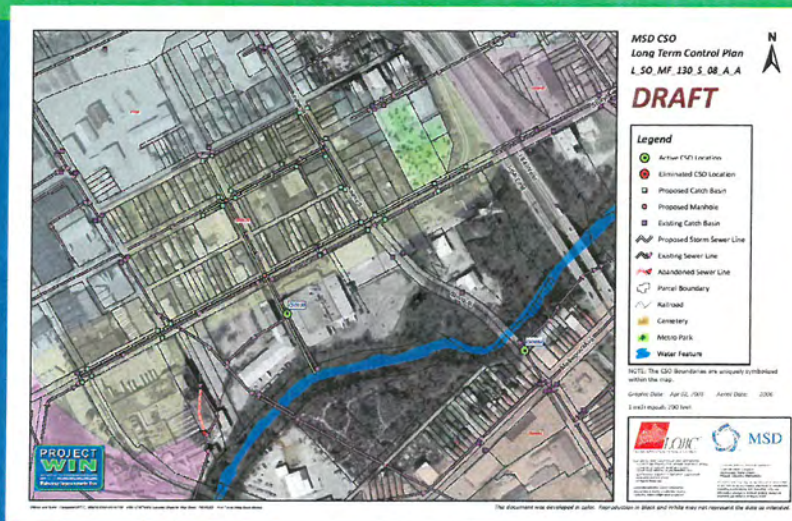


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CSO - Specific Technology Comparison



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CSO - Specific Technology Comparison



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Preliminary CSO Score Sheet

Project #	Geographic Region	Technology	Total Weighted Benefit Score	Weighted Benefit/Cost Ratio (Capital Cost)	Weighted Benefit/Cost Ratio (Present Worth Cost)
L_SO_MF_097_M_09B_B_A	South Fork BGC	Off-line Storage	284	0.0277	0.0293
L_SO_MF_097_M_09B_B_B	South Fork BGC	Off-line Storage	300	0.0053	0.0059
L_SO_MF_097_M_09B_B_C	South Fork BGC	Off-line Storage	300	0.0075	0.0083
L_SO_MF_108_S_09B_B_A	South Fork BGC	Off-line Storage	300	0.0277	0.0296
L_SO_MF_109_M_09B_B_A	South Fork BGC	Off-line Storage	300	0.0202	0.0219
L_SO_MF_109_S_09B_B_A	South Fork BGC	Off-line Storage	300	0.1531	0.1576
L_SO_MF_118_M_09B_B_A	South Fork BGC	Off-line Storage	300	0.0053	0.0060
L_SO_MF_118_S_09B_B_A	South Fork BGC	Off-line Storage	600	0.0112	0.0126
L_SO_MF_130_S_09B_B_A	South Fork BGC	Off-line Storage	284	0.0894	0.0930
L_MI_MF_086_S_08_A_A	Middle Fork BGC	Separation	156	0.0734	0.0930
L_SO_MF_091_S_08_A_A	South Fork BGC	Separation	156	0.1619	0.2030
L_SO_MF_130_S_08_B_A	South Fork BGC	Separation	386	0.1965	0.2286
L_OR_MF_026_S_08_A_A	Central Relief Drain	Separation	36	0.0936	0.1190
L_OR_MF_027_S_08_A_A	Central Relief Drain	Separation	36	0.1282	0.1628
L_OR_MF_028_S_08_A_A	Central Relief Drain	Separation	-90	-0.2486	-0.3110
L_OR_MF_029_S_08_A_A	Central Relief Drain	Separation	6	0.0024	0.0030
L_OR_MF_030_S_08_A_A	Central Relief Drain	Separation	68	0.0454	0.0565
L_OR_MF_031_S_08_A_A	Central Relief Drain	Separation	36	0.1703	0.2171
L_OR_MF_150_S_08_A_A	Central Relief Drain	Separation	6	0.0084	0.0106
L_OR_MF_201_S_08_A_A	Central Relief Drain	Separation	-74	-0.0818	-0.1027
L_OR_MF_203_S_08_A_A	Central Relief Drain	Separation	-114	-0.1119	-0.1399
L_OR_MF_208_S_08_A_A	Central Relief Drain	Separation	-114	-0.3437	-0.4364
L_SO_MF_130_S_08_B_A	South Fork BGC	Separation	386	0.1965	0.2286
L_SO_MF_130_S_09B_B_A	South Fork BGC	Off-line Storage	284	0.0894	0.0930



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Discussion Summary Wrap-up



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SSO Control Summary and Benefit/Cost Results Example

Wet Weather Team
Stakeholder Group Meeting No. 17
April 3, 2008

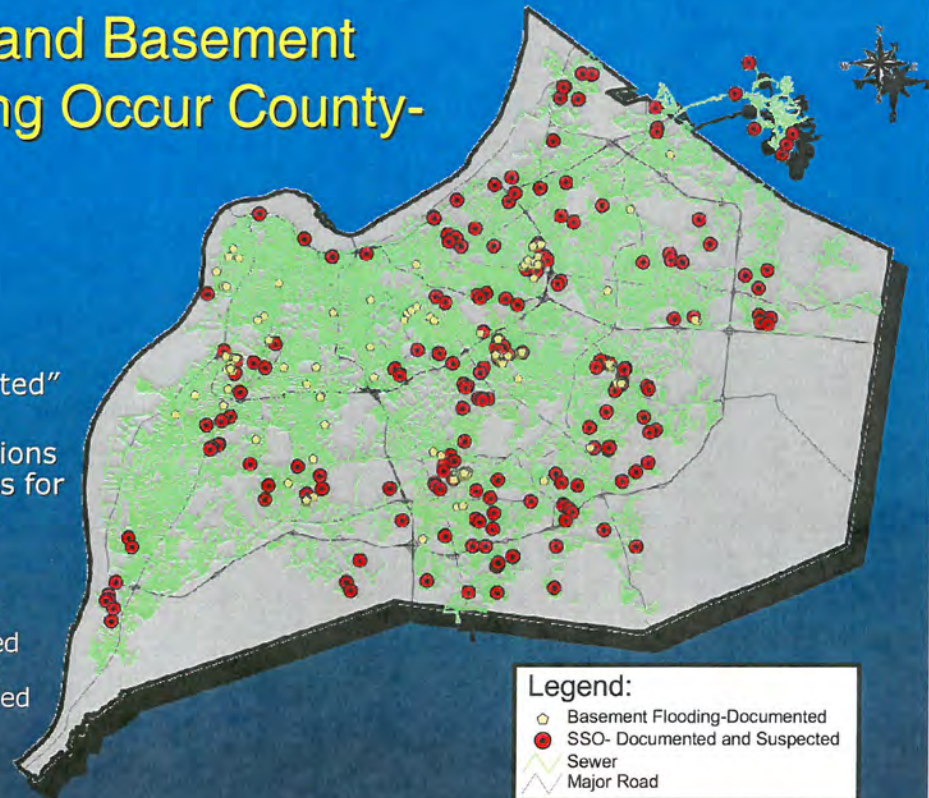
Louisville & Jefferson County
Metropolitan Sewer District

Sanitary Sewer Overflows (SSOs) Occur in Many Locations



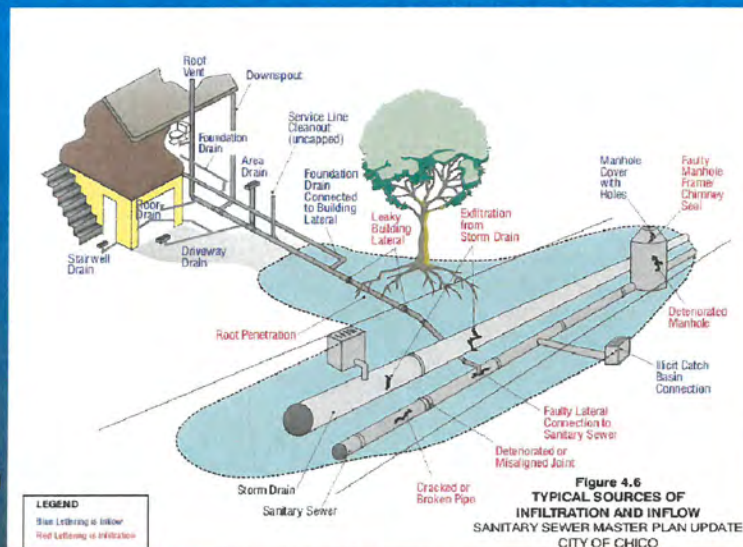
SSOs and Basement Flooding Occur County-Wide

- Over 100 "documented" SSOs
- Investigations in progress for suspected SSOs
 - Model Results
 - Reported but not confirmed



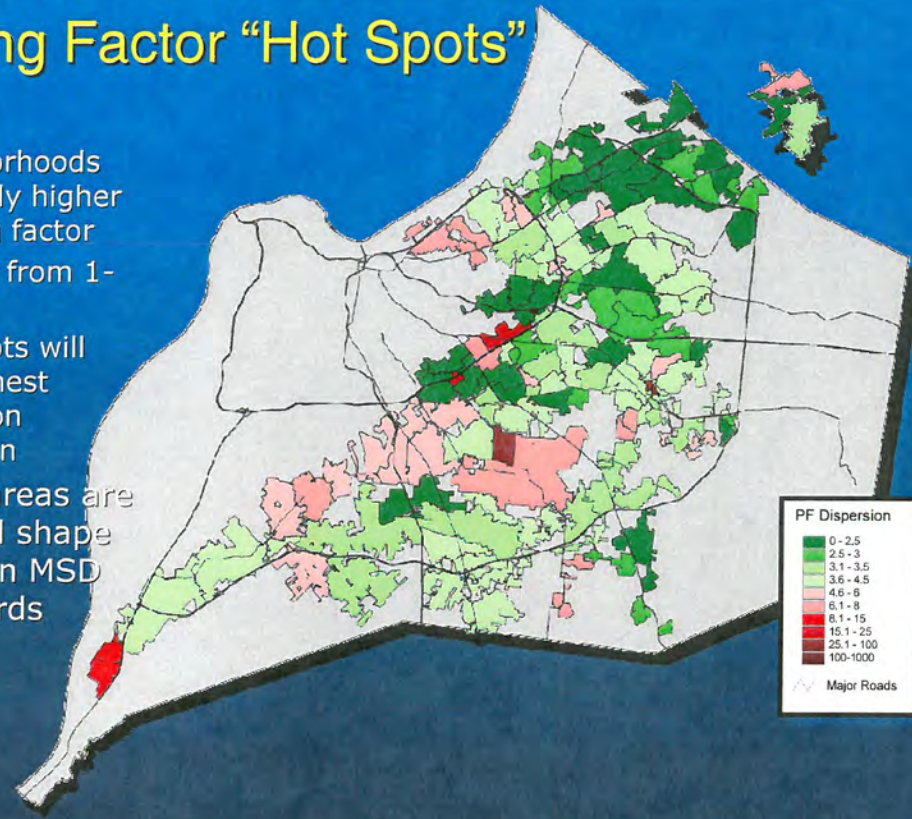
Reducing Inflow and Infiltration Supports Cost-Effective SSO control

- All solutions will start with I&I reduction
- Reviewed published papers on I&I reduction successes
- Used flow monitoring peaking factor (PF) as variable
- Large PF = large I&I reduction
- Small PF = no I&I reduction
- Modeled achievable levels of reduction



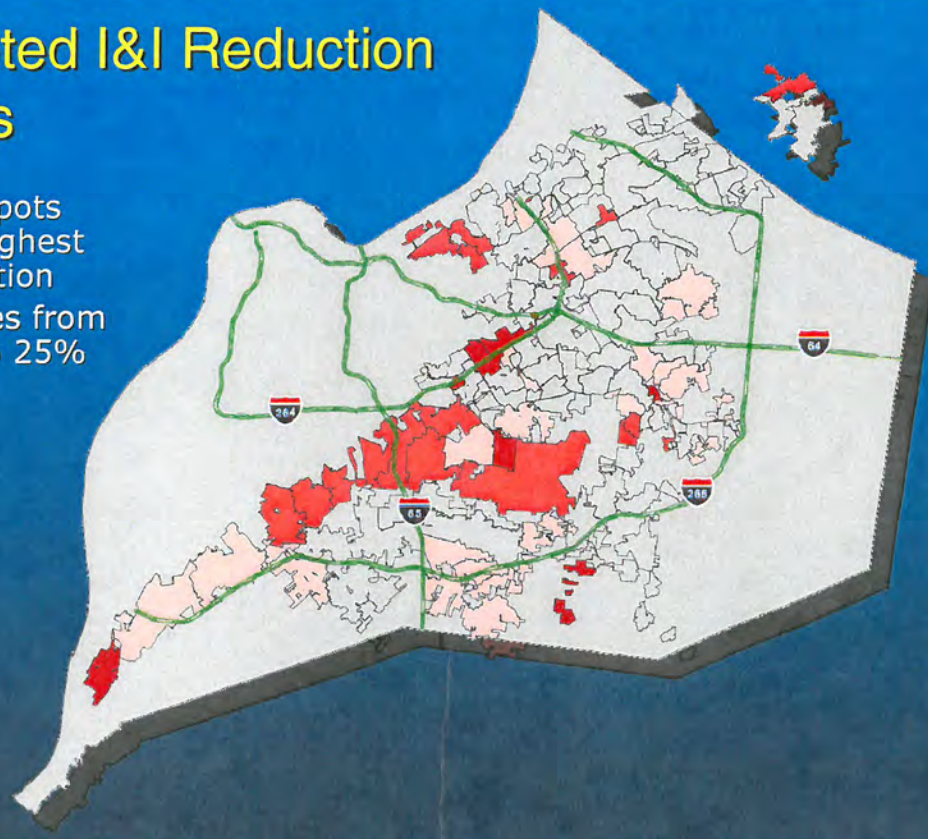
Peaking Factor “Hot Spots”

- Older neighborhoods generally higher peaking factor
- Ranged from 1- to 100
- Hot Spots will get highest reduction attention
- Many areas are in good shape & within MSD standards



Targeted I&I Reduction Levels

- Hot Spots get highest reduction
- Ranges from 0% to 25%



Impacts of Future Development on SSOs

- Used a step-wise analysis approach
- Considered land use information in LOJIC, and other LOJIC layers such as flood plains, steep slopes, etc.
- Considered available and developable non-sewered areas.
- Growth assumptions start now and continue to 2051

Application of Future Flows to SSO Model

- Only flows that can reach SSOs by gravity are considered
- Peaking factors for future sewers are based on MSD Design Standards – i.e. well-built, non-leaking sewers
- The Integrated Overflow Abatement Plan only considers the impacts of future growth on SSO solutions
- New sewers to transport future flows are addressed by MSD's Capacity Assurance Program

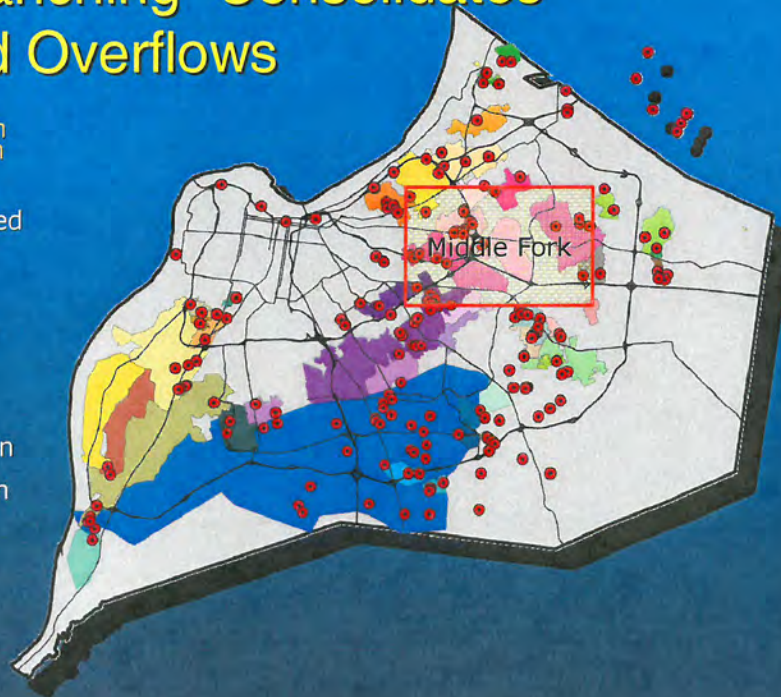
Early Modeling Results – Identification of Undocumented SSOs

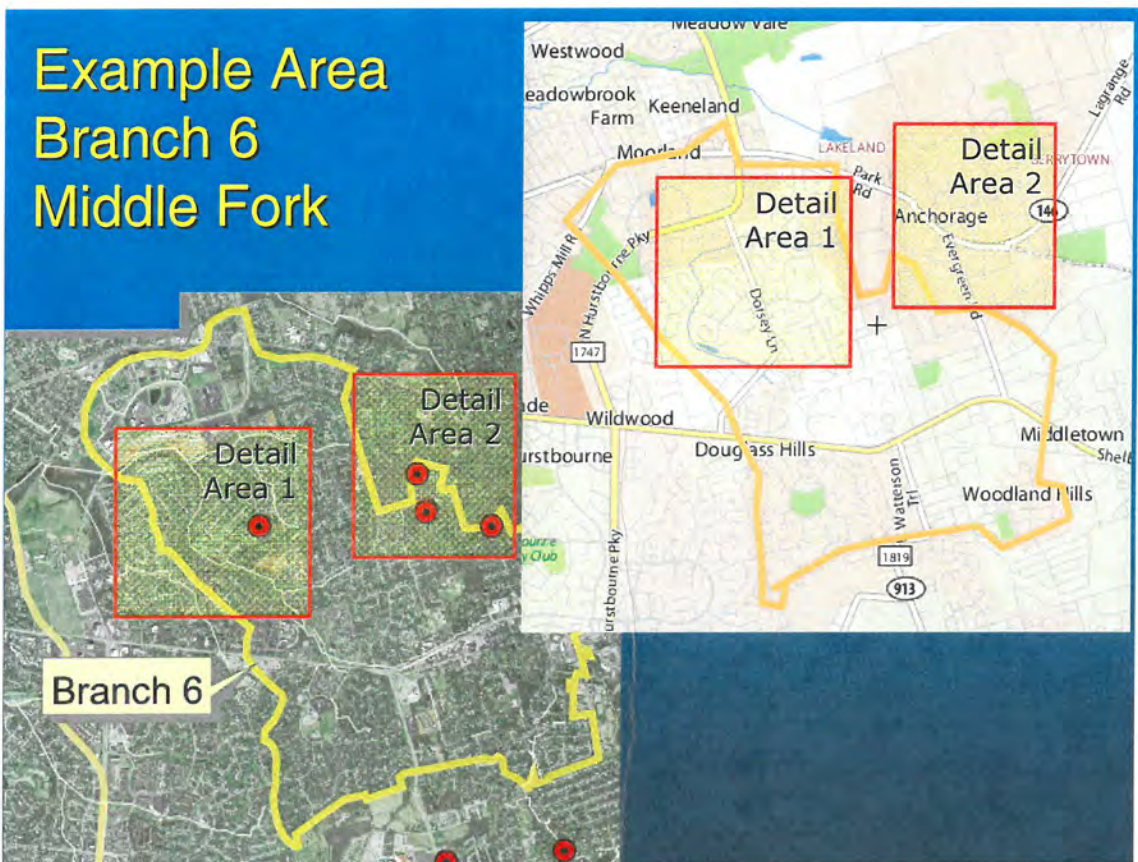
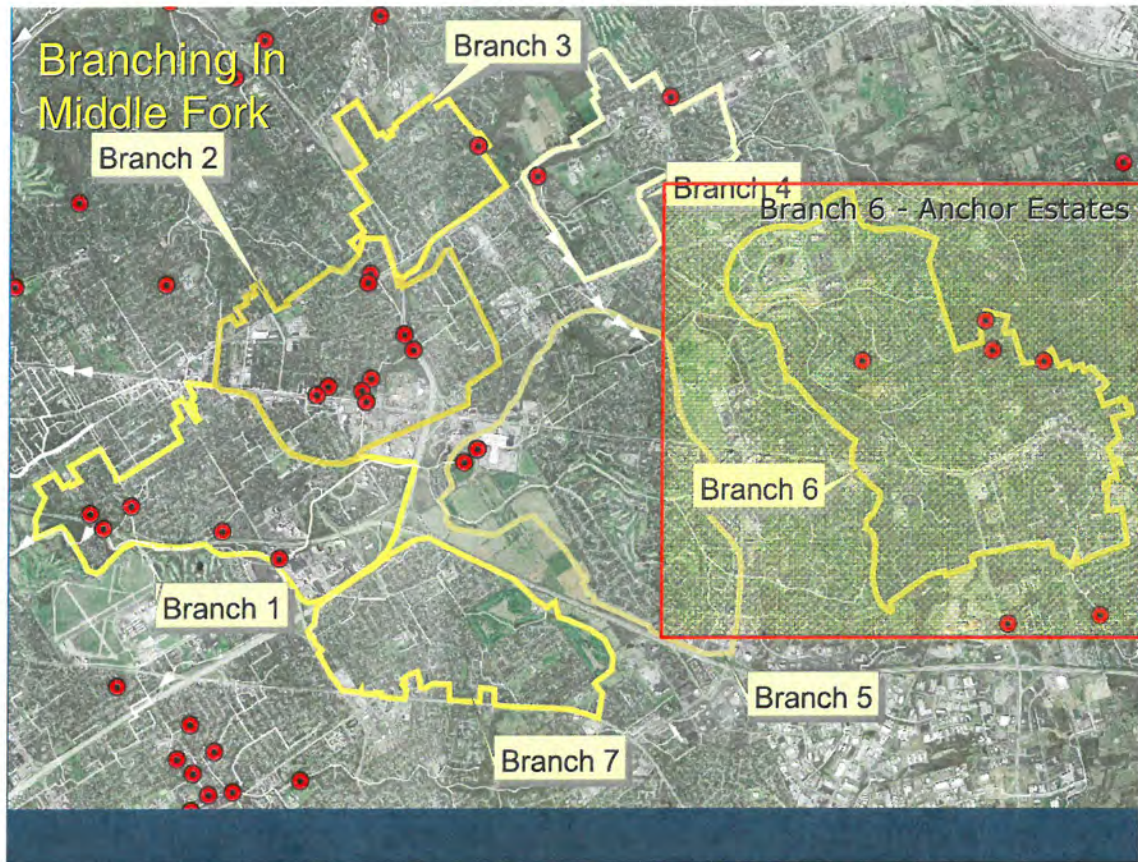
- Modeling indicated bottlenecks not associated with documented SSOs
- Recent rain (2-5 year range) allowed actual inspection of 73 locations at large storm levels
- Ten previously unknown locations confirmed as overflows, 35 areas show surcharging or manhole modifications, 25 + show no signs of capacity problem
- Newly identified overflow and surcharged locations will have solutions developed
- Fine-tuning model calibration will eliminate the prediction of overflows that don't occur



Model “Branching” Consolidates Connected Overflows

- Relates Problem area to Problem
- May include several SSOs both documented and suspected
- Solutions developed starting from most upstream branch then moving downstream
- Solution developed within Branch individually or in combinations
- Used in Benefit/Cost Evaluation

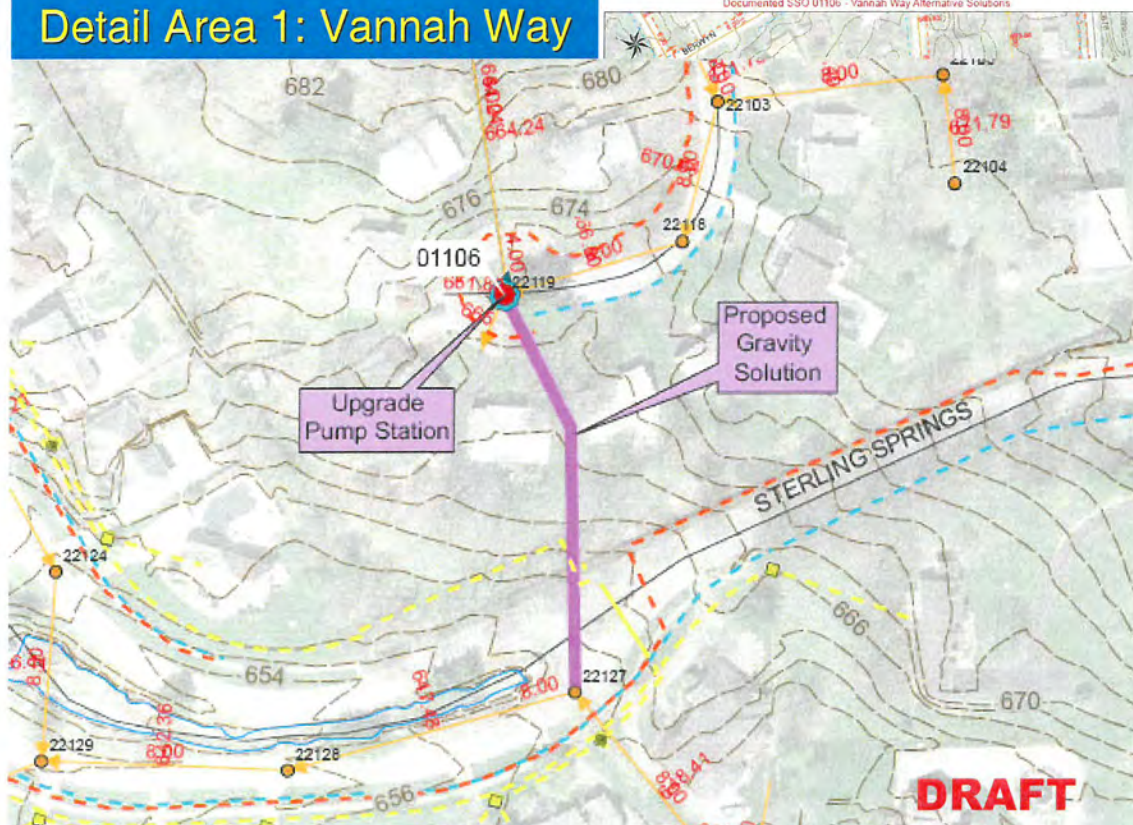


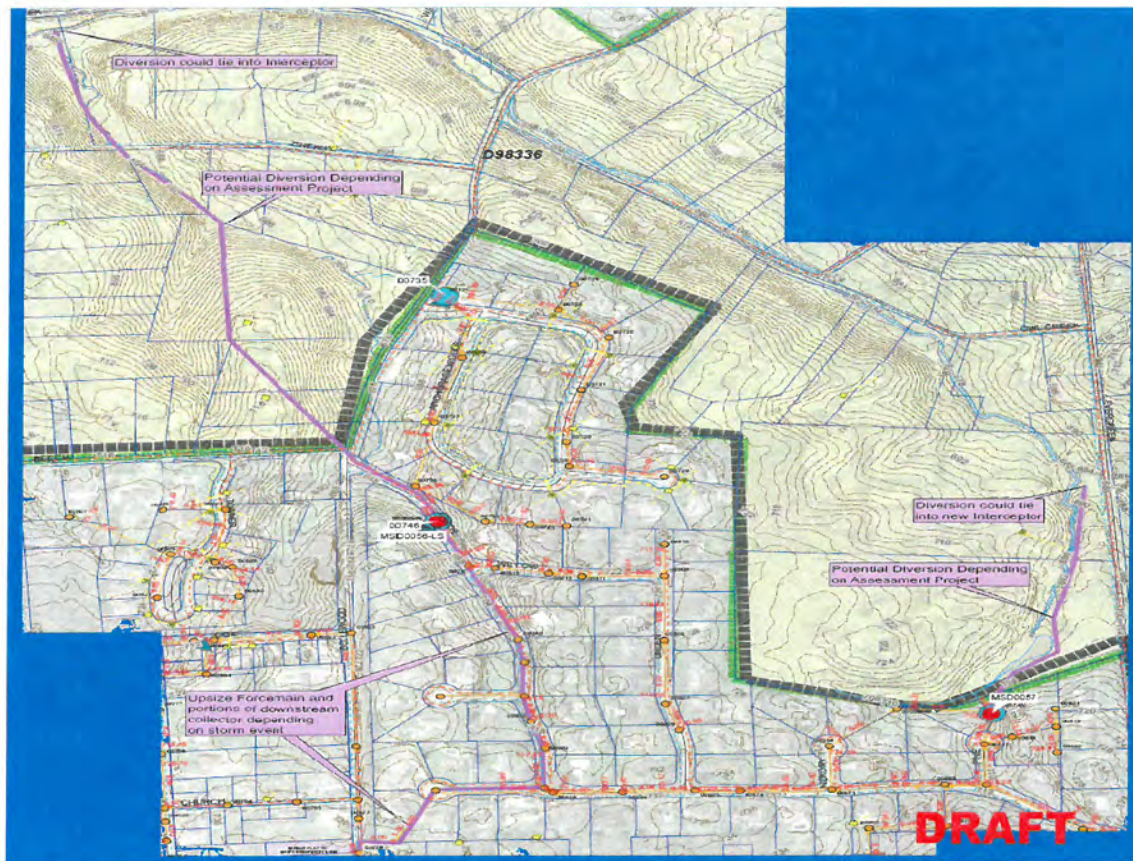


Summary of Solution Analysis

- Vannah Way (Detail area 1):
 - Diversion Alternative: Construct 400 LF of 8" sewer to existing sewer.
 - Conveyance Alternative: Upsize pump station and wet well
- Anchor Estates 1 & 2 (Detail Area 2):
 - Diversion Alternative: Construct gravity sewer to possible new interceptor
 - Conveyance Alternative: Upsize pump station and wet well, force main and portions of downstream collector

Detail Area 1: Vannah Way

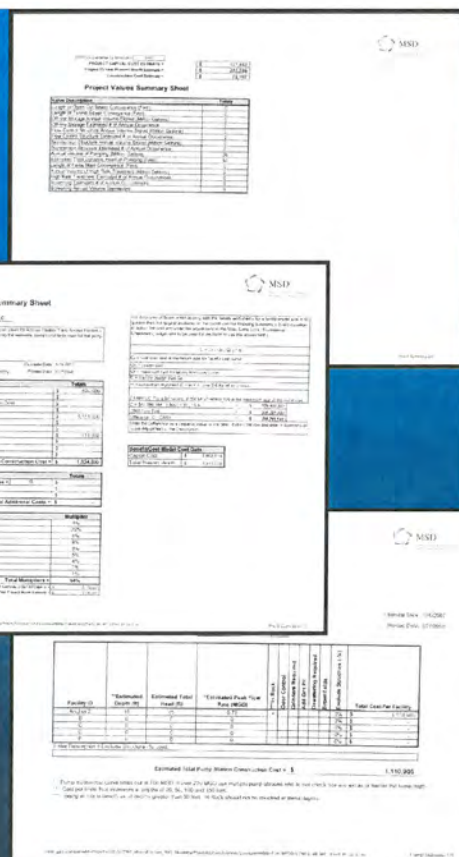




Example Cost Sheets

Branch 6

- Used Consistent Cost Tool
 - Pumps
 - Sewers
 - Force Mains
 - Storage
- Calculated for entire branch
- Includes long Term O&M



Example Benefit Sheets Branch 6

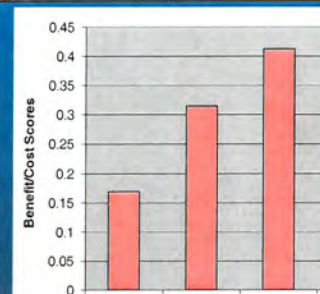
- Used values-based Benefit/Cost analysis
- Regulatory compliance takes into account all SSOs
- Calculated for entire branch

The image shows three overlapping spreadsheets titled 'Alternate 1-1 Year Storm Solution', 'Alternate 2-0 Year Storm Solution', and 'Alternate 3-1 Year Storm Solution'. Each spreadsheet has columns for 'Performance Measures', 'Frequency', and 'Values'. The 'Values' column contains numerical data for various performance measures like Regulatory Performance, Public Health Enhancement, Asset Protection, Environmental Enhancement, and Eco-Friendly Solutions.

Summary of Costs, Benefits, and B/C Ratios

Summary of Scores for Diversion Options for Middle Fork, Network Branch 06							
Values	Weights	Scores for Alternatives					
		Raw Score Alt-1 year	Weighted Score Alt-1 year	Raw Score Alt-2 year	Weighted Score Alt-2 year	Raw Score Alt-5 year	Weighted Score Alt-5 year
Regulatory Performance	8	18	144	39	312	54	432
Public Health Enhancement	10	8	80	11	110	13	130
Asset Protection	6	1	6	1	10	1	10
Environmental Enhancement	8	3	24	3	24	3	24
Eco-Friendly Solutions	6	-4	-24	-4	-24	-4	-24
Total Weighted Score All Values		230		432		572	
Total Present Worth Costs		\$1,370,080		\$1,370,080		\$1,389,590	
Weighted Benefit/Cost Ratio (Total Present Worth Costs)		0.1679		0.3153		0.4116	

- The Diversion Option at the 5-year level had the best B/C ratio for network Branch 6
- B/C ratio: Diversion options > Conveyance options
- Benefits ranged from 230-572
- Total Present Worth Costs were all near \$1.4M
- The Diversion B/C ratios ranged from 0.17 to 0.41 (5 Year)



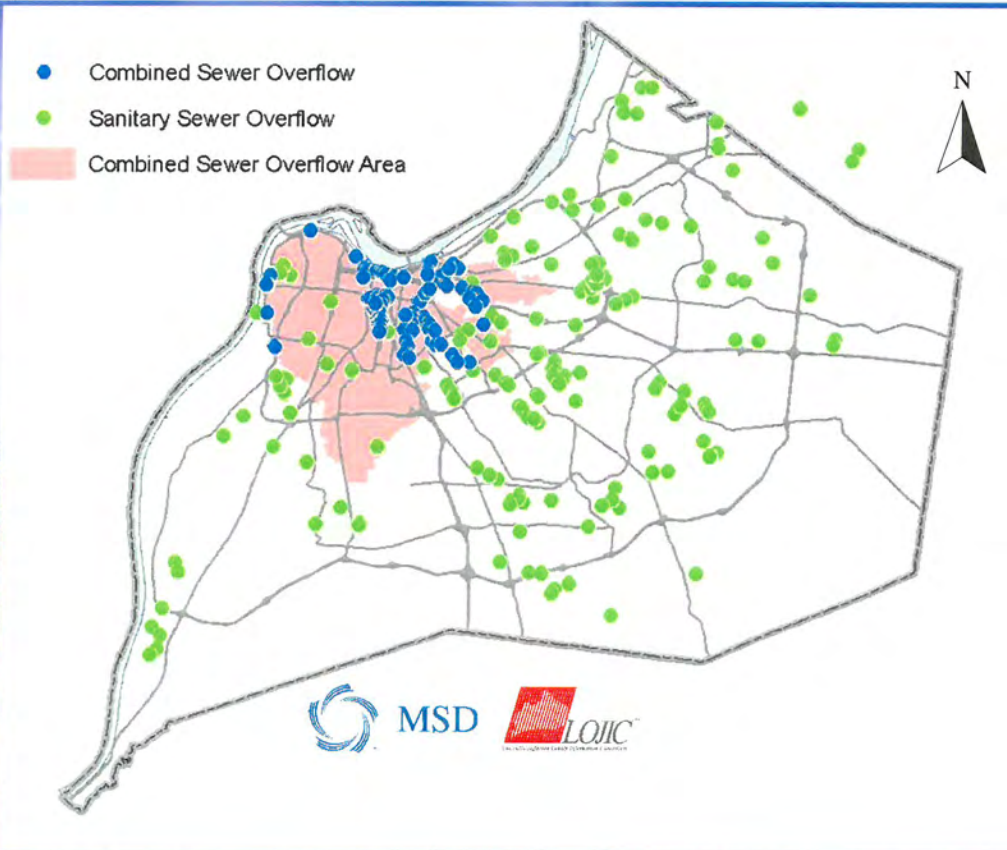
Summary – SSO Elimination

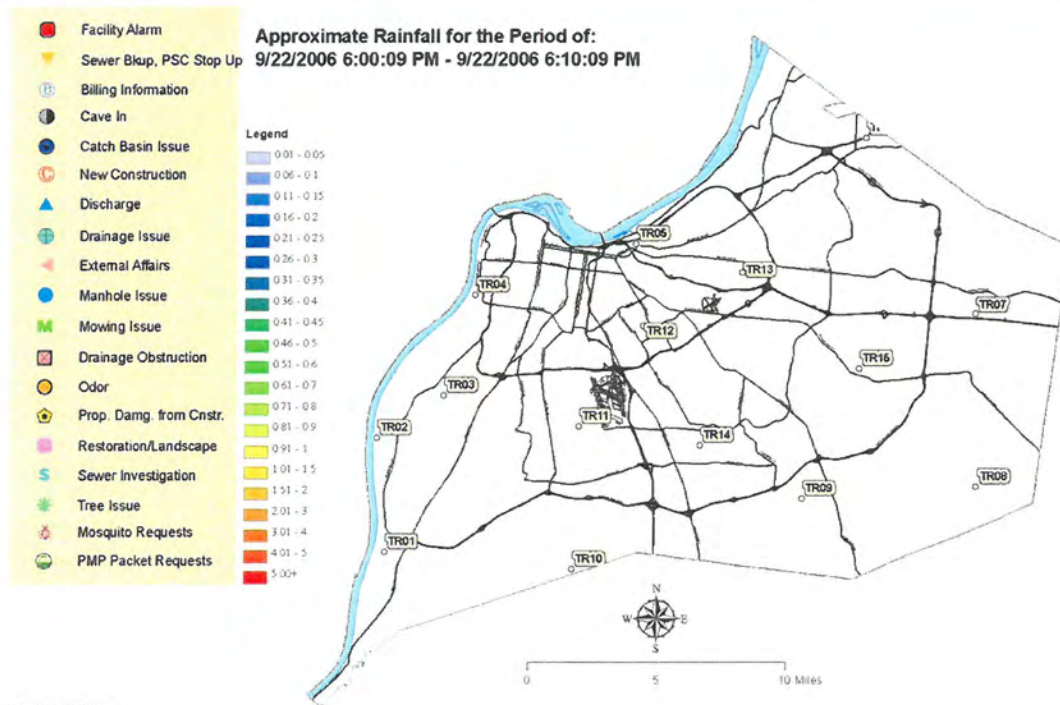
- Model calibration and validation results in accurate description of the current sanitary sewer system
- I&I reduction and build-out considerations are included in SSO considerations
- Benefit/Cost approach used to select approach and optimal level of protection

Compliance Monitoring



Wet Weather Stakeholder Group
April 3, 2008





Outline

- Compliance Monitoring Objectives
- Regulatory Guidance and Requirements
- Historical and Ongoing Monitoring
- Compliance Monitoring Components
 - Construction projects
 - Water Quality Improvements
 - Green Infrastructure Effectiveness
 - Behavior Change Effectiveness
 - Sustainability of changes
 - Effectiveness of changes

Monitoring Objectives

- CSO Objectives
 - Reduction in Overflow Frequency (e.g. 4/year)
 - Reduction in Overflow Volume (e.g. 85% AAOV)
 - Maximize Impact to Water Quality
- SSO Objectives
 - Elimination to Level of Protection
 - Impact Measurement
 - Impact to Water Quality
- System Performance & Performance Enhancement
- Behavior Changes
- Adaptive Management Adjustments

Monitoring Objectives

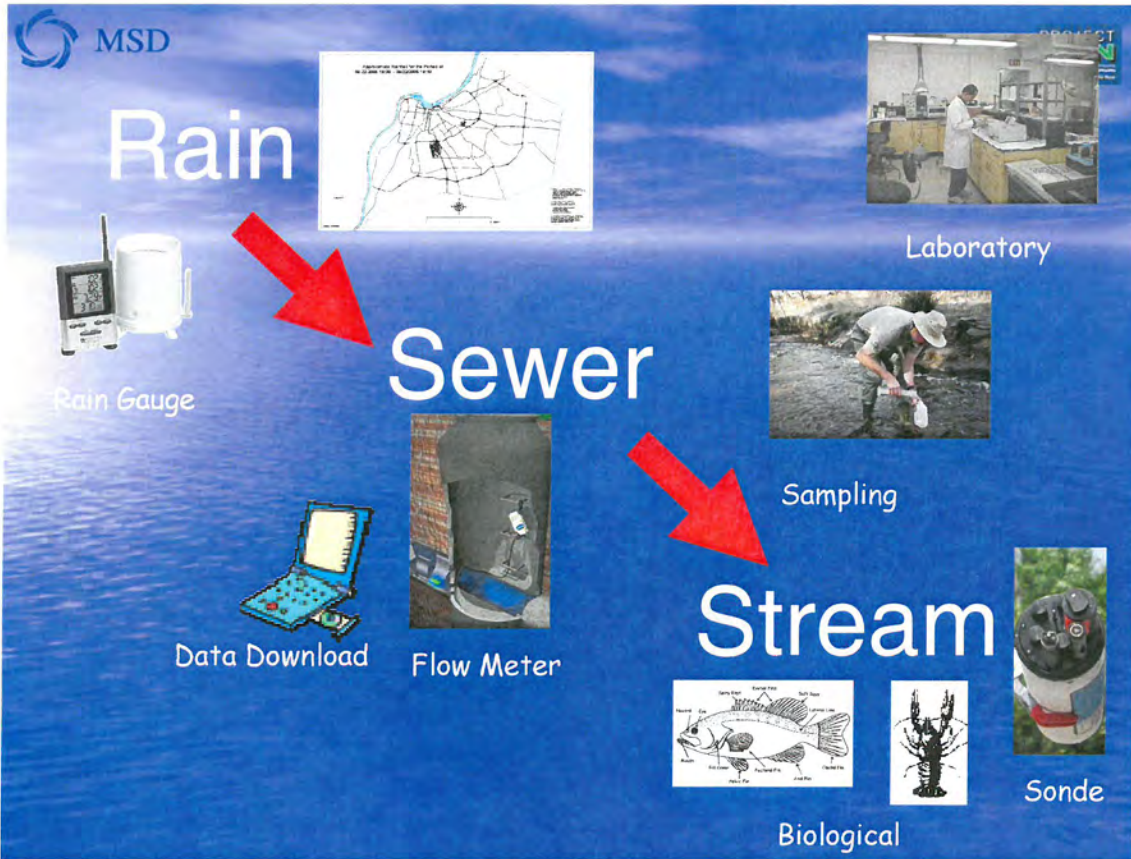
- Gray Solutions
 - Storage Basin Performance
 - Conveyance Performance
 - Treatment Performance (Quality & Volume)
 - Overflow Reduction
 - Real Time Control Opportunities
- Green Infrastructure
 - Presumptive Impact Planning (Gray/Green Integration)
 - Impact Measurement
 - Long Term Performance & Outreach Effectiveness
- System Long Term Monitoring & Sampling
- Habitat and Biological Studies
- Performance Needs & Water Quality Impact
 - Quarterly, Annual, and Synthesis Reporting
 - Water Quality and Quantity Modeling Extrapolation
 - Need for Additional Controls

Project Types for Monitoring

- Treatment Plant Expansion
- Site Treatment
- Storage
- Green Infrastructure (Impervious Disconnection)
- Sewer Separation
- Transport
- Plumbing Modification & Private Property Ordinance
- Sewer Rehabilitation
- Overall System Monitoring

Monitoring Plan Focus

- Monitoring sites selected to best measure performance
- Frequency of monitoring and monitored parameters will be reviewed
 - Regulatory requirements and guidance
 - Stakeholder values
- Quality Assurance Planning
 - Data Review
 - Equipment Maintenance Frequency
 - Telemetry



MSD

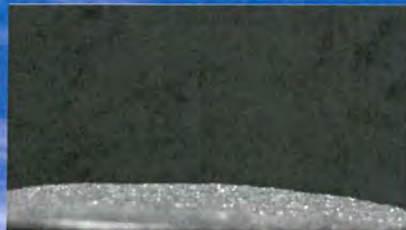
PROJECT WIN

Ongoing Monitoring Efforts

- Rainfall Data – Gage and Radar Rainfall
- Flow Monitoring – Stream, In Sewer, Overflow, Pump Station, Treatment Plant
- Water Quality Monitoring Sampling – Dry/Wet Weather, Continuous
- Habitat & Biological Studies (Recreational Use & Sensitivity Studies)
- KPDES Permit Sampling (dictated by permit)



Rain Data



PROJECT
WIN



RAINFALL CONDITIONS FOR ZEPHYRUS COUNTY, KENTUCKY

(gauge updates automatically)



Current Rainfall Conditions as of
Feb 28, 2006 1:05 PM

Gage	Station	Amount	Depth
TR11	Mad Creek WWTP	0.00	0.00
TR12	Mad Creek Station	0.00	0.00
TR13	Mad Creek	0.00	0.00
TR14	Mad Creek	0.00	0.00
TR15	Mad Creek	0.00	0.00
TR16	Mad Creek	0.00	0.00
TR17	Mad Creek	0.00	0.00
TR18	Mad Creek	0.00	0.00
TR19	Mad Creek	0.00	0.00
TR20	Mad Creek	0.00	0.00
TR21	Mad Creek	0.00	0.00
TR22	Mad Creek	0.00	0.00
TR23	Mad Creek	0.00	0.00
TR24	Mad Creek	0.00	0.00
TR25	Mad Creek	0.00	0.00
TR26	Mad Creek	0.00	0.00
TR27	Mad Creek	0.00	0.00
TR28	Mad Creek	0.00	0.00
TR29	Mad Creek	0.00	0.00
TR30	Mad Creek	0.00	0.00
TR31	Mad Creek	0.00	0.00
TR32	Mad Creek	0.00	0.00
TR33	Mad Creek	0.00	0.00
TR34	Mad Creek	0.00	0.00
TR35	Mad Creek	0.00	0.00
TR36	Mad Creek	0.00	0.00
TR37	Mad Creek	0.00	0.00
TR38	Mad Creek	0.00	0.00
TR39	Mad Creek	0.00	0.00
TR40	Mad Creek	0.00	0.00
TR41	Mad Creek	0.00	0.00
TR42	Mad Creek	0.00	0.00
TR43	Mad Creek	0.00	0.00
TR44	Mad Creek	0.00	0.00
TR45	Mad Creek	0.00	0.00
TR46	Mad Creek	0.00	0.00
TR47	Mad Creek	0.00	0.00
TR48	Mad Creek	0.00	0.00
TR49	Mad Creek	0.00	0.00
TR50	Mad Creek	0.00	0.00
TR51	Mad Creek	0.00	0.00
TR52	Mad Creek	0.00	0.00
TR53	Mad Creek	0.00	0.00
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TR57	Mad Creek	0.00	0.00
TR58	Mad Creek	0.00	0.00
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TR60	Mad Creek	0.00	0.00
TR61	Mad Creek	0.00	0.00
TR62	Mad Creek	0.00	0.00
TR63	Mad Creek	0.00	0.00
TR64	Mad Creek	0.00	0.00
TR65	Mad Creek	0.00	0.00
TR66	Mad Creek	0.00	0.00
TR67	Mad Creek	0.00	0.00
TR68	Mad Creek	0.00	0.00
TR69	Mad Creek	0.00	0.00
TR70	Mad Creek	0.00	0.00
TR71	Mad Creek	0.00	0.00
TR72	Mad Creek	0.00	0.00
TR73	Mad Creek	0.00	0.00
TR74	Mad Creek	0.00	0.00
TR75	Mad Creek	0.00	0.00
TR76	Mad Creek	0.00	0.00
TR77	Mad Creek	0.00	0.00
TR78	Mad Creek	0.00	0.00
TR79	Mad Creek	0.00	0.00
TR80	Mad Creek	0.00	0.00
TR81	Mad Creek	0.00	0.00
TR82	Mad Creek	0.00	0.00
TR83	Mad Creek	0.00	0.00
TR84	Mad Creek	0.00	0.00
TR85	Mad Creek	0.00	0.00
TR86	Mad Creek	0.00	0.00
TR87	Mad Creek	0.00	0.00
TR88	Mad Creek	0.00	0.00
TR89	Mad Creek	0.00	0.00
TR90	Mad Creek	0.00	0.00
TR91	Mad Creek	0.00	0.00
TR92	Mad Creek	0.00	0.00
TR93	Mad Creek	0.00	0.00
TR94	Mad Creek	0.00	0.00
TR95	Mad Creek	0.00	0.00
TR96	Mad Creek	0.00	0.00
TR97	Mad Creek	0.00	0.00
TR98	Mad Creek	0.00	0.00
TR99	Mad Creek	0.00	0.00
TR100	Mad Creek	0.00	0.00

Rain Gauge Network

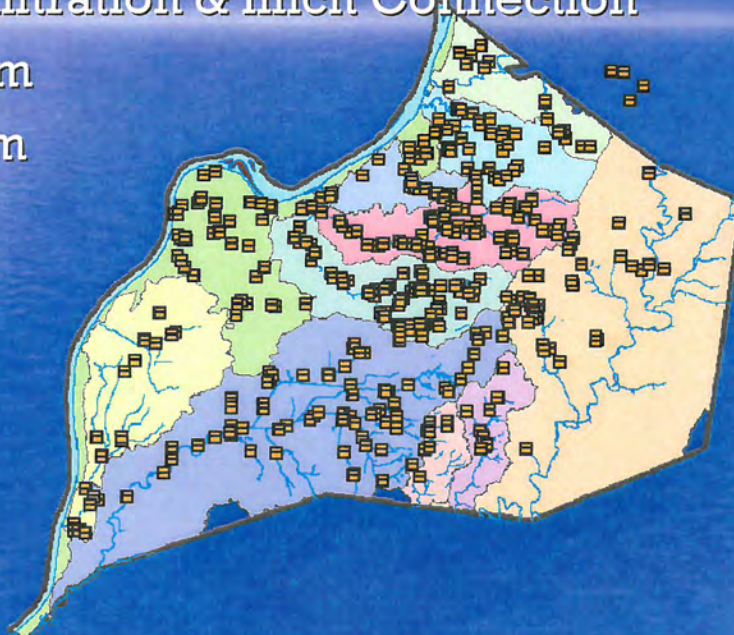
Radar Rainfall Data



Historical Flow Monitoring

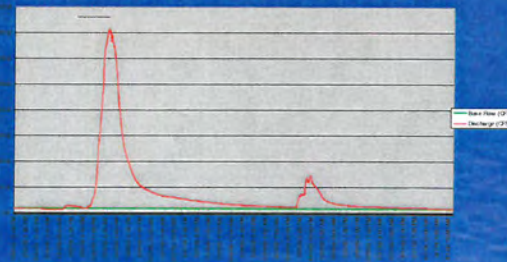
Locations

- Inflow/Infiltration & Illicit Connection
- Short Term
- Long Term



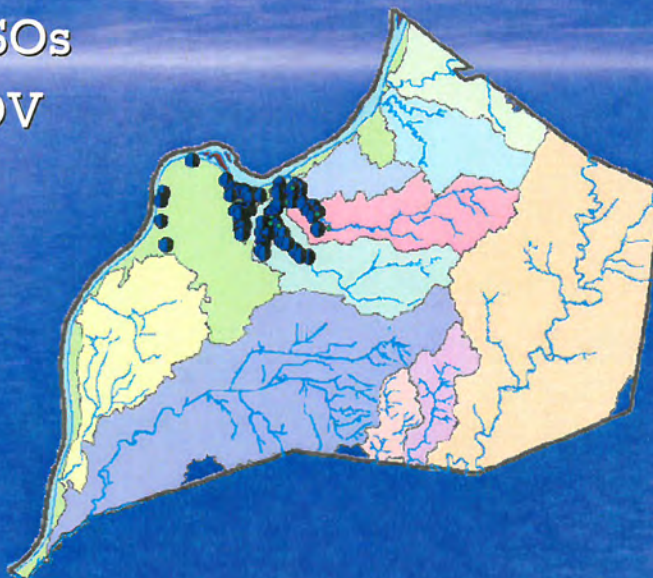
PROJECT
WIN

Sewer Flows and Overflows



CSO Flow Monitors

- ~ 25 Large CSOs
- > 10 MG AAOV
- Typical Year Modeling



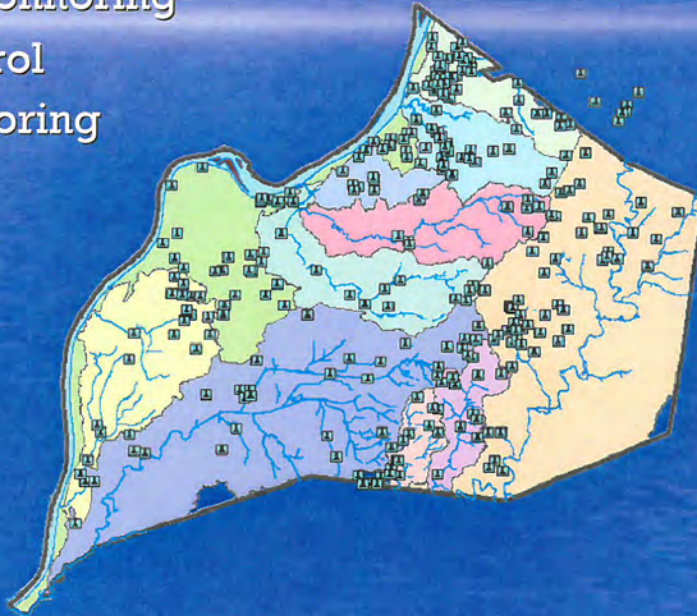


Operations Monitoring Sites



(PI)

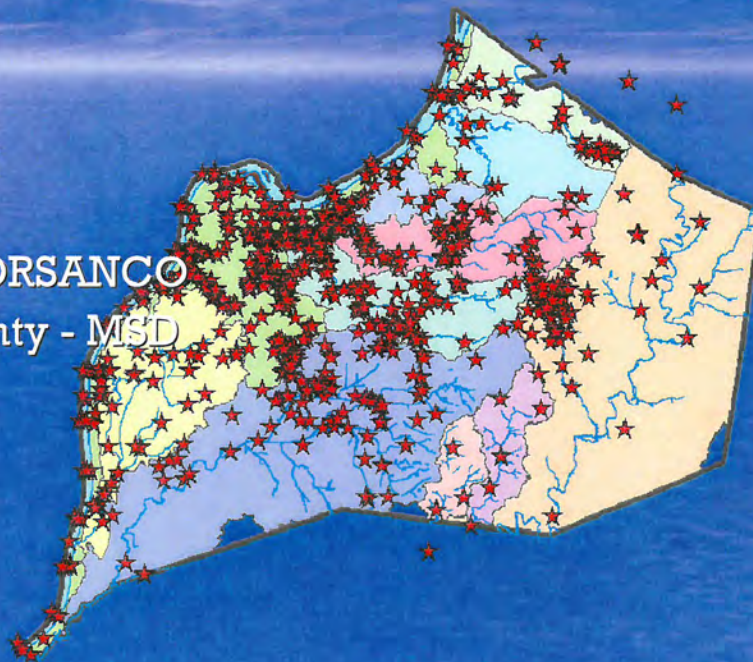
- Pump Station Monitoring
- Real Time Control
- Overflow Monitoring



Sampling Locations

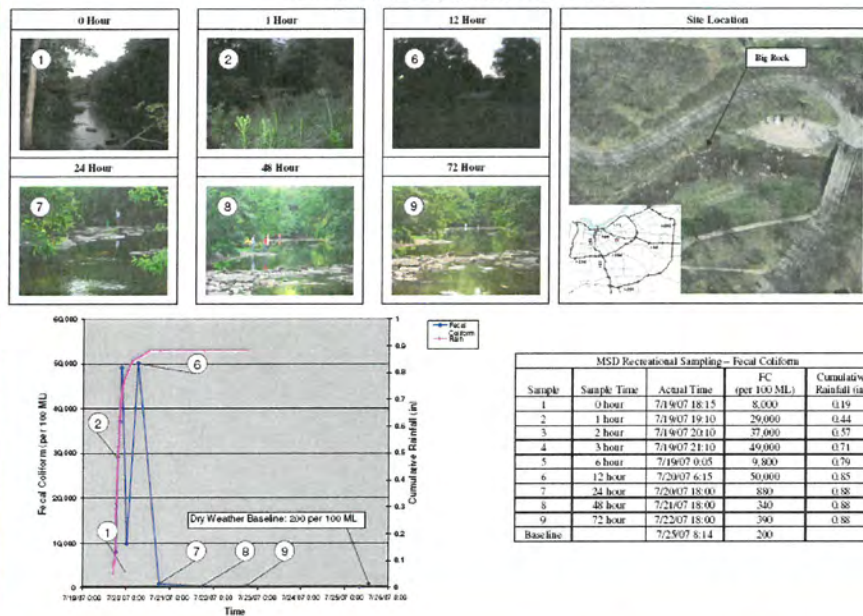


- Dry Weather
- Wet Weather
 - October 2007
 - March 2008
- Ohio River – ORSANCO
- Jefferson County - MSD



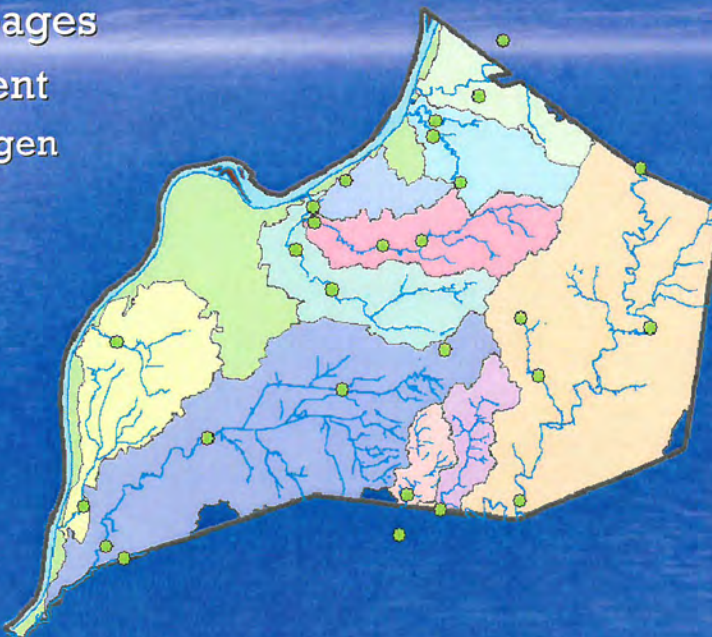
Sampling Information

Seneca Park Recreation Sampling - July 19, 2007 Rain Event



Long Term Monitoring Network

- USGS Stream Gages
- Sonde Equipment
 - Dissolved Oxygen
 - Temperature
 - pH
 - Conductivity
 - Telemetry



Water Quality Monitoring



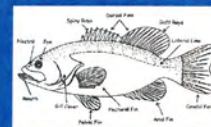
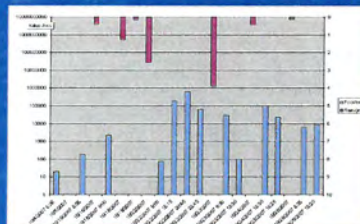
Sampling



Laboratory



Sonde



Biological

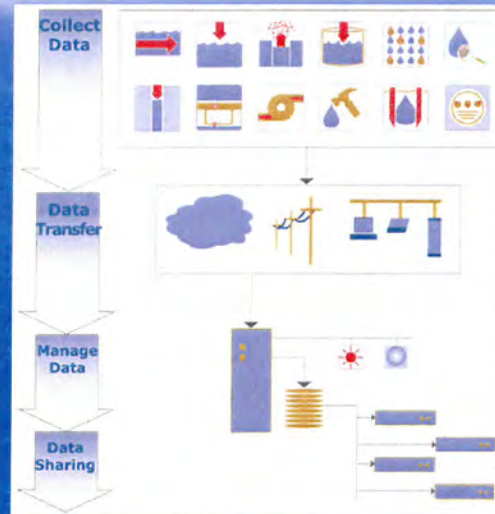
Bioassessment

- Algae
- Macro Invertebrates
- Fish
- Stream Reach Assessment
- Habitat
- Sensitivity Analysis
- Baseline Assessment
- Periodic Reassessment



Planned Efforts (Short Term)

- Expanded long term flow monitoring (in-sewer)
- Expanded telemetry
- Data Integration
- “Big Four” Baseline Sampling



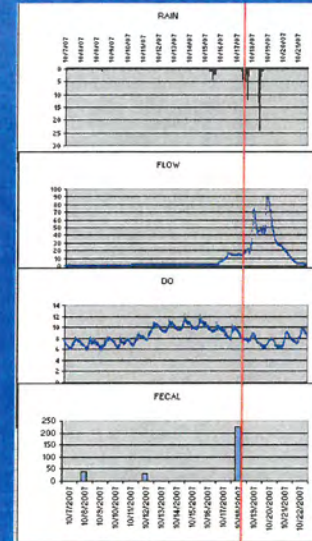
The Life Cycle of an Environmental Data Point

Sonde	Rain Gauge	Flow Meter	Stream Flow	Biological	Laboratory
<p>Technician installs Sonde in stream</p> <p>Each calibration and download made every 2 - 3 weeks</p> <p>3. Patrick logs files to network</p> <p>Patrick logs files to network</p> <p>SONDE application created by IT stores the data</p> <p>Patrick triggered creates reports that analyze data trends</p> <p>Data goes to help demonstrate compliance status with regulatory limits or prioritize environmental projects</p>	<p>Telemetered Rain Gauges:</p> <p>PLC sends data to MSD database and ONERAIN every 5 minutes</p> <p>Data is accessible real time via MSD Web Site</p> <p>Non-Telemetered Rain Gauges:</p> <p>Data is logged on a data card</p> <p>Mike Griffith's staff downloads data via a laptop and places files on the network</p> <p>ONERAIN data available for analysis real time</p>	<p>Permanent (Telemetered) Collection System Flow Meters:</p> <p>PLC sends data to MSD database and RTC systems every 5 minutes</p> <p>Temporary (Non-Telemetered) Collection System Flow Meters:</p> <p>Mike Griffith's staff downloads data via a laptop and places files on the network</p> <p>Collection System Flow Data used to generate hydrographs that help identify wet weather problems, reduce L&L, and prioritize elimination of overflows</p>	<p>USGS Stream Flow Gauges (Telemetered):</p> <p>USGS monitors network of stream flow gauges in conjunction with MSD</p> <p>Provided data for USGS stream flow meters available on line real time</p> <p>Final data gets transferred to MSD quarterly</p> <p>MSD data like fecal coliform can be plotted on the same graphs with stream flow data to indicate when water quality problems are the worst</p>	<p>Macroinvertebrate and Fish Sampling:</p> <p>Samples are collected from streams of various macroinvertebrate and fish species</p> <p>Taxonomy and condition data generated on samples</p> <p>Algae Sampling:</p> <p>Samples are collected from streams using ceramic tiles and analyzed under a microscope</p> <p>Taxonomy and enumeration data generated on samples, demonstrates condition of the stream</p>	<p>Surface Water Monitoring:</p> <p>Water quality technician collects discrete surface water samples and delivers them to the laboratory</p> <p>Laboratory analyzes samples and publishes data in the LIMS</p>

Environmental Data Interrelat

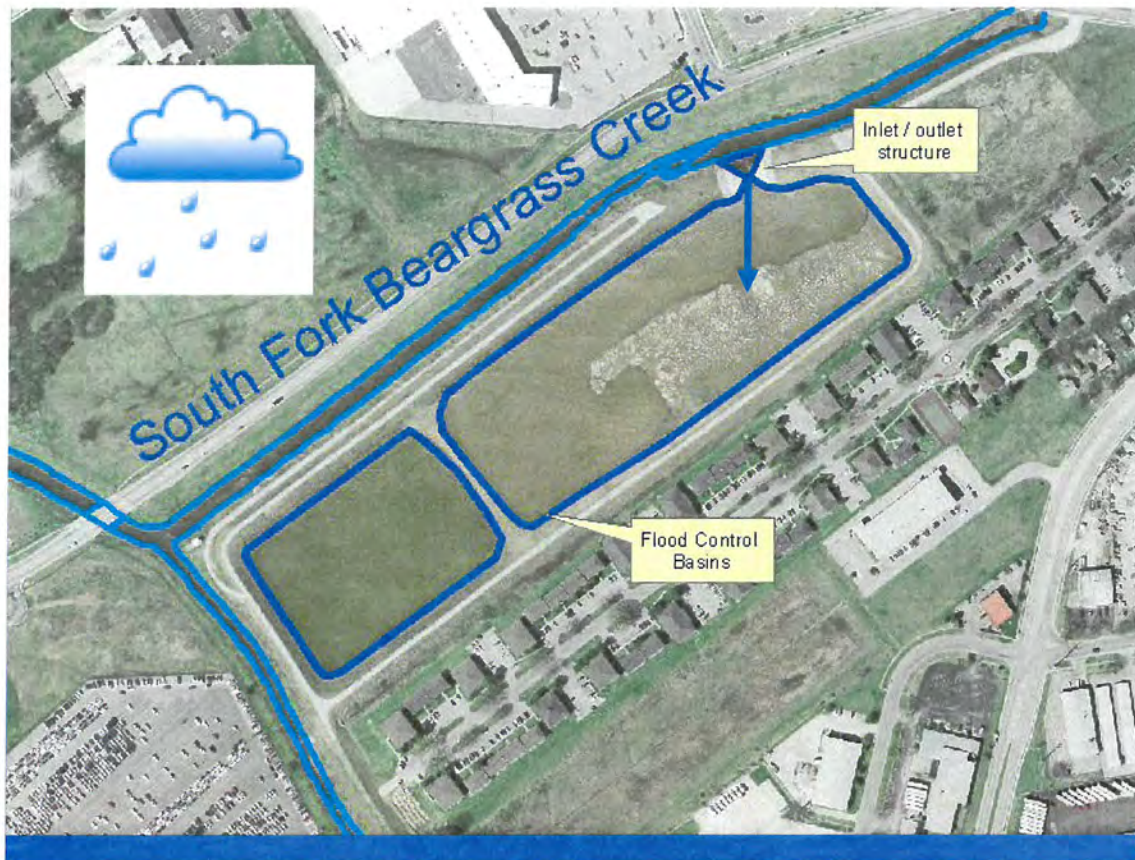


- Long dry spell affects oxygen, metals, and temperature in the stream
- Changes in oxygen and temperature affect biological life in stream (algae, bugs, fish)
- Rainfall causes increase in stream and sewer flows
- Runoff and sewer overflows cause increase in bacterial counts
- Sewer overflows may affect oxygen in the stream



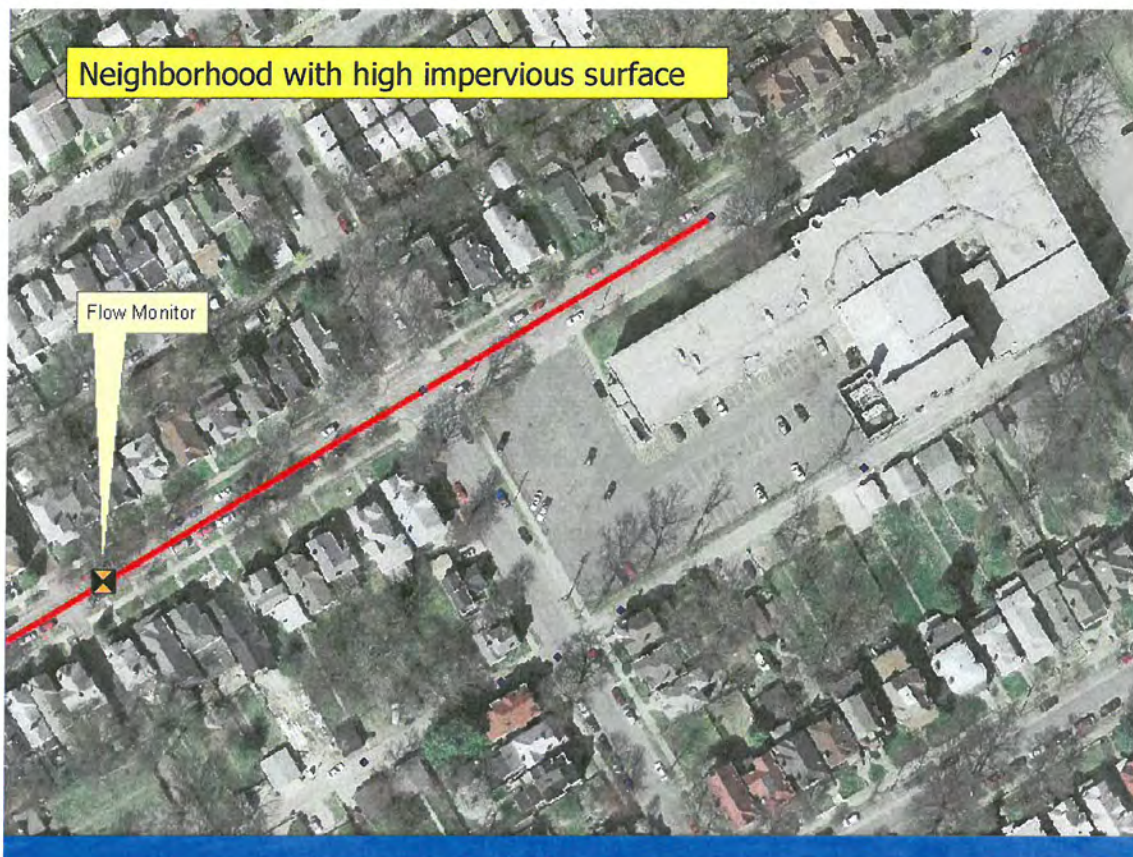
'Gray' Solution Monitoring

- Monitoring & Sampling Protocol
- Pre/Post Efforts
- Basin Flow Monitoring
- Baseline Sampling Assessment
- Treatment Flow Monitoring and Sampling
- Diversion Monitoring

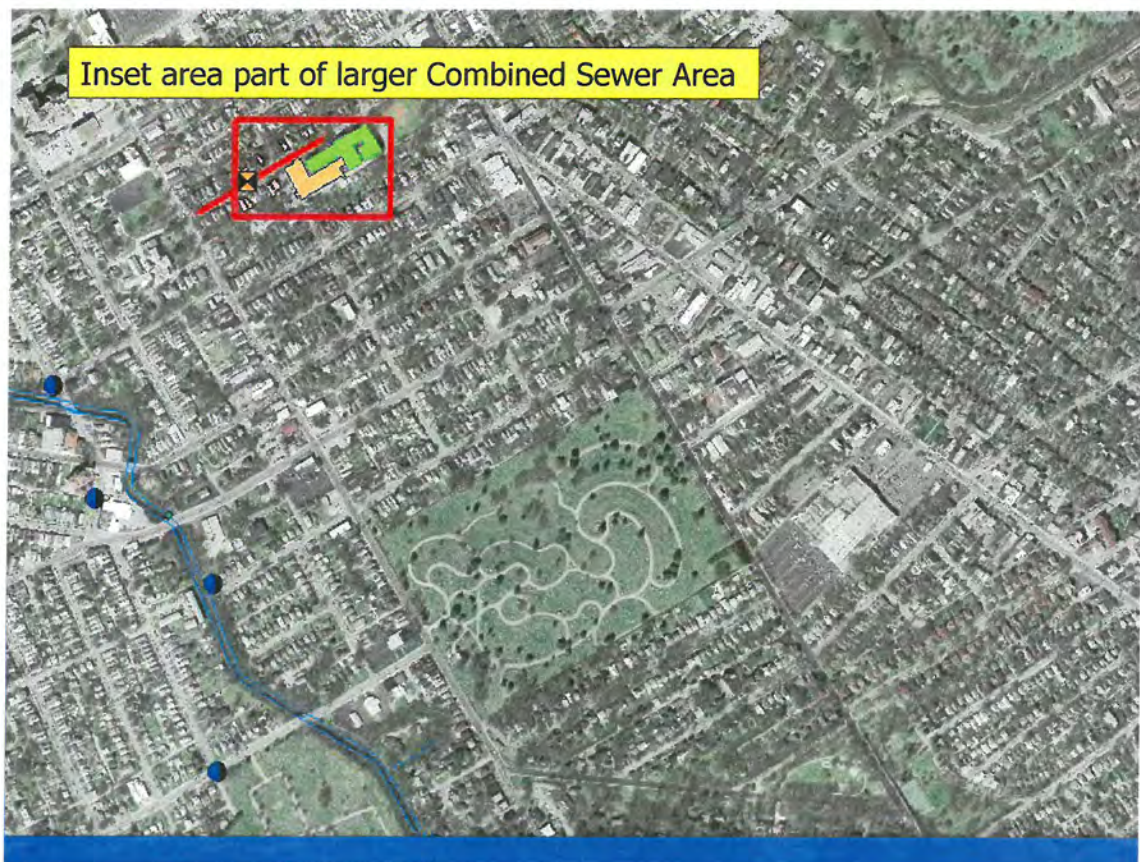


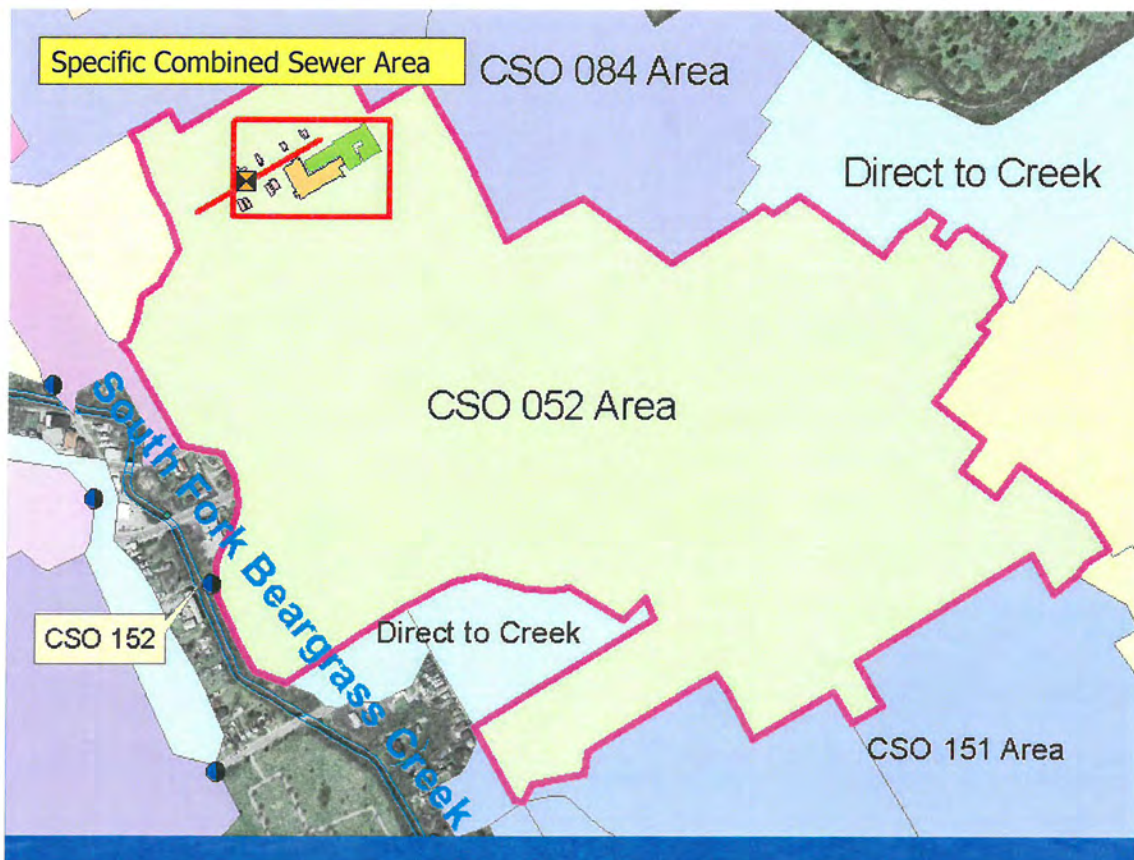
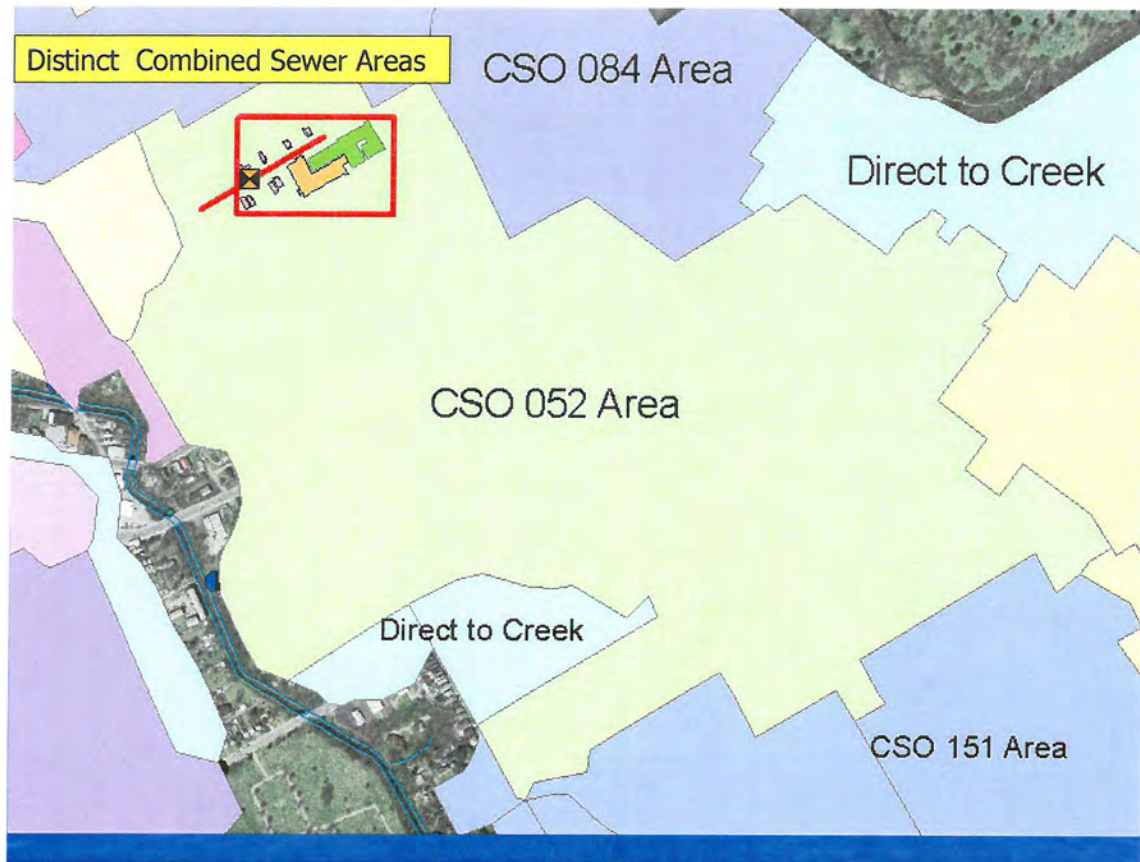
‘Green’ Solution Monitoring

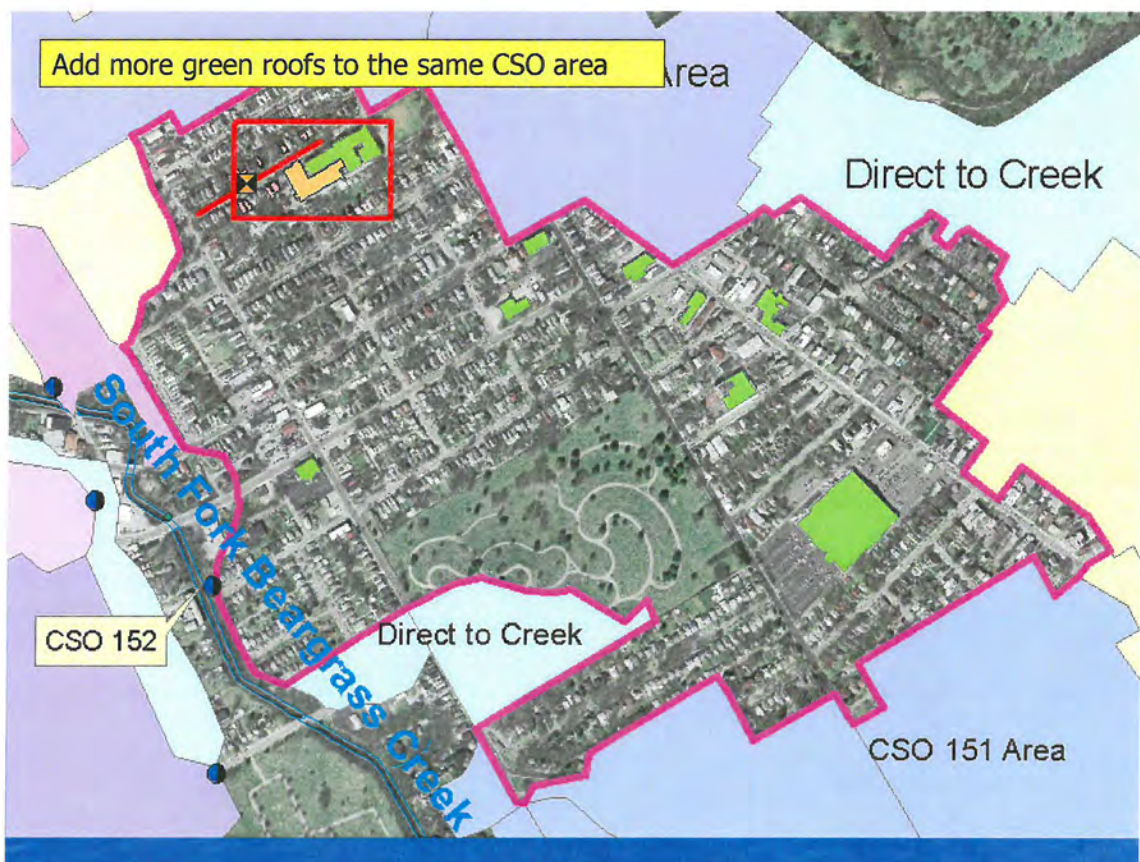
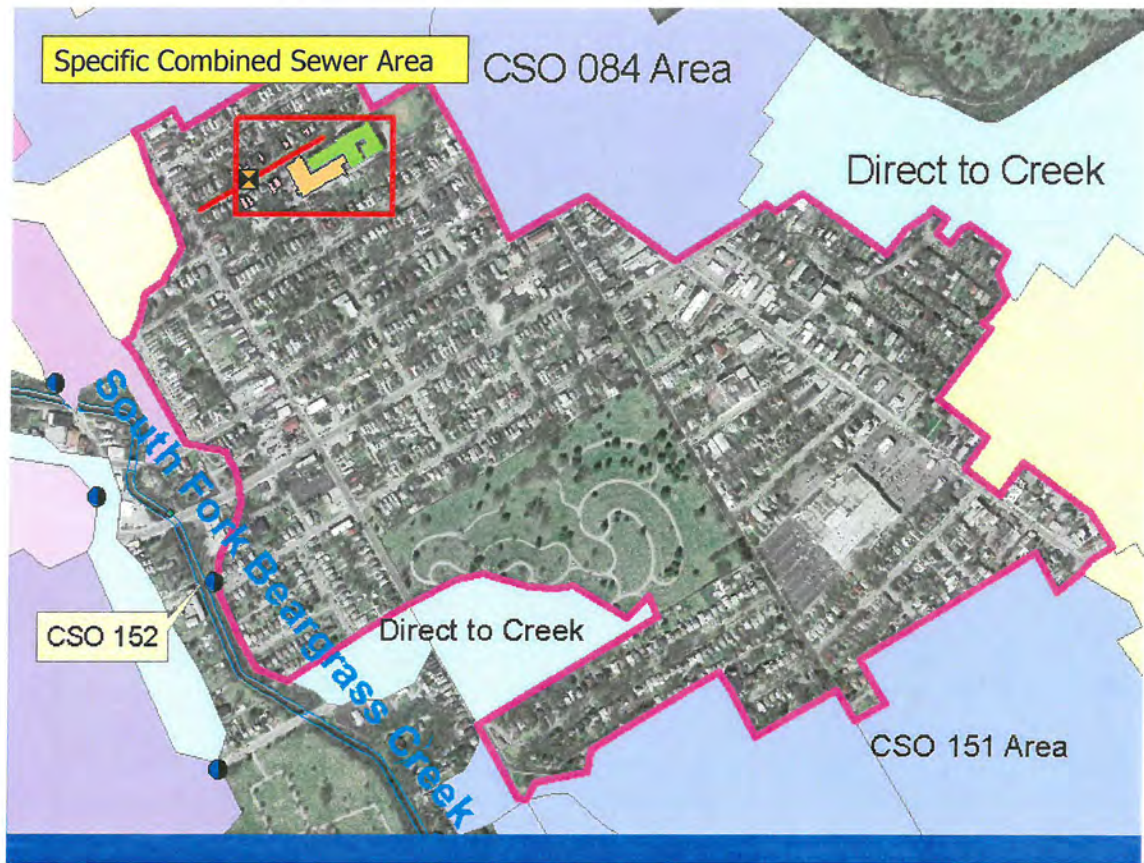
- “Presumptive” Volume Reduction per Green Infrastructure Type for Planning (Impervious Area Disconnected/Gallons Removed)
- Green Monitoring Program (Small Sewershed or Neighborhood Focus)
 - Rain Garden
 - Rain Barrel
 - Pervious Pavement
 - Green Roof
 - Collective Impact Monitoring

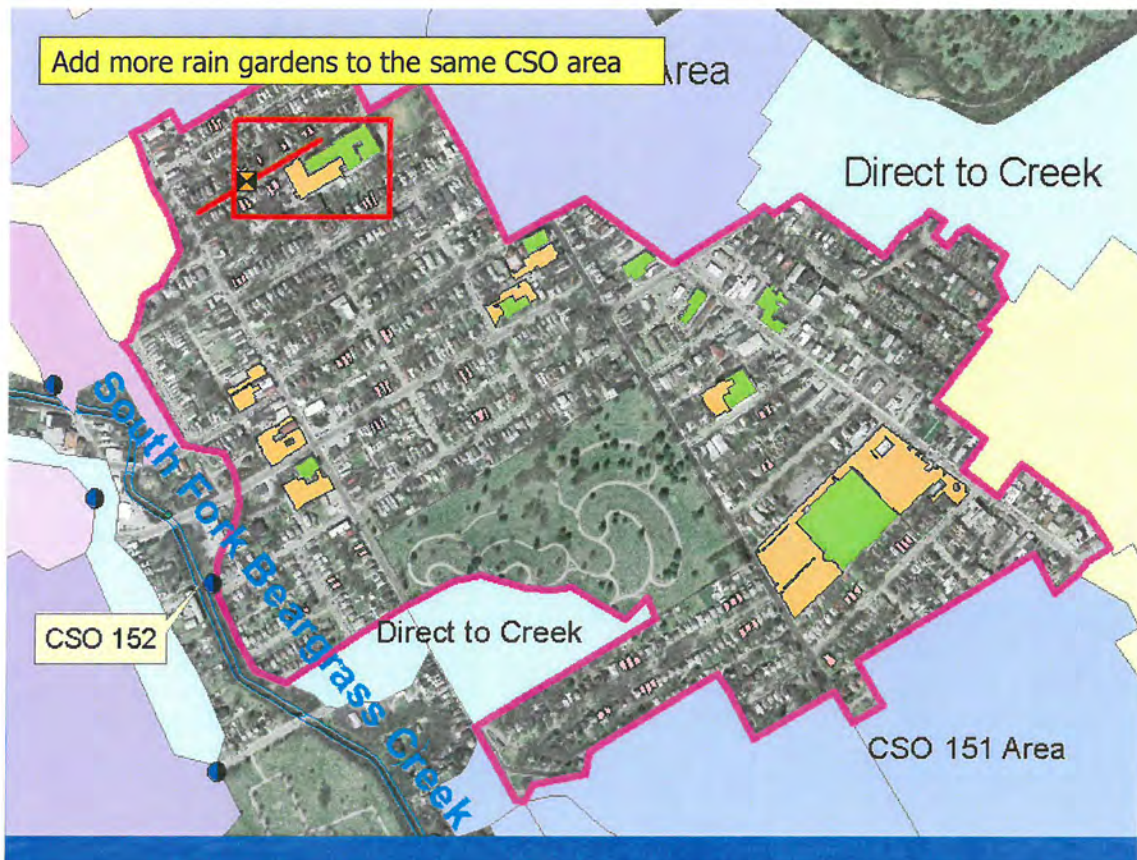
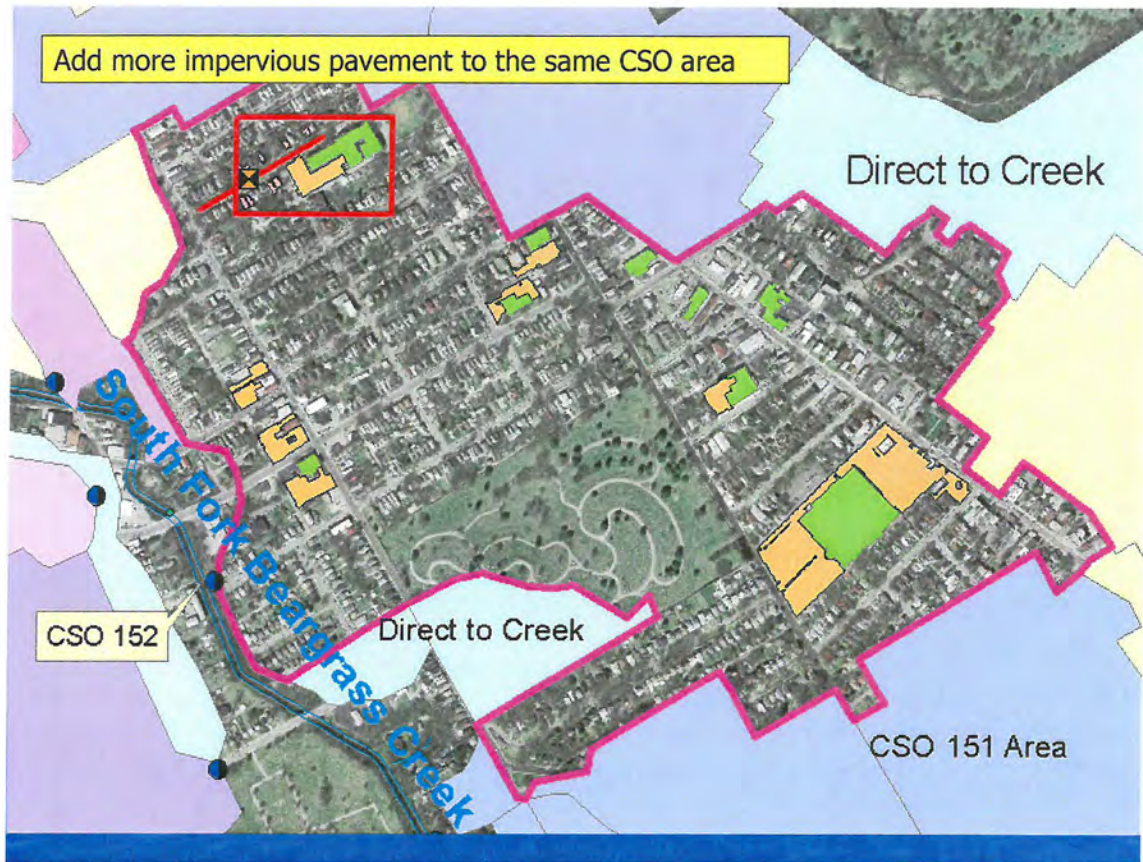












Sewer Rehabilitation - SSDP

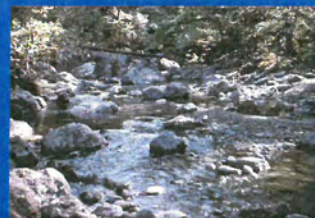
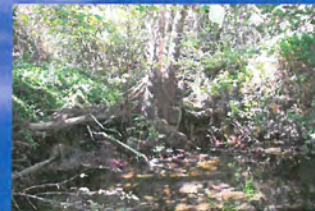
- Practical approach to assess impact on I&I
- Similar approach to green assessment
 - Manhole Rehabilitation & Pipe Lining
 - Private Property Program



Habitat Assessment

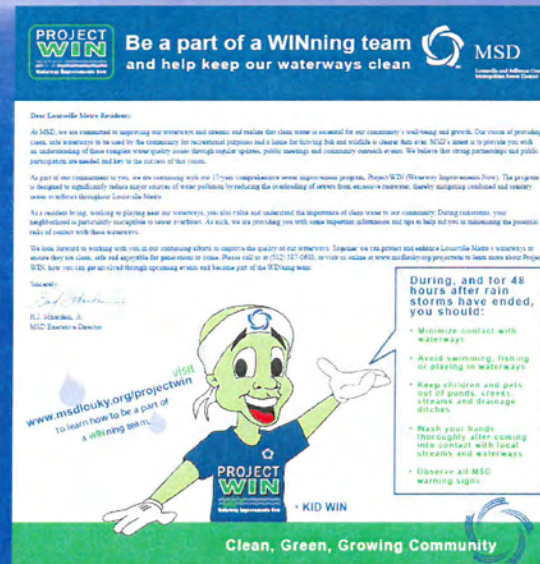
Important Elements of stream habitat


- Riffle zones
- Stream bends
- Cobble and gravel
- Rootwads
- Leafpacks
- Woody debris



Behavior Change Effectiveness

- How well are we getting our message across?
- Outreach Efforts
- Ratepayer Surveys



PROJECT WIN Be a part of a WINning team and help keep our waterways clean 

Dear Lakeville Water Residents:

At MSD, we are committed to improving our waterways and making the clean water a reward for our community's well-being and growth. The vision of providing clean, safe waterways to be used for the community for recreational purposes and a source for drinking has and will be shared with the 3021's goal is to provide you with an understanding of how we can improve water quality issues through regular updates, public meetings and community outreach events. We believe that strong partnerships and public participation are needed and are to the success of this vision.

As part of our commitment to you, we are continuing with the 17-year comprehensive water improvement program, Project WIN (Waterway Improvement Network). The program is designed to significantly reduce water pollution, of water pollution by reducing the amount of water that enters the waterway. Quarterly meetings combined and waterway surveys will be held throughout Lakeville.

As a resident living, working or playing near the waterway, you also will understand the importance of clean water to our community. During meetings, you will be asked to participate in a waterway survey. As such, we are providing you with some important information and tips to help you in maintaining the positive role of water with these surveys.

We look forward to working with you as our continuing efforts to support the quality of our waterways. Together, we can protect and enhance Lakeville's waterways to ensure that we clean, safe and enjoyable for generations to come. Please call or text (602) 337-3332, or visit us online at www.msdlouky.org/projectwin to learn more about Project WIN. Here you can get involved through upcoming events and become part of the WINning team.

Sincerely,
R.J. Skowron, Jr.
MSD Executive Director

www.msdlouky.org/projectwin to learn how to be a part of a winning team.

During, and for 48 hours after rain storms have ended, you should:

- Minimize contact with waterways
- Avoid swimming, fishing or playing in waterways
- Keep children and pets out of ponds, creeks, streams and drainage ditches
- Wash your hands thoroughly after coming into contact with local streams and waterways
- Observe all MSD warning signs

KID WIN

Clean, Green, Growing Community

Programmatic Reporting

- Volume Reduction
- Estimated Pollutant Load Reduction
- Performance Assessment