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# Long-Term Planning for Storm Water Control Measures

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# SCM / BMP Overview

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- ◁ Storm Water Control Measure = SCM
- ◁ Best Management Practice = BMP
- ◁ **SCM = BMP**



# Establishing a Long-Term SCM Planning Philosophy

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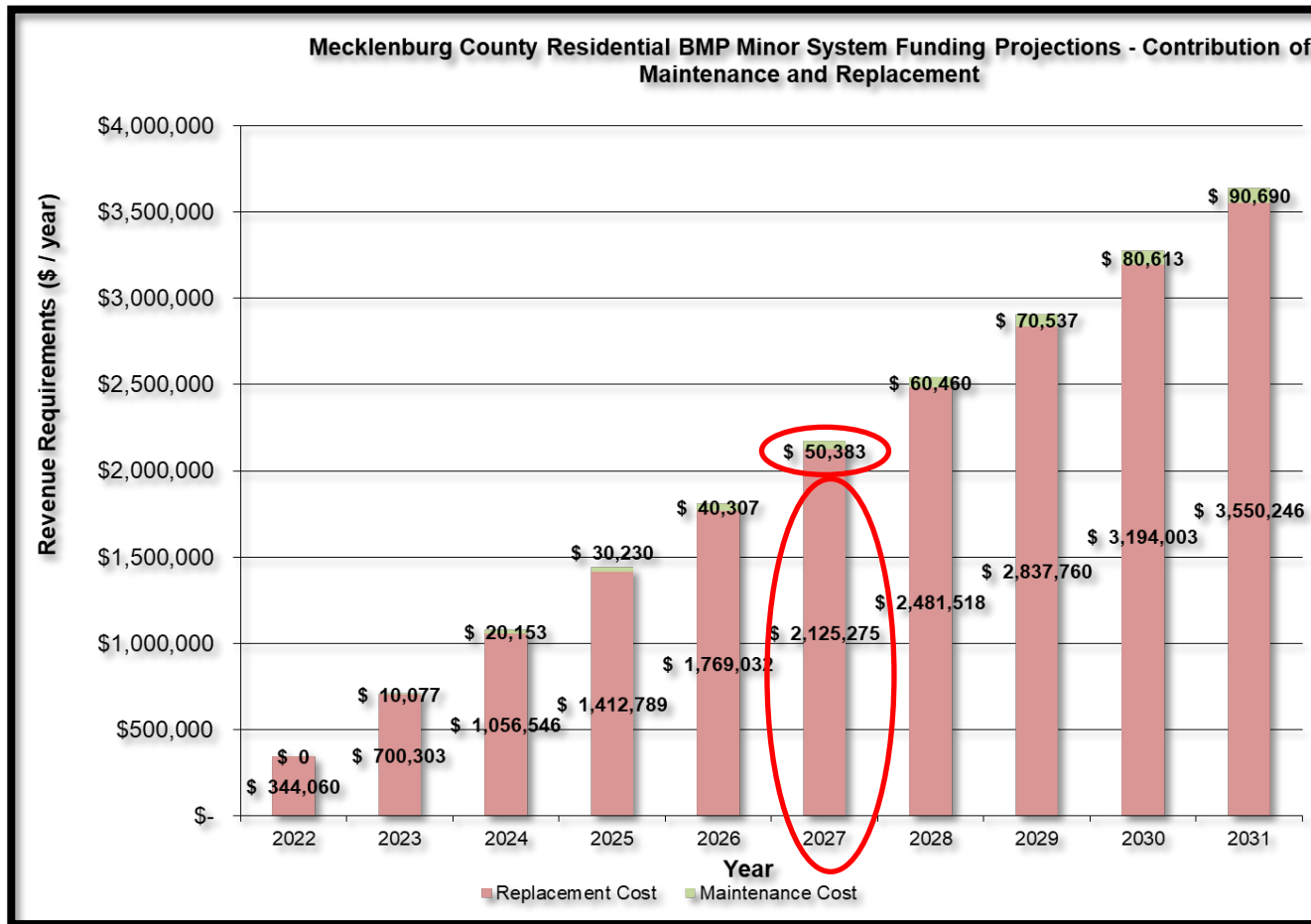
- ◁ Are SCMs more like private infrastructure or more like a municipal storm drain system?
- ◁ How much do SCMs cost to maintain & replace?
- ◁ Who should fund SCM inspection, maintenance and replacement for a) single-family residential, and b) commercial?
- ◁ Permit risks if SCMs are not maintained?
- ◁ Should municipal-owned SCMs be managed different than private-owned?

# SCM Cost Considerations

- ◁ Cost Methodology
- ◁ SCM type
- ◁ Useful Life
- ◁ Replacement Cost
- ◁ Undeveloped Land
- ◁ Build-Out Rate of Undeveloped Land
- ◁ Construction Inflation

<b>Sand Filter</b>			
<b>Maintenance and Schedule</b>			
<b>TASK</b>		<b>SCHEDULE</b>	
Inspect banks and surrounding drainage areas for erosion and stabilize if necessary		Monthly	
Street sweep parking lot		Quarterly	
Trash removal		Monthly	
Inspect outlet for obstructions		Monthly	
Inspect for clogging		Monthly	
Inspect inlet grates		Monthly	
Skim sand media		Yearly	
Pump oil and grit from sedimentation chamber		Yearly or at 50% full	
Replace sand media		As needed (expect 3 years)	
<b>Grassed Sand Filter Only</b>			
Mow basin to recommended height in alternating patterns to prevent compaction and prevent weed growth. Bag clippings to prevent thatch built-up.		Weekly to bi-weekly during the growing season, as needed other seasons	
Light fertilizing to establish healthy roots		Only during the first 2 years	
Aerate and dethatch basin floor		Every 2 Years	
<b>Budget for BMP Maintenance &amp; Replacement</b>			
<b>Item</b>	<b>Description</b>	<b>Estimated Costs</b>	<b>Comments</b>
1	BMP Installation Cost	\$ 40,000	
2	Surface Cover Cost (for underground BMPs)	\$ 0	
3	Total Initial BMP Construction Cost [Item 1 + Item 2]	\$ 40,000	
4	Down Payment [5% x Item 3]	\$ 2,000	
5	Replacement Cost [Item 3 – Item 4]	\$ 38,000	
6	Annual Replacement Budget [Item 5 / 20 years]	\$ 1,520	
7	Annual Inspection & Maintenance Budget [ 5.4753 x (Item1) <sup>-0.0227</sup> ] x Item 1 / 100]	\$ 1,722	
8	<b>Total Annual Budget [Item 6 + Item 7]</b>	<b>\$ 3,242</b>	

# Single-Family Residential SCM Cost Projections

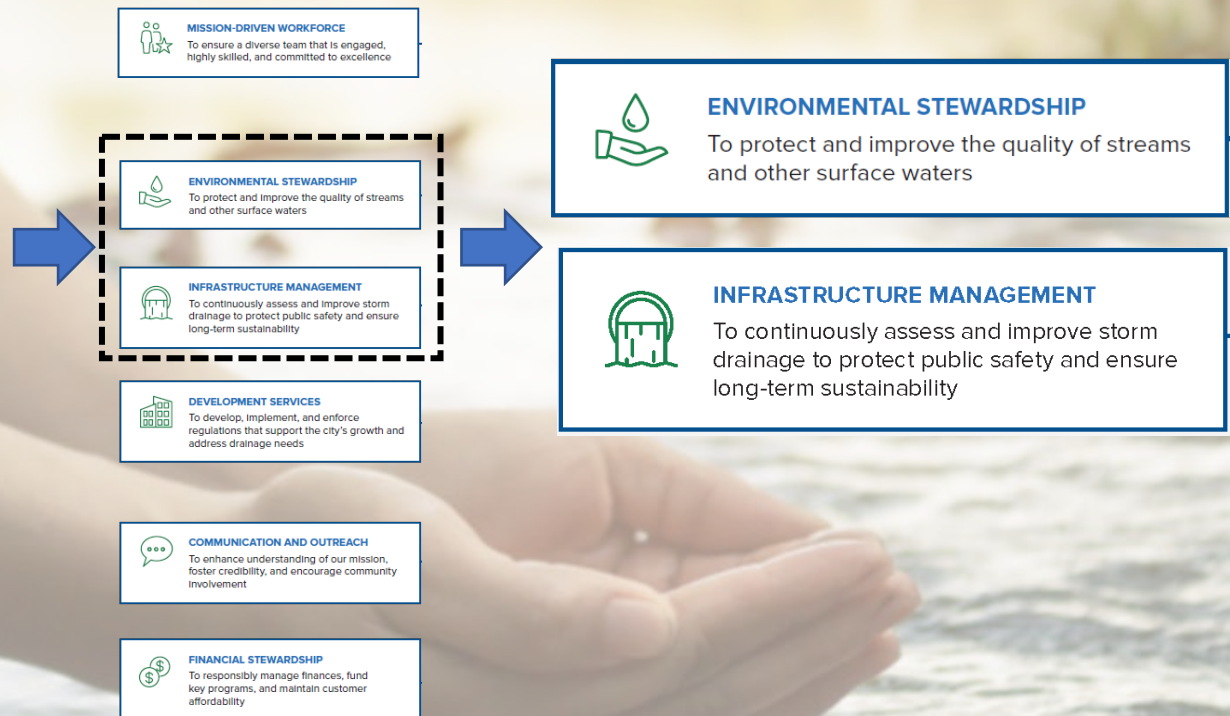




# Connection to Storm Water Services Mission



## PRIORITIES



# Long-Term Planning for Municipal SCMs

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## ◁ City of Charlotte Long-Term Stewardship Program

- Conduct annual inspections on municipal SCMs.
- Provide inspection reports to city departments to understand SCM maintenance needs.
- Assist City departments with financial planning to fund the implementation of maintenance.
- Execute department agreements to maintain and restore SCMs long-term.
- Implement routine, proactive, and restorative maintenance on municipal SCMs.

# Typical SCMs owned by the City of Charlotte



**Dry Detention (Dry Ponds)**



**Bioretention**



**Wet Ponds**



**Sand Filters**



**Constructed Wetlands**



**Underground Detention**



# Routine and Proactive Maintenance of SCMs

## ◁ Examples

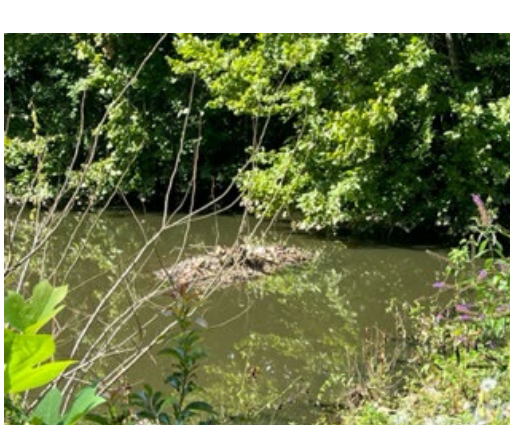
- Mowing
- Mulch replacement
- Overgrown / Invasive Vegetation Management
- Add/Redistribute Rip Rap
- Partial plant replacement
- Underdrain investigations
- Trash Removal
- Soil media testing
- Outlet structure maintenance
- Sediment removal from underground detention



# Maintenance Example: High Hazard Dam and Wet Pond

## ◁ *Routine and Proactive Maintenance*

- Brush hogged overgrown vegetation on dam
- Remove invasive vegetation from rip rap
- Remove trees and invasive vegetation from outlet area
- Manually remove beaver dam, trash, and sediment impaction from trash rack
- Haul debris and trash off site to dumping facility





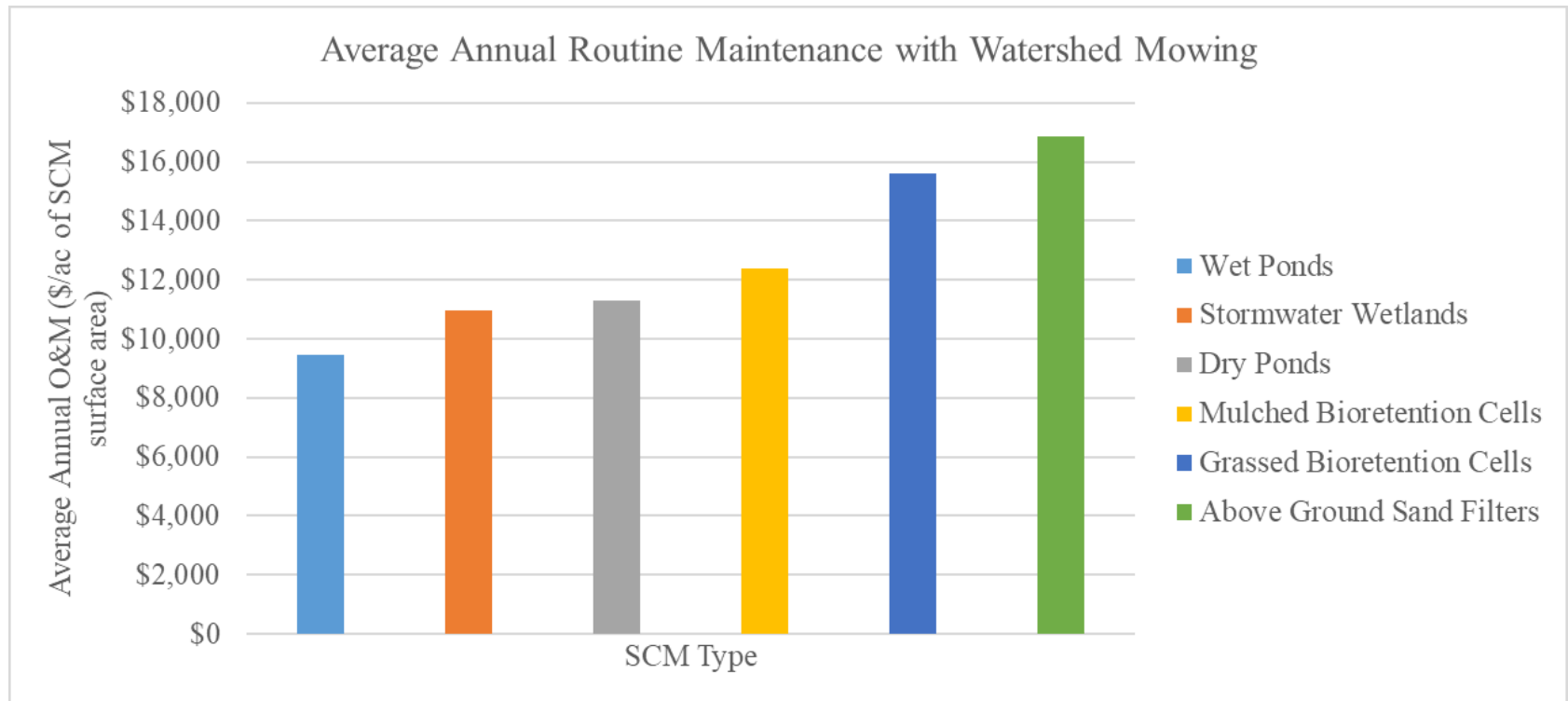
# Restorative maintenance of SCMs

## ◁ Examples

- Complete soil and media replacement
- Sediment removal / Dredging
- Tree removal
- Structural repairs
- Embankment repairs
- Full plant replacement
- Underdrain scoping / cleanouts
- Riser replacement



# How much does this cost?



▢ **Figure 1: Private contractor average annual routine maintenance with mowing costs in 2018** (Waickowski, S.E., Lord, W.G., & Hunt, W.F. (2021). *Maintenance costs of stormwater control measures (SCMs) in North Carolina.*)



# Key Points

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- ◁ **Municipal programs need funding and staff to establish long-term maintenance programs.**
- ◁ **Municipal SCMs tend to be larger and may carry higher maintenance costs than privately maintained SCMs.**
- ◁ **In most cases, lack of maintenance will lead to increased overall life cycle cost.**
- ◁ **Check the NCDEQ Dam Safety inventory to find out what regulated dams exist in your area.**

<https://deq.nc.gov/about/divisions/energy-mineral-and-land-resources/dam-safety>