



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

**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 (2<sup>nd</sup> 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.

University City\20240124\_StrmWtrComm.\_AdHOC\_Aproved Minutes