



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, February 6, 2024
3:30 PM**

1. MEETING CALLED TO ORDER

2. ATTENDANCE-ROLL CALL

3. APPROVAL OF AGENDA

4. APPROVAL OF MINUTES

❖ January 9, 2024

5. CITIZEN COMMENTS

6. ANNOUNCEMENTS BY COMMISSIONERS

7. SUBCOMMITTEE REPORTS

❖ January 18, 2024

❖ January 24, 2024

8. NEW BUSINESS

9. OLD BUSINESS

➤ **Status update:**

❖ Partnership with University of Health Sciences & Pharmacy

❖ Tunnel study

❖ Tunnel cleaning

10. COUNCIL LIAISON COMMENTS

11. ADJOURNMENT



Storm Water Commission
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MINUTES OF THE STORMWATER COMMISSION

January 9, 2024

1. **Call to Order.** The fortieth meeting of the Stormwater Commission (Commission) was called to order at 3:38 PM by Chair Todd Thompson.
2. **Attendance-Roll Call.** The following Commission members were present at the Community Center: Susan Armstrong, Garry Aronberg, Robert Criss, Mark Holly, Eric Karch, Todd Thompson. Also, in attendance were Councilman Dennis Fuller, Darin Girdler, Director of Public Works; Mirela Celaj, Assistant Director of Public Works; and John Mulligan, City Attorney.
3. **Visitor:** Many visitors were present.
4. **Agenda.** Publish agenda was approved (Karch, Thompson):
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 November 7, 2023, meeting were amended: in item 10.1 correct spelling to Fitz. The amended minutes were approved by voice vote (Armstrong, Aronberg). Nov 14 and Nov 30 ad hoc mtg minutes approved by voice vote (Thompson, Aronberg) (Armstrong, Holly).
6. **Citizen Comments:**
 - 6.1. Dave Sandel, Company address 6900 Delmar, informed the Commission that his company manufactures flash flood sensors with a weather head and security features. Marketing will begin soon. He would like to work with the Commission and commended us for our work. Commissioners don't recall receiving messages from Mr. Sandel's company in the past but Commissioners look forward to hearing more about his system. Commissioner Criss pointed out that we have set-up a well calibrated flash flood warning system.
 - 6.2. Barbara Chicherio comments: suggested that the Commission move comments to end; she looks forward to hearing about the Commission's progress on the impervious ordinance.
 - 6.3. Stephanie Todd, Amherst: present to support ordinance to reduce impermeable surfaces. She had sent to Commissioners a video about storemwater overflowing the gutters along the south side of 7100 block of Amherst. The overflowing gutters may be caued by inadequate and inefficient inlets along Midland and Amherst. St. Louis County officials are looking into improvements along Midland. She encouraged University City to make improvements. Councilman Fuller pointed-out that Amhurst at that point is a private street in University Park Subdivision. Councilman Fuller will assist Ms.Todd in making contact with the Subdivision trustees. Mr. Mulligan informed Ms. Todd that residents may use neighborhood improvement district funding for improvements in private subdivisions – NID funding is a state-authorized loan program for neighborhood groups; the loans are administrated through municipalities but the loans are paid by the neighborhood group.



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- 6.4. Extensive free flowing discussion by visitors and Commissioners occurred about MSD's project to repair the reach of River des Peres east of Pennsylvania Avenue. Unease centered on extensive construction easement sought and lack of natural channel features used in the repair. The wide construction easement would remove many mature trees and impact mature landscaping.

7. Announcement By Commissioners.

- 7.1. Remote Sensing. Commissioner Holly is working with Jackson Potter, professor of mechanical engineering at Washinton University to identify remote sensing projects of stormwater problems in U. City. The identified projects would become the focus of graduate student and senior research.
- 7.2. Dubuque Bee Creek Improvement. Several Commissioners and residents reported on a presentation that described the re-opening of and restoration of a piped creek in Dubuque, Iowa. Bee Creek Restoration is a resident-driven 30-year effort to remove 4500-ft-long piped reach and return the creek to meandering open channel with new floodplain benches. Two large near-channel detention basins are part of the restoration. 320,000 CY for earth have been removed. Six houses were removed by buyout. Backflow prevention – a dam feature – is part of the project to prevent the downstream channel from back flowing into Bee Creek. Restoration is in progress – about half complete. Federal and State grants of \$250,000,000 make up most of the funding. City staff completed the grant applications.
- 7.3. Model of RdP Tunnel. Commissioner Holly prepared a model of the River des Peres tunnel. The tunnel's upstream end is near Vernon and Kingsland. The model incorporated LiDAR topographic data and flow data collected during the July 26, 2022 flood. The flow data was collected with meters that Commissioners Criss and Stein had installed. Commissioner Holly prepared two models: (a) pristine unobstructed conditions and (b) 10 percent obstructed. The two models evaluated the sensitivity of the tunnel to obstructions. The models demonstrated that significant flow reduction when the tunnel is 10 percent obstructed. Commissioner Holly concluded that there is a need for periodic inspection and maintenance to remove obstructions – perhaps on a 10-year interval.

Commissioner Criss indicated that the modeling supports the need for flow and depth monitoring at the tunnel entrance. That monitoring had been discussed at previous Commission meetings.

8. Committee Reports.

- 8.1. Impermeability Ordinance Ad Hoc Committee. The committee is now refining the mitigation offset table to meet a goal of nearly no increase in runoff when new impermeable area is added to a site. Additionally, the ad hoc committee is refining the matrix table offsets that will be easy for residents to implement. Amended soil mitigation option is under evaluation as an effective method for small sites. Mirala Calaj will be added to ad hoc committee to add the staff's insight. An education component will be added. The ad hoc committee has set a goal to bring recommendations to Commission by Feb 6.



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9. New Business. None

10. Old Business. None.

11. Council Liaison Comments (Dennis Fuller).

- 11.1. Councilman Fuller reported that the new comprehensive city plan was adopted by the Council on January 8. The Plan Commission worked hard to identify the community goals and visions and to incorporate them into the plan.
- 11.2. Four new businesses opened at Olive Market.
- 11.3. Parkview Senior Housing on Westgate will be rehabbed in late 2024.
- 11.4. FEMA grants continue to be used to rehab Centennial Commons. It will be fully restored later in 2024.

12. Adjournment. Motion to adjourn passed at 5:38 PM (Aronberg, Armstrong).

The minutes were prepared by Garry Aronberg.

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**MINUTES OF THE STORMWATER COMMISSION – AD-HOC SUB-COMMITTEE
TO REVIEW UNIVERSITY CITY MUNICIPAL CODE REVISIONS PROPOSED BY THE UNIVERSITY
HEIGHTS FLOOD TASK FORCE
January 18, 2024**

Call to Order. The subcommittee listed above was called to order at 3:35 PM by Eric Karch.

- 1. Attendance-Roll Call.** The following Commission members were present at City Hall (2nd Floor conference room): Susan Armstrong, Garry Aronberg, and Eric Karch. City representative Mirela Celaj attended as well. This was a non-quorum meeting, as allowed by our bylaws.

Agenda. To discuss revisions to the proposed code language, and specifically the matrix of eight (8) proposed mitigation practices presented by the University Heights Association Flood Task Force (version dated 11/10/2023 Impervious Surfaces Draft Bill). This meeting is being held in response to an action item from the 11/14 Ad-Hoc Subcommittee meeting and is a continuation of topics discussed on 11/14/2023 and 11/30/2023.

2. Old Business

- Mirela provided (in advance of the meeting) the City of Kirkwood “Stormwater Management Guidance” (January 2022).
<https://www.kirkwoodmo.org/home/showpublisheddocument/7847/637854587558070000>
- What is impervious? Kirkwood does not consider decks to be impervious. What if the slats abut with no gaps versus most decks with slats that have gaps? Discussion that there may be value to be consistent with neighbors.
- Design Rainfall / storm event
 - How does Kirkwood handle first flush? Using a volume generated from 1.14 inches of rain.
 - MSD uses 1.14 inches for water quality BMPs
 - U City - Mirela expressed that current U City Code defers to MSD, so using 1.14 inch design storm is appropriate for U City ordinance as well.
 - Our matrix will be for a new addition of impervious area on top of what was formerly grass. In other words, we are targeting the differential. If replacing 100 SF of patio with 100 SF of new shed, there would be no new mitigation offset required.
- **Item #1 - plant native plants, such as grass and herbaceous vegetation**
 - 0.31 new impervious area : 1 new planting site
 - 100 SF of new impervious : 330 SF of new native planting
- **Item #2 – amended soil**
 - Amended Soil
 - Garry presented calcs showing that the offset for a 6-inch deep amended soil area would need to be 53 SF to address 100 SF of new impervious area. Offset is 2:1.
 - 100 SF of new impervious area requires
 - 53 SF of 6-inch deep amended soil
 - 27 SF of 12-inch deep amended soil



- **Item #3 – install tree cover**
 - Mature oak tree canopy covers 314 SF.
 - 100 SF of new impervious area produces 73 gallons of runoff
 - Therefore, 1 mature oak would offset 100 SF, because the average runoff coefficient would be revised.
 - Effectively, the offset is similar to the offset required by native vegetation.
 - Discussed that different trees have a different mature tree canopy. Listing different canopies for different species would be difficult.
- **Item #4 – Install permeable pavement**
 - Susan suggesting deferring to Kirkwood manual (page 31)
 - 100 SF of new impervious requires 40 SF of 6-inch deep permeable pavement, for example.
- **Item #5 – Aerate lawns**
 - Killed this due to maintenance difficulties
- **Item #6 – Green roof**
 - Discussed that offset should be same as item #1 since it is essentially creating a native planting area. This is appropriate for a sloped roof.
 - Should there be a different offset for a flat roof ?
 - Discussed re-visit the offset to go from a runoff coefficient of 0.95 (impervious area) to a runoff coefficient of 0.1 (natives).
 - Evapotranspiration - this benefit is real, but should not be used as a design parameter since evapotranspiration benefit is on the year, but the ordinance is attempting to deal with a single storm event.
- **Item #7 – rain barrel**
 - Consider adding rain cisterns
 - 100 SF of new impervious area requires (1) 55-gallon rain barrel. This is because the differential runoff for converting 100 SF of grass to impervious is 49 gallons.
 - Ordinance should state that these features must be emptied between rain events to be functional.
 - MO Botanical Gardens shows that the rain barrel needs to be 73 gallons for 100 SF. However, this does not account for the fact that grass has runoff. Once that grass was removed to build the impervious area, the change is just the differential. That's why our calcs show only 49 gallons rain barrel for 100 SF.
- **Item 8 – Install Infiltration basins such as rain gardens and bioswales and dry wells**
 - Dry wells are not currently an option on the matrix.
 - Susan asked if dry wells are included in the USGBC LEED manual. They are.
 - <https://www.usgbc.org/credits/homes/v2008/ssc4>
 - Mirela says that a dry well was one of the most popular BMPs used in Crestwood to mitigate new impervious area.
 - Discussed adding this to item #8. Susan noted that U Heights would want us to require that the surface is grass, which is consistent with what Kirkwood requires.



- **Item 9 - Detention basin**
 - Garry presented calcs showing that a detention basin needs to contain 6.7 CF to contain the runoff from a 1-year storm.
- **Status of Matrix Review**
 - The group feels comfortable with decisions made to clarify Items 1 thru 7. Items 8 and 9 need additional work to clarify. At that point, a revised draft of the matrix can be presented for discussion.
- **Communities whose guidelines and/or ordinances that were reviewed:** Dubuque, Iowa's Bee Branch, all the communities in the HR Green report (Town & Country/Olivette/etc"), Kirkwood, Missouri, and Tulsa, Oklahoma
- 3. **New Business**
 - **Mirela presented some examples of plans she has been reviewing to illustrate issues she feels should be addressed by changes to City ordinances.**
 - Mirela will send the group some example plans and MSD's comments so that the group may review the items in preparation for a future discussion. The following were a couple of the examples briefly discussed.
 - New house (development is < 1 acre)
 - Though the development is < 1 acre, the plans show amended soils being incorporated.
 - It is assumed that MSD will have no comment on the water quantity or water quality impacts of this development because the land disturbance is <1 acre. However, MSD can and will comment on other aspects. Mirela directed us to a summary on page 2 of the Kirkwood stormwater guidance document for a list.
 - U City ordinance says don't issue any new permit until MSD approves the plans. U City is likely to approve the plans.
 - A question seems to be to what extent should U City comment on the amended soils?
 - House with burned garage.
 - The garage was originally built at the property line.
 - Homeowner wanted to rebuild garage in same location. There was a challenge for the property owner to collect the stormwater runoff to their property, due to the location, roof pitch, small size of the lot and amount of the impervious surface(including the deck being 4 feet from the garage).
 - Current Code would not allow a new garage to be built at the property line.
 - Current Code does not address the fact that replacement structures must be built to current code. Therefore, the homeowner wants to be grandfathered. This location would continue to allow runoff to flow directly onto the neighboring property, which violates other portions of the City Code.
 - One option was to use a rain barrel to collect the water. Ultimately, the homeowner ended up collecting the water at the previous system (collecting the gutters to the front of the garage to the existing drain). U City approved the plan.
 - Before the next meeting, Mirela will provide the group with the development plans and MSD's comments on these plans. Mirela will also provide a brief summary of the questions she would like the group to consider so that we can be prepared to discuss.



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4. **Next meeting** – Business was not completed. The group agreed to meet again 1/24/2024 at 3:30 at City Hall 2nd Floor. Mirela will reserve the room.
5. **Adjournment.** Adjourned at 5:15 PM.

Minutes Preparation. The minutes were prepared by Eric Karch.

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**MINUTES OF THE STORMWATER COMMISSION – AD-HOC SUB-COMMITTEE
TO REVIEW UNIVERSITY CITY MUNICIPAL CODE REVISIONS PROPOSED BY THE UNIVERSITY
HEIGHTS FLOOD TASK FORCE
January 24, 2024**

Call to Order. The subcommittee listed above was called to order at 3:51 PM by Eric Karch.

1. **Attendance-Roll Call.** The following Commission members were present at City Hall (2nd Floor conference room): Susan Armstrong, Garry Aronberg, and Eric Karch. City representative Mirela Celaj attended as well. This was a non-quorum meeting, as allowed by our bylaws.

Agenda. To discuss revisions to the proposed code language, and specifically the matrix of eight (8) proposed mitigation practices presented by the University Heights Association Flood Task Force (version dated 11/10/2023 Impervious Surfaces Draft Bill). This meeting is being held in response to an action item from the 11/14 Ad-Hoc Subcommittee meeting and is a continuation of topics discussed on 11/14/2022, 11/30/2023 and 1/18/2024.

2. **Old Business**

- **Discussed that MSD considers University City to be a “zero-increase” watershed. This is a more-stringent category than other watersheds. MSD has applied “zero-increase” to U City due to known flooding issues on the River Des Peres.**
- **Item #3 – install tree cover (REVISITED)**
 - Last meeting, we said, 1 mature oak would offset 100 SF.
 - Reviewed the concentration on runoff calculations based on rational method versus annual rainfall.
 - Total rainfall onto a 100 SF pad of concrete = $100 \text{ SF} \times 1'' \times 12 = 8 \text{ CF}$
 - A 1-inch caliper tree = 40 gallons / (7.48 CF/gallon) = 5.3 CF/year
How many storms per year? Our area gets 40 inches of rain per year. Hard to say how many rain events we get per year. Since rainfall events are often < 1 inch, it could be > 40. However, lets assume 10 events per year to be conservative.
 $5.3 \text{ CF/year} / 10 \text{ storms per year} = 0.53 \text{ CF/storm}$
So...one tree (1-inch caliper) would catch 0.5CF as compared to a 100 SF pad receiving 8 CF of total rainfall. In other words, the tree does not catch enough rain to offset the runoff from the new development.
 - A 20-inch caliper pin oak tree = 5,541 gallons/year / (7.48 CF/gallon) = 740 CF/year
 $740 \text{ CF/year} / 10 \text{ storms/year} = 74 \text{ CF/storm}$
So...one tree (20-inch caliper) would catch 74 CF as compared to a 100 SF pad receiving 8 CF of total rainfall. In other words, the tree does catch enough rain to offset the runoff from the new development.
 - This re-assessment helped us confirm that our previous assessment was reasonable. However, the group decided that we should account for two different tree sizes: overstory (biggest trees) and understory (smaller trees). 1 mature overstory (large) tree can be used to offset 500 SF of new impervious area. 1 mature understory (medium/small) tree can be used to offset 100 SF of new impervious area. How do we define what tree species are understory vs overstory? One



possible source is Ameren’s tree planting guide for under or beside the power lines.
<https://www.ameren.com/-/media/illinois-site/files/environment/plantingtrees.ashx>

- Discussed how to implement item #3:
 - Forest Activity Permit - Residents can apply for a permit to plant a tree within the road right of way. City Forester (Jacob Kaiser) would need to approve the permit and the species to be planted. More information can be found in the tree ordinance (Article II Trees and Shrubs, 505.160 C)
<https://ecode360.com/28296103#28296103>.
 - Mirela suggested involving the U City Arborist to approve of the developer’s tree planting plan. This would help address the following possible complications. Planting trees too close together would compromise the tree’s health. Planting trees too close to a house or utility (e.g. power line or sanitary lateral) should be avoided.
 - Consensus that requiring approval from the City’s arborist should be required.
- **Item 8 – Install Infiltration basins such as rain gardens and bioswales and dry wells**
 - Rain Garden - Discussed that a conservative estimate of volume is a 1-year, 1-hour storm which would produce 6.7 CF of runoff. Using the MO Botanical Garden suggested ratio of 5:1 means that a 100 SF impervious area would require a 20 SF basin. Eric discussed simplified calculations for an idealized perfect rectangle. To hold 6.7 CF, a 20 SF basin would need to be 4 inches deep if it were a perfect rectangle. A perfect rectangle is not feasible on a sloped yard with a sloped berm, but is nearly feasible on a flatter yard. The offset table should show both scenarios. Garry offered to revisit and populate the following table.

For a 100 SF new impervious area, the following table sets the required rain garden size

	4 inch deep	6-inch deep	12-inch deep
Area of Rain Garden (in a Flat Yard, e.g. 10 horizontal : 1 vertical)			
Area of Rain Garden (in a Steep Yard, e.g. 3 horizontal : 1 vertical)			

- Dry Well – discussed defaulting to Kirkwood guidelines for the design of the dry well. Garry offered to look at how these guidelines relate to the volume calculations we’ve been discussing for item 8. The sizing utilized by U City should essentially use the same total volume as discussed in the rain garden, but would be divided by 30% to account for the void space within the gravel. This void ratio depends on the gravel size and gradation, and could be adjusted. Garry offered to provide a suggestion.
- **Item 9 - Detention basin**
 - Discussed that at scale of a residential lot, the area and volume sizing of the detention basin is the same as the rain garden sizing.
- **Method of determining rainfall runoff volume used to determine the offsets for all matrix items:**
 - The goal clarified by the U Heights Flood Task Force at the 11/14/2023 meeting was:



- Improve U City code which does not currently regulate new impervious area less than 1 acre. Improvement should be as close as you can get to zero increase in stormwater runoff.
- Differential rainfall runoff – The offsets discussed to date (on 11/30/2023, 1/18/2024, and 1/25/2024) have been based on using a differential rainfall runoff increase. The understanding is that turfgrass itself creates a certain amount of rainfall runoff. A development to change turfgrass to impervious would generate more rainfall runoff. The matrix items would then be sized to handle these differential runoff increases. In doing so, the U Heights goal for no increase would be met.
- At the end of today’s meeting, Mirela presented an alternative. She presented an example calculation for a dry well, which was based on total runoff volume. This approach would create an enhanced treatment of not only the new impervious area from the development, but also additional pre-existing runoff. Mirela pointed out that asking developers to understand the differential runoff might be asking too much. There was agreement on that point, but this was countered by the fact that although the matrix would be based on the differential runoff, the matrix could be presented in a way that the developer would not need to perform the calculations themselves. This would be in keeping with the goal clarified by the U Heights Flood Task Force on 11/14/2023 to:
 - Include a table of acceptable stormwater offsets to new impervious area that can be understood and installed by a homeowner or craftsman.
- The group did not reach agreement on whether the alternative rainfall runoff method should be used. If it is, the group would need to revise the offsets determined on 1/18/2024.
- **Status of Matrix Review**
 - The group spent a majority of the meeting re-visiting matrix item #3. We then advanced items 8 and 9, but items 8 and 9 need additional work to clarify. At that point, a revised draft of the matrix can be presented for discussion.
 - Presentation – Discussed that once the ad-hoc committee finalizes suggested revisions to the University Heights proposed ordinance, they should make a summary presentation to the Stormwater Commission and request a motion to accept. Susan offered to make the presentation.
- **Subjects raised, but not yet fully addressed**
 - Flatwork permit – Mirela offered to provide example code language via email for consideration.
 - Definition of impervious area – Mirela suggested this is necessary for enforcement.
 - Definition of rainfall runoff volume – Determine whether to use differential rainfall runoff or full rainfall runoff,
 - Item #3 - Should credit be given to a pre-existing tree? Should a requirement include using only trees native to Missouri?
 - Item #8 and #9 sizing
 - Should the basin be sized for the actual drainage area that it receives? In other words, consider an example where the basin receives not only 100 SF of new impervious area, but also 50 SF of grass. The basin should be sized to accommodate all of this drainage or the



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basin will become overwhelmed, which could lead to increased maintenance or even premature failure of the basin.

- Should there be a requirement that the developer demonstrate the watershed area draining to the selected location for the basin, and that the required area and depth can be achieved at this location?

3. Next meeting – Business was not completed. The group agreed to further this discussion via email.

4. Adjournment. Adjourned at 5:47 PM.

Minutes Preparation. The minutes were prepared by Eric Karch.

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