



# **Salem Willows**

## **Phase 2 Improvements**

### **Salem Conservation Commission**

### **NOI Hearing**

June 20, 2023

Rob Kenneally, PE

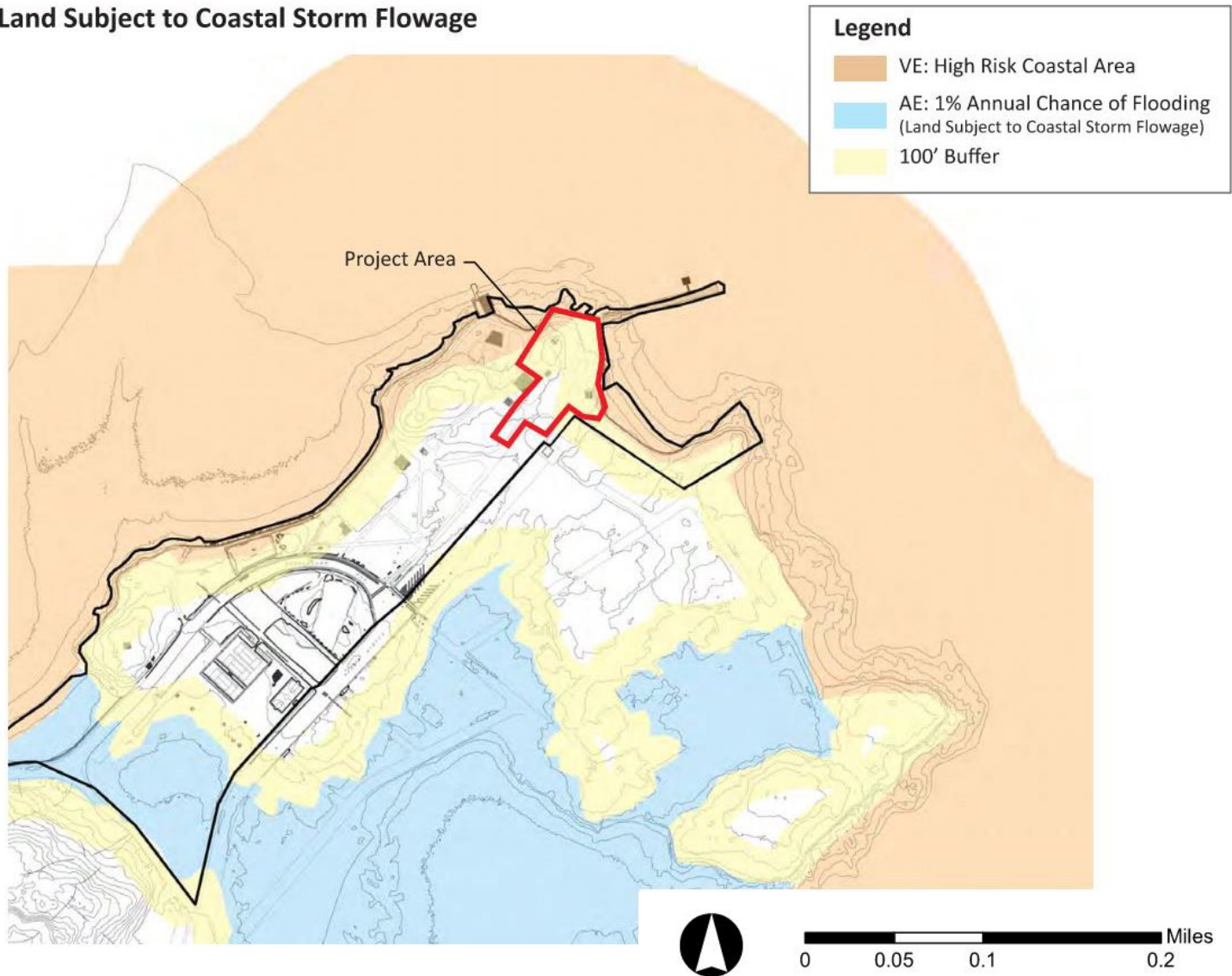
Matthew Pilis, PLA

Figure 2: City of Salem GIS Orthophoto



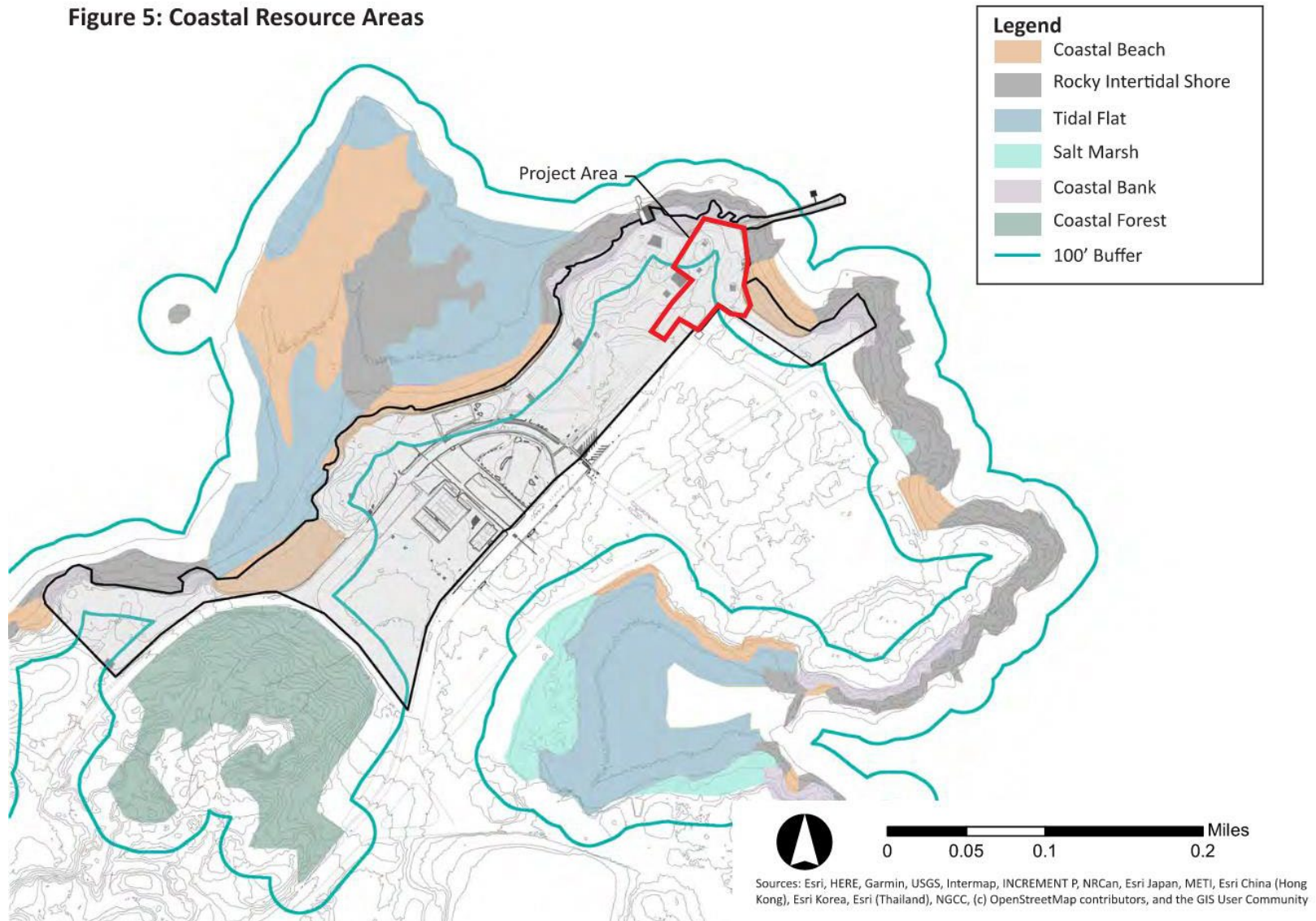


Figure 4: Land Subject to Coastal Storm Flowage

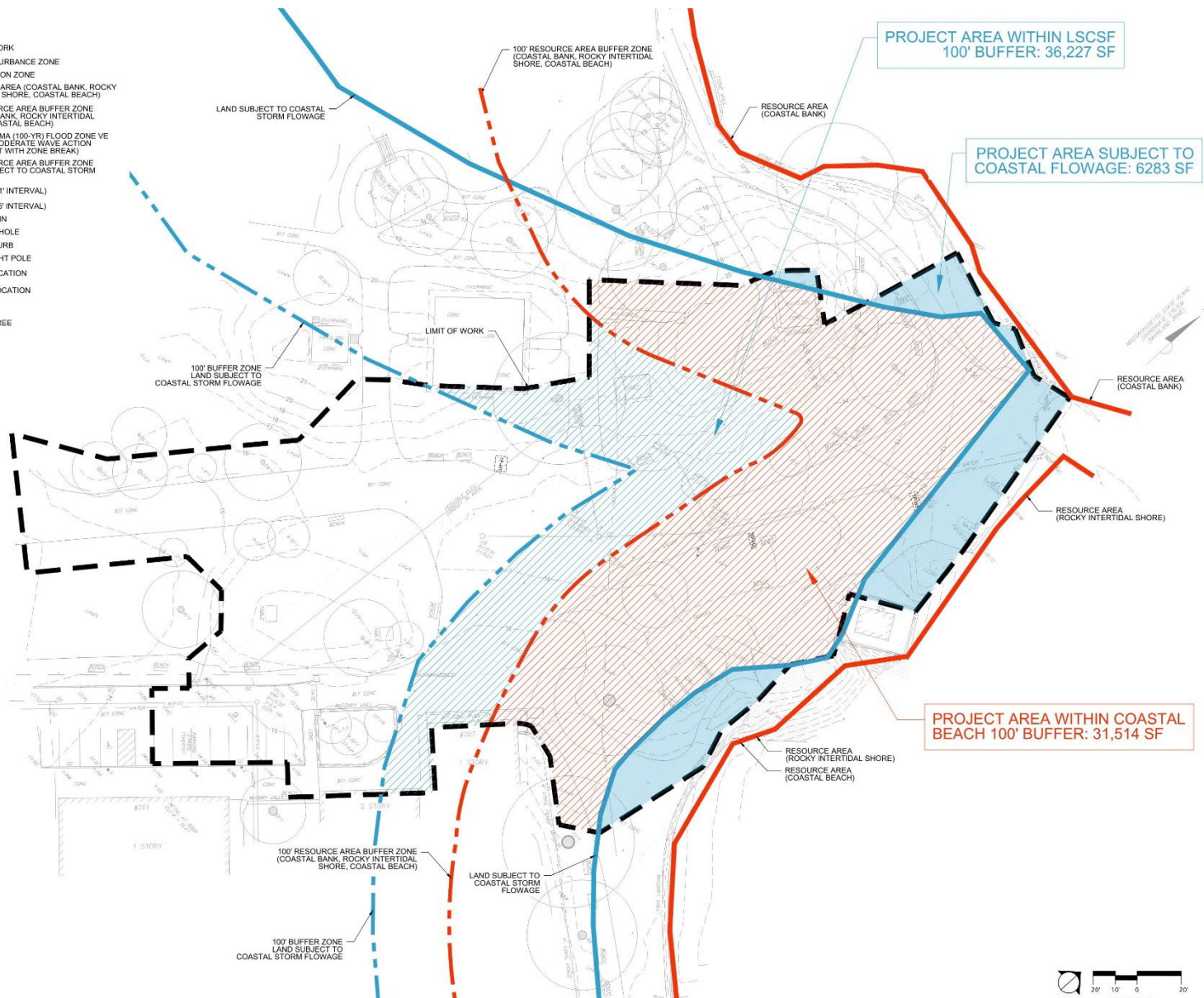
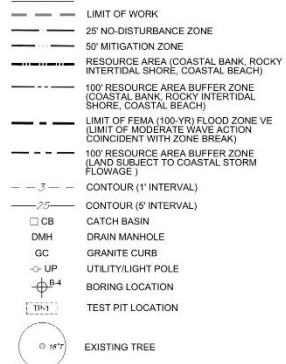


Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Figure 5: Coastal Resource Areas











Project Area

Proposed Pier





Inaccessible, oversized and undefined pathways and site circulation.



Inaccessible picnic areas, with some picnic tables currently sitting on tree roots.



Excessive impervious surfaces lead to uncontrolled stormwater runoff and concentrated flows.



Degraded and compacted softscape areas along coastal edges.





Large paved expanse leading towards sink holes along edge of existing seawall.



Oversized and undefined gateways and access points within the project site.



# Project Goals

## **Restore the Site**

- Improving pedestrian circulation, adding new pedestrian paths, and reducing impervious surfaces.
- Installing bioretention basins.
- Re-grading and improving existing picnic areas.
- Restoring degraded areas with native trees, shrubs, and groundcovers.







## Existing Conditions Plan

Impervious Surface = 31,752 SF

*Impervious Surface Reduction = 10,600 SF or 33% Reduction*



## Proposed Site Plan

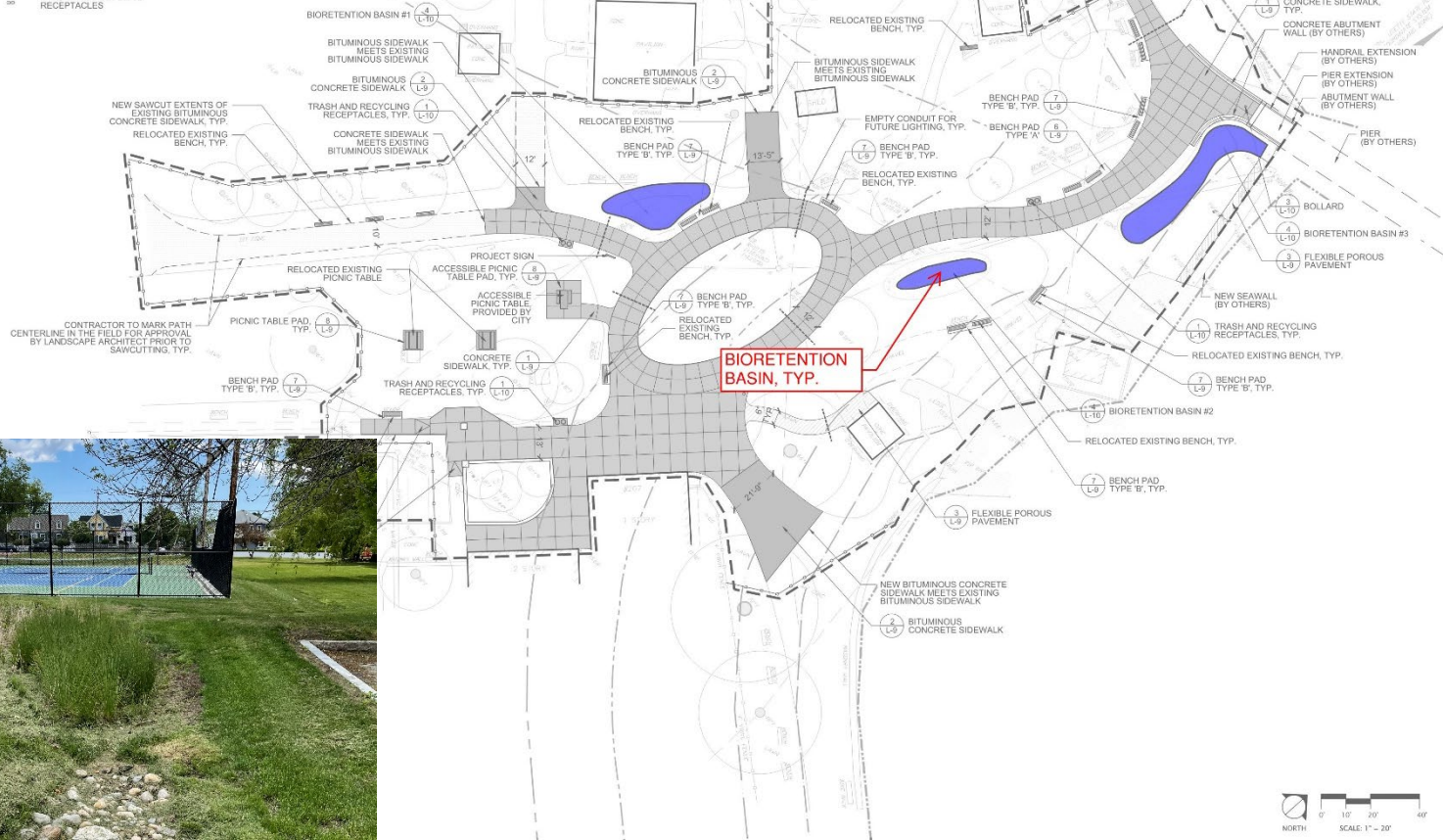
Impervious Surface = 21,152 SF

*Impervious Surface Comparison*  
**Conservation Commission**

# Bioretention Basins

## LEGEND

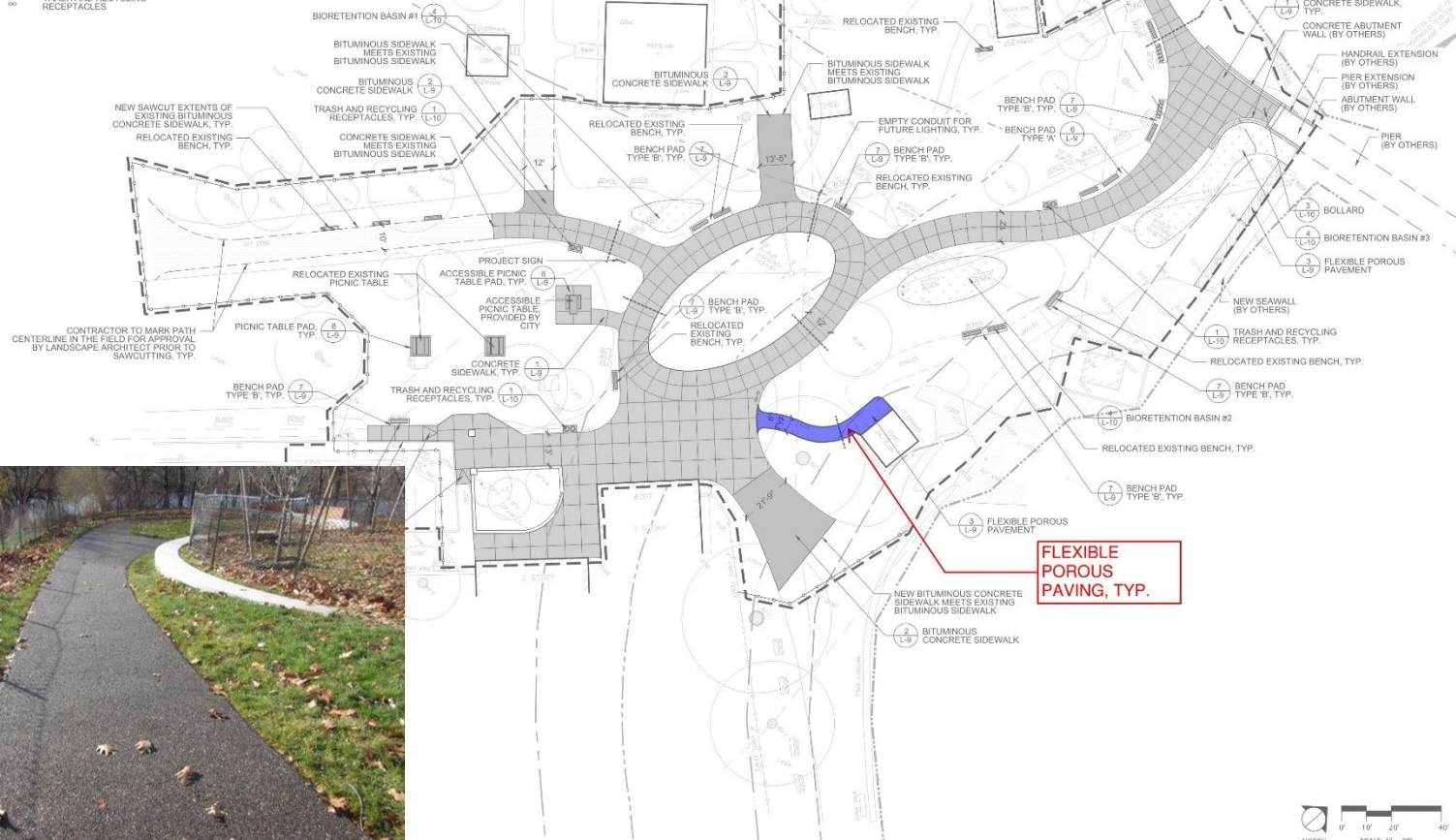
- LIMIT OF WORK
- 25' NO-DISTURBANCE ZONE
- 60' MITIGATION ZONE
- RESOURCE AREA (COASTAL BANK, ROCKY INTERTIDAL SHORE, COASTAL BEACH)
- 100' RESOURCE AREA BUFFER ZONE
- CONCRETE SIDEWALK
- NEW BITUMINOUS PAVING
- BIORETENTION BASIN
- VERTICAL GRANITE CURB
- PARK BENCH
- PICNIC TABLE
- TRASH AND RECYCLING RECEPTACLES
- R RADIUS
- L LENGTH
- D ANGLE
- TYP TYPICAL
- BP POINT OF BEGINNING
- EP END POINT
- CP CONTROL POINT
- PI POINT OF INTERSECTION
- PC POINT OF CURVATURE
- PT POINT OF TANGENCY
- PCC POINT OF COMPOUND CURVATURE
- PRC POINT OF REVERSE CURVATURE
- EMPTY CONDUIT FOR FUTURE LIGHTING

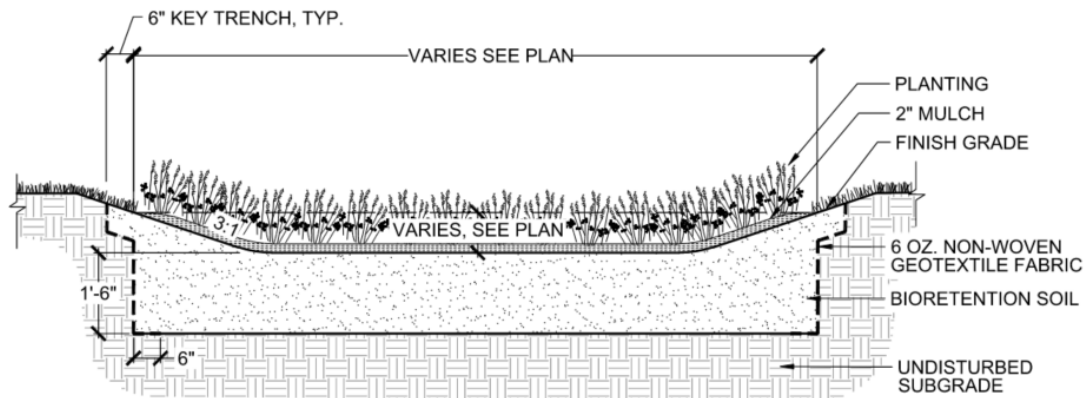




## LEGEND

	LIMIT OF WORK	R	RADIUS
	25' NO-DISTURBANCE ZONE	L	LENGTH
	50' MITIGATION ZONE	D	ANGLE
	THRESHOLD AREA (COASTAL BANK, ROCKY INTERTIDAL SHORE, COASTAL BEACH)	Typ	TYPICAL
	100' RESOURCE AREA BUFFER ZONE	BP	POINT OF BEGINNING
	CONCRETE SIDEWALK	EP	END POINT
	NEW BITUMINOUS PAVING	CP	CONTROL POINT
	BIORETENTION BASIN	PI	POINT OF INTERSECTION
	VERTICAL GRANITE CURB	PC	POINT OF CURVATURE
	PARK BENCH	PT	POINT OF TANGENCY
	PICNIC TABLE	PCC	POINT OF COMPOUND CURVATURE
	RETRASH AND RECYCLING RECEPTACLES	PRC	POINT OF REVERSE CURVATURE
		-----	EMPTY CONDUIT FOR FUTURE LIGHTING



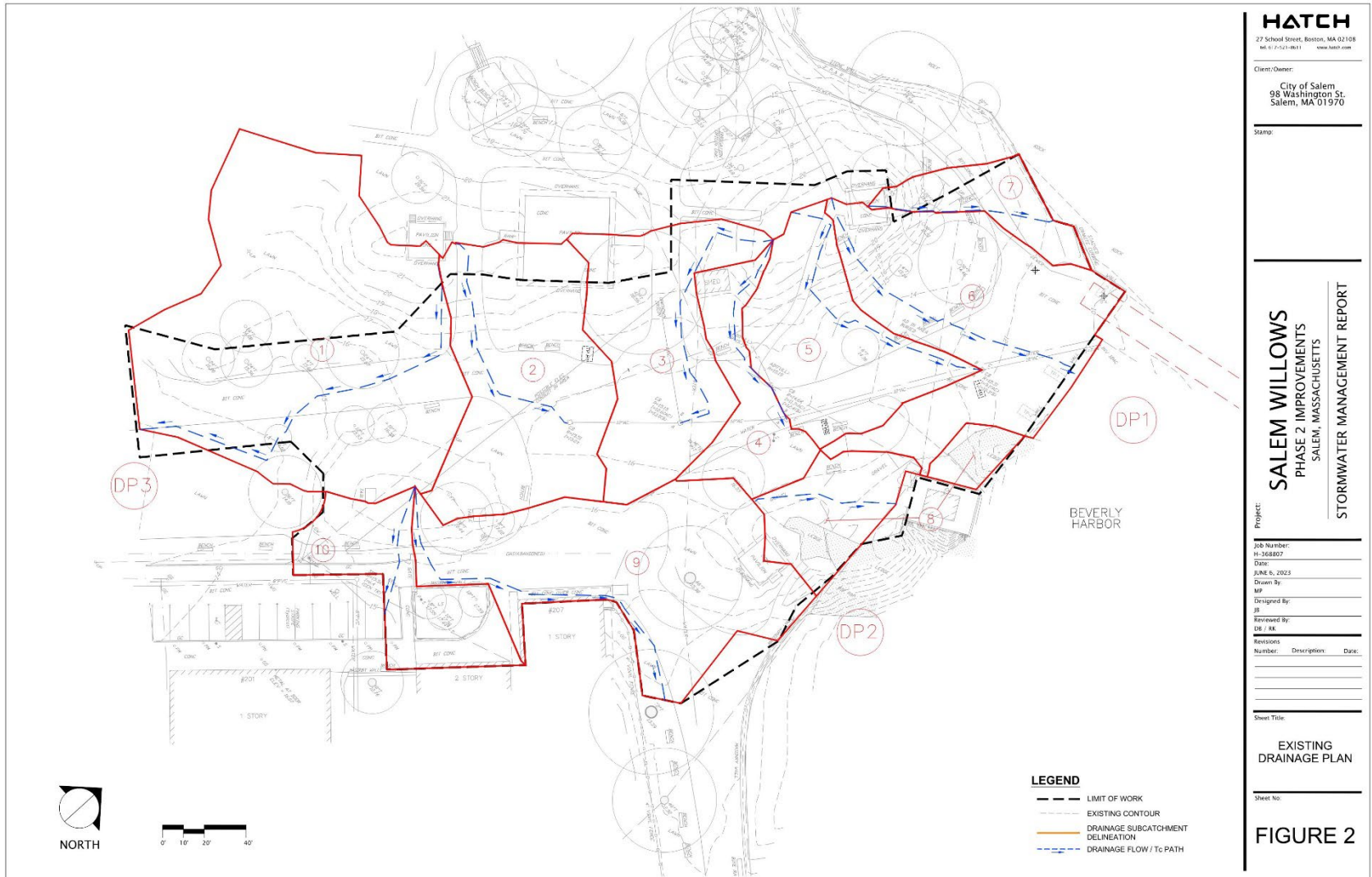


**Bioretention Basin**



**Flexible Porous Pavement**

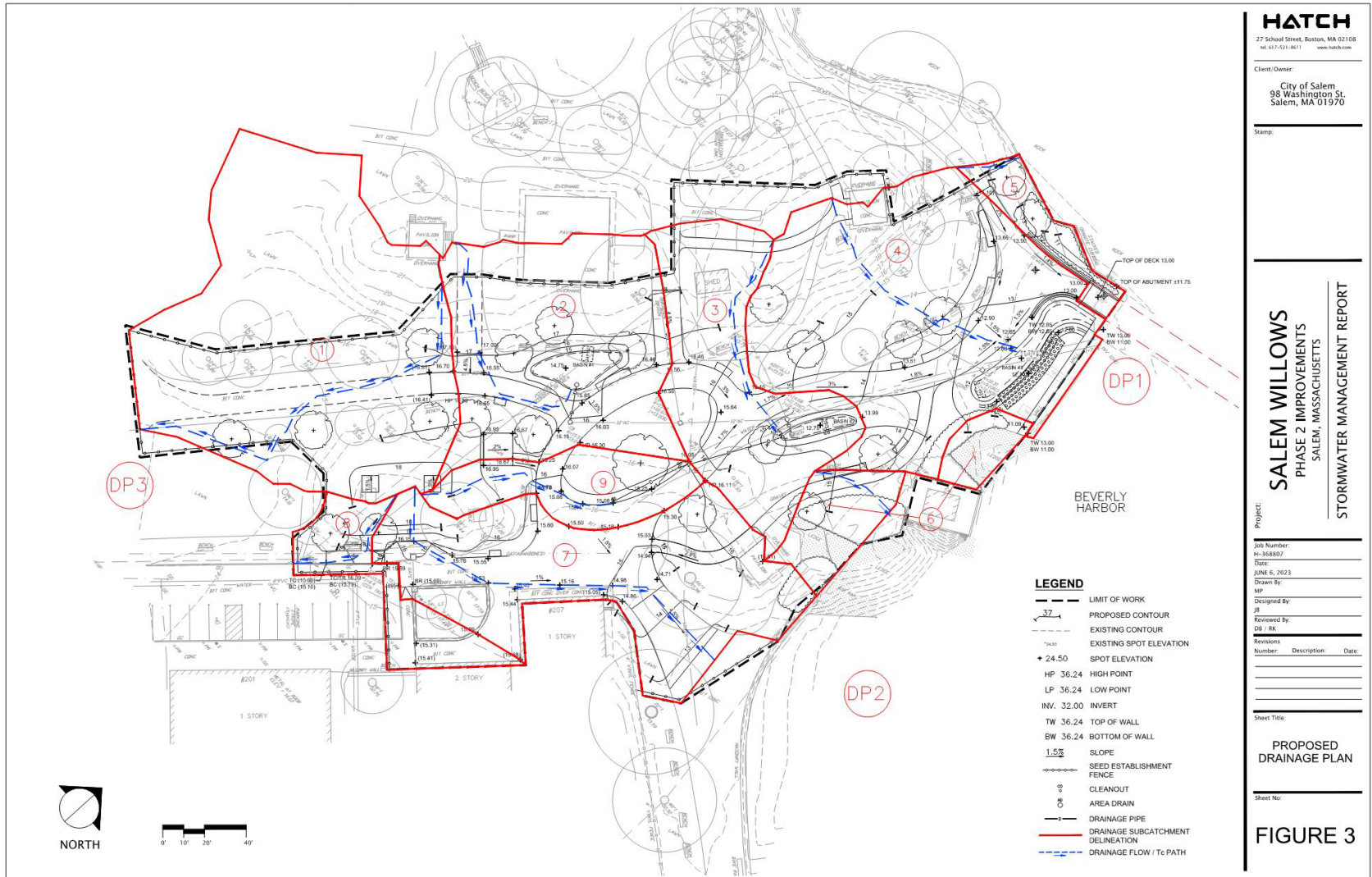




Three Discharge Points

Limit of Work Area: 1.55 acre

Drainage Area: 1.75 acre



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*Subcatchment Plan – Proposed Condition*  
**Conservation Commission**




- **Redevelopment Project**
- **Reducing Impervious (Paved) Surfaces**
  - **34% reduction in impervious area**
- **Reducing Peak Stormwater Flows**
  - **Post-development < Pre-development**
- **Recharge Volume & Water Quality**
  - **Providing MS4 (0.8"/sf) required recharge volume**
- **Operation and Maintenance**




1. Continued Planting approach from the Phase 1 Project.
2. Restoration planting (Maritime Shrubland) limited to coastal areas for stabilization and climate change resilience.
3. Creation of a native Bioretention Basin Plant Community.
4. Native, Non-cultivar Species
5. Highly Adaptive Plants—Minimize Maintenance.

## Maritime Shrubland

State Rank: S3 - Vulnerable



Dense sumac in a Maritime Shrubland. Photo: Patricia Swain, NHESP.



Bayberry in fruit, in a Maritime Shrubland. Photo: NHESP.

**Description:** Maritime Shrubland communities occur along the coast within the area of direct influence of the ocean and salt spray, such as on barrier beach dunes, next to tidal marshes, or on bluffs or rocky headlands. Maritime Shrublands often occur on sand or bedrock that does not hold water. They may extend inland in areas with droughty soils or extreme exposure to ocean winds that inhibit tree growth. Offshore islands can have extensive areas of Maritime Shrublands. They are dominated by patches of dense shrubs with scattered areas of more open low growth or bare ground, and have less than about 25% tree canopy. Plants in these communities are exposed to the direct influences of salt and constant ocean wind, which select for stress-tolerant species. The species of maritime shrublands do not withstand flooding by salt water, but they tolerate or recover

Maritime Shrubland communities are dominated by patches of dense shrubs with scattered areas of more open low growth or bare ground. On rocky coastal headlands or behind dunes, they receive salt spray during storms.

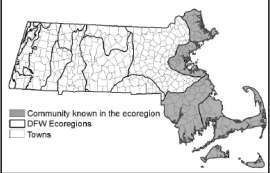
from salt deposits on their leaves. Fire was an important part of this environment prior to the establishment of fire suppression regimes in settled areas. Without regular disturbance, the community may succeed to forest.

**Characteristic Species:** Maritime Shrublands are up to 2-3m (~6-10 ft.) tall and very dense, often with one or several species dominant. They usually have a sparse herbaceous layer, but grasses or sedges can be abundant. Vines, including cutrier and poison ivy, often cover other plants, grow in dense patches on their own, or form impenetrable barriers particularly on their edges. Black huckleberry, bayberry, black cherry, black chokeberry, sumac, blueberries, and juniper are some of the shrubs that occur either mixed or with any one dominant in small or large patches. Large areas with dense red cedar are split out as Maritime Juniper Woodland/Shrubland. Low bush blueberry and bearberry may be abundant. Non-native species including Oriental bittersweet and Morrow's honeysuckle are often abundant.

**Differentiating from Related Communities:** Maritime Shrublands are intended to be large, relatively continuous areas dominated by shrubs

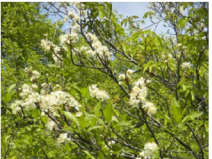
(>40% cover) in the salt spray zone. Large patches of scrub oak are separated out as Scrub Oak Shrublands. Areas dominated by pitch pine are Maritime Pitch Pine Woodland on Dunes, or Pitch Pine - Scrub Oak Community. Red cedar (*Virginia juniper*) dominated areas are Maritime Juniper Woodland/Shrublands. When shrub cover is <40%, the community is something else, often Sandplain Heathland or Maritime Dune. Maritime Dunes include patches of shrubs in areas protected from winds and salt spray. When large and continuous such patches may be Maritime Shrublands. Tree cover should be <25% overall in a Maritime Shrubland. Maritime and coastal forests and shrublands grade into each other and other community types, such as wetlands in interdunal swales, dry shrubby dunes, and more inland oak forests.

**Habitat for Associated Fauna:** Shrub thickets provide nesting areas for Northern Harriers, Northern Towhees, and




Song Sparrows. Maritime Shrublands are important during fall migrations for cover and forage -- many of the plants have fruit attractive to migrants. White-tailed deer maintain large populations in shrubland habitats. Coastal plain shrublands are habitat to state rare moths whose larvae feed on the typical shrubs. Generally, fewer terrestrial animals are expected as the environment becomes saltier.

**Examples with Public Access:** Hahab Point SP, Rockport; Boston Harbor Islands, Weymouth, Denarest - Lloyd Memorial SP, Dartmouth; Quivett Creek/Paines Creek (town), Brewster.



Beach plum flowering in Maritime Shrubland. Photo: Patricia Swain, NHESP.



Maritime Shrubland, with salt damage from a storm. Photo: Patricia Swain, NHESP.

From: *Classification of Natural Communities of Massachusetts* <http://www.mass.gov/nhesp/>  
Natural Heritage & Endangered Species Program, Division of Fisheries & Wildlife, 1 Rabbit Hill Rd., Westborough, MA 01581

Updated: 2016  
(508) 389-6360



# Timeline and Next Steps

- **Community Outreach**
  - Parks & Recreation Hearing: July 2023
- **Complete Design/Construction Documents:** Fall 2023
- **Out to Bid:** Anticipated Spring 2024
- **Construction:** Anticipated 2024 - 2025

# Thank You