Metropolitan St. Louis Sewer District

CSO Volume Reduction

Green Infrastructure

Pilot Program

Presented by: Susan McCrary, P.E.

Outline

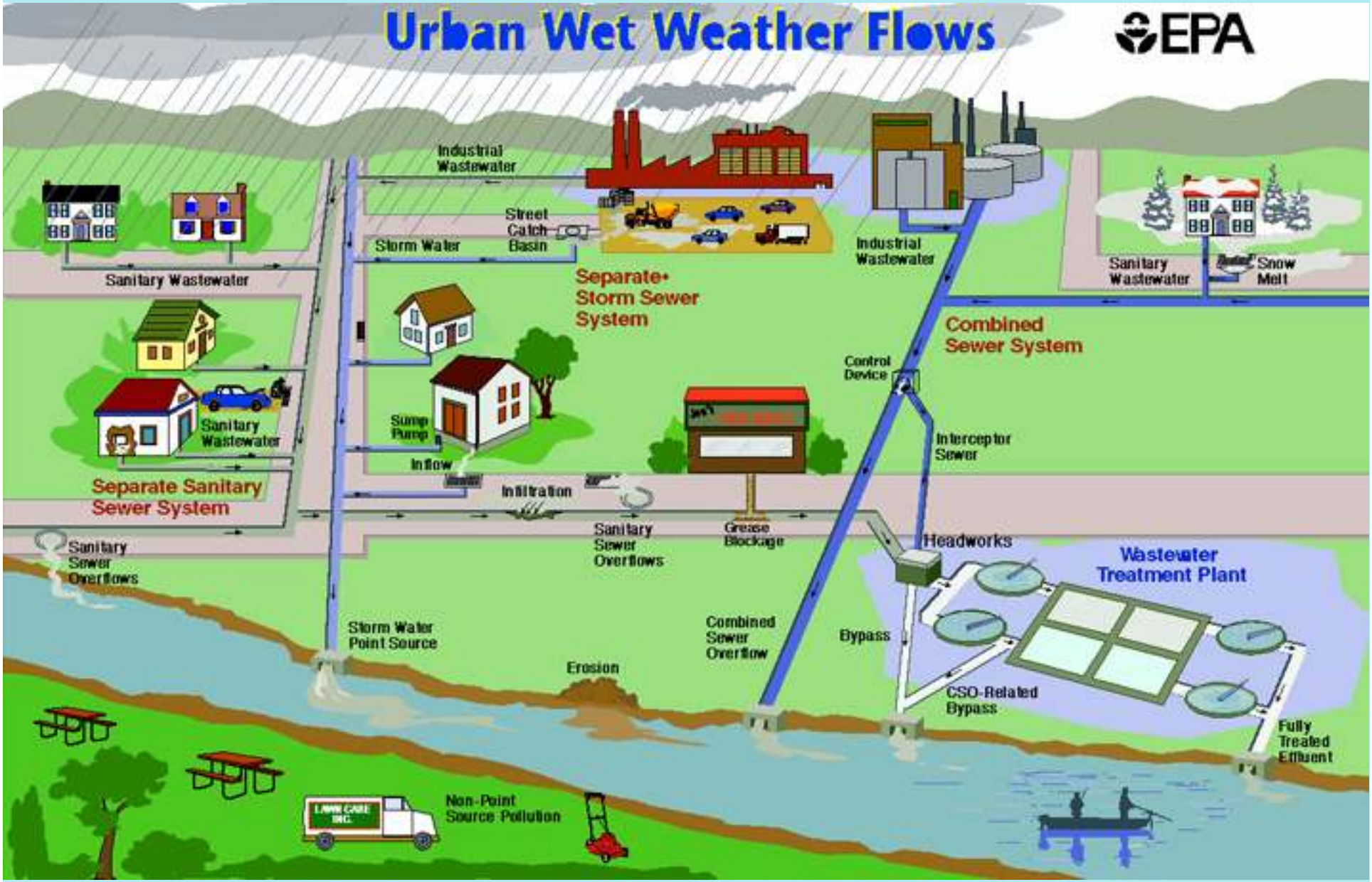
- Definitions:
  - MSD
  - Combined Sewer Overflow
  - Green Infrastructure
- MSD's CSO Volume Reduction Green Infrastructure Pilot Program
  - Background
  - MSD/LRA Partnership
  - Project Types

Outline

- MSD's CSO Volume Reduction Green Infrastructure Pilot Program (cont.)
  - Development/Maintenance Agreements
  - How's it Going So Far?
  - Anticipated Schedule
  - The $97 Million Question

MSD Fun Facts

- Sanitary and Storm services for 1.4 million people in the St. Louis metro area
- Processes more than 330 million gallons of wastewater every day
- 4,741 Miles of Sanitary Sewer
- 1,928 Miles of Combined Sewer
- 2,961 Miles of Storm Sewer
- Fourth largest sewer system in US


Urban Wet Weather Flows
EPA
Industrial Wastewater
Street Catch Basin
Storm Water
Sanitary Wastewater
Separate Storm Sewer System
Industrial Wastewater
Sanitary Wastewater
Snow Melt
Combined Sewer System
Control Device
Sump Pump
Inflow
Sanitary Wastewater
Interceptor Sewer
Separate Sanitary Sewer System
Infiltration
Sanitary Sewer Overflows
Grease Blockage
Headworks
Wastewater Treatment Plant
Sanitary Sewer Overflows
Storm Water Point Source
Combined Sewer Overflow
Bypass
Erosion
CSO-Related Bypass
Fully Treated Effluent
Non-Point Source Pollution

MSD Separated/ Combined Sewer Areas

What is Green Infrastructure?

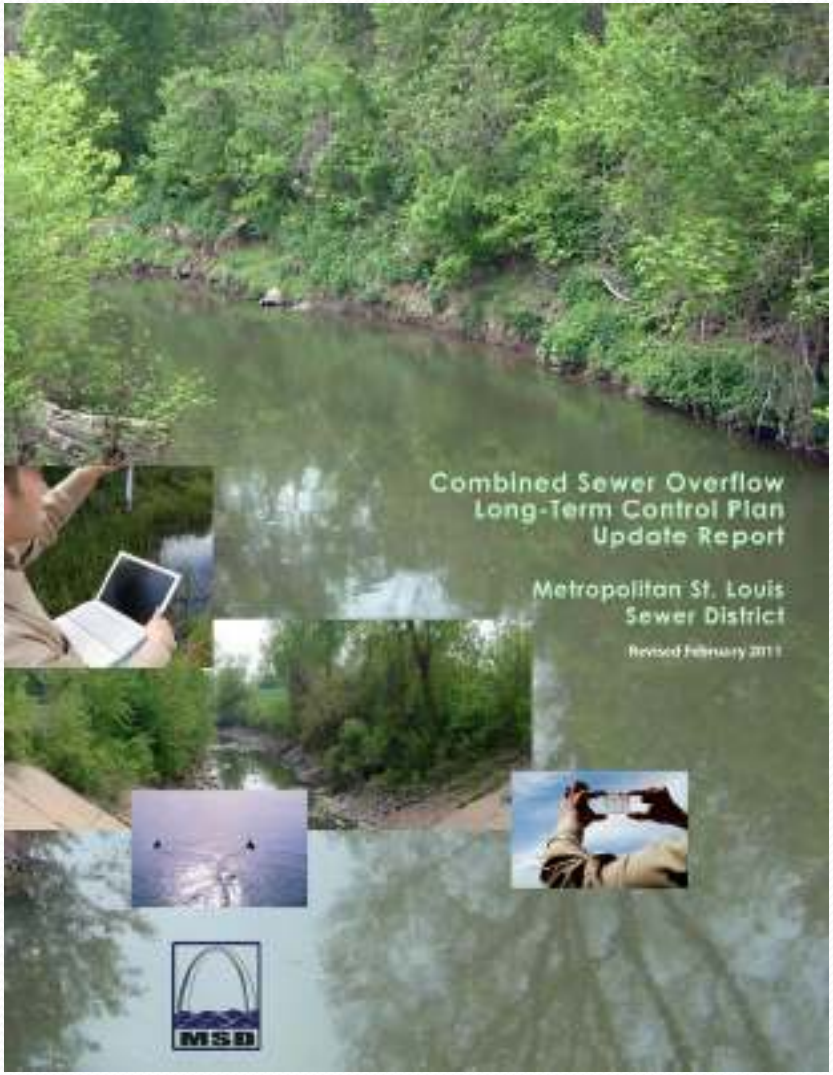
- Green infrastructure (GI) refers to **stormwater management practices** or facilities that reduce the volume, rate or pollutant load of runoff leaving a property
- Usually, detain runoff so that it may be slowed down, filtered, infiltrated into the ground, evaporated, taken up by plants, and/or reused
- Many are literally green with vegetated areas on the surface
- Some are figuratively "green" because of the environmental benefits, such as pervious pavement
- Other common terms are stormwater best management practices (BMPs) and Low Impact Development (LID)

What is Green Infrastructure?

- There are MANY types of green infrastructure best management practices (GI BMPs) including:
  - Bioretention cells and raingardens
  - Amended soil
  - Pervious pavements
  - Wet ponds and constructed wetlands
  - Tree trenches and native plantings
  - Planter boxes and rain barrels
  - Green or blue roofs
  - Rainwater harvesting

Background

- **MSD's Long Term Control Plan (LTCP)** is a document that outlines how MSD is reducing combined sewer overflows (CSOs). It can be found on MSD's website at: www.stlmsd.com/educationoutreach/bestpractices/combinedseweroverflow



Background

- The LTCP includes a Green Infrastructure program aimed at reducing CSO volumes for the CSOs along the Mississippi River (mainly Bissell Point wastewater treatment plant service area)
- Total commitment of $100 Million for Green Infrastructure over a 23-year period in the area that drains to these CSOs (Bissell Point Treatment Plant service area)
- **GOAL – Use Green Infrastructure practices to reduce the volume of CSOs by reducing the volume of stormwater that goes into the combined sewer system**

Background

- The Green Infrastructure program includes a $3 million, 5-year pilot program to work through logistical and technical challenges. The knowledge we gain will help us be more successful in the full implementation of the Green Infrastructure Program
- The pilot program will result in a report to EPA outlining what was done, what we learned, and how we propose to conduct the full Green Infrastructure Program
- Detailed information on the Green Infrastructure components of the LTCP can be found in **Chapter 12 and Appendix Q** of the document

Pilot Program Focus Area

Generally "North City"

- North of I-64
- City of St. Louis
- Bissell Point Waste Water Treatment Plant Service Area (area contributes to CSOs along the Mississippi River)

Background

- A major constraint to any green infrastructure program is to find willing property owners for locating GI BMPs
- The Land Reutilization Authority (LRA) is one of the City of St. Louis' economic development authorities and owns approximately 10,000 vacant and abandoned properties, most of which are within the area targeted for the Green Infrastructure Program
- MSD and the LRA felt they have a great opportunity for partnership!

MSD/LRA Partnership

- MSD provided $1.5 Million in funding for the LRA's demolition program
  - Immediate reduction in directly connected impervious area
- In demolition locations, and other agreed upon LRA locations, MSD is building GI BMPs, or holding areas for future GI BMP construction
- Some properties will be conveyed to MSD for larger neighborhood scale facilities servicing multiple lots, which will be owned and maintained by MSD

MSD/LRA Partnership

- Facilities on lots retained by LRA will be maintained by LRA or current owner
- Some lots are not feasible locations for construction of green infrastructure right now, but MSD can reserve an area for a facility to be built later, in coordination with future owners
- Maintenance or Development Agreements are being recorded for all LRA lots involved in the program, in order to provide lasting control for stormwater volume reduction

Green Infrastructure Concept Schematic

Neighborhood Scale Facilities

- Multi-lot GI BMPs designed to handle the runoff from most or all of the block
- Sized for an assumed percent of impervious surface when the block is re-developed
- MSD owns and maintains the facility
- Good opportunities to capture adjacent streets and alley drainage

Bioretention “Rain Gardens”

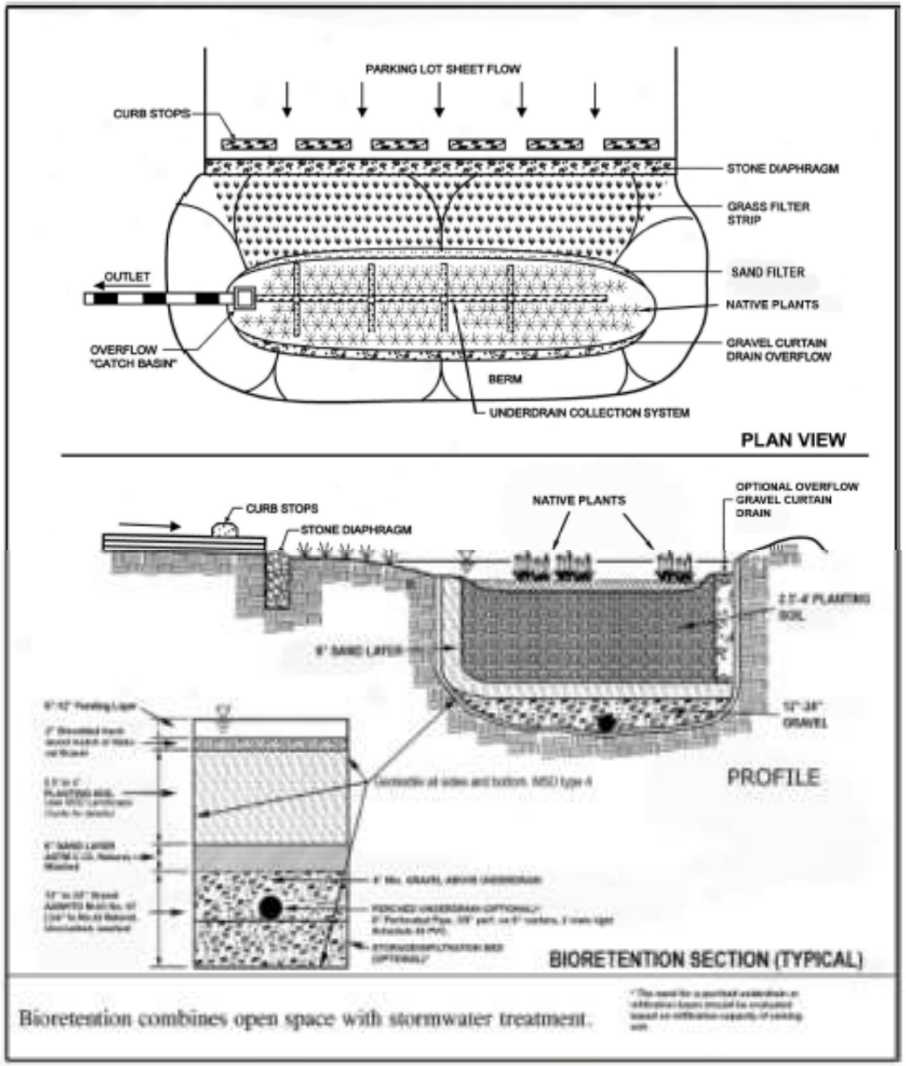


Figure 7: Bioretention Details Source: Maryland Stormwater Design Manual

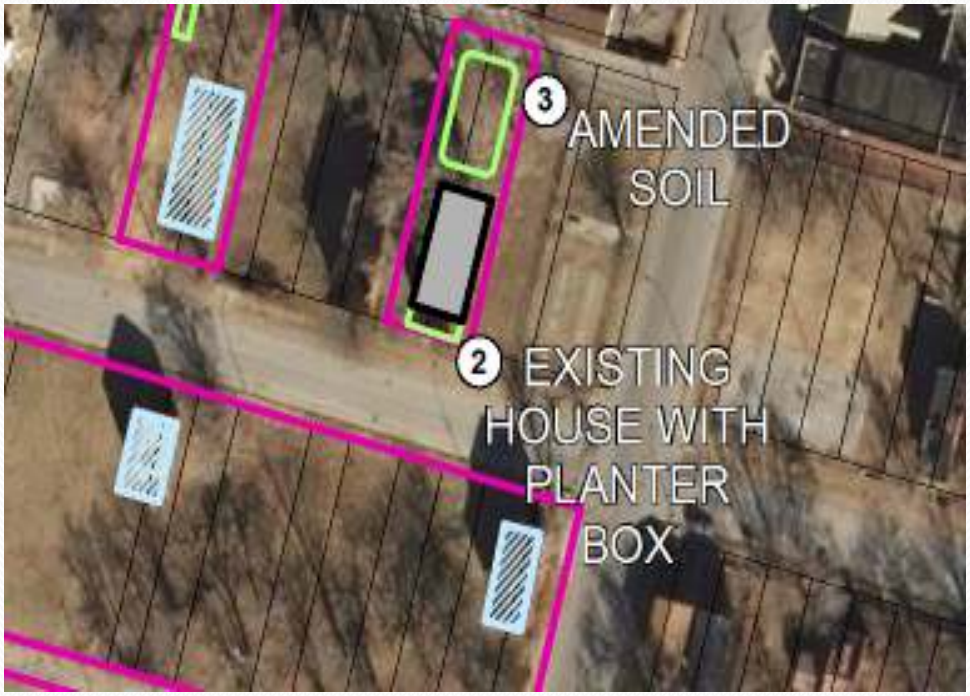
Ranken Jorden– photos courtesy of SWT Design

Street “Bump-out”

By SWT Design

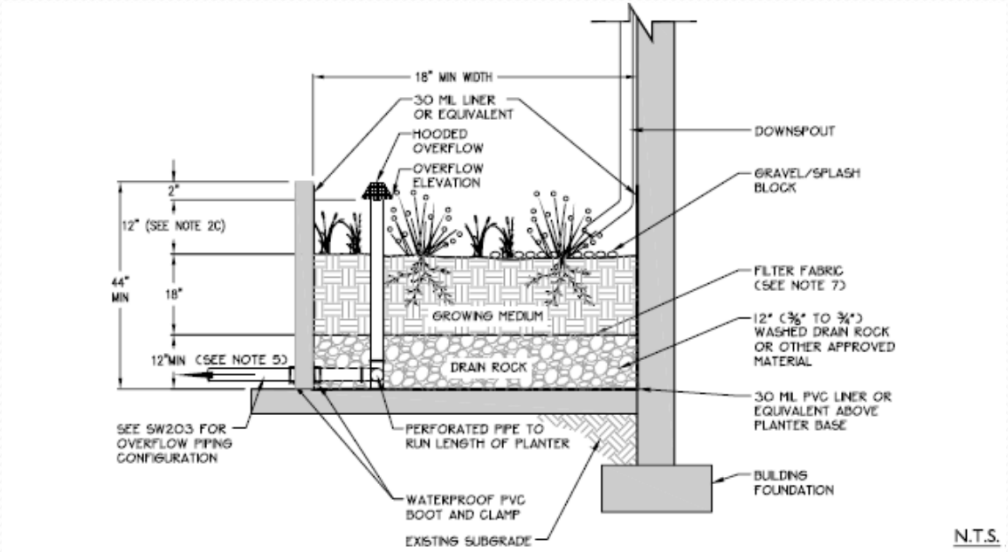
Pervious Alley

Lot Scale Facilities: Existing House with Planter Box/Rain Garden & Amended Soil



- New or rehab home. Downspouts disconnected to a planter box or other GI BMP
- Owned and maintained by the LRA or current property owner
- MSD has educational material with plant suggestions and maintenance tips and has a recorded Maintenance Agreement that is transferred to new owners

Planter Box and Soil Amendment



- Planter box is lined. Rock layer below the soil stores water while it weeps through holes to lawn or through pipe to lawn popup or sewer
- The soil in the yard can be amended to provide additional runoff control, such as by tilling in compost, and replanting the grass

Demolition with area for Future Lot Sized Facility

- For demolition locations where a facility built now is not feasible
- Record a Development Agreement with future Reserve Area
- Does NOT specify where the facility must go, just a required square footage
- MSD will work with future property owner to incorporate a GI BMP at that time
- On one site, the neighbor approached LRA to purchase the recently cleared lots next door, so we worked to divert the downspouts from their house to raingardens on the adjoining lots

Lot-sized Bioretention "Rain Garden"

- MSD has educational material for the raingarden with plant suggestions and maintenance information
- Plantings can be low maintenance
- Plantings could also have more of a garden appearance

Raingarden After Construction

Habitat for Humanity Lot-sized Bioretention

Development/Maintenance Agreements

- All private parcels involved in the program have a recorded Agreement.
- There are three types, all require:
  - MSD review of development plans
  - Future downspouts for roof drainage will not be re-connected to the combined sewer system
  - Sets a maximum area of impervious surface, which the facility is designed to handle

Development/Maintenance Agreements

- In addition to the general requirements:
  - Maintenance Agreement
    - On properties that receive a Lot Scale facility
    - Includes a "Reserve Area" exhibit showing the GI BMP location
  - Development Agreement with Future Reserve Area
    - On properties with MSD funded demolition but construction of a GI BMP now is not feasible
    - Specifies a minimum reserve area needed for future MSD funded GI BMP to be built when the lot is re-developed
  - Tributary Lot Development Agreement
    - Used for lots that drain to a Neighborhood Scale facility

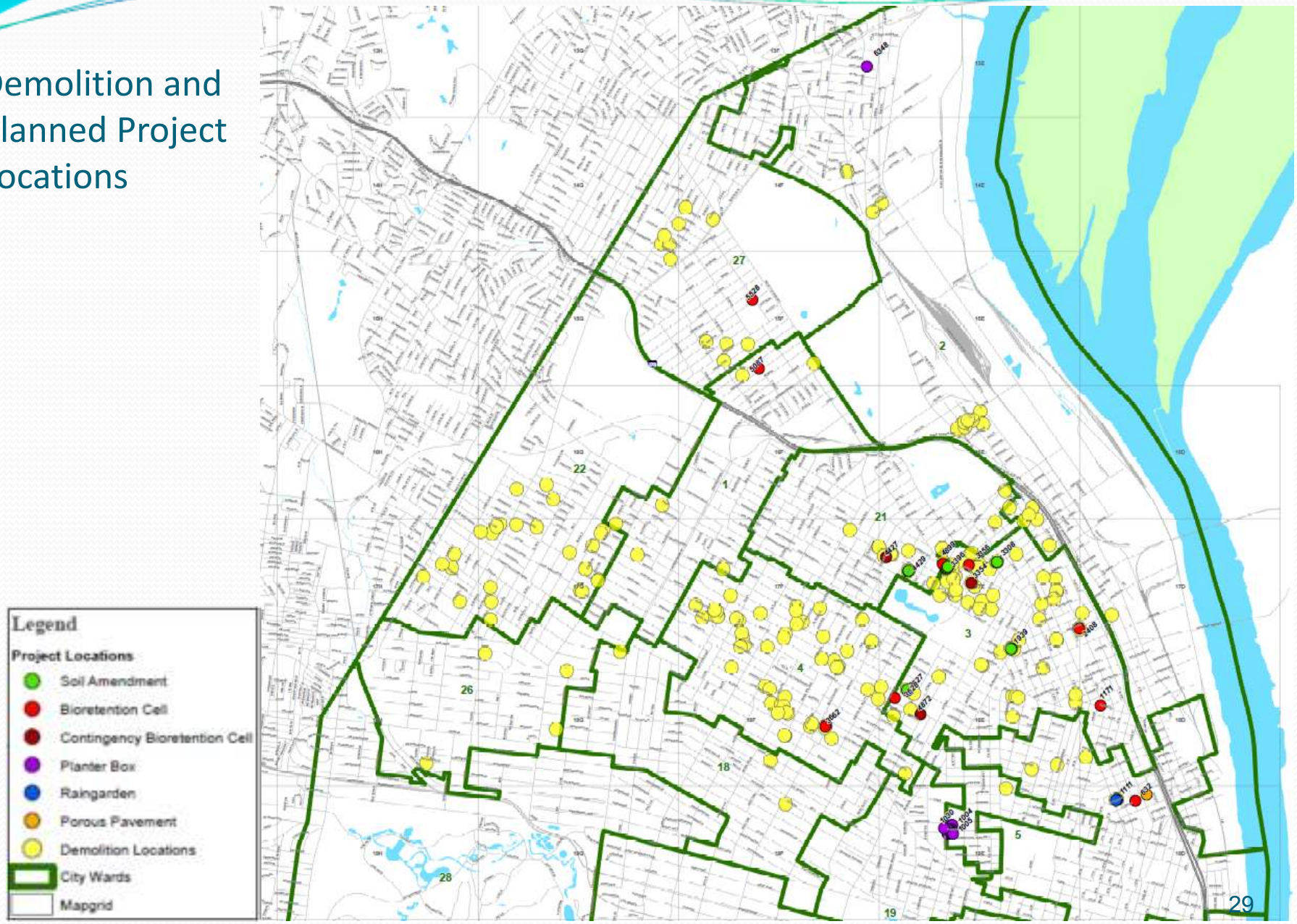
How's it going so far?

- Demolitions completed by LRA
  - 220 parcels
  - 222 buildings
  - Average demolition cost approximately $7,000/building

How's it going so far?

- We have located all Pilot facilities. Locations include:
  - 9 Neighborhood-Scale facilities:
    - 7 large bioretention facilities
    - 1 street-side bioretention facility
    - 1 pervious alley
  - Site-Scale facilities:
    - 13 planter boxes installed by Habitat for Humanity
    - 2 rain garden facilities installed by homeowner
    - 1 planter box/rain garden with a Community Development Agency home being rehabilitated
    - 13 parcels with amended soil test sites

Demolition and Planned Project Locations



Planned Locations/Schedule

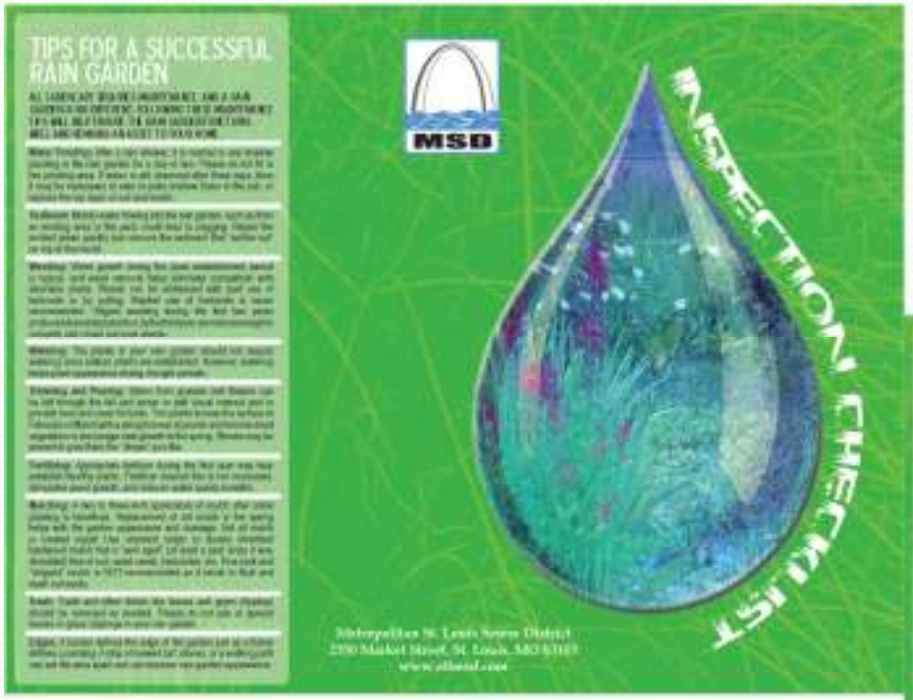
Lot Scale Projects:			
PROJECT NAME	**Ward**	**Planting Scheduled**	**City Block(s)**
C.B. 1003, 1004, 1005, 1030 (Habitat for Humanity Redevelopment - mult addresses)	3/19	Fall, 2011	1004, 1005, 1030
40' E OF NE CORNER OF N. FLORISSANT & MONROE (1451 & 1455 MONROE)	5	Spring, 2012	1111
Amended Soil Package #1 (4228-4240 Warne Avenue, 4133-4135 Lea Place)	3/21	Fall, 2011	3396, 4429
Amended Soil Package #2 (4021-4023 Glasgow, 3139-3143 N Sarah, 3832-3834 Labadie)	3/4	Spring, 2012	1939, 3624, 3627
Harlan #835 (CDA Rehab)	2	Spring, 2012	6348

Neighborhood Scale Projects:			
PROJECT NAME	**Ward**	**Planting Scheduled**	**City Block(s)**
CLINTON ST. #1323 BIORETENTION (CB632) - CSO VR GIPLT	5	Fall, 2012	632
CLINTON ST. - N. 13TH ST. PERVIOUS PAVEMENT ALLEY (CB 640) - CSO VR GIPLT	5	Spring, 2013	640
NORTH VANDEVENTER #2818 BIORETENTION CELL (CB 3628) CSO VR GIPLT	3	Spring, 2013	3628
NORTH SARAH #1801-1803 BIORETENTION (CB 3662) CSO VR GIPLT	4	Spring, 2013	3662
GERALDINE #5099 BIORETENTION (CB5087) CSO VR GIPLT	1	Spring, 2013	5087
BEACON #5479 BIORETENTION (CB5528) CSO VR GIPLT	27	Spring, 2013	5528
WARNE #4241 ROW BIORETENTION (CB4899) CSO VR GIPLT	21	Fall, 2013	4899
BLAIR #3961 BIORETENTION (CB2408) CSO VR GIPLT	3	Fall, 2013	2408
19TH ST #3301 BIORETENTION (CB1171) CSO VR GIPLT	3	Fall, 2013	1171

How's it going so far?

- Public Participation/Education:
  - Developed a "Homeowner's Toolkit" for raingardens including tips, maintenance information and schedule, common weeds, stormwater pollution information, etc. This template will be revised for bioretention and planter boxes.
  - Occasional updates on the pilot program can be found on MSD's blog at www.yourmsd.wordpress.com
  - Public information meetings will be conducted in the areas around Neighborhood-Scale projects
  - The final report will be featured on the MSD website

Homeowner's Toolkit



Homeowner's Toolkit

How's it going so far?

- Evaluation and Post Construction:
  - Monitoring plan/protocol is nearly complete
  - Tracking of private facilities and Agreements using GIS mapping to ensure parcels affected by the program are handled according to the recorded agreements
  - Discussing maintenance with the City in order to clearly define maintenance roles for facilities located in City right-of-way

Anticipated Schedule

- Demolitions complete
- Habitat planter boxes, 2 amended soil packages and 2 site-scale facilities complete
- First neighborhood scale facility and final site-scale facility this fall, 2012
- All pilot program construction to be complete by the end of 2013
- 2013 to 2015 – Monitoring and evaluation of effectiveness and develop recommendations for the full Green Infrastructure program (the rest of the $100 million)
- Pilot Program report due to EPA at the end of 2015, including recommendations for full program

The $97 Million Question

- EPA will receive the pilot report at the end of 2015
- Once EPA and MSD are in agreement on the plan for the full GI program, we can move forward
- "Early Action" projects:
  - The GI Program in the LTCP allows us to consider early opportunities prior to pilot program completion
  - Currently developing an application and prioritization process for potential projects, to be considered on an annual basis
  - Early action projects selected will be submitted to EPA for approval, which is required prior to proceeding on the projects

Thank You!

Questions?

Susan McCrary
314-768-6306
smccrary@stlmsd.com