



Green BMP Maintenance and Design

Waukesha County Stormwater Workshop Presentation

by City of Madison Engineering Division

April 20, 2021

Presenters

- ▶ Sarah Lerner, Professional Landscape Architect, GIS Specialist - Green Infrastructure and Flood Mitigation, City of Madison Engineering
- ▶ Madeline Dumas, M.S. Landscape Architecture, Greenway Vegetation Coordinator, City of Madison Engineering



Vegetation and BMP's

- ▶ Most of the plan communities that designers try to recreate are threatened ecological communities
 - ▶ Wet Mesic Prairie
 - ▶ G2: Globally Imperiled
 - ▶ S1: State Critically Imperiled
 - ▶ Wet Prairie
 - ▶ G3: Globally Vulnerable
 - ▶ SU: Lack of info to rank
 - ▶ Oak Opening
 - ▶ G1: Globally Critically Imperiled
 - ▶ S1: State Critically Imperiled
 - ▶ Mesic Prairie
 - ▶ G2: Globally Imperilled
 - ▶ S1: State Critically Imperiled

<https://dnr.wi.gov/topic/endangeredresources/communities.asp>

CITY OF MADISON



Overview

- ▶ City of Madison's Approaches to Installation and Maintenance of Vegetation associated with BMP's
- ▶ New Construction on Public Property issued by City of Madison
 - ▶ Design and Bidding Approaches
 - ▶ Public Works Projects Construction Projects
 - ▶ Maintenance Approaches
 - ▶ Citywide Contracts for Ecological Restoration Maintenance
- ▶ Guidance for Private Developers
- ▶ Existing Vegetation

Background of BMP's on Public Property

- ▶ **BMP Design and Construction**
 - ▶ City Engineers and Landscape Architects
 - ▶ Park Property, Engineering Property, Other Public Land, Public Terraces
 - ▶ Private Developers
 - ▶ Large subdivision developments dedicating private outlots
 - ▶ Design Consultants - occasional design contracts



BMP Design and Construction

- ▶ Bidding out native restoration
 - ▶ BPW Contracts - Typically restoration is a component of a larger project
- ▶ Approaches for Construction
 - ▶ Requirements for ecological restoration subcontractor to install
 - ▶ Bidding out installation and maintenance separate from the project

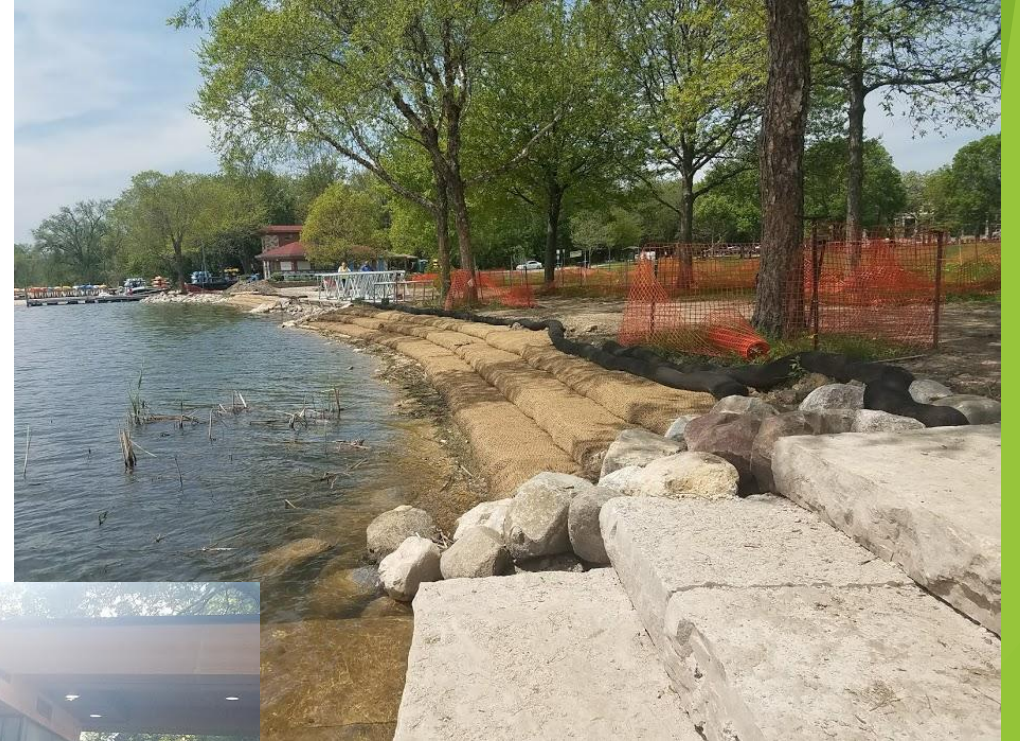
Approaches

- ▶ Tenney Park Restoration
 - ▶ Large shoreline reconstruction project, over 1 mile of shoreline
 - ▶ Major grading, bike path improvements, retaining wall
 - ▶ Restoration component was significant funding in itself
 - ▶ Separate contract for restoration

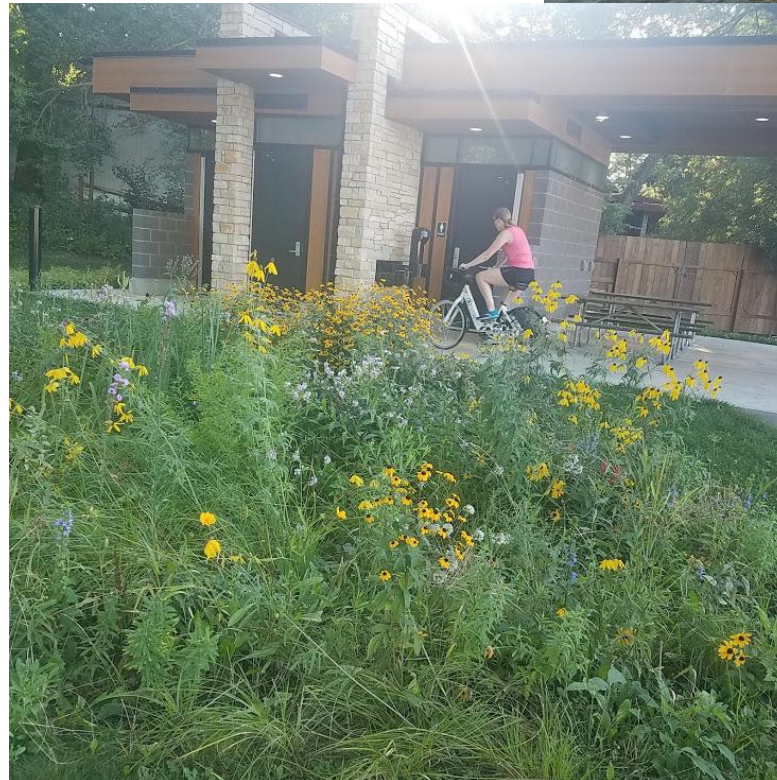


Approaches

- ▶ Wingra Shoreline
 - ▶ Shoreline rehabilitation along entire park
 - ▶ Encapsulated soil lifts with sedges and a few native wet forbs
 - ▶ Incorporated restoration work into contract



- ▶ Parking Lot Bioinfiltration Basins in Parks
 - ▶ Esther Beach Parks, Olbrich Park, Warner Park
 - ▶ Small planting projects, added to citywide contract



Long Term Maintenance for New Construction

- ▶ Citywide Invasive Removal & Restoration Contracts
 - ▶ Large, high visibility projects with significant investment
 - ▶ Three year contract limited by purchasing requirements, renew each year
 - ▶ Design to allow additional small raingarden projects to be installed as part of maintenance contract
 - ▶ Designate levels of management based on goals
 - ▶ E.G. some areas can tolerate a few more invasives
 - ▶ Public visability
 - ▶ Age of establishment
- ▶ Long term likely to continue to contract out projects that have significant capital investment or are staff resource intensive for ongoing maintenance



Long Term Maintenance for New Construction

Citywide Contract

- ▶ 82 Sites
 - ▶ Raingardens
 - ▶ Shoreline Restorations
 - ▶ Wet/Dry Ponds
- ▶ GIS Database



Name of Park: Brittingham Park

Location: Raingarden 1

Address: 701 W Brittingham Place

Manage for: TIER 2

Agency: PARKS

Legend

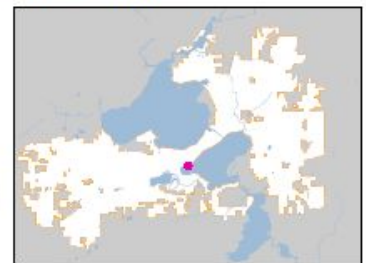
Property Line

Restoration Area

0 12.5 25 50 Feet

Document Path: M:\Maps\Parks GIS\Planning\Restoration\Restoration Contract_2018.mxd

SITE LOCATION MAP



Long Term Maintenance for New Construction

- ▶ Developed Tier System dependent on level of maintenance
- ▶ Established specifications for land management which included prescribed burning, clearing, invasive removals, seeding, planting
- ▶ Low bid was between \$230K - \$350K for all three years, depending on ability to burn, and additional seeding and invasive removals built into RFP.

ATTACHMENT A				
Botanical Name	Common Name	Tier 1	Tier 2	Tier 3
<i>Abutilon theophrasti</i>	Velvet Leaf	Yes	Yes	
<i>Acer negundo</i>	Boxelder	Yes	Yes	
<i>Acer platanoides</i>	Norway Maple	Yes	Yes	
<i>Acer tartaricum</i>	Amur Maple	Yes		
<i>Achyranthes japonica</i>	Japanese Chaff Flower	Yes		
<i>Aegopodium podagraria</i>	Goutweed	Yes		
<i>Ageratina altissima</i>	White snakeroot	Yes		
<i>Akebia quianata</i>	Chocolate vine	Yes		
<i>Alianthus altissima</i>	Tree of Heaven	Yes	Yes	
<i>Alliaria petiolata</i>	Garlic Mustard	Yes	Yes	
<i>Alnus glutinosa</i>	Black/ European Alder	Yes	Yes	
<i>Ambrosia artemisiifolia</i>	Common Ragweed	Yes	Yes	
<i>Ambrosia trifida</i>	Giant Ragweed	Yes	Yes	
<i>Ampleopsis brevipedunculata</i>	Porcelain berry	Yes	Yes	
<i>Anthriscus sylvestris</i>	Wild Chervil	Yes		
<i>Arctium minus</i>	Common Burdock	Yes	Yes	
<i>Artemisia absinthium</i>	Wormwood	Yes		
<i>Arundo donax</i>	Giant Reed	Yes		
<i>Berberis spp.</i>	Barberry	Yes		
<i>Berberis thubergii</i>	Japanese Barberry	Yes		
<i>Botomus umbellatus</i>	Flowering Rush	Yes		
<i>Buenia orientalis</i>	Hill Mustard	Yes		
<i>Campanula rapunculoides</i>	Bellflower	Yes		
<i>Caragana arborescens</i>	Siberian Peashrub	Yes		
<i>Cardamine impatiens</i>	Narrow Leaf Bittercress	Yes		
<i>Carduus acanthoides</i>	Plumeless Thistle	Yes	Yes	Yes
<i>Carduus nutans</i>	Musk Thistle	Yes	Yes	Yes
<i>Celastruc orbiculatus</i>	Oriental Bittersweet	Yes	Yes	
<i>Celastrus loesneri</i>	Asian loeseneri bitterswe	Yes		
<i>Centaurea biebersteinii</i>	Spotted Knapweed	Yes	Yes	
<i>Centaurea diffusa</i>	Diffuse Knapweed	Yes		
<i>Centaurea jacea</i>	Brown Knapweed	Yes		

Going forward -

- ▶ Large restoration projects bid out separately
- ▶ Where significant capital investment has been spent on restoration, will continue restoration contract for land management in those areas
- ▶ Wild ones & Ripple EF Maintenance 20202
- ▶ Next up! Guiding the design and installation of new outlots.
- ▶ How to maintain and manage existing established greenways and ponds.
- ▶ Working across agencies ?

New Construction on New Stormwater Outlots issued by Private Developers

- ▶ Old Approach
 - ▶ City accepted outlots containing a mix of aggressive invasive species and some native prairie species
 - ▶ Frequent mowing under private maintenance, down to mow of 1-2 times per year under City maintenance
 - ▶ Result: weedy, poor habitat, many complaints



New Construction on New Stormwater Outlots issued by Private Developers

- ▶ Updated Guidance for New Stormwater Outlots
- ▶ The Developer shall be responsible for seeding & establishing greenways and ponds with a native species mix that shall be specified by the City of Madison. This mix shall be referenced on the plan sheet provided and sealed by the Developer's Engineer and approved by City Engineering.
- ▶ The Developer shall have the initial seeding completed by an ecological restoration landscaping firm with knowledge and experience in completing native planting/seeding.
- ▶ The Developer shall maintain the newly seeded area with a goal of native plant establishment. Maintenance shall be completed by an ecological restoration landscaping firm with knowledge and experience in maintaining native plantings.
 - ▶ This will include a requirement of provision of a proposed course of action for establishment of the native planting at the time of pond/greenway approval.
 - ▶ This will include an annual report of actions completed (mowing, burning, pesticide application, etc.) to City Engineering annually until the pond/greenway is accepted.
- ▶ Prior to final acceptance of the pond/greenway the Developer shall provide a short report to the condition of the native planting. This report shall include recommended actions for the next year.

Guidance for Private Developers

- ▶ Sample vegetation maintenance plan and report
- ▶ Updated 2021 Standard Specifications to include recommendations for maintaining native plantings in the first years
- ▶ Offering a site walk-through in 2021
 - ▶ Native planting maintenance basics
 - ▶ Desirable vs. undesirable vegetation
 - ▶ Maintenance and access concerns



Maintenance of Existing Stormwater Land

- ▶ 2,000+ acres
 - ▶ Ponds, greenways, shorelines, rain gardens
- ▶ Labor
 - ▶ Mowing operators
 - ▶ One salaried staff member
 - ▶ One hourly staff member
 - ▶ Two seasonal interns
 - ▶ Youth crew
 - ▶ Contracted crews (goats)



Maintenance of Existing Stormwater Land

- ▶ Maintenance Approaches
 - ▶ Greenway Ratings

2020 Restoration Staff Maintenance Activities

Method	Labor Hours Spent	Percent of Time Spent
Hand-digging or pulling	690.5	35
Planting native plugs	326.5	16
Collecting, processing distributing native seed	555.75	28
Spot mowing*	33.75	2
Prescribed burning	41	2
Herbicide Application	338.5	17
*not including spot mows done by operations crews		



Maintenance of Existing Stormwater Land

- ▶ Contracted work
 - ▶ Goats
 - ▶ Burns

