



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

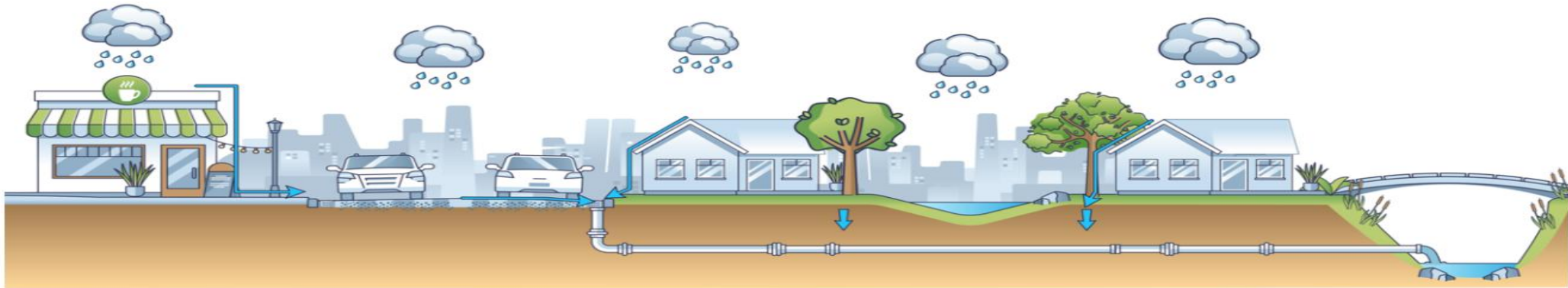
Local Drainage Plan (LDP) and Maintenance Operations

- 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

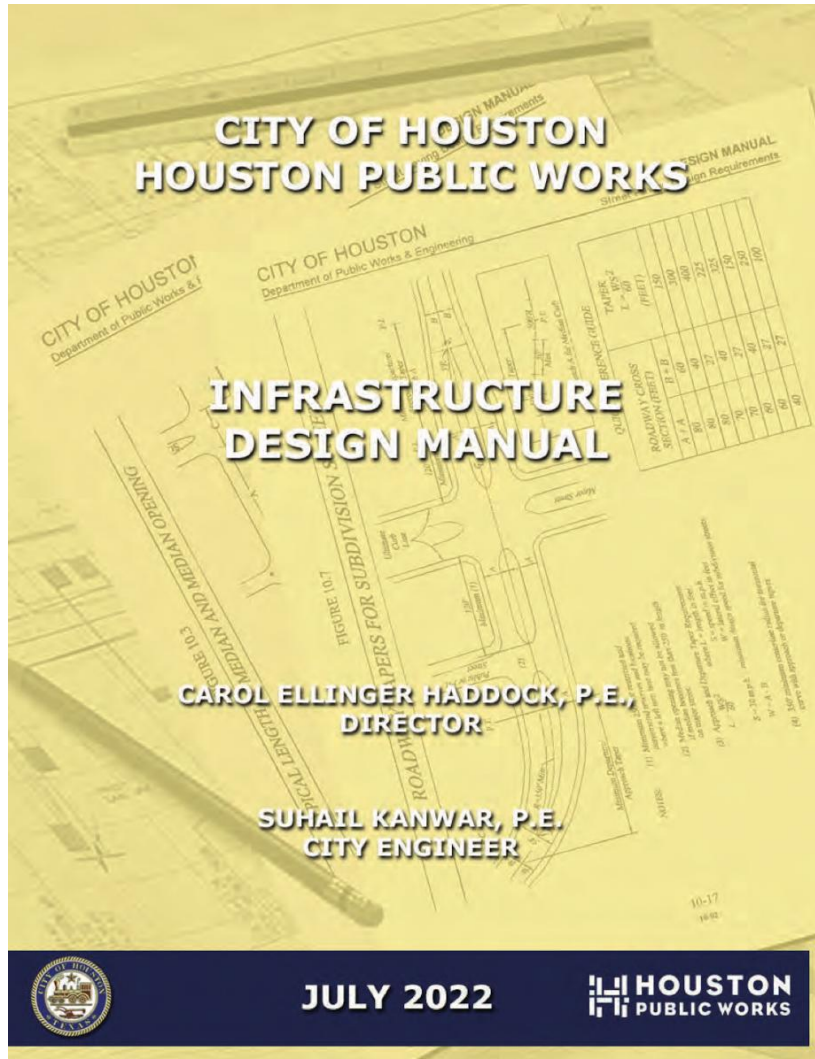
- Provides additional tools to achieve meaningful solutions in a local context
- Community Buy-in

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

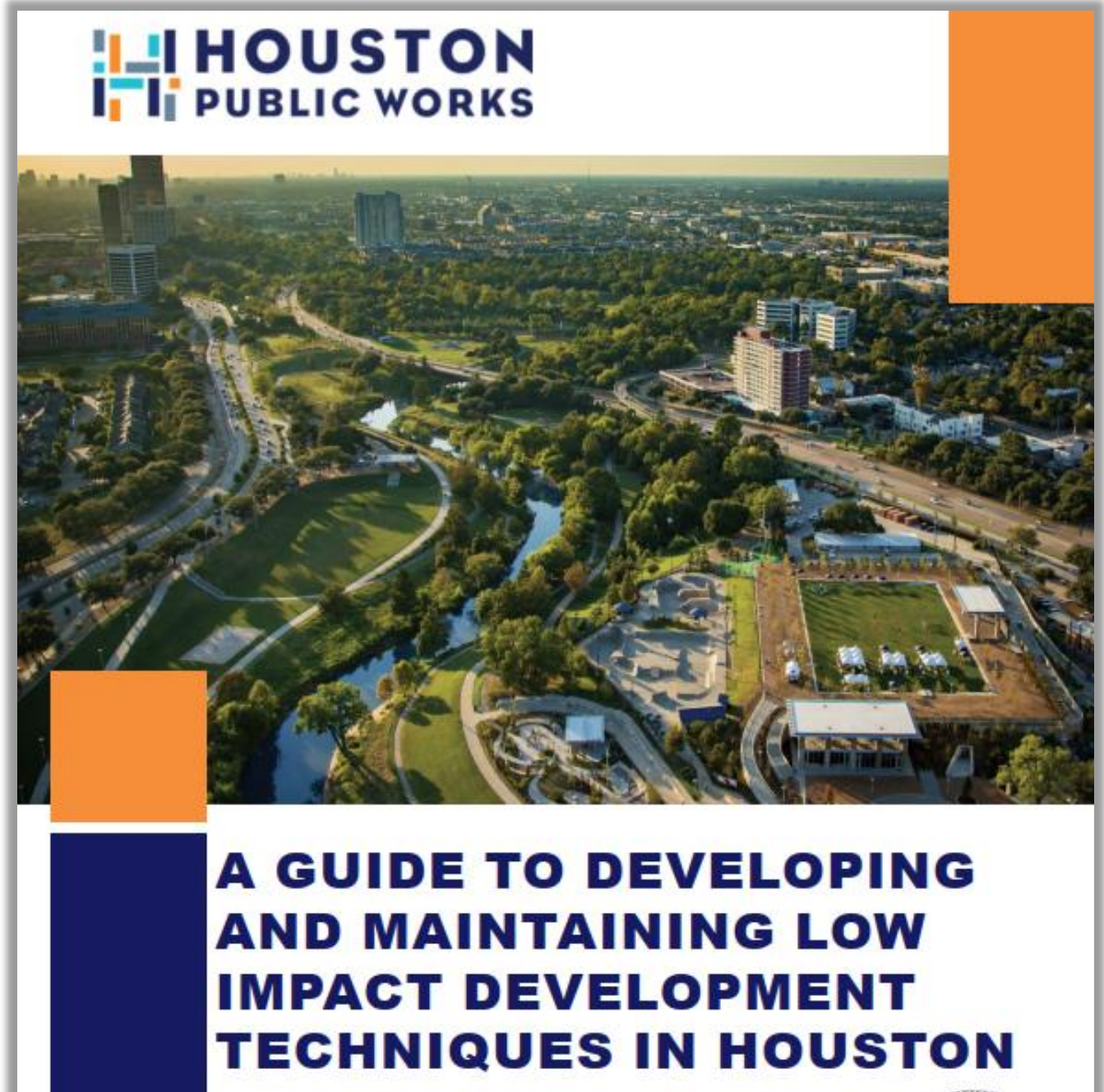
GSI GUIDEBOOK – COLLABORATION -- IDM



- 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

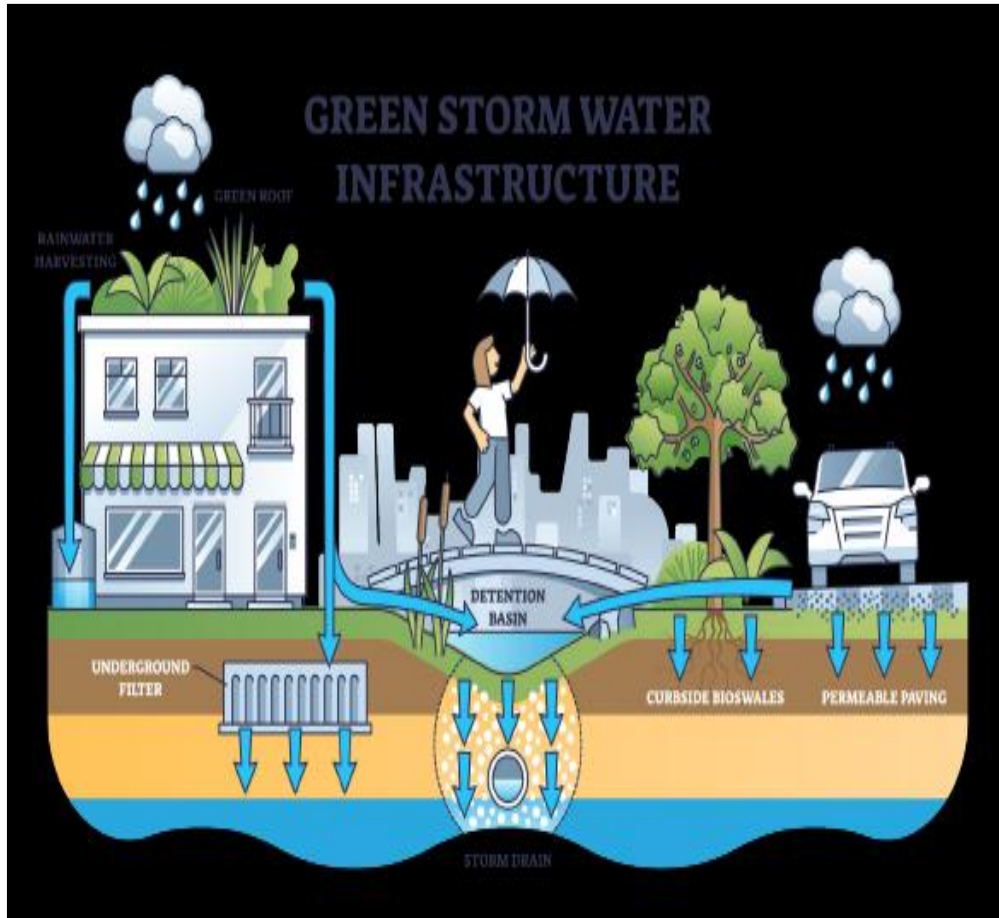


CHAPTER 2: MAIN OBJECTIVES

- **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](https://engagehouston.org) > Resources

- Project-Based Updates – Multi-Use Guidebook





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thank you!



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