Quincy Rock Island Cove Salt Marsh Conservation

Public Meeting
Quincy MA
5-31-2023

Weston & Sampson℠ SumCo Eco-Contracting Massachusetts Office of Coastal Zone Management

Project Team

- City of Quincy Department of Natural Resources
- Weston & Sampson Engineers: Civil & Environmental Engineering + Permitting
- SumCo Eco-Contracting, LLC
- Massachusetts Office of Coastal Zone Management

Why Rock Island Cove Marsh?

- Unique due to large size, amount of contiguous marshland & high marsh & overall health.
- Abutted by residential properties, roads & developed areas with little space to migrate.
- Buffers Houghs Neck & Germantown peninsulas, preventing or reducing coastal flooding, wave damage, erosion, & damage from storms & extreme weather events. Even more critical with climate change & sea level rise, & in areas with a lot of 100-year floodplain.
- Significant bird habitat for feeding, shelter, breeding, nesting, resting. Birding "hotspot" with sightings of >100 species. High-priority habitat for the Saltmarsh Sparrow, a species of "special concern" in MA due to its rarity & extinction risk. Osprey nesting platforms.
- Fish spawning habitat & nursery for juvenile fish & invertebrates. Very important for recreational & commercial fishing & shellfishing. Anglers report catching striped bass, smallmouth bass, chain pickerel & others. Flounder, haddock, cod abundant in the past.

Background

- The Rock Island Cove Salt Marsh is an approximately 124-acre marsh complex located within the area that adjoins the Houghs Neck and Germantown peninsulas in Quincy.
- In recent years, abutters of the marsh have reported alarming rates of erosion and calving of tidal creek banks, specifically downstream of a tidal stream crossing on Rockland Street and have reached out to the City of Quincy to seek solutions to protect areas of concern within this marsh.
- Additionally, an at-grade road that runs from Lind Street to the marsh and the cove, which has been used by commercial shell fishermen for waterfront access, is regularly inundated during high tides, which will likely worsen as climate driven sea level rise impacts increase in the future.

Background

Salt Marsh Down Stream from Rockland Street Culvert

At Grade Path Adjacent to Lind Street

Background


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Babcock Street
Stoughton Street
Peterson Road
Sea Street
Newton Street
Lenox Street
Winthrop Street
Turner Street
Darrow Street
Hawthorne Street
Manet Avenue
Casco Street
Madeleine Street
Joseph Street
Mallard Road
Elcott Road
Poplar Road
Post Island Road
Shoreside Road
Kilby Street
Lee Street
Mead Street
Gannett Road
Pequot Road
Oneida Street
Noanet Street
State Street
Utica Street
Allerton Street
Rhoda Street
Pawsey Street
Rockland Street
Spring Street
Tower Street
Rockland Street Culvert
At-Grade Access Road
Palmer Street
Empire Street
Lind Street
Broady Avenue
Brockton Avenue
Northfield Avenue
Wilgus Road
Riverbank Road
Beebe Road
Grace Road
Rhode Street
Roach Street
Bowes Avenue
Howe Street
Shed Street
Hodgkinson Street
Doane Street
750 375 0 750
Feet
Weston & Sampson

Background

- Due to predictions of large losses of salt marsh, and high marsh habitat in particular, the City of Quincy has prioritized active management to increase the resilience and sustainability of salt marshes.
- It is with this salt marsh preservation goal that the City of Quincy has hired Weston & Sampson to conduct this salt marsh assessment at Rock Island Cove.

MarshRAM Assessment

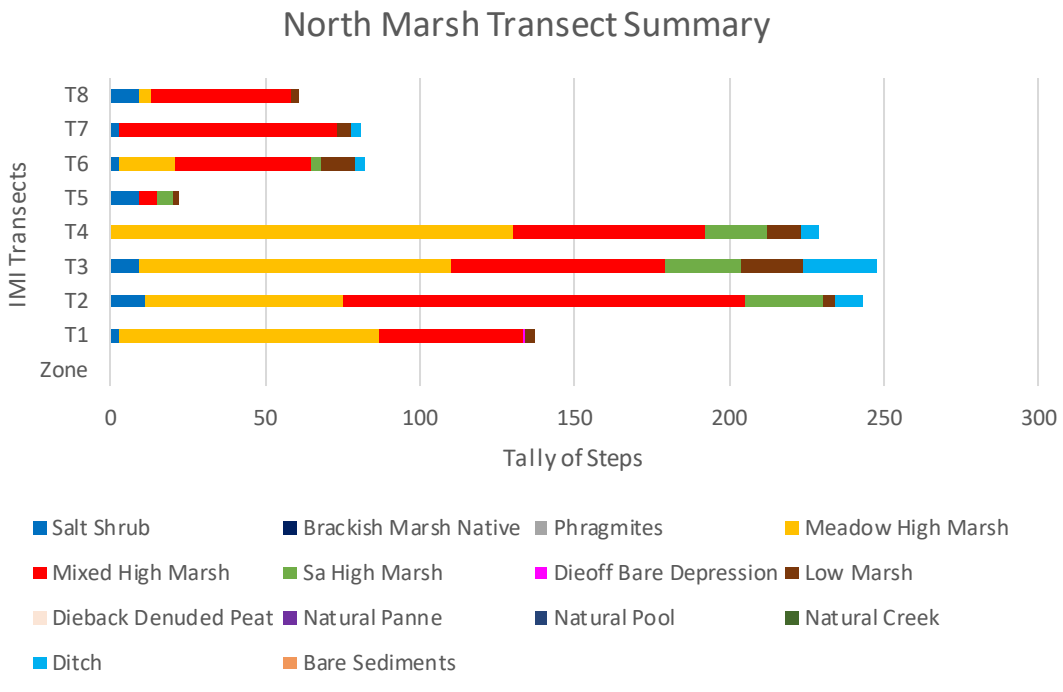
- Weston & Sampson utilized the recently developed **Salt Marsh Rapid Assessment Method (MarshRAM)**. MarshRAM is designed to produce metrics and indices characterizing salt marsh disturbances, platform integrity (plants and soils), landward migration potential, and ecological and cultural value, to inform salt marsh restoration, conservation, and policy.
- The MarshRAM methodology includes five components. The first three are checklists of characteristics and condition indicators observed in the field, the fourth is a quantitative marsh community-composition survey and model, and the fifth is a semi-quantitative model that assesses aspects of landward salt marsh migration potential.

MarshRAM Assesment

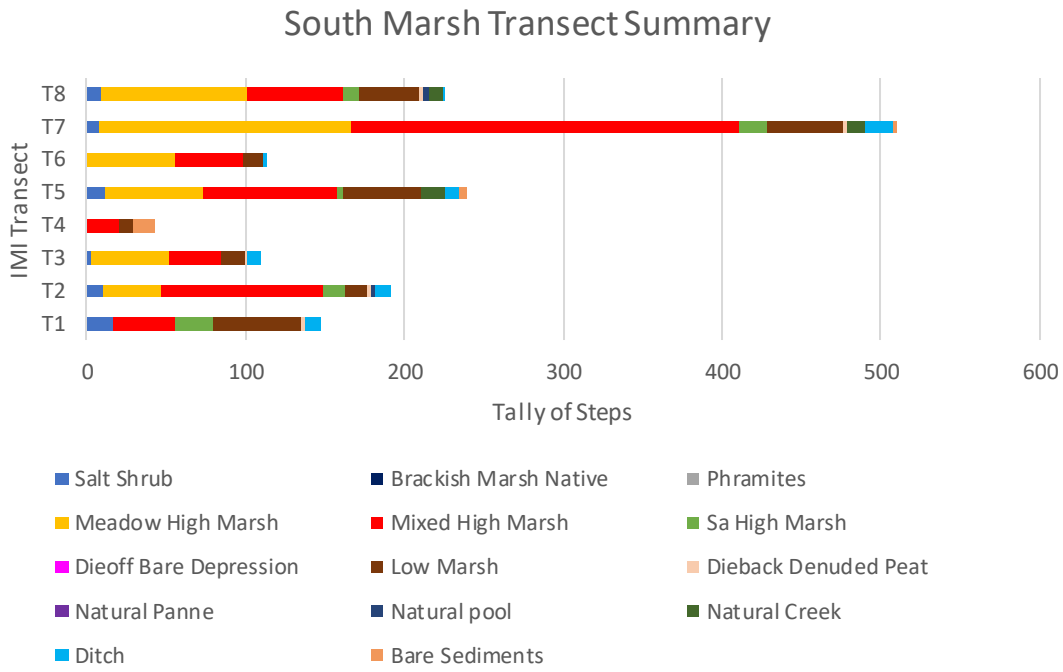
- A field assessment was conducted on October 3, 2022, at the Rock Island Cove Salt Marsh. To assess the entire marsh system, the marsh was broken into the northern (north marsh, a.k.a. Second marsh) and southern (south marsh, a.k.a. First Marsh) areas separated by Rhoda Street.
- The investigators walked a total of 16 transects using the MarshRAM methodology to collect representative data on the entire Rock Island Cove Salt Marsh complex.

Figure 1: MarshRAM Field Map

MarshRAM Assessment



North (Second) Marsh Salt Marsh Cover Tally



South (First) Marsh Salt Marsh Cover Tally

MarshRAM Assessment

- Overall, the results of the assessment determined the Rock Island Cove Salt Marsh is a lower degraded marsh system. Therefore, it is important to preserve the marsh's health to prevent the marsh from further erosion and/or degradation.

Restoration Opportunities

- Upon completion of the assessment a list of salt marsh restoration opportunities was identified followed by an alternatives analysis of feasible options.
- Note that the final report may include additional alternatives.

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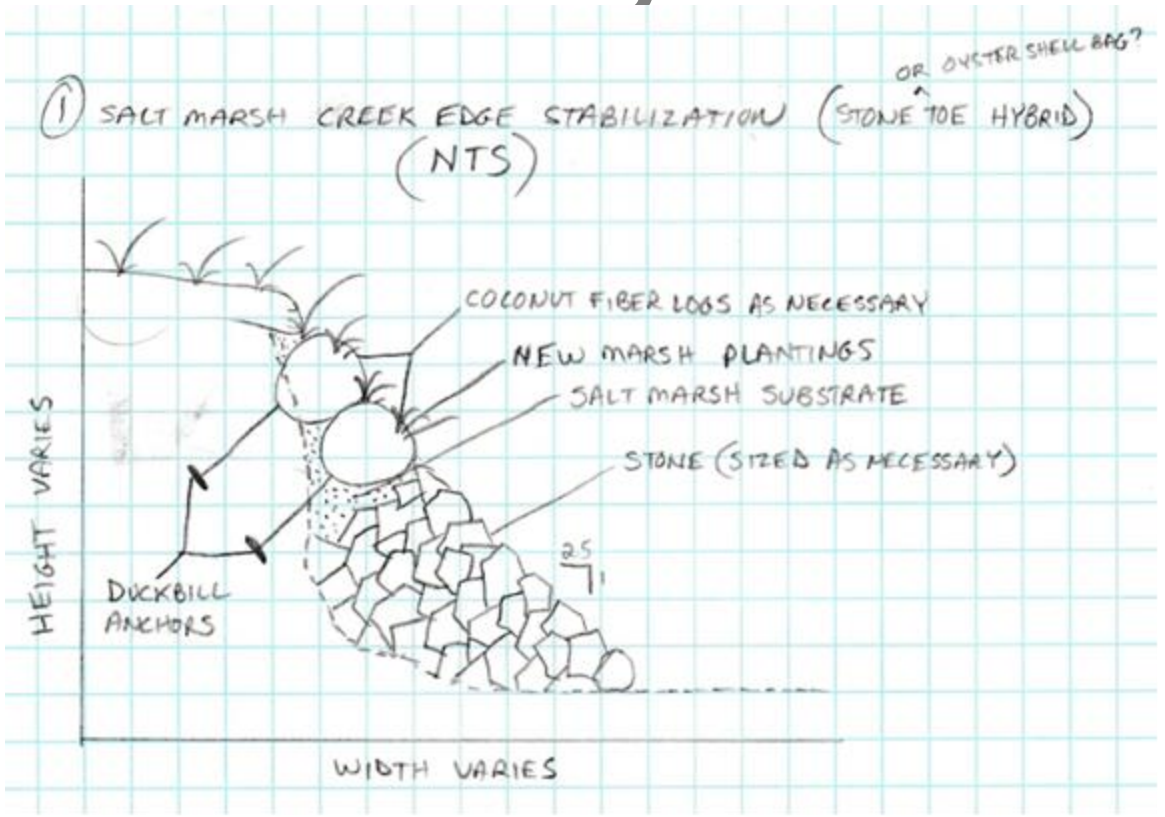
Alternatives Locations Map

Weston & Sampson

Alternative 1 – Marsh Edge Stabilization – Stone Toe Hybrid

- Stabilization of the existing toe of eroded marsh edge using stone as the base up to normal tide elevation, with a bioengineered apparatus on top of that to desired marsh platform elevation.



Alternative 1

Advantages:

→ Makes use of an array of natural materials to create a strong outer edge. The toe of the eroded edge is strengthened with stone, which is critical to long-term stabilization, and the rest with natural biodegradable materials and plants.

→ Provides, arguably, the strongest defense against future erosion outside of using 100% stone.

Disadvantages:

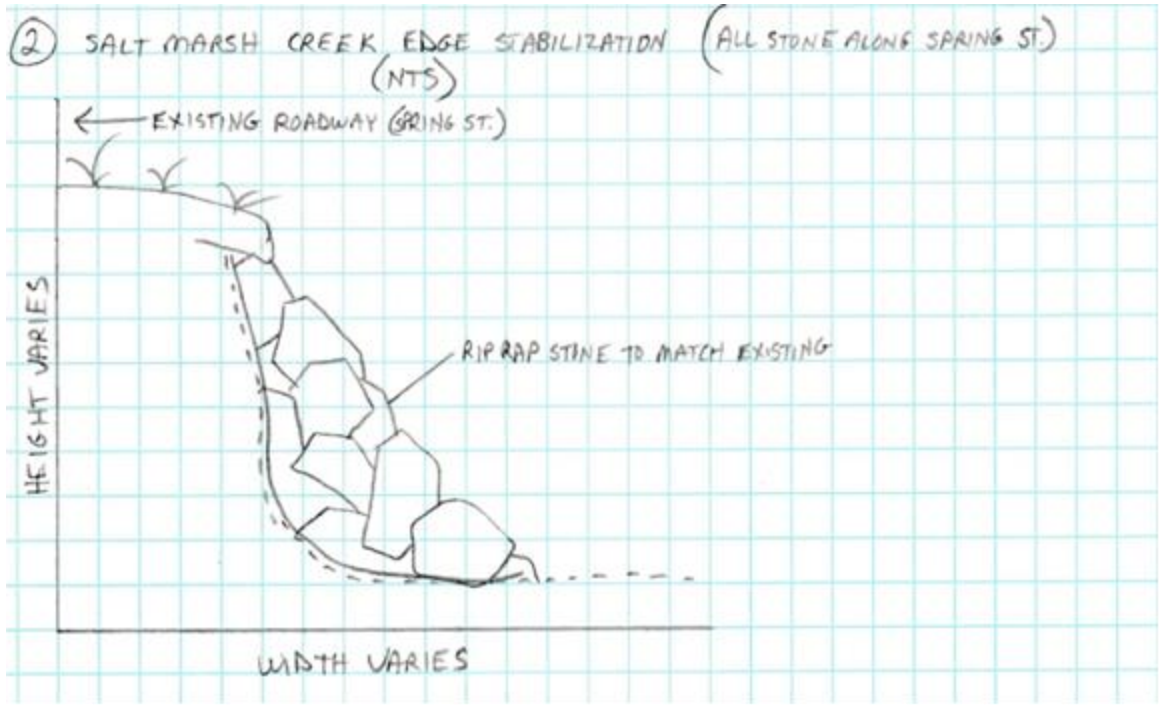
→ Using stone in an environment that includes water velocities, waves, and other energies, always carries the risk of energy reflection to unprotected nearby surfaces.

→ Biodegradable materials in marsh environments in New England carry an expected lifespan of just a few years. Plant establishment for long-term success is critical.

Alternative 1
Additional Photos

Alternative 2 – Marsh Edge Stabilization – Stone

- To protect Spring Street, stabilization of the existing eroded marsh edge in using stone consistent with adjacent existing stone protection at Rockland Street culvert.



Alternative 2

Advantages:

→ Provides an almost permanent stabilization solution right out of the gate, with little to no maintenance.

Disadvantages:

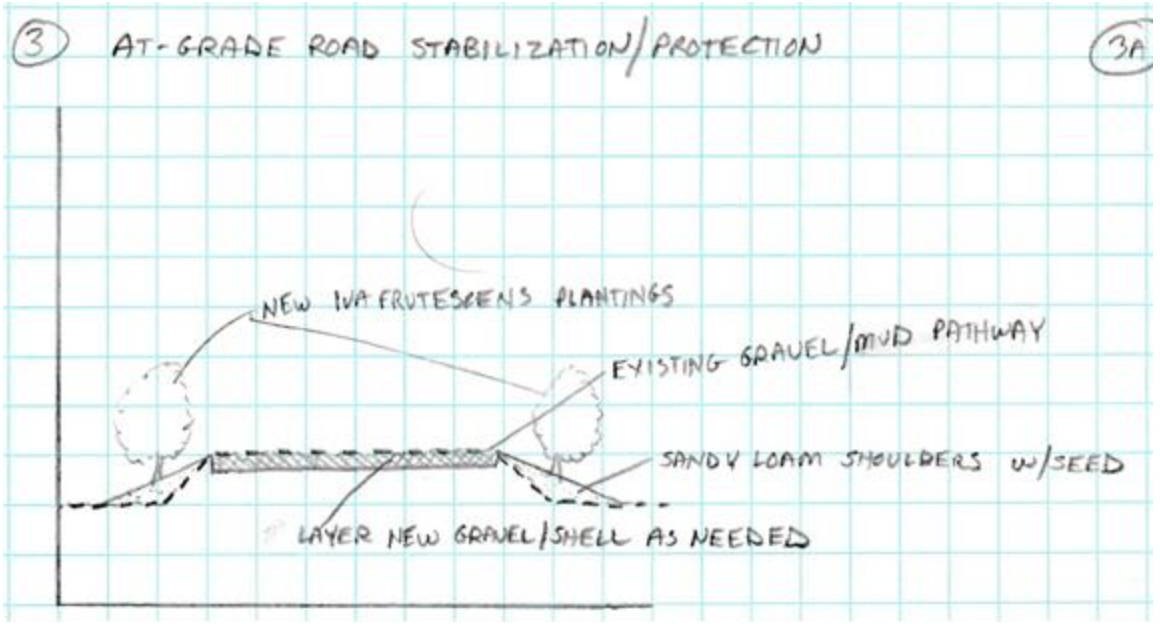
→ Using stone in an environment that includes water velocities, waves, and other energies, always carries the risk of energy reflection to unprotected nearby surfaces.

→ Not very attractive to permitters

Alternative 2
Additional Photos

Alternative 3A – At-Grade Road Stabilization & Protection

- Protection and stabilization of an existing informal roadway used for residential recreation and by local clamming activities. The existing road is a mix of gravel and other soils, varies in elevation, crosses existing ditches, includes degraded portions, and presents an erosion risk during storms. Improvements to this roadway would include addition of a stable surface material, stabilized shoulders, and shrub protection to minimize erosion potential. Potential to use sections of coarse stone under the roadway to improve existing ditch connectivity.



Alternative 3A

Advantages:

→ Solidifies and strengthens an existing informal roadway to minimize erosion.

→ Satisfies local population that uses the roadway for various reasons.

→ Relatively cost-effective

Disadvantages:

→ Improving the roadway could indirectly promote and attract unwanted use.

→ Construction of an erodible roadway in tidal zone will be difficult to permit.

→ Area would require significant erosion controls during construction that would need to be left in place until the roadway was completely stable.

Alternative 3B – At-Grade Road Replacement with Helical Supported Boardwalk System

- As an alternative to altering the existing pathway, which was not initially well-received by CZM and potentially other regulatory bodies, an alternative was developed that includes the installation of an elevated boardwalk system and associated restoration of the previous pathway. This alternative allows for the best chance to receive CZM grant money by incorporating a salt marsh restoration element, where the old pathway would be removed, and the area regraded to allow for salt marsh plant communities to thrive.

Alternative 3B

Advantages:

→ Removes and upgrades the existing pathway.

→ Creates an Opportunity to restore a significant portion of the marsh (Approx. 25,000 SF) that is currently elevated above tidal elevations and contains invasive plant species.

→ A more attractive alternative to permitting agencies and meet CHWQ (CZM) grant money.

Disadvantages:

→ Potentially expensive option if not supplemented with grant money.

Alternative 3A and 3B Additional Photos

Alternative 4 – Restoration at Rhoda Street Culvert

- The area of the Rhoda Street culvert currently exhibits the use of excessive riprap stone for stabilization on the marsh surface, roadway embankment, and inside the channel on both sides. The team has assessed that this stone is not necessary and is exacerbating the growth of *Phragmites australis*. It is proposed that this stone should be removed/reused thoughtfully, and existing surfaces restored to their proper habitat type using natural techniques and materials

Alternative 4

Advantages:

→ Removes the unnecessary stone along the roadway, down the bank, and on the marsh surface.

→ Restoration would include the eradication of the existing stand of invasive *Phragmites australis* with replacement of native plant communities.

→ Re-use of existing stone in strategic areas like the roadside, and in the transition zone where vegetation is typically tough to establish (choked riprap).

Disadvantages:

→ Engineering 'down' from the existing stone temporarily destabilizes the area and increases potential maintenance as new native habitat types establish.

Alternative 4
Additional Photos

Alternative 5 – Phragmites Management near Rhoda Street Culvert

- Chemical and/or mechanical removal of existing *Phragmites australis* stands in isolated populations along the edge of the marsh and near the Rhoda Street culvert.

Alternative 5

Advantages:

→ Removes minor but extensive threat to upland and high marsh habitat

Disadvantages:

→ May not be necessary in light of likely potential sea level rise, where it could be kept at bay naturally.

→ Multi-Year treatment with herbicides likely.

Alternative 6 – South (First) Marsh Fill Removal

- Multiple locations in the southern marsh, totaling about an acre in size, exhibit piles of fill material from an unknown source. These areas currently exhibit upland characteristics & plant communities and could be removed to create high marsh habitat.

Alternative 6
Additional Photos

Alternative 6

Advantages:

→ Removes existing upland habitat and replaces with high marsh habitat.

→ Presents potential opportunity to re-use existing fill to elevate lower areas of marsh to increase high marsh habitat or migration potential.

→ Also potentially satisfies CZM grant program criteria for marsh restoration.

Disadvantages:

→ Potentially expensive option depending on where fill is able to be relocated/reused r disposed.

→ Operations to remove the fill would require heavy equipment and would need to be done very carefully.

Alternative 7 – Green Infrastructure /Low Impact Development

Bioswales / Sunken Planters
Bioswales or sunken planters capture and hold stormwater runoff and allow it to slowly infiltrate through soil media, thus reducing flooding.

Floodable Parks
Floodable parks and recreation spaces represent the greatest opportunity for large retention spaces within urban areas.

Wet Plazas
Wet plazas or floodable public spaces are another great opportunity for large retention capacity within denser urban environments.

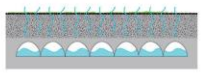
Pond Restoration
Pond restoration and targeted dredging can help build capacity for stormwater through retention and detention.

Stream Daylighting
Daylighting pipes can involve reopening historic streams, formalizing existing streams, or creating new streams as conveyance connections between other cloudburst elements.

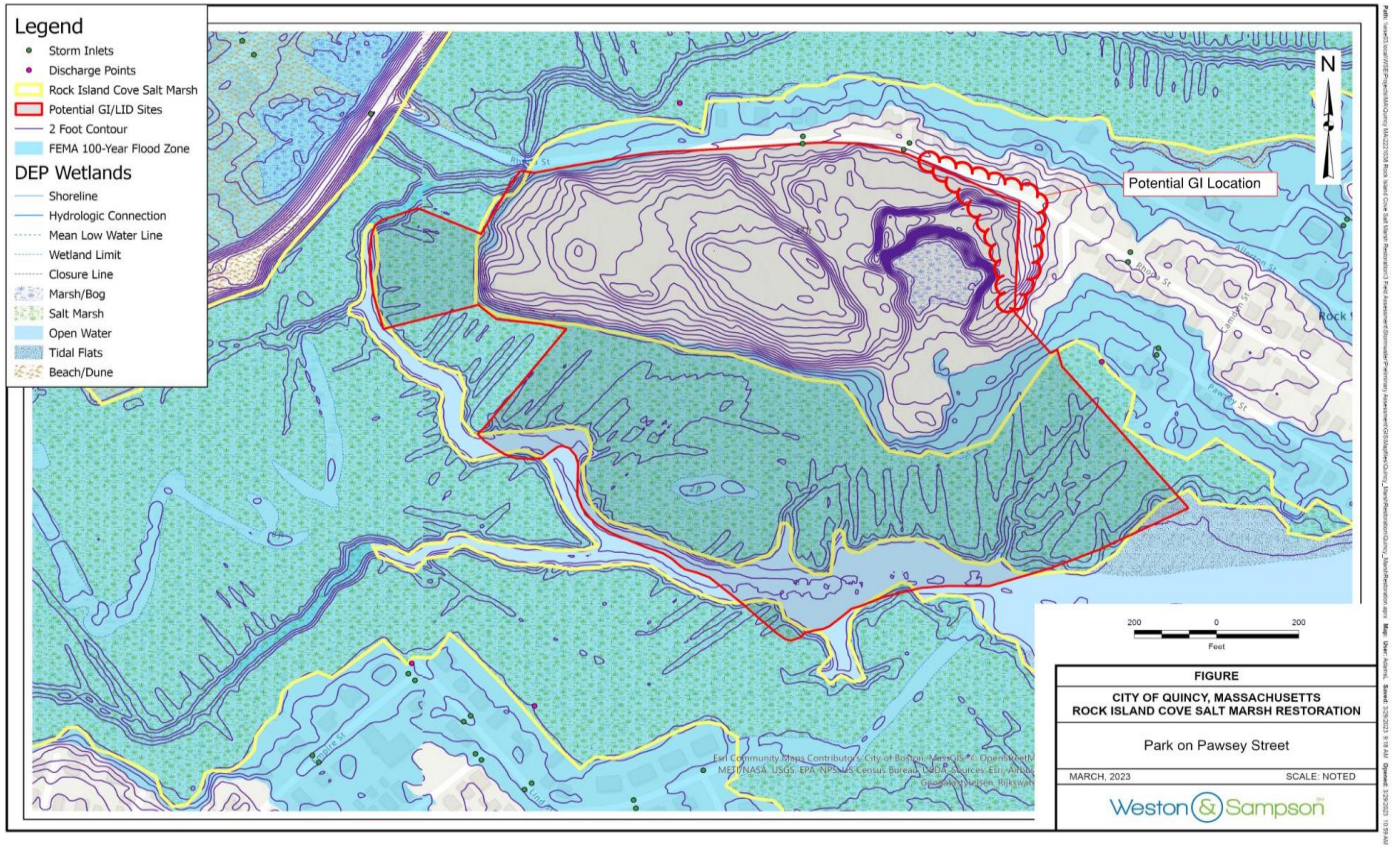
Street Tree Planters
Tree planters can be installed on their own, or in conjunction with bioswales.

Permeable Pavement
Roadways and sidewalks are big contributors to stormwater runoff.

Underground Storage
Underground Storage chambers can be used for reuse, retention, detention, or controlling the flow of on-site stormwater



Alternative 7 – Location 1



Location 1: Park on Pawsey Street (a.k.a. the Crusher)

Alternative 7 – Location 1 Options

1. **Bioswale.** This option will allow for roadway runoff to be captured and treated before entering the marsh. Pretreatment measures such as a bioswale can be tailored to remove nutrients such as nitrogen and phosphorus and can remove 80% or more of the total suspended solids (TSS) in stormwater.

   Advantages: This solution will fit into limited streetside space and has a low cost.

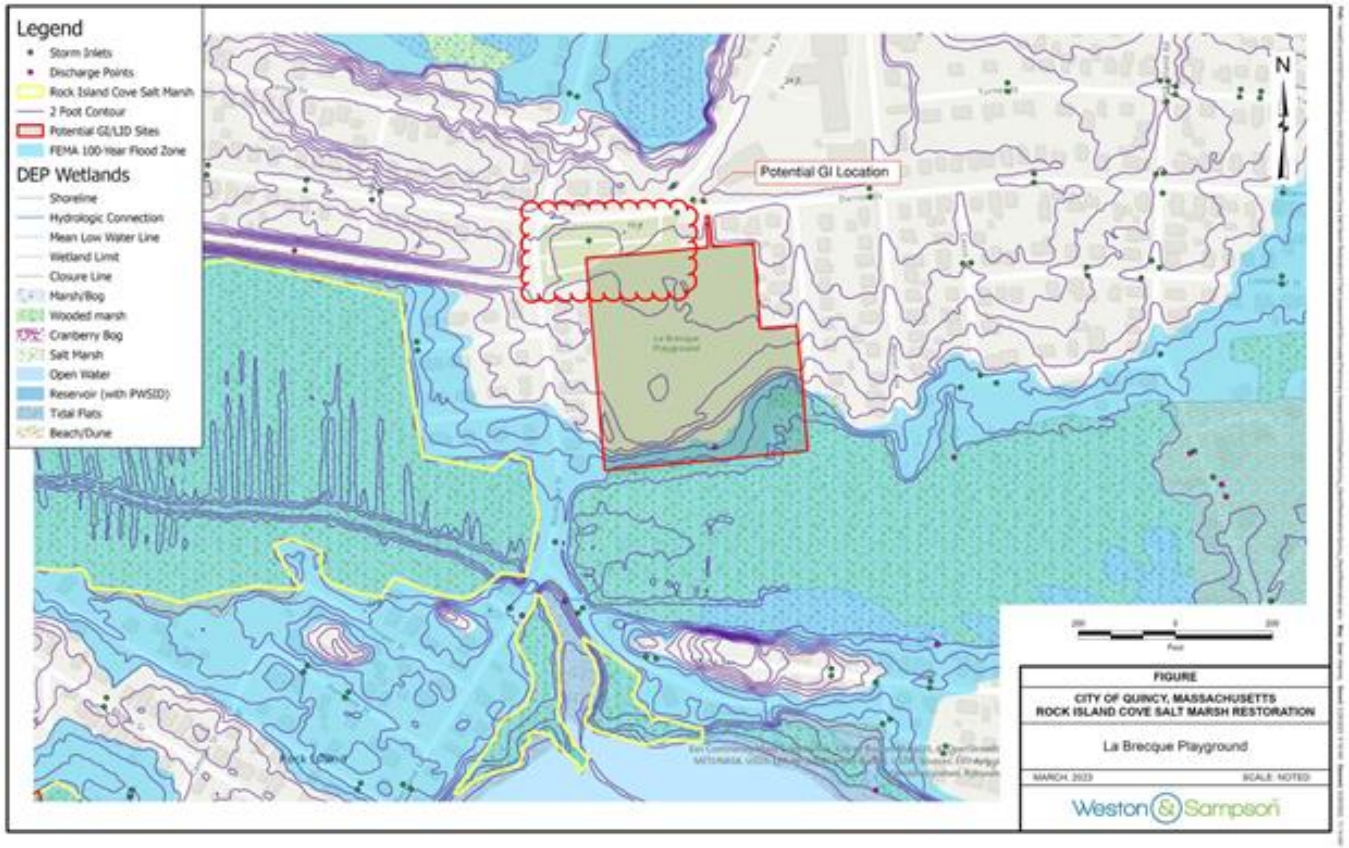
   Disadvantages: This system functions as pretreatment and is most effective followed by a primary treatment system, such as the biofiltration described below.

2. **Biofiltration.** A biofiltration system uses soils, plants, and microbes to treat stormwater before it is infiltrated and/or discharged. Stormwater runoff would be directed from the street or the existing stormwater system into cells. The runoff would then filter through the soil media. Biofiltration systems are designed to remove 90% TSS, 30-50% total nitrogen, 40-90% total phosphorus, and 40-90% of metals, including copper, lead, zinc, and cadmium (Massachusetts Stormwater Handbook).

   Advantages: This system is customizable for the site constraints and needs. There is a lower cost of installation than the underground storage system.

   Disadvantages: Maintenance is required to keep system functioning well.

Alternative 7 – Location 2



Location 2: La Brecque Playground

Note that this location may not be feasible since it was determined that the parking lot to the north is privately-owned.

Alternative 7 – Location 2 Options

1. **Porous asphalt pavement**: In its current state, the parking lot to the north of the fields covers approximately 36,000 square feet and is entirely impervious with no vegetation or opportunity for stormwater infiltration. The City could take the opportunity to install porous asphalt in the parking stalls, reducing impervious surface and allowing for infiltration of stormwater from the parking lot and surrounding roads. Porous pavement, when designed to prevent runoff and with adequate storage capacity, has an 80% TSS removal. If additional nutrient removal is desired, additional Best Management Practices (BMPs) can be considered for this area.

   Advantages: Porous asphalt treatment can be installed anywhere there is existing asphalt at the playground and will not require additional space.

   Disadvantages: Salt and sand is not recommended on porous asphalt parking lots due to the ability to clog the pores. A vacuum truck is required to maintain the parking lot periodically.

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Feet

Alternatives Locations Map

Weston & Sampson

Thank You for your time!

Questions and Comments?

For Additional Information Check Out the Website:

https://www.quincyma.gov/departments/natural_resources/environmental/rock_island_cove_marsh.php

If you have any additional questions, please forward to page.hailey@wseinc.com or jgawrys@sumcoeco.com or hlis@quincyma.gov