GREEN INFRASTRUCTURE PROGRAM PROGRESS REPORT

August 1, 2013
(Fiscal Year July 1, 2012 – June 30, 2013)

DETROIT WATER AND SEWERAGE DEPARTMENT

PURSUANT TO REQUIREMENTS UNDER

NPDES PERMIT NO. MI0022802

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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 2012 - 2013. SEMCOG's 205j grant funding from the MDEQ continued to support efforts to facilitate progress on the development of DWSD's Green Infrastructure Program for part of this fiscal year. Ongoing activities have focused on continued discussions with City Departments and other agencies and jurisdictions. Concurrent with these activities, the city-wide 2012 Detroit Strategic Framework Plan has been completed. Initial planning for DWSD's green infrastructure is consistent with this frame work. This Annual Report is structured in the following manner:

- Green Infrastructure Program Collaboration that outlines overall partnerships and activities that support DWSD's program;
- Green Infrastructure Implementation in Fiscal Year 2012 – 2013 summarizes implementation activities; and
- Work Plan for Fiscal Year 2013 – 2014.

II. Green Infrastructure Program Collaboration

This section highlights general activities that have taken place in Fiscal Year 2012 – 2013 that directly affect the ongoing development of DWSD's Green Infrastructure Program.

SEMCOG Green Infrastructure Coordination

DWSD has contracted with SEMCOG to help facilitate various activities associated with the Green Infrastructure Program. This includes coordinating activities and various communications between departments, other jurisdictions and outside stakeholders. SEMCOG's ongoing coordination supporting the direction of DWSD's Green Infrastructure Program are listed as follows:

- Alliance of Rouge Communities to ensure integration of green infrastructure elements with the 319 Rouge River Watershed Management Plan;
- Detroit Economic Growth Corporation to understand process of land assembly and vacant properties;

- Environmental Protection Agency and Wayne State University to assist in site selection for their vacant property soil sampling research project;

- Southeast Michigan Green Infrastructure Team and overall implementation in the region;

- ERB Foundation and Detroit Works to coordinate overall green infrastructure activities in Detroit;

- Michigan Land Bank and Greening of Detroit to coordinate Vacant Lot Treatment Program, including issues related to property ownership;

- Lower Eastside Action Plan (LEAP) and Groundworks USA to collaborate on the green infrastructure program and transferability;

- Detroit Economic Growth Corporation and the Public Land Working Group to discuss the process for and prioritization of vacant land parcels for future assembly towards large scale greening efforts;

- Wayne County regarding Joy Road infrastructure collaboration.; and

- Grandmont Rosedale Development Corporation, Wayne County and the Rosedale-Grandomt Little League regarding Stoepel Park green infrastructure collaboration.

Additionally, SEMCOG drafted DWSD's Green Infrastructure Plan and coordinated a recent media event about the greening of the ten (10) vacant lots in the Rouge Cody area. Appendix A contains the media briefing, news release and a summary of the media coverage for the June 6th media event.

Greening of Detroit Green Infrastructure Contract

Performing services to DWSD under Contract CS-1546, Greening of Detroit has been a partner in the Green Infrastructure program since its inception. During this fiscal year, the organization was instrumental in installing trees, coordinating all downspout disconnection workshops, facilitating community engagement for the Vacant Lot Treatment Program and implementing greening treatments on vacant lots. These activities are discussed in more detail in this report.

Green Task Force: Water Subcommittee

City of Detroit Councilman Cockerel formed the Green Task Force that has a Water Subcommittee. DWSD and SEMCOG continue to attend these meetings throughout the year. Additionally, SEMCOG will be participating on the policy subcommittee. Earlier this year, the subcommittee established three working groups to promote policy, education and technology initiatives aligned with the Detroit Water Agenda, which are largely complimentary with DWSD initiatives in the Upper Rouge Tributary area.

Detroit Strategic Framework

The 2012 Detroit Strategic Framework completed its final recommendations and report this fiscal year. SEMCOG has routinely coordinated efforts with this process to ensure consistency between city-wide long-range decision making and DWSD's green infrastructure program.

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 goals.

Alliance of Rouge Communities (ARC)

DWSD 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 is in the process of assessing impervious areas for parcels in the city for purposes of assessing accurate stormwater fees. Billing for stormwater-only customers is expected in 2014. DWSD is considering green credit options to provide incentives for customers to invest in Green Infrastructure and reduce future runoff and stormwater charges. Several large customers have applied to the DWSD with proposals to reduce stormwater runoff into the combined sewer system in order to reduce their respective fees to DWSD. These proposals are being evaluated on a case-by-case basis.

Regional and National Conferences; Publications & Regulatory Agency Involvement

DWSD and SEMCOG have successfully partnered to submit abstracts to present papers at regional and national conferences regarding DWSD's Green Infrastructure Program. During Fiscal Year 2012 – 2013, DWSD presented at the following conferences:

- USGBC Greenbuild Conference November 2012 and
- 2013 MWEA Annual Conference June 2013.

Additionally, DWSD's Green Infrastructure Program was also discussed at local meeting groups as part of overall regional green infrastructure activities. These included:

- Regional GIS User's Group Meeting;
- Michigan Environmental Council Annual Southeast Michigan Meeting and
- 2013 Michigan Community Tree Seminar.

On the behalf of DWSD, SEMCOG also participated on a panel of experts as part of the Model D and MetroMode Speaker Series: Backyard to Big Picture in May 2013 that provided opportunity to highlight DWSD's green infrastructure efforts. This event took place at Lawrence Technological University and focused on various ways that green infrastructure is transforming the region.

Finally, SEMCOG partnered with Sanborn to publish a paper titled, "*Creating a Healthier Planet: From Smart Data Collection Planning to Effective Analysis and Implementation, regional planners in Southeast Michigan are enabling urban sustainability and green infrastructure*" in the Earth Imaging Journal. The focus of this paper was on SEMCOG's land cover analysis and processing, but also included a component about the use of the data in relation to DWSD's Green Infrastructure Program. See also Appendix B.

III. Green Infrastructure Implementation in Fiscal Year 2012 – 2013

This section summarizes this fiscal year's ongoing implementation efforts and provides an estimate of the runoff reduction benefits from these efforts. Implementation activities, including tree planting, demolitions and vacant lot greening are shown in Figure 1, below. Consistent with previous years, implementation primarily took place in the Rouge/Cody, Grandmont Rosedale and Brightmoor neighborhoods.
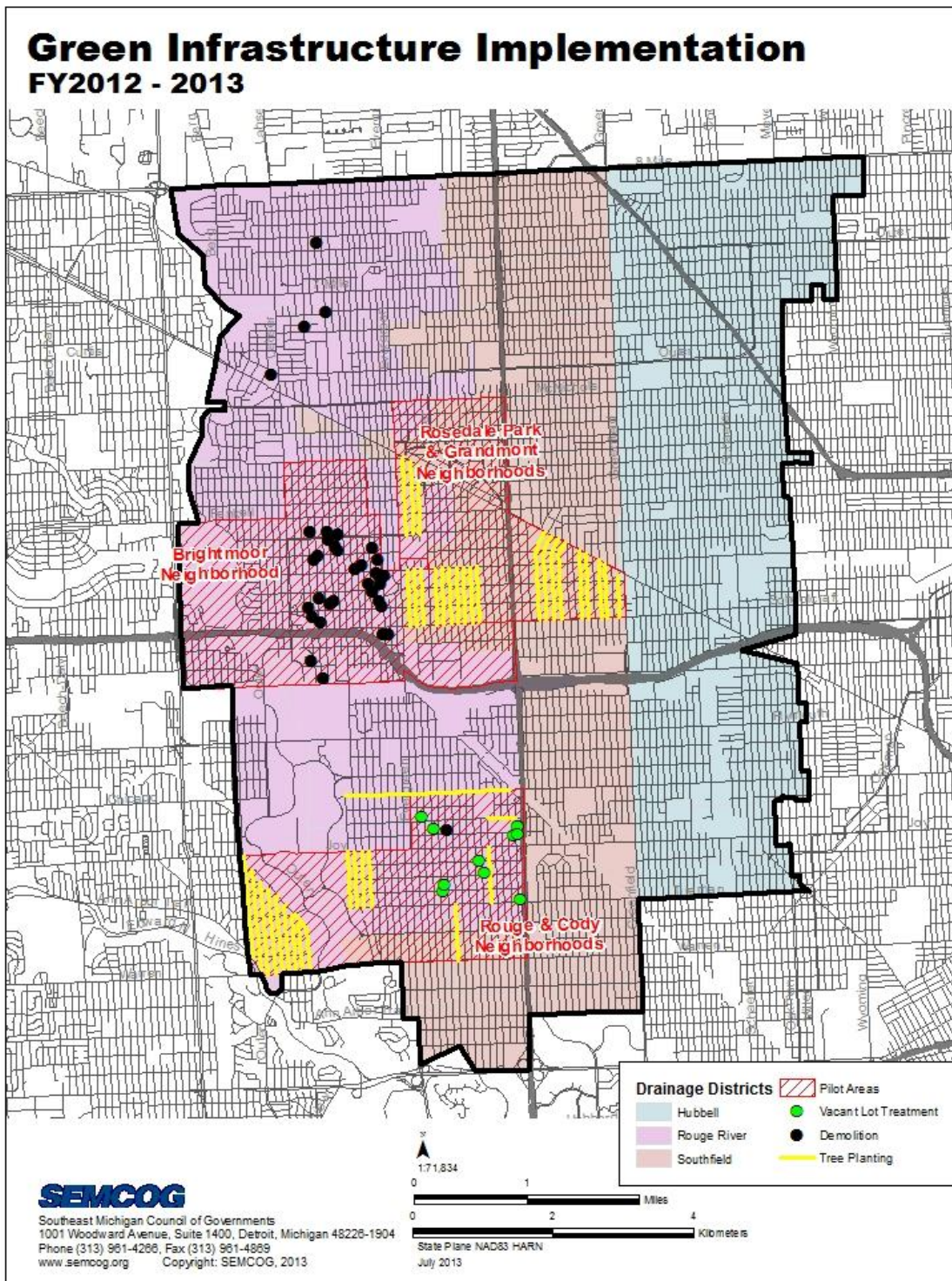
Figure 1. Green Infrastructure Implementation Locations

The neighborhood groups have been very active in providing assistance in identifying priority demolitions, participating in downspout disconnection workshops and public awareness and identifying tree planting locations. 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.

Tree Planting

Coordination with tree planting efforts across the CSO area includes the City of Detroit General Services Department and Greening of Detroit (GOD). Street tree planting is implemented within the road right-of-way between the sidewalk and curb along city and county roads and only in front of occupied homes. Trees are also planted in City parks. Greening of Detroit also provides one-year of after-planting care. The following list identifies the types of trees that were planted within the Upper Rouge Tributary 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.

Approximately 1,463 street trees were planted in the Fall 2012 and Spring 2013 within the Upper Rouge tributary area. Trees were selected based on species biodiversity, appropriateness for Southeast Michigan urban areas and interception/infiltration/evapotranspiration potential. As the tree canopy coverage increases, the rainfall interception rates will increase with a decrease in stormwater runoff entering the system.

Demolition and Greening Vacant Properties.

DWSD has been working with the Detroit's Buildings, Safety Engineering and Environmental Department (BSEED), to ensure appropriate follow-through and completion of the 140 demolitions identified in the June 2012 Green Infrastructure Annual Report. To date, BSEED has not completed these

demolitions; thus DWSD is actively pursuing completion by BSEED and alternative approaches to get this work accomplished in a timely manner

During FY 2012-2013, DWSD contracted with Michigan Land Bank (MLB) to complete twenty-five (25) demolitions on properties under MLB ownership. MLB is on schedule to have this work completed during the current summer season.

During Fiscal Year 2012 – 2013 DWSD also contracted with Greening of Detroit to restore ten (10) MLB vacant lots in the area of Cody Rouge. This Vacant Lot Treatment Program consisted of a community engagement process at the Cody Rouge Community Action Alliance Meeting. At this meeting, both site prioritization and selection of the "greening" alternatives for each of the vacant lots was determined. Appendix C includes a complete summary of the community engagement process. Additionally, the following elements are components of the draft agreement with MLB:

- DWSD will provide funds to MLB to implement the maintenance plan, potentially through a workforce development program;
- The agreement stays with the property even if property transfer takes place to ensure long-term sustainability;
- If the property is developed, the runoff reduction benefit shall be maintained; and
- The public may access the property and the property may be utilized for public education opportunities.

Downspout Disconnection

The program is currently being implemented with DWSD, Detroit Law Department, and BSEED. One step is ensuring the regulatory mechanisms align restricting downspouts to be connected (Currently, the antiquated City Code requires connection). While the City Law Department advised that a change of ordinance was not required, DWSD believes the change of ordinance is a necessary part of the program. First, it will align City regulations with state law thereby reducing confusion by City staff and the public. Second, it will more easily allow for enforcement through code enforcement unit.

While this change to the code is in process, DWSD has actively initiated a residential education and voucher program through the contract with Greening of Detroit in both the Rouge/Cody and Grandmont Rosedale neighborhood areas. DWSD via Greening of Detroit has hosted 44 workshops (between November 2012 and June 2013) on "how to" disconnect representing 211 households. Residents who attend the workshops are provided a voucher to pick up the materials at Greening of Detroit offices. One hundred sixty-five (165) vouchers for free materials (e.g., downspout elbow, extender, and plug) have

been redeemed by residents who have attended a workshop. A total of 642 residents have attended the 29 city-wide downspout disconnection educational sessions and 15 residents attended a workshop discussing installation of rain barrels as part of the downspout disconnect program. Runoff reduction estimates are provided in this report as an initial basis; however, inspections have not yet been completed to verify proper disconnection. See Table 1, *Green Infrastructure Program Financial and Runoff Reduction Summary*, on Page 10.

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 Joy Road was identified as an initial priority, the timing for other infrastructure projects along roads being rehabilitated is still being evaluated. SEMCOG completed traffic counts, has convened two meetings with Wayne County and achieved a general agreement that working collaboratively on the Joy Road infrastructure project could result in cost savings to both agencies. While achieving this general agreement is a large milestone, the timing between the federal funding for the road project and DWSD projects may not align. The technical and timing issues on this project will be resolved by DWSD's green infrastructure engineering consultant contract which has not yet been finalized.

Municipal Properties

Municipal properties include DWSD-owned properties, fire stations, police stations and DPW facilities. Stoepel Park #1 initially became a primary focus for evaluating municipal property green infrastructure opportunities. Many partners are involved with upgrading this park to serve as a focal point for neighborhood activities. Partners included not only departments within the City, such as the Recreation Department, but also included a commitment by Wayne County to construct a non-motorized path as well as private donations from local vendors. DWSD's interim green infrastructure consultant created a conceptual plan to evaluate runoff reduction opportunities. To date, this plan is still under review and will be further evaluated once contracting is complete with the new green infrastructure engineering consultant. The plan depicts opportunities for underground storage and infiltration with an annual runoff reduction of approximately 5.4 million gallons at an estimated cost of $2.7 million.

IV. Planning for Fiscal Year 2013 – 2014

Our work efforts for FY 2013 -2014 will be focused in 3 major areas. These 3 areas will be:

1) Finalize contract with GI consulting engineer and establish administration

2) Technical Issues

3) Execution of specific GI projects

Administration

DWSD is very close to selecting the consulting engineer. This has been a large effort for DWSD and extreme caution is being taken to ensure the best team for this effort is selected. After the contract is awarded, a framework of the project for the next 5 years and a detailed work plan will be developed.

Some of the administrative issues that need to be resolved include the following:

- Establish a tracking system for GI installations and runoff reduction;
- finalize agreement with the MDEQ on calculation methodologies;
- complete maintenance and deed restrictions for the greened vacant properties with Michigan Land Bank;
- establish policy and procedures for use by DWSD for green infrastructure installed in lieu of stormwater fees;
- determine how to incentivize and develop policies for loans or grants; and
- define the outreach program.

Technical Issues

The technical issues that need to addressed are types of GI for property types, how to measure the performance of installed GI, determine level of assistance for businesses and citizens, if any, develop the menu of GI installations for each specific application, and optimization of the implementation of downspout disconnection effort.

Execution of Specific GI Projects

Several efforts from previous years need to be completed and DWSD will target more tree planting and demolitions at a minimum for this FY. The following tasks will be undertaken this year:

1. Tree planting will take place in the Fall 2013 and Spring 2014. Locations and quantities will be determined at the coordination meetings.
2. Complete the 140 demolitions Commitment made in FY 2011-2012 report.
3. Complete the 25 MLB demolitions.
4. Continued implementation of the vacant lot greening program.
5. Make a final determination on the Joy Road reconstruction project and incorporating green infrastructure; a substitute or supplemental project may be conceived in FY-13-14 to augment similar green road and pedestrian friendly streets.
6. Pilot improved methods of deploying downspout disconnection.

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: Cumulative Expenditures and Benefits

A consistent message regarding green infrastructure is the fact that it is typically designed to manage smaller rain events up to the 2-year; 24-hour event. Using the same Curve Number Method methodology since the inception of this program, an approximation of the runoff benefits for the tree planting, twenty-five (25) demolitions, ten (10) vacant property treatments and one hundred sixty-five (165) residential lot downspout disconnections is 78,600 gallons. The cumulative runoff reduction estimate for the green infrastructure program to-date is 454,400 gallons.

Additionally, Table 1. *Green Infrastructure Program Financial and Runoff Reduction Summary,* below, describes the budgeted or expended dollars for the activities described in this report and funded through DWSD. Program funding expended during Fiscal Year 2012-2013 was $808,536. Based on the previous two annual reports, the cumulative expenditures for green infrastructure implementation are approximately $2,518,325. These costs are based only on the costs expended each fiscal year and do not include life cycle costs which will be determined as the GI program matures.

Table 1. Green Infrastructure Program Financial and Runoff Reduction Summary

Green Infrastructure Implementation Activity	FY 2010-11	FY 2011-12	FY 2012-13	Cumulative Expenditures	Cumulative Estimated Runoff Reduction (gallons)[3]	Cost/ Gallon
Demolition	N/A	$ 1,200,000	$ 250,000	$ 1,450,000	406,300	$4
Tree Planting[1]	172,000	$172,000	$172,000	$516,000	9,000	$57
Downspout Disconnection[2]	N/A	N/A	$221,640	$221,640	28,400	$8
Vacant Lot Greening	N/A	N/A	$25,000	$25,000	10,700	$2
Planning (SEMCOG, Stoepel Park Concept)	N/A	$40,789	$64,896	$105,685	N/A	N/A
Staff	$50,000	$75,000	$75,000	$200,000	N/A	N/A
Totals	$222,000	$1,487,789	$808,536	$2,518,325	454,400	$6

N/A = not applicable

[1]Tree planting estimates converted from annual reduction to that based on 2-year; 24-hour event. This is based on initial tree canopy area which increases annually. The annual increase is not included as part of this estimate.

[2]Downspout disconnection based on 165 vouchers redeemed. Inspections have not yet been

completed to verify disconnection.

[3] Estimated runoff reduction based on TR-55 methodology.

[4]The final $6/gallon represents an overall cost given all planning and implementation costs and techniques implemented.

MEDIA SUMMARY ON VACANT LAND TREATMENT PROGRAM: BRIEFING; NEWS RELEASE & SUMMARY OF COVERAGE

Vacant Lot Treatment Program
8601 Brace Street, Detroit
Media Briefing, June 6, 10 a.m.
Run of Show

Opening remarks begin between 10 and 10:15

Welcome to the Cody Rouge Neighborhood   3-4 Minutes

- **Rodney Gasaway**, Director of Community Development at Joy-Southfield Community Development Corporation

DWSD's commitment to green infrastructure   6-8 minutes

- **Sue McCormick**, Director of Detroit Water and Sewerage Department

Program implementation   5 minutes

- **Rebecca Salminen-Witt**, President of The Greening of Detroit
- Briefly explain treatment at Brace lot

Community impact   3-4 minutes

- **Kenyetta Campbell**, community activist in Cody Rouge, will talk briefly about how the repurposed vacant lots revitalize and stabilize the neighborhood.

Collaboration and tomorrow's Detroit   3-4 minutes

- **Heidi Alcock,** Detroit Future City – aligning with the strategic framework

Thank everyone for coming

Contact: Mary P. Alfonso, DWSD

Phone: (313) 964-9477

Mobile: (313) 999-2753

sevakis@dwsd.org

trish@greeningofdetroit.com

Contact: Trish Hubbell

The Greening of Detroit

Phone: (313)285-2255

Mobile: (313) 729-6109

The Greening of Detroit installs green infrastructure land treatments on 10 vacant lots

Detroit Water and Sewerage Department kicks off vacant lot greening program

Detroit, June 6: The last of 10 blighted, vacant lots owned by the Michigan Land Bank was treated with green infrastructure today. The Detroit Water and Sewerage Department (DWSD), The Greening of Detroit, and the Southeast Michigan Council of Governments (SEMCOG) are partnering on a pilot project to transform 10 vacant residential property lots in the city's Cody-Rouge neighborhood into greener, healthier public spaces. The primary goal of the green infrastructure initiative is to reduce the amount of storm water entering the sewer system, but the additional benefits of neighborhood stabilization, improved property values, better air quality, and beautification are significant.

"We at DWSD believe in increasing green infrastructure in the city," said DWSD Director Sue F. McCormick. "Green projects help divert runoff from going into the combined sewer system, and that could reduce costs that are passed on to our customers.   The project in the Cody Rouge neighborhood is one of the first steps in a multi-year greening program at DWSD. We're excited about its potential."

The Greening of Detroit is collaborating with Cody-Rouge neighborhood residents and community groups to transform vacant residential lots into natural, low-maintenance spaces that will become neighborhood assets.

Community residents were engaged in the process of selecting one of four low-maintenance treatment plans for each location: a low-grow prairie grass; a perennial wildflower mix; a rye grass and wildflower combination; and tree planting. The community voted on plans for each of the 10 properties.

"This pilot project will demonstrate how the use of natural seed mixes can help absorb more rain water, stabilize property values, and decrease maintenance costs associated with vacant land across the city of Detroit," said Dean Hay, director of Green Infrastructure at The Greening of Detroit.

Repurposing vacant land in ways that add economic, environmental, and social benefits to Detroiters is part of the vision laid out in the Detroit Future City strategic framework introduced in January. The Greening's Vacant Lot Treatment Program is an example of community engagement and successful collaboration among multiple community, nonprofit, and municipal partners.

"Partnerships are essential for making green infrastructure work in our region and the City of Detroit. Including the neighborhood in determining the types of green infrastructure, along with support from the state, nonprofits, and the city is a winning combination for long-term success of this program." said Amy Mangus, Manager of Environmental Programs at SEMCOG.

"The type of partnership developed between public agencies and a local non-profit to execute this important project is indicative of- the formula needed to successfully implement the recommendations within the strategic framework," said Dan Kinkead, the Director of Detroit Future City. "Together they used the framework to guide their approach to effect change in the Cody-Rouge neighborhood; each using their particular strength to achieve the larger goal of improving the quality of life in Detroit and creating a more environmentally and fiscally sustainable city."

Treatment plans provide beautiful flowers, reduced maintenance, and natural habitats for birds. Trees cleanse the air by intercepting airborne particles, reducing heat, and absorbing pollutants such as carbon monoxide, sulfur dioxide, and nitrogen dioxide. Those treatments are also part of a larger urban ecosystem, creating a healthier urban environment over all.

The Greening of Detroit is a nonprofit organization committed to inspiring sustainable growth of a healthy urban community through trees, green spaces, food, education, training and job opportunities.

DWSD supplies high-quality drinking water to Detroit and 127 other communities in southeast Michigan. The Department provides wastewater services to Detroit and 76 other southeast Michigan communities.

SEMCOG, the Southeast Michigan Council of Governments, is the only organization in Southeast Michigan that brings together all governments to solve regional challenges and enhance the quality of life for the seven-county region's 4.7 million people

# # #

Media coverage on Vacant Land Treatment Program

June 6 media event

Detroit Unspun – Detroit Regional News Hub
http://blog.thedetroithub.com/2013/06/08/detroit-vacant-lots-transformed-and-revitalized-in-cody-rouge-community/

Detroit Free Press
http://www.freep.com/article/20130608/BUSINESS06/306080014/Detroit-Greening-of-Detroit-green-infrastructure

Deadline Detroit
http://detroitworksproject.com/2013/06/09/the-future-detroit-took-root-thursday-in-one-small-lot-at-van-buren-and-brace/

DBusiness Magazine
http://www.dbusiness.com/DBusiness/May-June-2013/The-Greening-of-Detroit-Installs-Green-Infrastructure-Land-Treatments/

CBS Channel 62
http://detroit.cbslocal.com/2013/06/06/group-transforms-vacant-detroit-lots-into-nature-areas/

MLive
http://www.mlive.com/news/detroit/index.ssf/2013/06/low-cost_fix_for_detroits_drai.html

WWJ – radio interviews

WDET – radio interviews

Channel 4
http://www.clickondetroit.com/news/trees-planted-on-west-side-in-effort-to-create-greener-detroit/-/1719418/20457608/-/11vjmaaz/-/index.html

Video Blog
http://vimeo.com/67925049

Crains

http://www.crainsdetroit.com/article/20130613/BLOG112/130619921/greening-detroit-working-to-clean-up-the-blue

APPENDIX B

EARTH IMAGING JOURNAL ARTICLE

The hexagonal diagram shows topics: Climate Change, Wildfires, Air Quality, Green Space Planning, Renewable Energy, Water Conservation, Storm Water Runoff, Smart Growth, Water Quality.

Creating a
Healthier Planet

From smart data-collection planning to effective analysis and implementation, regional planners in Southeast Michigan are enabling urban sustainability and green infrastructure.

*By Sudha Maheshwari, Sanborn (*www.sanborn.com*), Colorado Springs, Colo., and Ann Burns and Amy Mangus, Southeast Michigan Council of Governments (*www.semcog.org*), Detroit.*

U rban sustainability involves a plethora of important issues confronting urban managers and planners, from climate change and air and water quality to stormwater management, flooding and many other interrelated social and environmental issues. Such issues force decision makers to balance the economic, environmental and societal outcomes of any action.

As a result, urban sustainability is prompting decision makers and planners to look more holistically at interrelated phenomena and focus on multiple goals instead of one outcome. Developing sustainable solutions to address complex urban issues requires urban managers to plan ahead to collect the right data, analyze the data to evaluate various scenarios, and implement policy and actions to make changes based on

the analysis. The Southeast Michigan Council of Governments (SEMCOG) is using this framework to develop more sustainable solutions to create a healthier planet.

Grant Enables Urban Sustainability

SEMCOG is the regional planning agency for a 4,500-square-mile area, encompassing seven Michigan counties comprising 4.7 million people. As the designated regional water quality management agency under the Clean Water Act, SEMCOG has been engaged in environmental activities for more than 40 years.

The last comprehensive land cover update for the region was performed in the 1980s. With local implementation activities related to habitat restoration, low impact development and natural resource preservation on the rise, there was no doubt that an update of the land cover data was

needed to assist in planning and implementation efforts. The venture was cost-prohibitive during an economic recession, but the problem was solved when SEMCOG secured a grant through the Housing and Urban Development (HUD) Sustainable Communities Regional Planning Grant (see *http://portal.hud.gov/ hudportal/HUD?src=/program_offices/ sustainable_housing_communities/ sustainable_communities_regional_ planning_grants program*).

There was no doubt that an update of the land cover data was needed to assist in planning and implementation efforts.

The purpose of SEMCOG's grant-funded project was to develop a green infrastructure vision to benchmark the agency's current level of land cover and envision a new region that includes greening as a critical element. Specific tasks included:

• Benchmarking green infrastructure by developing a green infrastructure coverage map based on existing 2010 aerial imagery.

• Envisioning the future through planning sessions with stakeholders, assessing green infrastructure benefits and opportunities, and setting targets/metrics.

• Developing recommendations on how to implement the vision.

The project involved collecting data, analyzing the data with tools such as American Forests' CITYgreen land-use planning software and Esri's ArcGIS geographic information system software, and implementing appropriate and best management practices based on data analysis.

Planning Efficient Data Collection

SEMCOG sought vendors to develop a land cover dataset that could meet the grant's requirements as well as the SEMCOG community's greater needs. The Sanborn Map Company won the project based on its expertise and past experience with similar data and analysis.

The land cover layers created through the project consisted of a suite of products/thematic layers:

• Land cover data
• Tree canopy data
• Building footprint data
• Composite data

For land cover data, the five-class classification of SEMCOG 2010 imagery—impervious surface, open space, trees, urban:bare and water—encompassed urban and rural areas. The urban areas were mapped with a 0.025-acre minimum mapping unit (MMU), and the rural areas were mapped with a 0.25-acre MMU.

The classification also covered 873 square miles of area previously mapped by Sanborn through separate contracts with the Alliance of Rouge Communities, the Alliance of Downriver Watersheds, the City of Detroit and Shelby Township. In these areas, a change detection methodology was used instead of reclassifying the full area. The two methodologies produced a consistent and seamless dataset. The approach leveraged previous work and provided the most cost-effective, efficient way to create the data.

Because the land cover data were derived using leaf-off imagery, the dataset didn't include the canopy's full extent. To delineate the entire canopy, 2010 National Agricultural Imagery Program (NAIP) imagery was used to classify a full canopy dataset comprised of binary data (canopy/noncanopy). Combining full-canopy and full-impervious data using the leaf-on and leaf-off imagery allows users to model full canopy over impervious or vice versa.

For building footprint data, vector polygons were captured through heads-up digitizing in a 2-D environment. Each polygon/footprint was tagged with an estimated height using light detection and ranging (LiDAR) data processed separately for each county. In addition, the building footprints were leveraged for the land cover data to prioritize impervious over canopy in that dataset.

Testimonials Confirm
SEMCOG Data's Value

Multiple stakeholders are benefitting from SEMCOG's land cover data development efforts.

"In our work at the Clinton River Watershed Council, we're using SEMCOG's new land cover data to help us bring landscape-level green infrastructure concepts down to the neighborhood and site level. The data allow us to assist communities to quantify green infrastructure, model runoff and set realistic, site-specific goals and targets into local communities in a way that wasn't possible before the data became available."
— *Nina Ignaczak, watershed planner, Clinton River Watershed Council*

"St. Clair County has used the SEMCOG data to identify driveway locations to improve address location tools. The ability to cross reference existing buildings with driveway locations is extremely beneficial in finding areas where field crews and first responders may have difficulty. The process to collect address points was already in progress; spatial queries against the new datasets have been great timesavers. The building footprints have been used to assist local fire departments when looking to validate mutual aid contracts and adjust service areas. With the ability to quickly count and quantify building characteristics, first responders have been able to better estimate the impact of changing districts. As we continue to strive to achieve more results on a shrinking budget, baseline datasets such as these are extremely valuable."
— *Trevor Floyd, GIS analyst, St. Clair County*

"We've used the building footprints with several applications. We just received preliminary Digital Flood Insurance Rate Maps (DFIRMS) from the Federal Emergency Management Agency. Having the building footprints enabled us to measure the impact on the community. There are several factors that determine whether a house is in or out of a flood hazard area, location only being one of them. However, being able to compare the current DFIRMS with the preliminary DFIRMS, using the building footprints, we were able to notify the municipalities of a negative or a positive impact and highlight areas of concern that might receive an extreme impact from the preliminary study."
— *Jeffrey S. Boudrie, GIS specialist, Monroe County Planning Department*

Quantifying Economic Impacts
Analysis Process Flow
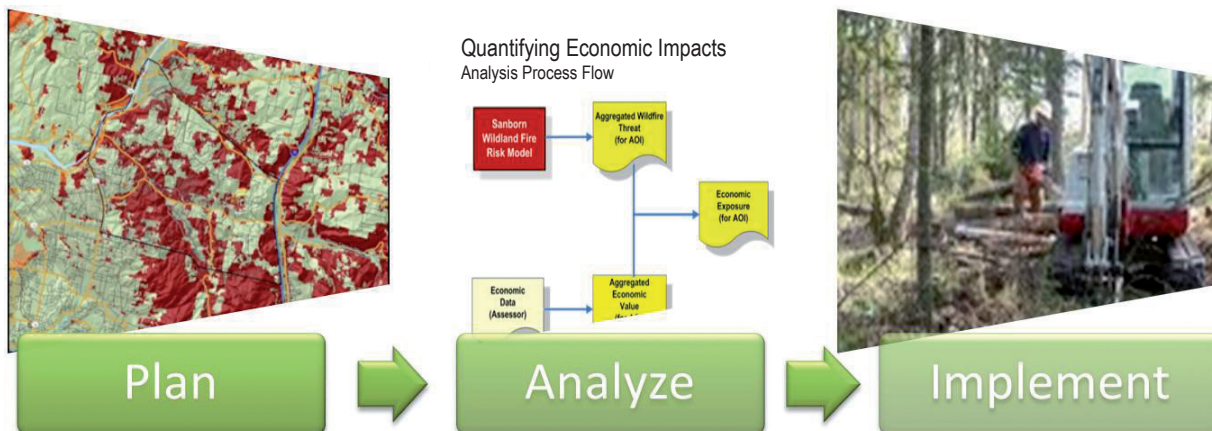
The project involved planning data collection, analyzing the data, and implementing appropriate and best management practices based on data analysis.

Land Cover Type	Tributary Area (acres)
Impervious Cover: Buildings	3,112
Impervious Cover – Paved: Drains to Sewer	8,778
Open Space – Grass/Scattered Trees	4,706
Trees with Grass/Turf Understory > 75%	647
Trees with Grass/Turf Understory 50-75%	5,230
Trees with Impervious Understory	1,212
Urban: Bare (dirt)	301
Water	24

	Acreage	% of total acreage in the Tributary Area	Runoff volume (2-yr; 24-hr) MG	% of total runoff in the Tributary Area
Residential	10,813		391	
Roads	6,684		283	
City Parks (open and closed)	2,639	90%	78	88%
City Vacant (TE)	300		8	
State and Wayne County Vacant Land	267		7	
Vacant Non-Tax Exempt	820		22	
Commercial	883		41	
Industrial	992		47	
Institutional (Churches/Universities)	354	10%	14	12%
Hospital and Medical	42		2	
Civic	17		1	
State and Federal Buildings	7		0	
Totals	**23,818**		**893**	

The aforementioned datasets were combined to create a composite dataset that could be input into the CITYgreen software to provide the most suitable green infrastructure assessments. All work for the land-cover data was performed in a raster environment, but final deliverables included raster and vector data. The vector data were created from raster data through a raster-to-vector conversion process using smoothing algorithms. Work for building footprint data was done in a vector environment.

Analysis Benefits Multiple Stakeholders

The collected data already have been used for several analyses at SEMCOG and the Detroit Water and Sewerage Department
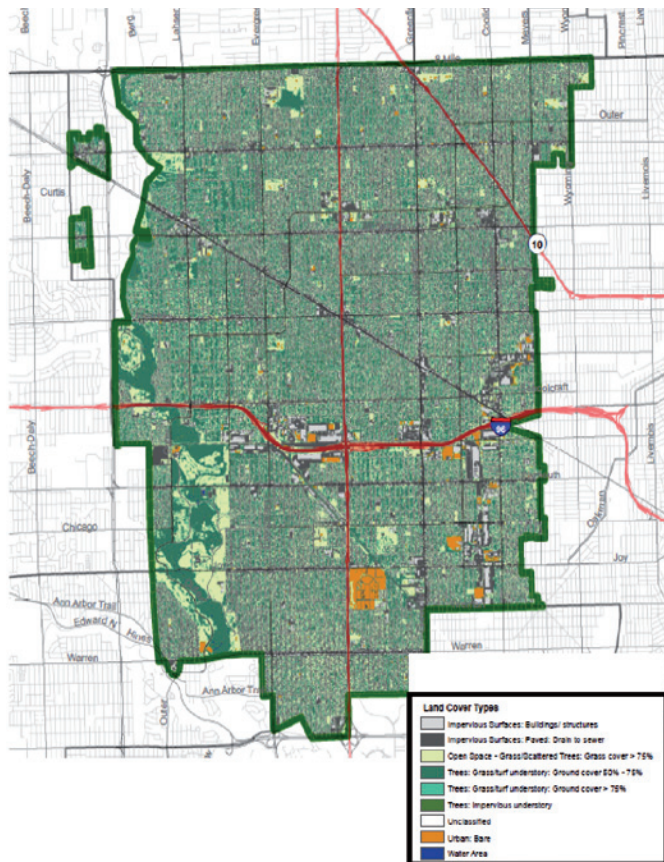

Land use was overlaid with land cover to help DWSD determine the land uses with the most opportunity to increase green infrastructure.

(DWSD). Additional analyses are highlighted in "Testimonials Confirm SEMCOG Data's Value," page 41.

DWSD Stormwater Goals

SEMCOG used the land cover data to develop a green infrastructure strategy to help DWSD meet its combined sewer overflow permit requirements. The plan sets the stage for a 2.8 million gallon reduction in stormwater volume into the city's sanitary sewer system through the use of green infrastructure.

SEMCOG used the land cover data to determine the stormwater runoff benchmark for DWSD's 37-square-mile tributary area. The tables above summarize the acreage of land cover based on the area's SEMCOG Composite Dataset.

Next, as shown in the figure at left, land use was overlaid with land cover to determine the land uses with the most

This set of activities is just one example of how geographic data and tools are being used by successfully by decision makers to enable a more sustainable world.

opportunity to increase green infrastructure. This process illustrated that land use areas with the most opportunity for runoff reduction included vacant land (public and private), roadways, and residential and municipal properties (municipal buildings, parks and schools).

This information, along with priority sewersheds and vacancy rates, was used to develop scenarios for the top land use opportunities. For example, vacant land was identified at the parcel level, along with local roadways. A total volume reduction was quantified based on implementing the scenario over a 20-year timeframe and a pilot implementation to meet the 2.8 million gallon reduction requirement by 2017.

SEMCOG Long-Range Transportation Plan

As part of the development of a 2040 Long-Range Transportation Plan, SEMCOG used tree canopy information as an input

into the federal requirement to analyze potential impacts of proposed transportation projects on environmentally sensitive areas. This analysis is shared with transportation agencies along with suggested guidelines to mitigate the project's impacts on environmental resources.

Implementation and the Road Ahead

Because SEMCOG's three-year HUD grant extends until 2014, several policies and implementation-related activities are still in the works. For example, SEMCOG is in the process of developing a green Infrastructure vision for Southeast Michigan.

To date, the land cover information has been benchmarked by region, counties and watershed, as shown in the chart below. The benchmarking also included the amount of land cover included in each land use category. SEMCOG will use the information to identify areas where green infrastructure opportunities can be increased. Similarly, using CITYgreen software, the region's stormwater runoff and air quality carbon sequestration has been benchmarked.

This summer, visioning sessions will be held to gather additional input beyond the program's 50- person task force to
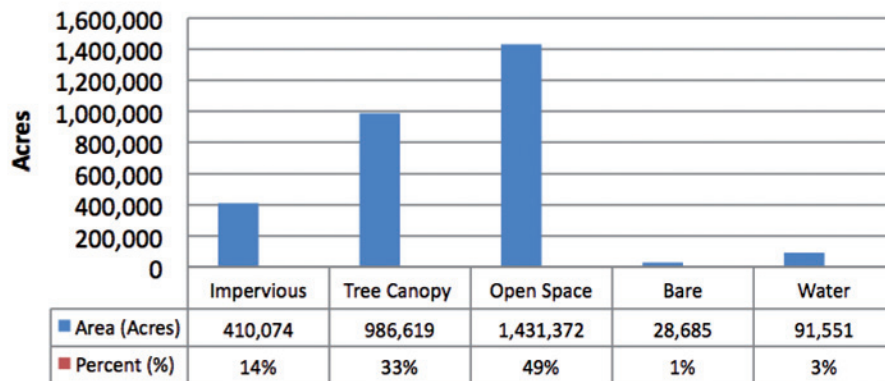
determine where green infrastructure should be added and what kind it should be. For example, green infrastructure can range from additional buffers around highly sensitive areas to adding bioswales along high-volume roadways.

In addition, these sessions will set the stage for developing recommendations on how to implement the vision. The recommendations will contain metrics and actions to achieve the metrics. For example, the regional tree canopy is 33 percent. A metric could be to raise this to 40 percent as a region. Actions could include continued funding of street tree plantings through state grants and private donations as well as from regional utility companies.

The vision will be completed and set for adoption by the SEMCOG General Assembly in the spring of 2014. This set of activities, which started with data collection, moved to data analysis and culminated with data-based action, is just one example of how geographic data and tools are being used successfully by decision makers to enable a more sustainable world. ⧉

Authors' Note: Thanks to Kelly Karll at SEMCOG for her assistance with this article.

Land Cover in Southeast Michigan

	Impervious	Tree Canopy	Open Space	Bare	Water
■ Area (Acres)	410,074	986,619	1,431,372	28,685	91,551
■ Percent (%)	14%	33%	49%	1%	3%

APPENDIX C

COMMUNITY ENGAGEMENT for VACANT LOT TREATMENT
PROGRAM

**Cody Rouge Vacant Land treatment Program
Important information!**

Dear Cody Rouge Resident,

In spring 2013, The Greening of Detroit is implementing a community-based Vacant Land Program to repurpose vacant land in Detroit. This program collaborates with landowners and the community to transform vacant land into natural, low maintenance spaces that are seen as assets to the neighborhood.

We will be transforming 10 Michigan Land Bank-owned vacant lot properties, in partnership with Detroit Water and Sewerage Department, with a tree planting or natural seed mix. The purpose of the project is to improve the appearance of the vacant lots and increase neighborhood stabilization.

On Tuesday March 18th, the community voted to prioritize vacant lots and treatments during our first phase for spring 2013. The community voting results from The Cody Rouge Community Action Alliance meeting ballots are tallied below!

There were nine vacant lots and four vacant land treatments on the ballot. Residents could choose from up to five lots and five of the following treatments: Rye and Flower Mix (Fig. 1), Low Grow Prairie (Fig.2), Perennial Wildflower Mix (Fig. 3) or Trees (Fig.4) at the meeting. Please see the voting results and implementation ranking below.

fig. 1   fig. 2   fig. 3   fig. 4

Vacant lots north of Joy Rd.	Winning Treatment	Votes	Implementation ranking: 1-9
Lot #8: 8898 Ashton	Perennial Wildflower Mix	10	1
Lot #7: 8883 Ashton	Trees	4	2
Lot #2: 9223 Auburn	Low Grow Prairie	9	3
Lot #3: 9048 Minock	Perennial Wildflower Mix	6	4
Lot #9: 9046 Ashton	Low Grow Prairie	8	5
Lot #1: 19553 W. Chicago	Trees	10	6
Lot #5: 8821 Minock	Perennial Wildflower Mix	10	7
Lot #6: 8851 Rosemont	Trees	6	8
Lot #4: 9043 Minock	Rye & Flower Mix	8	9

These lots will be implemented based on how easily they can be converted at this time. Lots with structures or fences will not be planted during the first phase but will be prioritized for implementation in phase two.

We are following up with the community to present these voting results, asking for feedback and are scheduled to begin vacant lot conversions on the five lots that are ready to be converted (highlighted in blue

above) in April 2013. We will also be planting five lots south of Joy Road. Below are the recommended treatments for these lots. <mark>**Please give us your feedback as we move forward on these.**</mark>

Vacant lots south of Joy Rd.	Applicable Treatment
#1: 8018 Ashton	Low Grow Prairie
#2: 8641 Ashton	Low Grow Prairie
#3: 8090 Warwick	Rye and Wildflower
#4: 8601 Brace	Trees
#5: 8412 Brace	Trees

Please see the treatment map below for physical treatment locations

Cody Rouge Vacant Land Treatment Program
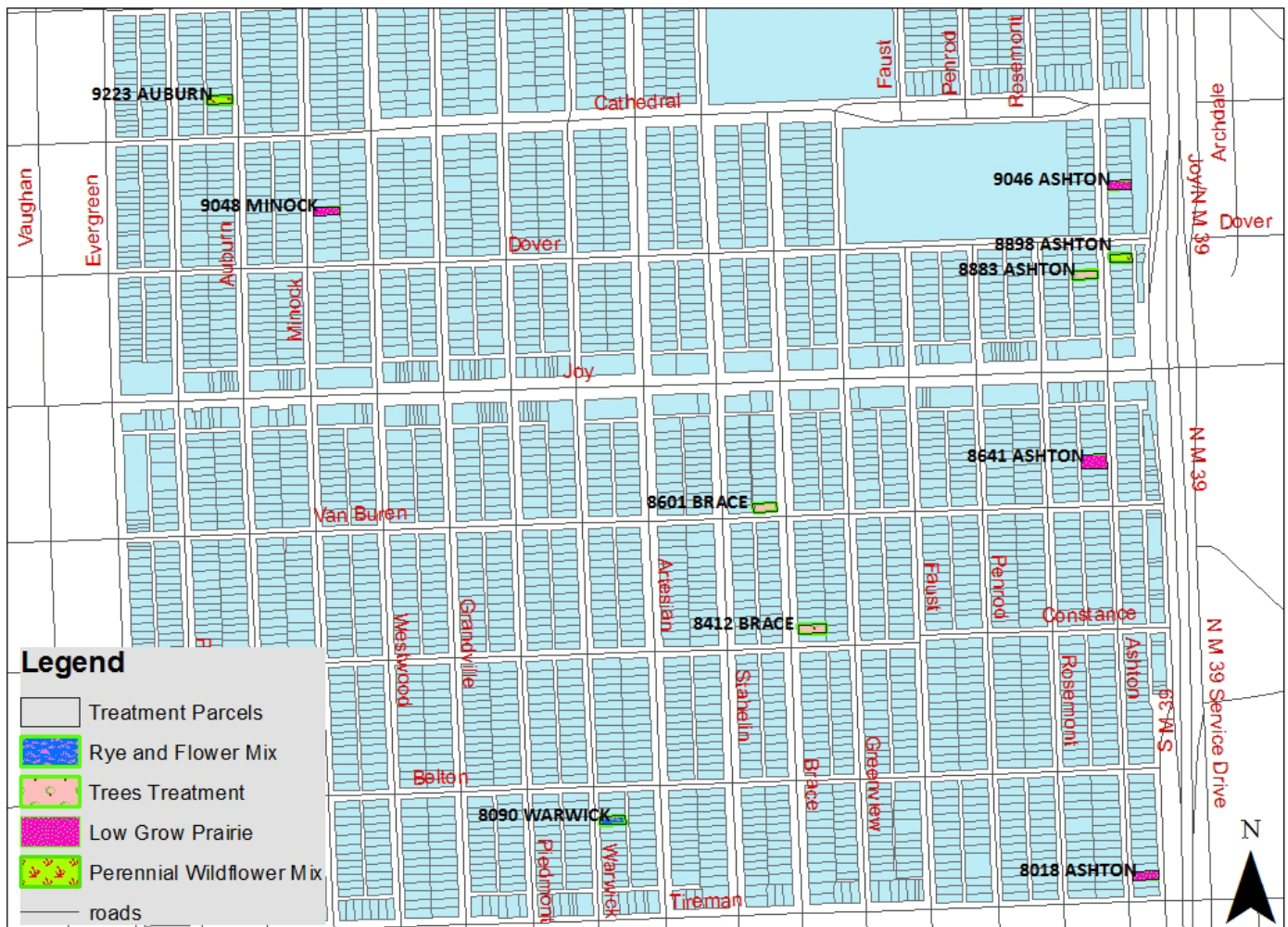
If you have questions, comments, or would like to be more involved, Please call Jay Biernat, Greening of Detroit Vacant Land Manager at 313-285-2260 or email him at jay@greeningofdetroit.com .

Thank you for your participation in helping us transform the vacant land in your neighborhood.

Sincerely,

Jay Biernat