

**To the Mayor and Members of the City Council****October 4, 2022**

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SUBJECT: GREEN STORMWATER INFRASTRUCTURE

The purpose of this Informal Report (IR) is to respond to Council questions from the August 22nd Work Session regarding incentives given to developers for Green Stormwater Infrastructure (GSI) and the flood mitigation benefits that can occur from GSI. GSI is a very broad term that commonly includes a wide range of best management practices that promote infiltration and absorption of rainfall at or near where it falls to help reduce and treat runoff. Examples of GSI include: bio-retention cells or swales, rain gardens, permeable pavers, green roofs and rain barrels.

The City promotes GSI at Pre-Development (PDC) meetings with developers and incentivizes GSI in private development through award of Stormwater utility fee credits for non-residential properties, form based code set back exceptions and additional floors (such as at the Berry/University Urban Village), and recognition through the Green Business Partners and Environmental Excellence awards.

The City has implemented GSI in streets and at City owned facilities such as bio-retention at Handley Street, tree wells along East Rosedale, rainwater-collection tanks at the Rolling Hills Tree Farm, and parking lot bio-swales at the North Service Center, Bob Bolen Public Safety Complex, and Chisholm Trail Community Center/Park. GSI has been voluntarily implemented in private development in the City. Examples include: the living roof and parking lot medians at the Botanical Research Institute of Texas, Silva tree cells at Sundance Square, permeable pavers at the parking lots at Texas Christian University, bio-retention cells at the Tarrant Community College southwest campus, and the green roof at the Texas Health Clearfork Hospital. Example GSIs are shown in the attachment.

Stormwater Facilities Maintenance Agreements (SWFMAs) associated with these developments outline maintenance requirements for such GSI. The amount of runoff volume held and released from GSI is typically limited to capturing and treating up to the first 1.5 inches of rainfall over 24 hours due to limitations of volume storage in specialized treatment media used in GSI. This rainfall volume storage corresponds to less than a 1-year event.

Past evaluation of GSI by the Stormwater Management Program has shown GSI to have limited benefits for flood mitigation. For example, in the highly flood prone Central Arlington Heights area, it was determined that roughly 60 acre-feet of storage would be needed to mitigate the 100-year storm (1% chance of occurrence in any given year) or that roughly 20 acre-feet would be needed to mitigate flooding from a 5-year storm (20% chance of occurrence in any given year). In comparison, storage resulting from various GSI approaches for Central Arlington Heights provided the following:



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Method	Storage Volume Provided
Permeable Pavers covering 1,000 linear feet of neighborhood street, 24 feet wide	0.50 acre-feet
Bio-swales along 1,000 linear feet of roadsides	0.10 acre-feet
<u>50-gallon rain barrels installed on 450 properties</u>	<u>0.27 acre-feet</u>
Total	0.87 acre-feet

This case study shows that GSI can have flood reduction benefits for smaller storm events (less than 1 year event) but that it does little to mitigate flooding for larger rain events unless significant amount of additional storage is available through other structural means such as detention ponds and underground storage.

GSI, when properly designed, constructed and continually maintained is capable of providing stormwater treatment, aesthetic, environmental, and some flood reduction benefits. Due to the inter-disciplinary nature of GSI, collaboration between staff from different City departments and with external partners is critical. Staff from Transportation & Public Works, Code Enforcement, Planning and Data Analytics, Development Services, and Parks & Recreation continually collaborate to promote GSI in private development, and implement GSI in City projects where feasible.

The following collaborative efforts are highlighted among other on-going activities:

- Potential overlay zones with different Stormwater treatment requirements based on proximity to economically and ecologically sensitive areas;
- Promoting during PDCs the integration of GSI with other elements of development such as permeable pavers for parking lots;
- Engagement with other Cities in DFW through the Integrated Stormwater Management (iSWM) program of the North Central Council of Governments (NCTCOG);
- Continued evaluation of GSI on City projects, and implementation wherever feasible and practicable; and
- Study of enhanced storage and infiltration of runoff along creek corridors with setbacks from edge of creeks.

Questions about this Informal Report can be directed to Ranjan Muttiah, Sr. Professional Engineer, Stormwater Management at 817-392-7919.

David Cooke
City Manager



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The Berry/University Form Based Code is located at the following link:

<https://www.fortworthtexas.gov/departments/planning-data-analytics/planning/urbanvillages/berry-university>



Exhibit shows the area of development covered by the Berry/University Form Based Code



Bio-retention at Tarrant Community College Southwest campus



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Silva plant cells at Sundance Square Plaza



Green roof at Texas Health Clearfork Hospital



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Permeable pavers at Texas Christian University



Example roadside bio-retention (Source: San Antonio River Authority)



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Rain barrel at the Edwards Aquifer Authority (Source: Texas Water Development Board)