


Appendix A: Assessment Summaries for BMPs

HW Site ID#: 1		Town: Cohasset
Type of BMP: Constructed wetland		
Grant Funding Source/ID Number: 319/07-06		
Year Built: 2010		
Reference Plans: Hand Markup of BMP Location #5, Design Details Nicholas Street at Atlantic Ave. Cohasset, Massachusetts; last revised 12/07/09.		
Address: Nichols Rd and Atlantic Ave		
BMP Condition: Poor condition. Inlet clogged so water cannot enter BMP. Appears that water ponds on street and overflows into BMP.	Potential Retrofit: Add another pretreatment practice (e.g., forebay) to address sand/sediment. Needs vegetation maintenance to address invasive species.	
Climate Change Risks: Protected from ocean by a sea wall approximately 5-6 feet high. Exposed to marsh to the east. Functional problem appears to be from lack of maintenance which caused erosion.		
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: 5.11 ft.	Weather: Rain Within Past 24 hours
BMP Plant Health: Salt Impacts. Lots of phragmites. Wall collapsed into forebay, possibly undercut by high water. Water in catch basin approx 2 feet below rim. Inlet from diversion manhole completely blocked. Appears that bmp is not functioning and all water is diverted to nearby wetland.	Arrival Time: 12:05 PM
	Nearest Tide: High, 1:28 PM
	Observers: None
Observed Constraints: None	Date Assessed: 6/4/2015
	Outfall Details
	Outfall Observed: No
	Outfall Notes: Did not find outfall structure, but clear indication of discharge.
Direction of Coastal Exposure: North	Outfall Photo: 
Coastal Barriers: Sea wall	
Condition of Shoreline: Large stone wall created on back side of beach on beach side of street. On the east side of bmp, there is a marsh.	
Storm Damage/Flooding: Yes	
High Groundwater: Yes	
Assessed by: JER/ESB	

BMP Photos



Drainage Area Photos




Sand appears to wash over lower section of sea wall, across Atlantic Ave. from BMP.




Looking northwest on Atlantic Ave.



Looking southwest across Atlantic Ave. to the gravel wetland.

HW Site ID#: 2		Town: Cohasset
Type of BMP: Rain garden		
Grant Funding Source/ID Number: 319/07-06		
Year Built: 2011		
Reference Plans: BMP Location #4, As Built Plan Opposite 37 Beach Street Cohasset, Massachusetts; last revised 09/06/11.		
Address: 44 Beach St		
BMP Condition: Slit in manhole/catch basin that outfalls to rain garden. BMP appears to be in good condition and functioning properly.		
Climate Change Risks: Located at the low point on road and immediately adjacent to wet areas. Seems likely that groundwater will impact rain garden benefits.	Potential Retrofit: Needs vegetation maintenance to address invasive species.	
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: 9.93 ft.	Weather: Rain Within Past 24 hours
BMP Plant Health: Salt Impacts. Overall good condition. Not clear what the planting scheme is, maybe bayberry. Immediately adjacent to rain garden are phragmites and BVW.	Arrival Time: 10:43 AM
	Nearest Tide: High, 1:28 PM. Tide gate.
	Observers: Sara Grady (MassBays)
Observed Constraints: New Development. New single family home under construction up the street. Adjacent homes appear to be new or recently redone.	Date Assessed: 6/4/2015
	Outfall Details
	Outfall Observed: No
	Outfall Notes: Could not locate outfall.
Direction of Coastal Exposure: Northwest	Outfall Photo: 
Coastal Barriers: Marsh	
Condition of Shoreline: Immediately adjacent to BVW and salt marsh.	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: JER/ESB	

BMP Photos




Drainage Area Photos



Periwinkle snail paths evident on rock, indicating high water.



HW Site ID#: 8/9		Town: Cohasset
Type of BMP: Stormceptor, infiltration basin		
Grant Funding Source/ID Number: 319/10-04		
Year Built: 2011		
Reference Plans: Jerusalem Road at Atlantic Ave Drainage Improvements; last revised 10/01/10		
Address: Jerusalem Rd at Atlantic Ave		
BMP Condition: Swale overgrown with knotweed. Hard to see swale.		
Climate Change Risks: Infiltration basin is not a recommended practice here due to high groundwater. Also, significant Japanese Knotweed presence could limit conveyance and available storage in practice.		
	Potential Retrofit: Possible space for bioretention across the street, at a higher elevation and buffered from the marsh.	
Notes: Three catch basins are full of sediment.		

GENERAL INFORMATION	Site Visit
Elevation: 8.9.0 ft.	Weather: Rain Within Past 24hours
BMP Plant Health: All knotweed all the time.	Arrival Time: 12:44 PM
	Nearest Tide: High, 1:29 PM
	Observers: None
Observed Constraints: None	Date Assessed: 6/4/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes:
	Outfall Photo:
Direction of Coastal Exposure: Southeast	
Coastal Barriers: Marsh	
Condition of Shoreline: Discharges to small area of salt marsh and then out to open water, appears to be coastal pond or restricted tidal area. Open ocean is opposite side of Atlantic Ave in front of houses.	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: JER/ESB	

BMP Photos



Swale is in the knotweed, upland marsh area is to the left and salt marsh grass to the right.



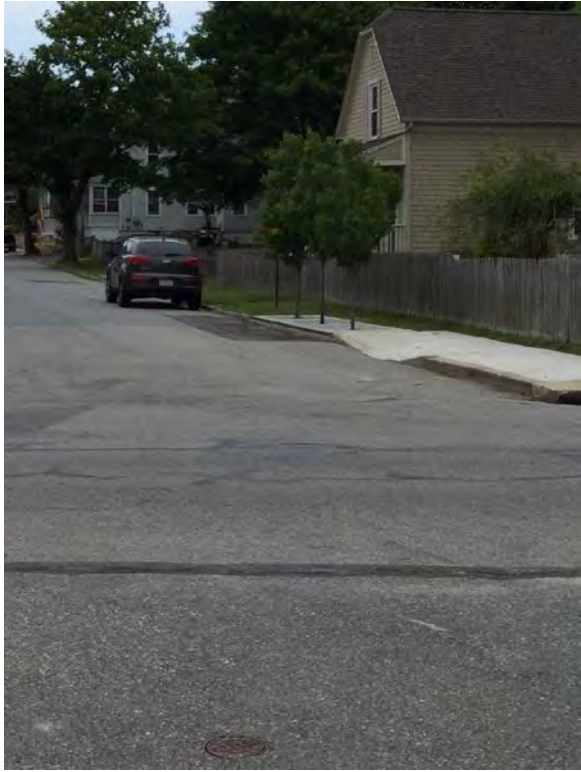
Three catch basins in the road discharge to swale (in the knotweed) across the street.

Drainage Area Photos



Opposite side of the street. Potential retrofit location.



HW Site ID#: 11		Town: Fairhaven
Type of BMP: Tree box filter		
Grant Funding Source/ID Number: 319/10-06		
Year Built: 2013		
Reference Plans: Northern Fairhaven / New Bedford Inner Harbor LID Stormwater Enhancements; dated 5/6/12		
Address: Alpine Ave (11A), Dover St (11B) and Morgan St (11C) at Sycamore St		
BMP Condition: Tree box filters in good condition.		
Climate Change Risks: This neighborhood would have benefitted from outreach. Neighbors opposed the tree box filters.	Potential Retrofit:	
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: 9.00 ft.	Weather: Overcast
BMP Plant Health: Good (11A); N/A (11B); N/A (11C)	Arrival Time: 11:57 AM
	Nearest Tide: High, 1:20 PM
	Observers: Elise Leduc (Woods Hole Group)
Observed Constraints: Neighborhood opposition	Date Assessed: 6/8/2015
	Outfall Details
	Outfall Observed: No
	Outfall Notes:
	Outfall Photo:
Direction of Coastal Exposure: South	No Outfall Photo Available
Coastal Barriers: Too Far Away	
Condition of Shoreline: Too Far Away	
Storm Damage/Flooding: No	
High Groundwater: No	
Assessed by: ERK/ACK	

BMP Photos



Site 11A, Alpine Avenue. Trees installed.



Site 11B, Dover Street. Trees not installed.



Site 11C, Morgan Street. Trees not installed.

Drainage Area Photos




Site 11A, Alpine Ave.




Site 11B, Dover Street



Site 11C, Morgan Street

HW Site ID#: 15		Town: Fairhaven
Type of BMP: Rain garden		
Grant Funding Source/ID Number: 319/09-04		
Year Built: 2012		
Reference Plans: Northern Fairhaven / New Bedford Inner Harbor LID Stormwater Enhancements; dated 9/24/09		
Address: Near corner of Pilgrim Ave and Cherry St		
BMP Condition: Rain Garden in good condition, with no debris or erosion.		
Climate Change Risks: Outfall possibly could have been sited at a higher elevaton to allow for a rise in sea level.	Potential Retrofit: Possibly raise outlet pipe in wall.	
Notes: No level spreader in Bioretention. Rip rap inflow needs maintenance.		

GENERAL INFORMATION	Site Visit
Elevation: 5.00 ft.	Weather: Clear
BMP Plant Health: Sparse	Arrival Time: 11:16 AM
	Nearest Tide: High, 1:20 PM
	Observers: Elise Leduc (Woods Hole Group)
Observed Constraints: None	Date Assessed: 6/8/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes: Duck bill on outfall. Lots of trash near outfall.
	Outfall Photo:
Direction of Coastal Exposure: South	
Coastal Barriers: Sea wall	
Condition of Shoreline: Sea wall in need of repairs/maintenance. Litter and debris.	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: ERK/ACK	

BMP Photos





Drainage Area Photos



Drains to catchbasin at rain garden outlet.



HW Site ID#: 16		Town: Fairhaven
Type of BMP: Filtered catch basin		
Grant Funding Source/ID Number: 319/09-04		
Year Built: 2013		
Reference Plans: Northern Fairhaven / New Bedford Inner Harbor LID Stormwater Enhancements; dated 9/24/09		
Address: Near corner of Pilgrim Ave and Cherry St		
BMP Condition: Unknown. It was not possible to fully inspect the Ultrahydroclean unit.		
Climate Change Risks: The filtering mechanism of the practice potentially could be bypassed if water backs up through the catch basin. Outfall could have been sited at a higher elevation to allow for a rise in sea level.	Potential Retrofit:	
Notes: Missing duck bill on outfall.		

GENERAL INFORMATION	Site Visit
Elevation: 4.00 ft.	Weather: Clear
BMP Plant Health: NA	Arrival Time: 11:16 AM
	Nearest Tide: High, 1:20 PM
	Observers: Elise Leduc (Woods Hole Group)
Observed Constraints: None	Date Assessed: 6/8/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes: No duck bill on outfall. Lots of trash near outfall.
Direction of Coastal Exposure: South	Outfall Photo:
Coastal Barriers: Sea wall	
Condition of Shoreline: Sea wall in need of repairs/maintenance. Litter and debris.	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: ERK/ACK	

BMP Photos



Needs maintenance.



Drainage Area Photos



HW Site ID#: 17		Town: Provincetown
Type of BMP: Combined Infiltration / Leaching CB		
Grant Funding Source/ID Number: 319/09-03		
Year Built: 2011		
Reference Plans: Bradford and Court Street Stormwater Improvements Plan - Court Street, Notes and Details, revised 7/29/09		
Address: Court St east of Commercial St		
BMP Condition: Good condition.		
Climate Change Risks: Elevated groundwater levels and potential wave action damage to structures during large storm event.	Potential Retrofit: None.	
Notes: Standing water in pretreatment tank.		

GENERAL INFORMATION	Site Visit
Elevation: 6.29 ft.	Weather: Clear
BMP Plant Health: NA	Arrival Time: 2:00 PM
	Nearest Tide: Low, 3:04 PM
	Observers: None
Observed Constraints: Roadwork. Porous asphalt paving of Commerical St. has likely reduced the total drainage area to retrofit.	Date Assessed: 5/29/2015
	Outfall Details
	Outfall Observed: No
	Outfall Notes: No outfall shown on plans.
	Outfall Photo:
Direction of Coastal Exposure: Southeast	No Outfall Photo Available
Coastal Barriers: None	
Condition of Shoreline: Stable beach	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: ACK/MW	

BMP Photos



Looking towards water.



looking up the drainage area from the BMP



Inlet not built per design. Commercial Street is now porous asphalt. DMH is under trash can.

Drainage Area Photos





Two buildings in drainage area to practice.



Drainage area is only the road between Commercial Street and the beach, as well as two roofs.



HW Site ID#: 18		Town: Provincetown
Type of BMP: Combined Infiltration / Leaching CB		
Grant Funding Source/ID Number: 319/09-03		
Year Built: 2011		
Reference Plans: Bradford Street Drainage Improvements Plan and Profile; dated June 2012		
Address: Bradford St, east of Hancock St to just east of corner of Kendall Lane		
BMP Condition: Standing water in catch basins, but they have sumps. No noticeable issues.		
Climate Change Risks: These underground systems were likely installed to reduce localized flooding. They are two streets back from the shoreline and relatively elevated, so not as at risk as some of the other Provincetown sites.	Potential Retrofit:	
Notes:		


GENERAL INFORMATION	Site Visit
Elevation: 1.59 ft.	Weather: Clear
BMP Plant Health: NA	Arrival Time: 5:22 PM
	Nearest Tide: Low, 3:04 PM
	Observers: None
Observed Constraints: None	Date Assessed: 5/29/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes: Duckbill on outlet pipe. Evidence of discharge.
	Outfall Photo:
Direction of Coastal Exposure: Southeast	
Coastal Barriers: Other	
Condition of Shoreline: Good; Not close	
Storm Damage/Flooding: No	
High Groundwater: Unknown	
Assessed by: ACK/MW	

BMP Photos



Drainage Area Photos



HW Site ID#: 19a		Town: Hull
Type of BMP: Subsurface infiltration chambers		
Grant Funding Source/ID Number: 319/08-06		
Year Built: 2012		
Reference Plans: Project Final Report - Stormwater BMPs at Straits Pond, Project Number 09-06/319		
Address: Richards Rd at Pond St		
BMP Condition: Disturbed area above chambers lacks stabilized veg. Covered by rocks and invasives.		
Climate Change Risks: The underground system is likely to address local flooding (area is a low point). Likely high groundwater, so subsurface infiltration is not ideal here. Need to size appropriately to account for lack of infiltration and/or assume detention only.	Potential Retrofit:	
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: 8.97 ft.	Weather: Clear
BMP Plant Health: NA	Arrival Time: 1:24 PM
	Nearest Tide: High, 1:29 PM
	Observers: None
Observed Constraints: None	Date Assessed: 6/4/2015
	Outfall Details
	Outfall Observed: No
	Outfall Notes:
	Outfall Photo:
Direction of Coastal Exposure: Northeast	No Outfall Photo Available
Coastal Barriers: Upland Veg Buffer	
Condition of Shoreline: Japanese knotweed and other shrubs and trees protect practice.	
Storm Damage/Flooding: No	
High Groundwater: No	
Assessed by: JER/ESB	

BMP Photos



Surface of practice area.



Drainage Area Photos



HW Site ID#: 19b		Town: Hull
Type of BMP: Rain garden		
Grant Funding Source/ID Number: 319/08-06		
Year Built: 2012		
Reference Plans: Project Final Report - Stormwater BMPs at Straits Pond, Project Number 09-06/319		
Address: Richards Rd at Pond St		
BMP Condition: Forebay appears to be a deep sump catch basin with weir outlet, cut in basin structure. Flow enters by paved inlet. Flow goes to small rain garden, and overflows to existing drain pipes. Ponding on road as evidenced by sediments.		
Climate Change Risks: Could be affected by high groundwater and presence of invasive species.	Potential Retrofit:	
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: 8.15 ft.	Weather: Clear
BMP Plant Health: Good plant health. Nearby Japanese knotweed that is encroaching.	Arrival Time: 1:25 PM
	Nearest Tide: High, 1:29 PM
	Observers: None
Observed Constraints: No recent development	Date Assessed: 6/4/2015
	Outfall Details
	Outfall Observed: Connects to 19a
	Outfall Notes:
	Outfall Photo:
Direction of Coastal Exposure: Northeast	No Outfall Photo Available
Coastal Barriers: Upland Veg Buffer	
Condition of Shoreline: Too Far Away	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: JER/ESB	

BMP Photos





Drainage Area Photos



Looking upgradient on pond.



HW Site ID#: 22a		Town: Scituate
Type of BMP: Field stone plunge pool		
Grant Funding Source/ID Number: 319/06-06		
Year Built: 2009		
Reference Plans: Project Final Report - Herring River Coastal Low Impact Development Project, DEP Project #06-06/319		
Address: Parking lot across from golf course on Driftway		
BMP Condition: Appears to be in good condition. Erosion occurring to the right hand side of the outfall. Sediment deposits throughout BMP.		
Climate Change Risks: Erosion at outfall as a result of increased runoff in drainage area and/or coastal inundation.	Potential Retrofit:	
Notes: Road and large parking lot. Bike path along road.		

GENERAL INFORMATION	Site Visit
Elevation: 2.58 ft.	Weather: Rain Within Past 24hours
BMP Plant Health: Erosion Impacts. Logs established. Vegetation surrounding appears to be in good condition.	Arrival Time: 9:04 AM
	Nearest Tide: High, 1:44 PM
	Observers: Sara Grady (MassBays)
Observed Constraints: None	Date Assessed: 6/4/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes:
	Outfall Photo:
Direction of Coastal Exposure: Southwest	
Coastal Barriers: Marsh	
Condition of Shoreline: Some erosion present.	
Storm Damage/Flooding: Yes	
High Groundwater: No	
Assessed by: JER/ESB	

BMP Photos



Erosion.



Vegetation.



Sedimentation.

Drainage Area Photos




Salt marsh.



Looking west on Driftway. Golf course across street.



Looking east on Driftway.

HW Site ID#: 22b		Town: Scituate
Type of BMP: Rain garden		
Grant Funding Source/ID Number: 319/06-06		
Year Built: 2009		
Reference Plans: Project Final Report - Herring River Coastal Low Impact Development Project, DEP Project #06-06/319		
Address: Parking lot across from golf course on Driftway		
BMP Condition: Poor condition. Overgrown with grasses and other plants from nearby.		
Climate Change Risks: Small depression in large parking lot. Protected by retaining wall. Minimal risks to climate change except more localized flooding.	Potential Retrofit: Increase size of rain garden to capture more runoff and/or reduce impervious area in parking lot to increase benefit. Needs to be replanted.	
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: 6.95 ft.	Weather: Rain Within Past 24hours
BMP Plant Health: Plants as spec'd are not present. More like a grass swale.	Arrival Time: 9:01 AM
	Nearest Tide: High, 1:44 PM
	Observers: Sara Grady (MassBays)
Observed Constraints: None	Date Assessed: 6/4/2015
	Outfall Details
	Outfall Observed: No
	Outfall Notes:
	Outfall Photo:
Direction of Coastal Exposure: Southwest	No Outfall Photo Available
Coastal Barriers: Ret. Wall	
Condition of Shoreline: Marsh nearby, ramp access	
Storm Damage/Flooding: Yes	
High Groundwater: No	
Assessed by: JER/ESB	

BMP Photos



Looking toward marsh.



Looking towards driftway.



Retaining wall between BMP and marsh.

Drainage Area Photos




Parking lot entrance.




Parking lot.



Ramp to marsh from parking lot.

HW Site ID#: 22c		Town: Scituate
Type of BMP: Bioretention		
Grant Funding Source/ID Number: 319/06-06		
Year Built: 2009		
Reference Plans: Project Final Report - Herring River Coastal Low Impact Development Project, DEP Project #06-06/319		
Address: Adjacent to Driftway, east of Ladds Way development		
BMP Condition: Overgrown. Not maintained well. Still appears to be functioning. Forebay has significant sediment and debris. Overgrown outfall structure. Flared end of pipe has significant sediment. Needs cleaning,		
Climate Change Risks: Adjacent to marsh. Discharge is slightly above marsh, but no apparent high water issues. Water observed in base of overflow structure, at least 2 feet below grate.	Potential Retrofit:	
Notes: Structure appears to be functioning well but needs maintenance. Forebay full and spillway riprap embedded with sediment.		

GENERAL INFORMATION	Site Visit
Elevation: 10.55 ft.	Weather: Rain Within Past 24 hours
BMP Plant Health: Good health.	Arrival Time: 9:56 AM
	Nearest Tide: High, 1:44 PM
	Observers: Sara Grady (Massbays)
Observed Constraints: None	Date Assessed: 6/4/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes: Note edge of spillway riprap on left and edge of marsh wrack in center right, indicating high tide.
	Outfall Photo:
Direction of Coastal Exposure: Southeast	
Coastal Barriers: Marsh	
Condition of Shoreline: Healthy marsh	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: JER/ESB	

BMP Photos



Forebay full of sediment.



Note the vegetation.


Drainage Area Photos



Sign on pathway adjacent to BMP along marsh edge and nearby housing complex.



Marsh where the BMP discharges.

HW Site ID#: 25		Town: Sandwich
Type of BMP: Bioretention sand filter		
Grant Funding Source/ID Number: 319/02-13		
Year Built: 2010		
Reference Plans: Mill Creek Estuary Stormwater Mitigation As-Built, dated June 15, 2012		
Address: Tupper Rd north of Moody Dr		
BMP Condition: Bioretention well maintained.		
Climate Change Risks: Too close to groundwater to behave like a filter. Appears to be saturated all the time, so only surface storage is available (which helps with nitrogen removal).	Potential Retrofit:	
Notes:		


GENERAL INFORMATION	Site Visit
Elevation: 6.94 ft.	Weather: Overcast
BMP Plant Health: Good	Arrival Time: 11:48 AM
	Nearest Tide: Low, 12:52 PM
	Observers: None
Observed Constraints: None	Date Assessed: 5/27/2015
	Outfall Details
	Outfall Observed: No
	Outfall Notes:
	Outfall Photo:
Direction of Coastal Exposure: North	No Outfall Photo Available
Coastal Barriers: Too Far Away	
Condition of Shoreline: Too Far Away	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: ERK	

BMP Photos



Drainage Area Photos	

HW Site ID#: 26		Town: Sandwich
Type of BMP: Bioretention sand filter		
Grant Funding Source/ID Number: 319/02-13		
Year Built: 2010		
Reference Plans: Mill Creek Estuary Stormwater Mitigation As-Builts; dated June 15, 2012		
Address: Tupper Rd farther north of Moody and east of Old Tupper Rd		
BMP Condition: Bioretention well maintained.		
Climate Change Risks: With sea level rise, there will be less and less head (tailwater) and water will not be able to get into the practice.	Potential Retrofit: Suggest moving inlets or using larger inlets, or selecting a different practice.	
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: 7.12 ft.	Weather: Overcast
BMP Plant Health: Good	Arrival Time: 11:48 AM
	Nearest Tide: Low, 12:52 PM
	Observers: None
Observed Constraints: None	Date Assessed: 5/27/2015
	Outfall Details
	Outfall Observed: No
	Outfall Notes:
	Outfall Photo:
Direction of Coastal Exposure: North	
Coastal Barriers: Too Far Away	
Condition of Shoreline: Too Far Away	
Storm Damage/Flooding: Yes	
High Groundwater: Yes	
Assessed by: ERK	

BMP Photos



Drainage Area Photos



HW Site ID#: 27		Town: Sandwich
Type of BMP: Deep sump catch basin / leaching		
Grant Funding Source/ID Number: 319/02-13		
Year Built: 2009		
Reference Plans: Mill Creek Estuary Stormwater Mitigation As-Built; dated June 15, 2012		
Address: Tupper Rd just SW of River St/ Tupper Rd just NW of River St		
BMP Condition: Unknown. Underground structures in middle of road not accessible.		
Climate Change Risks: Underground infiltration may not be a good choice at sites that have high ground water.	Potential Retrofit:	
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: 5.45 ft.	Weather: Rain Within Past 24hours
BMP Plant Health: NA	Arrival Time: 12:01 PM
	Nearest Tide: High, 11:48 AM
	Observers: None
Observed Constraints: None	Date Assessed: 6/16/2015
	Outfall Details
	Outfall Observed: No
	Outfall Notes: Ties into site 28.
	Outfall Photo:
Direction of Coastal Exposure: North	No Outfall Photo Available
Coastal Barriers: Too Far Away	
Condition of Shoreline: Too Far Away	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: ERK	

BMP Photos




Looking south.



Drainage Area Photos




HW Site ID#: 28		Town: Sandwich
Type of BMP: Deep sump catch basin / leaching		
Grant Funding Source/ID Number: 319/02-13		
Year Built: 2011		
Reference Plans: Mill Creek Estuary Stormwater Mitigation As-Built; dated June 15, 2012		
Address: Tupper Rd and Captain Ellis Way		
BMP Condition: Needs maintenance. Catch basin is full of sediment / grass clippings. Underground structures in middle of road not accessible.		
Climate Change Risks: Underground infiltration may not be a good choice at sites that have high ground water.	Potential Retrofit: Swales with checkdams along Captain Ellis Way could be an alternative.	
Notes:		


GENERAL INFORMATION	Site Visit
Elevation: 5.61 ft.	Weather: Overcast
BMP Plant Health: NA	Arrival Time: 11:48 AM
	Nearest Tide: Low, 12:52 PM
	Observers: None
Observed Constraints: None	Date Assessed: 5/27/2015
	Outfall Details
	Outfall Observed: No
	Outfall Notes:
	Outfall Photo:
Direction of Coastal Exposure: North	No Outfall Photo Available
Coastal Barriers: Too Far Away	
Condition of Shoreline: Too Far Away	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: ERK	

BMP Photos



Drainage Area Photos	

HW Site ID#: 29		Town: Provincetown
Type of BMP: Deep sump catch basin / leaching		
Grant Funding Source/ID Number: CPR/10-14		
Year Built: 2010		
Reference Plans: 55 Commercial Street Stormwater Improvements Record Drawings; dated July 2010		
Address: 55 Commercial St in the parking lot		
BMP Condition: No evidence of problems, but probably sited in groundwater.		
Climate Change Risks: Rising groundwater may reduce infiltration capacity. Standing water in structures.	Potential Retrofit: No obvious retrofit opportunity.	
Notes: Same groundwater rise issues as several other sites due to sea level rise, but sea wall in good shape.		


GENERAL INFORMATION	Site Visit
Elevation: 4.24 ft.	Weather: Clear
BMP Plant Health: NA	Arrival Time: 3:50 PM
	Nearest Tide: Low, 3:04 PM
	Observers: None
Observed Constraints: Roadwork	Date Assessed: 5/29/2015
	Outfall Details
	Outfall Observed: No
	Outfall Notes: Buried.
	Outfall Photo:
Direction of Coastal Exposure: South	
Coastal Barriers: Ret. Wall	
Condition of Shoreline: Beach looks pretty good. But parking surface quite deteriorated.	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: ACK/MW	


BMP Photos



Drainage Area Photos



HW Site ID#: 30		Town: Oak Bluffs
Type of BMP: Rain garden/gravel wetland		
Grant Funding Source/ID Number: CPR/10-10		
Year Built: 2010		
Reference Plans: East Chop Drive Stormwater Pollution Prevention Construction Plans; dated March 23, 2010		
Address: Approx 64 East Chop Dr on Mill Sq Rd and East Chop Dr		
BMP Condition: BMP is in good working condition. In need of maintenance of plants and sediment removal. Outlet structure partially clogged with debris. Abutting large trees have died from root damage.		
Climate Change Risks: This practice may be subject to coastal over wash in an extreme event, but is moderately protected in the harbor from direct coastal storm influences. The site is highly influenced by tides as the bottom of the practice is below the high tide elevation. But the practice is lined so is not directly influenced by the tide.	Potential Retrofit: Possible improvements may include additional plantings along the top of slope to expand the buffer between the roadway and the practice. An alternative to the paved flume for pretreatment may improve sedimentation concerns.	
Notes: Overall, this site is performing well but requires maintenance.		

GENERAL INFORMATION	Site Visit
Elevation: -1.65 ft.	Weather: Clear
BMP Plant Health: Plant trimming required but otherwise healthy. Some sediment damage. Weeding necessary and some invasive control required.	Arrival Time: 10:38 AM
	Nearest Tide: High, 10:36 AM
	Observers: None
Observed Constraints: None	Date Assessed: 6/14/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes:
	Outfall Photo:
Direction of Coastal Exposure: Southeast	
Coastal Barriers: Sea wall	
Condition of Shoreline: Good; Sheet pile bulkhead in good condition	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: KMH/ACS	


BMP Photos



Drainage Area Photos



HW Site ID#: 31b		Town: Marion
Type of BMP: Bioretention		
Grant Funding Source/ID Number: CPR/05-01		
Year Built: 2005		
Reference Plans: Record Plan Island Wharf; dated 11/15/06		
Address: Parking lot north/ adjacent to Island Wharf Rd		
BMP Condition: Bioretention in good condition.		
Climate Change Risks: Raise outfall in outlet structure.	Potential Retrofit:	
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: 0.33 ft.	Weather: Clear
BMP Plant Health: Good maintenance. Cutting out woody. Some erosion on vegetated berm but otherwise okay.	Arrival Time: 10:02 AM
	Nearest Tide: Low, 6:21 AM
	Observers: Kirk Bosma, Elise Leduc (Woods Hole Group)
Observed Constraints: None	Date Assessed: 6/8/2015
	Outfall Details
	Outfall Observed: Submerged
	Outfall Notes: Outfall underwater at mean high tide.
	Outfall Photo:
Direction of Coastal Exposure: Southeast	
Coastal Barriers: Sea wall	
Condition of Shoreline: Minor erosion at back face of seawall	
Storm Damage/Flooding: Yes	
High Groundwater: Yes	
Assessed by: ERK/ACK	

BMP Photos



Manhole.



Bioretention.

Drainage Area Photos




Bioretention and parking area.



Eroded grass.

HW Site ID#: 31b		Town: Marion
Type of BMP: Bioretention		
Grant Funding Source/ID Number: CPR/05-01		
Year Built: 2005		
Reference Plans: Record Plan Island Wharf; dated 11/15/06		
Address: Parking lot north/ adjacent to Island Wharf Rd		
BMP Condition: Bioretention in good condition.		
Climate Change Risks: Raise outfall in outlet structure.	Potential Retrofit:	
Notes:		


GENERAL INFORMATION	Site Visit
Elevation: 0.98 ft.	Weather: Clear
BMP Plant Health: Plants are doing well	Arrival Time: 10:11 AM
	Nearest Tide: Low, 6:21 AM
	Observers: Kirk Bosma, Elise Leduc (Woods Hole Group)
Observed Constraints: None	Date Assessed: 6/8/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes: Eroded channel at outfall. Observed some flow.
	Outfall Photo:
Direction of Coastal Exposure: Southeast	
Coastal Barriers: Sea wall	
Condition of Shoreline: Needs stabilization. Some evidence of overflow	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: ERK/ACK	

BMP Photos



Drainage Area Photos




HW Site ID#: 31c		Town: Marion
Type of BMP: Bioretention		
Grant Funding Source/ID Number: CPR/05-01		
Year Built: 2005		
Reference Plans: Record Plan Island Wharf; dated 11/15/06		
Address: Parking lot north/ adjacent to Island Wharf Rd		
BMP Condition: Bioretention in good condition.		
Climate Change Risks: See 31a. Bioretention connected to outfall.	Potential Retrofit:	
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: -2.10 ft.	Weather: Clear
BMP Plant Health: Plants are doing well	Arrival Time: 10:24 AM
	Nearest Tide: Low, 6:21 AM
	Observers: Kirk Bosma, Elise Leduc (Woods Hole Group)
Observed Constraints: None	Date Assessed: 6/8/2015
	Outfall Details
	Outfall Observed: Submerged
	Outfall Notes: See 31a. Bioretention connected to outfall.
	Outfall Photo:
Direction of Coastal Exposure: Southeast	No Outfall Photo Available
Coastal Barriers: Sea wall	
Condition of Shoreline: See 31a. Bioretention connected to outfall	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: ERK/ACK	

BMP Photos



Drainage Area Photos	

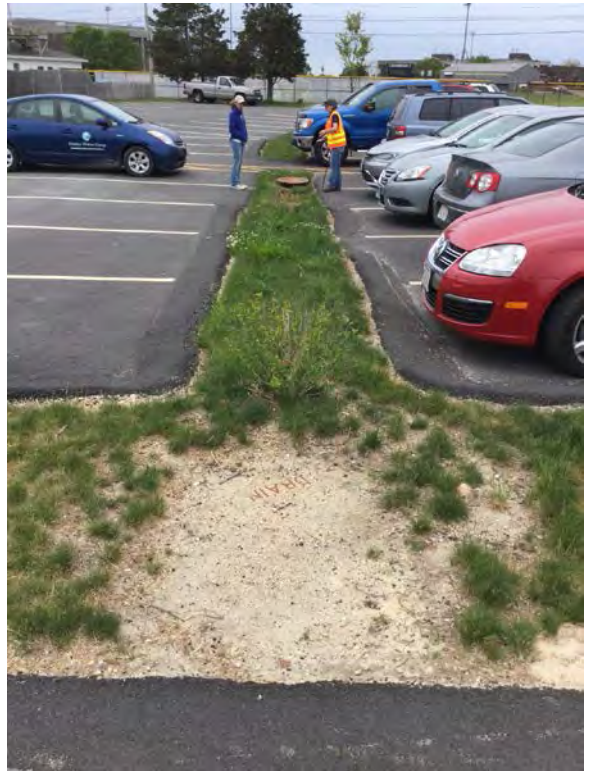
HW Site ID#: 31d		Town: Marion
Type of BMP: Bioretention		
Grant Funding Source/ID Number: CPR/05-01		
Year Built: 2005		
Reference Plans: Record Plan Island Wharf; dated 11/15/06		
Address: Parking lot north/ adjacent to Island Wharf Rd		
BMP Condition: Bioretention in good condition. Water was heard running through the underdrain pipes.		
Climate Change Risks: See 31a. Bioretention connected to outfall.	Potential Retrofit:	
Notes: Pretty significant flow from this under drain. Dry weather.		


GENERAL INFORMATION	Site Visit	
Elevation: -2.59 ft.	Weather: Clear	
BMP Plant Health: Plants are doing well	Arrival Time: 10:25 AM	
	Nearest Tide: Low, 6:21 AM	
	Observers: Kirk Bosma, Elise Leduc (Woods Hole Group)	
Observed Constraints: None	Date Assessed: 6/8/2015	
	Outfall Details	
	Outfall Observed: Submerged	
	Outfall Notes: See 31a. Bioretention connected to outfall.	
	Outfall Photo:	
No Outfall Photo Available		
		Direction of Coastal Exposure: Southeast
		Coastal Barriers: Sea wall
		Condition of Shoreline: See 31a. Bioretention connected to outfall
		Storm Damage/Flooding: No
	High Groundwater: Yes	
Assessed by: ERK/ACK		

BMP Photos



Drainage Area Photos	

HW Site ID#: 32a		Town: Bourne
Type of BMP: Cultec infiltration		
Grant Funding Source/ID Number: CPR/14-04		
Year Built: 2014		
Reference Plans: Buttermilk Way Stormwater Improvements Record Drawing; dated 06/12/2014		
Address: Approx 14 Buttermilk Way		
BMP Condition: Unknown. It appears that settling tank is functioning but we are unable to access the underground infiltration chambers.		
Climate Change Risks: Could be affected by high ground water, or backup from connected system.		Potential Retrofit: Missed opportunity to incorporate vegetative filter in parking islands above chamber system to provide water quality treatment for nitrogen.
Notes:		


GENERAL INFORMATION	Site Visit
Elevation: 2.39 ft.	Weather: Raining
BMP Plant Health: NA	Arrival Time: 1:18 PM
	Nearest Tide: High, 2:25 PM
	Observers: Elise Leduc (Woods Hole Group)
Observed Constraints: None	Date Assessed: 6/8/2015
	Outfall Details
	Outfall Observed: Connects to 32a
	Outfall Notes:
	Outfall Photo:
Direction of Coastal Exposure: Southwest	
Coastal Barriers: Upland Veg Buffer	
Condition of Shoreline: in parking lot at restaurant, not immediately adjacent to shoreline.	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: ERK/ACK	


BMP Photos



Drainage Area Photos



HW Site ID#: 32b		Town: Bourne
Type of BMP: Cultec infiltration		
Grant Funding Source/ID Number: CPR/14-04		
Year Built: 2014		
Reference Plans: Buttermilk Way Stormwater Improvements Record Drawing; dated 06/12/2014		
Address: Approx 14 Buttermilk Way		
BMP Condition: Unknown. It appears that settling tank is functioning but we are unable to access the underground infiltration chambers.		
Climate Change Risks: High groundwater, sea level rise will exacerbate the problem.	Potential Retrofit: Underground infiltration may not be a good choice at sites that have high ground water. Recommend duck bill on outfall.	
Notes:		


GENERAL INFORMATION	Site Visit
Elevation: 2.37 ft.	Weather: Raining
BMP Plant Health: NA	Arrival Time: 1:18 PM
	Nearest Tide: High, 2:25 PM
	Observers: Elise Leduc (Woods Hole Group)
Observed Constraints: None	Date Assessed: 6/8/2015
	Outfall Details
	Outfall Observed: Submerged
	Outfall Notes: Submerged. No duck bill.
	Outfall Photo:
Direction of Coastal Exposure: Southwest	
Coastal Barriers: Upland Veg Buffer	
Condition of Shoreline: Exposed beach area at the outfall. Adjacent shoreline is protected by rip rap walls.	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: ERK/ACK	


BMP Photos



Drainage Area Photos



HW Site ID#: 33		Town: Kingston
Type of BMP: Subsurface infiltration chambers		
Grant Funding Source/ID Number: CPR/13-14		
Year Built: 2013		
Reference Plans: Jones River Estuary BMPs Phase 1; Funded Under CZM CPR '13; 6/29/13; Sheet1/3 Proj No. 12-228		
Address: Locus at end of River St near wharf, just northeast from harbormaster		
BMP Condition: Harbor master says working fine. Maybe getting overland flow bypassing lowest cb. Standing water in main leaching chamber. Uphill chambers and CBs seem fine.		
Climate Change Risks: Cleaning and maintenance for chambers is difficult. There are no inspection ports.	Potential Retrofit: Proposed rain garden (not constructed under this grant) is an ideal location to capture a portion of the parking lot runoff. Retrofit to capture manage sediment in parking/ boat ramp area. Install berm around trash dumpster.	
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: 3.45 ft.	Weather: Clear
BMP Plant Health: NA	Arrival Time: 8:39 AM
	Nearest Tide: Low, 8:33 AM
	Observers: None
Observed Constraints: None	Date Assessed: 6/5/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes: Iron floc staining.
	Outfall Photo:
Direction of Coastal Exposure: East	
Coastal Barriers: Ret. Wall	
Condition of Shoreline: At boat ramp, no marsh grass. No significant sign of erosion at outfall.	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: JER/ACK	

BMP Photos




Hooded outlet pipe.


Drainage Area Photos



Looking uphill at drainage area.



HW Site ID#: 34		Town: Kingston
Type of BMP: Two rain gardens with trench drain (for		
Grant Funding Source/ID Number: CPR/13-14		
Year Built: 2013		
Reference Plans: Jones River Estuary BMPs Phase 1; Funded Under CZM CPR '13; Kingston, MA; 6/29/13; Sheet 2/3 Proj No. 13-231		
Address: Locus at end of Delano Ave near water's edge		
BMP Condition: Raingardens look good. Trench drain clogged with sediment, organics. Erosion evidence in riprap overflow. Water in both raingarden inlets. Runoff passes clogged trench drain, overtops curb. Minor curb damage in rain garden near Delano (plow?).		
Climate Change Risks: None.	Potential Retrofit: Clean out trench drain. Stone overflow and stairs should be planted to stabilize slopes. Consider curb cuts to allow direct flow to raingarden in larger events to prevent backups/ ponding behind curb. Reduce sediment, debris from drainage area?	
Notes: Love this retrofit, interesting design. Challenge is to keep trench drain unclogged. Need to ensure that maintenance happens or rain gardens will be bypassed and slope will erode. Not sure I saw wind impacts on plants, but perhaps foot traffic on berms.		

GENERAL INFORMATION	Site Visit
Elevation: 7.78 ft.	Weather: Clear
BMP Plant Health: Good condition. Good coverage, except along berms. Needs typical maintenance to remove small invasive species.	Arrival Time: 9:26 AM
	Nearest Tide: Low, 8:33 AM
	Observers: None
Observed Constraints: None	Date Assessed: 6/5/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes: Erosion at bottom, along stairs and along riprap overflow.
	Outfall Photo:
Direction of Coastal Exposure: West	
Coastal Barriers: Marsh	
Condition of Shoreline: Short distance to water/marsh.	
Storm Damage/Flooding: Yes	
High Groundwater: No	
Assessed by: JER/ACK	

BMP Photos

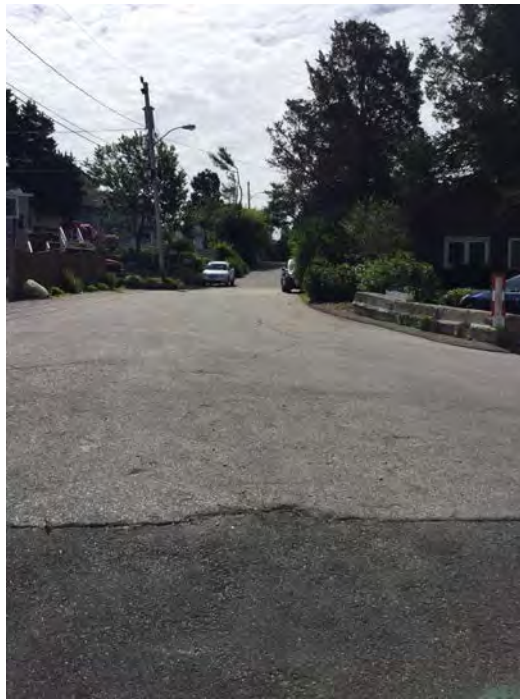


Rain garden immediately downgradient of Delano. Broken concrete curb.




Second rain garden.


Drainage Area Photos



Looking upstream towards Delano.



HW Site ID#: 35		Town: Duxbury
Type of BMP: Four subsurface chamber systems with		
Grant Funding Source/ID Number: CPR/13-02		
Year Built: 2013		
Reference Plans: Stormwater Mitigation Facilities for Bay Road Area 28, Duxbury, MA; 6/30/13; Sheet 1/1 Proj No. 13-230		
Address: Bay Rd just SW of Bayview Rd, Bay Rd just NE of Bayridge Lane		
BMP Condition: Practice is underground, so it is hard to determine the condition. Looks good from surface.		
Climate Change Risks: These practices are sitting in groundwater, but maybe that is ok if these are for detention only.	Potential Retrofit:	
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: 8.04 ft.	Weather: Clear
BMP Plant Health: NA	Arrival Time: 2:10 PM
	Nearest Tide: Low, 3:42 PM
	Observers: None
Observed Constraints: Additional roadwork, installation of new catchbasins and possibly more underground storage, which could have changed drainage area.	Date Assessed: 6/13/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes:
Direction of Coastal Exposure: Southeast	Outfall Photo: 
Coastal Barriers: Marsh	
Condition of Shoreline: Stable outfall, but well-defined channel; marsh extensive	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: ACK	


BMP Photos



Drainage Area Photos



HW Site ID#: 37		Town: Plymouth
Type of BMP: Bioretention		
Grant Funding Source/ID Number: 319/04-09		
Year Built: 2009		
Reference Plans: Town of Plymouth Water Front Park Drainage Improvements Project Final s.319 Project Report; Project # 4-09/319; Prepared for MADEP Bureau of Resource Protection and U.S. EPA Region 1		
Address: Water Street, Plymouth MA		
BMP Condition: Covered by morning glory vines. Standing, stagnant water with algae near inflow point. Observation wells hidden. Overflow structure clogged, ponding. Outfall pipe clogged with debris. Evidence of overflow (green grass, scour at sidewalk).	Potential Retrofit: Needs vegetation maintenance to remove invasive species. Check if the underdrain is clogged. Clear debris from outfall pipe and outlet structure.	
Climate Change Risks: Practice located directly adjacent to the water with significant exposure to wind.		
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: 4.63 ft.	Weather: Clear
BMP Plant Health: Plants in good condition, good coverage. Vines in bio should be removed. Slightly overgrown. Detritus should be removed.	Arrival Time: 10:46 AM
	Nearest Tide: High, 2:15 PM
	Observers: None
Observed Constraints: Other	Date Assessed: 6/5/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes: Rock and debris in outfall pipe.
	Outfall Photo:
Direction of Coastal Exposure: Northeast	
Coastal Barriers: Sea wall	
Condition of Shoreline: Stabilized/ hardened.	
Storm Damage/Flooding: No	
High Groundwater: No	
Assessed by: JER/ACK	

BMP Photos




Green grass indicates overflow from bio. Erosion on other side of sidewalk where overland flow discharges to sea wall.



Overgrown, vines.

Drainage Area Photos



HW Site ID#: 40		Town: Barnstable
Type of BMP: Bioretention		
Grant Funding Source/ID Number: /		
Year Built: 2010-2011		
Reference Plans: New Bathhouse and Garage, Sandy Neck Beach, Grading and Drainage Sheet C-8 Bid Set, 2010		
Address: Sandy Neck Rd, bathhouse and parking lot		
BMP Condition: Primary Bioretention in good condition. Second Bioretention needs some work on eroded slopes.		
Climate Change Risks: No recommendations. This practice is located a significant distance from the shoreline.	Potential Retrofit:	
Notes:		


GENERAL INFORMATION	Site Visit
Elevation: 4.49 ft.	Weather: Clear
BMP Plant Health: Wind Impacts	Arrival Time: 3:27 PM
	Nearest Tide: High, 4:53 PM
	Observers: None
Observed Constraints: None	Date Assessed: 6/8/2015
	Outfall Details
	Outfall Observed: NA
	Outfall Notes:
	Outfall Photo:
Direction of Coastal Exposure: North	No Outfall Photo Available
Coastal Barriers: Too Far Away	
Condition of Shoreline: Sandy Neck Beach - Erosion	
Storm Damage/Flooding: No	
High Groundwater: No	
Assessed by: ERK/ACK	


BMP Photos



Drainage Area Photos



HW Site ID#: 41		Town: Chelsea
Type of BMP: Two biofilter systems		
Grant Funding Source/ID Number: MET/		
Year Built: 2013		
Reference Plans: Stormwater System Retrofits MACE Public Housing Chelsea, Massachusetts; 12/18/13; Sheet C-1		
Address: Clinton St and Mill Court, Mace Housing Complex, Chelsea		
BMP Condition: Maintenance observed during our visit. Landscapers suggest mulch is deep and should be removed, replaced to lower elevation. Water is flowing over berms and carrying mulch into gravel spillways. Catch basin into lower basin is ponding, clogged.	Potential Retrofit:	
Notes:		

GENERAL INFORMATION	Site Visit
Elevation: 5.89 ft.	Weather: Rain Within Past 24hours
BMP Plant Health: Plants had been dying initially after installation but look healthy now.	Arrival Time: 2:50 PM
	Nearest Tide: High, 1:24 PM
	Observers: Julie Simpson (MIT Sea Grant)
Observed Constraints: None	Date Assessed: 6/4/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes: Outfall ditch has recently been riprapped for stabilization. Unclear if outfall is at near end or far end of riprap.
	Outfall Photo:
Direction of Coastal Exposure: Northeast	
Coastal Barriers: Marsh	
Condition of Shoreline: Highlight impacted marsh edge. Chain link fence along marsh edge. Vegetated buffer between lower practice and salt marsh grass is only a few feet. Outfall pipe discharges to marsh; Ditch has recently been stabilized with riprap.	
Storm Damage/Flooding: No	
High Groundwater: Yes	
Assessed by: JER/ESB	

BMP Photos





Maintenance underway.



Drainage Area Photos



HW Site ID#: 44		Town: Plymouth
Type of BMP: Bioretention, Subsurface infiltration		
Grant Funding Source/ID Number: CPR/2011		
Year Built: 2011		
Reference Plans: Pond Road Stormwater Improvements, dated March 2012		
Address: Pond Road, Plymouth		
BMP Condition: Bioretention in very good condition. Some sediment build-up on trench drain grate.		
Climate Change Risks: No recommendations. This practice is quite a bit higher than the adjacent water elevation.	Potential Retrofit:	
Notes: Sediment fore bay needs to be cleaned out. Pretreat tanks do not have access manholes		

GENERAL INFORMATION	Site Visit
Elevation: 16.77 ft.	Weather: Overcast
BMP Plant Health: Good	Arrival Time: 2:30 PM
	Nearest Tide: High, 4:45 PM
	Observers: None
Observed Constraints: None	Date Assessed: 6/8/2015
	Outfall Details
	Outfall Observed: Yes
	Outfall Notes: Overflow in good condition
Direction of Coastal Exposure: Northeast	Outfall Photo:
Coastal Barriers: Ret. Wall	
Condition of Shoreline: Great condition; local neighborhood association is responsible for beach maintenance.	
Storm Damage/Flooding: No	
High Groundwater: No	
Assessed by: ERK/ACK	

BMP Photos



Drainage Area Photos

