CITY OF MINNEAPOLIS

Overview: Updated Stormwater Ordinance & Street Design Guide GSI Section

Minneapolis
City of Lakes

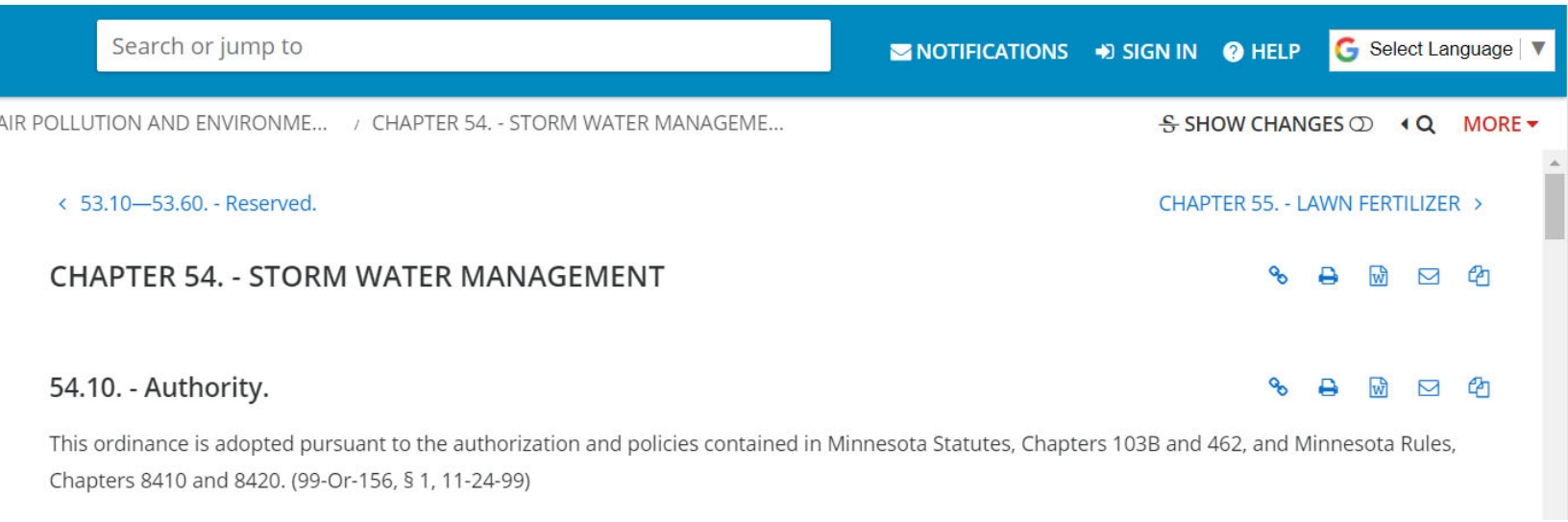
Objectives

I. Understand the changes to the Stormwater Ordinance

II. Understand how to meet the ordinance on transportation projects

III. Become more familiar with the SDG

IV. Know what to look for and where in the GSI section



Chapter 54
Stormwater Ordinance

Stormwater Ordinance Update

Big Changes:

1. Eliminate the linear exemption – transportation projects will have to evaluate if they trigger ordinance
2. Decrease the disturbance area required to trigger ordinance

New Stormwater Ordinance Overview

- What Triggers Ordinance
  - Construction after January 1, 2022
  - Disturb over 1/2 acre
- Requirements:
  1. Volume Control (infiltrate)
  2. Peak Discharge Rate Control
  3. Water Quality Control

Stormwater Ordinance Overview

- What Triggers Ordinance
  - Construction after January 1, 2022
  - Disturb over 1/2 acre
- Requirements:
  1. Infiltrate at least the treatment volume
  2. Meet or reduce the rate stormwater leaves the site
  3. Remove pollutants from stormwater

Stormwater Ordinance Overview

- What Triggers Ordinance
  - Construction after January 1, 2022
  - Disturb over 1/2 acre
- Requirements:
  1. Volume Control (infiltrate)
  2. ~~Peak Discharge Rate Control~~ → Likely met with typical project
  3. Water Quality Control

1/2 Acre of Disturbance

- Underlying soil, not the road subbase
- Connected area
- ~ 22,000 SF
- ~ ½ block
- ~½ mile new trail

Treatment Volume

- Infiltrate **at least** 0.55” over the **final impervious** area

OR

- 1.1" over new impervious (more common for private development)
- Impervious areas: roadway, sidewalk, trails, curb and gutter

Water Quality

- Reduce Total Suspended Solids (TSS) by 70%
- Check Minneapolis PW SWS Map for Total Phosphorous (TP) Removal
- Demonstrate removal efficiency for a 1.25” event
- Compliance shown in MIDS, SLAMM, other models

Rate Control

- Meet or reduce the peak discharge rate leaving the site
  - Each connection to a conveyance network leading to an outfall
- If drainage system remains consistent and impervious area is reduced, not a concern
- Simple summary to demonstrate compliance

Project Status by Layout/30%:

- Determine if project is **Voluntary** or **Regulatory**
- Estimate Treatment Volume
- Identify soil types and any site constraints
  - Site constraint examples: high groundwater, contaminated soils, steep slopes, bedrock, etc.
  - Identify soil infiltration testing locations
- Layout/Plan should include:
  - Location/Type of GSI
  - Drainage Area(s) to GSI
    - Include impervious area
  - Required and Provided Treatment Volume (per GSI facility)
  - Inlet details

Project Status by Layout/30%:

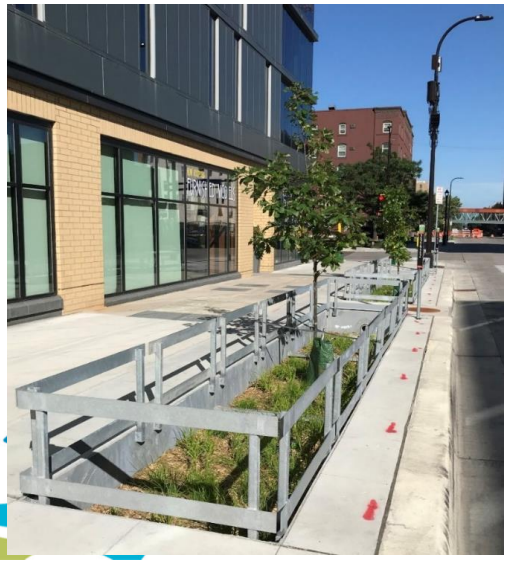
- Coordination with SWS:
  - TMDL/WQ Limits
  - Flooding Issues
  - Asset Management
  - O&M Feasibility and Access
  - Opportunity to go above and beyond?
- Community/Property Owner Outreach
  - Vegetation preferences and care responsibilities
- Draft Stormwater Management Report and Calculations

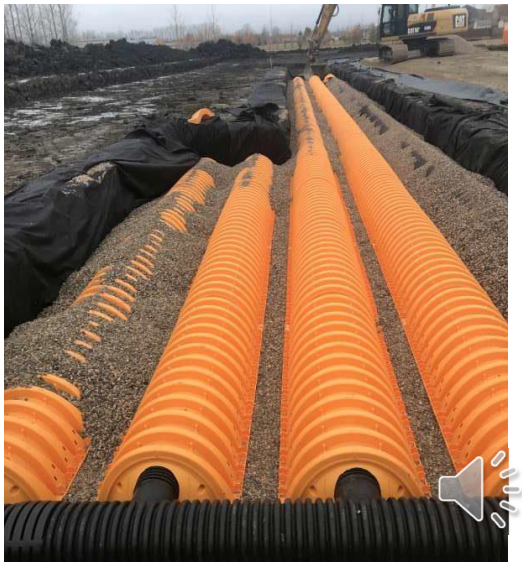
By 60% Design

- Infiltration testing to determine design infiltration rate
- Refine treatment volume calculations
- Water quality model
- GSI facilities model, plan for overflow
- Refine GSI details, cross-sections

Options to Provide Treatment Volume

1. Surface vegetated treatment (bioretention)
2. Permeable surfaces (unit pavers)
3. Underground treatment
4. Route to a Regional/off-site BMP
5. Banking





In the works

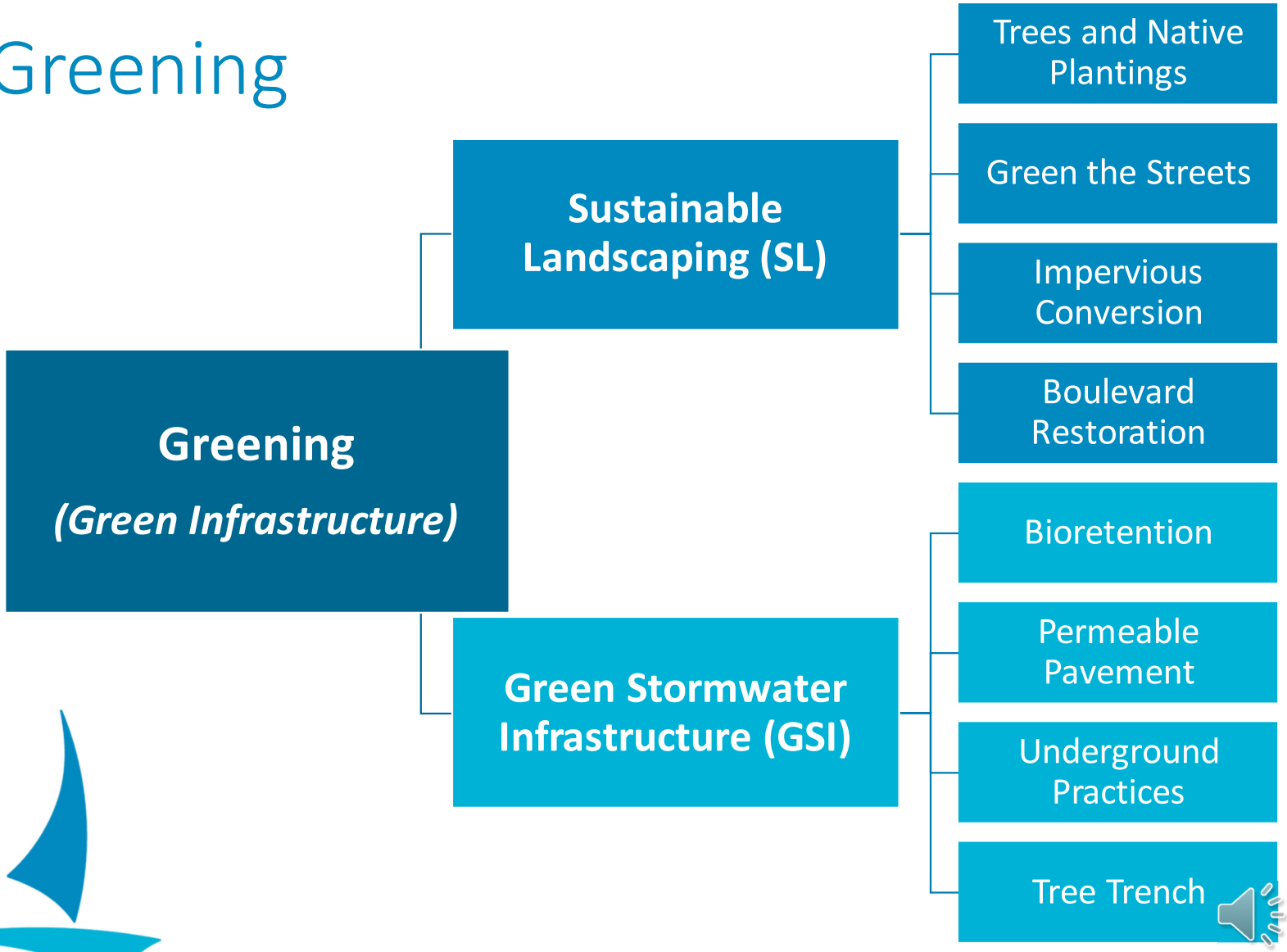
- Compliance sequence
- Checklist
- Guidance materials
- Standards and Details
- O&M Program/Plan recommendations
- Banking

Street Design Guide: Green Stormwater Infrastructure

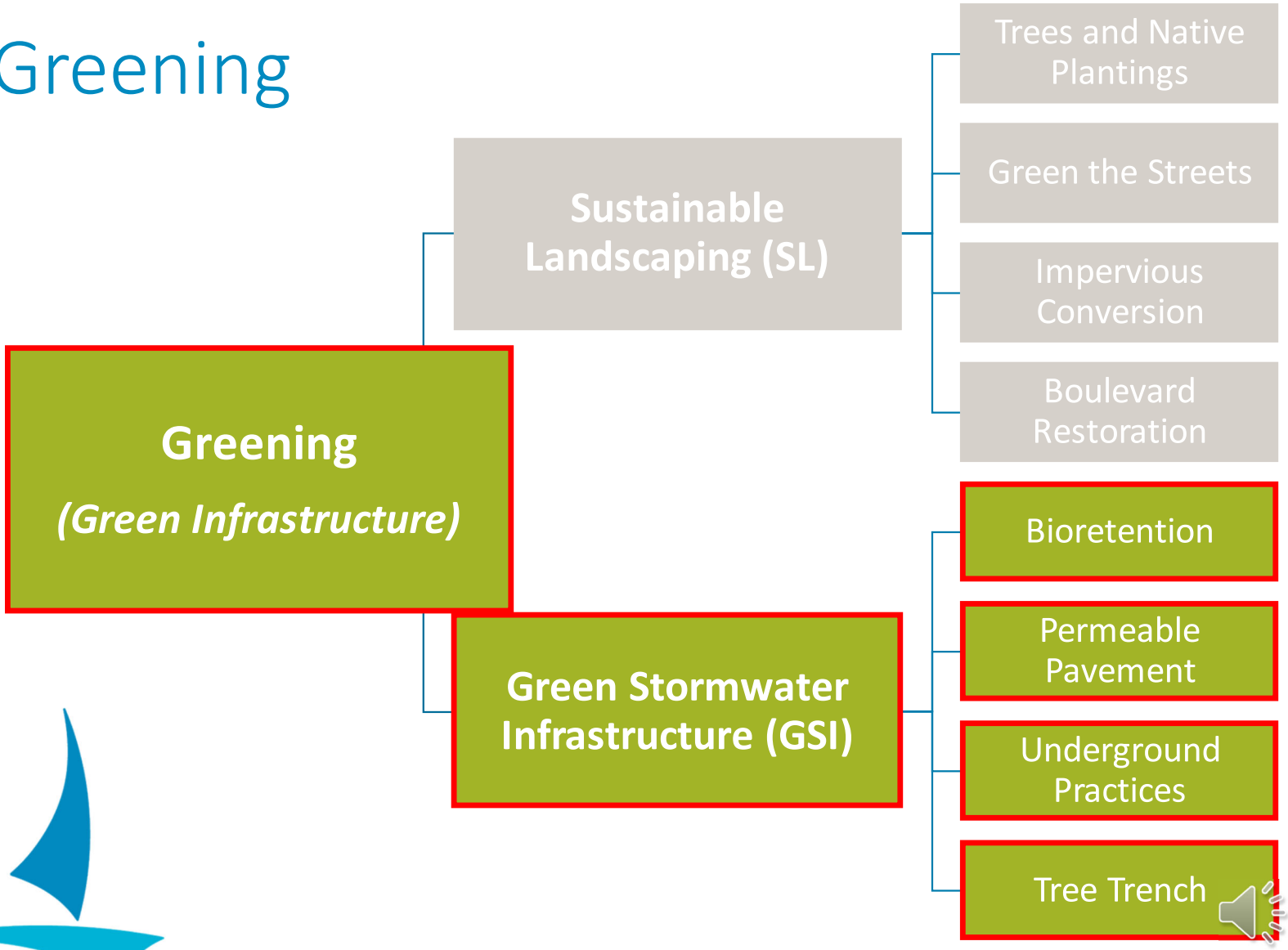
Motivation

- Support and aid in successful inclusion of GSI/SL on transportation projects
- Capitalize on greening/green streets initiatives and align goals
- Design with Minneapolis standards and best practices

Greening


Greening
(Green Infrastructure)
Sustainable Landscaping (SL)
Trees and Native Plantings
Green the Streets
Impervious Conversion
Boulevard Restoration
Green Stormwater Infrastructure (GSI)
Bioretention
Permeable Pavement
Underground Practices
Tree Trench

Greening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GSI Section: What it Includes

- **The Rules:** City Ordinances, Watershed District Regulations, State Regulations
- **The Best Practices:** MN Stormwater Manual, NACTO, Design Guidance
- **The How:** Tables, Graphics, *Minneapolis Specifications, Details, SWS Manual*

The Rules

Local, State, and Watershed District Guidance and Requirements

Each GSI facility should be designed per local stormwater management requirements, which include:

- Minneapolis Ordinance Chapter 54 – Storm Water Management
- Minnesota Pollution Control Agency (MPCA) National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit – MNR100001
- Local Watershed Requirements
  - Minnehaha Creek Watershed District
  - Mississippi Watershed Management Organization
  - Shingle Creek Watershed Management Commission
  - Bassett Creek Watershed Management Commission

The How

Other manuals and guides

GSI designs should generally comply with recommendations set forth in the following documents:

- **Minnesota Stormwater Manual**
- **National Association of City Transportation Officials (NACTO) Urban Street Stormwater Guide**
- **City of Minneapolis Standard Specifications and Detail Plates**
- **City of Minneapolis Stormwater and Sanitary Guide** or subsequent guidance and recommendations published by the Surface Water and Sewers Division for GSI and or drainage system work in the right of way

The How

Criteria and references to design to requirements and best practices

Criteria	Reference	Notes
Contributing Drainage Area	**Minnesota Stormwater Manual**	Maximum drainage areas for type of GSI facility.
Site Suitability	**City of Minneapolis Stormwater and Sanitary Guide**	Identify concerns such as steep slopes (>10%), hot spots, water quality needs or total maximum daily loads (TMDLs), prior to siting infiltrating GSI
Hydrologic Parameters	**City of Minneapolis Stormwater and Sanitary Guide**	Parameter guidance (infiltration rates, runoff coefficients, methodology) and recommended modeling software
Design Rainfall	**City of Minneapolis Stormwater and Sanitary Guide** or Local Watershed District Permitting Requirement, whichever is stricter	24-hour storm depths for standard return periods

The How

To evaluate, select, and design GSI facilities

A	Maximize pervious surfaces as much as feasible
B	Delineate and estimate the drainage areas impacted by and flowing into a street design project and consider multiple GSI tools or facilities to cumulatively manage stormwater runoff.
C	3' or wider buffers between the bike lane and traffic lanes are preferred. 2' buffers can be used for very space-constrained environments provided the location is not adjacent to a parking lane and the bike lane and buffer area generally maintain a minimum combined width of 8' (including the gutter).
D	Design the GSI facility to provide water quality treatment for the required water quality volume. For each inflow point, define: 1 Total drainage area including impervious portion; 2 Right of Way (ROW) drainage including impervious portion; 3 Change in impervious area with street design project; and 4 Required and provided water quality volume for treatment.
	Consider soil amendments or an underdrain when the underlying soils' infiltration rate is outside of the range presented in the City of Minneapolis Stormwater and

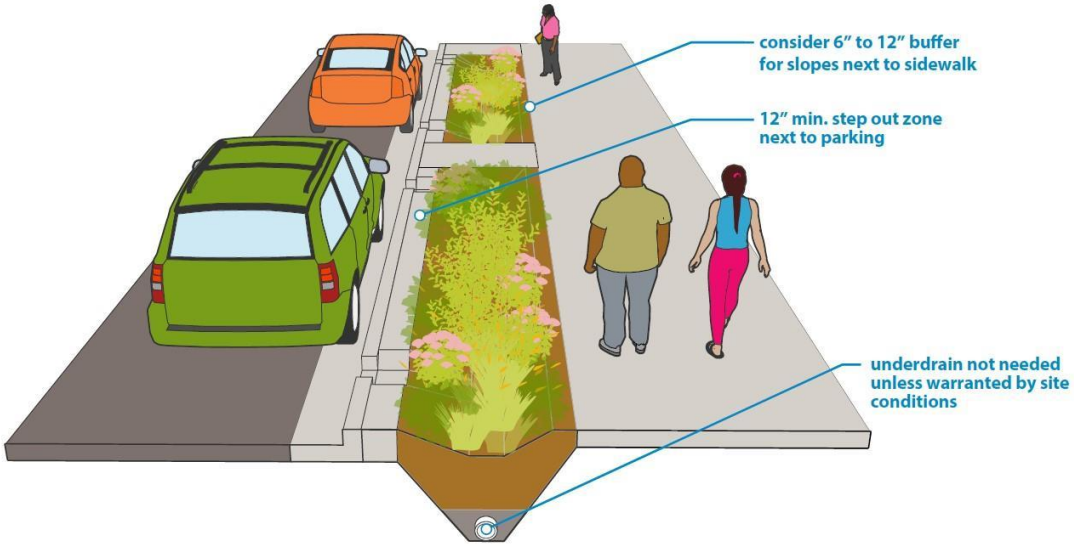
GSI Types

Detailed Design

- Simplified into 2 main GSI types:
  - Bioretention (bioswale and planter) and permeable pavement
- Guidance for each specific design element
  - Footprint
  - Curb Cuts
  - Infiltration
  - Dimensions
  - Plants
  - Soils

Graphics

- Visualize GSI facility
- Required dimensions and setbacks
- Design modifications



Documentation

Summarizes what to consider and document at each phase

Layout Approval and 30% Design

In addition to the pre-construction components noted in the guide:

- Layout/approximate location and type of GSI facilities
- Drainage Areas to each GSI facility
- Required (if applicable) and provided water quality volume for entire project and per each GSI feature
- General detail for GSI facility: cross-section, inlet, bypass
- Pedestrian safety considerations (both how pedestrians will detect potential drop-offs and how GSI facilities can be used to increase safety)
- Connections to stormwater conveyance system
- Identification of increased water quality needs (including TMDL)
- Identification of GSI considerations, such as steep slopes (>10%), hotspots, soil conditions, anticipated utility conflicts, adjacent existing uses to remain
- Vegetation changes (such as tree removal and additions)
- Coordination needs/opportunities (adjacent properties)
- Identify maintenance responsibilities and funding sources
- Coordinate with Surface Water and Sewers Division on key aspects of project including sewer and drainage system condition assessment, flooding within corridor, and GSI siting and details

60% Design

- Design calculations that incorporate survey and geotechnical information
  - Include annual pollutant removal for TP and TSS (from MIDS or other approved WQ model)
- Refined layouts with design details
- Landscape plan
- Utility conflicts and mitigation approach (move, remove, protect)

90% Design

- Incorporate comments from reviewers and revisions based on coordination done at 60%
- Same content as 60%.

Post Construction

- Delivery of As-built drawings of all infrastructure, contours, and soil modification.

Future Updates

- Updated Graphics for more opportunities: bump-outs, protected bike lanes, etc.
- More detailed design guidance
- Lessons learned
- Stormwater Ordinance Compliance


THANK YOU!
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