

# **Green Infrastructure Progress Report Upper Rouge Tunnel Area**

**Fiscal Year July 1, 2013 – June 30, 2014  
NPDES Permit No. MI0022802**

**Detroit Water and Sewerage Department**  
735 Randolph  
Detroit, MI 48226



August 1, 2014



**Green Infrastructure Program  
Upper Rouge Tunnel Area**

**Annual Progress Report**

August 1, 2014

Fiscal Year July 1, 2013 – June 30, 2014  
NPDES Permit No. MI0022802

Detroit Water and Sewerage Department  
735 Randolph  
Detroit, MI 48226

Prepared by:

Tetra Tech  
65 Cadillac Square, Suite 3610  
Detroit, MI 48226



## TABLE OF CONTENTS

<b>1.0 GREEN INFRASTRUCTURE PROGRAM OVERVIEW .....</b>	<b>1</b>
<b>2.0 PRIOR YEAR IMPLEMENTATION.....</b>	<b>2</b>
2.1 Planning and Coordination.....	4
2.1.1 DWSD Contracted Services .....	4
2.1.2 Coordination within DWSD, Departments, Agencies and Groups .....	5
2.1.3 2014 Green Infrastructure Plan .....	5
2.2 Demolitions .....	6
2.3 Downspout Disconnections.....	9
2.4 Tree Planting.....	9
2.5 Vacant Lot Greening .....	11
2.6 Public Outreach and Public Participation.....	13
2.7 Institutional Structures.....	14
<b>3.0 INVESTMENT IN GREEN INFRASTRUCTURE.....</b>	<b>14</b>
<b>4.0 VOLUMETRIC REDUCTIONS .....</b>	<b>15</b>
4.1 Quantification To Date .....	15
4.2 Green Infrastructure Tracking Program .....	16
<b>5.0 WORK PLAN FOR FISCAL YEAR 2014-2015 .....</b>	<b>16</b>
5.1 DWSD Activities for 2014-2015 .....	16
5.2 DWSD Work Activities for 2014 - 2015 .....	17

## LIST OF TABLES

Table 1 Status of 2013 Progress Report Administrative Activities .....	2
Table 2 Status of 2013 Progress Report Technical Activities .....	3
Table 3 Status of 2013 Progress Report Implementation Activities .....	3
Table 4 DWSD Funded Demolitions through June 30, 2014 .....	6
Table 5 Impact of Demolitions, 2010 – 2014.....	6
Table 6 Tree Planting Summary.....	9
Table 7 Vacant Lot Greening Landscape Conditions in 2014 .....	11
Table 8 Green Infrastructure Program Cumulative Expenditures .....	14
Table 9 Agreements with Residual Value.....	15
Table 10 Stormwater Runoff Volume Reduction Summary.....	16
Table 11 Action Item Summary .....	17

## LIST OF FIGURES

Figure 1 DWSD Funded Demolished Properties.....	7
Figure 2 URT Area Demolitions.....	8
Figure 3 Tree Plantings in URT Area .....	10
Figure 4 Vacant Lot Greening Locations .....	12
Figure 5 Well-Established Landscape at 8883 Ashton.....	13
Figure 6 DWSD GI Program Expenditures.....	15



## ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
BSEED	Buildings, Safety Engineering and Environmental Department
CSO	Combined Sewer Overflow
DBA	Detroit Building Authority
DLBA	Detroit Land Bank Authority
DWSD	Detroit Water and Sewerage Department
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
Fps	Feet per second
FY	Fiscal Year
GLRI	Great Lakes Restoration Initiative
LID	Low Impact Development
MDEQ	Michigan Department of Environmental Quality
MDOT	Michigan Department of Transportation
MLBA	Michigan Land Bank Authority
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
NWI	Northwest Interceptor
O&M	Operations and Maintenance
RCP	Reinforced Concrete Pipe
ROW	Right-of-way
SEMCOG	Southeast Michigan Council of Governments
TAP	Transportation Alternatives Program
URT	Upper Rouge Tunnel
USDOT	United States Department of Transportation



## 1.0 GREEN INFRASTRUCTURE PROGRAM OVERVIEW

The Detroit Water and Sewerage Department (DWSD) is responsible for developing and implementing the Alternative Rouge River Combined Sewer Overflow (CSO) Control Program. This CSO Control Program is designed to restore water quality and protect public health, while staying within the City's 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 (GI) solutions along with "right-sized" conventional CSO control facilities.

This document is the Green Infrastructure Annual Progress Report for 2013 – 2014, which corresponds to the time period of July 1, 2013 – June 30, 2014. An annual progress report is required according to the permit (Part I.A.15.d.5.a) that:

- 1) *Summarizes the GI implementation work during the preceding DWSD fiscal year that has been undertaken and completed as part of the Green Infrastructure program,*
- 2) *Contains a work plan for GI implementation projects for the next DWSD fiscal year,*
- 3) *Documents the annual expenditure for the preceding DWSD fiscal year,*
- 4) *Documents a cumulative total-spent-to-date on the GI program, and*
- 5) *Includes an updated estimate of the volume of wet weather flow that has been removed from the combined sewer system as a result of the Green Infrastructure program, using agreed upon calculation techniques.*

The Green Infrastructure Program is focused on a 37.5-square-mile area known as the URT Area. This designation relates to the proposed Upper Rouge Tunnel (URT) that was later abandoned due to escalating costs and financial challenges. Some of the combined sewage flows generated in this area are managed at the Hubbell-Southfield CSO Facility, while other combined sewage flows are tributary to uncontrolled outfalls. The area includes a variety of neighborhood, industrial, and commercial areas which are in varying states of stability. The potential of storm water to be converted to CSO discharges will be a factor in prioritizing efforts, while the local socio-economic conditions will be a key determinant in the type of project implemented.

The City of Detroit has gone through major institutional changes. Some of these changes require adjustments to processes while others provide new sources of information and data that are highly beneficial to the Green Infrastructure Program. Overall, the changes in the institutional landscape provide additional opportunities for the implementation of green infrastructure in the City of Detroit.

In 2013, DWSD implemented the selection process for DWSD Contract No. CS-1522, Green Infrastructure Program. This contract provides for \$14.5 million to assist DWSD with the evaluation, design, and implementation of green infrastructure improvements over the course of the next five (5) years. Tetra Tech was selected for this contract, with work initiated in February 2014.

As a result of the myriad changes, not only in DWSD's team for the Green Infrastructure Program, but also within other agencies and institutions in the City of Detroit, much of the effort in the past year has been invested in working through institutional processes and forming relationships. DWSD's Green Infrastructure Program will be a continually evolving effort to identify and implement projects and programs that will reduce CSO discharges while benefiting the community.

DWSD's progress on GI implementation is measured based on cumulative expenditures. The spending requirement is for a cumulative spending of \$30 million by 2019. Through June 30, 2014, a total of \$2,268,001 had been spent on the GI Program, and an additional \$14,957,386 was committed through various contract vehicles, for an overall total of \$17,225,387.

In addition, the Program has a goal of reducing runoff volume to the combined sewer system during the 2-year, 24-hour event. Based on the projects implemented to date, an estimated 365,000 gallons have been removed per this criterion.

Details for the various items in the permit requirement are presented in this Progress Report. It is structured in the following manner:

- Section 2 summarizes the planning, coordination and implementation efforts undertaken during the preceding year.
- Section 3 provides a financial summary of the investments made toward the green infrastructure program both for the preceding year and the cumulative total to date.
- Section 4 documents the estimated volume of wet weather flow removed as a result of the green infrastructure program.
- Section 5 summarizes the planned activities for the upcoming year.

## 2.0 PRIOR YEAR IMPLEMENTATION

This section summarizes this fiscal year’s ongoing planning and implementation efforts. The first portion presents status of specific activities discussed in the 2013 Progress Report. Later sections describe general status of permit identified activities.

Table 1 through Table 3 summarizes the activities discussed in the 2013 Progress Report along with the current implementation status and comments. The information is organized into administrative activities (Table 1), technical activities (Table 2), and implementation activities (Table 3). Activities that are in progress are cross-referenced to future planned tasks (e.g., Refer to Task 1-8) which are discussed further in Section 5.0 (beginning on page 16).

**Table 1 Status of 2013 Progress Report Administrative Activities**

Activity Discussed in 2013 Progress Report	Status	Comments
Select and execute contract for consulting engineer/ program manager for CS-1522	Complete	DWSD selected Tetra Tech as engineer/ program manager in August 2013. The contract was executed in December 2013 and the year 1 task order was authorized February 1, 2014.
A framework for the next 5 years and a detailed work plan will be developed	Complete	The approach to future work is included in the 2014 Green Infrastructure Plan (2014 Plan). The near-term action items from the GI Plan are included later in this document.
Establish a tracking system for GI installations and runoff reduction;	In progress	A tracking system is being developed. This system is currently focused on GIS tracking of DWSD installed practices and their magnitude. The current focus is to ensure that prior efforts have been captured in the system. (Refer to Task 1-8)
Finalize agreement with the MDEQ on calculation methodologies	In progress	Proposed calculation methodologies are discussed in the 2014 Plan.
Complete maintenance and deed restrictions for the greened vacant properties with Michigan Land Bank;	In progress	Discussions are continuing with the Michigan and Detroit Land Banks relative to long-term ownership. The institutional structures of these organizations have changed since the start of 2014. (Refer to Task 3-5)
Establish policy and procedures for use by DWSD for green infrastructure installed in lieu of stormwater fees	In progress	This item is being addressed as part of the drainage charge credit system development. (Refer to Task 1-3)

Activity Discussed in 2013 Progress Report	Status	Comments
Determine how to incentivize and develop policies for loans or grants; and	In progress	This item is being addressed as part of the drainage charge credit system development. (Refer to Task 1-3)
Define the outreach program.	Complete	A defined outreach program is included in the 2014 Plan.

**Table 2 Status of 2013 Progress Report Technical Activities**

Activity Discussed in 2013 Progress Report	Status	Comments
How to measure the performance of installed GI	Complete	Methodology for measuring the performance of installed GI is addressed in the 2014 Plan.
Determine level of assistance for businesses and citizens, if any	In progress	This item is being addressed as part of the drainage charge credit system development. (Refer to Task 1-3)
Develop the menu of GI installations for each specific application	Complete	A suite of GI approaches is presented in the 2014 Plan. As projects are implemented the menu of practices may be modified.
Optimization of the implementation of downspout disconnection effort	Complete	Plans for downspout disconnection are identified in the 2014 Plan.

**Table 3 Status of 2013 Progress Report Implementation Activities**

Activity Discussed in 2013 Progress Report	Status	Comments
Tree planting will take place in fall 2013 and spring 2014. Locations and quantities will be determined at the coordination meetings.	Complete	Tree plantings were limited in this fiscal year. This was partially limited by the criteria applied (plantings occurred in front of occupied, stable residence). The plan for tree plantings is reviewed in the 2014 GI Plan. (Refer to Task 3-6).
Complete the 140 demolitions commitment made in FY 2011-2012 report.	In progress	Demolitions proceeded under the memorandum of understanding with BSEED. Approximately 80 were completed prior to the end of 2013. The demolition process changed in January 2014 (now performed through DBA) and the process to resume the demolitions is ongoing. (Refer to Task 3-5)
Complete the 25 MLB demolitions	Not Complete	These demolitions were not completed. Change in agency role will result in this effort being shifted to the DBA.
Continue implementation of the vacant lot greening program.	In progress	Focus for greening of vacant lots included coordination with the on-going research at University of Michigan, Wayne State and Lawrence Technological University along with the Detroit Future City work on a vacant lot toolkit. Greening of vacant land will focus on locations where significant runoff change can be achieved or those locations that are integrated with other projects. (Refer to Task 2-2 and 3-5)

Activity Discussed in 2013 Progress Report	Status	Comments
Make a final determination on the Joy Road reconstruction project and incorporating green infrastructure; a substitute or supplemental project may be conceived in FY13-14 to augment similar green road and pedestrian friendly streets.	Complete	The Joy Road project was not pursued due to the status of the design and construction. Water main design (which was complete) would have needed significant revision in order to accommodate green infrastructure practices. Plans for transportation projects are included in the 2014 GI Plan.
Pilot improved methods of deploying downspout disconnection.	In progress	Downspout disconnection methods will likely shift to working with property owners who own significant number of homes. This is documented in the 2014 GI Plan. (Refer to Task 3-1 and 3-2)

## 2.1 PLANNING AND COORDINATION

Planning efforts in the 2013 – 2014 fiscal year were a predominate component of work performed on the program. This included a reexamination of the effectiveness of prior work, reestablishment/development of new relationships within departments and agencies, and a review of approaches going forward.

Reasons for the planning emphasis included:

- Transitioning of green infrastructure program support from SEMCOG to Tetra Tech. In August 2013 Tetra Tech was selected as the program manager/ consultant for CS-1522. Major decisions on the program activities were deferred until Tetra Tech was under contract and had been authorized to initiate work (February 2014). Once Tetra Tech was under contract, various relationships with other City departments and agencies needed to be transitioned or established. Subsequent planning efforts included a review of prior work and development of plans for future implementation. The results of this effort are included in the 2014 Plan. SEMCOG continues to support the program through facilitation, although SEMCOG's direct responsibilities for project implementation have transitioned to Tetra Tech.
- Changes in City of Detroit structure under Mayor Duggan. The Duggan administration has significantly modified the structure of demolitions and public property management. This relates to the expanded role of the Detroit Land Bank and the Detroit Building Authority. Parcels previously held by the Michigan Land Bank, and those that had been acquired by the City through tax foreclosures and other forfeitures are being consolidated into the Detroit Land Bank. Demolition activities previously managed by BSEED have transitioned to the Detroit Building Authority. Mayor Duggan also created the Department of Neighborhoods, which increases the emphasis on neighborhood planning.
- The City of Detroit bankruptcy which was filed in July 2013. This was preceded by the appointment of an emergency financial manager in March 2013.
- Motor City Mapping Project (MCM). MCM was conducted in late 2013 and early 2014, with results available in late May 2014. This data set is of great value to the GI Program, and influences the decision making and project selection.

DWSD's Green Infrastructure consultant, Tetra Tech and their subconsultants have been coordinating with DWSD, MDEQ, SEMCOG, City Departments and other stakeholders for development of policies and strategies. This coordination includes meetings and other communication to address key issues throughout the planning process.

### 2.1.1 DWSD Contracted Services

DWSD executed and continued contracts with Tetra Tech and SEMCOG, respectively, to coordinate and implement green infrastructure programs on behalf of DWSD.

CS-1522 Green Infrastructure Program. This contract provides for \$14.5 million for Tetra Tech to assist the Department with the evaluation, design, and implementation of green infrastructure improvements over the course of five (5) years.

CS-1547 SEMCOG Coordination of Green Infrastructure Program. This contract provides \$300,000 for SEMCOG to provide support to DWSD with the development of a green infrastructure plan.

Greening of Detroit has performed work under direct contract with DWSD (CS-1546). For future work, Greening of Detroit will be funded through CS-1522.

## 2.1.2 Coordination within DWSD, Departments, Agencies and Groups

Coordination with departments, agencies, and groups has been ongoing throughout the fiscal year. Significant effort was expended by the new consultant in working through institutional processes and forming relationships as work was transitioning from SEMCOG to Tetra Tech. In addition, changes to City department organization and staff with the new administration resulted in the need to re-establish relationships. Coordination efforts occurred with the following:

### Internal DWSD Groups

- DWSD Commercial Operations
- DWSD Financial Planning Division
- DWSD GIS Group
- DWSD Water Supply Operations
- DWSD Public Affairs

### City Departments

- BSEED
- PDD
- DPW
- General Services – parks (proposed)
- General Services – buildings (proposed)
- Detroit Building Authority

### Agencies

- Detroit Land Bank
- Michigan Land Bank
- Wayne County Department of the Environment
- Wayne County Road Commission
- MDOT
- Detroit Economic Growth Corporation
- Michigan Department of Environmental Quality
- US EPA, Region V
- Detroit Public Schools (proposed)
- Detroit Housing Commission (proposed)
- Michigan State Housing Development Authority (proposed)
- DTE Energy (proposed)

### Organizations

- Detroit Future City
- Sierra Club
- Erb Family Foundation
- Detroit Greenways Coalition
- Brightmoor Alliance
- Grandmont Rosedale Development Corporation
- Joy Southfield Development Corporation
- Other neighborhood groups (proposed)

### Institutions

- University of Michigan
- Wayne State University
- Lawrence Tech University

### Groups

- Green Infrastructure Task Force – water subcommittee
- Blue Green Task Force

In addition to a series of meetings held with these organizations, a workshop was conducted on June 20, 2014, with a majority of Detroit decision-makers and city department staff that have a role in setting and implementing policies, procedures, and requirements related to green infrastructure implementation.

## 2.1.3 2014 Green Infrastructure Plan

The Green Infrastructure Plan is a requirement for DWSD under the NPDES permit (Permit No. MI0022802), issued by the Michigan Department of Environmental Quality (MDEQ). The permit requires DWSD to develop and

implement a plan that will describe a process for locating, designing, constructing, operating, and evaluating GI in the sewersheds for 17 outfalls to the Rouge River. The permit identifies specific elements that will be included in the Plan including downspout disconnection, demolitions, tree planting, vacant lot greening, bioswales along roadways and parking lots, rain barrels and rain gardens at properties, and programmatic and policy type elements. The status of these elements is discussed below.

A Green Infrastructure Plan was developed with support by SEMCOG in 2013. It was conditionally approved by MDEQ on October 16, 2013. Based on comments received and additional evaluations and planning performed, this document has been updated and replaced with the 2014 Plan. The 2014 Plan reviews the current status of efforts and identifies a series of actions going forward. The 2014 Plan is being provided to MDEQ on August 1, 2014.

## 2.2 DEMOLITIONS

The August 1, 2012 Green Infrastructure Program Progress Report indicated that 140 homes had been identified for demolition, including 90 in the neighborhood of Brightmoor. DWSD has funded activities for 98 properties, which in some cases includes asbestos remediation only and others which include complete demolition. Approximately 80 homes have been demolished since the beginning of the program. In accordance with a change in City policy as a result of the change in administration this year, the Detroit Land Bank is responsible for the variety of demolitions, with the Detroit Building Authority (DBA) responsible for the actual demolition process. As a result of this transition, interagency agreements need to be reconfigured for additional DWSD demolitions to proceed. The impact of DWSD demolitions is shown in Table 4.

**Table 4 DWSD Funded Demolitions through June 30, 2014**

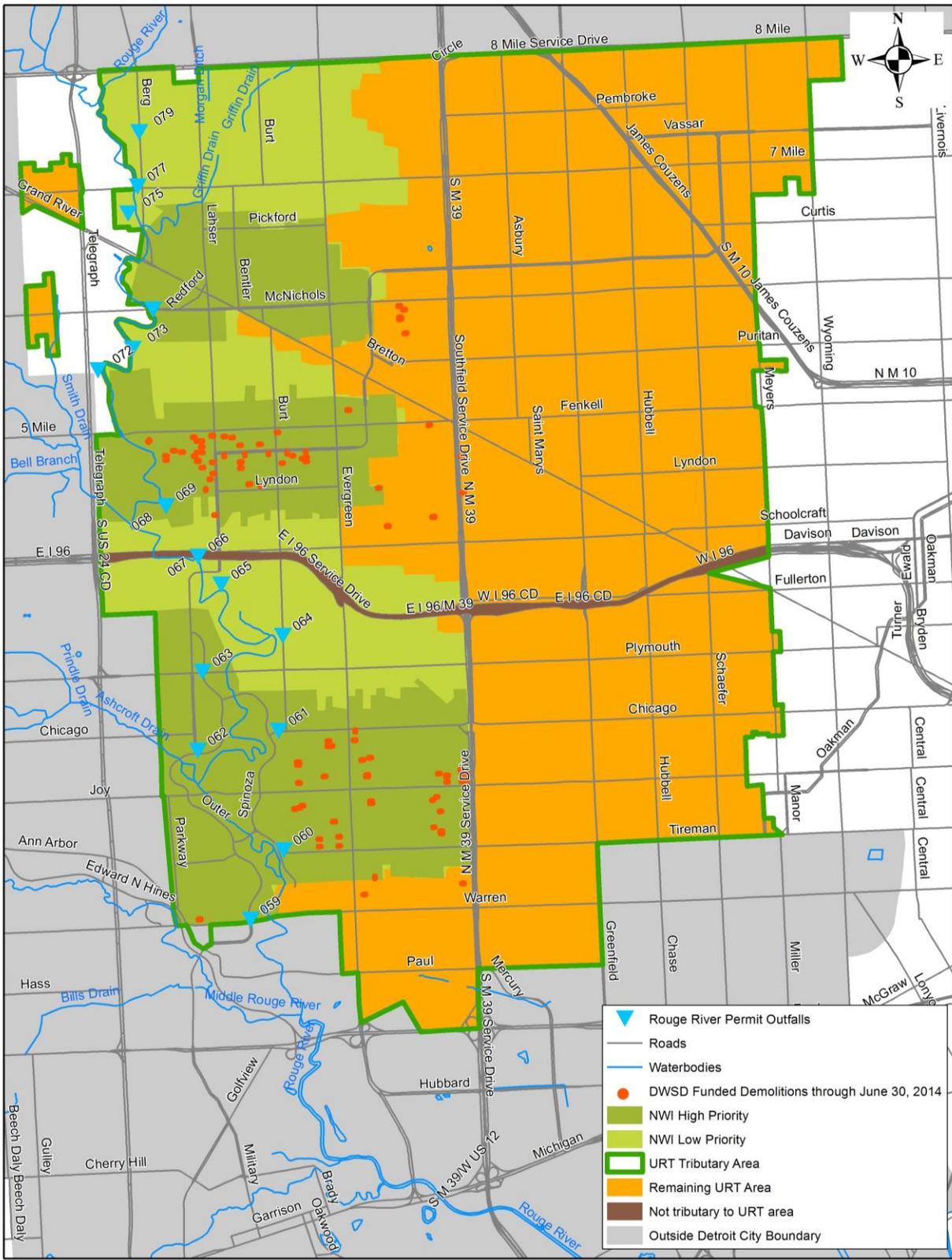
Description	Quantity
Number of Demolitions	80
Total lot area (acres)	9.5
Original impervious cover (acres)	4.9
Post demolition impervious cover (acres)	0.0
<b>Estimated Runoff Reduction (MG)</b>	<b>0.13</b>

In addition to the demolitions that DWSD has funded, approximately 241 acres of impervious cover has been removed in the URT area since 2010. The impact of these demolitions is shown in Table 5. Locations of DWSD demolitions and overall URT demolitions are shown in Figure 1 and Figure 2, respectively.

**Table 5 Impact of Demolitions, 2010 – 2014**

Statistic	NWI High Priority	NWI Low Priority	URT Total
Number of parcels with structures, 2010	21,913	16,335	92,666
Number of parcels with structures, 2014	21,055	15,916	90,048
Building footprint area in 2010 (acres)	594	596	3,557
Estimated building footprint removed as of 2014 (acres)	22	24	114
Estimated total impervious area removed as of 2014 (acres)	48	49	259
Est. effective impervious area removed assuming 95% effective (acres)	46	47	246
<b>Estimated Runoff Reduction (MG)</b>	<b>1.4</b>	<b>1.4</b>	<b>7.5</b>

Figure 1 DWSD Funded Demolished Properties





## 2.3 DOWNSPOUT DISCONNECTIONS

Per the NPDES permit, DWSD shall eliminate direct connections of eaves troughs and roof downspouts to the sewer system throughout the service area tributary to the Upper Rouge CSO outfalls (Outfalls 059-069, 072-075, 077, and 079). DWSD plans to fulfill the requirements of the NPDES permit through implementing the disconnection of residential, commercial and industrial downspouts, where feasible.

DWSD initiated a residential downspout disconnect program in 2011/2012 in the pilot areas of Cody Rouge and Grandmont Rosedale. As part of this program, DWSD partnered with the nonprofit organization, Greening of Detroit, to perform downspout disconnection workshops and staff a help line for those residents needing additional assistance. Individuals who attended the workshops received vouchers which allowed them to pick up free disconnection materials to utilize in completing the disconnection from the combined sewer system. Additional materials were also provided to local neighborhood associations and development corporations with existing home repair programs, with the intent to assist with disconnection for elderly and disabled persons. According to Greening of Detroit's records, this initiative provided 177 residential properties with the necessary materials needed to disconnect their downspouts, thereby discharging rain water roof drainage to available green space.

As part of this progress report, 30 percent of the residential properties that collected the disconnect materials were inspected (June 2014) from the curb side to determine if workshop participants followed through with the disconnection of their downspouts.

Based upon the June 2014 investigation of the previous effort for downspout disconnection, approximately 50 percent of residences (50 percent of the 177, for an estimated total number of 89) had disconnected or partially disconnected downspouts, (i.e., all of the visible downspouts disconnected). The remaining properties were found to still be connected to the sewer system. A summary of the estimated volume reduction corresponding to the disconnected homes is located in Section 4.0, Volumetric Reductions.

In addition to the downspout disconnection program, DWSD has supported the distribution of rain barrels through the Greening of Detroit. A total of 127 rain barrels were distributed at the Northwest Farmer's Market.

## 2.4 TREE PLANTING

DWSD funded tree planting through The Greening of Detroit, under contract CS-1546. Street tree planting is implemented within the road right-of-way between the sidewalk and curb along city and county roads. Grouped tree plantings were also completed in two City-owned parks.

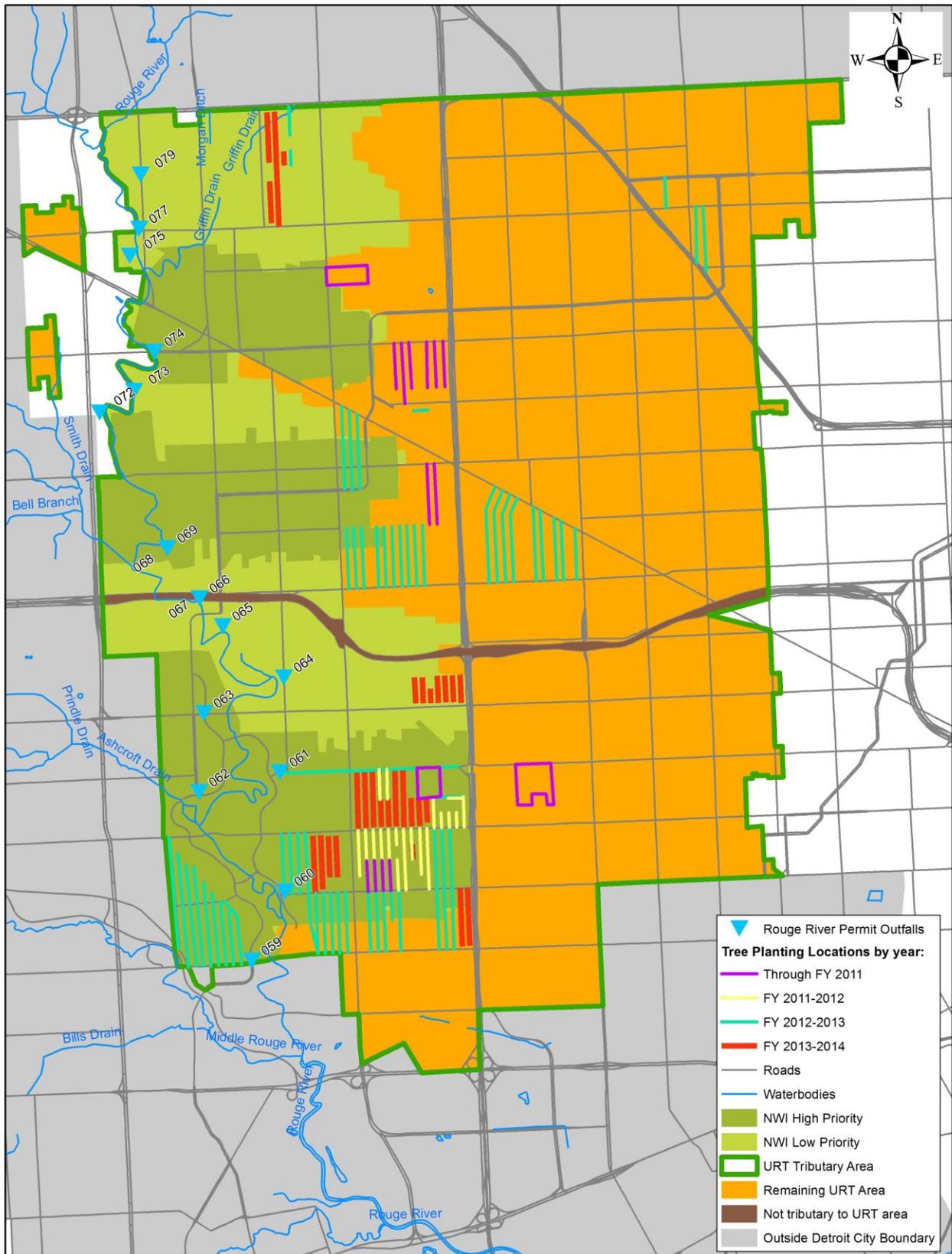
An additional 1,219 street trees were planted in the current fiscal year. Planning focused on identification of current status of rights-of-way for additional street trees and initial planning toward the goal of carbon forests along interstate highways. Greening of Detroit is leading the carbon forest efforts using other sources of funding. DWSD is collaborating with Greening of Detroit to maximize stormwater components of the implemented projects. The initial carbon forests may be implemented outside of the URT.

Cumulative to date, Greening of Detroit has planted 5,342 trees in the URT area under the DWSD Green Infrastructure Program, as summarized in and shown on Table 6 and Figure 3.

**Table 6 Tree Planting Summary**

Description	Number of Trees Planted in the URT Area	Estimated Runoff Reduction (MG)
Through FY 2011 Street Trees	332	0.009
Through FY 2011 Park Trees	769	0.022
FY 2011-2012 Street Trees	985	0.028
FY 2012-2013 Street Trees	1,867	0.052
FY 2012-2013 Park Trees	170	0.005
FY 2013-2014 Street Trees	1,219	0.034
<b>Total</b>	<b>5,342</b>	<b>0.150</b>

Figure 3 Tree Plantings in URT Area



## 2.5 VACANT LOT GREENING

Ten properties from the original DWSD Vacant Lot Pilot Program were initially planted by June 6, 2013. The location of these lots was in the Rouge-Cody neighborhood. Locations indicated on Figure 4 have been reviewed and evaluated. The properties were visited on June 17, 2014, and the condition of the landscaping reviewed. The new landscaping was typically found to be in good condition and becoming established. The progression of the planted seed mix is on schedule with the initial estimate. Each property was identified with Pilot Program signage, and the landscaping on sites with light bare spots should infill over time. Sites with considerable bare spots should be over-seeded and reevaluated for establishment in the next evaluation period.

The 10 properties consist of a total of 51,890 square feet (1.19 acres). See Table 7 for landscape notes on the individual properties and Figure 5 for an example of a well-established property.

**Table 7 Vacant Lot Greening Landscape Conditions in 2014**

Address	Landscape Condition
8018 Ashton	Low Grow Prairie: Fair growth, some bare spots, weedy
8883 Ashton	Tree Plantings: Good grass growth and coverage, trees in good condition
8898 Ashton	Low Grow Prairie: Good growth, fair to good coverage, some bare spots
9046 Ashton	Low Grow Prairie: Good growth and coverage, front of lot is mown
9223 Auburn	Low Grow Prairie: Minimal growth, poor coverage
8412 Brace	Tree Plantings: Good grass growth and coverage, trees in good condition
8601 Brace	Tree Plantings: Good grass growth and coverage, trees in good condition
9048 Minock	Perennial Wildflower Mix: Good growth and coverage, trash on site
8114 Westwood	Rye Grass and Wildflower Mix: Good growth and coverage, some weeds, wildflowers not dominant
8247 Grandville	Low Grow Prairie: Good growth, fair to good coverage, some thin spots



**Figure 5 Well-Established Landscape at 8883 Ashton**



## **2.6 PUBLIC OUTREACH AND PUBLIC PARTICIPATION**

---

Public outreach and participation has been and will continue to be an important element in both selecting the site and selecting the green infrastructure techniques. Each green infrastructure project (whether big or small) contains a stakeholder engagement process. This includes engaging local neighborhood associations and/or development corporations along with direct resident engagement through neighborhood meetings.

In 2013 – 2014, public outreach focused on meeting with select groups (Green Infrastructure Task Force, Blue Green Task Force) that have a public outreach and engagement focus; meeting with some neighborhood groups; and developing the action strategy.

Examples of prior outreach and participation are listed below. These and additional activities are anticipated in the future:

- Greening of Detroit utilizes a community engagement process to select streets for street tree planting. This includes community meetings and engaging residents in planting and maintenance. In addition, each resident is informed ahead of time of the planting and can "opt out" of the program.
- The local neighborhood association and/or community development corporation is initially engaged in site selection for projects implemented through the program.
- DWSD has contracted with Greening of Detroit to engage residents in learning the importance of downspout disconnection, learning the basics of how to disconnect, the option of building a rain barrel,

and receiving free materials. Greening of Detroit has partnered with local development corporations to publicize the events and provide free locations.

- A public engagement process is included in each major green infrastructure construction project, including the development of large-scale green infrastructure on vacant property, implementing green streets, and incorporating green infrastructure on municipal properties. This will include engagement of neighborhood associations and/or community development corporations and general citizens during from the initial design through implementation.
- Stakeholders are also engaged through DWSD's public outreach mechanisms, including their web site and public education materials.

## 2.7 INSTITUTIONAL STRUCTURES

DWSD is working with institutional structures for parcel drainage management from two perspectives.

- The Drainage Charge System provides an opportunity to create incentives for property owners to better control flows generated on their sites. In order to accomplish this, a methodology that recognizes stormwater management is required. Efforts are underway to define the methodologies that could be applied within the context of DWSD green infrastructure and CSO performance expectations and various equity considerations relative to the drainage charge methodology.
- Codes and ordinances can either promote or impose barriers to green infrastructure and on-site stormwater management. DWSD is currently working with BSEED to perform a review of codes and ordinances.

## 3.0 INVESTMENT IN GREEN INFRASTRUCTURE

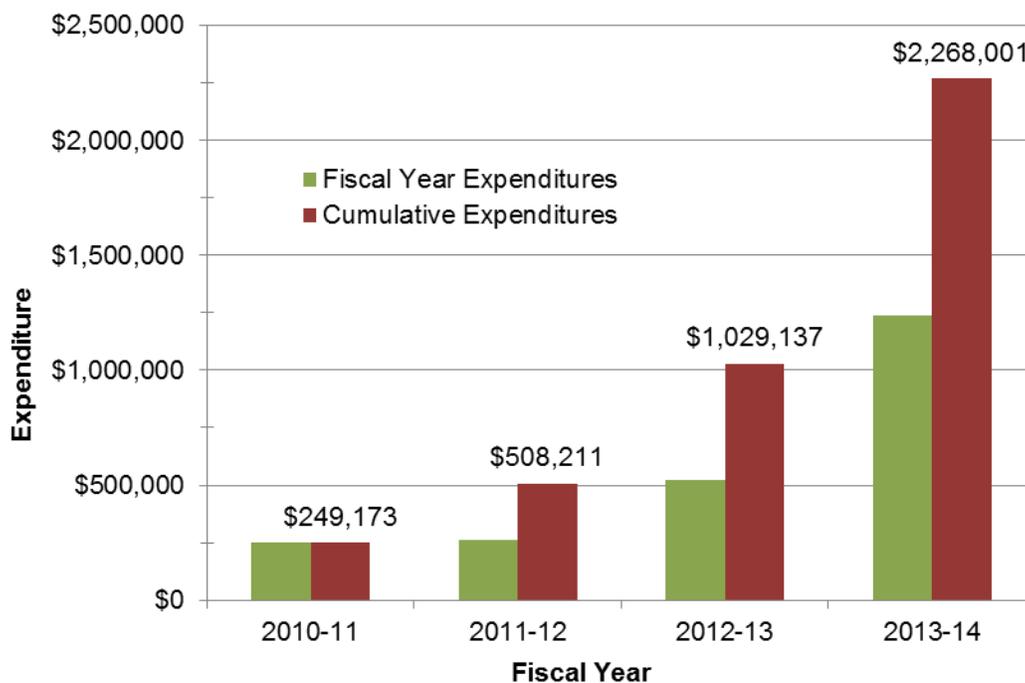
Since the inception of DWSD's Green Infrastructure Program, a variety of implementation projects and coordination efforts have occurred. These projects include stakeholder workshops, distribution of education materials, and efforts toward tree planting, demolitions, vacant lot greening, and downspout disconnections.

As part of the preparation of this report, a detailed review of prior spending was performed. Previous reports have not differentiated between planned and actual spending. This report and future annual progress reports will clearly distinguish between the two. The costs identified in Table 8 and displayed on Figure 6 are based on the date of the invoice, although some of the effort may have been performed in the prior fiscal year. Program funding expended during the current fiscal year was \$1,238,864.

**Table 8 Green Infrastructure Program Cumulative Expenditures**

Activity	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	Cumulative Expenditures
Demolitions	N/A	N/A	\$55,186	\$571,284	\$626,470
Downspout Disconnection	N/A	N/A	\$95,551	\$56,295	\$151,846
Tree Planting	\$172,000	\$172,000	\$237,103	\$106,330	\$687,433
Vacant Lot Greening	N/A	N/A	N/A	\$25,000	\$25,000
DWSD Staff	\$50,000	\$75,000	\$75,000	\$75,000	\$275,000
Professional Services	\$27,173	\$12,038	\$58,087	\$404,955	\$502,253
<b>Total</b>	<b>\$249,173</b>	<b>\$259,038</b>	<b>\$520,926</b>	<b>\$1,238,864</b>	<b>\$2,268,001</b>

**Figure 6 DWSD GI Program Expenditures**



In addition to actual expenditures (invoices), DWSD has entered into agreements to perform work on the Green Infrastructure Program. Original contract value and residual contract value for major agreements performing ongoing work associated with DWSD’s Green Infrastructure Program are displayed in Table 9.

**Table 9 Agreements with Residual Value**

Vendor	Contract Number	Contract Dates	Original Contract Value	Residual Contract Value
<b>SEMCOG</b>	CS-1547	2012-2013	\$300,000	\$239,675
<b>BSEED</b>	MOU	2012-2014	\$1,200,000	\$580,731
<b>Tetra Tech</b>	CS-1522	2013-2018	\$14,500,000	\$14,136,980
<b>Total</b>			<b>\$16,000,000</b>	<b>\$14,957,386</b>

Based on the cumulative spent to date and the agreements that have been executed, DWSD has committed a total of \$17,225,387 to the Program through 2018.

## 4.0 VOLUMETRIC REDUCTIONS

### 4.1 QUANTIFICATION TO DATE

The runoff volume estimates for discrete storm events are based on NRCS curve number hydrology calculations. Green infrastructure practices that are designed to manage stormwater runoff are calculated based on the runoff volume from the tributary area. In the case of practices which result in a land cover conversion the managed runoff calculation is based on the change in curve numbers. Detailed information of the NRCS Curve Number approach is available in the NRCS Part 630 National Engineering Handbook. The initial abstractions assumption inherent in the NRCS approach was updated according to the ASCE *State of the Practice Curve Number Hydrology* by Richard Hawkins, et al. (2009). Volume calculations are summarized in Table 10 for a single 2-year, 24-hour storm event (equivalent to approximately 2.34 inches of rainfall).

Estimated runoff reduction volumes for tree planting are based on 5,342 trees being planted in the URT since the inception of the program. The planting locations and methods are such that the greatest benefit from a stormwater runoff perspective is from tree canopy interception. Tree canopy interception rates are based on interception capabilities as planted. As the trees grow and the canopy increase, the interception will increase and the corresponding runoff reduction estimates from tree plantings will increase.

**Table 10 Stormwater Runoff Volume Reduction Summary**

Activity	FY 2010-11 (MG)	FY 2011-12 (MG)	FY 2012-13 (MG)	FY 2013-14 (MG)	Cumulative Total (MG)	Cumulative DWSD Expenditure (\$)
Demolitions (funded by DWSD)	N/A	N/A	0	0.130	0.130	\$626,470
Downspout Disconnection	N/A	N/A	N/A	N/A	0.063	\$151,846
Tree Planting	0.031	0.028	0.057	0.034	0.150	\$687,433
Vacant Lot Greening	N/A	N/A	N/A	0.022	0.022	\$25,000
<b>Total</b>					<b>0.365</b>	<b>\$1,490,749</b>

## 4.2 GREEN INFRASTRUCTURE TRACKING PROGRAM

A tracking and performance assessment database is being developed for green infrastructure implementation activities. The objective for development of a tracking and performance assessment database is to define, at a minimum, the location, ownership, financial investment, performance, and installation date of the green infrastructure practices.

There are several general categories of information that will be tracked in the database. These include the following:

- DWSD Green Infrastructure Practices – These practices include those described in Section 3.0 that are implemented with participation from DWSD. Although tracking of non-DWSD practices is also important, initial efforts will give priority to tracking DWSD practices.
- Non-DWSD Green Infrastructure Practices - These practices include those described in Section 3.0 that are implemented without participation from DWSD.
- Area Scale – DWSD would like to quantify changes in land cover over the long-term. This may include cooperating with other entities in gathering aerial imagery and conducting a land cover analysis every five years.

Implementation of the data collected in the tracking database for DWSD practices will be used to develop a GIS-based database that will be maintained by DWSD. This will keep DWSD investment well documented and current. As an on-going process, the database will be evaluated and adapted to meet evolving needs.

## 5.0 WORK PLAN FOR FISCAL YEAR 2014-2015

### 5.1 DWSD ACTIVITIES FOR 2014-2015

DWSD’s Green Infrastructure Program has identified the following activities which will establish policies and processes and will gradually transition the program into long-term implementation

#### **Activity 1. Institutional Processes**

Institutional processes include code and ordinance review and the drainage charge system and will drive implementation of green infrastructure on parcels and private property in the long-term. Within the URT area, 65

percent of the land area is made up of parcels; therefore, managing flow from these parcels is vital to the green infrastructure program.

**Activity 2. Prototype Projects**

Implementation of green infrastructure requires the development of new policies, processes, and procedures. It also requires additional understanding of the performance, costs, and implementation realities associated with various project types. The realities of policies, processes, and procedures can best be realized in the process of implementing projects. A variety of project types have been identified to be included in the prototype implementation and include land assembly and large scale greening, right-of-way bioretention and curb-extension, street runoff diversion onto parcels, community enhancement projects with parcel and roadway bioretention and impervious area removal.

**Activity 3. Continued Implementation Projects**

DWSD has previously implemented a series of early action projects that include downspout disconnection, demolitions and site restoration, and planting trees in the program area. Each of these activities will be continued in the future, modified based on lessons learned and adapted for current conditions.

**Activity 4. Long Term Performance**

The ultimate goal of green infrastructure implementation is the reduction of CSO discharges. The benefits associated with green infrastructure may reduce the extent of future constructed CSO controls. Long-term performance will be evaluated to address questions on maintenance, sustainability through direct ownership, deed restrictions, drainage charge related sustainability requirements or other mechanisms.

**Activity 5. Stakeholder and Community Engagement and Coordination**

Stakeholder and community engagement is fundamentally part of all priorities. DWSD recognizes that the success of green infrastructure implementation and long-term maintenance depends on generating stakeholder support through a combination of tailored education and meaningful engagement activities. DWSD has initiated the development of a green infrastructure outreach strategy that consists of three branches: (1) an overarching educational campaign developed and implemented as a collaborative effort with other key partners; (2) outreach and engagement related to green implementation discounts on the drainage charge; and (3) project-specific outreach tailored to meet the specific needs and characteristics of stakeholders affected by green infrastructure project planning, implementation, and maintenance

**5.2 DWSD WORK ACTIVITIES FOR 2014 - 2015**

Primary projects for 2014-2015 are as identified in the GI Plan. Those proposed work activities are identified in Table 11.

**Table 11 Action Item Summary**

Task ID	Activities	Schedule
<b>Activity 1 – Policies, Procedures and Standards</b>		
1-1	Codes and Ordinances	Complete review and recommendations by June 30, 2015.
1-2	Stormwater Technical Reference Manual	Draft of manual complete by March 31, 2015. Final version complete by March 31, 2016.
1-3	Drainage Charge Credit System	Complete initial standards and processes by April 30, 2015. Finalize by November 30, 2015.
1-4	Green Streets Standards	Draft standards by June 30, 2016. Final by June 30, 2017.

Task ID	Activities	Schedule
1-5	Structure Demolition and Lot Greening Standards	Provide technical support upon request.
1-6	Public Stormwater Maintenance Guidance	Draft guidance complete by June 30, 2015. Final version complete by June 30, 2016.
1-7	Municipal Stormwater Maintenance Manual	Draft manual complete by July 31, 2016. Final by July 31, 2017.
1-8	Tracking System	Draft tracking system by July 31, 2015. Final by July 31, 2016.
<b>Activity 2 - Prototype Projects</b>		
2-1	Small Scale Greening	Ecological restoration of demolition sites constructed by December 31, 2014. Other opportunities on-going.
2-2	Large Scale Greening	Begin stakeholder and community engagement by September 1, 2014. Complete engagement process and conceptual designs by August 31, 2016.
2-3	Public Facilities Flow Management	Develop prioritized opportunity list by January 31, 2015. Project selection and implementation schedule by July 31, 2015.
2-4	Open Stream Connections	Develop prioritized opportunity list by January 31, 2015. Complete conceptual designs by June 30, 2015. Project selection and implementation schedule by July 31, 2015.
2-5	Municipal Parks Flow Management	Develop prioritized opportunity list by January 31, 2015. Project selection and implementation schedule by May 31, 2015.
2-6	Transportation Corridor Flow Management	Develop prioritized opportunity list by January 31, 2015. Project selection and implementation schedule by May 31, 2015. Annual updates and coordination with city departments, county and state.
<b>Activity 3 - Continued Implementation</b>		
3-1	Downspout Disconnection - Homes	Process update by November 30, 2014. Coordination with major landlords, neighborhood groups and organization by April 30, 2015. Major implementation emphasis in Spring 2015 and on-going through June 2017.
3-2	Downspout Disconnection - Multi-Family Residential, Commercial, and Industrial	Site characterization assessment complete by January 31, 2015. Approach methodology by May 31, 2015. Pilot disconnection projects by November 30, 2015.
3-3	Demolitions and Site Restoration	Budget planning by October 31, 2014. Coordination with DBA on-going.
3-4	Tree Plantings	Opportunity assessment by October 31, 2014. Additional planting beginning Fall 2014.
<b>Activity 4 - Long Term Performance</b>		
4-1	Updated Collection Systems Model	Complete by April 1, 2015

Task ID	Activities	Schedule
4-2	Green Infrastructure Performance Planning	Complete by June 30, 2015
4-3	Green Infrastructure Benefits Evaluation	Complete by June 30, 2016
4-4	Amendment to the Supplemental Report on Alternative CSO Controls for the Upper Rouge	Complete by January 1, 2017
4-5	Legal agreements for long-term sustainability	Ongoing
<b>Activity 5 - Stakeholder and Community Engagement</b>		
5-1	Green Infrastructure Website	Functional by February 15, 2015.
5-2	Green Rewards Program Stakeholder Engagement	Stakeholder team formation launched August 2014 and following Drainage Charge System Schedule
5-3	Green Rewards Toolbox	Materials available in draft form by January 31, 2016
5-4	Green Rewards Training Workshops	Concurrent with Green Rewards Public Launch
5-5	Green Infrastructure Case Studies and Demonstration Projects	Ongoing with initial case studies developed by June 2015
5-6	Green Infrastructure Forum	Annually in May
5-7	Stakeholder Involvement and Education Strategy	Draft by September 30, 2014. Finalize Plan with input by December 31, 2015.
5-8	Overarching Green Infrastructure Educational Campaign	On-going.