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WATER AND SEWERAGE DEPARTMENT
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June 1, 2012

Ms. Laura Verona
Michigan Department of Environmental Quality
Southeast Michigan District Office
27700 Donald Court
Warren, Michigan 48092-2793

Dear Ms. Verona:

Regarding: **2011-2012 Green Infrastructure Program Progress Report**

This letter transmits the second annual Progress Report (Report) on the Green Infrastructure Program (Program) activities underway by the Detroit Water and Sewerage Department (DWSD) pursuant to requirements set forth in Part I A.14.d.9) of National Pollutant Discharge Elimination System (NPDES) Permit No. MI0022802 modified on June 28, 2011.

The Report provides the Michigan Department of Environmental Quality (MDEQ) an overview of significant Program activities since the program's inception and those presently planned, implemented and in progress, *going forward*. It is important to recognize that this Program is being coordinated in conjunction with Permit requirements otherwise stipulated for alternative "right-sized" CSO control facilities for the Upper Rouge Outfalls to meet State Water Quality Standards for discharges from such outfalls over the extended time line revised for correction through 2035.

Since 2009, SEMCOG has greatly assisted DWSD in the development, planning and implementation of the Program with funding provided under a CWA Section 205j Grant, administered by the MDEQ. Although such grant funding is tentatively scheduled to expire later this summer, it is DWSD's intent to sustain SEMCOG's services similarly for greening the URT tributary area for at least three additional years, under a contractual agreement. Such services will be closely allied with Long Term Green Infrastructure Planning Strategy to be presented to the MDEQ, and others, in the form of SEMCOG's deliverable due later this year under terms of the current 205j Grant.

We look forward to continuing to advance the Green Infrastructure Program with MDEQ staff, including the opportunity to tour some recent green and gray investments made and planned in Detroit in the coming days ahead.

Ms. Laura Verona

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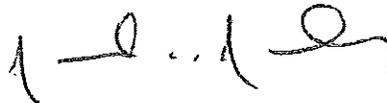
MDEQ, Southeast Michigan District Office

RE: 2011-2012 Green Infrastructure Program Progress Report

June 1, 2012

If you have questions, or need further information on the Green Infrastructure Program, please feel free to contact Mr. Daniel Schechter at (313) 297-6408 or Mr. Gary Stoll at (313) 297-6402.

Respectfully submitted,



Samuel A. Smalley, P.E.

Assistant Director of Wastewater Operations

SM/DS/GS

cc: Mr. W.Creal (MDEQ-Water Resources Division)
Mr. P. Argiroff (MDEQ-WRD Permits Section)
Mr. C. Hersey (SEMCOG)
Mr. R. Hinshon (Hinshon Environmental Consulting)

SEMCOG



**GREEN INFRASTRUCTURE
PROGRAM
PROGRESS REPORT
June 1, 2012**

**DETROIT WATER AND
SEWERAGE DEPARTMENT**

PURSUANT TO REQUIREMENTS UNDER

**NPDES PERMIT NO.
MI0022802**

Prepared for:
Michigan Department of Environmental Quality
Prepared by:
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I. Green Infrastructure Program Overview.

DWSD's Alternative Rouge River CSO Control Program is designed to restore water quality and protect public health while staying within its financial means by controlling rate increases that will be needed to pay for new projects. The program encompasses a 25-year phased plan that focuses on Green Infrastructure solutions along with "right-sized" conventional CSO control facilities. The purpose of this report is to outline progress achieved on the Green Infrastructure Program during Fiscal Year 2011 - 2012.

SEMCOG's 205j grant funding from the MDEQ has continued to support efforts to facilitate progress on the development of DWSD's Green Infrastructure Program. Ongoing activities have focused on continued discussions with City Departments as well as process development for those techniques under respective City Department jurisdiction. Concurrent with these activities, the city-wide Detroit Works Project, has also shared initial results of the collective vision for Detroit's future at the neighborhood, city and metropolitan scale. Thus, this Annual Report is structured in the following manner:

Green Infrastructure Program Collaboration and Strategic Processing;

Green Infrastructure Implementation in Fiscal Year 2011 – 2012; and

Planning for Fiscal Year 2012 – 2013.

The Federal District Court issued the November 4, 2011 Order which significantly addressed DWSD governance, structure, procurement, human resources, law, relationships with unions, etc. Thus, this reporting fiscal year, DWSD underwent significant leadership changes that included hiring a new Director that has subsequently led to changes that will positively affect the Wastewater Treatment Plant operations, the Combined Sewer Overflow program and the Green Infrastructure program. As these internal changes were taking place, staff time within the green infrastructure program was focused on forming and strengthening collaboration efforts, updating DWSD policies and procedures and raising public awareness in order to create a solid foundation on which to move the design and implementation components of green infrastructure forward.



II. Green Infrastructure Program Collaboration and Strategic Processing

This section highlights the ongoing efforts essential for green infrastructure implementation activities that are designed to expand collaboration efforts, explore unique partnering opportunities and identify alternative approaches to green infrastructure implementation. To support the extensive network of collaboration that developing, DWSD staff have engaged in various time-consuming support activities to build a foundation for the green infrastructure program. Attachment 1 provides a detailed list of meetings, discussions, conference calls and presentations during this fiscal year. These support activities are further described here.

DWSD Finance Policies

As part of the transition with new DWSD leadership, finance policies have been clarified providing direction regarding contractor procurement, invoicing and payments that are designed to streamline and simplify the process to avoid unnecessary delays in projects and payments. This includes updates to the procurement policies as established by the November 4, 2011 Order as per the Federal District Court.

SEMCOG Green Infrastructure Assistance Contract

DWSD expressed a desire to retain SEMCOG as a partner in ongoing green infrastructure program facilitation beyond the 205j grant expiration. The two agencies have jointly developed contract language which is awaiting review and approval by the Board of Water Commissioners on June 27, 2012.

Greening of Detroit Green Infrastructure Contract

Greening of Detroit has been a partner in the Green Infrastructure program since its inception and will continue to have an active role in both planning, implementation and public awareness. The Greening and DWSD are drafting contract language for approval by the Board of Water Commissioners on June 27, 2012.

Green Task Force: Water Subcommittee

City of Detroit Councilman Cockerel formed the Green Task Force that has a Water Subcommittee. Beginning in the fall of 2011, DWSD and SEMCOG have attended these meetings, led jointly by the Sierra Club and City of Detroit Planning staff, in order to communicate DWSD's mission to its customers and to describe current NPDES permit compliance obligations established by the State of Michigan Department of Environmental Quality.

*Detroit Works Project*

The Detroit Works Project is an ongoing long-term planning effort that will result in a blueprint for the City to guide long-range decision making. Results from this project will strategically outline areas anticipated for future development as opposed to those areas that will not realize future development. SEMCOG staff have met with Detroit Works consultants during this fiscal year and have provided the consultants with information, data and direction on various topics. DWSD's Green Infrastructure Program is dependent on Detroit Works as the project results will identify long-term goals for development, redevelopment and reuse of land across the City.

Regional Green Infrastructure Vision Task Force

DWSD is an active participant in SEMCOG's Green Infrastructure Vision Task Force. This Vision is designed to set long-term goals and recommendations for green infrastructure implementation across the region. Detroit's participation helps to establish priorities and ensure consistency between regional and DWSD green infrastructure targets.

Alliance of Rouge Communities (ARC)

DWSD has recently approved membership to the Alliance of Rouge Communities to further facilitate collaboration with neighboring jurisdictions and watershed partners.

Southeast Michigan Green Infrastructure Team (SEM GI Team)

The MDEQ initiated a group of stakeholders that meet on a regular basis to work collaboratively on moving green infrastructure forward within the Southeast Michigan region. Stakeholders include MDEQ, MDNR, MDOT, SEMCOG, DWSD & MEDC.

Alternative Financing Mechanisms

DWSD has met with various entities regarding creative financing networks for green infrastructure implementation. The Great Lakes Protection Fund recently awarded Environmental Consulting & Technology, Inc. with funding to demonstrate feasibility with private financing in implementing green infrastructure in both the City of Milwaukee and City of Detroit, with DWSD as a partner. Further research will take place regarding this approach.

DWSD is also researching stormwater fee alternatives as well as identifying those vacant parcels that still contribute stormwater to the combined sewer system, but that may not have active water/sewer accounts. Additionally, Cobo Hall representatives are evaluating alternative designs to reduce stormwater runoff into the combined sewer system in order to reduce their respective fees to DWSD.

*Regional and National Conferences; Publications & Regulatory Agency Involvement*

DWSD and SEMCOG have successfully partnered to submit abstracts for and to present papers at numerous regional and national conferences regarding DWSD's Green Infrastructure Program. During Fiscal Year 2011 – 2012, these conferences were:

- American Water Works Association (AWWA) Rust Belt Cities Conference;
- Alliance of Downriver Watersheds What Color is Your Infrastructure;
- Michigan Water Environment Association Watershed Summit;
- Wayne State University's Water and Wastewater Treatment Best Management Practices Forum;
- Southeast Oakland County Municipal Engineers;
- State of the Strait Conference; and the
- Regional GIS User's Group Meeting.

Additionally, SEMCOG and DWSD are scheduled to present at the following upcoming conferences:

- Water Environment Federation (WEF) Collection Systems Conference and
- Greenbuild 2012.

Each of these conferences provides an opportunity to convey information about DWSD's green infrastructure program in addition to understanding lessons learned from other national green infrastructure programs.

The recent issue of MWEA Matters also highlighted DWSD's Green Infrastructure Program in an article titled, "*Retention Treatment Basins Reduce Untreated Wet Weather Discharges in Southeast Michigan and Protect our Waterways*". This is included as Attachment 2 to this report. The Great Lakes Echo also published an online article title, "*Greening Sewers Saves Environment, Money*".

Finally, SEMCOG and DWSD coordinated two (2) separate tours of the Upper Rouge Tributary drainage area during this fiscal year. The first tour in June 2011 included a large number of MDEQ staff from both the Lansing and district offices. The second tour in September 2011 hosted a Region V EPA representative to tour this area along with MDEQ Water Resources Division staff.

Green Infrastructure Program Administration

SEMCOG and DWSD staff participated in numerous meetings related to the implementation of green infrastructure across the Upper Rouge Tributary drainage area. Please see Attachment 1. Additionally,



DWSD has completed a draft RFP to solicit proposals from engineering consultants to engage in design and coordination of green infrastructure activities. This RFP is anticipated to be issued in July 2012.

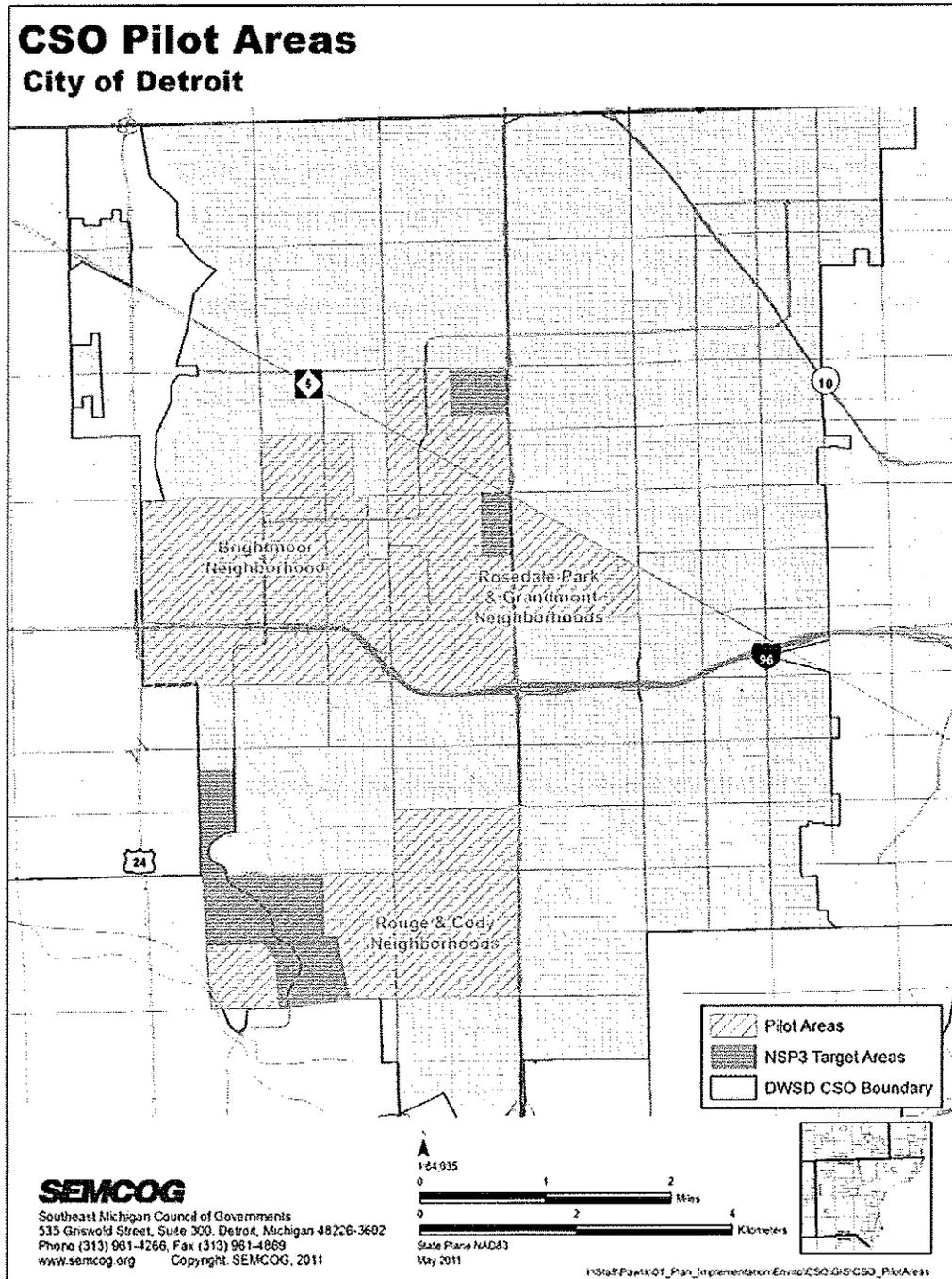
III. Green Infrastructure Implementation in Fiscal Year 2011 – 2012

As described in the June 2011 Green Infrastructure Annual Report, the primary pilot areas for implementation are the Rosedale Park/Grandmont and the Rouge/Cody neighborhood areas. Together they encompass approximately 3,500 acres. Additionally, the Brightmoor neighborhood area was added to the pilot areas during this FY due to the extensive demolition and greening opportunities. See **Figure 1. Green Infrastructure Pilot Areas**. The descriptions contained in this section provide a summary of the ongoing efforts within each of the identified permit categories as well as an estimate of runoff reduction for those techniques implemented in the 2011 - 2012 fiscal year.

The neighborhood groups for these pilot areas have been very active in providing assistance in identifying priority demolitions, participating in downspout disconnection workshops and public awareness and identifying tree planting locations. Additionally, Brightmoor residents are actively participating in alternative selections for greening of vacant lots. Grandmont Rosedale Park Development Corporation included information about the green infrastructure program in their spring newsletter. Obtaining buy-in from the local residents and neighborhood groups is a crucial component of the green infrastructure program and while this takes time and significant effort, increased success will be realized in the future.



Figure 1. Green Infrastructure Pilot Areas.





A. Tree Planting.

Coordination with tree planting efforts across the CSO area includes the City of Detroit General Services Department and Greening of Detroit (GOD) (<http://www.greeningofdetroit.com/>). City of Detroit General Services Department oversees tree planting across the city and Greening of Detroit implements tree planting activities. While initial green infrastructure implementation activities are occurring within the two primary focus areas, two distinct categories of tree planting activities were described in the June 2011 Green Infrastructure Annual Report, including Street Trees and Urban Stormwater Forests. Street tree planting is implemented within the road right-of-way between the sidewalk and curb along city and county roads. Urban stormwater forests consist of more densely planting trees within a city park. Benefits of both types of planting activities are realized in many ways for a city, including environmental (air & water), economic, safety & social.

Approximately 1,591 street trees were planted in the Fall 2011 and Spring 2012 within the CSO tributary area. Of this total number of trees, 531 trees were planted in the Spring 2012 as part of another grant funding program through Greening of Detroit. Another 60 trees were planted as part of SEMCOG's GLRI US Forest Service Grant pass through to Wayne County. The following list identifies the types of trees that were planted within the CSO area:

- Red Maple;
- Swamp White Oak;
- London Planetree;
- American Elm;
- Hackberry;
- Red Oak;
- River Birch;
- Serviceberry;
- Sweet Gum;
- Kentucky Coffee Tree; and
- Winter King Hawthorn.

Trees were selected based on species biodiversity, appropriateness for Southeast Michigan urban areas and interception/infiltration/evapotranspiration potential. These trees were planted by Greening of Detroit who will also provide two years of after-planting care. Table 1. Tree Planting Stormwater



Volume Reduction Benefits summarizes the stormwater-related benefits attributed to these trees as planted.

Table 1. Tree Planting Stormwater Volume Reduction Benefits

| | Total Number of Trees Planted | Interception (gallons per year) | Canopy Cover (square feet) |
|--------------|-------------------------------|---------------------------------|----------------------------|
| Street Trees | 1,591 | 22,500 | 22,000 |

Obviously, as the tree canopy coverage increases, the stormwater runoff reduction and rainfall interception rates will increase.

In addition to the trees planted within the CSO drainage area, the City of Detroit General Services Department contracted with Davey Tree Service to GPS every street tree within the neighborhood planning clusters. This encompasses a large portion of the drainage area and the data will be valuable in setting future priorities for street tree planting.

B. Demolition and Greening Vacant Properties.

Working in conjunction with the Detroit's Buildings, Safety Engineering and Environmental Department (BSE&ED), approximately 252 demolitions were completed within the CSO tributary area during this fiscal year through the Neighborhood Stabilization Area funding from the US Department of Housing and Urban Development (HUD).

Neighborhood groups for Grandmont Rosedale Park, Rouge Cody and Brightmoor additionally identified specific residential lots to be targeted for demolition in conjunction with SEMCOG staff. Presently, there are 140 identified for demolition. DWSD and BSE&ED are currently finalizing the internal financial agreement between the two departments so that BSE&ED may authorize the contractor to complete the demolitions. Additionally, DWSD is also formalizing a contract with Greening of Detroit who will coordinate and implement greening of these properties. During Fiscal Year 2011 – 2012 SEMCOG and DWSD staff worked to understand Greening of Detroit's program for vacant properties as well as strategize about a suite of alternatives for individual lots.

Table 2. 2011 Demolitions Stormwater Runoff Estimated Benefits describes the estimated reduction of stormwater entering the combined sewer system. Similar to the analyses conducted in 2009 using the CITYgreen© methodology which follows the TR-55 curve number approach, an 17% reduction of stormwater runoff volume is initially anticipated during a typical 2-year, 24-hour event equivalent to approximately 2.25 inches of rainfall.



Table 2. 2010 Demolitions: Stormwater Runoff Estimated Benefits

| | Pre-Demolition | Post-Demolition |
|--|----------------|-----------------|
| Total Acreage of the 252 Demolitions (Acres) | 28 | 28 |
| Impervious Cover Estimate (Acres) | 5 | 0.5 |
| Composite Curve Number Across Parcels Encompassing the Demolitions | 81 | 78 |
| Stormwater Runoff Volume (Million Gallons) | 0.58 | 0.48 |

As vegetation becomes denser following greening activities mentioned above, the corresponding curve number will decrease which will increase the long-term stormwater runoff reduction benefits.

Additionally, opportunities are being explored for large-scale greening techniques in areas identified by Detroit Works to not have future development. Coordination for this type of green infrastructure technique includes a significant effort in understanding the land assembly process. Those meetings will continue into the next fiscal year in an effort to clarify that process in order to determine how large scale greening will take place in this area. As an example, a portion of Brightmoor (Figure 2) has been identified for potential large-scale green infrastructure techniques that would not only transform the landscape to green space in the form of meadows, wetlands or forests, but will also incorporate redirected roadway runoff from the surrounding major roadways.

Figure 2. Brightmoor Potential Large-Scale Greening Opportunities





C. Downspout Disconnection

The program is currently being implemented with DWSD, Detroit Law Department, and BSE&ED. A legal opinion was drafted and a technical committee is currently determining whether or not an ordinance change is warranted. A downspout disconnection technical committee convened numerous times over the last fiscal year to work through legal and implementation challenges to the program (see Attachment 1). At the same time, the DWSD began the program implementation as a homeowner disconnect program. Homeowners are required to disconnect from the system. DWSD via Greening of Detroit has hosted 20 workshops on "how to" disconnect and will be providing free materials (e.g., downspout elbow, extender, and plug) to those that attended. Approximately 227 people have attended the workshops during this fiscal year. DWSD Public Affairs has developed a "how to" educational brochure (Attachment 3) that also contains a "help-line" for residents to call with any questions on the program. Publicity documents regarding this program are attached to the end of this report. As currently envisioned, DWSD will work with BSE&ED inspectors to begin inspections in the pilot areas of the CSO tributary area.

Additionally, the City of Detroit General Services Department is currently reviewing and inspecting all city-owned municipal buildings within this drainage area to review and disconnect downspouts from the combined sewer system. SEMCOG staff is also working with Rosedale Park and Joy Southfield neighborhood groups to integrate this program into their senior/disability assistance programs.

D. Roadways and Parking Lots

Meetings between SEMCOG, Wayne County, MDOT, DWSD and City of Detroit have been ongoing to discuss incorporating green infrastructure designs into future roadway projects and to identify short-term opportunities for green infrastructure implementation. While West Chicago and Joy Road have been identified as initial priorities, the timing for other infrastructure projects along these roads is still under consideration. Additionally, SEMCOG contracted to have traffic counts completed for Joy Road that demonstrated a potential for a lane diet. Discussions with Wayne County and the Joy Southfield Development Corporation are being scheduled.

E. Municipal Properties

Municipal properties typically include DWSD-owned properties, fire stations, police stations and DPW facilities. While the initial focus was the DPW West Yard, collection of other information regarding the property has postponed continued efforts. Additionally, and in order to stream line all green infrastructure design, the coordination group determined that large-scale design work should be completed by the green infrastructure contractor once that contractor is selected in 2012. Finally, DWSD



is also encouraging the use of green infrastructure for modifications to any municipal facilities. For example, DPW incorporated green infrastructure at its facility on Michigan Avenue.

IV. Planning for Fiscal Year 2012 – 2013

The following activities are planned for FY 2012 – 2013:

1. SEMCOG, working in partnership with DWSD, is drafting the Long-Term Green Infrastructure Strategy for the Upper Rouge Tributary CSO area. This Strategy is a deliverable for SEMCOG's 205j grant and will be complete by December 2012.
2. Efforts are underway to continue and strengthen collaboration with regional, state and national stakeholders, including the Southeast Michigan Green Infrastructure Team and the Alliance of Rouge Communities. Additionally, DWSD will continue to support the efforts of the City of Detroit Green Task Force. Finally, SEMCOG will continue to explore coordination with MDOT to integrate green infrastructure techniques along state-owned roadways. This includes simple tree planting within or outside of the road right-of-way in addition to utilizing surrounding properties (either state, county or city-owned) for managing roadway runoff redirected from state-owned roads.
3. DWSD will continue to coordinate with the Great Lakes Commission, the Great Lakes Protection Fund, Wayne State University and SEMCOG on researching and procuring other financial mechanisms that may support green infrastructure implementation.
4. Tree planting will take place in the Fall 2012 and Spring 2013. Locations and quantities will be determined at the coordination meetings.
5. At least 140 demolitions are planned to take place within the pilot areas with select pilot lots to followup with greening techniques. The pilot lots will be selected in partnership with the three pilot neighborhood groups (Rosedale Park, Joy Southfield & Brightmoor). Large scale greening opportunities will be evaluated as well as the legal process for and combining parcels. Meetings will continue to take place with Detroit Economic Growth Corporation & Detroit Works regarding land assembly with a focus on a pilot area in Brightmoor.
6. The downspout disconnection program will continue and inspections will begin in summer 2012 with the Rosedale Park area. Financing mechanisms are presently being refined between the departments. It is estimated that the inspection process will cost approximately \$40/residential lot.



7. Discussions will take place regarding Joy Road reconstruction with the intent of incorporating green infrastructure. Additionally, a collaboration process between DWSD and DPW will be formulated to review these opportunities on an annual basis.
8. The potential for single lots to accept road runoff will be further assessed and conceptualized for those areas on Fenkell.
9. DWSD will hire an engineering contractor to complete design work associated with future green infrastructure projects. In the fall 2012, DWSD expects to award a professional services contract to dovetail. The contract is structured on a 5-year, cost reimbursable, as-needed basis. Specific GI planning, development, monitoring & precision w/ benchmarks from calibrated hydrologic & hydraulic modeling analysis are included. FY expenditure metrics built-in to limit funding to \$3M/yr with budget constraints: 20% for plan/design activity, 75% for implementation, 5% for outreach. Anticipated advertisement of RFP before June 30, 2012.
10. Municipal properties will be prioritized for green infrastructure opportunities.
11. DWSD anticipates approving a 1-year contract with the Greening of Detroit commencing July 1, 2012. The contract, valued at \$590,640, provides implementation and support services in the Cody Rouge, Rosedale and North Rosedale "pilot" neighborhoods. Contract has provisions for planting 2000 more street trees and greening of as many as 10 vacant City-owned lots with vegetative cover, as well as provisions for sustaining the Downspout Disconnection Program in the pilot areas.

These planned activities represent the current discussions taking place for the next fiscal year. It is not intended to represent the only activities planned, but represents the overall direction for the next fiscal year.

V. Conclusions

Green infrastructure is typically designed to manage smaller rain events up to the 2-year; 24-hour event. The initial analysis conducted for the green infrastructure program utilized the CITYgreen© TR-55 Curve Number Methodology with the 2-year; 24-hour event (2.25 inches)¹. Given the basis of that analysis, the combined 2011-1012 activities consisting of 252 demolitions and 1,531 trees a combined reduction of stormwater entering the CSO system is estimated at 122,500 gallons. As previously

¹ As DWSD advances its green infrastructure program, every effort will be made to refine such predicted benefits through emerging, yet tested, hydrologic and hydraulic modeling tools and methodologies to better correlate with emerging upgrades of DWSD's Greater Detroit Regional Sewer System (GDRSS) Hydraulic Model.



mentioned, as the vegetation is modified through greening techniques on the demolition properties and as the trees increase in size, the stormwater runoff reduction benefit will increase.

Additionally, Table 3. Green Infrastructure Program Financial Details describes the budgeted or expended dollars for each of the various ongoing or completed projects either through DWSD or funded through another agency. Presently, the total funding for green infrastructure by DWSD is \$1,759,000.

Table 3. Green Infrastructure Program Financial Details

| Green Infrastructure Activity (Upper Rouge Tributary Area) | FY 2010 – 2011 & FY 2011 - 2012 | |
|---|---------------------------------|------------------------------|
| | DWSD Funded | Outside Agency/Grant Funded |
| Tree Planting (2,026 trees) | \$344,000 | NA |
| Tree Planting (531 trees) | NA | Greening of Detroit GLRI EAB |
| Tree Planting (60 trees) | NA | SEMCOG/Wayne Cty GLRI USFS |
| Demolitions (907 residential units) | \$0 | NSP HUD ¹ |
| Demolitions (140 scheduled for FY 2012 - 2013) ² | \$1.2 Million | NA |
| SEMCOG Contract | \$100,000 | |
| DWSD Staff | \$75,000 | |
| Engineering Contract (METCO) | \$40,000 | |

¹ Neighborhood Stabilization Program through Department of Housing & Urban Development

² Note that the funding for these demolitions has been allocated; however, the official money transfer will occur once DWSD and BSE&ED finalize the internal process, departmental agreement and financial arrangements (anticipated in June 2012). The 140 demolitions will occur in FY 2012 – 2013. The associated runoff benefits will be reflected in the June 2013 annual report.

Attachments

Attachment 1: Meeting Summary FY 2011 - 2012

Attachment 2: *Retention Treatment Basins Reduce Untreated Wet Weather Discharges in Southeast Michigan and Protect our Waterways*

Attachment 3: Downspout Disconnection Brochure

Attachment 1: Meeting Summary FY 2011 - 2012

Attachment I.

Green Infrastructure Program Progress Report

Detroit Water Sewerage Department

Meeting Summary FY 2011 - 2012

| Date | Topic | OC | NGC | DD | DG | T | R | O |
|------------|---|----|-----|----|----|---|---|---|
| 6/1/2011 | Environmental Groups Presentation | | | | | | | X |
| 6/15/2011 | Greening of Detroit | | | X | X | X | | |
| 6/17/2011 | URT Area Bus Tour Dry Run | | | | | | | X |
| 6/20/2011 | DWSD Staff Coord | | | | | | | X |
| 6/21/2011 | Overall Coord | X | | | | | | |
| 6/29/2011 | Neighborhood Grps | | X | | | | | |
| 6/30/2011 | URT Area Bus Tour | | | | | | | X |
| 7/14/2011 | DWSD Public Education Subcommittee | | | | | | | X |
| 7/21/2011 | Citygreen consultant | X | | | | | | |
| 7/26/2011 | City of Detroit Engineering | X | | | | | X | |
| 7/27/2011 | Downspout Disconnection Technical Committee | | | X | | | | |
| 8/17/2011 | Detroit Nonmotorized Grp | | | | | | | X |
| 8/22/2011 | Grandmont Rosedale Park | | X | | | | | |
| 8/24/2011 | Downspout Disconnection Technical Committee | | | X | | | | |
| 9/7/2011 | Grandmont Rosedale Park | | X | | | | | |
| 9/7/2011 | DWSD Staff Coord | | | | | | | X |
| 9/8/2011 | BSE&ED | | | | X | | | |
| 9/13/2011 | Downspout Disconnection Technical Committee | | | X | | | | |
| 9/14/2011 | MDEQ w/EPA Staff Tour | | | | | | | X |
| 9/20/2011 | Rouge-Cody Group | | X | | | | | |
| 9/21/2011 | Overall Coord | X | | | | | | |
| 9/27/2011 | DWSD Staff Coord | | | | X | | | |
| 10/5/2011 | Greening of Detroit | | | X | X | X | | |
| 10/6/2011 | Public Education | | | | | | | X |
| 10/13/2011 | Outer Drive Tour/Inspect | | | | | | X | |
| 10/14/2011 | Brightmoor Tour/Inspect | | X | | | | | |
| 10/20/2011 | Brightmoor Tour/Inspect | | X | | | | | |
| 10/20/2011 | Environmental Groups Wshed Discussion | | | | | | | X |
| 10/21/2011 | Downspout Disconnection Technical Committee | | | X | | | | |
| 11/3/2011 | DWSD & other dept coord | | | | X | | | |
| 11/9/2011 | AWRA | | | | | | | X |
| 11/15/2011 | SOCME | | | | | | | X |
| 11/22/2011 | Brightmoor Alliance | | X | | | | | |
| 11/22/2011 | Internal SEMCOG coord | X | | | | | | |
| 11/29/2011 | Long Term Strategy Coord | X | | | | | | |
| 12/6/2011 | Overall Coord | X | | | | | | |
| 12/8/2011 | Greening of Detroit | | | X | X | X | | |
| 12/19/2011 | Water Subcommittee | | | | | | | X |
| 1/5/2012 | EPA Conf Call on GI | | | | | | | X |

Attachment 1.

Green Infrastructure Program Progress Report

Detroit Water Sewerage Department

Meeting Summary FY 2011 - 2012

| Date | Topic | OC | NGC | DD | DG | T | R | O |
|-----------|---|----|-----|----|----|---|---|---|
| 1/6/2012 | DWSD Staff Coord | X | | | | | | |
| 1/10/2012 | Environmental Group Discussion | | | | | | | X |
| 1/12/2012 | Brightmoor | | X | | | | | |
| 1/19/2012 | Long Term Strategy Coord | X | | | | | | |
| 1/25/2012 | Grandmont Rosedale Park | | X | | | | | |
| 2/3/2012 | Downspout Disconnection Technical Committee | | | X | | | | |
| 2/10/2012 | DEQ permit meeting | | | | | | | X |
| 2/24/2012 | GIS Technical Coord | X | | | | | | |
| 2/29/2012 | GIS Internal Coord | X | | | | | | |
| 3/2/2012 | Milwaukee MSD Mtg | | | | | | | X |
| 3/8/2012 | Downspout Disconnection Technical Committee | | | X | | | | |
| 3/20/2012 | DWSD Staff Coord | X | | | | | | |
| 3/21/2012 | GSD | | | X | X | X | | |
| 3/28/2012 | MWEA | | | | | | | X |
| 4/2/2012 | Detroit Works Coordination | X | | | | | | X |
| 4/4/2012 | Water Subcommittee | | | | | | | X |
| 4/9/2012 | Long Term Strategy Coord | X | | | | | | |
| 4/10/2012 | Consultant Mtg | | | | | | | X |
| 4/19/2012 | MEDC | | | | X | | | X |
| 4/26/2012 | Water Subcommittee | | | | | | | X |
| 5/1/2012 | DWSD Staff Coord | X | | | | | | |
| 5/3/2012 | DWSD Staff Coord | X | | | | | | |
| 5/3/2012 | Water Subcommittee | | | | | | | X |
| 5/9/2012 | DWSD Staff Coord | X | | | | | | |
| 5/16/2012 | DWSD Staff Coord | | | | | | | X |
| 5/16/2012 | LEAP & EastSide | | | | | | | X |
| 5/23/2012 | Greening of Detroit | | | | X | | | |

OC: Overall Coordination (internal or w/external DWSD staff)

NGC: Neighborhood Group Coordination (regarding identifications of demolitions, types of greening, locations of trees &/or downspout disconnection)

DD: Downspout Disconnection Coordination (internal or w/ DWSD staff, attorneys, Building & Safety, General Services, etc.)

DG: Demolitions & Greening of Lots Coordination (w/ neighborhood groups, Greening of Detroit, Building & Safety, General Services, etc.)

T: Trees (coordination on numbers, locations)

R: Roadway discussions and strategizing on process for integrating green infrastructure into designs, engineering & projects

O: Outreach (coordination and discussion w/ DWSD staff, attendance at environmental group meetings, hosting of meetings at SEMCOG, presentations at conferences)

BSE&ED: City of Detroit Buildings, Safety Engineering and Environmental Department

GSD: City of Detroit General Services Department

Attachment 2: Retention Treatment Basins Reduce Untreated Wet Weather Discharges in Southeast Michigan and Protect our Waterways

Retention Treatment Basins Reduce Untreated Wet Weather Discharges in Southeast Michigan and Protect our Waterways

By DWSD Wholesale Customer Outreach Wastewater Best Practices and Public Education Work Groups

The operation of the sewer system in southeast Michigan is significantly impacted by wet weather. When it rains, separate storm sewers in many communities collect the stormwater runoff from streets and houses and discharge it into nearby drains and rivers. This runoff contains pollutant loadings that can be reduced through stormwater best management practices like street cleaning and green infrastructure programs. In older areas with combined sewers that collect the stormwater runoff in the same pipe as the sewage, the increased stormwater flows present a different challenge. These sewers can receive up to three times the volume of flow during storms than is normally transported on a dry day. The increased flows place an enormous burden on the collection and treatment system, forcing equipment to operate at higher capacities. The need to manage and balance the flows becomes critical to avoid overloading the Detroit Wastewater Treatment Plant (WWTP) and to prevent combined sewer overflows (CSOs) into area rivers.

The Detroit WWTP services 77 communities in southeast Michigan; 26 of these communities have older combined sewer systems that have implemented controls to handle these increased wet weather flows. These controls include reducing storm water flows that get into the sewers, maximizing storage capacity within the sewer pipes through the use of dams and gates, increasing treatment capacity at the Detroit WWTP, and using satellite treatment facilities in the collection system to treat wet weather flows. Satellite treatment facilities are designed to capture and treat the additional flow and pollutant loadings generated by the tributary sewers they serve. These facilities include retention treatment basins, or RTBs, and other structures that provide screening and disinfection of flows prior to discharge.

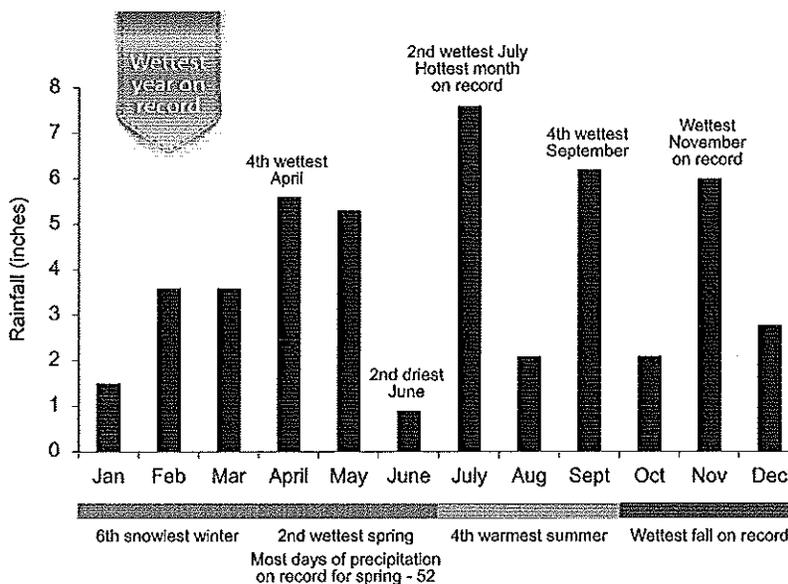
These treated discharges meet federal and state National Pollutant Discharge Elimination System (NPDES) permit requirements and are deemed protective of public health.

Since 1959, 15 RTBs have been constructed in the sewer system tributary to the Detroit WWTP to treat the mixture of stormwater and sewage through screening, settling and disinfection in large concrete tanks. Discharges only occur during wet weather and stored flows are sent to the Detroit WWTP when storms subside. Three screening and disinfection facilities (SDFs) have also been constructed that treat flows using fine screening with disinfection contact

time provided in downstream pipes rather than a basin structure. This past year, 3 new treatment shafts, a type of RTB that stores and treats flows in a vertical shaft rather than a horizontal basin, were placed in service.

These 15 RTBs, 3 SDFs and 3 treatment shafts are operated by the Detroit Water and Sewerage Department (DWSD), the City of Dearborn, and Macomb, Oakland and Wayne Counties. All of these facilities must meet similar NPDES permit requirements. While each facility operates independently, operators coordinate efforts when dewatering stored flows back into the sewer system and work together to develop and implement best practices

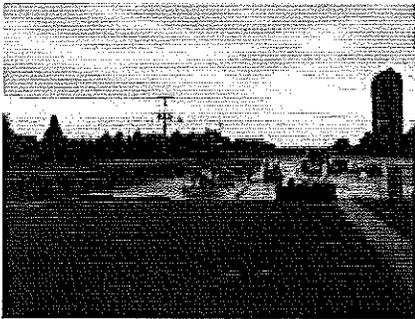
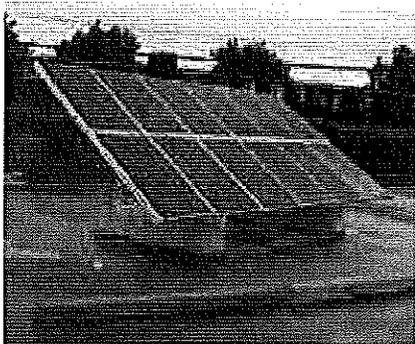
Figure 1: Precipitation in the Detroit Metropolitan Area



In terms of the weather, 2011 was a record-setting year in many aspects - monthly and seasonal records were set in rainfall, temperature and snowfall. Overall, 2011 was the wettest year on record with 47.70 inches of precipitation. This just beat the 1880 record when 47.69 inches of precipitation fell on a much less developed Detroit Metropolitan area.

Data source: National Oceanic and Atmospheric Administration





Installation of 84 solar panels in 7 units was completed at Macomb County's Chapaton RTB. Power generated will be sent to the grid and used to offset electrical costs. The panels are expected to generate enough electricity to power the RTB control and administration building each day.

for operations. During 2011, dedicated operation of these facilities, referred to as RTBs hereafter, prevented 27.8 billion gallons of CSOs from entering our waterways.

A Historic Year for Wet Weather
The year 2011 stands out as the wettest year for the Detroit Metropolitan area since the National Oceanic and Atmospheric Administration (NOAA) began keeping records in 1870. New monthly and seasonal records were established (Figure 1).

According to Danny Costello, Hydrologist and Meteorologist with NOAA's White Lake office that compiles data for our region, there was a significant increase in widespread storm systems across the Detroit Metropolitan area during 2011. "Every year there are heavy rains in the US but it doesn't always occur in the same spot," explains Costello. "Northern Indiana was hit for a few years in a row, and this past year the Detroit area saw increased precipitation. In fact, the Detroit area received 13.9 more inches of rain than Saginaw."

"Our weather differed from other parts

of the country. The South and Midwest were in drought," continues Costello. "This year was significantly different from 2010 when the Detroit area was really dry for six months and only received above average precipitation during May, June and July. Overall, precipitation in the Detroit Metropolitan area was 32.28 inches in 2010 compared to 47.70 inches in 2011."

This localized wet weather required our sewer infrastructure to perform at a higher level than in years past. RTB operators worked long hours for days and

weeks at a time to successfully capture and treat the increased flows storms sent down sewer pipes at increased frequency and volume.

Record Setting RTB Operations

The high levels of precipitation received during 2011 challenged operators from staffing and equipment maintenance perspectives. RTBs operated on 107 days during 2011. This is an increase of 50 days from 2010 demonstrating how increased precipitation required operators to work more hours.



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The tour included a vacant lot where various green infrastructure treatments, such as a tree nursery, are being implemented.

“RTBs must operate within NPDES permit requirements that dictate the quality of their discharges,” explains Peter Ostlund, Field Operations Section Chief with the Michigan Department of Environmental Quality (MDEQ). “RTB discharges differ from combined sewer

overflows (CSO) and sanitary sewer overflows (SSO) in that treatment has been provided in accordance with their permit. RTB discharges are an indication that additional wet weather flows are being captured and treated. As long-term CSO corrections are implemented,

we’ll see CSO volumes decrease and RTB discharge volumes increase.”

The volume of flow processed in RTBs (Figure 2) totalled 27.8 billion gallons (BG) – 19.4 BG was treated and discharged to our rivers and 8.4 BG was stored in RTBs and dewatered back into the sewer system and sent to the Detroit WWTP.

The Detroit WWTP treated record levels of flows as well. “By design, the sewer system conveys additional flows to the WWTP during wet weather,” explains Sam Smalley, DWSD’s Assistant Director of Wastewater Operations. “After the storms have passed, RTBs are dewatered to the plant, which essentially extends the duration of the high flow period for the plant. During 2011, we treated an additional 20 BG of flow at the WWTP compared to 2010.”

While the overall number of storms in the area increased during 2011, two events in particular stand out because they generated large volumes of rain – May 25-27 and November 29-30. The May storm prompted area flood warnings and generated newspaper headlines like “Turn around, don’t drown: Rain makes mess in Metro Detroit with more on the way.”

“The May 25-27 storm was one of the most intensive storms we have experienced at the George W. Kuhn (GWK) RTB in our 10-year history,” stated John Stange, Supervisor of RTBs for the Oakland County Water Resources Commissioner’s office. “We discharged for 3 days and went through 288,282 gallons of disinfectant (sodium hypochlorite). Our operations staff kept busy adjusting the treatment process and collecting samples at the GWK RTB and the three other RTBs we operate.”

The November storm came the week after Thanksgiving generating 3.6 billion gallons of treated discharges for southeast Michigan. Brent Avery, Operations Manager for Macomb County Public Works, explained, “The areas served by the Martin and Chapaton RTBs received almost 3 inches of rain on the 29th of November. This was the largest storm for the Martin RTB for the year, and the second largest storm for Chapaton. Our staff responded to these challenging conditions working long hours to assure treatment was provided.”

Kerry Rudolph, DWSD’s CSO Supervisor, summarized the year as follows. “2011 was our busiest year ever – precipitation was high and all of our

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facilities were active. We now have 5 RTBs and 3 SDFs to capture and treat flows as well as in-system storage devices to maximize available storage in the sewer system. Operating and maintaining these facilities kept our staff busy throughout the year. We also have another RTB under construction that staff are becoming familiar with so we can transition to a smooth start up in 2012.”

“The City of Dearborn started the operation of three capture shafts this year,” explains James Foss, CSO Supervisor for Dearborn. “The Prospect Street shaft came on line in January and was thoroughly tested. The shaft took on flows from 46 storms, 17 of those storms were treated and discharged to the Rouge River. The experience we gained learning from other municipalities has been helpful for our operators as they improve the effectiveness of the treatment process.”

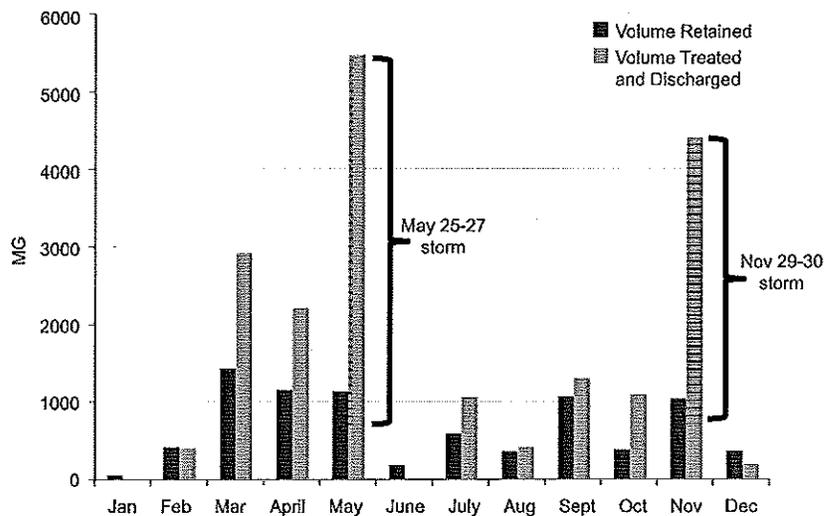
The frequency of RTB operations this year spotlights the value of preventive maintenance. Keeping primary equipment like screens, pumps, chemical mixers, disinfection feed systems, samplers and SCADA components in top shape was critical because the equipment really got a workout with each storm.

One of the most challenging aspects of RTB maintenance is that equipment frequently sits unused during dry periods and then needs to perform at 100% capacity when it rains and flows hit the RTB. It’s like taking a car that has been stored in a garage for an extended period of time, hopping on the expressway and going on a cross-country trip without advance notice.

“Our RTBs had been on standby for a three month period that started in November of 2010 and ended on February 28, 2011,” explains Ancell Noel, CSO Supervisor for the Wayne County Department of Public Services. “Because we had focused on keeping equipment ready for a storm, we didn’t encounter major problems when the first storm hit or the successive storms each month during the year. Finding time to inspect equipment and perform needed maintenance between storms was challenging because we had so many events.”

Figure 3 highlights the performance of the 5 RTBs with the largest storage capacities that treat the majority of flows generated by rain storms and snowmelt events.

Figure 2: RTB Volumes in Millions of Gallons (MG)



Two storm events stand out for overall contribution to total RTB discharges. The May and November storms represented 43% of the year’s treated discharges from RTBs. Of the total RTB, SDF, and treatment shaft volumes generated by storms in 2011, 30% was stored and then treated at the Detroit WWTP and 70% was treated in RTBs, SDFs and treatment shafts. It is important to remember that a large volume of wet weather flows are treated at the WWTP during storms. Only flows beyond the plant’s capacity are treated in RTBs.

Figure 3: Performance of Area’s Five Largest RTBs in 2011

| Facility Name / Owner | Maximum Storage Capacity | # of Storms | Volume of Treated Discharge |
|---|--------------------------|-------------|-----------------------------|
| George W. Kuhn RTB, Oakland County Water Resources Comm. | 124 MG | 15 | 3,240 MG |
| Center Creek RTB, Detroit Water & Sewerage Department | 63 MG | 17 | 7,302 MG |
| Chaparral RTB, Macomb County Public Works | 28 MG | 16 | 801 MG |
| Hubbell-Southfield RTB, Detroit Water & Sewerage Department | 22 MG | 22 | 4,114 MG |
| Max River RTB, Wayne County Department of Public Services | 19 MG | 29 | 1,442 MG |

The five largest RTBs in the Detroit wastewater service area discharged 16.9 billion gallons of treated flows, or 87% of the total volume of treated discharges in the area.

Working Together to Improve RTB Performance and Wet Weather Pollution Control

Through the wholesale customer outreach process, DWSD and customers who operate RTBs meet six times a year to discuss and refine operational protocols, share event debriefings and lessons learned, and improve testing procedures. By meeting regularly, operators pool their collective knowledge to learn from one another and improve operations at their own facilities. The MDEQ regularly attends these meetings as well.

In 2011, the Wastewater Best Practices Work Group focused on the disinfection of treated overflow, equipment maintenance and training, and new monitoring equipment. Disinfection research focused on achieving optimal dosing of sodium hypochlorite to limit total chlorine residual in RTB effluent while achieving the required NPDES bacterial kill limit. Research continued on the application of real time measurement of influent suspended solids as an indicator to adjust the sodium hypochlorite feed rate. The feed rate is increased at the start of an event to account for the high suspended



Staff from DWSD, the State of Michigan, SEMCOG, Greening of Detroit and other organizations attended a tour of the City of Detroit pilot area in June.

solids chlorine demand, and decreased throughout the event as suspended solids and chlorine demand decrease.

Training and certification of new staff was also explored as individuals plan for retirement and new staff are being trained to take over. With such a high number of events, there were many training opportunities for new staff to learn the RTB treatment process which is critical since it takes several years and a dozen or so events to gain the experience needed to perform and direct RTB operations during an event. The Work Group is always evaluating new technology like the Flow Shark technology which uses a gated cross correlation with digital pattern recognition to measure flow rate in a sewer.

Work Continues on Projects to Address Wet Weather Flows

While significant progress has been made through the investment of millions of dollars in collection system improvements, WWTP improvements and construction of RTBs, work still remains. New control facilities are being designed and constructed, and improvements undertaken at existing facilities. Activities during 2011 included projects undertaken by Dearborn, DWSD, and Macomb County.

The City of Dearborn brought 3 new CSO treatment facilities online during 2011. Called treatment shafts, these facilities work like RTBs but treat and store their flows in a deep, vertical structure rather than a shallower, horizontal tank. The shafts are 134 to 170 feet deep and have storage capacities ranging from 6.5 to 7.5 MG. Like RTBs, the treatment shafts disinfect, settle and screen flows prior to discharging. The shafts dewater captured flows back to the Detroit WWTP.

The Dearborn shafts came online in January, June and September. The frequency of rain events has proved challenging as staff perfect the operation of the City's first CSO treatment facilities. Participation in the Wastewater Best Practices Work Group has been extremely helpful to the operators who have been working with staff from Oakland, Wayne and Macomb Counties, and DWSD.

DWSD's approved Long Term CSO Control Plan for the 17 untreated Upper Rouge CSO outfalls calls for design and construction of 9 facilities in the area between Warren Avenue and 8 Mile Road. All of the new facilities are to be built near existing untreated outfalls, with the facilities handling flow from multiple outfalls to reduce the burden on DWSD operations staff.

The first facility will be built at the Puritan outfall to the Rouge River, and will include a 1.1-MG storage tank to capture the 'first flush' and remove the most heavily polluted runoff from the river for subsequent treatment at the Detroit WWTP. Once the first flush tank has filled, any remaining wet weather flow will be screened and disinfected prior to discharge. Design is underway for the Puritan facility, which will serve as the pilot project to demonstrate the effectiveness of the new control technology since disposable nets and the in-pipe disinfection system have not previously been used in Michigan. The schedule calls for the \$23.5-million facility to be placed in service by July 1, 2015, after which DWSD will conduct a 2-year evaluation of its operation and performance.

The NPDES permit calls for DWSD to build the remaining 8 CSO control facilities along the Upper Rouge on a phased implementation schedule. The timing for initiating construction of the remaining facilities will be developed after evaluating the City's financial capability to incur the debt associated with the projects. The total estimated construction cost for the 9 new Upper Rouge CSO Control facilities is \$479 million (2009 dollars).

SEMCOG has been assisting DWSD in getting the green infrastructure program underway through a \$308,000 grant se-



DWSD has contracted with Greening of Detroit for this work that includes hiring Detroit high schoolers to maintain trees.



"DWSD will focus on 140 demolitions in areas where funding was not available in the coming year. Approximately 125 city-owned vacant lots were identified for greening activities in 2012."

cured with MDEQ. Significant headway was made in 2011 through the efforts of DWSD, SEMCOG, the Detroit Building and Safety Department, and Greening of Detroit. More than 2,000 1.5-inch-diameter trees were planted in two pilot areas: the Rosedale Park/Grandmont and Rouge/Cody neighborhoods. Greening of Detroit supervised these activities and is providing plant care for the first two years of their growth. An additional 1,000 trees will be planted in spring 2012.

Approximately 655 houses have been demolished within the CSO tributary area using Neighborhood Stabilization Program funding from the US Department of Housing and Urban Development. To supplement this effort, DWSD will focus on 140 demolitions in areas where funding was not available in the coming year. Approximately 125 city-owned vacant lots were identified for greening activities in 2012.

Greening of Detroit is also assisting with the downspout disconnection program requiring all residents in the City to disconnect their downspouts by June 30, 2012. The first workshop was held in October of 2011. SEMCOG is also assessing roadways for green infrastructure potential as part of the grant.

DWSD's Oakwood CSO RTB is under construction and will be placed in service during 2012. Located on the lower portion of the Rouge River immediately south of I-75, the 9-MG RTB is designed to provide CSO treatment through storage plus fine screening and disinfection. The facility includes a major influent pumping station with capacity to pump 1,800 cubic feet per second (cfs). Once completed, this pumping station will replace the existing pumping station and increase the level of service for the Oakwood District and help alleviate basement flooding in the tributary area.

The Macomb County Public Works Commissioner's office recently completed energy improvements at the Chapaton RTB consisting of three components – solar panels, boiler replacement and radiant heat, and new light fixtures, windows and doors. The 84 solar panels mounted on the roof of the

underground basin are connected to DTE Energy's electrical grid and expected to generate 19 kWh of power each day. This is enough electricity to power the RTB's control and administrative building when the large pumps are not running.

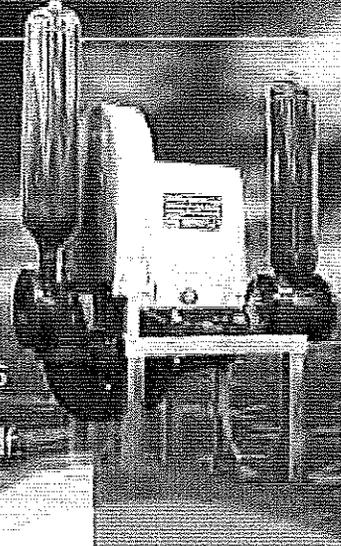
The new 399,000-BTU (British Thermal Unit) boiler is replacing a 43-year-old boiler that was four times its size and less efficient.

Decades old windows, doors and lighting were also replaced to continue cost savings by keeping the new, greener energy in the building. An Energy Management Plan was also implemented with occupancy-sensing thermostats and lights. The \$700,000 project was funded with a State Revolving Fund loan. The improvements are expected to pay for themselves in 7-10 years. ♣

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The workforce behind the water treatment and distribution process encompasses hundreds of water professionals who work diligently each day drawing upon engineering, scientific, operations and maintenance expertise and years of hands-on experience. These individuals manage the treatment process, keep water flowing through transmission mains at the required pressure, monitor water quality, and perform needed repairs. They are guardians of public health delivering some of Michigan's best tasting tap water and ensuring adequate flows for fire protection. The stories behind these faces are told here, and an accompanying video can be viewed at <http://www.youtube.com/cleanwater100>.

By: DWSD Wholesale Customer Outreach Public Education Work Group



MICHELLE GENDRON

Account Clerk II
City of Southgate
Years in the Industry: 3

The upbeat, reassuring voice Southgate residents hear when they call the Water Department with a question about their utility bill belongs to Michelle Gendron. She manages the water meter reading and billing process for 13,000 accounts in the City with precision each month. The deadline-driven job requires her to quickly analyze usage and have a repairman address questionable meter readings before the billing process is completed.

A new billing cycle starts each month when Michelle schedules meter readers to drive out and collect meter readings. Two of the City's four ledger areas are read each month with customers receiving a bill every two months. Michelle loads ledger meter data into two electronic meter reading devices or guns that send a wakeup call to meters inside homes and businesses as the meter reader drives the route. Customers' meters respond by sending the current meter reading to the gun. When the ledger is completed, Michelle downloads the data to her computer and sends the meter readers out to read the next ledger.

First, she compiles a list of meters that could not be read and generates work orders. A consumption report is then generated for the ledger showing the difference between the current and previous meter readings. Line by line, she reviews each account to identify



abnormally high or low readings that require further investigation. Work orders are then generated for these accounts and the meter readers are sent back to each resident to check the meter out or leave a card to schedule an appointment before the bill goes out. The process is then repeated with the second ledger area. Typically, 120-150 work orders are generated each month. If the repair cannot be scheduled on a meter without a reading, the usage is estimated based on the previous billing cycle that covered the same usage period (typically the previous year).

Once missing meter readings are manually entered in the system, bills are printed, folded and mailed by the Finance/Water Billing Department. The entire process for two ledgers takes about four weeks to complete. Each year 24 billing cycles are completed to generate six sets of statements for each of the four ledgers.

About 30% of customers still have older

meters that must be read on foot and entered into the billing system using a different data collection device. Michelle schedules meter replacements with these outstanding customers as the budget allows, typically 300 residents per month. The new meters have the ability to detect possible intermittent and continuous leaks and store a 96-day history of water usage that can be helpful in pinpointing the exact time a problem started. Because these meters are more accurate than the older ones, residents can be initially surprised by their actual consumption.

Michelle's other responsibilities include setting up automatic payment plans, processing final bills when people move, preparing history status reports for title companies, rolling delinquent balances over to the tax roll and addressing residential customer concerns. Summer bills generate the most phone calls when residents forget how much they may have watered their yards.

"If your bill is higher than you think it should be, check for leaks," urges Michelle who routinely sends concerned residents leak detection information. "Silent leaks can add up – a leaky toilet can cause a loss of 36,000 gallons of water during a 3-month period. Drippy faucets contribute to the problem too. Our meter repairman actually helped a resident find a leak in their sprinkler system that they were unaware of." ■





SAL CONIGLIARO, PE

Public Works Director
City of Sterling Heights
Years in the Industry: 20
License: Professional Engineer

Sal Conigliaro easily moves from managing implementation of a ten-year water master plan that ensures the City's infrastructure keeps pace with its needs and incorporates appropriate cost-saving technology, to brainstorming ideas with his Water Division Supervisor on pinpointing an elusive water leak in the distribution system. His ability to work on a broad range of issues with operations staff, residents, business owners, contractors and council members is critical to keeping the City's Department of Public Works running smoothly each day. Water is only one of the vital public services Sal is responsible for – he also oversees sewers, roads, parks and engineering.

With a population of more than 120,000, Sterling Heights is DWSD's fifth largest wholesale water customer. As water passes through ten-metered connections, its safe delivery to customers' taps becomes the responsibility of the Water Distribution Division overseen by Sal. The division operates the distribution system conducting meter reading, testing and installation; water main repairs; hydrant repairs; backflow prevention inspections; sampling within the distribution system and marking water utilities for the MISS DIG program.

A carefully crafted Capital Improvement Plan (CIP) guides infrastructure improvements each year. Long-term and routine maintenance projects are identified through a collaborative process. Large, capital-intensive projects to address pressure and flow needs are drawn from the master plan and modeling studies, and broken into phases to make them more affordable. Input from the Water Division Supervisor and his staff, based on field observations, is used to identify current rehabilitation needs. Planned road improvements are reviewed to see if water main repair or replacements should be conducted at the same time or vice versa. Input is also obtained from the public and a Capital Improvement Committee. Once all the improvements are identified, Sal prioritizes the projects and determines

what the budget can support. The proposed CIP then goes back through the committee, City Manager and finally City Council before it is finalized.

As the CIP is completed each year, the information is funneled back into the master plan so that it can be updated. Each plan feeds the other providing checks and balances that the City's valuable assets are being maintained. A 20-inch transmission main was recently constructed along Mound Road as a CIP project that provides additional flow for a higher level of fire protection identified in the master plan. An eight-year program to update the



metering system throughout the City is also underway. With about 20% of the work complete, the new system allows meter readings to be collected from the billing clerk's desk via a fixed tower network that receives radio signals from the meters. Routine rehabilitation projects last year included replacing older cast iron pipe that experienced water quality and breaking problems as a result of corrosion, with ductile iron pipe.

Providing high quality water to the public is one of the foundations of a viable society but the process is sometimes taken for granted because DWSD and local communities do their jobs so well that nobody thinks about it. "Maintaining the level of public service that residents expect with decreasing revenue and a smaller staff is challenging," explains Sal. "We need reliable water and sewer service to maintain the population and industry we have. The most demanding part of our work is finding newer and different ways to deliver the same service. Efficiencies from technology are helping us bridge the gap."



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DOC (DONOVAN) WALTON

Assistant Superintendent of Water System and Maintenance
Construction
Detroit Water and Sewerage Department
Years in the Industry: 29

The Central Services Facility impressively houses three of DWSD's four district yards used to maintain the large transmission mains connecting to suburban communities, and all of the pipes within the City of Detroit. Doc Walton moves throughout the 23-acre facility supervising the activities of more than 300 employees who maintain and repair water mains, sewers and catch basins to make sure the system flows efficiently. His steadfast approach and ability to develop practical solutions enables him to skillfully manage any maintenance situation that occurs.

Doc's crews are responsible for 3,438 miles of water main within the City, 402 miles of transmission main in suburban communities, hundreds of valves and 27,244 fire hydrants. They also maintain the catch basins and local sewers in the City of Detroit. A typical day shift starts at 7:30 AM when 32 crews from the four district yards receive their work list that has been prioritized by their Yard Supervisor. Assignments include investigating customer issues, repairing water main breaks and service leaks, connecting/disconnecting service, hydrant



repair, catch basin repair and sewer cleaning. Crews also assist with repairs requiring heavy equipment at water plants and pump stations, and perform routine maintenance activities on larger infrastructure components. Doc works directly with Yard Supervisors on the larger, more complex repairs providing technical direction and troubleshooting any problems that arise.

DWSD's large transmission mains range in diameter from 3-8 feet. Valves are placed in these mains about every 2,000 feet so that sections can be isolated when repairs are required. Regular valve turning is critical to ensure that valves will operate when needed - the 3- and 4-foot valves must be turned each month. With more than 1,000 large valves, Doc has a crew exercising valves

on a daily basis. This requires opening each valve 10-15% to make sure that it is in good operating condition and there are no leaks. Crews also assist suburban communities when a project in their community requires isolating a valve in a transmission main so work can be performed on a local water main. Doc will meet with the community to address potential issues and establish traffic control and a shut down schedule so the project goes smoothly. He also works closely with the Systems Control Center on major projects like a recent PRV valve replacement where continually monitoring and maintaining sufficient pressures to three communities throughout the work effort was critical.

All work orders for repairs are managed through a computerized system. A dispatcher will receive a call from a citizen, business owner or DWSD employee reporting a problem. The dispatcher will enter the project in the database creating a ticket number that is then tracked from start to finish. While the number varies, up to 300 tickets can be generated in a day. Maintenance activities vary by season. Water main breaks are more frequent in the summer, due to higher demand and water usage, and in the winter when cold temperatures strain older pipes. Key performance indicators are tracked for the different types of repairs completed and analyzed each month by upper management. Based on these indicators and seasonal needs, direction is provided on where to focus maintenance and repair activities to balance work with the system's short and long term needs.

"The sheer size of the pipe we work with can be eye-opening," explains Doc. "It is one thing to hear about a 48-inch water main but it is a completely different experience to stand next to that pipe and see what is involved in repairing it." One of Doc's crews recently completed a challenging repair in a wooded area of Rouge Park that required heavy equipment to clear a path to the site. "They worked four, 12-hour days to complete a difficult repair on the 36-inch water main and did an excellent job." ■

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Attachment 3: Downspout Disconnection Brochure

Detroit residents are required by state law to disconnect downspouts leading to the sanitary sewer system. This is a requirement of all Michigan cities. Water from downspouts connected to the sewer system can overload the sewer system and can pollute our rivers and cause basement flooding.

Residents have until June 30, 2012 to disconnect. After this date, City staff will inspect your property. Failure to disconnect can result in penalties.

Disconnecting a downspout is usually not very complex. A permit is not required to perform the work. Disconnecting downspouts should cost approximately \$40 for most houses. However, DWSD is partnering with Greening of Detroit to host free workshops to learn how to disconnect and receive free materials. For more information, call the Downspout Disconnection Help Line at 313-285-2260.

Free Downspout Disconnection Workshops

Want to learn hands on how to disconnect your downspouts? DWSD is partnering with Greening of Detroit in hosting free workshops (including materials). Call the Downspout Disconnection Help Line at 313-285-2260. You can also check out DWSD's website at www.dwsd.org.



Detroit Water and Sewerage Department

Downspout Disconnection Program



Information and
"How to" guide
for Detroit Residents

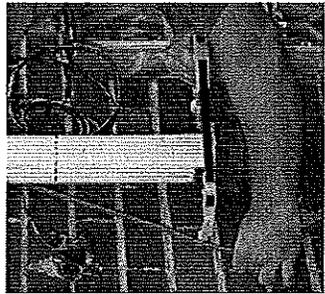
How to Disconnect a Downspout

Supplies

- work gloves • eye protection • dust mask • hacksaw
- measuring tape • marker • pliers • screwdriver
- downspout elbow and extension

Supplies needed in Step 4

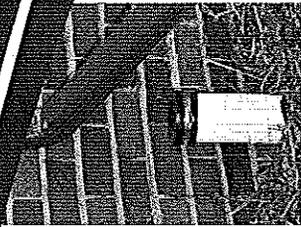
For straight pipe use rubber cap with hose clamp
For bell pipe use concrete, chicken wire,
newspaper, bucket



Step 3

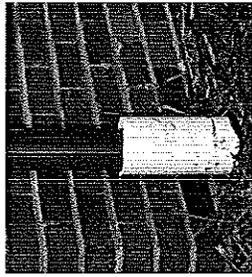
Cut the downspout with a hacksaw where you measured and right above where the downspout enters the pipe. Remove that section of downspout.

Straight Pipe: Cap the sewer pipe. This prevents water from going in. In most cases, you should be able to use a rubber cap secured by a hose clamp. Use a screwdriver or ratchet to tighten the cap until it is secure.

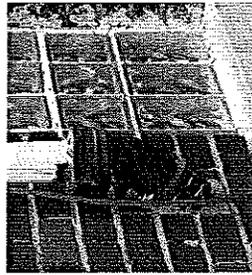


Step 1

Determine if the pipe where the downspout attaches is a bell shape or straight.



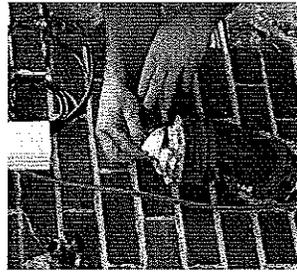
Straight Pipe



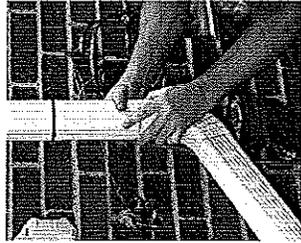
Bell Shape Pipe

Step 4

Bell Shape Pipe: Cut about 1 foot by 1 foot amount of chicken wire and form into cup shape. Place into the pipe just below the bell. Add crumpled newspaper on top of the mesh (this will help ensure the concrete doesn't leak down into the sewer). Mix the concrete according to directions (stiff mixture) and add concrete until it is flush with top of bell.



Step 5



Insert the downspout into the elbow. You may need to crimp the end of the downspout with a pair of pliers to get a good fit. (You may want to secure the downspout with a screw or rivet).

Step 6

Attach a downspout extension to carry water away from the house and foundation. We recommend 5 feet in a direction away from foundations, sidewalks and driveways. It is critical to make sure that disconnecting your downspout and redirecting the water does not cause a hazard or nuisance to you or your neighbors!

