Department of Public Works and Parks

6801 Delmar Boulevard, University City, Missouri 63130, Phone: (314) 505-8560, Fax: (314) 862-0694

AGENDA
COMMISSION ON STORM WATER ISSUES
HEMAN PARK COMMUNITY CENTER
975 PENNSYLVANIA
Tuesday, May 6, 2025
3:30 PM

1. **MEETING CALLED TO ORDER**

2. **ATTENDANCE-ROLL CALL**

3. **APPROVAL OF AGENDA**

4. **APPROVAL OF MINUTES**

   ❖ April 1, 2025

5. **CITIZEN COMMENTS**

6. **ANNOUNCEMENTS BY COMMISSIONERS**

7. **SUBCOMMITTEE REPORTS**

   ❖ Monitoring Subcommittee Report
   ❖ AdHoc Subcommittee Report

8. **NEW BUSINESS**

9. **OLD BUSINESS**

10. **COUNCIL LIAISON COMMENTS**

11. **ADJOURNMENT**

Storm Water Task Force
6801 Delmar Boulevard, University City, Missouri 63130,
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Draft: MINUTES OF THE STORMWATER COMMISSION
April 1, 2025

1. **Call to Order.** The fiftieth meeting of the Stormwater Commission (Commission) was called to order at 3:33 PM by Chair Todd Thompson.

2. **Attendance-Roll Call.** The following Commission members were present at the Community Center: Bob Criss, Phil Eastin, Mark Holly, Eric Karch, Todd Thompson. Also in attendance were John Tieman (Councilperson), Mirela Celaj (Director of Public Works), John Mulligan (City Attorney), and John Wagner (Director of Planning and Zoning). Garry Aronberg could not attend.

3. **Agenda.** The following agenda was accepted without objection: *Roll Call; Approval of Agenda; Approval of Minutes; Citizen Participation; New Business; Old Business; Subcommittee Reports; Miscellaneous Business; Council Liaison Comments; Adjournment.*

4. **Minutes.** The March 2025 minutes were approved with the following corrections. Approval was moved by Criss, seconded and approved.
   - Amend item 7 > RDP Monitoring Subcommittee - Lists $32k, which was the budget. Spent about $28k to date, so $4k under budget.
   - Amend item 7 > Ad Hoc Committee – Add Community outreach – Armstrong gave a 10 min presentation on 2/23/2025 to the UHeights Neighborhood Association's annual meeting regarding proposed ordinances 400.15 and 405.510 for impervious surfaces. Add the slides provided by Armstrong.

5. **Citizen Comments.**
   - University of Health Sciences & Pharmacy Computer and Data Sciences Departments - Jacob Woodard (student lead); two student colleagues; Sylvester Orimaye PhD Assistant Professor -
     o Instant reporting system and flood map http://stlfloodreporting.net/
     o Chat bot on bottom right allows residents and property owners to report on flooding at a property. This data is used to further enhance the flood map and flood probability opinions.
     o Flood map shows flood probability opinions per property.
     o Commission comments
        ▪ Prefer that you provide written material that the Commission can review to understand the basis and intent of this project. Provide summary of the data used to generate probability opinions. Include a summary of how this product compares to other products that are available. After review of this information, Commission will consider reaching out for more interaction.
        ▪ Did you consider the July 2022 flood extents map? Yes.
        ▪ Did you consider the First Street Foundation project? Yes.
        ▪ Take note of Vernon Ave, Dartmouth Ave, Heman Park Community Center which are showing low probabilities of flooding but were under water during the July 2022 Flood.
        ▪ Will you apply to other Communities? Yes. Just got another batch of MSD data that will be considered
        ▪ Thank you to the students for coming to present today and for your work to date.

6. Announcements by Commissioners and Staff.
  - o None.

7. Committee Reports
  - River Des Peres (RDP) Monitoring Subcommittee:
    - o Cameras. (Eastin)
      - Still need to buy 2. Prepared and provided quote to City.
      - City (Celaj) is working to buy the cameras.
    - o RDP Monitoring Data Platform. (Eastin)
      - Prepared and presented a table with budgetary build out cost of the Platform. (EXHIBIT 1)
      - Concern is that we currently have two independent monitoring platforms.
      - Goal is to improve the automation so that the two systems are presented in one platform.
      - Comparison of two platforms:
        - o Fondriest WQ DataLive Platform – closed system that only supports Fondriest brand or licensed equipment, so it's limited,
        - o iNeighborhoods Data Platform – Capable of incorporating the iNeighborhoods tools as well as incorporating the WQ Data Live dataloggers. Uses Internet of Things (IoT).
    - o Instrumentation update (Karch)
      - Rain gages and water level sensors are functional.
      - Water level sensors need adjustment because they are reporting intermittently. We will make the adjustment to Hafner sensor. If adjustments cause correct reports, we'll make the same adjustments to the tunnel sensor.
    - o Flood timing (Criss).
      - Prepared and shared table showing observed peak stage from 1998 to present.(EXHIBIT 2)
      - Out of bank flooding (stage >14-feet) and Main floor flooding (stage > 16-feet)
      - Floods causing main floor flooding to occur from June to September.
      - Why? Intensity of rainstorms (climatically) is highest and it's hurricane season.
    - o Flood Stage and Warning Time (Criss).
      - Prepared and shared table comparing predictive floods to actual events. (EXHIBIT 2)
      - Shows good predictions except two dates:
        - o 7/1/2023 – False positive. Issued warning. No out-of-bank flooding (stage = 13.67).
        - o 11/5/2024 – Did not issue warning. Out-of-bank but not main floor flooding. (stage = 14.48)
    - o Flood Stage and Warning Time (Criss).
      - Prepared and shared hydrograph plot of November 2024 predicted and actual. (EXHIBIT 2)
      - Red line=Predicted. Blue line=Actual.
      - Provides remarkable accuracy at the flood peak, where it matters for flooding concerns. Is less accurate at smaller storms that are not out of bank.
      - Diffusion equation – no free parameters; perfectly theoretically-based. Generally, can predict 25-minutes ahead of the problem flooding. Always predicts ahead of the actual

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peaks, so that's a theoretical defect, but it's an advantageous defect because it gives us a little more warning.

- Process to generate the plot is manual and time consuming, but not difficult. For each 5-min increment, it uses the rainfall and sums all of the theoretical outputs to generate the hydrograph.
- Suggest first working toward an improvement that is automated. Will talk to David Sandel who is likely capable.
- Suggest working to improve the predictive equation and which may have issued a warning for the 11/5/2024 flood. Already working on a new equation that so far over-predicts the peak stage, but is further ahead in timing, so provides more warning. Tradeoffs are accuracy (false positives) versus earlier warning. More to come.

- o MSD rain gage data network PRISM access
  - Approximately 50 gages in MSD service area (St Louis County).
  - Data is online and available on demand.
  - MSD gave the Storm Water Task Force access to the data using a login online.
  - This data was crucial toward development of the predictive equations.
  - Access was terminated at some point in time.
  - Commission requests that MSD re-connect the Commission to the PRISM network.
  - City will draft a letter to MSD formally requesting that access to PRISM be re-instated.

- Ad Hoc Committee:
  - o Presentation to UHeights Neighborhood Association's Annual Meeting
    - Armstrong gave a 10-minute presentation on February 23rd on the subject of the proposed ordinance for pervious surfaces. (EXHIBIT 3)

8. **New Business**
   - None

9. **Old Business.**
   - Code Review Committee Report (John Wagner).
     - o Want more background on the reasons for the proposed ordinances 400.15 and 405.510 for impervious surfaces.
     - o How we came about it?
       - (Armstrong) U Heights Flood Task Force started the process.
     - o What do we hope to accomplish?
       - (Armstrong) Hold level of imperviousness in U City.
       - (Criss) added that U City is 43+% impervious which is the highest for a City in Missouri. River Des Peres is the flashiest watershed that he's studied in MO.
       - (Armstrong) Engage residents / businesses that add impervious to be part of the solution.
     - o How did we develop the threshold 100-SF of impervious increase to require mitigation?
       - (Armstrong) U Heights Flood Task Force suggested the value based on a comparison to similar ordinance by neighboring communities, and recognition that U City lots are smaller so the threshold impervious should also be smaller.
     - o City has concerns about the added costs to City: adding staff to implement.

- ▪ (Criss) Flooding causes multi-million dollars in damage to the City, so the added cost for a staff person should be worthwhile.
  - o Would the ordinances impact flooding?
    - ▪ (Karch) Yes for everyday storms. No for July 2022 level flooding.
    - ▪ (Criss) Preventing further increases in impervious would help prevent increases in flooding.
    - ▪ (Criss) Ordinance prevents neighbor-to-neighbor flooding, which is independent of the threshold value.
  - o What is the evidence that the ordinance would improve flooding
    - ▪ (Karch) Properties that would benefit from the ordinance are only those located downhill of properties that would be developed under the proposed ordinance and would therefore have installed the proposed mitigation offsets.

10. **Council Liaison.** Councilperson Tieman, Council Liaison, reported the following:
    - Welcome Councilperson Tieman as the new Council Liaison to the Stormwater Commission, and farewell Councilperson Fuller.
    - Wilson Ave buyouts (FEMA funding administered by SEMA) was approved by Council.
    - Arts and Letters Commission – Public Arts Project opening (w/ Washington Univ.) opens 4/5 at 1pm.
    - Cool Cities StL – Mr. Tieman is involved with Cool Cities program; goal is to work to address climate crisis. Next monthly pop-up meeting is in Clayton with the topic "Data Tools for a Healthier City."

11. **Adjournment:** 5:16 Moved by Armstrong, 2nd, approved.

Minutes Preparation. Minutes were prepared by Eric Karch.

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Exhibit 1

Fondriest WQ DataLive Platform vs **iNeighborhood Data Platform**   3/25/2025

(File: 25-4-2 RdP platform)

The purpose of this document is to establish a budgetary build out cost of the RdP Monitoring Data Platform. The total scope of work at this time is not completely established. Currently the Fondriest rain gauges (3) and level sensors (2) data is accumulated on the WQ DataLive platform. UCity SWC has also purchased an iNeighborhood RdP monitoring system with camera and level sensor. This data is managed on the iNeighbor...IOT data platform. The SWC is currently planning to purchase 2 additional cameras from iNieghborhood.

Updated WQ Data Live –		5 yr Operating Cost
Annual internet $360/unit (5)	$1,800	
Annual WQDL Subscription fee -	$1,950	
Annual Subtotal Cost	$3,030	$15,150
Camera Upgrade 2 Fondriest cameras	$5,000	$ 5,000
		$20,150

Note: The WQ Data Live platform is a closed system that only supports Fondriest brand or licensed equipment.

iNeighborhood: IOT Platform: Process capable of accessing WQ Data Live dataloggers and converting to IOT Platform. Values below are not updated to reflect WQ Data Live

	Annual Cost	Total 5 Yr Cost
IOT annual fee - $50/mo/system (3)	$1,800/yr	$ 5,400.
Annual subscription (Fondriest WQ Data)	$950	$4750
IOT conversion of WQ DataLive	$5,000	$5,000
	$7,750	$15,150

Exhibit 1 continued

iNeighborhood process for converting WQ Data Live to Internet of Things (IoT) platform

Through WQData LIVE web-based interface, the users can access their historical data, spot trends, remotely access and configure the data logger and sensor, automate data report, configure alarm notification, and more.

Direct access to the data is provided by a set of REST APIs. API stands for Application Programming Interface. By using the API, iNeighborhoods will be able to query all SWC WQData Live dataloggers and receive the following information:

a) Device name, site and last contact.

b) Device parameters names used by a specific project, such as temperature, humidity, water level, flow level etc.

c) Device parameter data used by the specific project such as temperature F, Humidity %, water level in feet or cm etcd)

d) Device data such as timestamp.

Once iNeighborhoods has queried the WData API, the data would flow into the iNeighborhoods platform. This would allow the stored-data to be displayed in a variety of formats including integer values, floating point values, buttons or other types of indicators, and many different types of graphical formats. Reports could be generated directly from the web or mobile interface.

Programming would be done using the Python language which is a very common and stable language to interact with the API. Access to the APIs requires an API Key. Admin users and project owners can generate API Key from the WQData LIVE project setting.

To generate the API, an API license would have to be purchased at a cost of $950 per year.

iNeighborhoods would provide the programming interface between the API and the Neighborhoods platform for $5,000
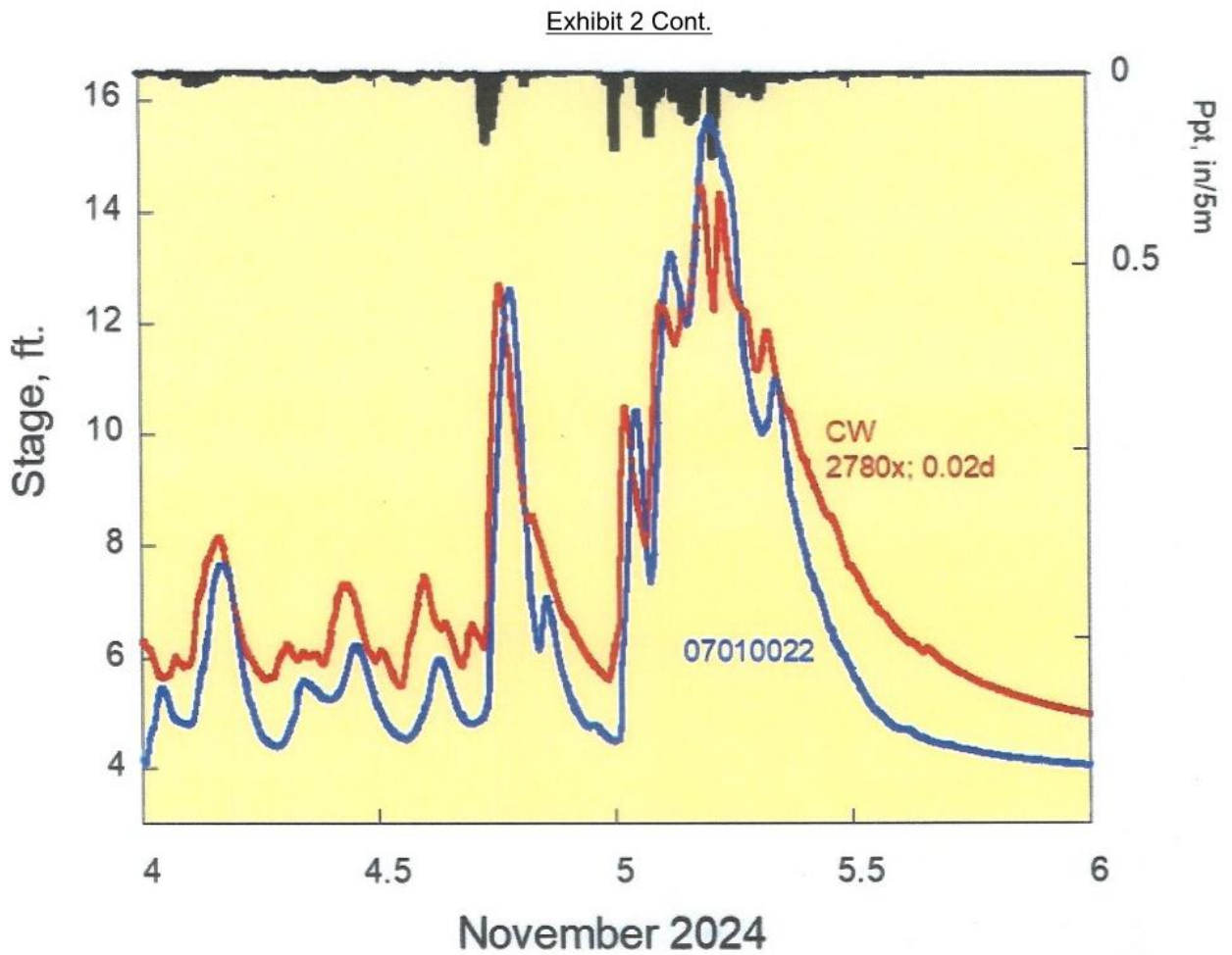
Exhibit 2
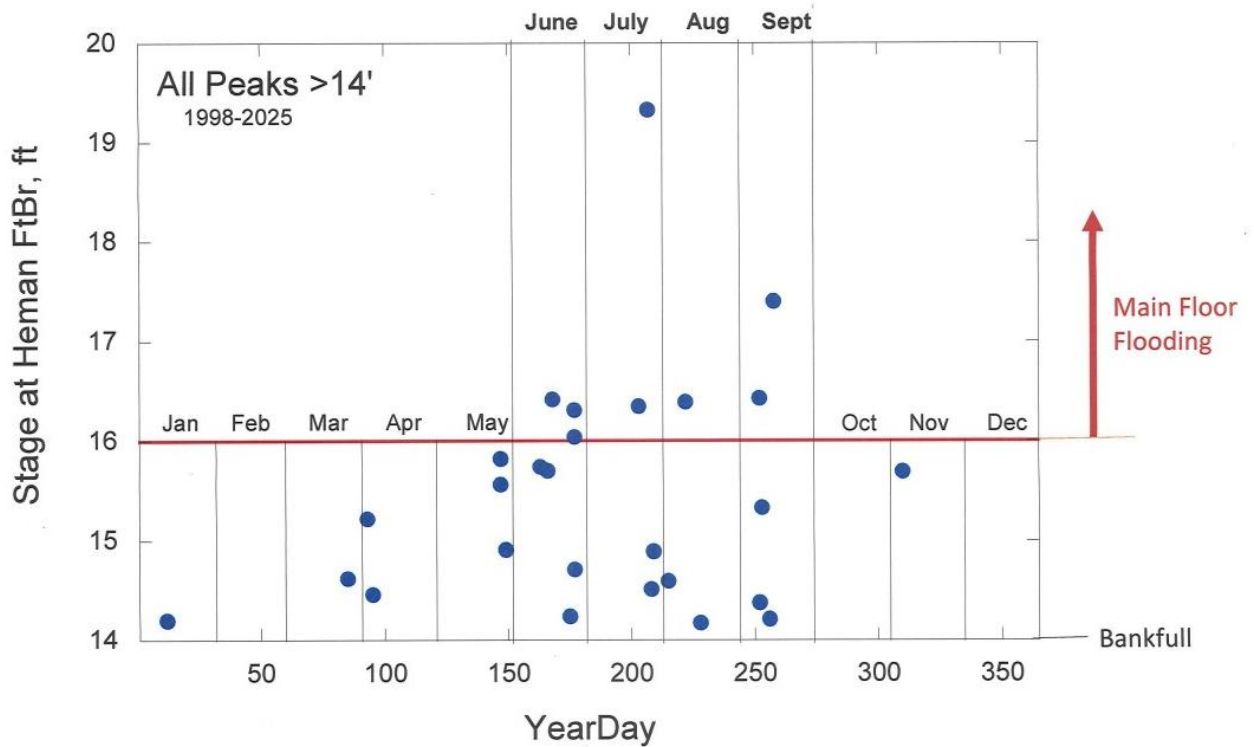
Exhibit 2 Cont.

DATE	Stg, USGS	1 hr Ppt	Warn Time	CW Stg Predicted	Min bf Pk	Min bf Bankfull
5/21/2022	10.65	0.75		10.92	30	
5/25/2022	10.1	0.75		10.78	35	
7/26/2022	19.33	2.39	210/30m	22.21	70	25.
7/28/2022	14.89	1.59	40/25	15.12	20	20.
8/3/2022	14.59	1.7	35/25	15.48	25	30.
8/4/2022	13.56	0.67		10.79	35	
4/15/2023	11.55	1.09		12.72	30	
5/13/2023	11.04	1.06		12.73	25	
7/1/2023	12.23	1.55	15/NA	13.67	35	
8/5/2023	11.44	0.86		11.33	30	
4/2/2024	15.22	1.18	NG	14.78	40	0.
4/26/2024	10.04	0.6		10.83	30	
4/29/2024	11.25	0.88		11.31	30	
7/16/2024	13.21	1.23		14.07	25	-999.
9/23/2024	10.67	1		11.91	15	
11/5/2024	15.69	0.96	NG	14.48	25	0.

Exhibit 2 Cont.

Exhibit 3 Commissioner Armstrong's Presentation to University Heights Stormwater Task Force

Green Approaches to
Flood Mitigation

Susan Armstrong PE, LEED-AP

UCity Storm Water Commissioner

February 23, 2025

Thank you, U Heights
Flood Task Force!

- Tunnel Clean-out by MSD, Nov 2023
- Educational Events:
  - "A Sewer Runs Through It"
  - Zoom Calls including UCity experts Dr. Bob Criss and Kathy Freese
  - Invited MSD speakers
- Draft UCity Pervious Surface Ordinance, June 2024
- Stormwater Commission appointment
- Buy-outs of homes in floodplain
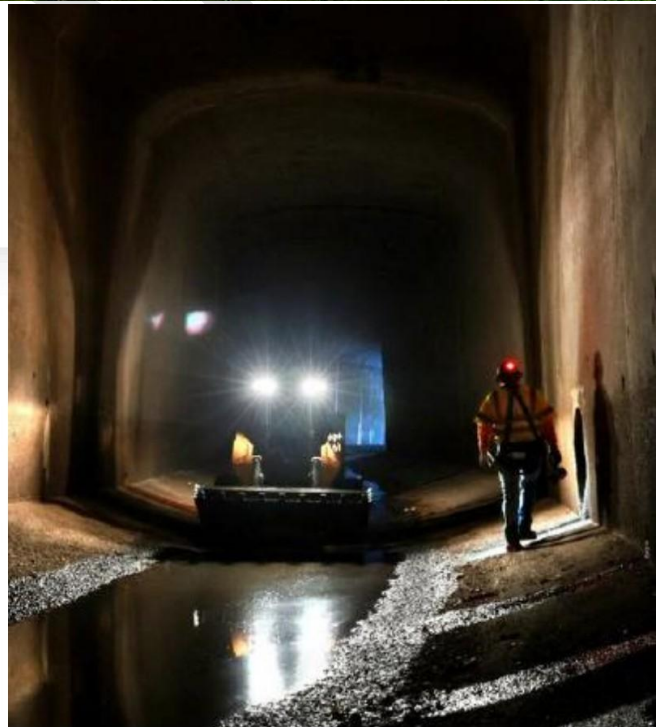
Urban Flash Floods

- What can individual homeowners/renters do to **mitigate** the burden these disasters, inflict?
- Urban flooding affects cities and towns
- Property damage and loss of life
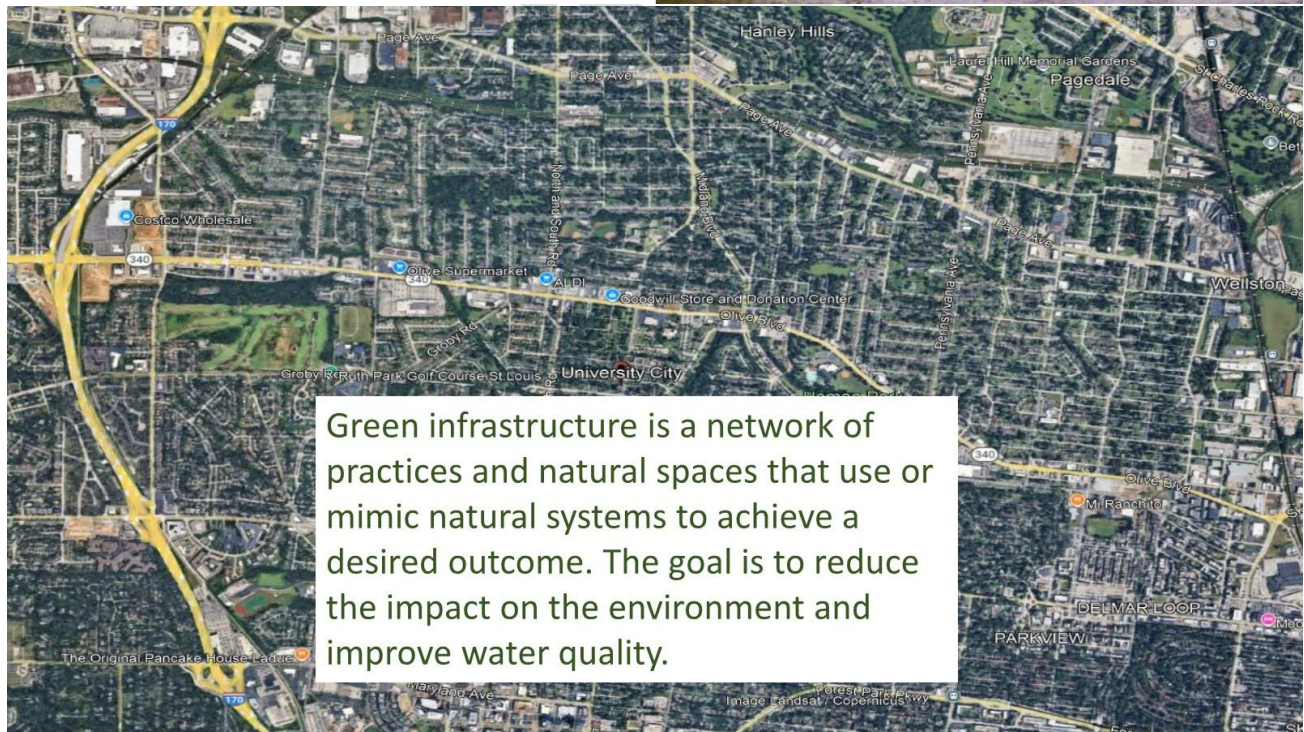
Green infrastructure is a network of practices and natural spaces that use or mimic natural systems to achieve a desired outcome. The goal is to reduce the impact on the environment and improve water quality.

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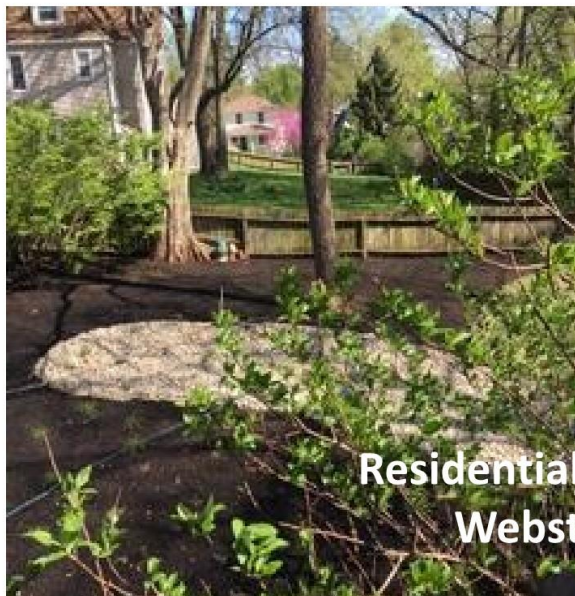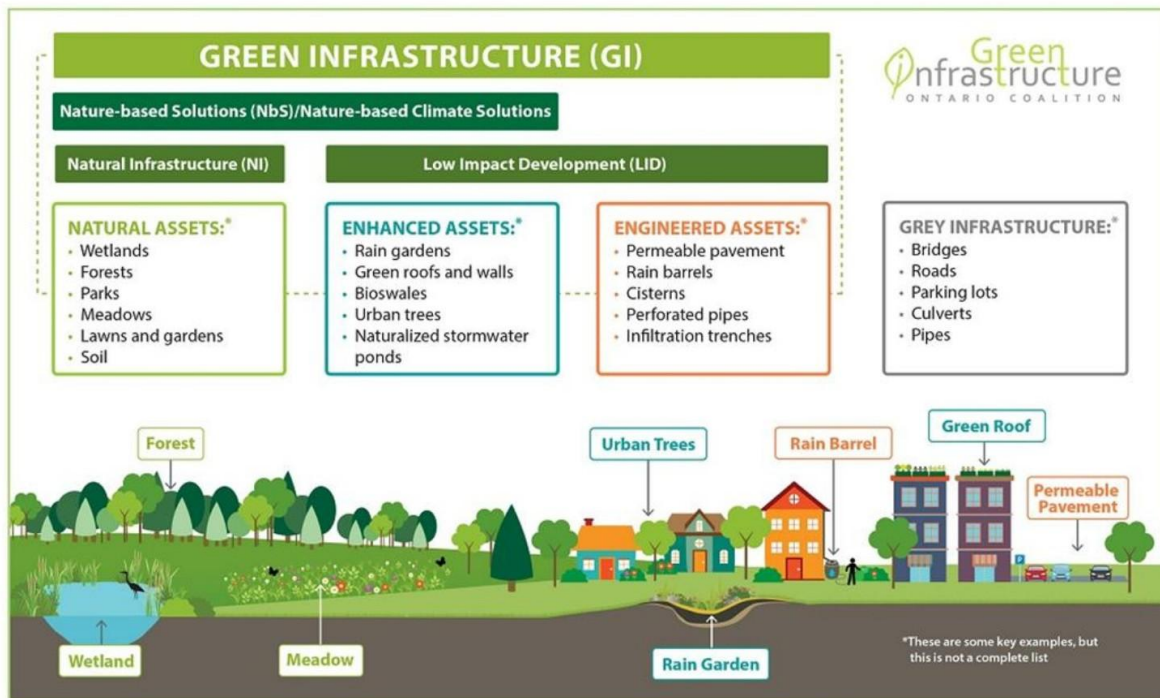
Residential Raingarden in Webster Groves

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Urban Rain Garden designed to collect stormwater for entire city block

Olson Outdoor Garden (green roof)

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Green Roof on Sheet
Metal Workers Local
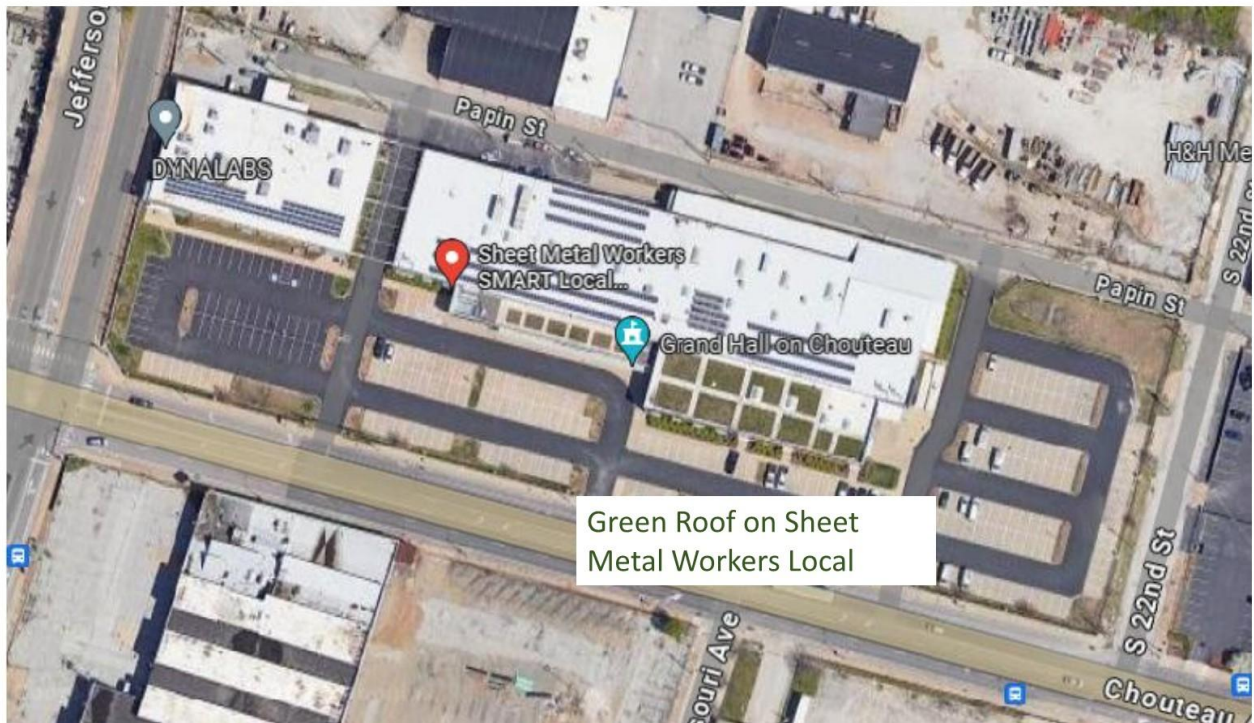
Native Plants

Resilient Communities

When natural disaster strikes...Social Infrastructure

- What can individuals do to recover?

- Know your neighbors

- Help each other

- Share resources

Urban Flash Floods

- Policies mitigating urban flooding affects cities and towns

- Many Cities have been able to **mitigate** the burden these disasters inflict on residents through the successful and inexpensive practice of limiting impervious surface coverage.
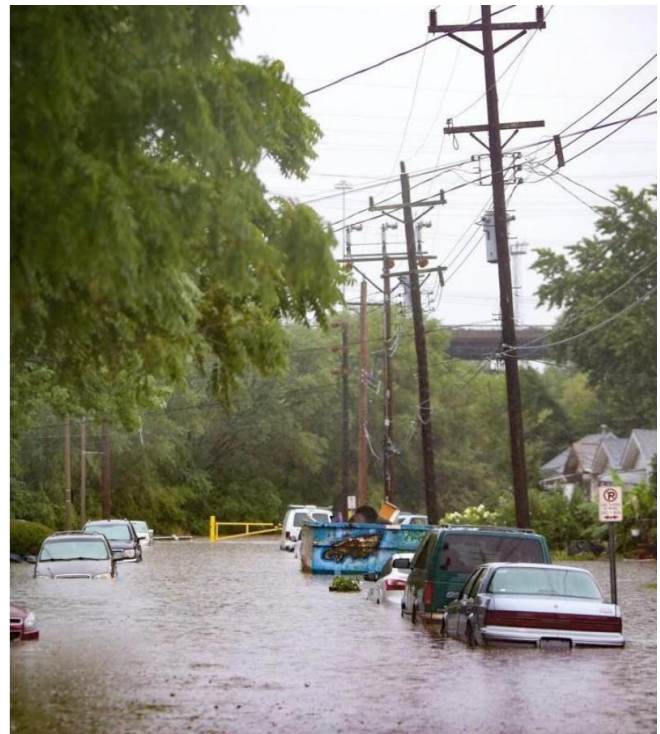
Green Infrastructure for Flood Mitigation

| Green Infrastructure University City proposed Pervious Surfaces Ordinance	Offset Guidelines Ratio of New Impervious surface area: to green infrastructure improvement
Plant native plants	1 sf:3.25
Amended soil / Mulch	1:1
Install tree cover	100 sf: 1 tree approved by UCity Arborist
Install permeable pavement	No offset required as this is not considered an impervious development
Build green roofs	5:1 Example: 100 SF Patio: 20 SF on flat roof
Install rain barrels	100 sf:1 barrel (55 gallons)
Install infiltration basins such as rain gardens and bioswales	5:1
Install dry well or French drain	12:1 for 6" deep French Drain 6:1 for 12" deep French Drain

Thresholds that trigger GISW (Green Infrastructure Stormwater Management) requirements

Communities' GISW Reviewed

City	State	SF trigger	Topic
Crestwood	MO	200	GISW
Brentwood	MO	200	GISW
Kirkwood	MO	1,000	GISW
Ladue	MO	400	GISW
Olivette	MO	400	GISW
Town& Country	MO	2,500	GISW
University City (proposed)	MO	100	GISW
Webster Groves	MO	100	GISW
Springfield	MO		Flood Project
Dubuque	IA		Flood Project
Tulsa	OK		Flood Project
Kansas City	MO		Green Roof Project

SF trigger: square ft of impervious surface that triggers BMP offset
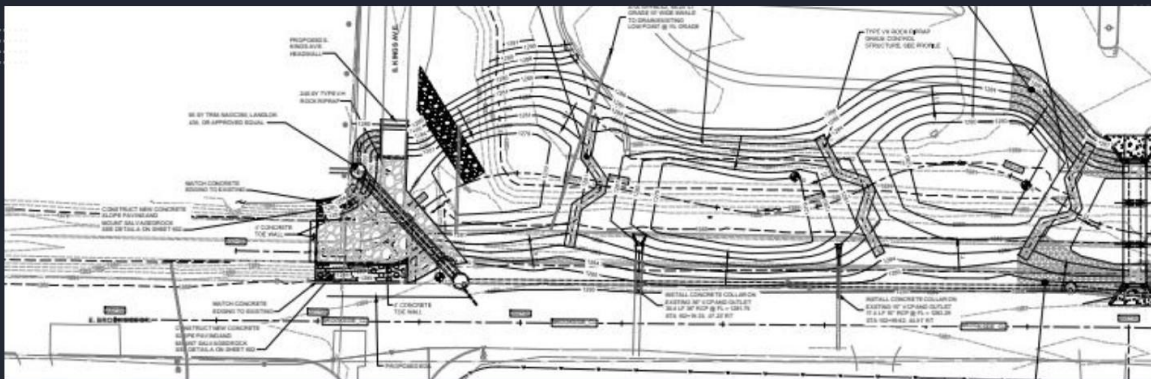
OPEN CHANNEL DESIGN

New vision for Open channel design for urban waterways once encased in concrete tunnel designed to move sewage away from homes as quickly as possible.

Open channel design returns the waterway to the natural meandering with banks for relaxing and naturally occurring animals and plants. Improves water quality and mitigates flooding. (Fassnight Creek Project Springfield Missouri
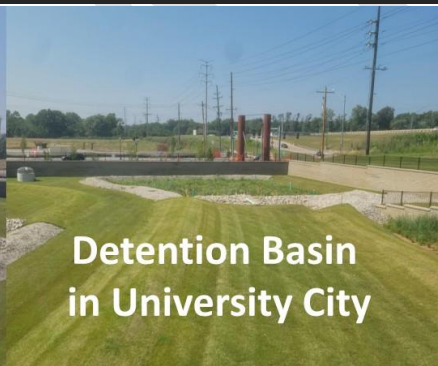
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Thank you

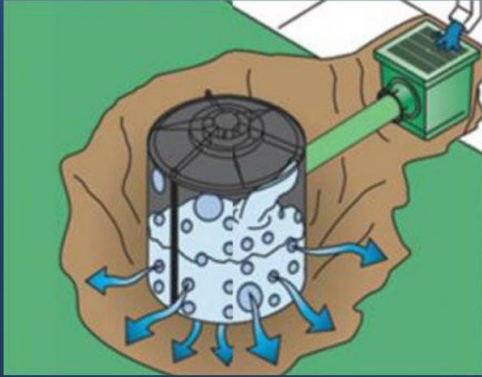BACKGROUND SLIDES

Detention Basin
in University City