

# Smart, Sustainable, and Equitable Green Stormwater Systems in Urban Communities

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## The Challenge

Green stormwater infrastructure (GSI) systems are an increasingly prevalent stormwater mitigation strategy. While municipalities are increasingly looking to GSI, there is limited knowledge of GSI life-cycle dynamics, minimal real-time adaptive control, or standard process for data-informed design and maintenance, as well as a lack of consideration of social equity. As such, the effectiveness of GSI programs is limited. The community-stormwater challenge is to reach sustainable stormwater solutions, inclusive to social and environmental conditions. To advance GSI and find solutions to the community stormwater challenge we must address: *How do you sustainably include the community perspective in stormwater management?* And, specially,

- How to predict and account for communities' stormwater needs and wants?
- What educational resources are needed for meaningful engagement by the community?
- Can GSI performance and needs be predicted through dynamic feedback?

## The Need for Change

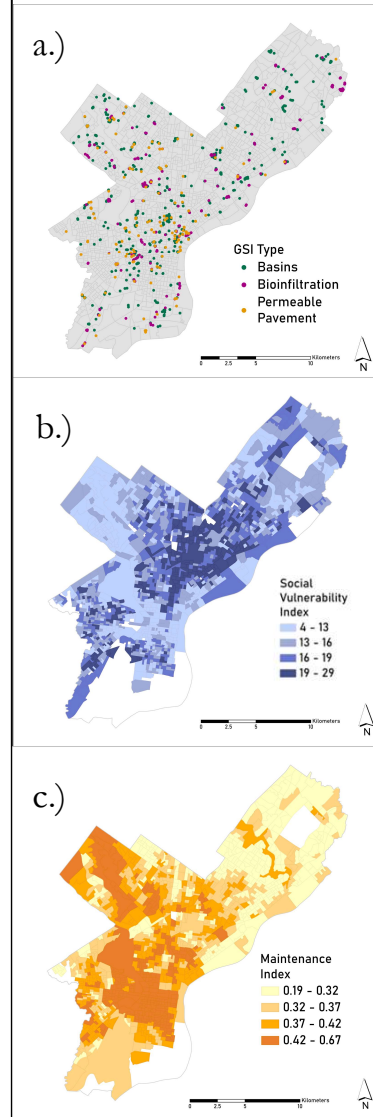


Figure 1: GSI (a), social vulnerability (b), and GSI maintenance needs (c) across Philadelphia.

Philadelphia, like many cities, has invested in GSI in response to EPA MS4 requirements. As this city-wide program grows (Fig. 1a) there is a growing demand for maintenance (Fig. 1c). Additionally, to best meet the needs for the community social vulnerabilities must be accounted for (Fig. 1b). The combination of a community's social makeup and environmental surrounding define both its stormwater challenge and the community's stormwater needs.

## Solutions through Smart Systems

There is a need for aligning understanding & expectation between stakeholders in stormwater

- **Municipalities:** face siloed & understaffed departments resulting in engagement fatigue when facing large challenges.
- **Community Organizations:** Aim to address "community" first, but face limitations for committing resources to the community.
- **Researchers/Funders:** Realize the importance of community engagement, but project length and scope create challenges in sustainable engagement and results in a mismatch of project's expectation & outcomes.

Future Goals: Smart systems, that leverage data driven tools, can advance the understanding and connectivity between these groups to allow for more sustainable and

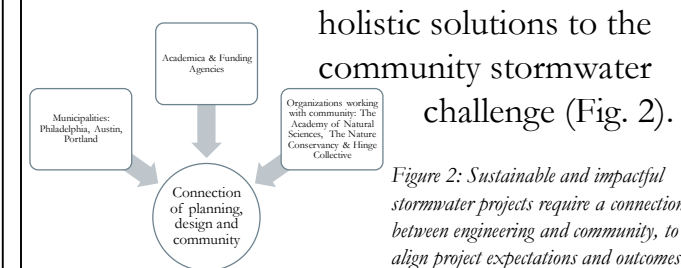


Figure 2: Sustainable and impactful stormwater projects require a connection between engineering and community, to align project expectations and outcomes.