



**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, October 3, 2023  
3:30 PM**

**1. MEETING CALLED TO ORDER**

**2. ATTENDANCE-ROLL CALL**

**3. APPROVAL OF AGENDA**

**4. APPROVAL OF MINUTES**

❖ September 12, 2023

**5. CITIZEN COMMENTS**

**6. ANNOUNCEMENTS BY COMMISSIONERS**

**7. SUBCOMMITTEE REPORTS**

**8. NEW BUSINESS**

❖ University Heights Flood Task Force Proposed Legislation.

**9. OLD BUSINESS**

**10 COUNCIL LIAISON COMMENTS**

**11 ADJOURNMENT**



Storm Water Commission  
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## MINUTES OF THE STORMWATER COMMISSION

September 12, 2023

1. **Call to Order.** The thirty-eighth meeting of the Stormwater Commission (Commission) was called to order at 3:36 PM by Chair Todd Thompson.
2. **Attendance-Roll Call.** The following Commission members were present at the Community Center: Susan Armstong, Garry Aronberg, Robert Criss, Mark Holly, Eric Karch, Todd Thompson. Also, in attendance were Councilman Dennis Fuller, Darin Girdler, Director of Public Works; and John Mulligan, City Attorney.
3. **Visitor:** Tom Sullivan.
4. **Agenda.** Publish agenda was approved:  
Attendance-Roll Call; Approval of Agenda; Approval of Minutes; Citizen Comments; Announcements by Commissioners; Committee Reports; New Business; Old Business; Council Liaison Comments; Adjournment.
5. **Minutes.** The minutes of the August 1, 2023, meeting were approved by voice vote with the Addition that Bob Criss was present (Karch, Holly).
6. **Citizen Comments.** No public comment.
7. **Announcement By Commissioners.**
  - 7.1. Commissioners Stein, Thompson, and Holly recognized the recent passing of Commissioner Stein:
    - 7.1.1. Mr. Stein will be sorely missed by our commission, community, and family.
    - 7.1.2. Commissioner Stein was instrumental in establishing an effective and reliable River des Peres (RdP) early warning system.
    - 7.1.3. Commissioner Stein contributed insight of great wisdom to Commission work.
    - 7.1.4. *River Front Times* had a recent article about Mr. Stein's contribution to the Focal Point music scene.
  - 7.2. The Commission welcomed Susan Armstong as a newly appointed commissioner. Ms. Armstong is a licensed professional engineer and has a masters degree in Health, Safety, and Environmental Engineering
8. **Committee Reports.**
  - 8.1. Early Warning System discussion led by Dr. Criss.
    - 8.1.1. Operation and Maintenance.
      - 8.1.1.1. Mr. Stein handled the maintenance and operations of the early warning system. With the passing of Mr. Stein, other arrangements for O&M will be necessary.
      - 8.1.1.2. Dr. Criss urged PW Director Girdler to take on running and maintaining the Early Warning System and other in-stream monitoring equipment that the Commission and City have installed. During discussion, maintenance and operation alternatives were discussed: vendor, U. City staff electricians, MSD. (Commissioner Karch has the log-in credentials for the system.)



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- 8.1.1.3. PW Director Girdler will work-out continued funding and operation.
- 8.1.1.4. PW Director Girdler will identify City Staff to maintain the EWS until long term operations and maintenance responsibilities are established.
- 8.1.1.5. O & M manual. The early warning subcommittee will prepare an operations and maintenance manual for the early warning system.
- 8.1.1.6. The early warning subcommittee will continue to coordinate with City officials regarding coordinating and implementing Code Red warnings.
- 8.1.2. Rating Curve for RdP Tunnel.
  - 8.1.2.1. Dr. Criss has identified the RdP tunnel as a crucial feature in flooding of the Upper RdP in the east end of U. City
  - 8.1.2.2. A rating curve is important to assess the RdP tunnel's operation.
  - 8.1.2.3. Mr. Karch will discuss with Jeff Reipe of MSD whether MSD can install operate and evaluate meters and gauges to determine a rating curve for the tunnel.

## 9. New Business

- 9.1. At the October meeting of the Commission, The University Heights Flood Task Force will present proposals to limit impermeable surface through ordinance changes.

## 10. Old Business.

- 10.1. SW Master Plan update on behalf of the stormwater consultant, HR Green, Mr. Aronberg presented evaluation of changes in bridges and imperviousness.
  - 10.1.1. Bridge opening changes at Groby Road would have a small impact on the water surface elevation of the 1 percent annual probability (AP) runoff (100-year storm):
    - 10.1.1.1. Doubling the area of the opening changed the 1% AP by 0.1 foot.
    - 10.1.1.2. The channel is too small to convey the 1 percent annual probability runoff. Therefore, water rises above the banks and enters the floodplain in which homes have been built.
    - 10.1.1.3. Channel deepening is not feasible:
      - 10.1.1.3.1. Effective hydraulic deepening would have to extend a long distance and exacerbate the channelization of the RdP.
      - 10.1.1.3.2. Deepening would require re-grading of the banks to maintain bank stability. Raising of banks would greatly reduce back yards and may require the taking of some homes.
    - 10.1.1.4. Raising the bridge would require a change in the profile of the Groby Road and other nearby intersecting streets. Driveways and yard drainage would be impacted. Raising Groby Road bridge and roadway profile creates a dam in the floodplain.
    - 10.1.1.5. The decision: spend money on raising bridges and roads or in buyouts?
  - 10.1.2. Impervious Changes
    - 10.1.2.1. Computations tested impervious changes: pavement to lawn.
      - 10.1.2.1.1. The sensitivity analysis examined changing 10 and 20 percent of the pavement to lawn. The 1 percent AP RdP water surface changed in the order of 0.1 foot.
      - 10.1.2.1.2. Impervious changes would provide most benefit during low intensity storms: backyard flooding would be reduced rather than RdP flooding.
      - 10.1.2.1.3. Detention such as rain gardens would provide that backyard benefit.



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**11. Council Liaison Comments.**

- a. U City received a \$3.5 million grant for buyout of Haffner Court apartments.
- b. U City is still pursuing other FEMA grants.

**12. Adjournment.** Motion to adjourn passed at 5:16 PM (Karch, Aronberg).

Minutes Preparation. The minutes were prepared by Garry Aronberg.

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DRAFT

10/1/2023

By Garry Aronberg

Mtg Order	Mtg Date	Type of Mtg
1	20200804	Regular Commission Mtg
2	20200901	Regular Commission Mtg
3	20201006	Regular Commission Mtg
4	20201103	Regular Commission Mtg
5	20201201	Regular Commission Mtg
6	<b>20210105</b>	Regular Commission Mtg
7	20210202	Regular Commission Mtg
8	20210302	Regular Commission Mtg
9	20210406	Regular Commission Mtg
10	20210504	Regular Commission Mtg
11	20210519	Special Commission Mrg: USACE Report
12	20210601	Regular Commission Mtg
13	20210706	Regular Commission Mtg
14	20210803	Regular Commission Mtg
15	20210907	Regular Commission Mtg
16	20211005	Regular Commission Mtg
17	20211102	Regular Commission Mtg
18	20211207	Regular Commission Mtg
19	<b>20220104</b>	Regular Commission Mtg including standard agenda
not a mtg	20220110	Recommendations to Council Regarding USACE Report on Upper River desPeres
20	20220201	Regular Commission Mtg
21	20220301	Regular Commission Mtg
22	20220503	Regular Commission Mtg
	no mtg in June 2022	
23	20220705	Regular Commission Mtg
24	20220802	Regular Commission Mtg
25	20220906	Regular Commission Mtg
not a mtg	20220907	Request for Archival Storage of SW Commission Data
26	20221004	Regular Commission Mtg
not a mtg	20221004	Commendation for Life Saving actions during July Flooding
27	20221117	Regular Commission Mtg rescheduled
28	20221206	Regular Commission Mtg
29	<b>20230103</b>	Regular Commission Mtg
30	20230207	Regular Commission Mtg
31	20230307	Regular Commission Mtg
32	20230321	Special meeting to consider unfinished business - SW master plan-code revisions: small project triggers, more detention, more green space, larger setbacks

- 33 20230404 Regular Commission Mtg
- 34 20230418 Special meeting to consider unfinished business -  
SW master plan - definition of public vs private problems
- 35 20230612 Regular Commission Mtg:  
--renewed expression of Commission presenting public  
information mtgs,  
--Discussion of buyouts
- 36 20230711 Regular Commission Mtg:  
--University Heights group discussed ordinance revisions  
for limiting impervious area.  
-- Discussed improvements to RdP stages & early warning
- 37 20230801 Regular Commission Mtg:  
--Citizen urged more improved announcement of early  
warning of flooding.  
--Planning Department asked for advice for changes in  
Comp Plan
- 38 20230912 Needed Correspondance with Planning Department

# DRAFT June 1, 2023

Section 410.170 of the Municipal Code of the City of University City, relating to floodways, is hereby replaced with the following:

## **Floodplain Non-Development Zone** **410.170 Floodplain Non-Development Zone**

Floodways are extremely hazardous areas due to the velocity of floodwaters that carry debris and potential projectiles. the following provisions shall apply:

- A. For streams depicted as a solid blue line on the most current United States Geological Survey (U.S.G.S.) 7.5 Minute Series (Topographic) Maps for Missouri, no new developments shall be built other than an undisturbed natural vegetative buffer. This buffer shall be maintained for 50 feet, measured horizontally, on both banks (as applicable) of the stream as measured from the top of the stream bank. For all other streams subject to this ordinance, an undisturbed natural vegetative buffer shall be maintained for 25 feet, measured horizontally, on both banks (as applicable) of the stream as measured from the top of the stream bank. This buffer shall be referred to as the Floodplain Non-Development Zone or the Non-Development Zone.
  - a. The Non-Development Zone may be larger than 50 feet if needed to protect the channel or surrounding ecosystem.
  - b. Existing developments may remain within the Non-Development Zone. However, no new development may be constructed and no modifications to the existing development that cumulatively equal or exceed thirty percent (30%) of that property's market value may be constructed.
- B. Allowable Encroachments. Encroachments into Non-Development Zones can cause floodplain and floodway impingements for high-flow conditions, erosion, and water quality impairment and can result in the cumulative loss of floodplain. Encroachments can also divert flows, reduce flow capacity and destabilize banks, impede fish and wildlife passage, and impact other crucial natural resource functions. As a result, only the following encroachment uses are permitted:
  - a. Building soft surface trails. Trail width may not exceed 30 inches.
  - b. Maintenance and repair of existing culverts or water crossing structures when coverage and utility size are not increased. Replacement of culverts or water crossing structures is not considered maintenance and requires review by the Floodplain Administrator, as assigned in §410.045.
  - c. Replanting with native vegetation using hand-held equipment.

## DRAFT June 1, 2023

- d. Removal of vegetation on the City's nuisance plant list. Plant removal must be done with hand-held equipment.
  - e. Installation of temporary fencing. The fence must be removed within five years.
  - f. Construction of underground utility infrastructure, including but not limited to storm and sanitary sewers, sewer laterals, water mains, phone and cable lines, power lines, and gas lines, as long as the disturbance area is replanted with native plants.
  - g. Temporary emergency procedures necessary for the protection of life, health, safety, or property. Temporary emergency procedures for the safety or protection of property that result in permanent impacts must meet the regulations of this Chapter after the emergency has passed.
  - h. The Floodplain Administrator must approve additional projects, such as new bridges, crossings, and culverts. All approved crossings must be designed to pass the peak discharge for the 25-year design storm without flowing past the inlet. Approved crossings must also minimally impact the stream's slope, width, depth, and bed composition.
- C. No septic tanks or septic tank drain fields shall be permitted within the Non-Development Zone.
- D. Vegetation coverage within the Non-Development Zone must achieve 90% coverage within one year after construction. Plantings must be native, i.e., indigenous terrestrial and aquatic species that have evolved and occur naturally in the land where University City now sits.



# DRAFT – July 5, 2023

INTRODUCED BY: \_\_\_\_\_

Date: \_\_\_\_\_

BILL NO. \_\_\_\_\_

ORDINANCE NO. \_\_\_\_\_

AN ORDINANCE AMENDING TITLE IV OF THE MUNICIPAL CODE OF THE CITY OF UNIVERSITY CITY, RELATING TO LAND USE, TO INCORPORATE CHAPTER 420, RELATING TO PERVIOUS SURFACES REQUIREMENTS.

BE IT ORDAINED BY THE COUNCIL OF THE CITY OF UNIVERSITY CITY, MISSOURI, AS FOLLOWS:

WHEREAS, the River Des Peres flows through University City ("the City") and its watershed is almost wholly developed with most surfaces impervious or compacted; and

WHEREAS, a significant portion of the City's population and infrastructure lies in the floodplain of the River Des Peres, thus risking damage to life, safety, property and infrastructure, economic distress, cultural loss, streambank erosion, water quality degradation, and loss of community spirit from flooding; and

WHEREAS, flooding risks are exacerbated by both the presence of impervious surfaces that disrupt natural hydrological flows and climate change that is set to increase the variability and extremity of heavy precipitation events, which inflict consequences such as the historic flooding from July 2022;

WHEREAS, flooding poses severe risks to life in the City, such as safety, thousands of dollars in annual damage to property and infrastructure, regional economic distress, cultural loss, streambank erosion, water quality degradation, and loss of community spirit; and

WHEREAS, immediate action to reduce the occurrence and severity of flooding must be taken to protect the health and welfare of residents;

NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF UNIVERSITY CITY, MISSOURI, AS FOLLOWS:

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Section 420.010

## ARTICLE I

### **Authorization**

#### **Section 420.010. Authorization**

The Legislature of the State of Missouri has in Section 89.020.1 R.S. Mo., delegated the responsibility to local governmental units to adopt flood management regulations designed to protect health, safety, and general welfare. Therefore, the City Council of the City of University City, Missouri, ordains as follows:

# DRAFT – July 5, 2023

Section 420.020

Section 420.020

## ARTICLE II

### Definitions

#### Section 420.020 Definitions

Unless specifically defined below, words or phrases used in this Chapter shall be interpreted to give them the same meaning they have in common usage and to give this Chapter its most reasonable application.

**DEVELOPER** – Anyone who engages in Development that increases the amount of impervious surface on a property by more than 100 square feet.

**DEVELOPMENT** – Any manmade change to improved or unimproved real estate that increases the Impervious Surface of a site by more than 100 square feet.

**IMPERVIOUS SURFACE OR IMPERVIOUS COVER** – Any man-made paved, hardened, or structural surface, regardless of material. Impervious cover includes but is not limited to rooftops, buildings, streets, roads, decks, swimming pools, and any concrete or asphalt.

**NATIVE PLANTS** – Indigenous terrestrial and aquatic species that have evolved and occur naturally in the land where University City now sits.

**STORMWATER** – Water that originates as precipitation on a particular site, basin, or watershed.

**STORMWATER FLOW** – Flow resulting from Stormwater traveling overland as sheet flow or as concentrated flow in natural channels, streams, or structural conveyance systems.

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Section 420.030

Section 420.090

## ARTICLE III

### General Provisions

#### **Section 420.030. Lands to Which this Chapter Applies**

This Chapter shall apply to all lands within the boundaries of the City of University City, Missouri, except those in the High Density Residential and the Joint Development Zoning Overlay districts as described in the University City zoning code.

#### **Section 420.050. Property Subject to the Law**

A property will become subject to this Chapter when there is Development on a property covered by Section 420.030.

#### **Section 420.060. Compliance**

When a property becomes subject to this Chapter, the property owner or Developer must ensure that the property is able to capture and retain the increase in Stormwater Flow caused by the Development so that there is no net increase of Stormwater Flow from the property.

A. For purposes of this Chapter, one square foot of Impervious Surface is found to cause an increase of 0.6 gallons of Stormwater Flow on the property.

B. Compliance with this Chapter may be achieved by any of the following methods, or by any other method deemed effective by the Floodplain Administrator.

1. Plant Native Plants, such as grassy and herbaceous vegetation
2. Direct new Impervious Surface runoff to permeable areas on the property
3. Install tree cover
4. Install permeable pavement
5. Aerate lawns
6. Build green roofs
7. Install rain barrels to capture and slow runoff
8. Install infiltration basins such as rain gardens and bioswales
9. Direct water into stormwater detention basins, such as ponds

#### **Section 420.090 Responsibility for Compliance**

Except as otherwise provided in this Chapter, the following entities are jointly and severally liable for compliance with 420.060:

- A. Any person with a property interest in a property subject to this Chapter, and

# DRAFT – July 5, 2023

- B. A Developer that contributed to Development that led to that property becoming subject to this Chapter under section 420.050.
  - 1.

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Section 420.110

Section 420.110

## ARTICLE IV

### **Administration**

#### **Section 420.110. Director of Public Works and Parks**

The Director of Public Works and Parks shall designate a person or persons responsible for management of the requirements of this Chapter.

A.

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Section 420.270

Section 420.300

## ARTICLE V

### Other Provisions

#### **Section 420. 270. Abrogation and Greater Restrictions**

It is not intended by this Chapter to repeal, abrogate, or impair any existing easements, covenants or deed restrictions. However, where this Chapter imposes greater restrictions, the provisions of this Chapter shall prevail. All other ordinances inconsistent with this Chapter are hereby repealed to the extent of the inconsistency only.

#### **Section 420.280. Compatibility with Other Regulations and Requirements**

Except as specifically provided, this ordinance is not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, statute, or law. The requirements of this ordinance should be considered minimum requirements, and where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule, regulation, or other provision of law, whichever provisions are more restrictive or impose higher protective standards for human health or the environment shall be considered to take precedence.

#### **Section 420.290. Interpretation**

In their interpretation and application, the provisions of this Chapter shall be held to be minimum requirements, shall be liberally construed in favor of the Governing Body, and shall not be deemed a limitation or repeal of any other powers granted by State Statutes.

#### **Section 420.300. Severability**

If any Section, clause, provision, or portion of this Chapter is adjudged unconstitutional or invalid by a court of appropriate jurisdiction, the remainder of this Chapter shall not be affected thereby.

# Mitigate Future Flash Floods

## Support Bill #\_\_\_



The University Heights Neighborhood Association supports Bill # \_\_\_ to mitigate the damage caused by future urban floods. As we approach the first anniversary of the July 26 flash flood, the tragedy that resulted in over \$30 million in damages and condemned over 300 homes continues to loom over our community. As global temperatures continue to rise, the frequency and severity of extreme storm events will drastically increase. While University City alone cannot prevent the effects of climate change, there is another way the city can make a difference: by reducing the amount of land covered by impervious surfaces.

### **Flooding and Impervious Surfaces**

Urban flooding affects cities and towns around the world. Many have been able to relieve the burden these disasters inflict on residents through the successful and inexpensive practice of limiting impervious surface coverage. Impervious surfaces are water-resistant materials, like asphalt and concrete, which prevent water from entering the soil. They increase the likelihood of urban flooding by causing the rapid accumulation of stormwater into nearby rivers, resulting in the flooding of the surrounding area.

### **Proposed Legislation**

The ordinance will reduce the prevalence and impact of future flash floods by incorporating concepts that have already been used in Brentwood, Town and Country, St. Peters and Ladue:

- Mandate that almost every property development be offset by equivalent stormwater management practices (see back) so that no development has the potential to increase the risk and severity of flooding in University City.
- Create an implementation committee to assist property owners and builders in achieving compliance with this policy. The Public Works Director will be responsible for overseeing this committee along with other aspects of the legislation.

**Without action, flooding will continue to devastate the University City. Our community is searching for meaningful relief from these disasters, and we believe this ordinance is a significant step towards that change.**



## INDEX

**Definition: Green infrastructure** is any practice that uses or replicates natural systems to achieve a desired outcome. Green infrastructure looks to nature for advice, restoring and replicating ecological systems to create human benefits, <https://www.usgbc.org/resources/green-infrastructure>. Green infrastructure are **pollution control systems** which slow down, redirect to irrigation, and clean stormwater. Select Pretreatment such as large rocks to collect debris, and native flora & fauna which thrive on organic/carbon rich stormwater.

#	Green Infrastructure	Offset Guidelines for Ratio of New Impervious surface area: to green infrastructure improvement	References
1	Plant Native Plants, such as grassy and herbaceous vegetation	<b>5:1</b>	<a href="https://grownative.org/learn/manage-stormwater/">https://grownative.org/learn/manage-stormwater/</a>
2	Direct new Impervious Surface runoff to permeable areas on the property	<b>5:1</b> Ex: new 100 sf patio : 20 sf permeable area offset	<a href="https://www.missouribotanicalgarden.org/sustainability/sustainability/sustainable-living/at-home/rainscaping-guide/design-and-build-a-rain-garden">https://www.missouribotanicalgarden.org/sustainability/sustainability/sustainable-living/at-home/rainscaping-guide/design-and-build-a-rain-garden</a>
3	Install tree cover	See Arbor Day Foundation calculations for Stormwater offset	<a href="https://www.arborday.org/calculator/">https://www.arborday.org/calculator/</a>
4	Install permeable pavement	No offset required	
5	Aerate lawns		
6	Build green roofs	<b>5:1</b> Allow for 10% evaporation in green roof capacity for stormwater offset	<a href="https://www.epa.gov/sites/default/files/2018-09/documents/greenroofs_casestudy_kansascity.pdf">https://www.epa.gov/sites/default/files/2018-09/documents/greenroofs_casestudy_kansascity.pdf</a> <a href="https://sustainability-innovation.asu.edu/urban-climate/green-roof-calculator/">https://sustainability-innovation.asu.edu/urban-climate/green-roof-calculator/</a>
7	Install rain barrels to capture and slow runoff	<b>1:1</b> Ex:1 gallon of increased runoff: 1 gallon of rain barrel capacity	1 sf of Impervious Surface causes an increase of 0.6 gal of Stormwater Flow on the property
8	Install infiltration basins such as rain gardens and bioswales	<b>5:1</b>	<a href="https://www.missouribotanicalgarden.org/sustainability/sustainability/sustainable-living/at-home/rainscaping-guide/design-and-build-a-rain-garden">https://www.missouribotanicalgarden.org/sustainability/sustainability/sustainable-living/at-home/rainscaping-guide/design-and-build-a-rain-garden</a>
9	Direct water into stormwater detention basins, such as ponds	As low as <b>100:1</b> (1%) Ex: If you paved 1 acre (43,560 sf) property, the area of the green infrastructure base would be around 435 sf with a 1 ft depth and 3:1 side slopes.	Design variables include ponding depth, side slopes, pond bottom area, length & width of pond top, runoff coefficient, drainage area, % impervious, coefficient of permeability of filter media, land use & zoning  <a href="http://chesapeakestormwater.net">http://chesapeakestormwater.net</a>

Research on Green Infrastructure has increased with more publications on design & results. Select similar climate region for design parameters.