



GREEN INFRASTRUCTURE IN HOUSTON:

A GUIDE FOR DEVELOPING AND MAINTAINING LID TECHNIQUES



TEAM MEMBERS

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STORMWATER OPERATIONS

Capital Improvement Planning (CIP)

- Neighborhood-Wide / Regional Solutions
- Can include channel improvement and street reconstruction
- Preventing structural loss and roadway inaccessibility

Stormwater Action Team (SWAT)

- Work with council districts for project selection
- Neighborhood-specific drainage upgrades
- Can respond to community reports of opportunities or issues
- Focus on achieving 2-yr LOS or providing opportunity for more

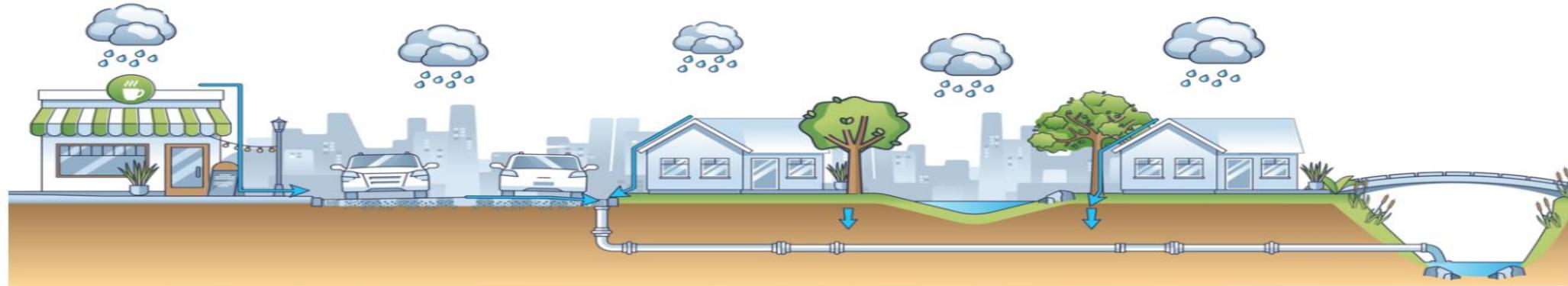
Local Drainage Plan (LDP) and Maintenance Operations

- Rehab and upsizing of offroad infrastructure
- Can also focus on culverts or outfall improvements
- Small-scale drainage impacts



COH STORMWATER INFRASTRUCTURE

- **Size = 670 Sq Mi**
- **Population = 2.3 Million**
- **Structures = 550,200**
- **1900 miles of Storm Lines (over 36 in)**
- **2800 miles of Roadside Ditch**
- **500 miles of channels (Maintained by HCFCD)**



HOW DOES GSI FIT IN?

GSI AS A SOLUTION

Capital Improvement Planning

- Projects broken down into phases - more focused solutions
- Need of mitigation/detention

LDP/Maintenance

- Resilient Solutions – reduce maintenance efforts over the long-term
- Convert infrastructure to something more functional/aesthetic

SWAT

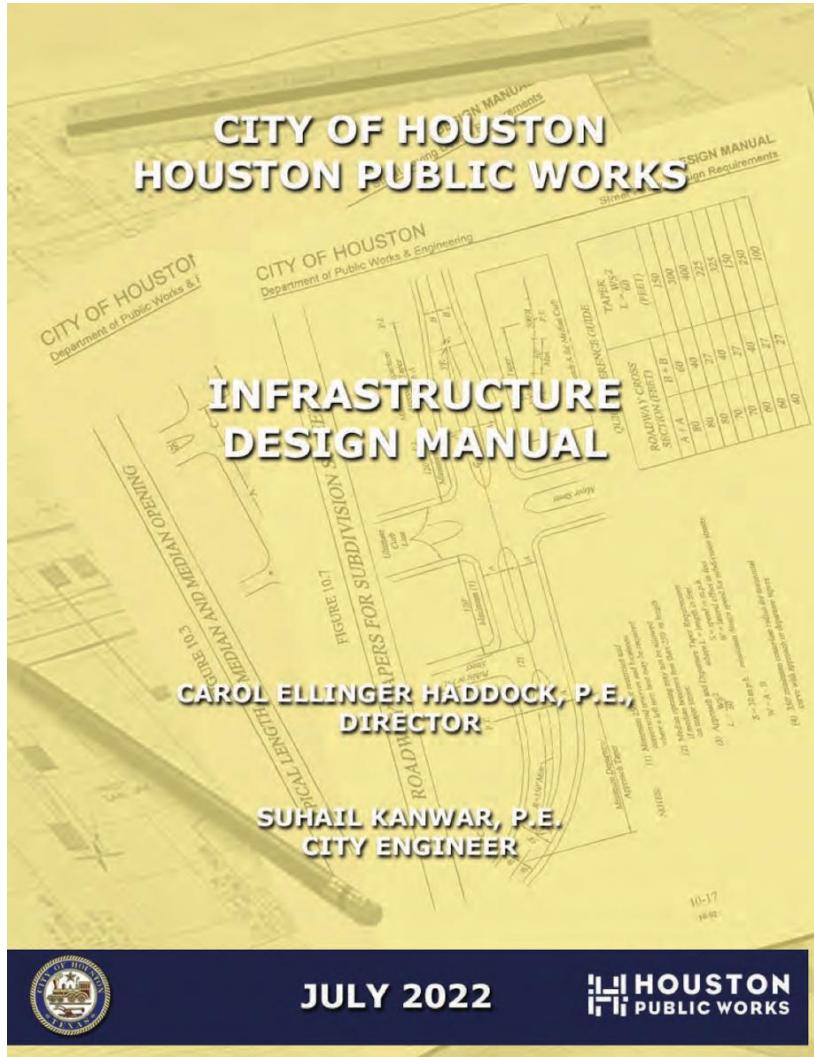
- Provides additional tools to achieve meaningful solutions in a local context
- Community Buy-in

Creates more collaborative solutions between Stormwater Planning as well as other Houston Public Works service lines (Street Design, Neighborhood Planning, etc)

LEADING THE DISCUSSION

- Collaborate
- Guidebook Development
- Pilot Projects

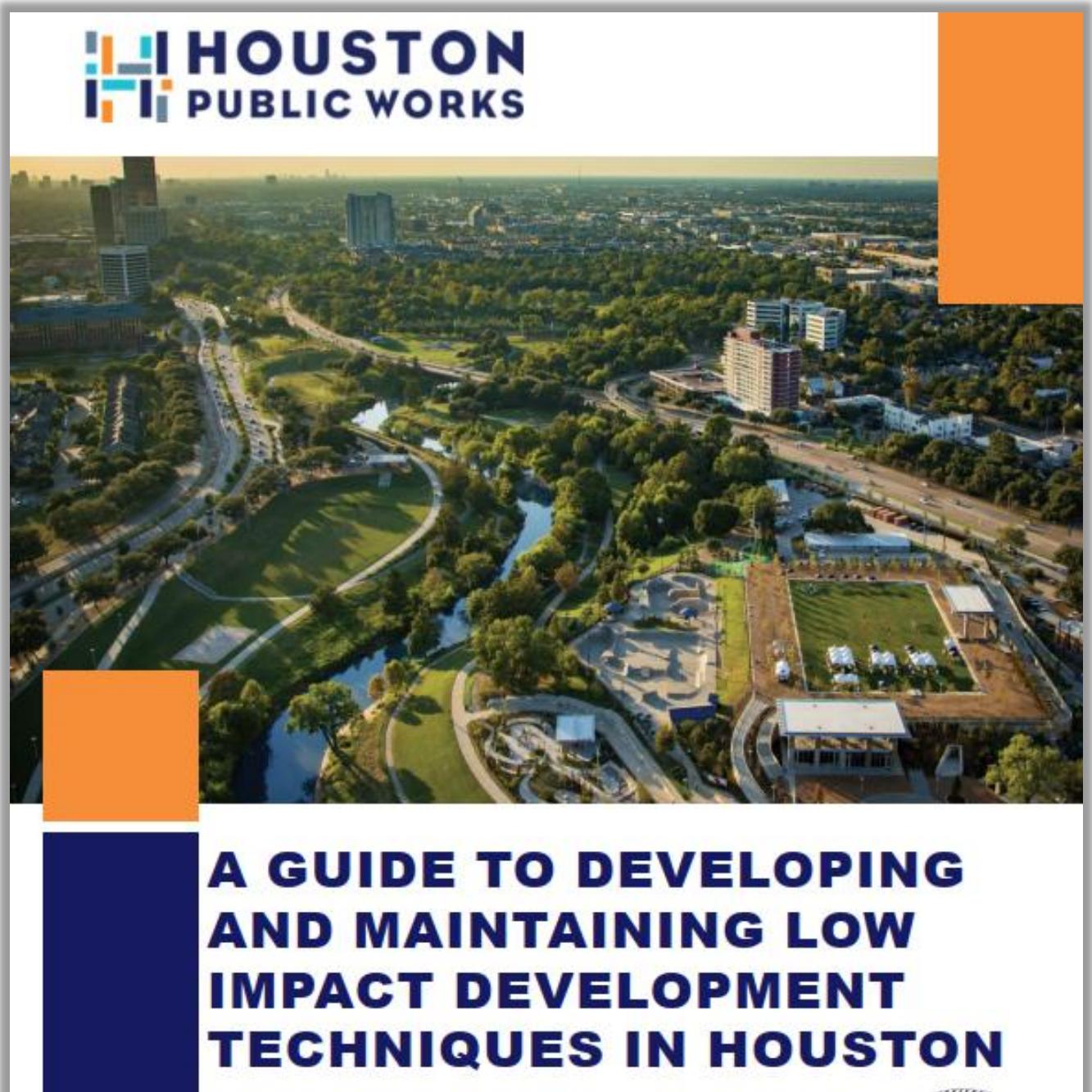
GSI GUIDEBOOK – COLLABORATION – IDM



- **Governs technical requirements and specifications for projects within CoH.**
- **Updated by Chapters on a 5–7-year cycle – Chapters 9 and 10 updates began in 2024.**
- **Includes updated and clarified design section for GSI, including new site requirements, BMP explanations, and specification drawings per GSI technique.**
- **These changes are mirrored in the GSI Guidebook and the Guidebook is referenced within IDM – increase in education!**

GSI GUIDEBOOK – COLLABORATION

- Developed in collaboration with / reviewed by all Stormwater Operations Teams
- Takes into account specific challenges and opportunities of City of Houston
- Aligns with recent updates to guidance, planning, and infrastructure design documents (Ex. IDM)



GSI GUIDEBOOK -- DEVELOPMENT

ORGANIZATION OF THE MANUAL



- **Describe purpose and benefits of GSI**
- **Discuss variability of the Houston region (soil types, heat islands, etc.)**
- **Discuss importance of site planning – not all techniques work everywhere!**
- **“Triple bottom line” benefits**
- **Specific techniques or Best Management Practices (BMP’s)**

CHAPTER 1: MAIN OBJECTIVES

- **Discuss Houston from a climate and topology perspective**
- **Discuss challenges facing Houston today and how GSI can be used as a tool to combat those challenges**
- **Introduce different methods of implementation of GSI features**



CHAPTER 2: MAIN OBJECTIVES

- **Narrow down to the regional/neighborhood level – soil types, eco-regions, specific regulations per watershed/bayou.**
- **Begin to discuss GSI in the view of larger city projects**
- **Present case studies where GSI features were implemented alongside other efforts, such as landscape architecture or streetscape.**



CHAPTER 3: MAIN OBJECTIVES



- Discuss characteristics of successful site planning down to the project level.
- Introduce goals of specific types of BMPs within the Stormwater Planning context
- Explain features needed to ensure success of the GSI Technique – Pretreatment, filter materials, etc.
- Communicate standards for design and construction, project management, and maintenance considerations.

CHAPTER 4: MAIN OBJECTIVES

- Describe “Triple Bottom Line Benefits” and ENVISION focus.



- **Environmental** – Water Quality, ecosystem preservation, air quality
- **Social** – Quality of life, collaborative investments, community buy-in
- **Economic** – Property values, reduced maintenance considerations, tie-in to larger systems

CHAPTER 5: MAIN OBJECTIVES

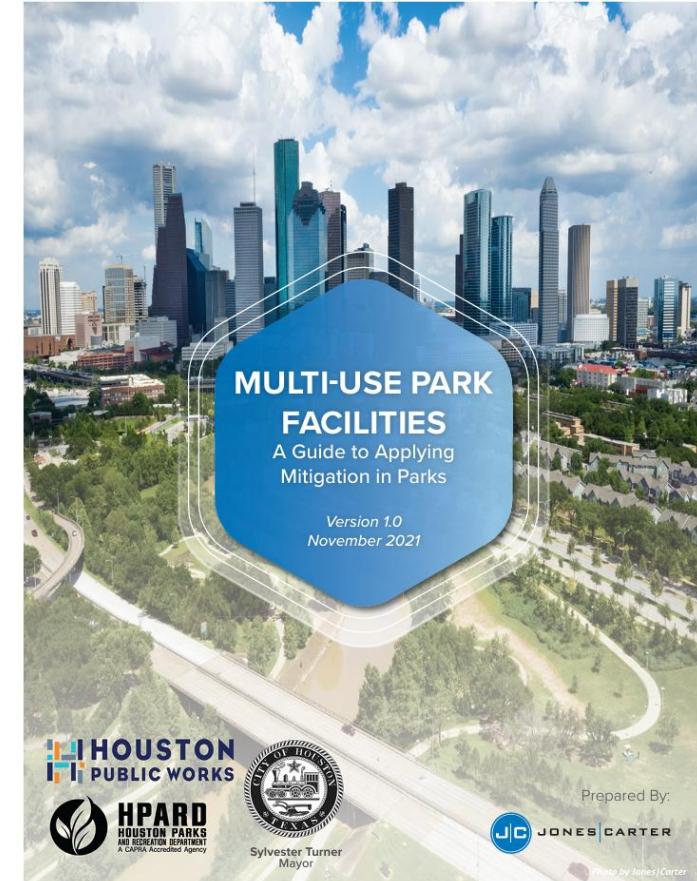
- **Description of the details of each GSI Technique**
- **Discussion of the best BMPs in specific site context.**
- **Advantages and disadvantages of each technique within specific site context**
- **Maintenance and Construction considerations, BMP specific practices and important factors when implementing a given BMP.**
- **Explanation of treatment trains, manufactured systems and other components that drive success of the specific sites and tie back into larger watershed considerations.**



Now that we have the information, how do we move forward?

NEXT STEPS: COLLABORATION

- Moving public infrastructure projects forward with ENVISION focus.
- Collaborating with other recently completed stormwater initiatives such as our Multi-Use Park Guidebook and Stormwater Master Plan.
- Obtaining increased grant opportunities and partnerships with other entities such as HCFCD, HPB, and HHD.



How about specific projects?

NEXT STEPS: PROJECTS

- Finalize the IDM and distribute Guidebook, leading to more incentive at both the public and private sector for GSI projects
- Utilize planning efforts to perform regional site analysis, finding the best locations and opportunities to implement successful GSI techniques in coordination with city stormwater projects.
- Kick off pilot projects in collaboration with City of Houston owned sites (detention opportunities, facilities) or in partnership with other groups (Safe Street initiatives, HOAs, etc.)



Guidebook Distribution

houstonpublicworks.org > Transportation and Drainage Operations > Stormwater Operations

- **City of Houston Stormwater Initiatives – Information on City of Houston Stormwater Master Plan**

[Engagehouston.org](http://engagehouston.org) > Resources

- **Project-Based Updates – Multi-Use Guidebook**





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thank you!



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