

Overview

Oak Island's Phase II stormwater permit (NCS000455) became effective March 1, 2007. This 5-year permit requires a Comprehensive Stormwater Management Program (also known as a stormwater plan) that details the management and specific progress of six major areas (see below). **The tasks and sub-tasks that should be accomplished in the first year of the permit are in boldface text.**

1. **public education and outreach on stormwater impact**
 - **identify target pollutants and target pollutant sources**
 - **identify target audiences**
 - **informational website**
 - develop and distribute public education materials to identified user groups
 - media campaign
 - establish a hotline or help line
 - **establish a public education and outreach program within 12 months of the permit being issued**
2. public involvement and participation
 - **administer a public involvement program**
 - allow public an opportunity to review and comment on the stormwater plan
 - **organize a volunteer community involvement program**
 - **establish a mechanism for public involvement**
 - establish a hotline or help line
3. illicit discharge detection and elimination
 - develop/implement illicit discharge detection & elimination program
 - establish and maintain appropriate legal authorities
 - develop a storm sewer system base map and inventory of major outfall
 - inspection/detection program to detect dry weather flows at MS4 outfalls
 - employee training
 - provide public education
 - establish a public reporting mechanism
 - establish procedures to identify and eliminate failed septic systems and sanitary sewer overflows
4. construction site runoff control
 - establish a post-construction stormwater management program
 - establish strategies which include BMPs appropriate for the MS4
 - establish a program under the post-construction minimum measures to control the sources of fecal Coliform to the maximum extent possible
 - city code, permitting, regulations, easement, and/or deed restrictions and protective covenants are consistent with approved stormwater plans
 - operation and maintenance plan
 - setbacks for built upon areas
5. post-construction stormwater management in new development and redevelopment
 - must comply with NC State regulations regarding low density and high density projects in any of the following areas: Water Supply Watershed I; Watershed II; Watershed III; Watershed IV; Freshwater High Quality Waters; Freshwater Outstanding Resource Waters; Neuse River Basin Nutrient Sensitive Waters; Tar-Pamlico River Basin Nutrient Sensitive Waters; and Randleman Lake Water Supply Watershed Nutrient Management Strategy.
6. pollution prevention and good housekeeping for municipal operations
 - develop an operation and maintenance program
 - develop site pollution prevention plan for municipal facilities
 - inspection and evaluation of facilities, operations, and the MS4 system and associated structural BMPs
 - conduct staff training
 - spill response team and procedures put in place
 - prevent or minimize contamination of SW runoff from all areas used for vehicle and equipment cleaning

1. Public Education & Outreach Programs Completed in the First Year

Within the first year of the permit, the Town of Oak Island:

- **Established a website (www.oakislandcleanwater.org)**
 - This provides a clearinghouse of information on Best Management Practices (BMPs), town ordinances, homeowner projects, local water quality monitoring reports, and links to technical information.
- **Held a rain barrel workshop (Feb 21st)**
 - There were presentations by John Michaux, Director, Oak Island Stormwater; Al Hight, Director, Brunswick County office of the NC Cooperative Extension Service; Mamie Caison, Director, Brunswick County Soil & Water Conservation District; Shelly Miler, Director, NC Community Conservation Assistance Program; and Bob Zeid, Chair, Stormwater Advisory Board. Copies of all presentations are on the website
 - More than 70 residents attended from surrounding areas; it was taped and will be aired on Channel 8.
- **Riparian Buffer Restoration Program and Rain Gardens Initiative**
 - Met with Brunswick County Soil & Water Conservation District to review areas on the island that would be ideal demonstration spots for rain gardens and restoring riparian buffers at street ends
 - Funding for projects will be available through the NC Community Conservation Assistance Program (CCAP).
- **Water Quality Monitoring Initiative**
 - Met with officials from UNCW about assistance with water quality testing of particular areas around Davis Canal and ICW; may be funding available from NC DWQ “319” grants. There are two types of 319 grants: “base” grants for non-point source (NPS) and “incremental” grants for restoration. The most available money is on the incremental side for restoration. Both types of grants require a 40% match from the municipality. See http://h2o.enr.state.nc.us/nps/Section_319_Grant_Program.htm for more information.
- **June 5, 2007 Presentation at Planning Board Meeting**
 - The Planning Board discussed tree & vegetation ordinances. Bob Zeid presented an overview of the stormwater system and how critical this was to an optimal plan. Other proposals were discussed as well to allow for a harmonized planning and stormwater approach.
- **Enviroscape™ Educational Program**
 - The town purchased Enviroscape™, which is an educational tool used to demonstrate erosion principles. John Michaux gave demonstrations to the entire 5th grade level science & geography classes at Southport Elementary School.
- **Oak Island Cleanwater Logo Contest**
 - Started a contest to see who can design the logo for the Oak Island Cleanwater website and educational materials. Contest rules on the website. Designs are due by May 1, 2008.

A detailed list of activities is provided in the table, beginning on the follow page.

No.	BMP	Measurable Goal	Start Date	Frequency	Progress Measurements	Effectiveness Measurements
PE-1	Identify target pollutants and sources	<p>Identify the target pollutant and target pollutant sources the education program is designed to address and why they are an issue.</p> <hr/> <p><i>Sediment is a chief pollutant from construction runoff and deterioration of riparian buffers. Pesticides, herbicides, and fertilizers are pollutants stemming from lawn care and golf course maintenance. Coliform bacteria are a pollutant stemming from animal waste.</i></p>	Year 1	1x	<p>Educate homeowners about controlling runoff quantity and improving water quality of runoff.</p> <p>Initiate a water quality monitoring project with UNCW</p> <p>Initiate a riparian buffer restoration program along Davis Canal and the ICW</p> <p>Coordinate with Development Services to begin formal program of contractor/construction BMPs.</p>	<p>Rain barrel workshop (2/21/08) detailed the importance of reducing water runoff as well as improving water quality. Over 60 rain barrels purchased by local residents; Brunswick Soil & Water Conservation District also had orders for rain barrels.</p> <p>Website (up Dec 2007) details organic measures to reduce use of fertilizers as well as establish rain gardens. Pick up pet poop,</p> <p>Refrigerator magnets with top 10 BMP passed out at rain barrel workshop.</p> <p>Coordinate water quality monitoring of Davis Canal and ICW with UNCW; post data on website to give residents an idea of progress (or deterioration) in water quality. To be completed in Year 2 of the permit.</p> <p>Contractor education outlined and under "construction" with Development Services. To be completed in Year 2 of the permit.</p> <p>Riparian buffer restoration project: identify critical street-ends and inland town-owned property for rain garden projects; coordinate with NC Cooperative Extension Service and Brunswick County Soil & Water Conservation District (& CCAP funding).</p>

No.	BMP	Measurable Goal	Start Date	Frequency	Progress Measurements	Effectiveness Measurements
PE-2	Identify target audiences	<p>Identify the target audiences likely to have significant storm water impacts and why they were selected.</p> <hr/> <p>Single-family homes comprise the majority of structures (and impervious surface) on the island. Homeowners who reduce water runoff as well as improve water quality of the runoff will be a significant improvement.</p> <p>The construction & development activity on the island and mainland will increase when island-wide sewer is available. Improved practices in construction BMPs, post-construction runoff, tree & vegetation buffers, and setting a maximum footprint on structure size, etc. will have a significant impact.</p>	Year 1	1x	<p>Residential Community</p> <p>Construction & Development Communities</p>	<p>Rain barrel workshop (2/21/08) attended by more than 70 residents; gave overview of stormwater program that detailed major pollutants and needed controls. Workshop was taped for Channel 8.</p> <p>Website (up Dec 2007) details homeowners' projects, BMPs, and low impact development (LID)</p> <p>Newspaper articles in <i>State Port Pilot</i> and <i>Wilmington Star News</i> detailed these aspects</p> <p>Contractor education outlined in first year but documents are still under "construction" with Development Services. Plans are to complete this in Year 2.</p> <p>Riparian buffer restoration project: identify critical street-ends and inland town-owned property for rain garden projects; coordinate with NC Cooperative Extension Service and Brunswick County Soil & Water Conservation District (& CCAP funding).</p>

No.	BMP	Measurable Goal	Start Date	Frequency	Progress Measurements	Effectiveness Measurements
PE-3	Web Site	Promote and maintain website A website was created and launched in December 2007 (www.oakislandcleanwater.org). The website address is included on all stormwater program materials.	Year 1	Ongoing	Whether or not the website was maintained, promoted and updated.	The website was launched in December 2007. It is being updated with presentations from recent programs. It will be revised to include a comments page.
		Include a comment form on the website	Year 2	Ongoing	No. of comments received from the public on website annually	% of comments that result in a response from the Town.
PE-4	Brochures	Distribute brochures (e.g., Construction Site Runoff Control, Owner's & Renter's Manual, etc.) to target audiences Existing town publications on BMPs and owners'/renter's guide to stormwater, etc. were scanned and put on the town website. Plans for Year 2 include a construction BMP guide that will be made available through Development Services as well as posted on the town website.	Year 2	Ongoing	No. of brochures and % distribution to the home owners/business populations	Development Services will note whether or not the contractors are implementing the measures discussed in the brochure during regular site inspections. No. and % of illicit discharges contributable to residents.

PE-5	Newspaper Advertising	<p>Purchase newspaper ads regarding stormwater and residential BMPs</p> <hr/> <p>Numerous articles were written about the workshops and presentations because the Stormwater Advisory Board and Director of Stormwater Management kept the press apprised of Oak Island activities.</p>	Year 1	Ongoing	No. of ads run, newspapers used, targeted pollutants	<p>The <i>State Port Pilot</i> ran at least three public service announcements prior to the rain barrel workshop as well as an article on it. The <i>Wilmington Star News</i> also ran an article on this event.</p>
PE-6	Community Cable Access Television	<p>Air videos/ads about stormwater, watershed ecology, Low Impact Development and other BMPs. Programs to be run weekly during primetime.</p> <hr/> <p>Channel 8 will provided daily bulletins of the website address and key reminders of BMPs.</p>	Year 1	Ongoing	No. of videos/ads run and length of airtime	<p>Channel 8 runs daily notices about the OI stormwater website. The rain barrel workshop was taped and will be aired on there as well.</p>

2. Stormwater Advisory Board Recommended Changes in Ordinances & Town Policy

In order for the stormwater plan to be optimized, there needs to be better integration of low impact development (LID) principles across other areas of town policy, development practices, and construction. Some recommendations to consider include:

1. Clearing and/or bush-hogging of street ends should be stopped. Need to create a no-mow zone that applies to both town and residents.
2. Revise building codes to require gutters and downspouts on new construction. Leave contractor the option of using rain barrels, cisterns, or infiltration trenches for capture.
3. Ban clear cutting lots from property line to property line for both residential and commercial. A vegetative buffer in the setback areas should be preserved except for areas needed to access the property. Establish a heritage tree protection program that ensures old growth is not removed without a permit or prior review
4. Review commercial parking requirements to allow a reduced number of parking spaces in lieu of more vegetative buffering and/or incorporating vegetation in the parking areas. This would not only serve the aesthetic demands of the community but, more importantly, help meet the requirements of the stormwater plan for the site. However, the vegetative areas must be large enough to be effective in aiding stormwater. The size of the vegetative areas needed should be determined by the capacity required for that design component of the stormwater site plan.
5. Residential: cap the size footprint of the house and driveway based on their combined total of impervious surface as (1) a percentage of the entire lot or (2) a percentage of the buildable area
6. Commercial: establish vegetative buffers around the property line within the setback that cannot be covered by driveways or other impervious surfaces; establish a cap on the total percentage of impervious surface allowed
7. Review of materials and designs typically used for driveways and parking areas. Alternative construction methods may allow grass strips or pervious materials inserted between concrete or paved runners. May also consider reducing the width of driveways and parking areas.
8. Apply a standard to development of lots less than one acre by requiring a stormwater plan be implemented for properties that exceed a trigger (e.g., 50% impervious surface)
9. Use of pervious surfaces for parking lots, pedestrian-friendly areas, and sidewalks in commercial district
10. Promote retrofits of commercial district to decrease impervious surface area
11. Promote Low Impact Development (LID) techniques by having significantly lower impact fees for projects that include significant stormwater management mitigation in their plans. Conversely, charge more for developments or new construction that does not include these features.
12. Establish a group of citizens that can work in conjunction with town employees to help consult and establish bowl gardens, bioretention ponds, artificial wetlands, etc. for other neighbors and projects planned by the town. This will be an excellent way to get information to citizens and build on a grassroots foundation of knowledge for applications. The town may want to subsidize costs of plants or materials or labor in order to affect a wider acceptance of the program; can help underwrite this with grant funding.
13. Establish an advisory group for citizens living directly on the water so that they can receive additional materials regarding keeping their riparian buffer healthy, not using pesticides/herbicides, or other practices that could have a dramatic impact on water quality. For example, could compile a list of commonly used pesticides and herbicides that should not be used around water. May also wish to publish on town website if appropriate.
14. Harmonize the town's stormwater ordinance with the state model ordinance. Harmonize the town's stormwater BMPs with the state's model BMP.
15. Prior to annexing property there should be a thorough review of stormwater issues for that property or area in order to avoid taking on the expense of having to address existing non-compliance (e.g., South Harbour).
16. Create financial incentives for homeowners to increase their stormwater management practices (e.g., contests, waive stormwater fees for a year, etc.)

3. Implications of No Action

The consequences of not improving stormwater measures could include:

- further deterioration of watershed resulting in decreased shellfish beds, algal blooms, fish kills, and beach closings
- increased regulatory scrutiny by CAMA, DENR, DWQ for any development subject to Phase II requirements
- state-mandated monitoring of Section 303(d) waters for certain pollutants (e.g., total maximum daily load [TMDL])¹. The watershed surrounding Oak Island is already designated as Section 303(d).
- costs associated with cleanup, mitigation, or other engineered measures to correct water quality issues such as piping.

If the current development practices continue unchanged the water quality could degrade to the point that the state will require Oak Island to treat the stormwater prior to discharge. This would require the construction of a facility on the mainland and conveyance (piping) of the stormwater to a treatment plant. The costs to purchase land, design and construct the facility, as well as operate it in combination with extensive monitoring could be comparable to (or exceed) the sewer infrastructure costs.

¹ TMDL or **Total Maximum Daily Load** is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and non-point sources. The calculation must include a margin of safety to ensure that the water body can be used for the purposes the State has designated. The calculation must also account for seasonal variation in water quality. A TMDL provides a detailed water quality assessment that provides the scientific foundation for an implementation plan. An implementation plan outlines the steps necessary to reduce pollutant loads in a certain body of water to restore and maintain human uses or aquatic life. The development of TMDLs and implementation plans are often the best method to improve water quality.

Section 303(d)(1)(C) of the Clean Water Act and the U.S. Environmental Protection Agency's (EPA) implementing regulations (40 CFR Part 130) require the establishment of a Total Maximum Daily Load (TMDL) for the achievement of state water quality standards when a water body is water quality-limited. A TMDL identifies the degree of pollution control needed to maintain compliance with standards and includes an appropriate margin of safety. The TMDL focuses on reducing the pollutant inputs to a level (or "load") that fully supports the designated uses of a given water body. The mechanisms used to address water quality problems after the TMDL is developed can include a combination of best management practices and/or effluent limits and monitoring required through NPDES permits.