Resilient Community Partnership Presentation

Town of Fenwick Island – December 6, 2019

KCI TECHNOLOGIES · DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL · DCMP DELAWARE COASTAL MANAGEMENT PROGRAM · UNIVERSITY OF DELAWARE · AECOM

Project Overview

KCI TECHNOLOGIES

Resilient Community Partnership

- City of Rehoboth Beach
- Town of Dewey Beach
- City of Lewes
- Town of South Bethany
- Town of Bethany Beach
- Town of Henlopen Acres
- Town of Fenwick Island

Additional Stakeholders - Save Our Lakes Alliance 3 and Delaware Center for Inland Bays

Project Overview

- Federally funded-
  - *Delaware Coastal Programs Section*
  - *National Oceanic and Atmospheric Administration*
  - *U.S. Department of Commerce*

- Three Components-
  1. Impervious Surface Coverage Assessment
  2. Coastal Delaware Best Management Practices (BMP) Guide
  3. Municipal Toolkit

Project Overview

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Delaware Coastal Communities
Impervious Surface Coverage
August 2019

Impervious Surface Coverage Assessment

Objectives

1. Assess accuracy of the impervious GIS layers in 2007 and 2016 for the Delaware coastal communities (RCP participants)
2. Determine change in impervious surface cover from 2007 to 2016

Data sources

1. State of Delaware impervious surface GIS layer for 2007
2. Chesapeake Conservancy land cover dataset (2016) using 2013 and 2014 NAIP and orthoimagery.

Impervious Surface Coverage Assessment

Accuracy Assessment

1. Project Raster tool
2. Generated sampling points
3. Random points for comparison
4. Visual sample points (Google Earth & Google Street View)

The accuracy is around 92%; therefore, the changes that are indicated between the two years are within the margin of error.

Impervious Surface Coverage Assessment

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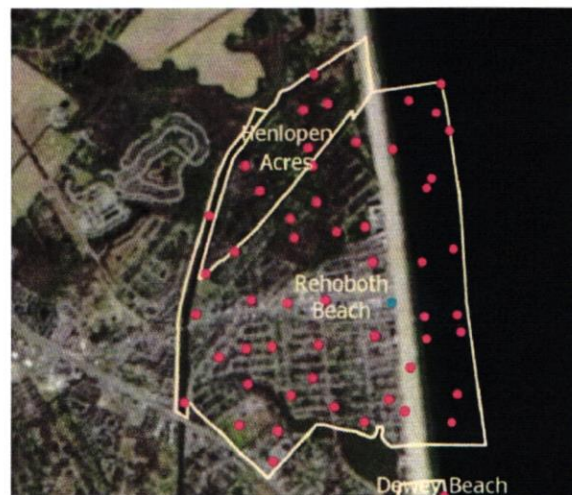
Municipality	Private Area[1]	2007 Delaware Layer			2016 Chesapeake Layer			% Private Parcel[4]	% Private Total[5]
		Private Imp Sfc[1]	% Imp Sfc Parcel[2]	% Imp Sfc Town[3]	Private Imp Sfc[1]	% Imp Sfc Parcel[2]	% Imp Sfc Town[3]		
Bethany Beach	2.18	0.78	30.79	25.70	0.89	35.06	29.26	4.26	3.56
Dewey Beach	0.54	0.35	52.92	29.64	0.34	52.56	29.44	-0.36	-0.20
Fenwick Island	0.58	0.29	46.99	22.43	0.35	56.64	27.04	9.66	4.61
Henlopen Acres	0.37	0.09	17.69	13.06	0.09	17.66	13.04	-0.02	-0.02
Lewes	4.90	1.21	12.52	10.10	1.36	14.07	11.35	1.55	1.25
Rehoboth Beach	1.69	0.82	38.34	20.90	0.82	38.59	21.03	0.25	0.14
South Bethany	0.79	0.34	37.09	24.71	0.41	44.98	29.97	7.89	5.26

The table summarizes the private impervious surface in comparison to the total parcel area (excludes lakes, canals, beaches) and total town area delineated by the Municipality layer.

Impervious Surface Coverage Assessment

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- On average, the beach towns' impervious surface area was 32% of the town area in 2007 with an increase to 35% by 2016.

- An analysis of only the private land areas revealed 41% private impervious surface area to total private land, 34% to total parcel area, and 21% of total town area for 2007.

- Revealed a 3% increase in impervious surface area in the Delaware Beach Communities over the 10 year period. The private designated areas within the towns reveals a 2% increase (in comparison to total town area) from 2007 to 2016.
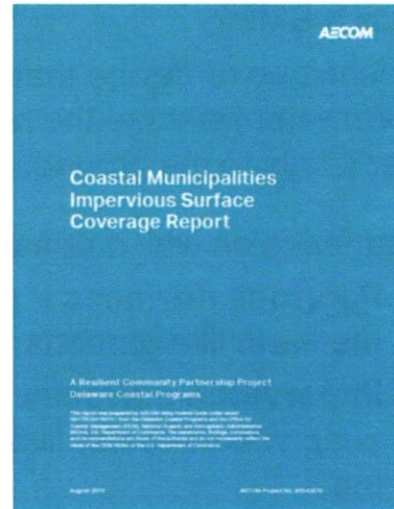
Project Overview

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Coastal Delaware Best
Management Practices
(BMP) Guide
August 2019

AECOM

**Coastal Municipalities
Impervious Surface
Coverage Report**

A Resilient Community Partnership Project
Delaware Coastal Programs

Best Management Practices Guide

AECOM

Community-based plan designed to summarize strategies for reducing existing and future impervious surface coverage and increasing stormwater infiltration in the coastal Delaware communities.

This guide is intended to be used by residents, elected officials, and community members.

Best Management Practices Guide AECOM

What is a BMP?

- A technique or device that captures or treats stormwater runoff. Stormwater refers to the rain water that flows off of different surfaces after it falls to the ground.

The surfaces on which rain water falls are classified into two categories:

1. **Pervious surfaces** – surfaces that *allow stormwater to seep into the earth* like gardens, forests and grass
2. **Impervious surfaces** – surfaces that *don't allow stormwater to seep into the earth* like driveways, roads, sidewalks, and roof tops.

Best Management Practices Guide AECOM

There are three general scenarios upon which BMPs may be placed to manage runoff from:

1. existing developed areas on a voluntary basis
2. small impervious areas being proposed that would not otherwise fall under the third scenario
3. larger (greater than 5,000 sq. ft.) earth disturbance being proposed

Best Management Practices Guide   AECOM

BMP Benefit

- Most of the BMPs included in this guide were chosen for their capability to reduce stormwater runoff since frequent flooding has been an issue in coastal Delaware communities, such as:

  ❖ Runoff Rate Reduction - slows down stormwater runoff or allows it to percolate into the soil to reduce flooding

  ❖ Water Quality - filters storm water to remove pollutants

  ❖ Habitat - creates areas that are beneficial to pollinators, birds, and/or small mammals

  ❖ Aesthetics - has a high approval rating among property owners and enhances the looks of a landscape

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Bioretention

Reduce flooding, erosion, and pollution and enhance groundwater recharge, wildlife habitat, and aesthetics.

Bioretention	Incentive	Regulatory
Rain Garden	X	
Tree Box Filters	X	X
Streetscape Bioretention		X
Large Retention		X
Raised Planter Box	X	

Figure 1: Rehoboth Art League
Soil media, plants, and stones are used to filter stormwater before draining into a ditch system.

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Bioswale

An elongated, linear bioretention facility often found on roadsides within the right-of-way. They can be outfitted with small dams to retain water on steeper slopes.

Bioswale	Incentive	Regulatory
Bioswale		X

Figure 1: The Center for Inland Bays (CIB) worked with the Town of South Bethany to install bioswales in the medians along Coastal Highway (Route 1.)

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Infiltration

Infiltration practices temporarily store stormwater before slowly allowing it to drain into soil.

Infiltration	Incentive	Regulatory
Infiltration Trench		X
Infiltration Basin		X

Figure 1: The Town of Fenwick Island installed an infiltration trench along Bayard Street to filter and store stormwater before draining to the canal.

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Permeable Pavement

Permeable pavements allow stormwater runoff to drain while also filtering pollutants.

Permeable Pavement	Incentive	Regulatory
Permeable Concrete Pavers	X	X
Grid Pavement Systems	X	X
Pervious Concrete	X	X
Pervious Asphalt	X	X

Figure 1: The Delaware CIB's main office located along the Indian River Bay. Their porous ashpalt parking lot helps disperse water during high rain events.

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Impervious Removal

When constrained to implement other BMPs, impervious surfaces can simply be removed and replaced with pervious surface to reduce runoff.

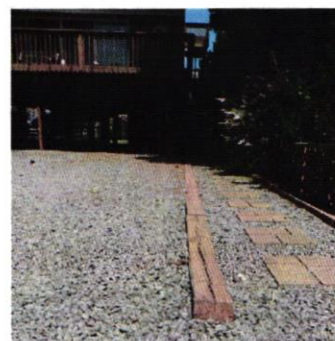| Impervious Surface Removal	Incentive	Regulatory
Impervious Surface Removal	X	

Figure 1: **Paver Pathway**
More and more residents are choosing to use pavers or gravel, which allow infiltration, instead of traditional concrete for driveways and walkways.

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Dry Well

Dry wells collect and store water that can be treated or filtered.

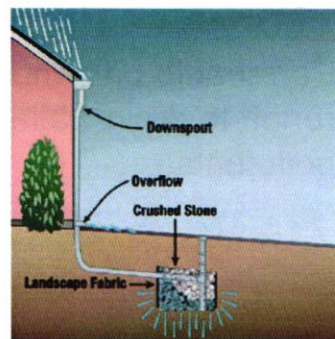| Dry Well	Incentive	Regulatory
Dry Well	X	X

Figure 1: The diagram above demonstrates how a dry well works.

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Rooftop Disconnect

Act of repositioning downspouts so that stormwater flows onto a permeable surface instead of an impermeable surface. It can be achieved by directing runoff onto grass or landscaping.

Rooftop Disconnect	Incentive	Regulatory
Rooftop Disconnect	X	X

Figure 1: Canalfront Inn in Lewes has a system of drainage pipes that convey water from the roof to planted beds around the hotel.

Best Management Practices Guide

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Green Roof

A rooftop garden where plants and engineered growing media are used to treat and store rainwater. Green roofs provide building insulation, which often results in decreased costs for heating and cooling.
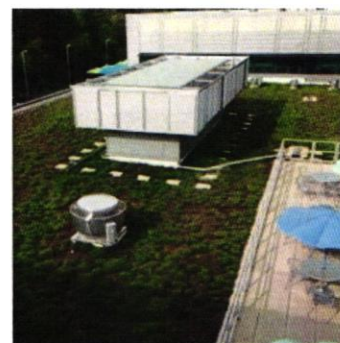
Green Roof	Incentive	Regulatory
Green Roof		X

Figure 1: An example of a green roof installed on a commercial building is pictured above.

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Rainwater Harvesting

Rain barrels and cisterns can be used to store rainwater to be reused for gardening and other non-potable water activities.

Rainwater Harvesting	Incentive	Regulatory
Rain Barrels	X	
Cisterns	X	

Figure 1: A resident of Lewes installed a 2,000-gallon cistern on site.

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Tree Planting

Trees absorb much more water than typical plants; thus they are an effective way to reduce stormwater runoff. Planting large groups of trees together can result in exponentially greater runoff reduction.

Tree Planting	Incentive	Regulatory
Tree Planting	X	

Figure 1: Trees near the Rehoboth Art League's walking path absorb stormwater runoff.

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Conservation Landscaping

Conservation landscaping can be done to reduce stormwater runoff in locations where detaining stormwater is not practical. Gardening with native plants increases habitat, reduces runoff rates, and promotes healthy soils.

Conservation Landscaping	Incentive	Regulatory
Conservation Landscaping	X	

Figure 1: One resident's conservation landscaping along Bayard Street Extension in Fenwick Island.

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Filtration

Filtration practices allow stormwater to percolate into the ground. They require that the underlying soils be permeable enough to drain water from the BMP within 72 hours.

Filtration	Incentive	Regulatory
Surface Sand Filter		X
Underground Sand Filter		X
Organic, Non-Structural Filter		X
Perimeter Sand Filter		X

Figure 1: The above picture features an underground sand filter in a Newark, Delaware municipal parking lot.

Municipal Toolkit KCI TECHNOLOGIES

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Municipal Toolkit
December 2019

Municipal Toolkit

Input - Municipalities

1. Obtain Preferred Public & Private BMP's (AECOM's Report)

2. Obtain Coastal Community Unique Challenges (Matrix of Options)

Worksheets provided for input
Due Thursday, December 12

Municipal Toolkit

Toolkit Development – KCI

1. Identify BMP's considered with each Municipality (private & public)
2. Summarize Coastal Community unique challenges
3. Finalize Coastal Community ordinance matrix
4. Implementation recommendations/next steps
5. Identify funding opportunities

To Do

Municipal Toolkit

Project Presentations

- Rehoboth Beach – Monday, November 4
- Lewes – Monday, November 4
- Henlopen Acres – Friday, November 8
- South Bethany – Friday, November 8
- Dewey Beach – Saturday, November 9
- Bethany Beach – Saturday, November 16
- *Fenwick Island – Friday, December 6*
- Present Draft Report to RCP – December 16, 2019

Questions

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