

MIAMI BEACH

COMMITTEE MEMORANDUM

TO: Public Safety and Neighborhood Quality of Life Committee Members

FROM: Eric Carpenter, City Manager

DATE: December 2, 2024

TITLE: DISCUSS IMPLEMENTATION OF RAIN GARDENS AND INCREASED NATURAL VEGETATION ALONG CITY ROADWAYS TO ENHANCE STORMWATER RUNOFF

RECOMMENDATION

The Administration recommends continuing the implementation of bioretention facilities through capital projects in areas with a minimum separation of two feet between the surface and the groundwater table. Due to the City's low elevation, only higher elevation areas are suitable for these solutions. For example, the bioswale pilot program on 59th Street and North Bay Road does not work as intended during extreme high tide events due to its low elevation, while the bioswale at Canopy Park works as intended all the time because of its higher elevation. Additional space within the right-of-way will also be required, which may need to be balanced with parking, sidewalks, and bike path needs. Any new bioretention or green stormwater infrastructure (BGSi) requests not currently planned under a neighborhood project will require a dedicated funding allocation.

The I-195 and Alton Road ramp systems are owned and maintained by FDOT. Any BGSi request involving this area will require FDOT's approval and agreement on funding and maintenance responsibilities. The Administration recommends for the ultimate ownership and maintenance responsibility to remain with FDOT for this specific area.

BACKGROUND/HISTORY

On June 26, 2024, at the request of Commissioner David Suarez, the Mayor and City Commission (City Commission) approved a referral to the Public Safety and Quality of Life Committee (PSNQL), Item C4 AQ (Attachment A) to discuss the implementation of bioretention facilities such as rain gardens, bioswales and increased natural vegetation along City roads, to enhance the City's stormwater management system and protect the environment.

Recent storm and flooding events have highlighted the need for continued innovative solutions to improve resilient infrastructure in Miami Beach. Commissioner Suarez would like for Committee members to discuss the feasibility of implementing rain gardens and increased natural vegetation along City roadways as well as a bioretention area at the I-195 and Alton Road ramp system.

The City's coastal location is what makes Miami Beach such a desirable place in which to live, work and play. Its coastal location and relatively low elevation also makes it susceptible to frequent, intense storm events, rising sea levels, and extreme tidal events, also known as "sunny day" flooding. Additionally, as with all highly urbanized areas, non-point source pollution reduction is both an environmental management priority and critical to maintaining safe and aesthetically pleasing water-oriented lifestyles and tourism. Miami Beach is surrounded by the rich and diverse ecosystem of Biscayne Bay, a fragile ecosystem sensitive to stormwater runoff. Biscayne Bay is also a designated Outstanding Florida Water.

In 2018, the Urban Land Institute (ULI) issued its Stormwater Management and Climate

Adaptation Review report for Miami Beach. ULI praised the City for its proactive efforts and provided a series of recommendations, including further exploration and integration of Blue and Green Stormwater Infrastructure (BGSi) into the City's strategies and projects. The City, acting upon this recommendation, developed and adopted its BGSi Concept Plan, via Resolution No. 2020-31316 (Attachment B). The BGSi Plan included recommendations for the use of bioretention facilities for certain areas within the City.

In 2020, the City Commission accepted the Buoyant City Historic District Resiliency and Adaptation Guidelines, which includes place-based strategies that recommend ecological measures to help treat stormwater runoff before it enters Biscayne Bay through the use of green infrastructure within both private yards and along public streets.

On November 13, 2024, the discussion on the implementation of bioretention facilities such as rain gardens, bioswales and increased natural vegetation along City roads was placed on the agenda, however, not reached. It is scheduled to be heard at the December 2, 2024 PSNQL meeting.

ANALYSIS

Bioretention facilities consist of sunken landscape beds containing plants in a special soil mix called engineered soil, that sits above a gravel drainage layer. They replicate the natural water cycle by allowing water to enter the soil, evaporate to the air, or be ponded for a period of time. These systems use Florida-friendly plants that can withstand both occasional dry periods and flooding. The combination of these plants and soils provide natural filtration and treatment of stormwater runoff, removing many pollutants that threaten our environmental resources. Bioretention can take many forms including bioswales, rain gardens and vegetated curb extensions. These work well with infiltration and storage facilities below the ground. An overview of the Bioretention systems for the BGSi plan is attached for reference (Attachment C).

While these projects have many benefits, such as improving water quality in stormwater discharges to Biscayne Bay, providing minimal flood reduction, and reducing the urban heat island effect, the challenge with using these bioretention systems is that they work best when there is a separation of two feet or greater between the surface and the groundwater table. Due to the extreme low elevation of our City, only higher elevation areas are suitable for such solutions. Another drawback is that if not designed, installed and maintained correctly, these can promote mosquito breeding. Additional space is needed within the right of way as well, which may need to be balanced with parking, sidewalk, and bike path needs. Opportunities exist to replace pervious areas with green infrastructure; however, these are done through capital funding, under parks and neighborhood improvement projects.

The City has actively worked on the incorporation of BGSi solutions into several City projects, including the following (the first two are specific to bioswales):

- 59th Street and North Bay Road - bioswale pilot
- Canopy Park - bioswale, cistern system and injection wells
- Brittany Bay Park - hybrid living shoreline
- Maurice Gibb Park - hybrid living shoreline and stormwater retention through installation of Arc tanks
- Bayshore Park - stormwater retention pond, and permeable pavers in parking lot
- Collins Park Canal - hybrid living shoreline/ floodable park
- Muss Park - living shoreline

The City has additional projects in planning and design that aim to incorporate the recommended BGSi approaches, including the following:

- Flamingo Park Baseball Stadium - solar panels and stormwater retention system
- 72nd Street Community Complex - stormwater retention system, solar panels

- Park View Island - hybrid shoreline (planned)
- First Street and South Pointe - neighborhood improvement project
- North Shore D - North Beach Town Center neighborhood improvement project
- Indian Beach Park, Beach View Park, and West 40th Street - living shorelines

These City projects have net increases in tree canopy and mangroves. The implemented and proposed BGSi solutions harness natural processes using soils, vegetation, and the landscape as infrastructure. When thoughtfully designed, BGSi aims to improve water and air quality, reduce flooding impacts, mitigate ecosystem fragmentation, reduce elevated surface temperatures, and provide many other community benefits. The City's Stormwater Master Plan proposes to continue the implementation of BGSi as part of the proposed infrastructure projects. There may be opportunities to replace pervious surfaces with vegetation which may not necessarily meet the 2 feet of separation criteria for bioretention, but may improve upon a scenario of run off, minor flooding or ponding.

The I-195 and Alton Road ramp systems are owned and maintained by the Florida Department of Transportation (FDOT). The City has advised FDOT of flooding conditions at their stormwater retention systems at the I-195 and Alton Road ramp systems during high tide and major storm events. Any BGSi requests from the City to FDOT will require approval and agreement over funding allocation and maintenance requirements.

Road Jurisdiction:

The roads within our City are owned and maintained by one of the following entities: City of Miami Beach for local roads, FDOT and Miami-Dade County Department of Transportation and Public Works (DTPW) for major arterial and emergency roads. Funding for the maintenance of these assets is planned and allocated accordingly. A map indicating which entity has jurisdiction over the roads within our City is attached for reference (Attachment D).

FISCAL IMPACT STATEMENT

To be determined per project.

CONCLUSION

The Administration recommends continuing the implementation of bioretention facilities through capital projects in areas with a minimum separation of two feet between the surface and the groundwater table. Due to the City's low elevation, only higher elevation areas are suitable for these solutions. For example, the bioswale pilot program on 59th Street and North Bay Road does not work as intended during extreme high tide events due to its low elevation, while the bioswale at Canopy Park works as intended all the time because of its higher elevation. Additional space within the right-of-way will also be required, which may need to be balanced with parking, sidewalks, and bike path needs. Any new bioretention or green stormwater infrastructure (BGSi) requests not currently planned under a neighborhood project will require a dedicated funding allocation.

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Applicable Area

Citywide

Is this a "Residents Right to Know" item, pursuant to City Code Section 2-17?

Is this item related to a G.O. Bond Project?

Yes

No

Was this Agenda Item initially requested by a lobbyist which, as defined in Code Sec. 2-481, includes a principal engaged in lobbying? No

If so, specify the name of lobbyist(s) and principal(s):

Department

Public Works

Sponsor(s)

Commissioner David Suarez

Condensed Title

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VEGETATION ALONG CITY ROADWAYS TO ENHANCE STORMWATER RUNOFF