

# Cape Cod Boat Ramps – Stormwater Retrofit Field Forms

Stormwater retrofit field forms were produced for all 20 sites during the field assessment for the Cape Cod Boat Ramp SW Retrofit Project from both data collected in the field on iPads as well as information collected and calculated in the office. The following is a summary of the information included on each form, organized by section.

## SITE AND CONCEPT DESCRIPTION:

This section provides a brief description of the existing site conditions and proposed concepts. Specific information important for ranking and/or design is included here, particularly information provided by the Project Team, residents or other stakeholders throughout the assessment process.

*Existing BMP? (Y/N):* Existing BMP refers to an actual SW management practice, not just infrastructure.

## SITE LOCATION:

Address for the site as well as a location map.

## GENERAL SITE INFORMATION:

This section provides general overview information about the site.

*Site Contact(s):* Contact(s) for site is included if known.

*Ownership:* Typically “Town” or “State” or both, with more information included where known.

*Parking Lot? (Y/N):* Indicates if a parking lot is present along with a boat ramp.

*Parking Spaces (V/VwT/H):* Number of available parking spaces for vehicles only (V), vehicles with trailers (VwT), and handicapped spaces (H).

*Surface (ramp/parking):* Indicates whether the ramp and parking lot is paved (P) or unpaved (UP).

*Existing Site Condition:* Refers to existing condition at the site. Sites in poor condition to start with may be higher priority to upgrade to prevent further damage and pollutant loading.

*Facilities/amenities:* Facilities and/or amenities at or near the site, such as restrooms, picnic tables, etc.

*Special Uses:* Information on specific uses of boat ramp/parking area throughout the year if known (e.g., Fourth of July parade staging area, polar plunge, craft fair, etc.).

*Receiving Water:* Name and type (freshwater-F, or estuarine-E) of adjacent water body

*Known Impairment:* Type of water quality impairment if known

*Adjacent Critical Resources:* Lists whether the site is at or adjacent to a public beach, anadromous fish run, shellfishing area, or other critical resource.

*Hotspot? (Y/N):* Hotspots are sites with potentially higher pollutant loads, such as ramps with fueling station/pumpouts, etc.

*Observed Pollutant(s):* This is a list of any pollutants actually observed at the site.

*Soils:* Lists whether the site is expected to have good or poor infiltration based on soil survey (GIS).

*Invasives:* Lists whether project location has obvious invasive plant species present, and if so, which kind.

*EJ Community (minority/income/minority&income):* Lists whether the site is within 1 mile of a mapped Environmental Justice (EJ) population based on mapped census (GIS) information.



## RETROFIT DETAILS:

Description of proposed concept components, and information needed for ranking and design.

*Existing BMP Retrofit or New?* Is the proposed practice a retrofit of existing BMP or a new BMP?

*Proposed BMP/Pretreatment:* General category of proposed BMPs and proposed type of pretreatment.

*Non-structural Controls:* Describes any additional non-structural practice recommended for the site, such as public education, stabilization, wetland restoration, etc.

*BMP Maintenance Burden:* Estimated maintenance level for proposed BMP(s) based on type of practice and expected pollutant load.

*BMP Benefits:* Lists benefits from proposed practice(s), other than water quality treatment, which is assumed:

Recharge – provides infiltration, recharging groundwater;

Storage – provides additional volume control for larger storm events;

Demo – location provides opportunity for outreach as a demonstration project;

Repair – opportunity to address an existing problem;

Habitat – results in improved habitat, such as wetland restoration, buffer planting, etc.;

Resiliency – opportunity to address future climate-related impacts.

*Primary Site Conflicts:* Lists potential site conflicts that could affect design and/or construction.

Soils – Poor soils (low infiltration) that may affect design;

Access – Limited access to area for construction and/or future maintenance;

Land Use – usage of site or surrounding area could limit/impact ultimate design (e.g., traffic patterns);

Utilities – actually observed at the site or indications of underground utilities (e.g., digsafes markings);

Polluted – site has existing contamination issues that would complicate permitting/construction;

High WT – sites with high groundwater tables can restrict design and construction options;

Wetlands – sites near wetlands may have complicated permitting burdens or limit design options.

## SIZING INFO:

Information needed for the sizing of the proposed concept.

*Estimated Drainage Area (ac):* Total contributing DA to boat ramp in acres, based on GIS topography.

Identified in field; calculated in the office.

*Estimated Impervious Area (ac):* Total impervious area in DA in acres, based on GIS topography. Calculated in the office.

*Impervious Area Type:* Category of impervious area in DA (e.g., street, parking lot, rooftop, etc.)

*WQv Goal/WQv Provided (cf):* The water quality volume goal in cubic feet based on one inch of runoff from total estimated impervious area draining to boat ramp, as well as the volume provided based on impervious area in the actual drainage area to proposed BMP.

*Estimated Practice Area (sf):* Available space at site in square feet for the proposed concept. Identified in field; calculated in the office.


*Existing Head Available? (Y/N):* Is there a generous amount of hydraulic head (vertical distance) available between drainage area and practice area? Certain BMPs require more head than others.

## PHOTOS/GRAPHICS:

Up to three photos are included for each site. A drainage area (DA) map with a site sketch is also included to show more detail about the area; topography is shown with 2-ft contours derived from MassGIS data.



# CC Boat Ramp Retrofit Field Summary Sheet

Name: Willimantic Drive Landing – Bioretention/Wet Swale		ID#: BA-BR1
<p><b>Site Description:</b> The Town owns the road and boat ramp, which are paved. The State owns the unpaved gravel parking lot. There is a sandy area between the parking lot the pond that is currently used as a neighborhood beach. Shubael Pond has a history of cyanobacteria blooms, and it is the location of an innovative/alternative septic pilot project with U.S. EPA. The Town is installing leaching basins along Willimantic Drive in fall 2022; however, vegetative treatment is not included in the design.</p> <p><b>Existing BMP on site?</b> No</p> <p><b>Concept Description:</b> There are two BMPs proposed for this site. The first BMP is a bioretention area in the town right-of-way at the corner of the parking lot. This bioretention facility will manage stormwater runoff from the road downstream of the town-proposed infiltration system. The second BMP proposed is a wet swale to manage the runoff from the gravel parking lot and a portion of the ramp (diverted with speed hump). This vegetated swale will also provide a windbreak. Good location for public education signage.</p>	<p><b>Site Location:</b> 138 Willimantic Dr, Marstons Mills, MA 02648</p> 	
<b>GENERAL SITE INFORMATION</b>	<b>RETROFIT DETAILS</b>	
<p><b>Site Contact(s):</b> Amber Unruh (Barnstable DPW); Doug Cameron (MA OFBA)</p> <p><b>Ownership:</b> Town &amp; State</p> <p><b>Parking Lot?</b> Yes</p> <p><b>Number of Spaces:</b> V: 8 VwT: 2 H: 0</p> <p><b>Parking Lot Surface:</b> P &amp; UP</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Fair</p>	<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Wet swale and bioretention / sediment forebay</p> <p><b>Non-Structural Controls:</b> Pavement removal. Swale will be planted to serve as a wind break, to help prevent sand from blowing up into parking area. Public education.</p> <p><b>BMP Maintenance Burden:</b> Low</p>	
<p><b>Facilities/Amenities:</b> None</p> <p><b>Special Uses:</b> None</p> <p><b>Receiving Water:</b> Shubael Pond (MA96293), Freshwater</p> <p><b>Known Impairment?</b> Unacceptable for phosphorus (SOTW)</p> <p><b>Adjacent Critical Resources:</b> Neighborhood beach</p>	<p><b>BMP Benefit(s):</b></p> <ul style="list-style-type: none"> <li>Recharge</li> <li>Demo</li> <li>Habitat</li> <li>Resiliency</li> </ul>	
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment</p> <p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p> <p><b>EJ Community:</b> None</p>	<p><b>Potential Site Constraint(s):</b></p> <ul style="list-style-type: none"> <li>Access (tight site, private driveways)</li> <li>High WT</li> <li>Wetlands (BVW to a Great Pond, DEP Approved Zone II)</li> </ul>	
<b>RETROFIT SIZING INFORMATION</b>		
<b>Estimated Drainage Area (ac):</b> 0.59	<b>WQv Goal/WQv Provided (cf):</b> 835/619	
<b>Estimated Impervious Area (ac):</b> 0.2	<b>Estimated Practice Area (sf):</b> 630	
<b>Impervious Area Type:</b> Street	<b>Existing Head Available?</b> Yes	

Date Assessed: 7/11/2022

Assessed by: EWH/GK



## PHOTOS/SKETCHES



**Photo Caption:** Gravel parking lot (State-owned)



**Photo Caption:** Willimantic Drive leading to Boat Ramp (Town-owned)



**Photo Caption:** Boat ramp




**Site Sketch:** Drainage area in pink, impervious cover in gray, BMPs in light green, revegetation in dark green, and proposed paved flumes in dark blue. Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/11/2022

**Assessed by:** EWH/GK



# CC Boat Ramp Retrofit Field Summary Sheet

Name: Hathaways Pond – Bioretention and Permeable Pavers		ID#: BA-BR2
<p><b>Site Description:</b> This is a popular park/public beach, but particularly in the summer when buses bring summer campers in to enjoy the beach. The loop driveway is partially paved (in poor condition), while the parking spaces and boat ramp are unpaved. Unmanaged stormwater is creating eroded gullies in a few places. The Town has funding in CIP for renovating/upgrading this park this fiscal year, including more picnic/playground space and renovating bathhouse. There are some safety concerns here – a need for more security/targeted night lighting.</p> <p><b>Existing BMP on site?</b> None</p> <p><b>Proposed BMP Description:</b> The concept for this site is to repave the loop driveway with Cape Cod berms to better direct runoff to infiltrating bioretention areas/swales, and stabilize parking spaces with permeable pavers. Eroded areas will be stabilized with native vegetation, and the bathhouse is great location for public education signage and a demonstration rain barrel and/or rain garden.</p>	<p><b>Site Location:</b> 1431 Phinney's Ln, West Barnstable, MA 02668</p> 	
<b>GENERAL SITE INFORMATION</b>		<b>RETROFIT DETAILS</b>
<p><b>Site Contact:</b> Amber Unruh (Barnstable DPW)</p> <p><b>Ownership:</b> Town</p> <p><b>Parking Lot?</b> Yes</p> <p><b>Number of Spaces:</b> V: 40 VW: 0 H: 0</p> <p><b>Parking Lot Surface:</b> UP</p> <p><b>Ramp Surface:</b> UP</p> <p><b>Existing Site Condition:</b> Poor</p>		<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Bioretention/Forebay and Permeable Pavers</p> <p><b>Non-Structural Controls:</b> Public education, rainwater harvesting, revegetation/stabilization</p> <p><b>BMP Maintenance Burden:</b> Medium</p>
<p><b>Facilities/Amenities:</b> Picnic tables, public beach, bathrooms (on-site septic system)</p> <p><b>Special Uses:</b> Dog walking, summer camps, scuba diving, ramp for small boats only</p>		<p><b>BMP Benefit(s):</b></p> <ul style="list-style-type: none"> <li>Recharge</li> <li>Storage</li> <li>Demo</li> <li>Repair</li> </ul>
<p><b>Receiving Water:</b> Hathaway Pond North, Freshwater</p> <p><b>Known Impairment?</b> None</p> <p><b>Adjacent Critical Resources:</b> Public Beach</p>		
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment</p>		
<p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p>		<p><b>Potential Site Constraint(s):</b></p> <ul style="list-style-type: none"> <li>Utilities (hydrant waterlines, septic system)</li> <li>Wetlands (BVW, Zone II, Certified Vernal Pool)</li> </ul>
<p><b>EJ Community:</b> Minority</p>		
<b>RETROFIT SIZING INFORMATION</b>		
<p><b>Estimated Drainage Area (ac):</b> 2.73</p>		<p><b>WQv Goal/WQv Provided (cf):</b> 3,387/3,099</p>
<p><b>Estimated Impervious Area (ac):</b> 0.93</p>		<p><b>Estimated Practice Area (sf):</b> 1,687</p>
<p><b>Impervious Area Type:</b> Street</p>		<p><b>Existing Head Available?</b> Y</p>

Date Assessed: 7/6/2022

Assessed by: MW/JV

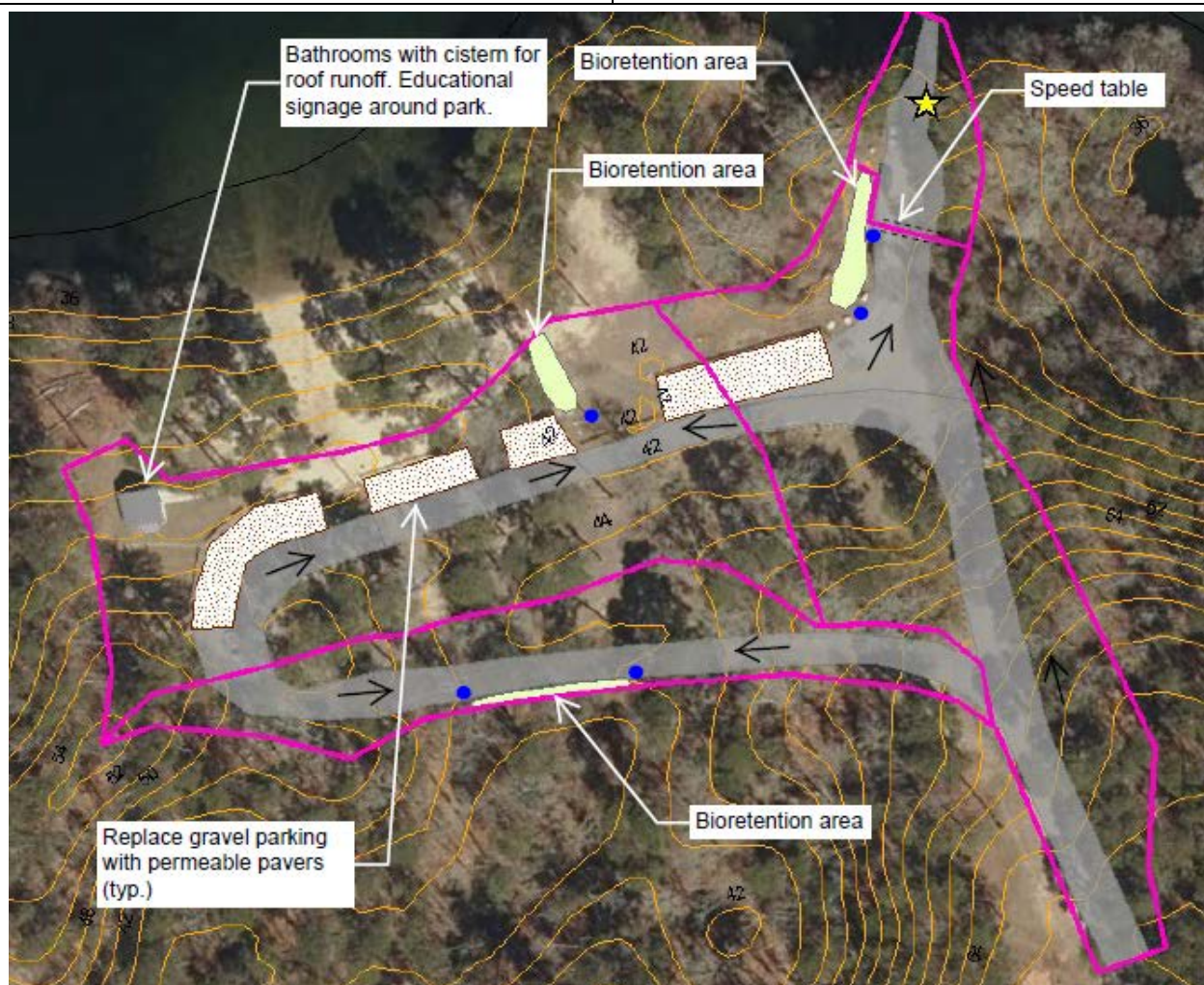
## PHOTOS/SKETCHES



**Photo Caption:** Boat ramp



**Photo Caption:** Picnic/grassy area in the driveway loop.




**Site Sketch:** Drainage area (pink), impervious cover (gray), BMPs (light green and speckled brown), paved flumes (dark blue), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/6/2022

**Assessed by:** MW/JV



# CC Boat Ramp Retrofit Field Summary Sheet

Name: Barlow's Landing Boat Ramp – Bioretention and Permeable Pavers (1A) and Bioretention (1B)		ID#: BO-BR1A & 1B
<p><b>Site Description:</b> This site is comprised of paved parking, dirt lot for vehicles with trailers, a large drivable pier (for emergency vehicles), dinghy storage/dock, picnic area, and public beach. It was recently repaved after dredging project (~10 years ago), when a leaching basin was installed for a portion of the site. A very active site year round as the only deep-water ramp on Cape side of Town, with high volume of boats. Also a popular beach and picnic area. Recently planted beach grass provides stabilization and windblock for parking lot, but there is severe erosion on the right side of the pier down to the beach from uncontrolled runoff. Highly visible site that receives a lot of resident attention and feedback.</p> <p><b>Existing BMP on site?</b> Leaching basin(s) w/o manhole access</p> <p><b>Proposed BMP Description:</b> Two concepts for this site: 1A includes a shallow bioretention and permeable pavers for trailer parking, while 1B includes retrofitting the existing leaching basins with a bioretention area for nitrogen removal. Good location for public education and involvement.</p>	<p><b>Site Location:</b> Barlows Landing Road, Bourne, MA 02559</p> 	
<b>GENERAL SITE INFORMATION</b>		<b>RETROFIT DETAILS</b>
<p><b>Site Contact:</b> Tim Lydon (Bourne Engineering), Stevie Fitch (Bourne Conservation), Chris Southwood (Bourne DNR)</p> <p><b>Ownership:</b> Town</p> <p><b>Parking Lot?:</b> Yes</p> <p><b>Number of Spaces:</b> V: 14 VwT: 5 H: 1</p> <p><b>Parking Lot Surface:</b> P</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Good</p>		<p><b>Existing BMP Retrofit or New?</b> New (1A)/Retrofit (1B)</p> <p><b>Proposed BMP/Pretreatment:</b> Bioretention/Forebay and Permeable Pavers (1A) and Bioretention/Forebay with overflow to existing leaching basin (1B)</p> <p><b>Non-Structural Controls:</b> Public Education</p> <p><b>BMP Maintenance Burden:</b> Medium</p>
<p><b>Facilities/Amenities:</b> Picnic tables, portable toilets, dumpster, kayak storage, dinghy dock</p> <p><b>Special Uses:</b> Only deep water ramp on the Cape side of the bridge, ramp used in all four seasons, plowed in winter.</p>		<p><b>BMP Benefit(s):</b></p> <ul style="list-style-type: none"> <li>Recharge</li> <li>Demo</li> <li>Repair</li> </ul>
<p><b>Receiving Water:</b> Pocasset/Red Brook Harbor (MA95-17), Estuarine</p> <p><b>Known Impairment?</b> Fecal Coliform, Unacceptable for Nitrogen (SOTW)</p> <p><b>Adjacent Critical Resources:</b> Shellfish Area, Public Beach</p>		<p><b>Potential Site Constraint(s):</b></p> <ul style="list-style-type: none"> <li>Access</li> <li>Land Use</li> <li>High WT</li> <li>Wetlands (Salt Marsh, Beach/Dune, Natural Heritage Priority/Estimated Habitats of Rare Species, Hurricane Surge Inundation Zone, 100-year Flood Zone, Velocity Zone)</li> </ul>
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment</p>		
<p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p>		
<p><b>EJ Community:</b> Income</p>		
<b>RETROFIT SIZING INFORMATION</b>		
<b>Estimated Drainage Area (ac, 1A/1B):</b> 0.81/1.65		<b>WQv Goal/WQv Provided (cf, 1A/1B):</b> 1,231/874 & 1,597/1,501
<b>Estimated Impervious Area (ac, 1A/1B):</b> 0.34/0.44		<b>Estimated Practice Area (sf, 1A/1B):</b> 1,207/967
<b>Impervious Area Type:</b> Parking Lot		<b>Existing Head Available?</b> N

Date Assessed: 7/6/2022 2:40:48 PM

Assessed by: MW/JV

## PHOTOS/SKETCHES



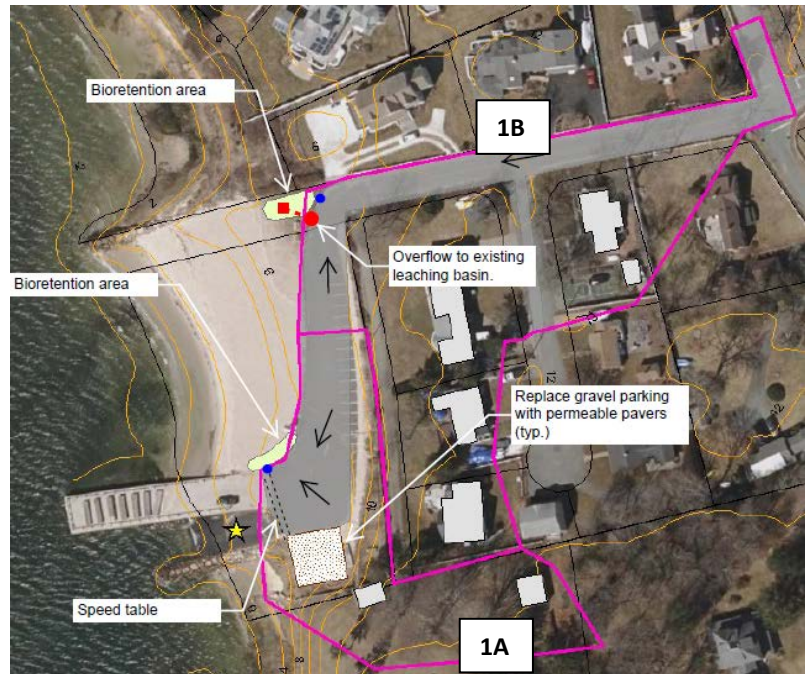
**Photo Caption:** Boat ramp with emergency access (top right) and dock (left)



**Photo Caption:** Looking up the driveway at parking spaces (right) and beach (left), with portable toilet and trash/recycling. Note existing flow path down center of pavement.



**Photo Caption:** Picnic/grassy area along beach with beach grass windbreak.




**Site Sketch:** Drainage area (pink), impervious cover (gray), BMPs (light green and speckled brown), paved flumes (dark blue), existing infrastructure (red), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/6/2022

**Assessed by:** MW/JV



# CC Boat Ramp Retrofit Field Summary Sheet

<b>Name: Electric Avenue Boat Ramp - Bioretention</b>		<b>ID#: BO-BR2</b>
<p><b>Site Description:</b> This site consists of a paved boat ramp next to a pier and paved kayak storage (with concrete retaining wall), on-street trailer parking, and a large parking lot for public beach separated from the ramp by a playground on top of the Coastal Bank. <u>For this project, we are focusing on the boat ramp side of the site.</u> The ramp is wider than needed, and there is not safe pedestrian access to the kayak rack/pier. Stormwater from the neighborhood flows past a clogged trench drain and down the ramp.</p> <p><b>Existing BMP on site?</b> Trench Drain (clogged) to Leaching Chamber</p> <p><b>Proposed BMP Description:</b> Remove excess pavement along ramp/kayak rack and replace trench drain with a speed table and deep sump catch basins connecting to a bioretention with an overflow to the existing leaching system. Provide safe pedestrian access to the racks and pier. The coastal bank by the playground will be stabilized with low-growing native vegetation, which will also serve as a windbreak for the parking lot. Great location for public education signage as well as community art on the wall.</p>		<p><b>Site Location:</b> Electric Avenue, Bourne, MA 02532</p> 
<b>GENERAL SITE INFORMATION</b>		<b>RETROFIT DETAILS</b>
<p><b>Site Contact:</b> Tim Lydon (Bourne Engineering), Stevie Fitch (Bourne Conservation), Chris Southwood (Bourne DNR)</p> <p><b>Ownership:</b> Town</p> <p><b>Parking Lot?:</b> Yes</p> <p><b>Number of Spaces:</b> V: 23 VwT: 0 H: 2</p> <p><b>Parking Lot Surface:</b> P</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Fair</p>		<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Bioretention/Forebay</p> <p><b>Non-Structural Controls:</b> Public Education/Art, Revegetation/Wind Block, Pavement Removal, Improved Pedestrian Access</p> <p><b>BMP Maintenance Burden:</b> Medium</p>
<p><b>Facilities/Amenities:</b> Dumpster, playground, portable toilet, bike rack, kayak rack</p> <p><b>Special Uses:</b> Mostly used by neighborhood residents, lower volume, boat size limited by nearby bridge.</p>		<p><b>BMP Benefit(s):</b></p> <ul style="list-style-type: none"> <li>Recharge</li> <li>Storage</li> <li>Demo</li> <li>Repair</li> <li>Habitat</li> <li>Resiliency</li> </ul>
<p><b>Receiving Water:</b> Buttermilk Bay (MA95-01), Estuarine</p> <p><b>Known Impairment?</b> Fecal Coliform, Nutrient/Eutrophication Biological Indicators</p> <p><b>Adjacent Critical Resources:</b> Shellfish Area, Public Beach</p>		
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment</p>		
<p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p> <p><b>EJ Community:</b> Income</p>		<p><b>Potential Site Constraint(s):</b></p> <ul style="list-style-type: none"> <li>Access (steep slopes)</li> <li>Polluted (Nearby Chapter 21E Site)</li> <li>Wetlands (Coastal Bank, Beach/Dune, Hurricane Surge Inundation Zone, 100-year Flood Zone)</li> </ul>
<b>RETROFIT SIZING INFORMATION</b>		
<b>Estimated Drainage Area (ac):</b> 1.73		<b>WQv Goal/WQv Provided (cf):</b> 3,049/2,105
<b>Estimated Impervious Area (ac):</b> 0.84		<b>Estimated Practice Area (sf):</b> 1,224
<b>Impervious Area Type:</b> Street		<b>Existing Head Available?</b> Y

Date Assessed: 7/6/2022

Assessed by: MW/JV

## PHOTOS/SKETCHES



**Photo Caption:** Boat ramp with dock on the left and the clogged trench drain in the foreground.



**Photo Caption:** Looking up the boat ramp with kayak rack on the right.

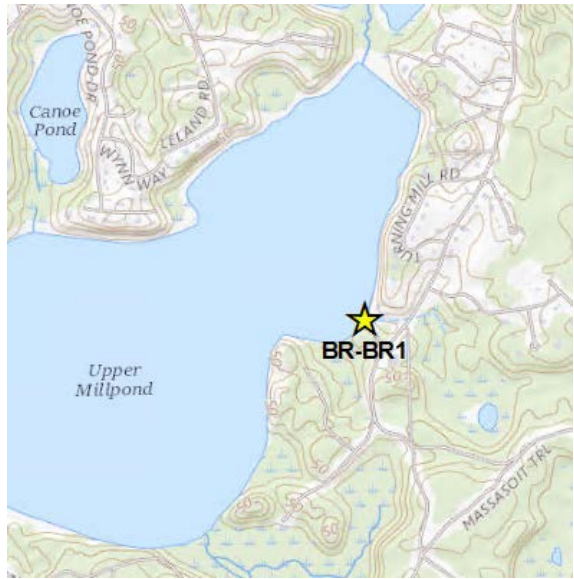


**Site Sketch:** Drainage area (pink), impervious cover (gray), impervious cover reduction (striped gray), BMPs (light green), paved flumes (dark blue), proposed infrastructure (red), revegetation (dark green), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/6/2022

**Assessed by:** MW/JV



Name: Upper Mill Pond Boat Ramp – Swales (1A)/Swale & Shallow Bioretention (1B)		ID#: BR-BR1A/B
<p><b>Site Description:</b> The road, parking area, and boat ramp are gravel. Erosion at boat ramp was noticed during site visit. The property is a conservation parcel and is surrounded by trails and conservation land. The Town uses this site for their summer recreation program, including sailing lessons. Property has limited parking, but more parking is available across the road at a separate parking lot. The Town has no plans to pave the road or parking area, but they would prefer a different style of boat ramp (e.g., concrete slab). There is an old cranberry bog that abuts the property which has a culvert discharging directly into the Pond.</p> <p><b>Existing BMP on site?</b> No</p> <p><b>Concept Description:</b> Given the existing drainage on this site, this site is split into two areas. In the first area (1A) to manage stormwater from the majority of the road, the existing country drainage swale will be formalized into a bio swale, with an overflow into the old cranberry bog. Closer to the boat ramp (1B), a bioswale and shallow bioretention are proposed. In order to direct runoff into the bioretention closest to the Pond's edge, a speed table will be installed at the top of the boat ramp. This site offers a great educational opportunity given the many uses of this site.</p>	<p><b>Site Location:</b> Town Landing Rd, Brewster, MA 02631</p> 	
<b>GENERAL SITE INFORMATION</b>	<b>RETROFIT DETAILS</b>	
<p><b>Site Contact:</b> Chris Miller (Brewster DNR Director)</p> <p><b>Ownership:</b> Town</p> <p><b>Parking Lot?</b> Yes</p> <p><b>Number of Spaces:</b> V: 7 VwT: 0 H: 1</p> <p><b>Parking Lot Surface:</b> UP</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Fair</p>	<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Swales and shallow bioretention / sediment forebay</p> <p><b>Primary Non-Structural Controls:</b> None</p> <p><b>BMP Maintenance Burden:</b> Medium</p>	
<p><b>Facilities/Amenities:</b> Trash, boat storage, overlook deck. Shed for town use.</p> <p><b>Special Uses:</b> Sailing lessons, fishing derbies, water sampling.</p> <p><b>Receiving Water:</b> Upper Mill Pond (MA96324), Freshwater</p> <p><b>Known Impairment?</b> No, but Town has conducted alum treatment in pond for phosphorus control.</p> <p><b>Adjacent Critical Resources:</b> Anadromous Fish Run (Herring)</p>	<p><b>BMP Benefit(s):</b> Recharge Demo (adjacent to trails and conservation land) Repair</p>	
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment</p> <p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p> <p><b>EJ Community:</b> None</p>	<p><b>Potential Site Constraint(s):</b> High WT Wetlands (BVW to a Great Pond, Former Cranberry Bog, 100-year Flood Zone, DEP Approved Zone II, NHESP Priority Habitat)</p>	
<b>RETROFIT SIZING INFORMATION</b>		
<b>Estimated Drainage Area (ac, 1A/1B):</b> 0.8 / 0.24	<b>WQv Goal/WQv Provided (cf, 1A/1B):</b> 283/283 & 283/261	
<b>Estimated Impervious Area (ac, 1A/1B):</b> 0.08 / 0.08	<b>Estimated Practice Area (sf, 1A/1B):</b> 750 / 350	
<b>Impervious Area Type:</b> Parking Lot and road	<b>Existing Head Available?</b> Yes	

## PHOTOS/SKETCHES



Photo Caption: Boat ramp

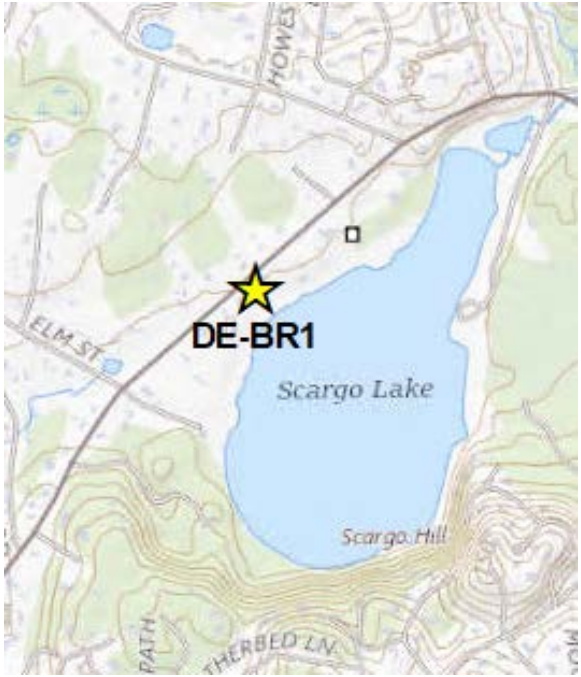
Photo Caption: Road and parking



**Site Sketch:** Drainage area in pink, impervious cover in gray, BMPs in light green, paved flumes in dark blue, and drainage flow paths shown with arrows. Star represents the GIS location of the boat ramp.



# CC Boat Ramp Retrofit Field Summary Sheet

<b>Name: Scargo Lake Landing Ramp – Wet Swale/Permeable Pavement</b>		<b>ID#: DE-BR1</b>
<p><b>Site Description:</b> The road and boat ramp are packed gravel. The Town would like to pave the road. Parking is available along both sides of the road. It is important to allow space for cars/trailers to turn around towards the top of the road before reversing to the boat ramp. There are two areas for people to launch boats. The dock can also be moved. Evidence of erosion along the sides of the road was visible during the site visit. Some drainage from the State-owned Route 6A is coming onto the site. This site is popular, and Scargo Lake is a priority for the Town to rehabilitate, as they are trying to restore herring passage.</p> <p><b>Existing BMP on site?</b> No</p>		<p><b>Site Location:</b> 961 Route 6A, Dennis, MA 02638</p> 
<p><b>Concept Description:</b> Pavement typically used for parking along the road will be converted into permeable pavement. A wet swale area located close to the pond will manage runoff from the town landing road. A catch basin will divert flow to the wet swale. A berm will be placed at the top of the road to prevent drainage from Route 6A coming onto the site. The boat ramp on the south side will be formalized, and the existing dock/platform can be relocated closer to the water. Public education/signage would be effective here.</p>		
<b>GENERAL SITE INFORMATION</b>		<b>RETROFIT DETAILS</b>
<p><b>Site Contact:</b> Tom Andrade (Dennis Town Engineer)</p> <p><b>Ownership:</b> Town</p> <p><b>Parking Lot?:</b> Yes</p> <p><b>Number of Spaces:</b> V: 3 VwT: 3 H: 0</p> <p><b>Parking Lot Surface:</b> UP</p> <p><b>Ramp Surface:</b> UP</p> <p><b>Existing Site Condition:</b> Fair</p>		<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Wet swale / sediment forebay</p> <p><b>Non-Structural Controls:</b> Pavement removal to permeable pavement, stabilization, public education</p> <p><b>BMP Maintenance Burden:</b> Low</p>
<p><b>Facilities/Amenities:</b> Small launch dock</p> <p><b>Special Uses:</b> None</p>		<p><b>BMP Benefit(s):</b></p> <p>Recharge</p> <p>Demo</p> <p>Repair</p>
<p><b>Receiving Water:</b> Scargo Lake (MA96279), Freshwater</p> <p><b>Known Impairment?</b> Unacceptable for phosphorus (SOTW)</p> <p><b>Adjacent Critical Resources:</b> Anadromous Fish Run</p>		
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment</p>		<p><b>Potential Site Constraint(s):</b></p> <p>Access (tight site with steep slopes)</p> <p>Wetlands (BVW to a Great Pond, NHESP Priority Habitat)</p>
<p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p>		
<p><b>EJ Community:</b> None</p>		
<b>RETROFIT SIZING INFORMATION</b>		
<b>Estimated Drainage Area (ac):</b> 0.54		<b>WQv Goal/WQv Provided (cf):</b> 1,180/551
<b>Estimated Impervious Area (ac):</b> 0.33		<b>Estimated Practice Area (sf):</b> 400
<b>Impervious Area Type:</b> Street		<b>Existing Head Available?</b> Yes

Date Assessed: 7/11/2022

Assessed by: EWH/GK

# PHOTOS/SKETCHES



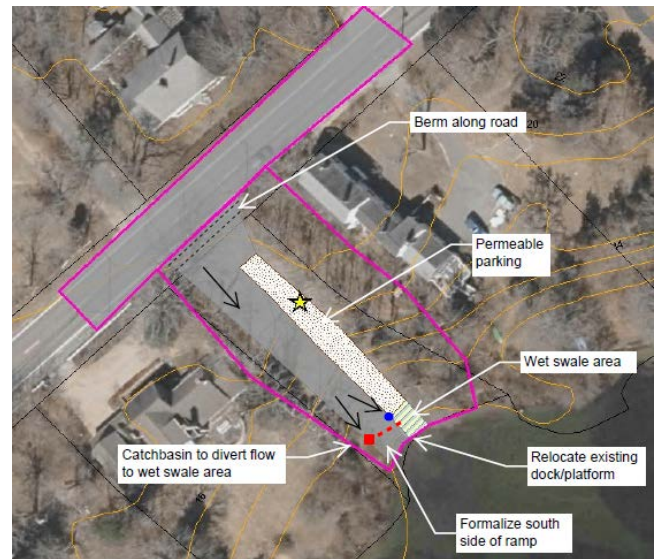
**Photo Caption:** Boat ramp



**Photo Caption:** Road leading down to boat ramp



**Photo Caption:** Parking available on both sides of the road




**Site Sketch:** Drainage area (pink), impervious cover (gray), impervious cover reduction (striped gray), BMPs (light green and speckled brown), paved flumes (dark blue), and proposed infrastructure (red). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/11/2022

**Assessed by:** EWH/GK



# CC Boat Ramp Retrofit Field Summary Sheet

<b>Name: Dr Lords Common Landing – Bioretention/Permeable Pavers</b>		<b>ID#: DE-BR2</b>
<b>Site Description:</b> This site is commonly used as a public beach and boat ramp. Parking lot is paved but in need of repair – Town has the repaving in their CIP for parking lot (rec dept) and access road (Eng). There are two residential driveways on either side of the parking lot to maintain access to throughout the year. The parking lot is very close to the shoreline. There are multiple access points to the lake from the parking lot that the Town would like to limit to preserve habitat. There is no formalized boat ramp needed here, site is for small car-top watercraft only (e.g., kayak, canoe, paddleboards). Overhead wires and Town water utilities on site. Creek runs alongside road that provides anadromous fish access to lake.		<b>Site Location:</b> 41 Dr Lords Rd, Dennis, MA 02638  
<b>Existing BMP on site?</b> No		
<b>Concept Description:</b> The project focuses on the parking lot only and proposes parking lot retreat away from the lake's edge, and grading/re-paving of drive aisle to direct runoff into bioretention facilities located on either side of the parking lot, and permeable pavers used in the parking spaces. Private driveway access at southern end will be maintained. Lake buffer will be stabilized and replanted to minimize informal access points. Management of access road runoff should be considered as separate project.		
<b>GENERAL SITE INFORMATION</b>		<b>RETROFIT DETAILS</b>
<b>Site Contact:</b> Tom Andrade (Dennis Town Engineer)		<b>Existing BMP Retrofit or New?</b> New <b>Proposed BMP/Pretreatment:</b> Bioretention / Sediment forebay. Permeable pavement. <b>Non-Structural Controls:</b> Pavement retreat/removal. Public education signage. Buffer restoration/removal and stabilization of excess access points. <b>BMP Maintenance Burden:</b> Low
<b>Ownership:</b> Town <b>Parking Lot?:</b> Yes <b>Number of Spaces:</b> V: 21 VW: 0 H: 1 <b>Parking Lot Surface:</b> P <b>Ramp Surface:</b> UP <b>Existing Site Condition:</b> Poor		
<b>Facilities/Amenities:</b> Portable toilet in summer, lifeguard. <b>Special Uses:</b> None		
<b>Receiving Water:</b> Scargo Lake (MA96279), Freshwater <b>Known Impairment?</b> Unacceptable for phosphorus (SOTW) <b>Adjacent Critical Resources:</b> Anadromous Fish Run, Public Beach		
<b>Is site a hotspot?</b> No <b>Observed Pollutant(s):</b> Sediment		
<b>Soils:</b> Good (HSG A) <b>Invasives:</b> No		<b>BMP Benefit(s):</b> Recharge Demo Repair Habitat Resiliency
<b>EJ Community:</b> None		
<b>RETROFIT SIZING INFORMATION</b>		
<b>Estimated Drainage Area (ac):</b> 2.67	<b>WQv Goal/WQv Provided (cf):</b> 1,597/1,597	
<b>Estimated Impervious Area (ac):</b> 0.44	<b>Estimated Practice Area (sf):</b> 780	
<b>Impervious Area Type:</b> Parking Lot	<b>Existing Head Available?</b> No	

Date Assessed: 7/11/2022

Assessed by: EWH/GK

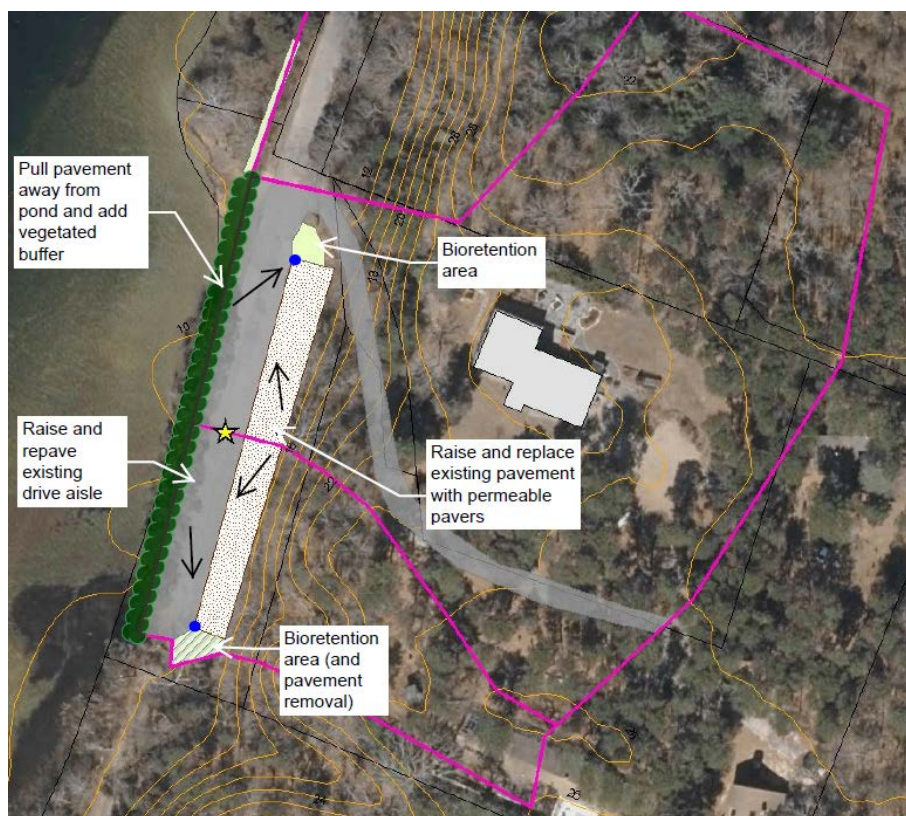
## PHOTOS/SKETCHES



**Photo Caption:** Parking lot, boat ramp, and Town beach. Note proximity of parking lot to lake.



**Photo Caption:** Parking lot in need of improvement



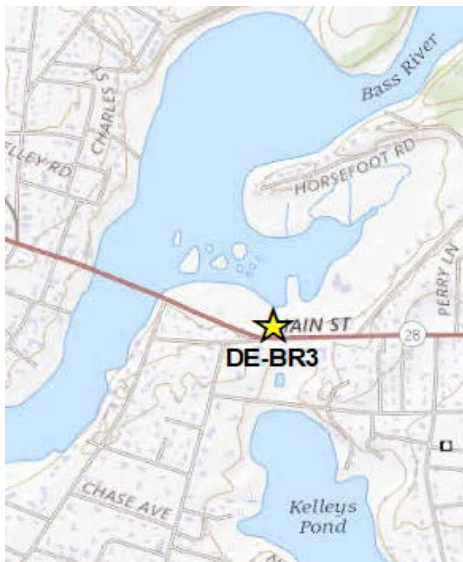
**Site Sketch:** Drainage area (pink), impervious cover (gray), impervious cover reduction (striped gray), BMPs (light green and speckled brown), revegetation (dark green), paved flumes (dark blue), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/11/2022

**Assessed by:** EWH/GK



# CC Boat Ramp Retrofit Field Summary Sheet

<b>Name: Horsefoot Cove Landing – Bioretention/Swale to Underground Infiltration</b>		<b>ID#: DE-BR3</b>
<p><b>Site Description:</b> This boat ramp is a popular State OFBA site and used heavily by the abutting canoe and kayak rental shop. The boat ramp driveway is steep and evidence of erosion and damage was observed during the site visit. There appears to be excessive pavement on the site. This site provides an excellent opportunity for public education.</p> <p><b>Existing BMP on site?</b> Catch basin to underground leaching system (unable to observe/unable to confirm)</p> <p><b>Concept Description:</b> The project proposes to use the existing grading in the parking lot, where runoff is directed to both sides of the parking lot. Water quality treatment will be provided in bioretention/swale before entering into an underground leaching system. The other side of the parking lot will drain to a bioretention area. There is some pavement removal with installation of the bioswale. The edges of the boat ramp will be stabilized to prevent erosion.</p>		<p><b>Site Location:</b> 104 Route 28, West Dennis, MA 02670</p> 
<b>GENERAL SITE INFORMATION</b>		<b>RETROFIT DETAILS</b>
<p><b>Site Contact:</b> Tom Andrade (Dennis Town Engineer) and Doug Cameron (OFBA)</p> <p><b>Ownership:</b> Town &amp; State</p> <p><b>Parking Lot?:</b> Yes</p> <p><b>Number of Spaces:</b> V: 3 VwT: 11 H: 1</p> <p><b>Parking Lot Surface:</b> P</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Fair</p>		<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Bioretention and swale with underground leaching system/sediment forebay &amp; oil/grit separator</p> <p><b>Non-Structural Controls:</b> Pavement removal, Public education</p> <p><b>BMP Maintenance Burden:</b> High</p>
<p><b>Facilities/Amenities:</b> None</p> <p><b>Special Uses:</b> Boat rental launches.</p>		<p><b>BMP Benefit(s):</b></p> <ul style="list-style-type: none"> <li>Recharge</li> <li>Storage</li> <li>Demo</li> <li>Repair</li> </ul>
<p><b>Receiving Water:</b> Bass River (MA96-12), Estuarine</p> <p><b>Known Impairment?</b> Fecal Coliform, Total Nitrogen, Unacceptable for nitrogen (SOTW)</p> <p><b>Adjacent Critical Resources:</b> Shellfish Area</p>		
<p><b>Is site a hotspot?</b> Yes</p> <p><b>Observed Pollutant(s):</b> Oil, Gas, Sediment</p>		<p><b>Potential Site Constraint(s):</b></p> <ul style="list-style-type: none"> <li>Access (Steep Slopes, Entrances/Driveway)</li> <li>High WT</li> <li>Wetlands (Salt Marsh, 100-year Flood Zone, Hurricane Surge Inundation Zone)</li> </ul>
<p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p>		
<p><b>EJ Community:</b> Income</p>		
<b>RETROFIT SIZING INFORMATION</b>		
<p><b>Estimated Drainage Area (ac):</b> 0.42</p>		<p><b>WQv Goal/WQv Provided (cf):</b> 1,488/1,148</p>
<p><b>Estimated Impervious Area (ac):</b> 0.41</p>		<p><b>Estimated Practice Area (sf):</b> 820</p>
<p><b>Impervious Area Type:</b> Parking Lot</p>		<p><b>Existing Head Available?</b> Yes</p>

**Date Assessed:** 7/11/2022

**Assessed by:** GLK/EH

## PHOTOS/SKETCHES



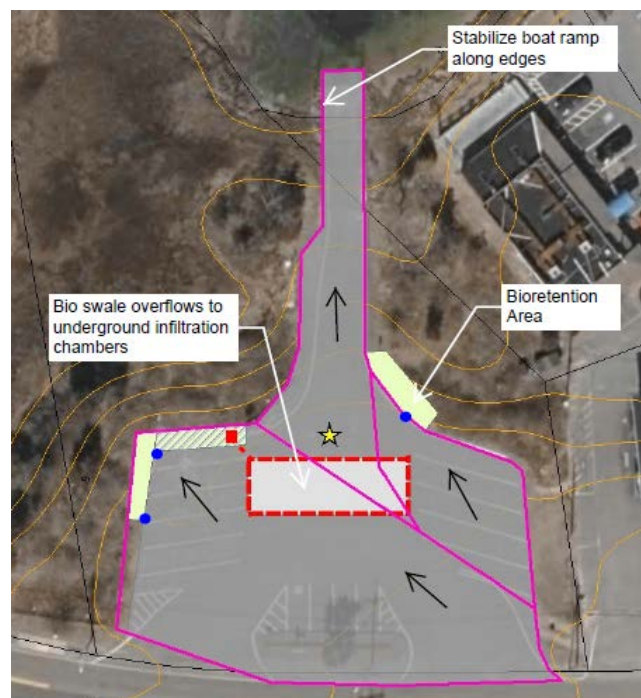
**Photo Caption:** Boat ramp parking lot for trailers and cars



**Photo Caption:** Erosion and damage to boat ramp



**Photo Caption:** Steep boat ramp driveway




**Site Sketch:** Drainage area (pink), impervious cover (gray), impervious cover reduction (striped gray), BMPs (light green and speckled brown), paved flumes (dark blue), proposed infrastructure in red, and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/11/2022

**Assessed by:** GLK/EH



# CC Boat Ramp Retrofit Field Summary Sheet

Name: Waquoit Bay Landing – Bioretention and Dry Swales		ID#: FA-BR1
<p><b>Site Description:</b> This is a State-owned and maintained boat ramp, while the parking lot and access road are owned and maintained by the Town. The ramp is used for year-round shellfishing; mostly recreational in the winter and commercial in the summer. The pavement is in very poor condition, with evident signs of crumbling and erosion. It is a very tight site, with little room between pavement and property lines, and difficult parking spots to maneuver with trailers. Stormwater from Waquoit Lane, the Town Landing Road (22.5' wide), and Nichols Road (10' wide dirt road) contributes to the runoff at the site, which flows past a clogged trench drain down along the sides of the ramp, causing erosion gullies. This site is planned for upgrades in the near-term.</p>	<p><b>Site Location:</b> Waquoit Bay Landing Rd, Falmouth, MA 02536</p> 	
<p><b>Existing BMP on site?</b> Trench Drain (clogged) on Ramp</p>		
<p><b>Proposed BMP Description:</b> Repave/regrade the road and parking lot to direct runoff to dry swales along the landing road and bioretentions at base of parking lot. Stabilize the edges of pavement to prevent erosion on coastal bank.</p>		
GENERAL SITE INFORMATION		RETROFIT DETAILS
<p><b>Site Contact:</b> Gregg Fraser (Falmouth Marine Services)/ Doug Cameron (MA OFBA)</p>	<p><b>Existing BMP Retrofit or New?</b> New</p>	
<p><b>Ownership:</b> Town/State</p> <p><b>Parking Lot?</b> Yes</p> <p><b>Number of Spaces:</b> V: 7 VwT: 7 H: 0</p> <p><b>Parking Lot Surface:</b> P</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Poor</p>	<p><b>Proposed BMP/Pretreatment:</b> Bioretention/Forebay and Dry Swale/Forebay</p> <p><b>Non-Structural Controls:</b> None</p> <p><b>BMP Maintenance Burden:</b> High</p>	
<p><b>Facilities/Amenities:</b> Dumpster, Dinghy storage</p> <p><b>Special Uses:</b> Year round shellfishing, yacht club uses ramp then parks at their facilities down the road.</p>	<p><b>BMP Benefit(s):</b></p> <ul style="list-style-type: none"> <li>Recharge</li> <li>Demo</li> <li>Repair</li> <li>Resiliency</li> </ul>	
<p><b>Receiving Water:</b> Seapit River/ Waquoit Bay (MA96-21), Estuarine</p> <p><b>Known Impairment?</b> Total Nitrogen, Unacceptable for Nitrogen (SOTW)</p> <p><b>Adjacent Critical Resources:</b> Shellfish Area</p>		
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment</p>	<p><b>Potential Site Constraint(s):</b></p> <ul style="list-style-type: none"> <li>Access (tight site with steep slopes, private driveways)</li> <li>Utilities (hydrant waterlines)</li> <li>Wetlands (Dune, Coastal Bank, FEMA velocity zone, hurricane surge inundation zone, ACEC)</li> </ul>	
<p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> Yes, Oriental bittersweet</p>		
<p><b>EJ Community:</b> Minority and Income</p>		
RETROFIT SIZING INFORMATION		
<p><b>Estimated Drainage Area (ac):</b> 3.79</p>	<p><b>WQv Goal/WQv Provided (cf):</b> 3,812/2,285</p>	
<p><b>Estimated Impervious Area (ac):</b> 1.05</p>	<p><b>Estimated Practice Area (sf):</b> 1,224</p>	
<p><b>Impervious Area Type:</b> Parking Lot</p>	<p><b>Existing Head Available?</b> Y</p>	

Date Assessed: 7/11/2022

Assessed by: MW/JV

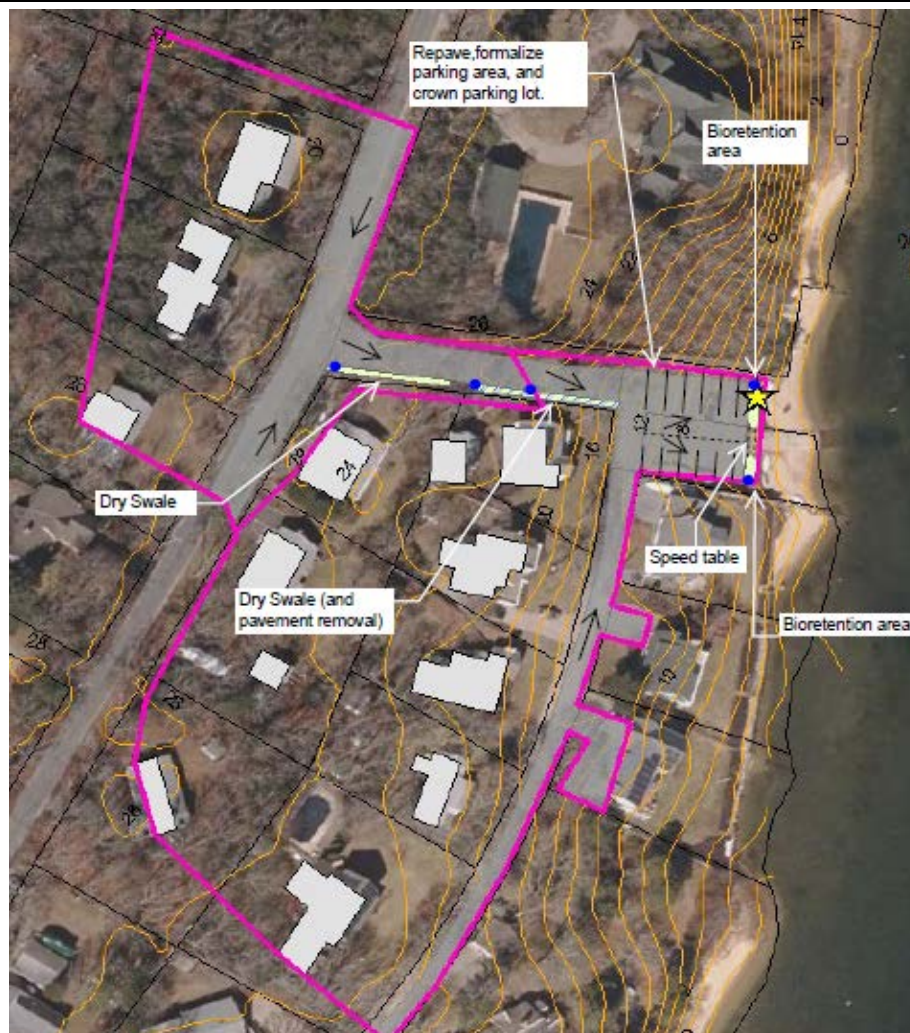
## PHOTOS/SKETCHES



**Photo Caption:** Clogged trench drain at boat ramp



**Photo Caption:** Unused portion of parking lot on Coastal Bank to be converted to bioretention




**Site Sketch:** Drainage area (pink), impervious cover (gray), BMPs (light green), paved flumes (dark blue), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/11/2022

**Assessed by:** MW/JV



# CC Boat Ramp Retrofit Field Summary Sheet

Name: Ashumet Pond Boat Ramp – Bioretention and Permeable Pavement		ID#: FA-BR2
<p><b>Site Description:</b> This State-owned and maintained parking lot and ramp is very busy in the summer, mainly for fishing. Jet skis have been banned in this pond. While no beaches are allowed near State-owned ramps, there is an open sandy area at this site that people use as a beach. Stormwater flows from Currier Road (no curbing), down the driveway/parking lot and ramp (both with granite curb) into the pond. Monitoring wells here were installed due to contamination plume from the nearby military base.</p> <p><b>Existing BMP on site?</b> None</p> <p><b>Proposed BMP Description:</b> Bioretention areas and a wet swale will be used to treat stormwater along edges of driveway and parking lot. A portion of the parking spaces will be converted into permeable pavement to reduce runoff. Sandy area along shoreline will be replanted for stabilization, habitat, and to discourage beach use. Public educational signage will be added.</p>	<p><b>Site Location:</b> 581 Currier Rd, East Falmouth, MA 02536</p> 	
<b>GENERAL SITE INFORMATION</b>	<b>RETROFIT DETAILS</b>	
<p><b>Site Contact:</b> Gregg Fraser (Falmouth Marine Services)/ Doug Cameron (MA OFBA)</p> <p><b>Ownership:</b> Town/State</p> <p><b>Parking Lot?</b> Yes</p> <p><b>Number of Spaces:</b> V: 0 VwT: 26 H: 2</p> <p><b>Parking Lot Surface:</b> P</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Fair</p>	<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Bioretention/Wet Swale/Forebay and Permeable Pavement</p> <p><b>Non-Structural Controls:</b> Pavement removal, revegetation along pond, public education</p> <p><b>BMP Maintenance Burden:</b> Medium</p>	
<p><b>Facilities/Amenities:</b> None</p> <p><b>Special Uses:</b> Small boat ramp, busy in summer for fishing</p> <p><b>Receiving Water:</b> Ashumet Pond (MA96004), Freshwater</p> <p><b>Known Impairment?</b> Total Phosphorus, Unacceptable for Phosphorus (SOTW)</p> <p><b>Adjacent Critical Resources:</b> None</p>	<p><b>BMP Benefit(s):</b></p> <ul style="list-style-type: none"> <li>Recharge</li> <li>Storage</li> <li>Demo</li> <li>Habitat</li> <li>Resiliency</li> </ul>	
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment</p> <p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> Yes, variety</p> <p><b>EJ Community:</b> Minority and Income</p>	<p><b>Potential Site Constraint(s):</b></p> <ul style="list-style-type: none"> <li>Utilities (hydrant waterlines)</li> <li>High WT</li> <li>Wetlands (BVW to a Great Pond, NHESP Priority Habitats)</li> </ul>	
<b>RETROFIT SIZING INFORMATION</b>		
<b>Estimated Drainage Area (ac):</b> 1.90	<b>WQv Goal/WQv Provided (cf):</b> 2,831/2,806	
<b>Estimated Impervious Area (ac):</b> 0.78	<b>Estimated Practice Area (sf):</b> 1,541	
<b>Impervious Area Type:</b> Parking Lot	<b>Existing Head Available?</b> N	

Date Assessed: 7/11/2022

Assessed by: MW/JV

PHOTOS/SKETCHES



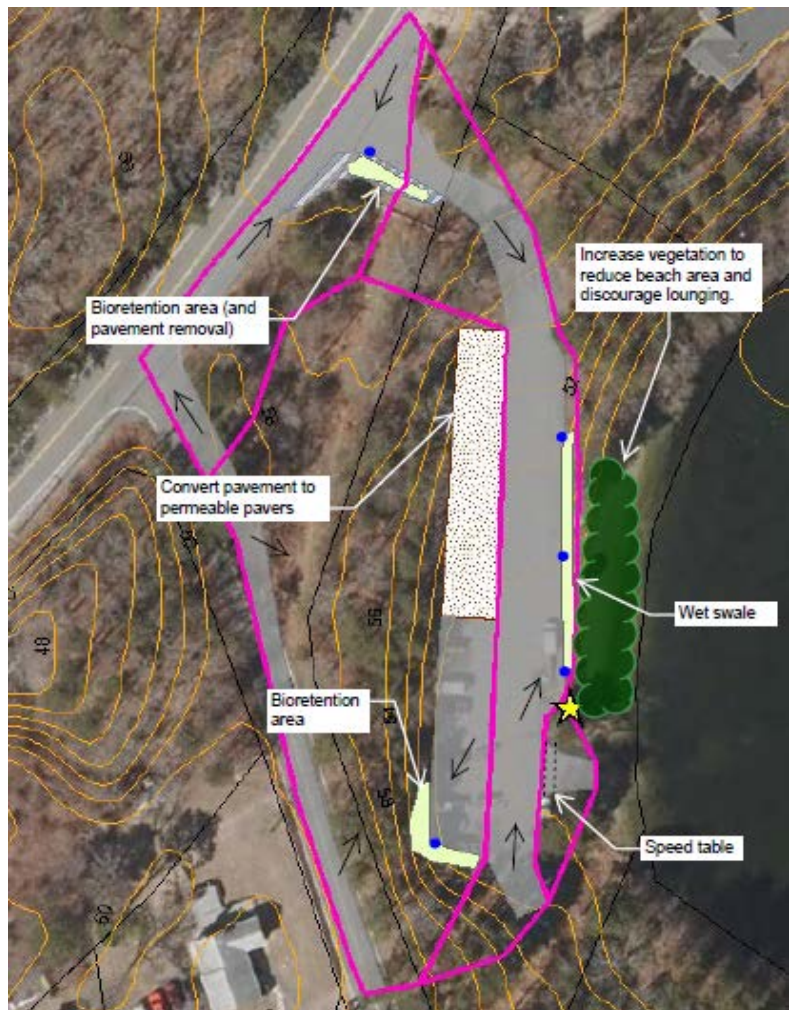
**Photo Caption:** Parking lot, facing the entrance (pond to the right)



**Photo Caption:** Parking lot, facing the back (pond to the left)



**Photo Caption:** Boat ramp in the foreground with sandy stretch of shoreline in the background.



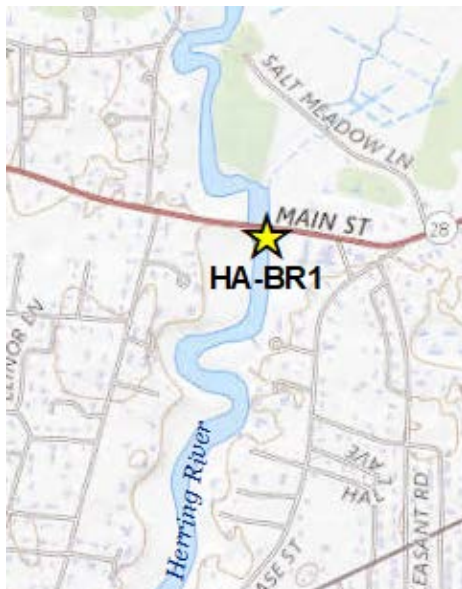
**Site Sketch:** Drainage area (pink), impervious cover (gray), impervious cover reduction (striped gray), BMPs (light green and speckled brown), paved flumes (dark blue), revegetation (dark green), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

Date Assessed: 7/11/2022

Assessed by: MW/JV



# CC Boat Ramp Retrofit Field Summary Sheet

Name: Herring River Boat Ramp – Shallow Bioretentions/Wet Swale & Permeable Pavers		ID#: HA-BR1
<p><b>Site Description:</b> This site is a large gravel parking lot with a concrete boat ramp that appears to have more space than needed. Evidence of erosion near the boat ramp was observed during the site visit. The parking lot elevation is very close to mean high tide, and the Town reports the parking lot does flood occasionally directly around the boat ramp. The site is directly adjacent to salt marsh, which is degraded near the parking lot edges. Currently, the lot serves as habitat for fiddler crabs. This is a popular site and thus, a great opportunity for public education.</p> <p><b>Existing BMP on site?</b> No</p>	<p><b>Site Location:</b> Route 28, Harwich, MA 02645</p> 	
<p><b>Concept Description:</b> The parking lot will be divided into three small areas by regrading and resurfacing the parking lot. A wet swale will be located along the edge closest to the salt marsh, and degraded salt marsh will be restored. Shallow bioretention areas will be located on either side of the parking lot. The gravel lot will be regraded/improved, with permeable paver parking spaces. Public education signage will be installed.</p>		
GENERAL SITE INFORMATION	RETROFIT DETAILS	
<p><b>Site Contact:</b> Heinz Proft (Harwich DNR Director)</p> <p><b>Ownership:</b> Town</p> <p><b>Parking Lot?</b> Yes</p> <p><b>Number of Spaces:</b> V: 4 VwT: 6 H: 0</p> <p><b>Parking Lot Surface:</b> UP</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Poor</p>	<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Shallow bioretentions and wet swale/sediment forebays</p> <p><b>Non-Structural Controls:</b> Permeable pavers, salt marsh restoration, public education</p> <p><b>BMP Maintenance Burden:</b> Medium</p>	
<p><b>Facilities/Amenities:</b> Dinghy storage, dock</p> <p><b>Special Uses:</b> None</p>	<p><b>BMP Benefit(s):</b></p> <ul style="list-style-type: none"> <li>Demo</li> <li>Repair</li> <li>Habitat</li> <li>Resiliency</li> </ul>	
<p><b>Receiving Water:</b> Herring River (MA96-22), Estuarine</p> <p><b>Known Impairment?</b> Fecal Coliform, Total Nitrogen, Unacceptable for Nitrogen (SOTW)</p> <p><b>Adjacent Critical Resources:</b> Shellfish Area</p>		
<p><b>Is site a hotspot?</b> Yes</p> <p><b>Observed Pollutant(s):</b> Sediment</p>	<p><b>Potential Site Constraint(s):</b></p> <ul style="list-style-type: none"> <li>High WT</li> <li>Wetlands (Salt Marsh, 100-year Flood Zone, Hurricane Inundation Zone)</li> </ul>	
<p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p>		
<p><b>EJ Community:</b> Minority and Income</p>		
RETROFIT SIZING INFORMATION		
<p><b>Estimated Drainage Area (ac):</b> 0.42</p>	<p><b>WQv Goal/WQv Provided (cf):</b> 1,151/1,073</p>	
<p><b>Estimated Impervious Area (ac):</b> 0.32</p>	<p><b>Estimated Practice Area (sf):</b> 1,240</p>	
<p><b>Impervious Area Type:</b> Parking Lot</p>	<p><b>Existing Head Available?</b> No</p>	

Date Assessed: 7/7/2022

Assessed by: EWH/GK

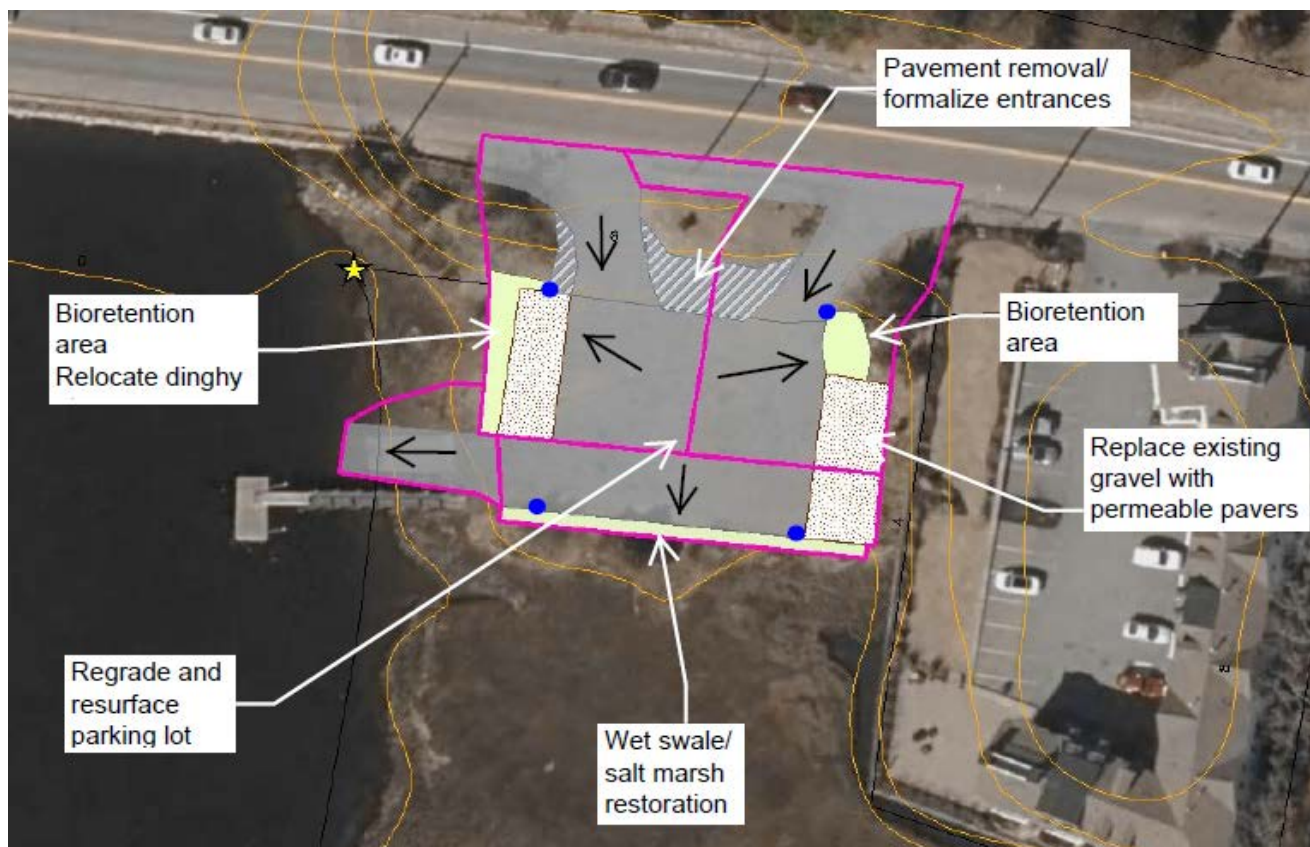
## PHOTOS/SKETCHES



**Photo Caption:** Gravel parking lot



**Photo Caption:** Parking area and boat storage




**Site Sketch:** Drainage area (pink), impervious cover (gray), impervious cover reduction (striped gray), BMPs (light green and speckled brown), paved flumes (dark blue), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/7/2022

**Assessed by:** EWH/GK



## CC Boat Ramp Retrofit Field Summary Sheet

Name: Ockway Bay Boat Ramp - Bioretention	ID#: MA-BR1
<p><b>Site Description:</b> The parking lot and boat ramp were recently upgraded, with the parking lot paved and expanded in 2020 and the boat ramp in spring 2022. While the parking lot seems larger than needed for the use at the site with opportunities for pavement reduction, stormwater from the lot flows away from the ramp, and thus, we are only focusing on the ramp portion for this project. When the ramp was redone, catchbasins to leaching basins were installed. However, the ramp was not crowned so runoff continues to flow down the ramp – ramp is supposed to be crowned fall 2022. This area of Ockway Bay is a priority shellfish restoration site for the Town as a part of nitrogen mitigation efforts, and there are shellfish propagation efforts on the dock here.</p> <p><b>Existing BMP on site?</b> Two catchbasins connected to two leaching basins</p> <p><b>Proposed BMP Description:</b> Existing BMP should be retrofit to first direct flow into a bioretention (removing pavement at the un-used turnaround), with overflows into the existing catchbasins/leaching basins.</p>	<p><b>Site Location:</b> 664 Great Neck Road South, Mashpee, MA 02649</p> 
GENERAL SITE INFORMATION	RETROFIT DETAILS
<p><b>Site Contact:</b> Ashley Fisher (Mashpee DNR)</p> <p><b>Ownership:</b> Town</p> <p><b>Parking Lot?</b> Yes</p> <p><b>Number of Spaces:</b> V: 8 VwT: 18 H: 0</p> <p><b>Parking Lot Surface:</b> P</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Good</p>	<p><b>Existing BMP Retrofit or New?</b> Retrofit</p> <p><b>Proposed BMP/Pretreatment:</b> Bioretention/Forebay</p> <p><b>Non-Structural Controls:</b> Pavement Removal</p> <p><b>BMP Maintenance Burden:</b> Low</p>
<p><b>Facilities/Amenities:</b> Dinghy storage</p> <p><b>Special Uses:</b> Shallow water ramp for smaller boats; Boat ramp does not get used very often.</p> <p><b>Receiving Water:</b> Ockway Bay (MA96-40), Estuarine</p> <p><b>Known Impairment?</b> Unacceptable for Nitrogen (SOTW)</p> <p><b>Adjacent Critical Resources:</b> Shellfish Area</p>	<p><b>BMP Benefit(s):</b></p> <ul style="list-style-type: none"> <li>Recharge</li> <li>Storage</li> <li>Repair</li> </ul>
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment</p> <p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p> <p><b>EJ Community:</b> None</p>	<p><b>Potential Site Constraint(s):</b></p> <ul style="list-style-type: none"> <li>Access (tight site with steep slopes)</li> <li>Utilities (electrical and water lines to dock)</li> <li>Wetlands (salt marsh, 100-year FEMA flood zone, hurricane inundation zone)</li> </ul>
RETROFIT SIZING INFORMATION	
<p><b>Estimated Drainage Area (ac):</b> 1.26</p>	<p><b>WQv Goal/WQv Provided (cf):</b> 2,693/468</p>
<p><b>Estimated Impervious Area (ac):</b> 0.74</p>	<p><b>Estimated Practice Area (sf):</b> 229</p>
<p><b>Impervious Area Type:</b> Parking Lot</p>	<p><b>Existing Head Available?</b> Y</p>

Date Assessed: 7/6/2022

Assessed by: MW/JV

## PHOTOS/SKETCHES



**Photo Caption:** Recently paved boat ramp with dock along left side and dinghy/kayak storage along right side.



**Photo Caption:** Dinghy/kayak storage at boat ramp. Note the existing catch basin.




**Site Sketch:** Drainage area (pink), impervious cover (gray), impervious cover reduction (striped gray), BMPs (light green), paved flumes (dark blue), existing infrastructure (red), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/6/2022

**Assessed by:** MW/JV



# CC Boat Ramp Retrofit Field Summary Sheet

Name: Mashpee-Wakeby Boat Ramp – Bioretention/Dry Swale		ID#: MA-BR2
<p><b>Site Description:</b> This State-owned, town-maintained (LMA) boat ramp is very popular. While the access drive was repaved ~5 years ago, the parking lot has not been repaved recently and is in poor condition. The traffic flow and design of boat ramp is not as efficient/safe as it could be, and this site is on the State's list for upgrades. Sandy area east of ramp is used to park boats for the day (even though not allowed), sometimes using this as access to nearby public beach. Illegal dumping is an issue in the adjacent woods. Runoff flows along edges of access road (no curbing) into the parking lot (curbed) and down the ramp with no management. There is a trail to the beach near the ramp, as well as a game trail along the west edge of the parking lot. Potentially an important archeological site, a former Wampanoag Village.</p> <p><b>Existing BMP on site?</b> None</p>	<p><b>Site Location:</b> 0 Main Street (Fisherman's Landing), Mashpee, MA 02649</p> 	
<p><b>Proposed BMP Description:</b> Treat runoff in infiltrating bioretention areas along edges of parking lot. Improve portable toilet locations and dumpster containment to reduce sources of pollution. Streamline signage/integrate public education to minimize sign fatigue. Redesign ramp for safer access/loading (<i>to be done separately by MA OFBA</i>), while planting sandy area for habitat, stabilization, and to discourage jet ski parking.</p>		
GENERAL SITE INFORMATION	RETROFIT DETAILS	
<p><b>Site Contact:</b> Ashley Fisher (Mashpee DNR)/Doug Cameron (MA OFBA)</p> <p><b>Ownership:</b> Town/State</p> <p><b>Parking Lot?</b> Yes</p> <p><b>Number of Spaces:</b> V: 0 VwT: 42 H: 2</p> <p><b>Parking Lot Surface:</b> P</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Poor</p>	<p><b>Proposed BMP/Pretreatment:</b> Bioretention/forebay and dry swale/forebay</p> <p><b>Non-Structural Controls:</b> Pavement removal, buffer revegetation, public education, improved source control (Portable toilet and dumpster improvements)</p> <p><b>BMP Maintenance Burden:</b> Medium</p>	
<p><b>Facilities/Amenities:</b> Portable toilet, dumpster</p> <p><b>Special Uses:</b> Very busy boat ramp, fishing derbies,</p>	<p><b>BMP Benefit(s):</b> Recharge Demo Repair Habitat Resiliency</p>	
<p><b>Receiving Water:</b> Mashpee/Wakeby Ponds (MA96194/MA96346), Freshwater</p> <p><b>Known Impairment?</b> Unacceptable for phosphorus (SOTW)</p> <p><b>Adjacent Critical Resources:</b> Anadromous Fish Run, Nearby Public Beach</p>		
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment and solid waste</p>	<p><b>Potential Site Constraint(s):</b> Land Use High WT Wetlands (BVW to Great Pond, NHESP Priority Habitat) Other – Possible archeological study needed</p>	
<p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> Yes, variety</p>		
<p><b>EJ Community:</b> Minority</p>		
RETROFIT SIZING INFORMATION		
<p><b>Estimated Drainage Area (ac):</b> 5.25</p>	<p><b>WQv Goal/WQv Provided (cf):</b> 4,356/3,918</p>	
<p><b>Estimated Impervious Area (ac):</b> 1.20</p>	<p><b>Estimated Practice Area (sf):</b> 2,126</p>	
<p><b>Impervious Area Type:</b> Street</p>	<p><b>Existing Head Available?</b> Y</p>	

Date Assessed: 7/11/2022

Assessed by: MW/JV

## PHOTOS/SKETCHES



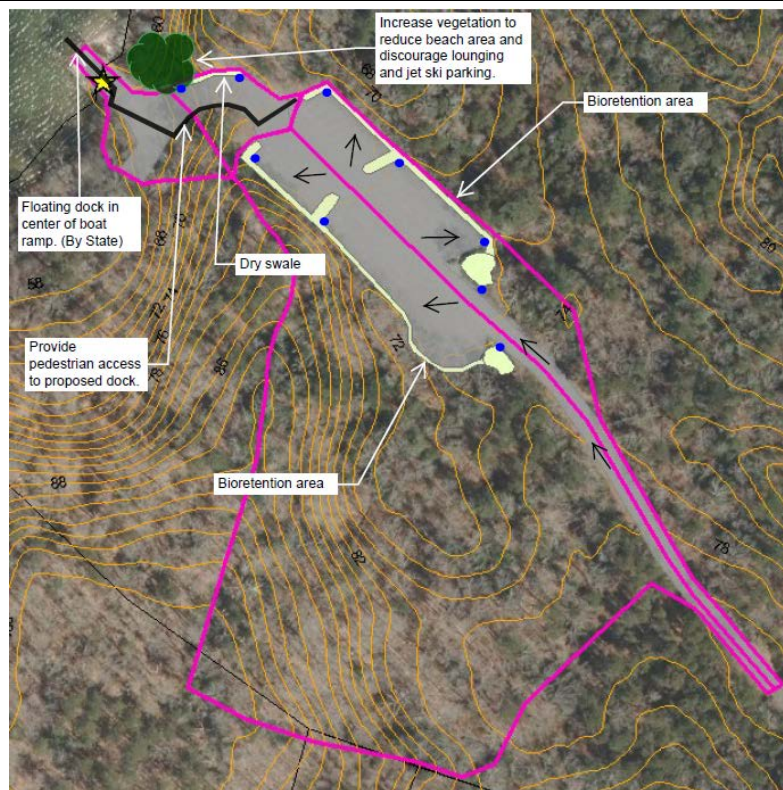
**Photo Caption:** Looking up the access road from the parking lot



**Photo Caption:** Portion of parking lot used by vehicles without trailers



**Photo Caption:** Two-lane boat ramp




**Site Sketch:** Drainage area (pink), impervious cover (gray), BMPs (light green), revegetation (dark green), paved flumes (dark blue), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/11/2022

**Assessed by:** MW/JV



# CC Boat Ramp Retrofit Field Summary Sheet

Name: John's Pond Boat Ramp – Bioretention/Dry Swale/ Underground Infiltration		ID#: MA-BR3
<p><b>Site Description:</b> The parking lot and ramp are owned and managed by the State. Even though it is the only public ramp on John's Pond, it is not very busy because it is too difficult to launch typical boats here due to parking lot dimensions and shallow boat ramp – mostly kayaks and small boats. The fire boat uses this ramp in emergencies, and has been damaged from the ramp conditions. The site is extremely tight, with steep slopes, retaining walls, and mature trees; leaf litter is a major issue here and little maintenance is done. There are no current plans to upgrade this site. The pond has had several bacteria closures.</p> <p><b>Existing BMP on site?</b> None</p>	<p>Site Location: 217 Hooppole Road, Mashpee, MA 02649</p> 	
<p><b>Proposed BMP Description:</b> The upper portion of the parking lot does not need space for trailers as they cannot maneuver the geometry, so pavement removal is proposed. In addition, runoff will be directed to a dry swale as pretreatment to underground infiltration, as well as to a shallow bioretention near the ramp itself.</p>		
GENERAL SITE INFORMATION	RETROFIT DETAILS	
<p><b>Site Contact:</b> Ashley Fisher (Mashpee DNR)/Doug Cameron (MA OFBA)</p> <p><b>Ownership:</b> Town/State</p> <p><b>Parking Lot?</b> Yes</p> <p><b>Number of Spaces:</b> V: 0 VwT: 11 H: 1</p> <p><b>Parking Lot Surface:</b> P</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Fair</p>	<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Bioretention/forebay, Dry Swale/forebay, and Underground Infiltration</p> <p><b>Non-Structural Controls:</b> Pavement Removal</p> <p><b>BMP Maintenance Burden:</b> High</p>	
<p><b>Facilities/Amenities:</b> None</p> <p><b>Special Uses:</b> Only ramp on John's Pond. Used for emergencies. Fishing tournaments are held here. Jet skis are allowed on pond.</p> <p><b>Receiving Water:</b> John's Pond (MA96157), Freshwater</p> <p><b>Known Impairment?</b> None</p> <p><b>Adjacent Critical Resources:</b> Anadromous Fish Run</p>	<p><b>BMP Benefit(s):</b></p> <ul style="list-style-type: none"> <li>Recharge</li> <li>Storage</li> <li>Demo</li> <li>Repair</li> </ul>	
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Leaf litter, organic matter</p> <p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p> <p><b>EJ Community:</b> Income</p>	<p><b>Potential Site Constraint(s):</b></p> <ul style="list-style-type: none"> <li>Access (tight site with retaining walls, close to abutters)</li> <li>Utilities (hydrant waterlines)</li> <li>High WT</li> <li>Wetlands (BVW to Great Pond, NHESP Priority Habitat)</li> </ul>	
RETROFIT SIZING INFORMATION		
<p><b>Estimated Drainage Area (ac):</b> 1.05</p>	<p><b>WQv Goal/WQv Provided (cf):</b> 1,971/1,889</p>	
<p><b>Estimated Impervious Area (ac):</b> 0.54</p>	<p><b>Estimated Practice Area (sf):</b> 1,800</p>	
<p><b>Impervious Area Type:</b> Parking Lot</p>	<p><b>Existing Head Available?</b> Y</p>	

Date Assessed: 7/11/2022

Assessed by: JV/MW

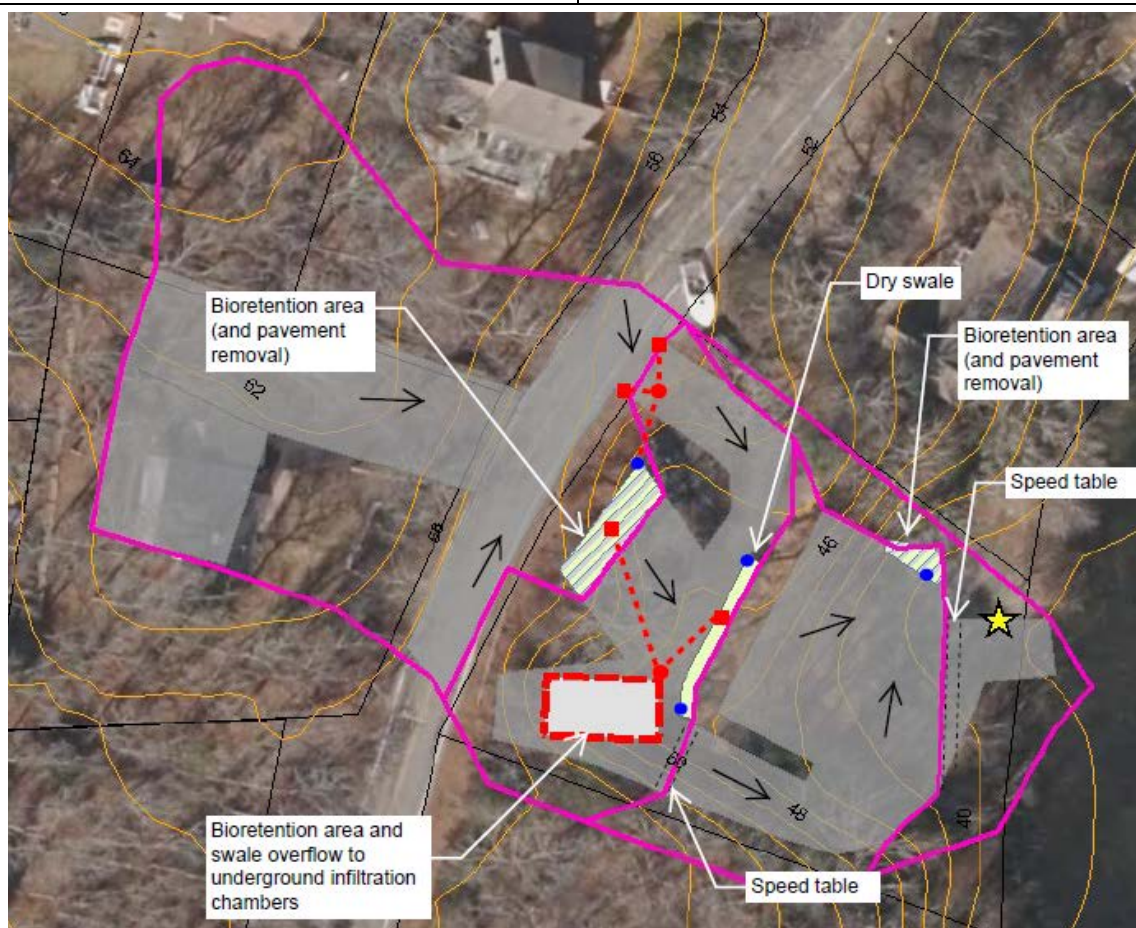
## PHOTOS/SKETCHES



**Photo Caption:** Lower Parking Lot and Boat Ramp



**Photo Caption:** Looking uphill at portion of Upper Parking Lot where underground infiltration is proposed.




**Site Sketch:** Drainage area (pink), impervious cover (gray), impervious cover reduction (striped gray), BMPs (light green), paved flumes (dark blue), proposed infrastructure (red), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/11/2022

**Assessed by:** JV/MW



# CC Boat Ramp Retrofit Field Summary Sheet

Name: Route 28 – Tree Trenches/Underground Infiltration		ID#: OR-BR1
<p><b>Site Description:</b> This site is a steep paved road leading to a concrete boat ramp. Route 28 drainage does not likely run onto the site. Parking is along both sides of the road; additional parking is on Route 28. The Town does not manage this area as a public bathing beach, however, people do use it as a beach. Sand has accumulated over time at the bottom of the boat ramp, which has created a challenge for boaters to properly launch their boats during low tide.</p> <p><b>Existing BMP on site?</b> No</p> <p><b>Concept Description:</b> Tree trenches are proposed on either side of the road. Excess runoff will overflow into catch basins that will capture and divert runoff from the road into an underground infiltration system.</p>	<p><b>Site Location:</b> Town Landing/Route 28, Orleans, MA 02653</p> 	
GENERAL SITE INFORMATION		RETROFIT DETAILS
<p><b>Site Contact(s):</b> Tom Daley (Orleans DPW/Natural Resources Director); Nate Sears (Orleans Natural Resources Manager)</p> <p><b>Ownership:</b> Town</p> <p><b>Parking Lot?:</b> Yes</p> <p><b>Number of Spaces:</b> V: 4 VwT: 3 H: 0</p> <p><b>Parking Lot Surface:</b> P</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Fair</p>	<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Tree trenches and underground infiltration system/sediment forebay</p> <p><b>Non-Structural Controls:</b> None</p> <p><b>BMP Maintenance Burden:</b> Medium</p>	
<p><b>Facilities/Amenities:</b> None</p> <p><b>Special Uses:</b> None</p>	<p><b>BMP Benefit(s):</b> Recharge Storage</p>	
<p><b>Receiving Water:</b> Pleasant Bay (MA96-77), Estuarine</p> <p><b>Known Impairment?</b> Total Nitrogen</p> <p><b>Adjacent Critical Resources:</b> Beach, Shellfish Area</p>		
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment</p>	<p><b>Potential Site Constraint(s):</b> Access (tight site with steep slopes and private driveway) High WT Wetlands (Beach/dune, Tidal Flats, ACEC, 100-year Flood Zone, Velocity Zone, Hurricane Surge Inundation Zone)</p>	
<p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p>		
<p><b>EJ Community:</b> None</p>		
RETROFIT SIZING INFORMATION		
<p><b>Estimated Drainage Area (ac):</b> 0.07</p>	<p><b>WQv Goal/WQv Provided (cf):</b> 261/161</p>	
<p><b>Estimated Impervious Area (ac):</b> 0.07</p>	<p><b>Estimated Practice Area (sf):</b> 65</p>	
<p><b>Impervious Area Type:</b> Street</p>	<p><b>Existing Head Available?</b> Yes</p>	
<p><b>Date Assessed:</b> 7/7/22</p>		<p><b>Assessed by:</b> EWH/GK</p>

## PHOTOS/SKETCHES



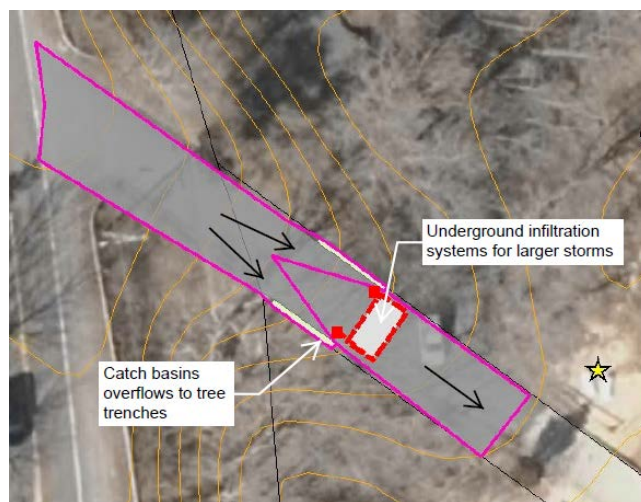
**Photo Caption:** Road leading to boat ramp



**Photo Caption:** Parking is along both sides of the road



**Photo Caption:** Concrete boat ramp




**Site Sketch:** Drainage area (pink), impervious cover (gray), BMPs (light green), proposed infrastructure (red), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/7/22

**Assessed by:** EWH/GK



# CC Boat Ramp Retrofit Field Summary Sheet

Name: Lonnie's Pond - Bioswales		ID#: OR-BR2
<p><b>Site Description:</b> This site has a paved road down to a paved boat ramp. Parking is informal along both sides of the road; vehicles typically park half on the pavement and half on the grass. Parking is very important for this site, as there is limited parking along the main Herring Brook Way. The Town would like to preserve the large trees along the north side of the landing road. There is an existing UMASS study in the pond on the nitrogen removal capabilities by shellfish.</p> <p><b>Existing BMP on site?</b> No</p> <p><b>Concept Description:</b> Two speed tables will be installed on the landing road to divert runoff into bioswales on the south side of the landing. While this concept reduces parking along the south side of the landing, efforts will be made to improve parking opportunities on the north side.</p>	<p><b>Site Location:</b> Town Landing/Herring Brook Way, Orleans, MA 02653</p> 	
<b>GENERAL SITE INFORMATION</b>		<b>RETROFIT DETAILS</b>
<p><b>Site Contact:</b> Tom Daley (Orleans DPW/Natural Resources Director); Nate Sears (Orleans Natural Resources Manager)</p> <p><b>Ownership:</b> Town</p> <p><b>Parking Lot?</b> Yes</p> <p><b>Number of Spaces:</b> V: 6 VwT: 4 H: 0</p> <p><b>Parking Lot Surface:</b> P/Grass</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Fair</p>	<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Bioswale/sediment forebay</p> <p><b>Non-Structural Controls:</b> None</p> <p><b>BMP Maintenance Burden:</b> Low</p>	
<p><b>Facilities/Amenities:</b> Dinghy storage on easement with abutter.</p> <p><b>Special Uses:</b> Commercial shellfishing</p> <p><b>Receiving Water:</b> Kescayo Gansett Pond (MA96-76), Estuarine</p> <p><b>Known Impairment?</b> Fecal Coliform, Total Nitrogen, Unacceptable for Nitrogen (SOTW)</p> <p><b>Adjacent Critical Resources:</b> Shellfish Area</p>	<p><b>BMP Benefit(s):</b> Recharge</p>	
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment</p> <p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p> <p><b>EJ Community:</b> Minority and Income</p>	<p><b>Potential Site Constraint(s):</b> Access (Tight site with steep slopes, private driveway) High WT Wetlands (Salt Marsh, ACEC, 100-year Floodplain, Hurricane Inundation Zone)</p>	
<b>RETROFIT SIZING INFORMATION</b>		
<b>Estimated Drainage Area (ac):</b> 0.11	<b>WQv Goal/WQv Provided (cf):</b> 305/251	
<b>Estimated Impervious Area (ac):</b> 0.08	<b>Estimated Practice Area (sf):</b> 325	
<b>Impervious Area Type:</b> Street	<b>Existing Head Available?</b> Yes	

Date Assessed: 7/7/2022

Assessed by: EWH/GK

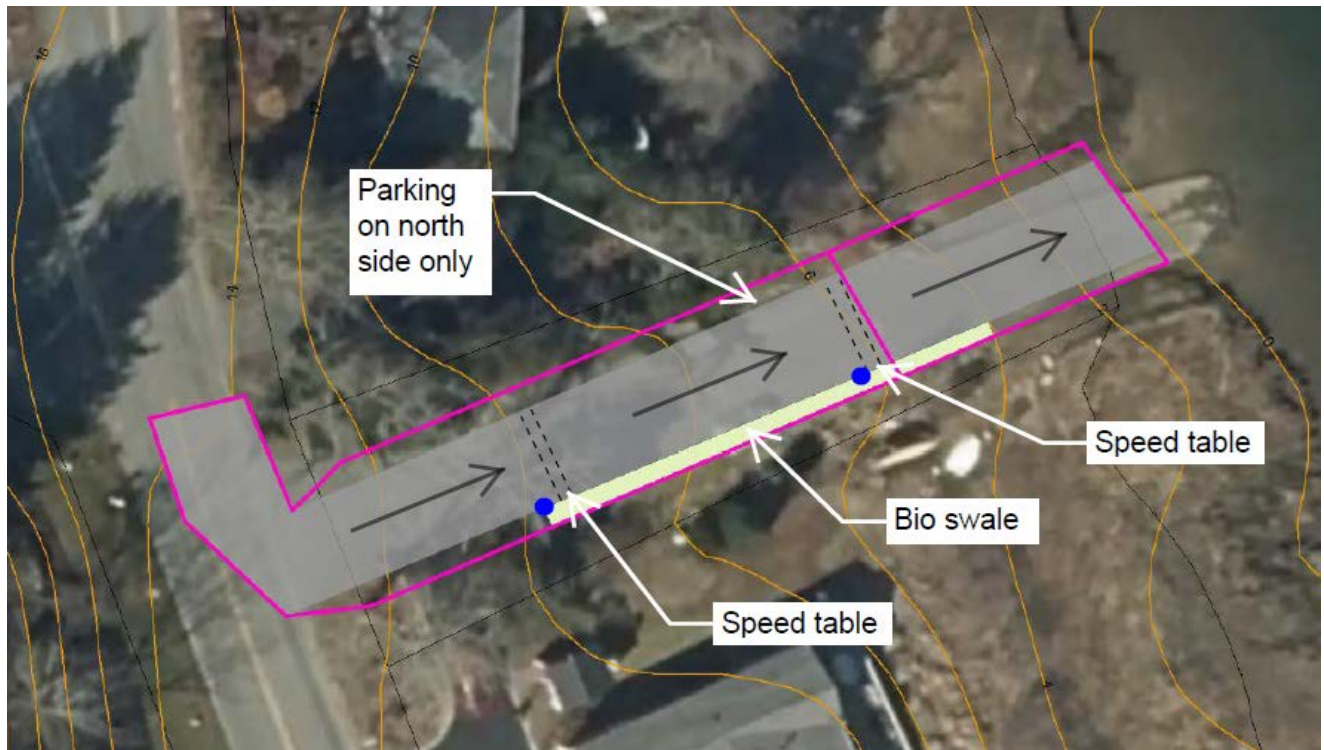
## PHOTOS/SKETCHES



**Photo Caption:** Road leading to boat ramp. Note parking on both sides of the road.



**Photo Caption:** Boat ramp with dinghy storage.




**Site Sketch:** Drainage area (pink), impervious cover (gray), BMPs (light green), paved flumes (dark blue), and drainage flow paths (arrows).

**Date Assessed:** 7/7/2022

**Assessed by:** EWH/GK



# CC Boat Ramp Retrofit Field Summary Sheet

Name: Oak Crest Cove – Bioretention & Permeable Pavement		ID#: SA-BR1
<p><b>Site Description:</b> This site is located near the Town Recreation Center at Oak Crest Lodge. This boat ramp has no specific parking lot – cars park at the rec center parking lot after unloading, and vehicles with trailers park at the beach parking lot. Large volumes of stormwater flow down from the summer camp area, eroding a gully on steep slope behind recreational courts. Sediment builds up on courts and then washes down boat ramp. In addition, 2 catch basins in rec center parking lot discharge onto road down to boat ramp with no management. The rec center's septic system is located under the turnaround area. Peters Pond has no inlet/outlet (kettle pond), and while the water quality is acceptable, there are occasional cyanobacteria blooms.</p> <p><b>Existing BMP on site?</b> None</p>	<p><b>Site Location:</b> 34 Quaker Meetinghouse Road, Sandwich, MA 02563</p> 	
<p><b>Proposed BMP Description:</b> Install a stepped bioretention system down steep slope, with perforated pipe overflow towards ramp. Convert parking lot and courts to permeable surfaces. Great location for public education with signage and perhaps with summer camps, and invasive species management is needed in area of proposed bio.</p>		
GENERAL SITE INFORMATION		RETROFIT DETAILS
<p><b>Site Contact:</b> Paul Tilton (Sandwich DPW), Dave DeConto (Sandwich DNR), Guy Boucher (Sandwich Rec)</p> <p><b>Ownership:</b> Town  <b>Parking Lot?</b> No  <b>Number of Spaces:</b> N/A  <b>Parking Lot Surface:</b> N/A  <b>Ramp Surface:</b> P  <b>Existing Site Condition:</b> Fair</p>	<p><b>Proposed BMP/Pretreatment:</b> Stepped bioretention/deep sump catchbasin and sediment forebay, permeable pavement  <b>Non-Structural Controls:</b> Invasive species management, public education  <b>BMP Maintenance Burden:</b> Medium</p>	
<p><b>Facilities/Amenities:</b> Recreation center, courts, summer camp, seasonal housing, dock  <b>Special Uses:</b> None, but jet skis recently banned on pond</p>	<p><b>BMP Benefit(s):</b>  Recharge  Storage  Demo  Repair  Habitat</p>	
<p><b>Receiving Water:</b> Peters Pond (MA96244), Freshwater  <b>Known Impairment?</b> None  <b>Adjacent Critical Resources:</b> Public Beach</p>		
<p><b>Is site a hotspot?</b> No  <b>Observed Pollutant(s):</b> Sediment</p>	<p><b>Potential Site Constraint(s):</b>  Access (steep slopes)  Land Use (adjacent recreational courts)  Utilities (electrical extends to dock, hydrant waterlines, septic system)  Wetlands (BVW, Zone II, Potential Vernal Pool)</p>	
<p><b>Soils:</b> Good (HSG A)  <b>Invasives:</b> Yes, wide variety</p>		
<p><b>EJ Community:</b> Income</p>		
RETROFIT SIZING INFORMATION		
<p><b>Estimated Drainage Area (ac):</b> 14.20</p>	<p><b>WQv Goal/WQv Provided (cf):</b> 5,372/3,774</p>	
<p><b>Estimated Impervious Area (ac):</b> 1.05</p>	<p><b>Estimated Practice Area (sf):</b> 571</p>	
<p><b>Impervious Area Type:</b> Street</p>	<p><b>Existing Head Available?</b> Y</p>	

Date Assessed: 7/6/2022

Assessed by: MW/JV

## PHOTOS/SKETCHES



**Photo Caption:** Boat ramp and dock



**Photo Caption:** Large paved area where the septic system is located, with basketball courts to the left and the recreation center parking area up to the right.




**Site Sketch:** Drainage area (pink), impervious cover (gray), BMPs (light/dark green and speckled brown), paved flumes (dark blue), existing outfalls (green circles), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/6/2022

**Assessed by:** MW/JV



# CC Boat Ramp Retrofit Field Summary Sheet

Name: Peters Pond – Bioretention & Underground Infiltration		ID#: SA-BR2
<p><b>Site Description:</b> This site is on State-owned land, maintained by State and Town via maintenance agreement. While pavement is in poor condition, there are no known issues with launching here, and the site is not on a list for upgrades. In the summer, the ramp is very busy. While no beach is allowed at a State boat ramp, a sandy area has developed next to the ramp where boaters wait to load. This is a tight, steep site. One of the abutters (Dunroamin Cottages) has a private beach near ramp. Stormwater flows down John Ewer Road (private) to the ramp (large drainage area) with no treatment or management of any kind. Peters Pond has no inlet/outlet (kettle pond), and while the water quality is acceptable, there are occasional cyanobacteria blooms.</p> <p><b>Existing BMP on site?</b> None</p>	<p><b>Site Location:</b> 3 John Ewer Road, Forestdale, MA 02644</p> 	
<p><b>Proposed BMP Description:</b> A bioretention area will be used as pretreatment for road runoff before directing it into underground infiltration chambers with a header row. Parking lot runoff will also be pretreated and infiltrated in the chambers. The lower section of parking lot will be treated with a shallow bioretention. The sandy area near the ramp will be revegetated. Educational signage will be installed, and street sweeping on the private road should be performed.</p>		
GENERAL SITE INFORMATION		RETROFIT DETAILS
<p><b>Site Contact:</b> Paul Tilton (Sandwich DPW), Dave DeConto (Sandwich DNR), Doug Cameron (MA OFBA)</p> <p><b>Ownership:</b> Town/State</p> <p><b>Parking Lot?</b> Yes</p> <p><b>Number of Spaces:</b> V: 0 VwT: 11 H: 1</p> <p><b>Parking Lot Surface:</b> P</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Poor</p>	<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Bioretention &amp; Underground Infiltration Chambers/Forebay &amp; Deep Sump Catch Basins</p> <p><b>Non-Structural Controls:</b> Public education, buffer vegetation, street sweeping</p> <p><b>BMP Maintenance Burden:</b> High</p>	
<p><b>Facilities/Amenities:</b> Portable toilet, trash</p> <p><b>Special Uses:</b> Weekend usage in summer is very busy.</p> <p><b>Receiving Water:</b> Peters Pond (MA96244), Freshwater</p> <p><b>Known Impairment?</b> None</p> <p><b>Adjacent Critical Resources:</b> Beach</p>	<p><b>BMP Benefit(s):</b></p> <ul style="list-style-type: none"> <li>Recharge</li> <li>Demo</li> <li>Repair</li> <li>Habitat</li> <li>Resiliency</li> </ul>	
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment</p> <p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p> <p><b>EJ Community:</b> None</p>	<p><b>Potential Site Constraint(s):</b></p> <ul style="list-style-type: none"> <li>Access (tight, steep site close to abutters)</li> <li>Wetlands (Fluctuating Pond Levels, NHESP Critical Watershed)</li> </ul>	
RETROFIT SIZING INFORMATION		
<p><b>Estimated Drainage Area (ac):</b> 6.79</p>	<p><b>WQv Goal/WQv Provided (cf):</b> 4,138/4,029</p>	
<p><b>Estimated Impervious Area (ac):</b> 1.14</p>	<p><b>Estimated Practice Area (sf):</b> 844</p>	
<p><b>Impervious Area Type:</b> Parking Lot</p>	<p><b>Existing Head Available?</b> Y</p>	
<p><b>Date Assessed:</b> 7/11/2022</p>		<p><b>Assessed by:</b> MW/JV</p>

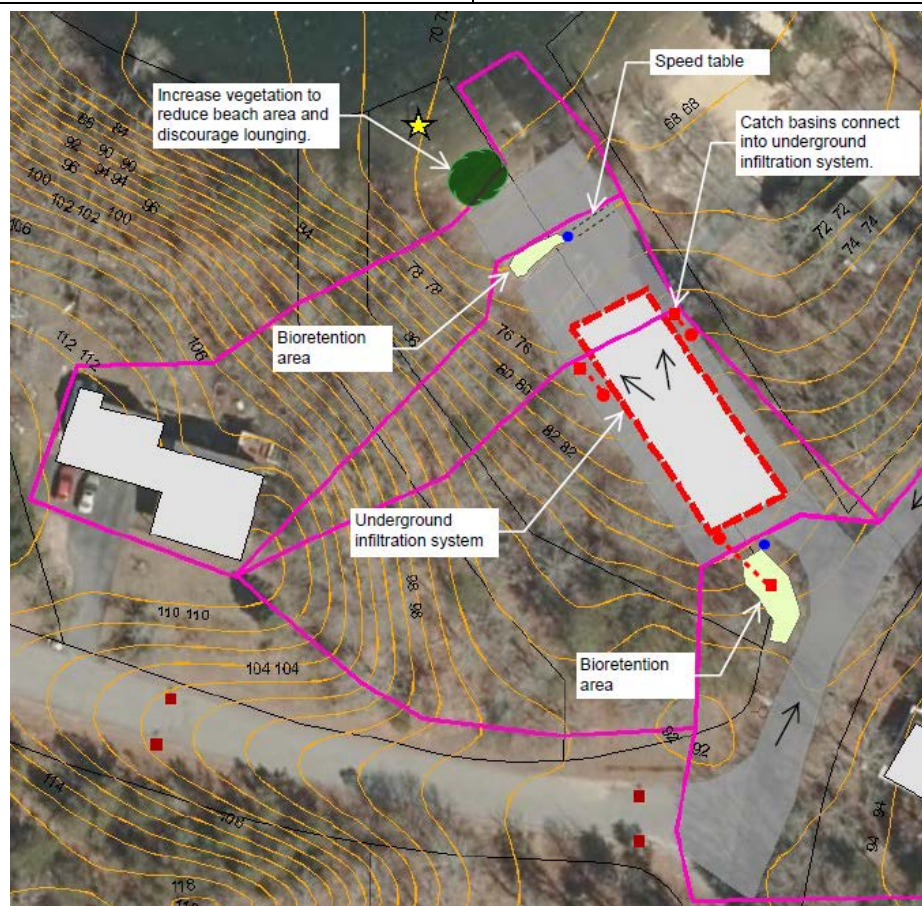
## PHOTOS/SKETCHES



**Photo Caption:** Boat ramp and lower portion of parking lot



**Photo Caption:** Looking uphill at upper portion of parking lot – note the condition of the pavement.




**Site Sketch:** Drainage area (pink – only portion near ramp shown here), impervious cover (gray), BMPs (light green), paved flumes (dark blue), proposed infrastructure (red), existing catchbasins (dark red squares), revegetation (dark green), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/11/2022

**Assessed by:** MW/JV



## CC Boat Ramp Retrofit Field Summary Sheet

Name: Follins Pond Road - Bioretention	ID#: YA-BR1
<p><b>Site Description:</b> This site is a steep, paved road down to a concrete-slab boat ramp, with eroded gullies along the edge. There is existing stormwater infrastructure along Follins Pond Road, installed in 2006, comprised of underground leaching systems. However, these BMPs do not have any vegetative component for nitrogen removal. There are electric and water utilities in the area.</p> <p><b>Existing BMP on site?</b> Yes, upgradient underground leaching systems</p> <p><b>Concept Description:</b> Bioretention areas located on either side of the road close to the boat ramp. A bioswale will be added in along Gun Rock Road. Berms will be added at each catch basin to prevent bypass. It also recommended the Town add vegetative treatment BMPs upgradient of the existing leaching systems.</p>	<p><b>Site Location:</b> Follins Pond Rd, Yarmouth, MA 02675</p> 
GENERAL SITE INFORMATION	RETROFIT DETAILS
<p><b>Site Contact(s):</b> Amanda Lima, (Yarmouth Town Engineer); Bill Bonetti (Yarmouth DNR)</p> <p><b>Ownership:</b> Town</p> <p><b>Parking Lot?</b> Yes</p> <p><b>Number of Spaces:</b> V: 8 VwT: 5 H: 0</p> <p><b>Parking Lot Surface:</b> P</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Good</p>	<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Bioretention areas/sediment forebay</p> <p><b>Non-Structural Controls:</b> None</p> <p><b>BMP Maintenance Burden:</b> Low</p>
<p><b>Facilities/Amenities:</b> None</p> <p><b>Special Uses:</b> Commercial shellfishing</p> <p><b>Receiving Water:</b> Follins Pond (MA96-114), Estuarine</p> <p><b>Known Impairment?</b> Total Nitrogen, Unacceptable of Nitrogen (SOTW)</p> <p><b>Adjacent Critical Resources:</b> Shellfish Area</p>	<p><b>BMP Benefit(s):</b></p> <p>Recharge</p> <p>Repair</p>
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Debris, Leaves</p> <p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p> <p><b>EJ Community:</b> None</p>	<p><b>Potential Site Constraint(s):</b></p> <p>Access (tight site with steep slopes with private driveways)</p> <p>Utilities (Hydrant Waterlines and electric)</p> <p>High WT</p> <p>Wetlands (100-year Flood Zone, Hurricane Surge Inundation Zone)</p>
RETROFIT SIZING INFORMATION	
<p><b>Estimated Drainage Area (ac):</b> 9.66</p>	<p><b>WQv Goal/WQv Provided (cf):</b> 7,187/5,324</p>
<p><b>Estimated Impervious Area (ac):</b> 1.98</p>	<p><b>Estimated Practice Area (sf):</b> 1,280</p>
<p><b>Impervious Area Type:</b> Street</p>	<p><b>Existing Head Available?</b> Yes</p>

**Date Assessed:** 7/7/22

**Assessed by:** EWH/GK



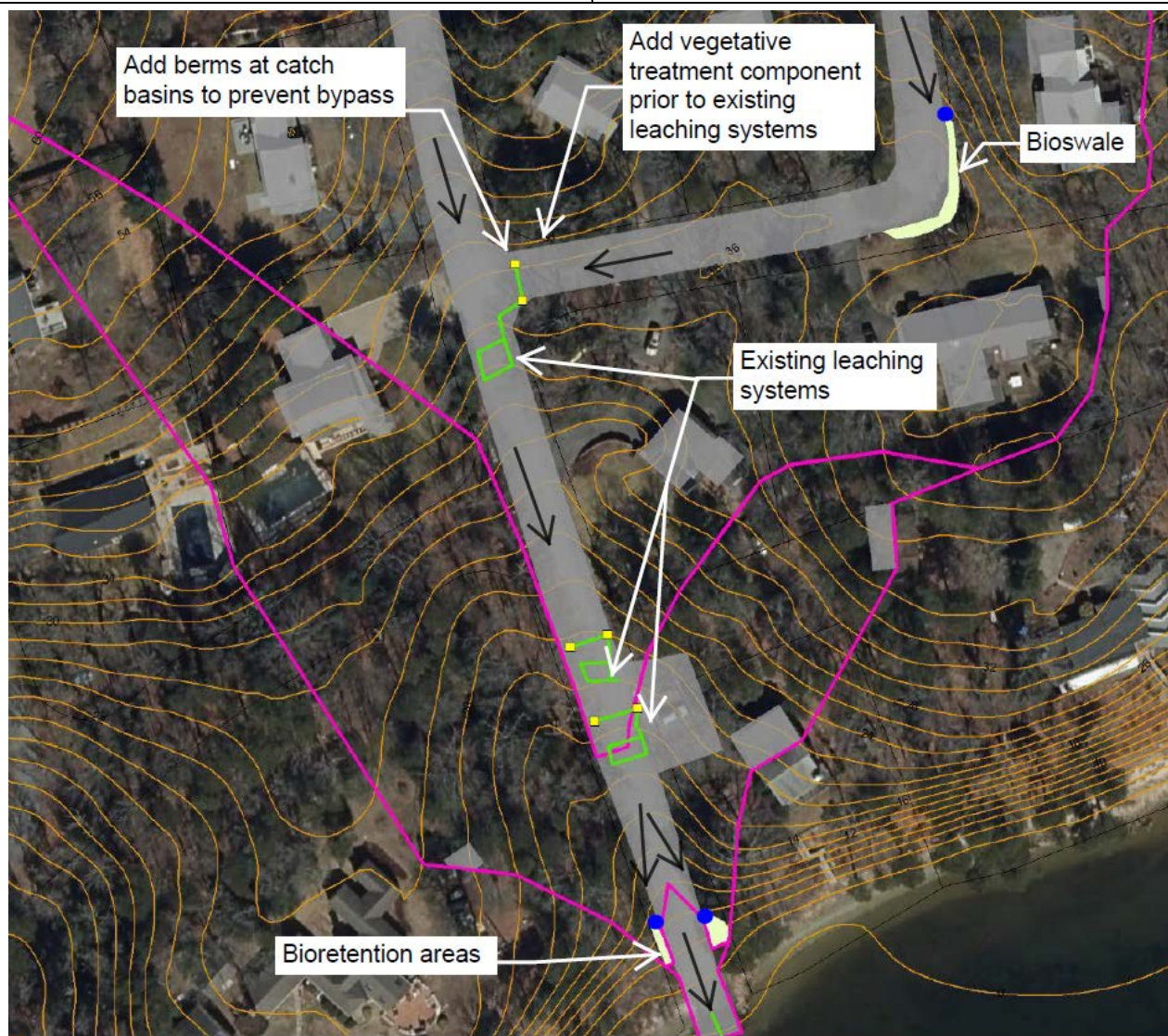
## PHOTOS/SKETCHES



**Photo Caption:** Parking along both sides of the road



**Photo Caption:** Steep road leading down to the boat ramp



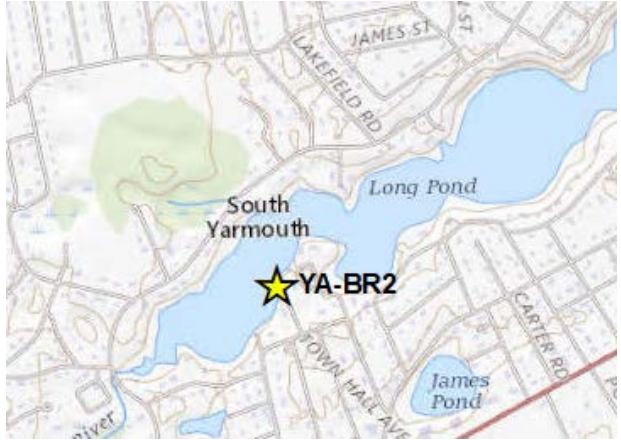
**Site Sketch:** Drainage area (pink), impervious cover (gray), BMPs (light green), paved flumes (dark blue), drainage flow paths (arrows), existing catch basins (yellow), and existing leaching basins (green).

**Date Assessed:** 7/7/22

**Assessed by:** EWH/GK



# CC Boat Ramp Retrofit Field Summary Sheet

Name: Davis Road (Long Pond) – Shallow Bioretentions		ID#: YA-BR2
<p><b>Site Description:</b> This site is a paved cul-de-sac with informal parking along the exterior. The boat ramp is interlocking concrete slabs. This is the only public hardened ramp for the Pond, so it is important to maintain. Additional parking located along Davis Road. Evidence of erosion along road and cul-de-sac was observed during site visit.</p> <p><b>Existing BMP on site?</b> No</p> <p><b>Concept Description:</b> Shallow bioretention areas/swales will provide water quality treatment of runoff from road and cul-de-sac. A Cape Cod berm should be installed to prevent erosion along the pavement edge and direct flows to the BMPs.</p>	<p><b>Site Location:</b> Davis Rd, Yarmouth, MA 02664</p> 	
<b>GENERAL SITE INFORMATION</b>	<b>RETROFIT DETAILS</b>	
<p><b>Site Contact(s):</b> Amanda Lima (Yarmouth Town Engineer); Doug Cameron (MA OFBA)</p> <p><b>Ownership:</b> Town &amp; State</p> <p><b>Parking Lot?</b> Yes</p> <p><b>Number of Spaces:</b> V: 4 VwT: 2 H: 0</p> <p><b>Parking Lot Surface:</b> P</p> <p><b>Ramp Surface:</b> P</p> <p><b>Existing Site Condition:</b> Fair</p>	<p><b>Existing BMP Retrofit or New?</b> New</p> <p><b>Proposed BMP/Pretreatment:</b> Shallow bioretention areas/sediment forebay</p> <p><b>Non-Structural Controls:</b> Cape Cod berm to prevent erosion along the edge of pavement</p> <p><b>BMP Maintenance Burden:</b> Low</p>	
<p><b>Facilities/Amenities:</b> Small boat storage.</p> <p><b>Special Uses:</b> None</p> <p><b>Receiving Water:</b> Long Pond (MA96180), Freshwater</p> <p><b>Known Impairment?</b> None</p> <p><b>Adjacent Critical Resources:</b> Anadromous Fish Run</p>	<p><b>BMP Benefit(s):</b> Repair</p>	
<p><b>Is site a hotspot?</b> No</p> <p><b>Observed Pollutant(s):</b> Sediment</p> <p><b>Soils:</b> Good (HSG A)</p> <p><b>Invasives:</b> No</p> <p><b>EJ Community:</b> Income</p>	<p><b>Potential Site Constraint(s):</b> Utilities (Hydrant Waterlines) High WT Wetlands (BVW to Great Pond, DEP Approved Zone II, Hurricane Surge Inundation Zone)</p>	
<b>RETROFIT SIZING INFORMATION</b>		
<b>Estimated Drainage Area (ac):</b> 0.52	<b>WQv Goal/WQv Provided (cf):</b> 581/537	
<b>Estimated Impervious Area (ac):</b> 0.16	<b>Estimated Practice Area (sf):</b> 554	
<b>Impervious Area Type:</b> Street	<b>Existing Head Available?</b> Yes	
<b>Date Assessed:</b> 7/11/2022		<b>Assessed by:</b> GLK/EH

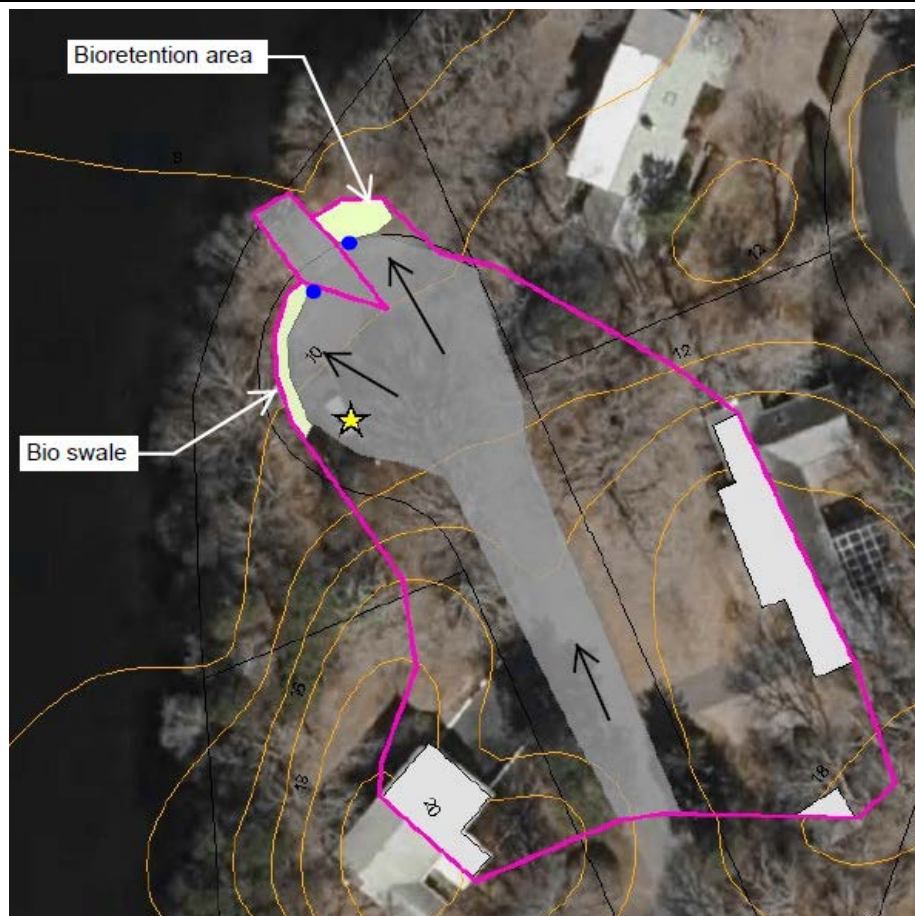
## PHOTOS/SKETCHES



**Photo Caption:** Boat ramp



**Photo Caption:** Cul-de-sac parking area



**Site Sketch:** Drainage area (pink), impervious cover (gray), BMPs (light green), paved flumes (dark blue), and drainage flow paths (arrows). Star represents the GIS location of the boat ramp.

**Date Assessed:** 7/11/2022

**Assessed by:** GLK/EH