

## **APPENDIX K**



## TETRA TECH

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### MEMORANDUM

**To:** David Hillegas (Town of Bethel)

**From:** Eugenia Hart and Kimberly Brewer

**Cc:** Jennifer Walls (DNREC); Bryan Hall (DNREC); Jennifer Volk (DNREC)

**Date:** January 24, 2012

**Subject:** Review of the Town of Bethel's Local Land Use Ordinances to Identify Barriers to Implementing the Chesapeake Bay Watershed Implementation Plan

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## 1 Introduction

Delaware has developed a Watershed Implementation Plan (WIP) to accompany the Chesapeake Bay nutrient and sediment total maximum daily loads (TMDLs). The WIP lays out plans for addressing existing pollutant load to the Bay as well as new pollutant loads from future land use changes. Delaware's Department of Natural Resources and Environmental Control (DNREC) has tasked Tetra Tech with assisting local Delaware municipalities in the Chesapeake Bay watershed to conduct a review of existing local municipal ordinances with regulations pertaining to new development.

The goal of the ordinance review is to provide a service to local governments in Delaware by reviewing existing land use ordinances to look for barriers to implementing the Chesapeake Bay WIP as well as identify potential opportunities for improving communities and allowing more techniques to be used to help property owners address nutrient and sediment loads from new developments. These include techniques such as green infrastructure, low impact development, conservation design, and performance standards that can allow flexibility. There are often unintended barriers to these techniques in local ordinances.

This memorandum presents the preliminary results of Tetra Tech's review of these local ordinances for the town of Bethel, DE. Note that recommendations for consideration of code revisions are not mandatory. They are intended only to provide more flexibility and effectiveness in meeting resource protection goals and regulations.

## 2 Approach

In August 2011 Tetra Tech contacted the Town of Bethel to obtain the most recent versions of the following types of ordinances, if available:

- Subdivision ordinance
- Zoning ordinance

- Sedimentation and erosion control ordinance or regulations
- Onsite wastewater ordinance or regulations

Bethel staff provided a draft subdivision ordinance and their existing zoning ordinance for review. The Town's Subdivision Ordinance requires applicants to adhere to the Sussex County Conservation District's (SCD) stormwater, sedimentation, and erosion control standards, by reference. Note that SCD does not have their own stormwater, sedimentation, and erosion control standards, but adheres to Delaware's State Sediment and Stormwater Regulations (see section 3.1 below). Bethel does not have specific on-site wastewater regulations.

Once the ordinances were obtained, they were reviewed based on the Ordinance Review Checklist developed by Tetra Tech (Appendix A). The checklist contains items related to the following seven goals:

1. Minimize Effective or Connected Impervious Area
2. Preserve and Enhance the Hydrologic Function of Unpaved Areas
3. Harvest Rainwater
4. Allow and Encourage Multi-Use Stormwater Controls
5. Manage Stormwater to Meet WIP and DNREC Regulations
6. Manage Construction Site Stormwater to Meet WIP and DNREC Regulations
7. Manage On-Site Wastewater Systems to Meet WIP and DNREC Regulations

The Town of Bethel staff reviewed the draft memo, and recommended revisions and corrections as needed.

Barriers to each of the items on the Checklist are summarized below in Section 3 along with potential solutions to overcome these barriers.

### **3 Summary of Barriers and Potential Solutions for Implementation**

This section of the memo provides a summary of the barriers identified for each of the seven goals indicated on the Ordinance Review Checklist (Appendix A). Following the summary of each barrier, potential solutions are provided.

#### **3.1 GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

##### **Mitigation of Runoff from Effective Impervious Area**

DNREC's final draft stormwater regulations (DNREC 2011) require that local regulations and standards mitigate stormwater runoff such that there is no direct contribution of stormwater runoff from a development. Bethel does not have an ordinance that directly addresses this issue; however, Bethel currently follows the provisions and requirements contained in the Sussex Conservation District's Sediment Control and Stormwater Management Program. SCD follows the State of Delaware's Sediment and Stormwater Regulations as a delegated agency. It is suggested that Bethel reference State of Delaware Sediment and Stormwater Regulations in their subdivision ordinance.

##### **Cluster Development**

Bethel's Draft Subdivision and Land Development Project Ordinance Article 2, § 2.1 defines clustering as "a development technique that concentrates buildings on a portion of the site to allow the remaining lands to be used for open space, recreation and preserve natural resources." However, there is no explicit allowance of this cluster development technique in the subdivision or zoning ordinance, and open space

design subdivisions are expressly prohibited from altering minimum lot sizes stipulated in the zoning ordinance. Some communities provide cluster development as a conditional use or special exemption for various zoning districts, and allow minimum lot sizes to be reduced (with the overall lot yield remaining the same).

### **Flexibility in Locating BMP Techniques On-site**

The location of low impact development (LID) best management practices (BMPs) in street and parking areas (e.g., parking medians, grass strips between sidewalk and curb, swales, etc.) is for the most part not explicitly prohibited or allowed in the ordinance. Lack of certainty about approval of these techniques can pose a barrier to implementation. It appears that height and setback limitations for landscaping at intersections would directly prohibit the use of LID techniques such as curb bumpouts/extensions with bioretention or bioswales.

### **Incentives for Infill Development and Redevelopment of Existing Areas over “Greenfield” Development**

DNREC’s draft sediment and stormwater regulations require that local regulations and standards impose less stringent runoff reduction requirements for proposed development in existing developed areas, thus providing incentives to develop in these areas rather than undeveloped or “greenfield” areas. Local zoning and subdivision requirements will need to be amended accordingly.

## **3.2 GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

### **Encouraging or Requiring Stream Buffers**

The Phase I WIP calls for local regulations and standards that encourage or require buffers of 60 feet for secondary waterbodies and 100 feet for primary waterbodies for new development proposals. These buffers can be reduced if combined with other pollution reduction actions. The Town’s current zoning and draft subdivision ordinances do not require such riparian buffers. However, the site analysis process in the Subdivision Ordinance does require consideration of stream protection. Local zoning and subdivision requirements would need to be amended if the Town desires more certainty regarding the preservation of streamside areas in natural vegetation.

## **3.3 GOAL #3: HARVEST RAINWATER**

### **Explicitly Allowing or Encouraging Rainwater Harvest**

Rainwater harvesting is not explicitly prohibited or allowed in the ordinances. However, lack of certainty about approval of these techniques can pose a barrier to implementation.

## **3.4 GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

### **Flexibility in Locating LID Techniques in Designated Landscape and Open Space Areas**

It appears that LID techniques such as constructed wetlands, bioretention, bioswales, etc. are not allowed or prohibited in required landscape and open space areas. Where these BMPs can be designed to support landscape and open space functions, flexibility should be provided in locating these BMPs where they can be most effective in managing water quality, drainage, and flooding impacts.

### **Credit for LID Techniques that Provide Landscape and Natural Open Space Functions**

LID BMPs are not given credit by the Town as part of the required open space area or for required landscaping area. Explicitly providing such credit would provide an extra incentive for developers to use LID techniques.

### **Landscaping Requirements**

This size of trees and plants required in the final landscape plan and the street and shade tree planting requirements (e.g., size at planting and maturity and spacing) may pose barriers to the use of LID BMPs. An exemption should be made for LID techniques that can also function as landscape area and street trees.

## **3.5 GOAL #5: MANAGE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

### **Meeting New DNREC Stormwater Regulations**

DNREC's final draft sediment and stormwater regulations require new minimum water quality, channel protection, and conveyance and flood control requirements for new development and redevelopment. As stated earlier, it is suggested that Bethel reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance.

### **Off-site Mitigation**

There are no provisions in the ordinance for off-site mitigation when on-site management does not meet the performance criteria. DNREC is in the final phases of developing an offset tool called the *Nutrient and Sediment Loading Assessment Protocol*. The tool allows developers to determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. This is a useful tool in determining whether or not a proposed development meets the TMDL or will need additional on-site management or off-site mitigation. Bethel may want to consider requiring developers to use this tool during the planning process before presenting the site plan to the planning and zoning commission for review.

## **3.6 GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

### **Meeting New DNREC Sediment and Erosion Control Regulations**

DNREC's final draft sediment and stormwater regulations require construction site stormwater management controls to be put in place for all construction activities exceeding 5,000 square feet of disturbance. As stated earlier, it is suggested that Bethel reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance.

## **3.7 GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WIP AND DNREC REGULATIONS**

Having no improved water or sewer infrastructure; the Town relies on independent wells and stand alone septic systems to meet the needs of local residents. The Town of Bethel's Comprehensive Plan (Bethel Planning Commission 2008) recommends that Bethel develop a formal relationship with Sussex County to evaluate the impact of County Sewer Service. It is recommended that Bethel's town leadership and

Sussex County officials discuss the County's plans for future expansion of sewer service to the Bethel area. At a minimum, the results of this dialogue could be a Memorandum of Understanding describing the policy for providing and extending sewer service to properties in and around Bethel at a pace acceptable to the community as a whole.

It is suggested that, in addition to exploring central sewer options, the Town of Bethel should encourage community systems, and/or require advanced treatment for all new and replacement systems. In the absence of a central sewer system, the Town of Bethel should also confirm that a septic system can be placed on a parcel before it is subdivided and recorded; thereby avoiding the placement of septic systems on parcels that are not appropriate for septic systems.

## 4 Accounting and Tracking of BMP Implementation

Bethel does not currently have a tracking and accounting system for implemented BMPs and does not plan on tracking BMPs in the future. Bethel has a minimal town area (about 300 acres) that contains a wharf, park, and town building. The surrounding area is all farmland. Bethel does not foresee the need to track future BMP implementation due to the small physical nature of the town.

It is suggested that DNREC provide the Town of Bethel with a list of BMPs approved for use in the Chesapeake Bay watershed TMDL model and have them notify DNREC if any of these types of BMPs are installed in the town so they can be appropriately credited in the Bay model.

## 5 Conclusions

Review of Bethel's subdivision and zoning ordinances result in several key findings. The first finding is that the Town's Bethel's draft Subdivision Ordinance has a number of strong features, including but not limited to

- A required site analysis that starts with open space/conservation design.
- Conservation and open space standards that require protection of existing woodlands, minimize grading and building on moderate to steeply sloped areas; and protect existing vegetation during construction.

There are some direct barriers to the use of LID techniques, such as allowances in required landscape and open space areas. In other cases, there are barriers of omission: by not expressly allowing the LID technique or providing for exemptions, the ordinances generate uncertainty regarding approval and thus unintentionally provide disincentives for some LID practices.

The Town does not have an ordinance that directly addresses sediment and stormwater management. Rather, Bethel's ordinances require applicants to follow the provisions and requirements contained in the Sussex Conservation District's Sediment Control and Stormwater Management Program and Handbook. Considering the new federal stormwater regulations due out in late 2011 and new state stormwater regulations due in 2012, it is suggested that the Town of Bethel reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance, and the agency implementing the regulations (DNREC or its Delegated Agency).

Finally, Bethel might want to consider adopting DNREC's *Nutrient and Sediment Loading Assessment Protocol* as part of their subdivision ordinance. The tool can help developers determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. The tool can help

to quantify the number and types of BMPs necessary on a new development site to meet the TMDL requirements.

## References

DNREC (Department of Natural Resources and Environmental Control). 2011. *Final Draft Sediment and Stormwater Regulations*. June 2011.

Delaware Department of Transportation (DelDOT). 2010. *Standards and Regulations for Subdivision Streets and State Highway Access*. Dover, DE.

Delaware State Fire Marshall. 2009. *Delaware State Fire Prevention Regulations*

Sussex Conservation District. 2011. *Sediment and Stormwater Management Checklist*  
<http://sussexconservation.org/> Accessed August 2011.

Town of Bethel Draft Subdivision and Land Development Project Ordinance

Town of Bethel Zoning Ordinance

## Appendices

Appendix A. Ordinance Review Checklist

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# Local Development Ordinance Tools/Techniques for Implementing Delaware's Chesapeake Bay Watershed Implementation Plan & DNREC Final Draft Sediment and Stormwater Regulations

## Town of Bethel Ordinance Review Checklist

### Town of Bethel Ordinances Reviewed

Subdivision and Land Development Ordinance (Draft)

Zoning Ordinance

Sussex Conservation District Sediment and Stormwater Management Checklist

DeIDOT Standards and Regulations for Subdivision Streets and State Highway Access

Delaware State Fire Prevention Regulations

*[Note: The Ordinance Checklist that follows is based on Delaware's Phase I Chesapeake Bay Watershed Implementation Plan (November 2010); Final Draft Sediment and Stormwater Regulations (DNREC, June 2011); Protecting Water Quality with Smart Growth Strategies and Natural Stormwater Management in Sussex County (January, 2009); Better Site Design: A Handbook for Changing Development Rules in Your Community (CWP, 1998); Low-Impact Development Design Strategies, An Integrated Approach (USEPA, 2000); and Tetra Tech's review of numerous local ordinances to identify opportunities and barriers to green infrastructure and low impact development techniques.]*

**Degree of Importance Key to Symbols:**

- Essential
- ◐ Very important
- Important

**GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

- Objective: Minimize impervious area associated with streets.
- Objective: Minimize impervious area associated with parking.
- Objective: Minimize impervious area associated with driveways and sidewalks.
- Objective: Clustering development.
- Objective: Incorporate sustainable hydrology practices into urban redevelopment.

GOAL #1 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Overall Effective Impervious Area</b>			
<ul style="list-style-type: none"> <li>• Is impervious area required to be controlled such that there is no direct contribution of stormwater runoff (i.e., the equivalent of 0% effective impervious area)?</li> </ul>	●	√	<p>Note: DNREC's Final Draft stormwater regulations require that after runoff reduction practices have been implemented on disturbed area, the site's impervious area shall not directly contribute stormwater runoff during a rain event that has an 99% annual probability of occurring. See Goal # 5 performance criteria.</p> <p>Ordinance Findings: No</p>
<b>Streets</b>			
<ul style="list-style-type: none"> <li>• For residential development, are the street pavement widths allowed to be between 18 to 22 feet, with curb pullouts for passing of large vehicles?</li> </ul>	●		<p>Ordinance Findings: Draft Subdivision and Land Development project Article 7 § 7.2 (A) All new streets shall be public streets dedicated to DelDOT and built to DelDOT standards.</p> <p>DelDOT findings: No. Figures 5-23 and 5-24 in Standards and regs show 24 ft – 36 ft for subdivision street with curb and 22 ft – 32 ft for subdivision street without curb. Width depends on street type.</p> <p>Section 3.6.7 allows reduced right-of-ways. Minimum width shall be 28 ft; however,</p>

			turnarounds must be provided at the end of the streets to permit maneuvering of service and emergency vehicles (see Figure 5-4 of Standards and Regs).
<ul style="list-style-type: none"> <li>• Are travel lanes allowed to be from 12 to 10 feet (or less), with curb pullouts for passing of large vehicles?</li> </ul>	●		<p>Ordinance Findings: Draft Subdivision and Land Development project Article 7 § 7.2 (A) All new streets shall be public streets dedicated to DelDOT and built to DelDOT standards.</p> <p>DelDOT: Yes. Figures 5-23 and 2-24 show travel lanes of 11 and 12 ft for Type I subdivision street with and without curbs.</p>
<ul style="list-style-type: none"> <li>• Are curb bumpouts/extensions allowed near intersections and mid-block for traffic-calming and bioretention opportunities?</li> </ul>	◐		<p>Ordinance Findings: Draft Subdivision and Land Development project Article 7 § 7.2 (A) All new streets shall be public streets dedicated to DelDOT and built to DelDOT standards.</p> <p>DelDOT: Yes. See Chapter III of Traffic Calming Manual. Section 5.1.7 of Standards and Regs refers to DelDOT Traffic Calming Design Manual for detailed guidance.</p>
<ul style="list-style-type: none"> <li>• Is pervious paving allowed for on-street parking and alleyways?</li> </ul>	○		<p>Ordinance Findings: Uncertain Draft Subdivision and Land Development project Article 7 § 7.2 (A) All new streets shall be public streets dedicated to DelDOT and built to DelDOT standards.</p> <p>DelDOT: No. 5.6.1: All subdivision streets and entrances shall be paved with a hot-mix asphalt or Portland cement concrete surface.</p>
<ul style="list-style-type: none"> <li>• Are grass swales or bioretention swales allowed instead of curb and gutter or with curb cuts (where slopes allow)?</li> </ul>	◐		<p>Ordinance Findings: Not expressly allowed or prohibited.</p> <p>DelDOT: Yes. See section 5.5.2 of Standards and Regs</p>
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, is the radius required to be 35 feet or less?</li> </ul>	○		<p>Ordinance Findings: Uncertain Draft Subdivision and Land Development project Article 7</p>

			<p>§ 7.2 (A) All new streets shall be public streets dedicated to DelDOT and built to DelDOT standards.</p> <p>DelDOT: Figure 5-3 in Standards and Regs: Radius to outside edge of pavement is 38 ft/46 ft with center islands</p> <p>2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in length.</p>
<ul style="list-style-type: none"> <li>If there are cul-de-sacs, are landscaped islands or bioretention islands allowed or encouraged?</li> </ul>	○		<p>Ordinance Findings: Not expressly allowed or prohibited.</p> <p>DelDOT: Yes. See Figure 5-3 of Standards and Regs</p> <p>2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in length.</p>
<ul style="list-style-type: none"> <li>Are site designs required to promote the most efficient street layout to reduce overall street length?</li> </ul>	○		<p>Ordinance Findings: No</p>
<b>Parking</b>			
<ul style="list-style-type: none"> <li>Is the minimum stall width for a standard parking space 9 ft. or less?</li> </ul>	●		<p>Ordinance Findings: Not addressed in ordinance</p>
<ul style="list-style-type: none"> <li>Are parking stall lengths allowed to be 15 ft.?</li> </ul>	●		<p>Ordinance Findings: Not addressed in ordinance</p>
<ul style="list-style-type: none"> <li>Are parking lot drive aisles allowed to be 22 ft.?</li> </ul>	◐		<p>Ordinance Findings: Not addressed in ordinance</p>
<ul style="list-style-type: none"> <li>Are bioretention cells allowed in parking medians?</li> </ul>	●		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>
<ul style="list-style-type: none"> <li>Are consolidated travel lanes and on-street parking allowed to create space for bioretention?</li> </ul>	○		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>
<ul style="list-style-type: none"> <li>Are pervious surfaces such as paver stones, porous pavement, or grass pavers allowed for on-street</li> </ul>	◐		<p>Ordinance Findings: Uncertain</p> <p>Draft Subdivision and Land Development project Article 7 § 7.2 (A) All new streets shall</p>

parking?			be public streets dedicated to DelDOT and built to DelDOT standards.  DelDOT: No. 5.6.1: All subdivision streets and entrances shall be paved with a hot-mix asphalt or Portland cement concrete surface.
• For office buildings, is the required parking ratio 3.0 spaces per 1,000 sq.ft. of gross floor area or less?	<input checked="" type="radio"/>		Ordinance Findings: Not addressed in ordinance
• For commercial centers, is the required parking ratio 2 to 4.5 spaces per 1,000 sq.ft. of gross floor area or less?	<input checked="" type="radio"/>		Ordinance Findings: No Zoning Ordinance § 5B 1 space per 200 sq.ft.
• Are proposed developments allowed to take advantage of opportunities for shared parking?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• Are proposed developments allowed to have parking stalls under the second floor podium?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<b>Driveways/Sidewalks</b>			
• Are driveway standards 9 feet or less in width?	<input checked="" type="radio"/>		Ordinance Findings: Draft Subdivision and Land Development project Article 7 § 7.2 (A) All new streets shall be public streets dedicated to DelDOT and built to DelDOT standards. DelDOT does not regulate driveway widths
• Are shared driveways allowed?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• If sidewalks are required, are they required to be designed to the narrowest allowable width (e.g, 4 ft.)?	<input type="radio"/>		Ordinance Findings: Not addressed in ordinance  DelDOT: No, minimum width of 5 ft required (5.1.5.1)
• Are sidewalks allowed to be on one side of the street only?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.

<b>Clustering Development</b>			
<ul style="list-style-type: none"> <li>• Is redevelopment encouraged in lieu of greenfield development through site performance standards?</li> </ul>	●	√	<p>Note: DNREC’s Final Draft stormwater regulations recognize the benefit of redevelopment, and have less stringent performance standards for proposed development in existing developed areas. See Goal # 5 performance criteria.</p> <p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Is Conservation or Open Space Design an option?</li> </ul>	●		<p>Ordinance Findings: Yes</p> <p>Draft Subdivision and Land Development Project Ordinance Article 4, § 4 (3) Design Process for Major Subdivisions requires a conservation and open space design process.</p>
<ul style="list-style-type: none"> <li>• To encourage clustering and open space design, are setbacks minimized (e.g., for residential lots that are ½-acre or less in size, is the front set back 20 feet or less, the rear setback 25 feet or less, and the side setback 8 feet or less?)</li> </ul>	●		<p>Ordinance Findings: Yes</p> <p>Zoning Ordinance, § 5 allows for minimal setbacks. However, note that no district allows a minimum lot area of less than ¾ acre.</p> <p>Draft Subdivision and Land Development Project Ordinance Article 4, § 4 (3) stipulates that any lots lines should be drawn according to density and dimensional requirements in the Zoning Ordinance. Note that this could pose a barrier to clustering to preserve open space</p> <p>Draft Subdivision and Land Development Project Ordinance Article 2, § 2.1 definition of clustering is “a development technique that concentrates buildings on a portion of the site to allow the remaining lands to be used for open space, recreation and preserve natural resources. However, there is no explicit allowance of cluster development in the subdivision or zoning ordinance.</p>

<ul style="list-style-type: none"> <li>• Are site designs required to have development focused on areas of lesser slopes and farther from watercourses?</li> </ul>	<p style="text-align: center;">●</p>		<p>Ordinance Findings: Yes                  Draft Subdivision and Land Development Project Ordinance Article 4, § 4 (3) Design Process for Major Subdivisions requires a conservation and open space design process whereby moderate to steep slopes and riparian buffers are to be considered part of the required 30% open space.</p>
<ul style="list-style-type: none"> <li>• Are policies effective in encouraging higher density development to be centered around transportation corridors?</li> </ul>	<p style="text-align: center;">○</p>		<p>Note that it is important for towns to allow density bonuses for protecting certain features, preserving open space, and limiting sprawl.                  Ordinance Findings: No</p>

**GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

Objective: Minimize building footprint/envelope area.

Objective: Preserve topsoil structure.

Objective: Preserve sensitive wetlands.

Objective: Preserve sensitive soils.

Objective: Preserve sensitive stream buffers.

GOAL #2 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Topsoil Structure &amp; Building Footprint</b>			
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas required to be phased?</li> </ul>	●	√	<p>Note: DNREC’s performance criteria for construction site management include limits on site disturbance. See Goal #6 performance criteria.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas and riparian areas required to be minimized?</li> </ul>	◐		<p>Ordinance Findings: Yes Draft Subdivision and Land Development Project Ordinance Article 4, § 4 (3) Design Process for Major Subdivisions requires a limit of disturbance line of a minimum of 50 ft to protect existing vegetation. Houses and other buildings shall be located a minimum of 100 ft from wetlands, watercourses, and floodplain areas.</p> <p>Draft Subdivision and Land Development Project Ordinance Article 6, § 6 (C) (4) Healthy woodlands exceeding ½ acre shall be preserved and designated as Conservation and Open Space to the maximum extent possible.</p> <p>Zoning Ordinance § 5D Any residential lot shall be covered with no more than 40% impervious surfaces. Any commercial lot shall be covered with no more than 60% impervious surfaces.</p>
<ul style="list-style-type: none"> <li>Are building envelopes</li> </ul>	◐		<p>Ordinance Findings: Yes</p>

<p>required/encouraged to avoid sensitive environmental areas such as riparian areas, wetlands, high infiltration soils, and steep slopes?</p>			<p>Ordinance Findings: Yes Draft Subdivision and Land Development Project Ordinance Article 4, § 4 (3) Design Process for Major Subdivisions requires a conservation and open space design process.</p> <p>Ordinance Findings: Yes Draft Subdivision and Land Development Project Ordinance Article 4, § 4 (3) Design Process for Major Subdivisions requires that houses and other buildings shall be located a minimum of 100 ft from wetlands, watercourses, and floodplain areas.</p>
<p><b>Wetlands</b></p>			
<ul style="list-style-type: none"> <li>Are site designs required to minimize hydrologic alteration to existing wetlands?</li> </ul>	<p>●</p>	<p>√</p>	<p>Note: there are state regulations prohibiting the disturbance of certain wetlands.</p> <p>Ordinance Findings: Yes</p>
<p><b>Sensitive Soils</b></p>			
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid highly erodible soils?</li> </ul>	<p>●</p>		<p>Ordinance Findings: No However, as noted above the Open Space Design Process does target slopes 15% or greater for conservation.</p> <p>Draft Subdivision and Land Development Project Ordinance Article 6, § 6 (E) (1) All grading and earthmoving on slopes greater than 15% shall be minimized.</p>
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid soils with high permeability (e.g., Hydrologic Soil Group A and B)?</li> </ul>	<p>●</p>		<p>Ordinance Findings: No</p>
<p><b>Stream Buffers</b></p>			
<ul style="list-style-type: none"> <li>Is a 60- to 100-foot stream buffer required/encouraged for new development?</li> </ul>	<p>●</p>		<p>Note: The Phase I WIP recommends 100 ft for primary waters and 60 ft for secondary waters; can be reduced if combined with other pollution</p>

			<p>reduction actions. This buffer recommendation is applicable to those areas where buffers are voluntary (i.e., not the Dept. of Ag's 30 ft buffer or CAFO buffers)</p> <p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Are stream buffers for new development required to remain in a natural state?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: Partially</p> <p>However, Draft Subdivision and Land Development Project Ordinance Article 6, § 6 (C) (3)(b) requires that subdivisions be designed to preserve woodlands along...lines occurring within the site such as streams and creeks</p> <p>There is no stipulation for vegetated buffers where there are no existing woodlands</p>
<ul style="list-style-type: none"> <li>• Are site designs required to preserve existing runoff pathways to adequately support existing wetlands?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Is a 50-foot wetland buffer required/encouraged?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: No</p>

**GOAL #3: HAVEST RAINWATER**

Objective: Allow rainwater harvesting through plumbing code provisions.

Objective: Allow the use of downspout disconnection/redirection, rain barrels, and above-and below-ground cisterns for rainwater harvesting

GOAL #3 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<ul style="list-style-type: none"> <li>• Can downspouts be disconnected or redirected to discharge into a rain barrel or yard?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are interior or exterior cisterns allowed?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Can rain barrels be placed within standard zoning setback areas?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Do zoning and building provisions allow cisterns to be placed on rooftops to harvest rainwater?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Is harvested rainwater allowed to be used for nonpotable interior uses such as toilet flushing?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.

### GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS

Objective: Allow and encourage stormwater controls as multiple use in open space areas.

Objective: Allow and encourage stormwater controls as multiple use in landscaped areas.

GOAL #4 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Landscaped Areas</b>			
<ul style="list-style-type: none"> <li>• Are bioretention areas allowed to be constructed in the development’s designated landscape areas, if properly designed?</li> </ul>	●		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are bioretention areas given “credit” as landscape area to count as a percent of the required landscaping?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Do landscaping requirements allow plantings conducive to bioretention, bioswales, raingardens , and other LID BMPs?</li> </ul>	●		<p>Ordinance Findings: No</p> <p>Draft Subdivision and Land Development Project Ordinance Article 4, § 4.1 (F) requires a final landscape plan indicating the types, sizes greater than 2.5 inches in caliper and species of native trees/plants to be used for landscaping. This size of tree/plant may pose a barrier to LID BMPs.</p> <p>Draft Subdivision and Land Development Project Ordinance Article 7 § 7.2 (B) Street and shade tree planting requirements (trees with 2.5 inch caliper, achieve a mature height of at least 35 ft., planted no closer than 4 ft. from road’s edge) may pose a barrier to the use of LID BMPs.</p>
<ul style="list-style-type: none"> <li>• Do tree planting requirements allow use of raingardens, tree boxes, and other LID BMPs?</li> </ul>	●		<p>Draft Subdivision and Land Development Project Ordinance Article 7 § 7.2 (B) Street and shade tree planting requirements (trees with 2.5 inch caliper, achieve a mature height of at least 35 ft., planted no closer than 4 ft. from road’s edge) may pose a barrier to the use of LID BMPs.</p>

Open Space Areas			
<ul style="list-style-type: none"> <li>• Are there open space preservation requirements or incentives?</li> </ul>	●		<p>Ordinance Findings: Yes                      Ordinance Findings: Yes                      Draft Subdivision and Land Development Project Ordinance Article 4, § 4 (3) Design Process for Major Subdivisions requires a conservation and open space design process with a required 30% open space.</p>
<ul style="list-style-type: none"> <li>• Is preserved open space required to be managed in a natural condition?</li> </ul>	●		<p>Ordinance Findings: Partially.                      A portion of the open space can be active recreation area, or used for farming or forestry purposes.</p>
<ul style="list-style-type: none"> <li>• Are structural LID techniques such as constructed wetlands, swales, and bioretention areas allowed to be constructed in a development's designated open space, if properly designed?</li> </ul>	●		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>
<ul style="list-style-type: none"> <li>• Are structural LID techniques such as constructed wetlands, swales, and bioretention areas given "credit" as open space to count as a percent of the required open space area, if properly designed?</li> </ul>	●		<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Does protection of sensitive, natural areas and habitat qualify as credit for local open space dedication?</li> </ul>	●		<p>Ordinance Findings: Yes</p>

**GOAL #5: MANAGE STORMWATER TO MEET WATERSHED IMPLEMENTATION PLAN & DNREC STORMWATER REGULATIONS**

- Objective: Meet DNREC stormwater regulations
- Objective: Replicate the predevelopment hydrology of the site, to the extent practicable.
- Objective: Maintain water quality functions of the watershed.
- Objective: Minimize channel erosion impacts.
- Objective: Minimize flooding impacts.
- Objective: Inspect BMPs to ensure proper construction and design.
- Objective: Long-term maintenance.

GOAL #5 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Stormwater Ordinance Provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• Is stormwater required to be retained/infiltrated onsite (through bioretention, natural areas, and swale infiltration) where possible?</li> </ul>	●	√	<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• DNREC Resource Protection Criteria</li> </ul>	●	√	<p>Note: For the 1-yr, 24 hour rainfall event, meet the following standards:                      Predevelopment wood/meadow – runoff reduction practices will yield the equivalent wooded condition for these areas.                      All remaining disturbed area shall achieve the equivalent of 0% effective imperviousness.                      The remaining discharge, if any, shall not exceed the 24-hour detention of the 1yr, 24 hr storm and an offsite offset is required for the portion of the storm not meeting the minimum requirements.                      Additional water quality treatment BMPs shall be required if runoff reduced is not sufficient to meet the TMDL.</p> <p>Ordinance Findings: No                      The Conservation District’s Sediment and Stormwater checklist SM 11 requires wet ponds to be designed to release the quality of stormwater runoff over a 24 hour period. Practices that have a permanent pool are to be designed to release the first inch of runoff</p>

			from the site over a 24 hour period. SM 12 requires infiltration practices to accept, at least, the first inch of runoff from all streets, roadways, and parking lots.
<ul style="list-style-type: none"> <li>• DNREC Conveyance Criteria for Channel Protection</li> </ul>	●	√	<p>Note: Conveyance Volume is the 10 yr, 24 hr rainfall event (or the volume of runoff produced by the post-development storm having a 10% chance of occurring)- less any volume reduction achieved through meeting the Resource Protection Criteria.</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Yes (it appears that the Conservation District standard below could meet this requirement.)</p> <p>The Conservation District's Sediment and Stormwater checklist SM 10 states that the pos-development peak rates of discharge for the 2- and 10-year storm events shall not exceed the predevelopment peak rates of discharge for the 2- and 10- year storm events.</p>
<ul style="list-style-type: none"> <li>• DNREC Flood Event Criteria</li> </ul>	●	√	<p>Volume of runoff produced by 100 yr, 24 hr rainfall event (or post-development storm having a 1% probability of occurrence).</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Not addressed in ordinances and standards reviewed.</p>
<ul style="list-style-type: none"> <li>• Alternative Criteria</li> </ul>	●	√	Land development that discharges to state waters included in a Designated Watershed or other watershed

			management plan approved in accordance with DNREC stormwater regulations shall meet alternative criteria in the approved plan.
<ul style="list-style-type: none"> <li>• Redevelopment Criteria</li> </ul>	●	√	<p>Recognizing the importance of redevelopment over greenfield development, redevelopment areas are required to only achieve a 50% reduction in effective impervious area based on existing conditions. Only the <u>increases</u> in the rate, volume, and duration of flow for the channel volume and flooding volume will need to comply with the DNREC stormwater regulations.</p> <p>A brownfield development remediation plan may meet the stormwater goals and intent of the DNREC stormwater regulations if approved by DNREC.</p> <p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	●	√	<p>Agricultural land having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meets DOA requirements.</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes</p> <p>Conservation District Program</p>
<b>Inspections</b>			
<ul style="list-style-type: none"> <li>• Are inspections required during construction and routinely after construction?</li> </ul>	●	√	<p>Ordinance Findings: Yes</p> <p>Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	●	√	<p>Note: DNREC requires a Certified Construction Reviewer</p> <p>Ordinance Findings: Yes</p> <p>Conservation District Checklist</p>

<b>Maintenance</b>			
• Are maintenance agreements required?	●	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	●	√	Ordinance Findings: No
<b>Off-Site Mitigation</b>			
• Is offsite mitigation required when on-site management does not meet the performance criteria (unless there is proof of no adverse impact)?	●		Ordinance Findings: No
• Is the DE Nutrient Protocol program required to calculate offsets?	◐		Ordinance Findings: No
• Is offsite mitigation for forested area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	◐		Ordinance Findings: No
• Is offsite mitigation for riparian area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	◐		Ordinance Findings: No
• Is offsite mitigation for BMP retrofit allowed in the same named watershed?	◐		Ordinance Findings: No
• Is nutrient banking or the equivalent land banking allowed in the same named watershed? Is redevelopment encouraged in lieu of greenfield development?	○		Ordinance Findings: No
<b>Local Stormwater Utility Ordinance</b>			
• Does an ordinance exist to support the development of a local stormwater utility?	◐		Ordinance Findings: No

**GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

Objective: Meet DNREC stormwater regulations

Objective: Minimize erosion and sedimentation and delivery of nonpoint source pollutants during construction activities.

Objective: Inspect BMPs ensure proper construction and design.

Objective: Maintain BMPs.

GOAL #6 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Sedimentation and Erosion Control provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• DNREC Turbidity Stormwater Management</li> </ul>	●	√	Best Available Technology shall be employed to manage turbid waters in accordance with state regulations. Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC requirement of Sediment and Stormwater Management Plans</li> </ul>	●	√	Ordinance Findings: Yes Conservation District Checklist
<ul style="list-style-type: none"> <li>• DNREC Land Disturbance Criteria</li> </ul>	●	√	Use of standard details for DE Erosion and Sedimentation Control Handbook-limited to sites where no more than 10 acres draining to a common discharge point will be disturbed at any one time. Ordinance Findings: No  Construction site BMPs intended to manage areas greater than 10 acres shall have supporting design computations. Ordinance Findings: No  In no case shall an area of disturbance draining to a common point exceed 20 acres. Grading within that drainage area shall not proceed unless temporary or permanent stabilization has been accomplished. All plans shall include a limit of disturbance line. Ordinance Findings: Yes Conservation District Checklist

<ul style="list-style-type: none"> <li>• DNREC Site Stabilization Criteria</li> </ul>	<p>●</p>	<p>√</p>	<p>Following soil disturbance or redisturbance, permanent or temporary stabilization shall be completed for all perimeter sediment controls, topsoil stockpiles, or other graded/disturbed areas within 14 calendar days unless a more restrictive federal requirement applies.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p> <p>Documentation of soil testing and materials used for stabilization shall be provided for verification.</p> <p>Ordinance Findings: Not addressed</p> <p>Release of financial guarantee and or issuance of Notice of Completion shall not occur until final stabilization of all exposed areas is achieved.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	<p>●</p>	<p>√</p>	<p>Agricultural having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meet DOA requirements</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<p><b>Inspections</b></p>			
<ul style="list-style-type: none"> <li>• Are weekly inspections required during construction?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>

<b>Maintenance</b>			
• Are maintenance agreements required?	●	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	●	√	Ordinance Findings: No

**GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

**Note: Onsite Wastewater Treatment and Disposal provisions are still in draft form and may not be subject to this ordinance review.**

<b>GOAL #7 KEY QUESTIONS</b>	<b>DEGREE OF IMPORTANCE</b>	<b>REQUIRED BY DNREC</b>	<b>COMMENTS</b>
<b>Performance Standards</b>			
Where do local governments allow/encourage/ban standard systems versus community systems and how does that impact growth patterns			Comprehensive Plan: Having no improved water or sewer infrastructure; the Town relies on independent wells and stand alone septic systems to meet the needs of local residents.



## TETRA TECH

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### MEMORANDUM

**To:** Vikki Prettyman (Town of Blades)  
**From:** Eugenia Hart and Kimberly Brewer  
**Cc:** Jennifer Walls (DNREC); Bryan Hall (DNREC); Jennifer Volk (DNREC)  
**Date:** January 24, 2012  
**Subject:** Review of the Town of Blades' Local Land Use Ordinances to Identify Barriers to Implementing the Chesapeake Bay Watershed Implementation Plan

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## 1 Introduction

Delaware has developed a Watershed Implementation Plan (WIP) to accompany the Chesapeake Bay nutrient and sediment total maximum daily loads (TMDLs). The WIP lays out plans for addressing existing pollutant load to the Bay as well as new pollutant loads from future land use changes. Delaware's Department of Natural resources and Environmental Control (DNREC) has tasked Tetra Tech with assisting local Delaware municipalities in the Chesapeake Bay watershed to conduct a review of existing local municipal ordinances with regulations pertaining to new development.

The goal of the ordinance review is to provide a service to local governments in Delaware by reviewing existing land use ordinances to look for barriers to implementing the Chesapeake Bay WIP as well as identify potential opportunities for improving communities and allowing more techniques to be used to help property owners address nutrient and sediment loads from new developments. These include techniques such as green infrastructure, low impact development, conservation design, and performance standards that can allow flexibility. There are often unintended barriers to these techniques in local ordinances.

This memorandum presents results of Tetra Tech's review of these local ordinances for the town of Blades, DE. Note that recommendations for consideration of code revisions are not mandatory. They are intended only to provide more flexibility and effectiveness in meeting resource protection goals and regulations.

## 2 Approach

In August 2011 Tetra Tech contacted the Town of Blades to obtain the most recent versions of the following types of ordinances, if available:

- Subdivision ordinance
- Zoning ordinance

- Sedimentation and erosion control ordinance or regulations
- Onsite wastewater ordinance or regulations

Blades staff provided their Land Development Ordinance for review. The Town follows the Sussex County Conservation District's (SCD) stormwater, sedimentation, and erosion control program. Note that SCD does not have their own stormwater, sedimentation, and erosion control standards, but adheres to Delaware's State Sediment and Stormwater Regulations (see section 3.1 below). The Town of Blades does not have specific on-site wastewater regulations as the Land Development Ordinance requires all lots and uses to connect to the Town's public sewerage system.

Once the ordinances were obtained, they were reviewed based on the Ordinance Review Checklist developed by Tetra Tech (Appendix A). The checklist contains items related to the following seven goals:

1. Minimize Effective or Connected Impervious Area
2. Preserve and Enhance the Hydrologic Function of Unpaved Areas
3. Harvest Rainwater
4. Allow and Encourage Multi-Use Stormwater Controls
5. Manage Stormwater to Meet WIP and DNREC Regulations
6. Manage Construction Site Stormwater to Meet WIP and DNREC Regulations
7. Manage On-Site Wastewater Systems to Meet WIP and DNREC Regulations

The Town of Blades staff reviewed the draft memo, and recommended revisions and corrections as needed.

Barriers to each of the items on the Checklist are summarized below in Section 3 along with potential solutions to overcome these barriers.

### **3 Summary of Barriers and Potential Solutions for Implementation**

This section of the memo provides a summary of the barriers identified for each of the seven goals indicated on the Ordinance Review Checklist (Appendix A). Following the summary of each barrier, potential solutions are provided.

#### **3.1 GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

##### **Mitigation of Runoff from Effective Impervious Area**

DNREC's final draft stormwater regulations (DNREC 2011) require that local regulations and standards mitigate stormwater runoff such that there is no direct contribution of stormwater runoff from a development. Blades does not have an ordinance that directly addresses this issue; however, Blades currently follows the Sussex Conservation District's Sediment Control and Stormwater Management Program. SCD follows the State of Delaware's Sediment and Stormwater Regulations as a delegated agency. It is suggested that Blades reference State of Delaware Sediment and Stormwater Regulations in its land development ordinance.

##### **Flexibility in Locating BMP Techniques On-site**

The location of low impact development (LID) best management practices (BMPs) in street and parking areas (e.g., parking medians, grass strips between sidewalk and curb, swales, etc.) is for the most part not explicitly prohibited or allowed in the ordinance. Lack of certainty about approval of these techniques can pose a barrier to implementation. It appears that height and setback limitations for landscaping at

intersections would directly prohibit the use of LID techniques such as curb bumpouts/extensions with bioretention or bioswales.

### **Street and Right-of-Way Widths**

Current zoning regulations do not allow minor streets to have narrow street pavement and travel lane widths to help minimize impervious area. In addition to the environmental benefits of narrowing streets, some studies have found that narrow residential streets are safer than wide streets (Center for Watershed Protection 1998).

In the last decade, numerous developments have been built using techniques to narrow street and right of way width. Techniques such as curb pullouts, staggered pull-out parking areas (rather than continuous lanes), or having a parking lane on one side of the street only have been employed. These developments have been able to meet the needs of access for service and emergency vehicles as well as on-street parking while also using narrower streets and public right-of-ways than do conventional subdivisions. That said, it should be recognized that concerns about these components of LID—narrow streets and right-of-ways—make it challenging to implement. In each community, moving forward requires a great deal of discussion and problem solving with staff from the fire department, public works, engineering, and other potentially affected departments in order to address concerns and develop mutually supported ordinance and code revisions. Note that Delaware State Fire Prevention Regulations do not appear to regulate street widths in residential developments, but do provide turn-around and cul-de-sac standards that allow for fire apparatus access.

### **Minimum Parking Requirements**

Current zoning establishes a high minimum parking space requirement and requires overly large parking stalls and drive aisles. Together these minimum parking requirements can unnecessarily increase the overall imperviousness of the development site. Some communities allow a smaller number of parking spaces per square feet of floor area in the development, as well as allow smaller stalls and aisles (e.g., stall width of 9 feet, minimum stall length to 15 feet, and minimum drive aisle width of 22 feet). These standards minimize paved area, provide adequate parking space, and reduce development costs.

### **Clustering of Development**

The current land development ordinance does not include a conservation design or cluster development district. Conservation design and cluster development districts allow environmentally-sensitive use of land by clustering houses on less environmentally sensitive areas while preserving interconnected green space as habitat areas, natural stormwater management, and recreation areas. This is achieved through allowing more flexibility on minimum lot size, setbacks, yards, placement of open space, etc.

### **Incentives for Infill Development and Redevelopment of Existing Areas over “Greenfield” Development**

DNREC’s draft sediment and stormwater regulations (June 2011) require that local regulations and standards impose less stringent runoff reduction requirements for proposed development in existing developed areas, thus providing incentives to develop in these areas rather than undeveloped or “greenfield” areas. Local zoning and subdivision requirements will need to be amended accordingly.

## **3.2 GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

### **Encouraging or Requiring Stream Buffers**

The Phase I WIP calls for local regulations and standards that encourage or require buffers of 60 feet for secondary waterbodies and 100 feet for primary waterbodies for new development proposals. These buffers can be reduced if combined with other pollution reduction actions. The town’s current land

development ordinance does not require such riparian buffers. Local zoning and subdivision requirements should be amended to address buffers and the preservation of streamside areas in natural vegetation.

### **Minimizing Disturbance in Environmentally Sensitive Areas**

It appears that the local regulations currently allow disturbance of riparian areas, erodible soils, steep slopes, and areas of high soil infiltration. LID uses these landscape features as a part of natural stormwater management and seeks to minimize their disturbance during and after construction. Local zoning and subdivision requirements should be amended to address the protection of environmentally sensitive areas.

### **3.3 GOAL #3: HARVEST RAINWATER**

#### **Explicitly Allowing or Encouraging Rainwater Harvest**

Rainwater harvesting is not explicitly prohibited or allowed in the ordinance. However, lack of certainty about approval of these techniques can pose a barrier to implementation.

### **3.4 GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

#### **Flexibility in Locating LID Techniques in Designated Landscape and Open Space Areas**

Due to current specifications and allowances, it appears that LID techniques such as bioretention, bioswales, constructed wetlands, etc. are not allowed in required landscape, screening, street tree, and open space areas. Where these BMPs can be designed to support landscape and open space functions, flexibility should be provided in locating these BMPs where they can be most effective in managing water quality, drainage, and flooding impacts. Explicit exemptions, as-of-right use, or even incentives, should be made for the use of vegetative LID techniques in screening, buffer, street shade tree, and landscape areas. Additionally, consideration should be given allowing bioretention and bioswales in the right-of-way area typically used as a grassed strip.

#### **Credit for LID Techniques that Provide Landscape and Natural Open Space Functions**

LID BMPs are not given credit by the Town as part of the required landscaping and open space area. Explicitly providing such credit would provide an incentive for developers to use LID techniques.

### **3.5 GOAL #5: MANAGE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Stormwater Regulations**

DNREC's final draft sediment and stormwater regulations require new minimum water quality, channel protection, and conveyance and flood control requirements for new development and redevelopment. As stated earlier, it is suggested that Blades reference State of Delaware Sediment and Stormwater Regulations in its land development ordinance.

#### **Off-site Mitigation**

There are no provisions in the ordinance for off-site mitigation when on-site management does not meet the performance criteria. DNREC is in the final phases of developing an offset tool called the *Nutrient and Sediment Loading Assessment Protocol*. The tool allows developers to determine whether or not a

proposed development plan meets the TMDL requirements for a particular watershed. This is a useful tool in determining whether or not a proposed development meets the TMDL or will need additional on-site management or off-site mitigation. Blades may want to consider requiring developers to use this tool during the planning process before presenting the site plan to the planning and zoning commission for review.

### **3.6 GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Sediment and Erosion Control Regulations**

DNREC's final draft sediment and stormwater regulations require construction site stormwater management controls to be put in place for all construction activities exceeding 5,000 square feet of disturbance. As stated earlier, it is suggested that Blades reference the State of Delaware Sediment and Stormwater Regulations in the Land Development Ordinance.

### **3.7 GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WIP AND DNREC REGULATIONS**

The Town of Blades does not have specific on-site wastewater regulations as the Land Development Ordinance requires all lots and uses to connect to the Town's public sewerage system.

## **4 Accounting and Tracking of BMP Implementation**

The Town of Blades is interested in tracking the implementation of BMPs in the town. It is suggested that DNREC provide Blades with a list of BMPs approved for use in the Chesapeake Bay watershed TMDL model and have the Town of Blades notify DNREC if any of these types of BMPs are installed in the town so they can be appropriately credited in the Bay model.

## **5 Conclusions**

Review of Blades' Land Development Ordinance identified a number of direct barriers to the use of LID techniques, such as specifications for shade trees along dedicated streets, and specifications and allowances for required screening, landscape and open space areas. Another key area where current requirements effectively prohibit use of LID techniques includes cluster development design. To allow or encourage the use of LID techniques, the Town would need to explicitly exempt these techniques or allow them as-of-right in these areas. The Town should also consider allowing bioretention and bioswales in the right-of-way area typically used as a grassed strip.

In some cases, the ordinance included barriers of omission: by not expressly allowing the LID technique or providing for exemptions, the ordinance generates uncertainty regarding approval and thus unintentionally provides disincentives for some LID practices. Examples of this include allowance of downspouts and location of rainbarrels or cisterns in zoning setback areas.

The Town does not have an ordinance that directly addresses sediment and stormwater management. Rather, Blades' follows the Sussex Conservation District's Sediment Control and Stormwater Management Program. Considering the new federal stormwater regulations due out in late 2011 and new state stormwater regulations due in 2012, it is suggested that the Town of Blades reference the State of

Delaware Sediment and Stormwater Regulations in the subdivision ordinance, and the agency implementing the regulations (DNREC or its Delegated Agency).

Reducing impervious area in new developments can be an important part of stormwater management. Blades may want to consider allowing narrower street and right of way widths in all new developments, while employing techniques such as curb pullouts and staggered pull-out parking areas to meet the needs of service and emergency vehicles as well as on-street parking. Blades might also want to consider allowing a smaller number of parking spaces as well as smaller parking stalls and aisles in new multi-family and commercial developments.

Finally, Blades might want to consider adopting DNREC's *Nutrient and Sediment Loading Assessment Protocol* as part of their Land Development Ordinance. The tool can help developers determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. The tool can help to quantify the number and types of BMPs necessary on a new development site to meet the TMDL requirements.

## References

Blades Land Development Ordinance

Center for Watershed Protection (CWP). 1998. *Better Site Design: A Handbook for Changing Development Rules in Your Community*.

DNREC (Department of Natural Resources and Environmental Control). 2011. *Final Draft Sediment and Stormwater Regulations*. June 2011.

Delaware Department of Transportation (DelDOT). 2010. *Standards and Regulations for Subdivision Streets and State Highway Access*. Dover, DE.

Delaware State Fire Marshall. 2009. *Delaware State Fire Prevention Regulations*

Sussex Conservation District. 2011. *Sediment and Stormwater Management Checklist*  
<http://sussexconservation.org/> Accessed August 2011.

## Appendices

Appendix A. Ordinance Review Checklist

## Appendix A. Ordinance Review Checklist

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# Local Development Ordinance Tools/Techniques for Implementing Delaware's Chesapeake Bay Watershed Implementation Plan & DNREC Final Draft Sediment and Stormwater Regulations

## Town of Blades Ordinance Review Checklist

### Town of Blades Ordinances Reviewed

#### Land Development Ordinance

- Zoning
- Subdivision and Land Development
- Streets and Sidewalks
- Flood-Prone Areas, Drainage, Erosion
- Off-Street Parking and Loading
- Recreation, Open Space, Screening, Shade

#### Sussex Conservation District Sediment and Stormwater Management Checklist

*[Note: The Ordinance Checklist that follows is based on Delaware's Phase 1 Chesapeake Bay Watershed Implementation Plan (November 2010); Final Draft Sediment and Stormwater Regulations (DNREC, June 2011); Protecting Water Quality with Smart Growth Strategies and Natural Stormwater Management in Sussex County (January, 2009); Better Site Design: A Handbook for Changing Development Rules in Your Community (CWP, 1998); Low-Impact Development Design Strategies, An Integrated Approach (USEPA, 2000); and Tetra Tech's review of numerous local ordinances to identify opportunities and barriers to green infrastructure and low impact development techniques].*

**Degree of Importance Key to Symbols:**

- Essential
- ◐ Very important
- Important

**GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

- Objective: Minimize impervious area associated with streets.
- Objective: Minimize impervious area associated with parking.
- Objective: Minimize impervious area associated with driveways and sidewalks.
- Objective: Clustering development.
- Objective: Incorporate sustainable hydrology practices into urban redevelopment.

GOAL #1 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Overall Effective Impervious Area</b>			
<ul style="list-style-type: none"> <li>• Is impervious area required to be controlled such that there is no direct contribution of stormwater runoff (i.e., the equivalent of 0% effective impervious area)?</li> </ul>	●	√	<p>Note: DNREC's Final Draft stormwater regulations require that after runoff reduction practices have been implemented on disturbed area, the site's impervious area shall not directly contribute stormwater runoff during a rain event that has an 99% annual probability of occurring. See Goal # 5 performance criteria.</p> <p>Ordinance Findings: No</p>
<b>Streets</b> (Note: Also check Fire Marshal's Code to see how it impacts the following goals)			
<ul style="list-style-type: none"> <li>• For residential development, are the street pavement widths allowed to be between 18 to 22 feet, with curb pullouts for passing of large vehicles?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Are travel lanes allowed to be from 12 to 10 feet (or less), with curb pullouts for passing of large vehicles?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Are curb bumpouts/extensions allowed near intersections and mid-block for traffic-calming and bioretention opportunities?</li> </ul>	◐		<p>Ordinance Findings: Not expressly allowed or prohibited.</p> <p>Note: Land Development Ordinance Article 8 § 8-2.(C) At street intersections, nothing shall be</p>

			planted or allowed to grow higher than 2 1/2 ft within the sight triangle measured along the right-of-way above the curb level of the intersecting streets for a distance of 20 ft. This requirement may prohibit use of bioretention and bioswales.
<ul style="list-style-type: none"> <li>Is pervious paving allowed for on-street parking and alleyways?</li> </ul>	○		Ordinance Findings: No Concrete and bituminous surface is required per the Town's construction specifications.
<ul style="list-style-type: none"> <li>Are grass swales or bioretention swales allowed instead of curb and gutter or with curb cuts (where slopes allow)?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>If there are cul-de-sacs, is the radius required to be 35 feet or less?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.  2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads >300 ft in length.
<ul style="list-style-type: none"> <li>If there are cul-de-sacs, are landscaped islands or bioretention islands allowed or encouraged?</li> </ul>	○		Ordinance Findings: No  2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads >300 ft in length.
<ul style="list-style-type: none"> <li>Are site designs required to promote the most efficient street layout to reduce overall street length?</li> </ul>	○		Ordinance Findings: No
<b>Parking</b>			
<ul style="list-style-type: none"> <li>Is the minimum stall width for a standard parking space 9 ft. or less?</li> </ul>	●		Ordinance Findings: No Land Development Ordinance Article 14 § 14-2 D.10 ft width required
<ul style="list-style-type: none"> <li>Are parking stall lengths allowed to be 15 ft.?</li> </ul>	●		Ordinance Findings: No Zoning Article 14 § 14-2 D.20 ft length required
<ul style="list-style-type: none"> <li>Are parking lot drive aisles allowed to be 22 ft.?</li> </ul>	◐		Ordinance Findings: No Land Development Ordinance Article 14

			§ 14-2 D. aisle required to be 25 feet
• Are bioretention cells allowed in parking medians?	<input checked="" type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• Are consolidated travel lanes and on-street parking allowed to create space for bioretention?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• Are pervious surfaces such as paver stones, porous pavement, or grass pavers allowed for on-street parking?	<input checked="" type="radio"/>		Ordinance Findings: No
• For office buildings, is the required parking ratio 3.0 spaces per 1,000 sq.ft. of gross floor area or less?	<input checked="" type="radio"/>		Ordinance Findings: No Land Development Ordinance Article 14 § 14-2 B I space per 200 sq.ft.
• For commercial centers, is the required parking ratio 2 to 4.5 spaces per 1,000 sq.ft. of gross floor area or less?	<input checked="" type="radio"/>		Ordinance Findings: No Land Development Ordinance Article 14 § 14-2 B I space per 200 sq.ft.
• Are proposed developments allowed to take advantage of opportunities for shared parking?	<input type="radio"/>		Ordinance Findings: Yes
• Are proposed developments allowed to have parking stalls under the second floor podium?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<b>Driveways/Sidewalks</b>			
• Are driveway standards 9 feet or less in width?	<input checked="" type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• Are shared driveways allowed?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• If sidewalks are required, are they required to be designed to the narrowest allowable width (e.g. 4 ft.)?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• Are sidewalks allowed to be on one side of the street only?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<b>Clustering Development</b>			
• Is redevelopment encouraged in lieu of greenfield development through site	<input checked="" type="radio"/>	✓	Note: DNREC's Final Draft stormwater regulations recognize the benefit of

performance standards?			redevelopment, and have less stringent performance standards for proposed development in existing developed areas. See Goal # 5 performance criteria. Ordinance Findings: No
• Is Conservation or Open Space Design an option?	●		Ordinance Findings: No
• To encourage clustering and open space design, are setbacks minimized (e.g., for residential lots that are 1/2-acre or less in size, is the front set back 20 feet or less, the rear setback 25 feet or less, and the side setback 8 feet or less?)	●		Ordinance Findings: No
• Are site designs required to have development focused on areas of lesser slopes and farther from watercourses?	◐		Ordinance Findings: No
• Are policies effective in encouraging higher density development to be centered around transportation corridors?	○		Note that it is important for towns to allow density bonuses for protecting certain features, preserving open space, and limiting sprawl. Ordinance Findings: No

## GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS

Objective: Minimize building footprint/envelope area.

Objective: Preserve topsoil structure.

Objective: Preserve sensitive wetlands.

Objective: Preserve sensitive soils.

Objective: Preserve sensitive stream buffers.

GOAL #2 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Topsoil Structure &amp; Building Footprint</b>			
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas required to be phased?</li> </ul>	●	√	Note: DNREC's performance criteria for construction site management include limits on site disturbance. See Goal #6 performance criteria. Ordinance Findings: Yes
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas and riparian areas required to be minimized?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are building envelopes required/encouraged to avoid sensitive environmental areas such as riparian areas, wetlands, high infiltration soils, and steep slopes?</li> </ul>	◐		Ordinance Findings: No
<b>Wetlands</b>			
<ul style="list-style-type: none"> <li>Are site designs required to minimize hydrologic alteration to existing wetlands?</li> </ul>	●	√	Note: there are state regulations prohibiting the disturbance of certain wetlands.
<b>Sensitive Soils</b>			
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid highly erodible soils?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid soils with high permeability (e.g., Hydrologic Soil Group A and B)?</li> </ul>	◐		Ordinance Findings: No
<b>Stream Buffers</b>			
<ul style="list-style-type: none"> <li>Is a 60- to 100-foot stream buffer required/encouraged for new development?</li> </ul>	●		Note: The Phase I WIP recommends 100 ft for primary waters and 60 ft for secondary waters; can be reduced if combined with other pollution reduction actions. This buffer

			<p>recommendation is applicable to those areas where buffers are voluntary (i.e., not the Dept. of Ag's 30 ft buffer or CAFO buffers)</p> <p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Are stream buffers for new development required to remain in a natural state?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Are site designs required to preserve existing runoff pathways to adequately support existing wetlands?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Is a 50-foot wetland buffer required/encouraged?</li> </ul>	<input type="radio"/>		Ordinance Findings: No

**GOAL #3: HAVEST RAINWATER**

Objective: Allow rainwater harvesting through plumbing code provisions.

Objective: Allow the use of downspout disconnection/redirection, rain barrels, and above-and below-ground cisterns for rainwater harvesting

GOAL #3 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<ul style="list-style-type: none"> <li>• Can downspouts be disconnected or redirected to discharge into a rain barrel or yard?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are interior or exterior cisterns allowed?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Can rain barrels be placed within standard zoning setback areas?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Do zoning and building provisions allow cisterns to be placed on rooftops to harvest rainwater?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Is harvested rainwater allowed to be used for nonpotable interior uses such as toilet flushing?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.

**GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

Objective: Allow and encourage stormwater controls as multiple use in open space areas.

Objective: Allow and encourage stormwater controls as multiple use in landscaped areas.

GOAL #4 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Landscaped Areas</b>			
<ul style="list-style-type: none"> <li>Are bioretention, bioswale or other vegetated LID areas allowed to be constructed in the development's designated landscape areas, if properly designed?</li> </ul>	●		<p>Ordinance Findings: No Bioretention is not included in the ordinances or construction standards; however certain provisions including but not limited to those below may effectively prohibit the use of vegetative LID practices such as bioswales and bioretention.</p> <p>Land Development Ordinance Article 15                      § 15-3 Screening and Landscaping                      For multi-family and manufactured homes, non-residential development abutting residential districts, offstreet parking closer than 50 ft. to residential development, and loading areas a visual screen shall be provided that includes both a high-level screening (either a 6 ft. fence or compact evergreen hedge or foliage) and low level screening (consisting of evergreen shrubs that are 2 ft in height at planting at no more than 5 ft. intervals).</p> <p>Land Development Ordinance Article 15                      § 15-3 (C) Interior parking area landscaping requirements include one landscaped island once every 25 single or double spaces have been exceeded.</p> <p>Land Development Ordinance Article 15                      § 15-4 (A) Trees along a dedicated street: every 30 ft. there must 1 deciduous tree</p>

			<p>with a trunk of at least 12 inches in diameter when fully mature</p> <p>Land Development Ordinance Article 8                  § 8-2 (B) (2) Fences, Walls, Hedges and Shrubbery along the front property line can be a maximum of 2 1/2 ft in height.</p> <p>Note: Land Development Ordinance Article 8                  § 8-2.(C) At street intersections, nothing shall be planted or allowed to grow higher than 2 1/2 ft within the sight triangle measured along the right-of-way above the curb level of the intersecting streets for a distance of 20 ft.                  This requirement may prohibit use of bioretention and bioswales.</p> <p>The Conservation District's Sediment and Stormwater checklist expressly prohibits infiltration practices from being located within 20 feet of basement walls.</p>
<ul style="list-style-type: none"> <li>• Are bioretention areas given "credit" as landscape area to count as a percent of the required landscaping?</li> </ul>	●		<p>Ordinance Findings: No                  Bioretention is not included in the ordinances</p>
<ul style="list-style-type: none"> <li>• Do landscaping requirements allow plantings conducive to bioretention, bioswales, raingardens , and other LID BMPs?</li> </ul>	●		<p>Ordinance Findings: No                  Bioretention is not included in the ordinances</p>
<ul style="list-style-type: none"> <li>• Do tree planting requirements allow use of raingardens, tree boxes, and other LID BMPs?</li> </ul>	●		<p>Ordinance Findings: No                  Bioretention is not included in the ordinances</p>
<p><b>Open Space Areas</b></p>			
<ul style="list-style-type: none"> <li>• Are there open space preservation requirements or incentives?</li> </ul>	◐		<p>Ordinance Findings: Yes                  Land Development Ordinance Article 15                  § 15-1</p>

<ul style="list-style-type: none"> <li>• Is preserved open space required to be managed in a natural condition?</li> </ul>			<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Are structural LID techniques such as constructed wetlands, swales, and bioretention areas allowed to be constructed in a development's designated open space, if properly designed?</li> </ul>			<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Are structural LID techniques such as constructed wetlands, swales, and bioretention areas given "credit" as open space to count as a percent of the required open space area, if properly designed?</li> </ul>			<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Does protection of sensitive, natural areas and habitat qualify as credit for local open space dedication?</li> </ul>			<p>Ordinance Findings: Not expressly allowed or prohibited.</p>

**GOAL #5: MANAGE STORMWATER TO MEET WATERSHED IMPLEMENTATION PLAN & DNREC STORMWATER REGULATIONS**

- Objective: Meet DNREC stormwater regulations
- Objective: Replicate the predevelopment hydrology of the site, to the extent practicable.
- Objective: Maintain water quality functions of the watershed.
- Objective: Minimize channel erosion impacts.
- Objective: Minimize flooding impacts.
- Objective: Inspect BMPs to ensure proper construction and design.
- Objective: Long-term maintenance.

GOAL #5 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Stormwater Ordinance Provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• Is stormwater required to be retained/infiltrated onsite (through bioretention, natural areas, and swale infiltration) where possible?</li> </ul>	●	√	Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC Resource Protection Criteria</li> </ul>	●	√	<p>Note: For the 1-yr, 24 hour rainfall event, meet the following standards:                      Predevelopment wood/meadow – runoff reduction practices will yield the equivalent wooded condition for these areas.                      All remaining disturbed area shall achieve the equivalent of 0% effective imperviousness.                      The remaining discharge, if any, shall not exceed the 24-hour detention of the 1yr, 24 hr storm and an offsite offset is required for the portion of the storm not meeting the minimum requirements.                      Additional water quality treatment BMPs shall be required if runoff reduced is not sufficient to meet the TMDL.</p> <p>Ordinance Findings: No                      The Conservation District’s Sediment and Stormwater checklist SM 11 requires wet ponds to be designed to release the quality of stormwater runoff over a 24 hour period. Practices that have a permanent pool are to be designed to</p>

			release the first inch of runoff from the site over a 24 hour period. SM 12 requires infiltration practices to accept, at least, the first inch of runoff from all streets, roadways, and parking lots.
<ul style="list-style-type: none"> <li>• DNREC Conveyance Criteria for Channel Protection</li> </ul>	●	√	<p>Note: Conveyance Volume is the 10 yr, 24 hr rainfall event (or the volume of runoff produced by the post-development storm having a 10% chance of occurring)- less any volume reduction achieved through meeting the Resource Protection Criteria.</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Yes (it appears that the Conservation District standard below could meet this requirement.)</p> <p>The Conservation District's Sediment and Stormwater checklist SM 10 states that the pos-development peak rates of discharge for the 2- and 10-year storm events shall not exceed the predevelopment peak rates of discharge for the 2- and 10- year storm events.</p>
<ul style="list-style-type: none"> <li>• DNREC Flood Event Criteria</li> </ul>	●	√	<p>Volume of runoff produced by 100 yr, 24 hr rainfall event (or post-development storm having a 1% probability of occurrence).</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Not addressed in ordinances and standards reviewed.</p>
<ul style="list-style-type: none"> <li>• Alternative Criteria</li> </ul>	●	√	Land development that discharges to state waters included in a Designated

			Watershed or other watershed management plan approved in accordance with DNREC stormwater regulations shall meet alternative criteria in the approved plan.
<ul style="list-style-type: none"> <li>• Redevelopment Criteria</li> </ul>	●	√	<p>Recognizing the importance of redevelopment over greenfield development, redevelopment areas are required to only achieve a 50% reduction in effective impervious area based on existing conditions. Only the <u>increases</u> in the rate, volume, and duration of flow for the channel volume and flooding volume will need to comply with the DNREC stormwater regulations.</p> <p>A brownfield development remediation plan may meet the stormwater goals and intent of the DNREC stormwater regulations if approved by DNREC.</p> <p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	●	√	<p>Agricultural land having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meets DOA requirements.</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes</p>
<b>Inspections</b>			
<ul style="list-style-type: none"> <li>• Are inspections required during construction and routinely after construction?</li> </ul>	●	√	Ordinance Findings: Yes
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	●	√	<p>Note: DNREC requires a Certified Construction Reviewer</p> <p>Ordinance Findings: Yes</p>
<b>Maintenance</b>			
<ul style="list-style-type: none"> <li>• Are maintenance agreements required?</li> </ul>	●	√	Ordinance Findings: Yes

<ul style="list-style-type: none"> <li>• Is maintenance required to be performed by a certified professional?</li> </ul>	●	√	Ordinance Findings: No
<b>Off-Site Mitigation</b>			
<ul style="list-style-type: none"> <li>• Is offsite mitigation required when on-site management does not meet the performance criteria (unless there is proof of no adverse impact)?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Is the DE Nutrient Protocol program required to calculate offsets?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Is offsite mitigation for forested area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Is offsite mitigation for riparian area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Is offsite mitigation for BMP retrofit allowed in the same named watershed?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Is nutrient banking or the equivalent land banking allowed in the same named watershed? Is redevelopment encouraged in lieu of greenfield development?</li> </ul>	○		Ordinance Findings: No
<b>Local Stormwater Utility Ordinance</b>			
<ul style="list-style-type: none"> <li>• Does an ordinance exist to support the development of a local stormwater utility?</li> </ul>	◐		Ordinance Findings: No

**GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

Objective: Meet DNREC stormwater regulations

Objective: Minimize erosion and sedimentation and delivery of nonpoint source pollutants during construction activities.

Objective: Inspect BMPs ensure proper construction and design.

Objective: Maintain BMPs.

GOAL #6 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Sedimentation and Erosion Control provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• DNREC Turbidity Stormwater Management</li> </ul>	●	√	Best Available Technology shall be employed to manage turbid waters in accordance with state regulations. Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC requirement of Sediment and Stormwater Management Plans</li> </ul>	●	√	Ordinance Findings: Yes
<ul style="list-style-type: none"> <li>• DNREC Land Disturbance Criteria</li> </ul>	●	√	Use of standard details for DE Erosion and Sedimentation Control Handbook-limited to sites where no more than 10 acres draining to a common discharge point will be disturbed at any one time. Ordinance Findings: No  Construction site BMPs intended to manage areas greater than 10 acres shall have supporting design computations. Ordinance Findings: No  In no case shall an area of disturbance draining to a common point exceed 20 acres. Grading within that drainage area shall not proceed unless temporary or permanent stabilization has been accomplished. All plans shall include a limit of disturbance line. Ordinance Findings: Yes

<ul style="list-style-type: none"> <li>• DNREC Site Stabilization Criteria</li> </ul>	<p>●</p>	<p>√</p>	<p>Following soil disturbance or redisturbance, permanent or temporary stabilization shall be completed for all perimeter sediment controls, topsoil stockpiles, or other graded/disturbed areas within 14 calendar days unless a more restrictive federal requirement applies.</p> <p>Ordinance Findings: Yes</p> <p>Documentation of soil testing and materials used for stabilization shall be provided for verification.</p> <p>Ordinance Findings: Not addressed</p> <p>Release of financial guarantee and or issuance of Notice of Completion shall not occur until final stabilization of all exposed areas is achieved.</p> <p>Ordinance Findings: Yes</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	<p>●</p>	<p>√</p>	<p>Agricultural having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft..</p> <p>Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meet DOA requirements</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes</p>
<p><b>Inspections</b></p>			
<ul style="list-style-type: none"> <li>• Are weekly inspections required during construction?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes</p>
<p><b>Maintenance</b></p>			

• Are maintenance agreements required?	●	√	Ordinance Findings: Yes
• Is maintenance required to be performed by a certified professional?	●	√	Ordinance Findings: No

**GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

**Note: Onsite Wastewater Treatment and Disposal provisions are still in draft form and may not be subject to this ordinance review.**

<b>GOAL #7 KEY QUESTIONS</b>	<b>DEGREE OF IMPORTANCE</b>	<b>REQUIRED BY DNREC</b>	<b>COMMENTS</b>
<b>Performance Standards</b>			
Where do local governments allow/encourage/ban standard systems versus community systems and how does that impact growth patterns			All new developments connect to sewerage system.



## TETRA TECH

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### MEMORANDUM

**To:** Merritt Burke (Town of Bridgeville)

**From:** Eugenia Hart and Kimberly Brewer

**Cc:** Jennifer Walls (DNREC); Bryan Hall (DNREC); Jennifer Volk (DNREC)

**Date:** January 24, 2012

**Subject:** Review of the Town of Bridgeville's Local Land Use Ordinances to Identify Barriers to Implementing the Chesapeake Bay Watershed Implementation Plan

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## 1 Introduction

Delaware has developed a Watershed Implementation Plan (WIP) to accompany the Chesapeake Bay nutrient and sediment total maximum daily loads (TMDLs). The WIP lays out plans for addressing existing pollutant load to the Bay as well as new pollutant loads from future land use changes. Delaware's Department of Natural Resources and Environmental Control (DNREC) has tasked Tetra Tech with assisting local Delaware municipalities in the Chesapeake Bay watershed to conduct a review of existing local municipal ordinances with regulations pertaining to new development.

The goal of the ordinance review is to provide a service to local governments in Delaware by reviewing existing land use ordinances to look for barriers to implementing the Chesapeake Bay WIP as well as identify potential opportunities for improving communities and allowing more techniques to be used to help property owners address nutrient and sediment loads from new developments. These include techniques such as green infrastructure, low impact development, conservation design, and performance standards that can allow flexibility. There are often unintended barriers to these techniques in local ordinances.

This memorandum presents the results of Tetra Tech's review of these local ordinances for the Town of Bridgeville, DE. Note that recommendations for consideration of code revisions are not mandatory. They are intended only to provide more flexibility and effectiveness in meeting resource protection goals and regulations.

## 2 Approach

In August 2011 Tetra Tech contacted the Town of Bridgeville to obtain the most recent versions of the following types of ordinances, if available:

- Subdivision ordinance

- Zoning ordinance
- Sedimentation and erosion control ordinance or regulations
- Onsite wastewater ordinance or regulations

Bridgeville staff provided their subdivision and zoning ordinances for review. The Town's Land Use and Development Ordinance requires applicants to adhere to the Sussex County Conservation District's (SCD) stormwater, sedimentation, and erosion control program. Note that SCD does not have their own stormwater, sedimentation, and erosion control standards, but adheres to Delaware's State Sediment and Stormwater Regulations (see section 3.1 below). Bridgeville does not have specific on-site wastewater regulations as all new developments hook to public water and sewer.

Once the ordinances were obtained, they were reviewed based on the Ordinance Review Checklist developed by Tetra Tech (Appendix A). The checklist contains items related to the following seven goals:

1. Minimize Effective or Connected Impervious Area
2. Preserve and Enhance the Hydrologic Function of Unpaved Areas
3. Harvest Rainwater
4. Allow and Encourage Multi-Use Stormwater Controls
5. Manage Stormwater to Meet WIP and DNREC Regulations
6. Manage Construction Site Stormwater to Meet WIP and DNREC Regulations
7. Manage On-Site Wastewater Systems to Meet WIP and DNREC Regulations

The Town of Bridgeville staff reviewed the draft memo, and recommended revisions and corrections as needed.

Barriers to each of the items on the Checklist are summarized below in Section 3 along with potential solutions to overcome these barriers.

### **3 Summary of Barriers and Potential Solutions for Implementation**

This section of the memo provides a summary of the barriers identified for each of the seven goals indicated on the Ordinance Review Checklist (Appendix A). Following the summary of each barrier, potential solutions are provided.

#### **3.1 GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

##### **Mitigation of Runoff from Effective Impervious Area**

DNREC's final draft stormwater regulations (DNREC 2011) require that local regulations and standards mitigate stormwater runoff such that there is no direct contribution of stormwater runoff from a development. Bridgeville does not have an ordinance that directly addresses this issue; however, Bridgeville currently follows the Sussex Conservation District's Sediment Control and Stormwater Management Program. SCD follows the State of Delaware's Sediment and Stormwater Regulations as a delegated agency. It is suggested that Bridgeville reference State of Delaware Sediment and Stormwater Regulations in its Land Use and Development Ordinance.

##### **Flexibility in Locating BMP Techniques On-site**

The location of low impact development (LID) best management practices (BMPs) in street and parking areas (e.g., parking medians, grass strips between sidewalk and curb, swales, etc.) is for the most part not explicitly prohibited or allowed in the ordinance. Lack of certainty about approval of these techniques can

pose a barrier to implementation. It appears that height and setback limitations for landscaping at intersections would directly prohibit the use of LID techniques such as curb bumpouts/extensions with bioretention or bioswales.

### **Clustering and Open Space Development Design**

The current Land Use and Development Ordinance does not include open space design or cluster development districts. Open space design and cluster development districts allow environmentally-sensitive use of land by clustering houses on less environmentally sensitive areas while preserving interconnected green space as habitat areas, natural stormwater management, and recreation areas. This is achieved through allowing more flexibility on minimum lot size, setbacks, yards, placement of open space, etc.

### **Street and Right-of-Way Widths**

Bridgeville's current Construction Standards and Specifications do not allow minor streets to have narrow street pavement and travel lane widths to help minimize impervious area. In addition to the environmental benefits of narrowing streets, some studies have found that narrow residential streets are safer than wide streets (Center for Watershed Protection 1998).

In the last decade, numerous neo-traditional developments have been built using techniques to narrow street and right of way width. Techniques such as curb pullouts, staggered pull-out parking areas (rather than continuous lanes), or having a parking lane on one side of the street only have been employed. These developments have been able to meet the needs of access for service and emergency vehicles as well as on-street parking while also using narrower streets and public right-of-ways than do conventional subdivisions. That said, it should be recognized that concerns about these components of LID—narrow streets and right-of-ways—make it challenging to implement. In each community, moving forward requires a great deal of discussion and problem solving with staff from the fire department, public works, engineering, and other potentially affected departments in order to address concerns and develop mutually supported ordinance and code revisions. Note that Delaware State Fire Prevention Regulations do not appear to regulate street widths in residential developments, but do provide turn-around and cul-de-sac standards that allow for fire apparatus access.

### **Minimum Parking Requirements**

Current Land Use and Development regulations establish a high minimum parking space requirement and requires overly large parking stalls and drive aisles. Together these minimum parking requirements can unnecessarily increase the overall imperviousness of the development site. Some communities allow a smaller number of parking spaces per square feet of floor area in the development, as well as allow smaller stalls and aisles (e.g., stall width of 9 feet, minimum stall length to 15 feet, and minimum drive aisle width of 22 feet). These standards minimize paved area, provide adequate parking space, and reduce development costs.

### **Incentives for Infill Development and Redevelopment of Existing Areas over "Greenfield" Development**

DNREC's draft sediment and stormwater regulations require that local regulations and standards impose less stringent runoff reduction requirements for proposed development in existing developed areas, thus providing incentives to develop in these areas rather than undeveloped or "greenfield" areas. Local land use and development requirements will need to be amended accordingly.

### **3.2 GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

#### **Encouraging or Requiring Stream Buffers**

The Phase I WIP calls for local regulations and standards that encourage or require buffers of 60 feet for secondary waterbodies and 100 feet for primary waterbodies for new development proposals. These buffers can be reduced if combined with other pollution reduction actions. The town's current Land Use and Development Ordinance does not require such riparian buffers and should be amended to address buffers and the preservation of streamside areas in natural vegetation.

#### **Minimizing Disturbance in Environmentally Sensitive Areas**

It appears that the local regulations currently allow disturbance of riparian areas, erodible soils, steep slopes, and areas of high soil infiltration. LID uses these landscape features as a part of natural stormwater management and seeks to minimize their disturbance during and after construction. Local land use and development requirements should be amended to address the protection of environmentally sensitive areas.

### **3.3 GOAL #3: HARVEST RAINWATER**

#### **Explicitly Allowing or Encouraging Rainwater Harvest**

Rainwater harvesting is not explicitly prohibited or allowed in the ordinances. However, lack of certainty about approval of these techniques can pose a barrier to implementation.

### **3.4 GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

#### **Flexibility in Locating LID Techniques in Designated Landscape and Open Space Areas**

It appears that LID techniques such as bioretention, bioswales, constructed wetlands, etc. are not allowed in required landscape, screening, and open space areas. Where these BMPs can be designed to support landscape and open space functions, flexibility should be provided in locating these BMPs where they can be most effective in managing water quality, drainage, and flooding impacts. Explicit exemptions, as-of-right use, or even incentives, should be made for the use of vegetative LID techniques in screening, buffer, and landscape areas. Additionally, consideration should be given allowing bioretention and bioswales in the right-of-way way area typically used as a grassed strip.

#### **Credit for LID Techniques that Provide Landscape and Natural Open Space Functions**

LID BMPs are not given credit by the Town as part of the required open space or landscaping area. Explicitly providing such credit would provide an incentive for developers to use LID techniques.

#### **Landscaping and Grass Control**

Certain landscape and grass control requirements could limit the use of bioretention, bioswales, and other LID techniques. One such requirement is the Brush, Grass, and Weed Ordinance, which requires that no weeds, grass, or other ground cover vegetation shall exceed a height of 8" at any time. Explicit exemptions should be made for bioretention, bioswale, and similar LID techniques properly designed.

### **3.5 GOAL #5: MANAGE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Stormwater Regulations**

DNREC's final draft sediment and stormwater regulations (June 2011) require new minimum water quality, channel protection, and conveyance and flood control requirements for new development and redevelopment. As stated earlier, it is suggested that Bridgeville reference the State of Delaware Sediment and Stormwater Regulations in the Land Use and Development Ordinance.

#### **Off-site Mitigation**

There are no provisions in the ordinance for off-site mitigation when on-site management does not meet the performance criteria. DNREC is in the final phases of developing an offset tool called the *Nutrient and Sediment Loading Assessment Protocol*. The tool allows developers to determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. This is a useful tool in determining whether or not a proposed development meets the TMDL or will need additional on-site management or off-site mitigation. Bridgeville may want to consider requiring developers to use this tool during the planning process before presenting the site plan to the planning and zoning commission for review.

### **3.6 GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Sediment and Erosion Control Regulations**

DNREC's final draft sediment and stormwater regulations (June 2011) require construction site stormwater management controls to be put in place for all construction activities exceeding 5,000 square feet of disturbance. As stated earlier, it is suggested that Bridgeville reference the State of Delaware Sediment and Stormwater Regulations in the Land Use and Development Ordinance.

### **3.7 GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WIP AND DNREC REGULATIONS**

Bridgeville does not have specific on-site wastewater regulations as all new developments are connected to public water and sewer.

## **4 Accounting and Tracking of BMP Implementation**

Bridgeville would consider tracking the implementation of BMPs in the town; however, before committing to this task they would like to be provided with additional information from DNREC on what it would entail.

It is suggested that DNREC provide the Town of Bridgeville with a list of BMPs approved for use in the Chesapeake Bay watershed TMDL model and request that Bridgeville notify DNREC if any of these types of BMPs are installed in the town so they can be appropriately credited in the Bay model.

## 5 Conclusions

Review of Bridgeville's land use ordinances resulted in several key findings. The first finding is that the Town of Bridgeville's Land Use and Development Ordinance has a number of strong features including, but not limited to:

- the Residential Planned Community Zone provides for mixed use development that requires 1/3 of the area of the residential development to be open space for a passive recreational area
- Recreational areas that are wooded must remain wooded except for walking, biking, and jogging trails.

There are some direct barriers to the use of LID techniques, such as specifications for shade trees along dedicated streets, and specifications and allowances for required screening, landscape and open space areas. To allow or encourage the use of LID techniques, the Town would need to explicitly exempt these techniques or allow them as-of-right in these areas. In other cases, there are barriers of omission: by not expressly allowing the LID technique or providing for exemptions, the ordinances generate uncertainty regarding approval and thus unintentionally provide disincentives for some LID practices.

The Town does not have an ordinance that directly addresses sediment and stormwater management. Rather, Bridgeville's Land Use and Development Ordinance requires applicants to follow the provisions and requirements contained in the Sussex Conservation District's Sediment Control and Stormwater Management Program. Considering the new federal stormwater regulations due out in late 2011 and new state stormwater regulations due in 2012, it is suggested that the Town of Bridgeville reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance, and the agency implementing the regulations (DNREC or its Delegated Agency).

Reducing impervious area in new developments can be an important part of stormwater management. Bridgeville may want to consider allowing narrower street and right-of-way widths in all new developments, while employing techniques such as curb pullouts and staggered pull-out parking areas to meet the needs of service and emergency vehicles as well as on-street parking. Bridgeville might also want to consider allowing a smaller number of parking spaces as well as smaller parking stalls and aisles in new multi-family and commercial developments.

Finally, Bridgeville might want to consider adopting DNREC's *Nutrient and Sediment Loading Assessment Protocol* as part of their Land Use and Development Ordinance. The tool can help developers determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. The tool can help to quantify the number and types of BMPs necessary on a new development site to meet the TMDL requirements.

## References

Bridgeville Brush, Grass, and Weeds Ordinance

Bridgeville Construction Standards and Specifications for Water, Sewer, and Streets

Bridgeville Land Use and Development Ordinance

Center for Watershed Protection (CWP). 1998. *Better Site Design: A Handbook for Changing Development Rules in Your Community*.

DNREC (Department of Natural Resources and Environmental Control). 2011. *Final Draft Sediment and Stormwater Regulations*. June 2011.

Delaware Department of Transportation (DelDOT). 2010. *Standards and Regulations for Subdivision Streets and State Highway Access*. Dover, DE.

Delaware State Fire Marshall. 2009. *Delaware State Fire Prevention Regulations*

Sussex Conservation District. 2011. *Sediment and Stormwater Management Checklist*  
<http://sussexconservation.org/> Accessed August 2011.

## Appendices

Appendix A. Ordinance Review Checklist

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## Appendix A. Ordinance Review Checklist

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# Local Development Ordinance Tools/Techniques for Implementing Delaware's Chesapeake Bay Watershed Implementation Plan & DNREC Final Draft Sediment and Stormwater Regulations

## Town of Bridgeville Ordinance Review Checklist

### Town of Bridgeville Ordinances Reviewed

Land Use and Development

Brush, Grass, and Weeds

Construction Standards and Specifications for Water, Sewer, and Streets

*[Note: The following Ordinance Checklist is based on Delaware's Phase I Chesapeake Bay Watershed Implementation Plan (November 2010); Final Draft Sediment and Stormwater Regulations (DNREC, June 2011); Protecting Water Quality with Smart Growth Strategies and Natural Stormwater Management in Sussex County (January, 2009); Better Site Design: A Handbook for Changing Development Rules in Your Community (CWP, 1998); Low-Impact Development Design Strategies, An Integrated Approach (USEPA, 2000); and Tetra Tech's review of numerous local ordinances to identify opportunities and barriers to green infrastructure and low impact development techniques].*

**Degree of Importance Key to Symbols:**

- Essential
- ◐ Very important
- Important

**GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

- Objective: Minimize impervious area associated with streets.
- Objective: Minimize impervious area associated with parking.
- Objective: Minimize impervious area associated with driveways and sidewalks.
- Objective: Clustering development.
- Objective: Incorporate sustainable hydrology practices into urban redevelopment.

GOAL #1 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Overall Effective Impervious Area</b>			
<ul style="list-style-type: none"> <li>● Is impervious area required to be controlled such that there is no direct contribution of stormwater runoff (i.e., the equivalent of 0% effective impervious area)?</li> </ul>	●	√	<p>Note: DNREC’s Final Draft stormwater regulations require that after runoff reduction practices have been implemented on disturbed area, the site’s impervious area shall not directly contribute stormwater runoff during a rain event that has an 99% annual probability of occurring. See Goal # 5 performance criteria.</p> <p>Ordinance Findings: No</p>
<b>Streets</b> (Note: Also check Fire Marshal’s Code to see how it impacts the following goals)			
<ul style="list-style-type: none"> <li>● For residential development, are the street pavement widths allowed to be between 18 to 22 feet, with curb pullouts for passing of large vehicles?</li> </ul>	●		<p>Ordinance Findings: No Construction Standards and Specifications for Streets require pavement width for Minor Streets and Residential Planned Community Streets to be 25’9”, and 25’5” respectively.</p>
<ul style="list-style-type: none"> <li>● Are travel lanes allowed to be from 12 to 10 feet (or less), with curb pullouts for passing of large vehicles?</li> </ul>	●		<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>● Are curb bumpouts/extensions allowed near intersections and mid-block for traffic-calming and bioretention opportunities?</li> </ul>	◐		<p>Ordinance Findings: Limited opportunity Land Use and Development 234, Article XII, § 234.52 At street intersections, nothing</p>

			shall be planted or allowed to grow higher than 2 ½ feet within the sight triangle measured along the right-of-way line above the curb level of the intersecting street for a distance of 20 feet from the intersection...
<ul style="list-style-type: none"> <li>• Is pervious paving allowed for on-street parking and alleyways?</li> </ul>	○		Ordinance Findings: No Concrete and bituminous surface is required per the Town's construction standards and specifications.
<ul style="list-style-type: none"> <li>• Are grass swales or bioretention swales allowed instead of curb and gutter or with curb cuts (where slopes allow)?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.  Potential barrier: The Brush, Grass and Weeds Ordinance Chapter 90, § 90.2 establishes a maximum height states that no weeds, grass or ground cover vegetation shall exceed 8" at any time.
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, is the radius required to be 35 feet or less?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.  2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads >300 ft in length.
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, are landscaped islands or bioretention islands allowed or encouraged?</li> </ul>	○		Ordinance Findings: No  2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads >300 ft in length.
<ul style="list-style-type: none"> <li>• Are site designs required to promote the most efficient street layout to reduce overall street length?</li> </ul>	○		Ordinance Findings: No
<b>Parking</b>			
<ul style="list-style-type: none"> <li>• Is the minimum stall width for a standard parking space 9 ft. or less?</li> </ul>	●		Ordinance Findings: No Land Use and Development 234 Article XIX

			§151 234-87(E)(1)(a). 10 ft width required
• Are parking stall lengths allowed to be 15 ft.?	<input checked="" type="radio"/>		Ordinance Findings: No Land Use and Development 234 Article XIX §151 234-87(E)(1)(a). 20 ft length required
• Are parking lot drive aisles allowed to be 22 ft.?	<input type="radio"/>		Ordinance Findings: No Land Use and Development 234 Article XIX §151 234-87(E)(2) 25 ft width required
• Are bioretention cells allowed in parking medians?	<input checked="" type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• Are consolidated travel lanes and on-street parking allowed to create space for bioretention?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• Are pervious surfaces such as paver stones, porous pavement, or grass pavers allowed for on-street parking?	<input type="radio"/>		Ordinance Findings: No Concrete and bituminous surface is required per the Town's construction standards and specifications.
• For office buildings, is the required parking ratio 3.0 spaces per 1,000 sq.ft. of gross floor area or less?	<input type="radio"/>		Ordinance Findings: No Land Use and Development 234 Article XIX §151 234-87(B) 1 space per 200 sq.ft. of floor area
• For commercial centers, is the required parking ratio 2 to 4.5 spaces per 1,000 sq.ft. of gross floor area or less?	<input type="radio"/>		Ordinance Findings: No Land Use and Development 234 Article XIX §151 234-87(B) 1 space per 200 sq.ft. of floor area, plus 1 for each 2 employees on the largest shift
• Are proposed developments allowed to take advantage of opportunities for shared parking?	<input type="radio"/>		Ordinance Findings: Yes
• Are proposed developments allowed to have parking stalls under the second floor podium?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<b>Driveways/Sidewalks</b>			
• Are driveway standards 9 feet or less in width?	<input type="radio"/>		Ordinance Findings: Not addressed

<ul style="list-style-type: none"> <li>• Are shared driveways allowed?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• If sidewalks are required, are they required to be designed to the narrowest allowable width (e.g, 4 ft.)?</li> </ul>	○		Ordinance Findings: No Construction Standards and Specifications for Sidewalks require 5 ft. in width
<ul style="list-style-type: none"> <li>• Are sidewalks allowed to be on one side of the street only?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.
<b>Clustering Development</b>			
<ul style="list-style-type: none"> <li>• Is redevelopment encouraged in lieu of greenfield development through site performance standards?</li> </ul>	●	√	Note: DNREC's Final Draft stormwater regulations recognize the benefit of redevelopment, and have less stringent performance standards for proposed development in existing developed areas. See Goal # 5 performance criteria. Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Is Conservation or Open Space Design an option?</li> </ul>	●		Ordinance Findings: No However, the Land Use and Development 234 Article VIII Residential Planned Community Zone provides for mixed use development. §234-37(D)(3) requires 1/3 of the area of the residential development to be open pace for passive recreational area
<ul style="list-style-type: none"> <li>• To encourage clustering and open space design, are setbacks minimized (e.g., for residential lots that are 1/2-acre or less in size, is the front set back 20 feet or less, the rear setback 25 feet or less, and the side setback 8 feet or less?)</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Are site designs required to have development focused on areas of lesser slopes and farther from watercourses?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Are policies effective in encouraging higher density development to be centered around transportation corridors?</li> </ul>	○		Note that it is important for towns to allow density bonuses for protecting certain features, preserving open space, and limiting sprawl. Ordinance Findings: No

## GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS

Objective: Minimize building footprint/envelope area.

Objective: Preserve topsoil structure.

Objective: Preserve sensitive wetlands.

Objective: Preserve sensitive soils.

Objective: Preserve sensitive stream buffers.

GOAL #2 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Topsoil Structure &amp; Building Footprint</b>			
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas required to be phased?</li> </ul>	●	√	Note: DNREC's performance criteria for construction site management include limits on site disturbance. See Goal #6 performance criteria. Ordinance Findings: Yes Conservation District Checklist
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas and riparian areas required to be minimized?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are building envelopes required/encouraged to avoid sensitive environmental areas such as riparian areas, wetlands, high infiltration soils, and steep slopes?</li> </ul>	◐		Ordinance Findings: No
<b>Wetlands</b>			
<ul style="list-style-type: none"> <li>Are site designs required to minimize hydrologic alteration to existing wetlands?</li> </ul>	●	√	Note: there are state regulations prohibiting the disturbance of certain wetlands.
<b>Sensitive Soils</b>			
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid highly erodible soils?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid soils with high permeability (e.g., Hydrologic Soil Group A and B)?</li> </ul>	◐		Ordinance Findings: No
<b>Stream Buffers</b>			
<ul style="list-style-type: none"> <li>Is a 60- to 100-foot stream buffer required/encouraged for new development?</li> </ul>	●		Note: The Phase I WIP recommends 100 ft for primary waters and 60 ft for secondary waters; can be reduced if

			combined with other pollution reduction actions. This buffer recommendation is applicable to those areas where buffers are voluntary (i.e., not the Dept. of Ag's 30 ft buffer or CAFO buffers) Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Are stream buffers for new development required to remain in a natural state?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Are site designs required to preserve existing runoff pathways to adequately support existing wetlands?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Is a 50-foot wetland buffer required/encouraged?</li> </ul>	<input type="radio"/>		Ordinance Findings: No

**GOAL #3: HAVEST RAINWATER**

Objective: Allow rainwater harvesting through plumbing code provisions.

Objective: Allow the use of downspout disconnection/redirection, rain barrels, and above-and below-ground cisterns for rainwater harvesting

GOAL #3 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<ul style="list-style-type: none"> <li>• Can downspouts be disconnected or redirected to discharge into a rain barrel or yard?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are interior or exterior cisterns allowed?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Can rain barrels be placed within standard zoning setback areas?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Do zoning and building provisions allow cisterns to be placed on rooftops to harvest rainwater?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Is harvested rainwater allowed to be used for nonpotable interior uses such as toilet flushing?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.

### GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS

Objective: Allow and encourage stormwater controls as multiple use in open space areas.

Objective: Allow and encourage stormwater controls as multiple use in landscaped areas.

GOAL #4 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Landscaped Areas</b>			
<ul style="list-style-type: none"> <li>Are bioretention areas allowed to be constructed in the development's designated landscape areas, if properly designed?</li> </ul>	●		<p>Ordinance Findings: No Location of bioretention is not included in the ordinances Brush, Grass, and Weed Ordinance Chapter 96 § 90-2 No weeds, grass, or other ground cover vegetation shall exceed a height of 8" at any time.</p> <p>The Conservation District's Sediment and Stormwater checklist expressly prohibits infiltration practices from being located within 20 feet of basement walls.</p>
<ul style="list-style-type: none"> <li>Are bioretention areas given "credit" as landscape area to count as a percent of the required landscaping?</li> </ul>	●		<p>Ordinance Findings: No Location of bioretention is not included in the Land Use and Development Ordinance</p>
<ul style="list-style-type: none"> <li>Do landscaping requirements allow plantings conducive to bioretention, bioswales, raingardens, and other LID BMPs?</li> </ul>	●		<p>Ordinance Findings: No See planting and vegetation notes above</p>
<ul style="list-style-type: none"> <li>Do tree planting requirements allow use of raingardens, tree boxes, and other LID BMPs?</li> </ul>	●		<p>Ordinance Findings: No Location of bioretention and other LID BMPs is not included in the Land Use and Development ordinance</p>
<b>Open Space Areas</b>			
<ul style="list-style-type: none"> <li>Are there open space preservation requirements or incentives?</li> </ul>	◐		<p>Ordinance Findings: No The Land Use and Development Ordinance 234, Article XX Recreation, Open Space, Screening Shade § 234-89(B) Does require a percentage of</p>

			the tract to be dedicated as park and recreation area, however from it is small percentage of the site except for high density development (e.g. 100 units per acre or greater). Moreover, the land dedicated can be in active recreation unless it is currently wooded.
<ul style="list-style-type: none"> <li>Is preserved open space required to be managed in a natural condition?</li> </ul>	●		Ordinance Findings: No Except as noted above, dedicated recreation area which is wooded must remain wooded except for walking, biking, and jogging trails
<ul style="list-style-type: none"> <li>Are structural LID techniques such as constructed wetlands, swales, and bioretention areas allowed to be constructed in a development's designated open space, if properly designed?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are structural LID techniques such as constructed wetlands, swales, and bioretention areas given "credit" as open space to count as a percent of the required open space area, if properly designed?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Does protection of sensitive, natural areas and habitat qualify as credit for local open space dedication?</li> </ul>	●		Ordinance Findings: Not expressly allowed or prohibited.

**GOAL #5: MANAGE STORMWATER TO MEET WATERSHED IMPLEMENTATION PLAN & DNREC STORMWATER REGULATIONS**

- Objective: Meet DNREC stormwater regulations
- Objective: Replicate the predevelopment hydrology of the site, to the extent practicable.
- Objective: Maintain water quality functions of the watershed.
- Objective: Minimize channel erosion impacts.
- Objective: Minimize flooding impacts.
- Objective: Inspect BMPs to ensure proper construction and design.
- Objective: Long-term maintenance.

GOAL #5 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Stormwater Ordinance Provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• Is stormwater required to be retained/infiltrated onsite (through bioretention, natural areas, and swale infiltration) where possible?</li> </ul>	●	√	Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC Resource Protection Criteria</li> </ul>	●	√	<p>Note: For the 1-yr, 24 hour rainfall event, meet the following standards:                      Predevelopment wood/meadow – runoff reduction practices will yield the equivalent wooded condition for these areas.                      All remaining disturbed area shall achieve the equivalent of 0% effective imperviousness.                      The remaining discharge, if any, shall not exceed the 24-hour detention of the 1yr, 24 hr storm and an offsite offset is required for the portion of the storm not meeting the minimum requirements.                      Additional water quality treatment BMPs shall be required if runoff reduced is not sufficient to meet the TMDL.</p> <p>Ordinance Findings: No                      The Conservation District’s Sediment and Stormwater checklist SM 11 requires wet ponds to be designed to release the quality of stormwater runoff over a 24 hour period. Practices that have a permanent pool are to be designed to release the first inch of runoff</p>

			from the site over a 24 hour period. SM 12 requires infiltration practices to accept, at least, the first inch of runoff from all streets, roadways, and parking lots.
<ul style="list-style-type: none"> <li>• DNREC Conveyance Criteria for Channel Protection</li> </ul>	●	√	<p>Note: Conveyance Volume is the 10 yr, 24 hr rainfall event (or the volume of runoff produced by the post-development storm having a 10% chance of occurring)- less any volume reduction achieved through meeting the Resource Protection Criteria.</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Yes (it appears that the Conservation District standard below could meet this requirement.)</p> <p>The Conservation District's Sediment and Stormwater checklist SM 10 states that the pos-development peak rates of discharge for the 2- and 10-year storm events shall not exceed the predevelopment peak rates of discharge for the 2- and 10- year storm events.</p>
<ul style="list-style-type: none"> <li>• DNREC Flood Event Criteria</li> </ul>	●	√	<p>Volume of runoff produced by 100 yr, 24 hr rainfall event (or post-development storm having a 1% probability of occurrence).</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Not addressed in ordinances and standards reviewed.</p>
<ul style="list-style-type: none"> <li>• Alternative Criteria</li> </ul>	●	√	Land development that discharges to state waters included in a Designated Watershed or other watershed

			management plan approved in accordance with DNREC stormwater regulations shall meet alternative criteria in the approved plan.
<ul style="list-style-type: none"> <li>• Redevelopment Criteria</li> </ul>	●	√	<p>Recognizing the importance of redevelopment over greenfield development, redevelopment areas are required to only achieve a 50% reduction in effective impervious area based on existing conditions. Only the <u>increases</u> in the rate, volume, and duration of flow for the channel volume and flooding volume will need to comply with the DNREC stormwater regulations.</p> <p>A brownfield development remediation plan may meet the stormwater goals and intent of the DNREC stormwater regulations if approved by DNREC.</p> <p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	●	√	<p>Agricultural land having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meets DOA requirements.</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes</p> <p>Conservation District Program</p>
<b>Inspections</b>			
<ul style="list-style-type: none"> <li>• Are inspections required during construction and routinely after construction?</li> </ul>	●	√	<p>Ordinance Findings: Yes</p> <p>Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	●	√	<p>Note: DNREC requires a Certified Construction Reviewer</p> <p>Ordinance Findings: Yes</p> <p>Conservation District Checklist</p>
<b>Maintenance</b>			

• Are maintenance agreements required?	<input checked="" type="radio"/>	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	<input checked="" type="radio"/>	√	Ordinance Findings: No
<b>Off-Site Mitigation</b>			
• Is offsite mitigation required when on-site management does not meet the performance criteria (unless there is proof of no adverse impact)?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is the DE Nutrient Protocol program required to calculate offsets?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for forested area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for riparian area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for BMP retrofit allowed in the same named watershed?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is nutrient banking or the equivalent land banking allowed in the same named watershed? Is redevelopment encouraged in lieu of greenfield development?	<input type="radio"/>		Ordinance Findings: No
<b>Local Stormwater Utility Ordinance</b>			
• Does an ordinance exist to support the development of a local stormwater utility?	<input checked="" type="radio"/>		Ordinance Findings: No

**GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

Objective: Meet DNREC stormwater regulations

Objective: Minimize erosion and sedimentation and delivery of nonpoint source pollutants during construction activities.

Objective: Inspect BMPs ensure proper construction and design.

Objective: Maintain BMPs.

GOAL #6 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Sedimentation and Erosion Control provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• DNREC Turbidity Stormwater Management</li> </ul>	●	√	Best Available Technology shall be employed to manage turbid waters in accordance with state regulations. Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC requirement of Sediment and Stormwater Management Plans</li> </ul>	●	√	Ordinance Findings: Yes Conservation District Checklist
<ul style="list-style-type: none"> <li>• DNREC Land Disturbance Criteria</li> </ul>	●	√	Use of standard details for DE Erosion and Sedimentation Control Handbook-limited to sites where no more than 10 acres draining to a common discharge point will be disturbed at any one time. Ordinance Findings: No  Construction site BMPs intended to manage areas greater than 10 acres shall have supporting design computations. Ordinance Findings: No  In no case shall an area of disturbance draining to a common point exceed 20 acres. Grading within that drainage area shall not proceed unless temporary or permanent stabilization has been accomplished. All plans shall include a limit of disturbance line. Ordinance Findings: Yes Conservation District Checklist

<ul style="list-style-type: none"> <li>• DNREC Site Stabilization Criteria</li> </ul>	<p>●</p>	<p>√</p>	<p>Following soil disturbance or redisturbance, permanent or temporary stabilization shall be completed for all perimeter sediment controls, topsoil stockpiles, or other graded/disturbed areas within 14 calendar days unless a more restrictive federal requirement applies.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p> <p>Documentation of soil testing and materials used for stabilization shall be provided for verification.</p> <p>Ordinance Findings: Not addressed</p> <p>Release of financial guarantee and or issuance of Notice of Completion shall not occur until final stabilization of all exposed areas is achieved.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	<p>●</p>	<p>√</p>	<p>Agricultural having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meet DOA requirements</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<p><b>Inspections</b></p>			
<ul style="list-style-type: none"> <li>• Are weekly inspections required during construction?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>

<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	●	√	<p>Ordinance Findings: Yes Conservation District Checklist</p>
<p><b>Maintenance</b></p>			
<ul style="list-style-type: none"> <li>• Are maintenance agreements required?</li> </ul>	●	√	<p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Is maintenance required to be performed by a certified professional?</li> </ul>	●	√	<p>Ordinance Findings: No</p>

**GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

**Note: Onsite Wastewater Treatment and Disposal provisions are still in draft form and may not be subject to this ordinance review.**

GOAL #7 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards</b>			
<p>Where do local governments allow/encourage/ban standard systems versus community systems and how does that impact growth patterns</p>			<p>This question will likely not apply to towns with sewer. Most likely a county issue.</p> <p>Chapter 190 SEWERS article I §190-3: [Amended 4-11-2005 by Ord. No. A05-5]</p> <p>It shall be unlawful to construct or maintain any privy, privy vault, septic tank, cesspool or other facility intended or used for the disposal of sewage, except as hereinafter provided. The owners of all houses, buildings, and properties used for human occupation, recreation, employment or other purposes situated within the Town of Bridgeville are hereby required at their expense to install suitable toilet facilities therein and to connect such facilities directly with the property public sewer in accordance with the provisions of this article within 90 days after the date of official notice to do so.</p> <p>§190-5: When a public sanitary or combined sewer is not made available by the Town of Bridgeville, the building sewer shall be connected to a private sewage disposal system complying with the requirements of state and local regulatory agencies. No construction shall begin nor connection made until permission has been obtained from the Town of Bridgeville or its agents and state and local regulatory agencies.</p>



## TETRA TECH

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### MEMORANDUM

**To:** Sara Bynum-King (Town of Delmar)

**From:** Eugenia Hart and Kimberly Brewer

**Cc:** Jennifer Walls (DNREC); Bryan Hall (DNREC); Jennifer Volk (DNREC)

**Date:** January 24, 2012

**Subject:** Review of the Town of Delmar's Local Land Use Ordinances to Identify Barriers to Implementing the Chesapeake Bay Watershed Implementation Plan

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## 1 Introduction

Delaware has developed a Watershed Implementation Plan (WIP) to accompany the Chesapeake Bay nutrient and sediment total maximum daily loads (TMDLs). The WIP lays out plans for addressing existing pollutant load to the Bay as well as new pollutant loads from future land use changes. Delaware's Department of Natural Resources and Environmental Control (DNREC) has tasked Tetra Tech with assisting local Delaware municipalities in the Chesapeake Bay watershed to conduct a review of existing local municipal ordinances with regulations pertaining to new development.

The goal of the ordinance review is to provide a service to local governments in Delaware by reviewing existing land use ordinances to look for barriers to implementing the Chesapeake Bay WIP as well as identify potential opportunities for improving communities and allowing more techniques to be used to help property owners address nutrient and sediment loads from new developments. These include techniques such as green infrastructure, low impact development, conservation design, and performance standards that can allow flexibility. There are often unintended barriers to these techniques in local ordinances.

This memorandum presents the results of Tetra Tech's review of these local ordinances for the Town of Delmar, DE. Note that recommendations for consideration of code revisions are not mandatory. They are intended only to provide more flexibility and effectiveness in meeting resource protection goals and regulations.

## 2 Approach

In August 2011 Tetra Tech contacted the Town of Delmar to obtain the most recent versions of the following types of ordinances, if available:

- Subdivision ordinance
- Zoning ordinance

- Sedimentation and erosion control ordinance or regulations
- Onsite wastewater ordinance or regulations

Delmar staff provided their Planning and Zoning Regulations for review.

Once the ordinances were obtained, they were reviewed based on the Ordinance Review Checklist developed by Tetra Tech (Appendix A). The checklist contains items related to the following seven goals:

1. Minimize Effective or Connected Impervious Area
2. Preserve and Enhance the Hydrologic Function of Unpaved Areas
3. Harvest Rainwater
4. Allow and Encourage Multi-Use Stormwater Controls
5. Manage Stormwater to Meet WIP and DNREC Regulations
6. Manage Construction Site Stormwater to Meet WIP and DNREC Regulations
7. Manage On-Site Wastewater Systems to Meet WIP and DNREC Regulations

The Town of Delmar staff reviewed the draft memo, and recommended revisions and corrections as needed.

Barriers to each of the items on the Checklist are summarized below in Section 3 along with potential solutions to overcome these barriers.

### **3 Summary of Barriers and Potential Solutions for Implementation**

This section of the memo provides a summary of the barriers identified for each of the seven goals indicated on the Ordinance Review Checklist (Appendix A). Following the summary of each barrier, potential solutions are provided.

#### **3.1 GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

##### **Mitigation of Runoff from Effective Impervious Area**

DNREC's final draft stormwater regulations (DNREC 2011) require that local regulations and standards mitigate stormwater runoff such that there is no direct contribution of stormwater runoff from a development. Delmar does not have an ordinance that directly addresses this issue; however, Delmar currently follows the provisions and requirements contained in the Sussex Conservation District's Sediment Control and Stormwater Management Program. SCD follows the State of Delaware's Sediment and Stormwater Regulations as a delegated agency. It is suggested that Delmar reference State of Delaware Sediment and Stormwater Regulations in their Planning and Zoning Regulations.

##### **Flexibility in Locating BMP Techniques On-site**

The location of low impact development (LID) best management practices (BMPs) in street and parking areas (e.g., parking medians, grass strips between sidewalk and curb, swales, etc.) is for the most part not explicitly prohibited or allowed in the ordinance. Lack of certainty about approval of these techniques can pose a barrier to implementation. It appears that height and setback limitations for landscaping at intersections would directly prohibit the use of LID techniques such as curb bumpouts/extensions with bioretention or bioswales.

### **Street and Right-of-Way Widths**

Delmar's current Planning and Zoning Regulations do not allow minor streets to have narrow street pavement and travel lane widths to help minimize impervious area. In addition to the environmental benefits of narrowing streets, some studies have found that narrow residential streets are safer than wide streets (Center for Watershed Protection 1998).

In the last decade, numerous neo-traditional developments have been built using techniques to narrow street and right of way width. Techniques such as curb pullouts, staggered pull-out parking areas (rather than continuous lanes), or having a parking lane on one side of the street only have been employed. These developments have been able to meet the needs of access for service and emergency vehicles as well as on-street parking while also using narrower streets and public right-of-ways than do conventional subdivisions. That said, it should be recognized that concerns about these components of LID—narrow streets and right-of-ways—make it challenging to implement. In each community, moving forward requires a great deal of discussion and problem solving with staff from the fire department, public works, engineering, and other potentially affected departments in order to address concerns and develop mutually supported ordinance and code revisions. Note that Delaware State Fire Prevention Regulations do not appear to regulate street widths in residential developments, but do provide turn-around and cul-de-sac standards that allow for fire apparatus access.

### **Minimum Parking Requirements**

Current planning and zoning regulations establish a high minimum parking space requirement and requires overly large parking stalls and drive aisles. Together these minimum parking requirements can unnecessarily increase the overall imperviousness of the development site. Some communities allow a smaller number of parking spaces per square feet of floor area in the development, as well as allow smaller stalls and aisles (e.g., stall width of 9 feet, minimum stall length to 15 feet, and minimum drive aisle width of 22 feet). These standards minimize paved area, provide adequate parking space, and reduce development costs.

### **Clustering and Open Space Development Design**

Open space design and cluster development zones allow environmentally-sensitive use of land by clustering houses on less environmentally sensitive areas while preserving interconnected green space as habitat areas, natural stormwater management, and recreation areas. This is achieved through allowing more flexibility on minimum lot size, setbacks, yards, placement of open space, etc. The current planning and zoning regulations do not include a conservation design or open space design overlay. While the regulations do provide for cluster development in R1 and R4 zoning districts, Delmar might want to consider narrowing the setback requirements.

### **Incentives for Infill Development and Redevelopment of Existing Areas over "Greenfield" Development**

DNREC's draft sediment and stormwater regulations (June 2011) require that local regulations and standards impose less stringent runoff reduction requirements for proposed development in existing developed areas, thus providing incentives to develop in these areas rather than undeveloped or "greenfield" areas. Local planning and zoning requirements will need to be amended accordingly.

## **3.2 GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

### **Encouraging or Requiring Stream Buffers**

The Phase I WIP calls for local regulations and standards that encourage or require buffers of 60 feet for secondary waterbodies and 100 feet for primary waterbodies for new development proposals. These buffers can be reduced if combined with other pollution reduction actions. The town's current Planning and Zoning Regulations do not require such riparian buffers and should be amended accordingly.

### **Minimizing Disturbance in Environmentally Sensitive Areas**

It appears that the local regulations currently allow disturbance of riparian areas, erodible soils, steep slopes, and areas of high soil infiltration. LID uses these landscape features as a part of natural stormwater management and seeks to minimize their disturbance during and after construction. Local land use and development requirements should be amended to address the protection of environmentally sensitive areas.

### **3.3 GOAL #3: HARVEST RAINWATER**

#### **Explicitly Allowing or Encouraging Rainwater Harvest**

Rainwater harvesting is not explicitly prohibited or allowed in the Planning and Zoning Regulations. However, lack of certainty about approval of these techniques can pose a barrier to implementation.

### **3.4 GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

#### **Flexibility in Locating LID Techniques in Designated Landscape and Open Space Areas**

In the limited cases where landscaping, screening, and open space requirements appear in the ordinance, it appears that LID techniques such as constructed wetlands, bioretention, bioswales, etc. are not allowed, with the exception of R4 Zoning Districts. Where these BMPs can be designed to support landscape and open space functions, flexibility should be provided in locating these BMPs where they can be most effective in managing water quality, drainage, and flooding impacts. Explicit exemptions, as-of-right use, or even incentives, should be made for the use of vegetative LID techniques in screening, buffer, and landscape areas.

The Town's street construction and design standards were not located in the review. Typically these standards include requirements for grass strips in the street right-of-ways such that bioswales and bioretention areas are prohibited. Consideration should be given allowing bioretention and bioswales in the right-of-way area typically used as a grassed strip.

#### **Credit for LID Techniques that Provide Landscape and Natural Open Space Functions**

LID BMPs are not given credit by the Town as part of the required open space and landscaping area. Explicitly providing such credit would provide an incentive for developers to use LID techniques.

### **3.5 GOAL #5: MANAGE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Stormwater Regulations**

DNREC's final draft sediment and stormwater regulations (June 2011) require new minimum water quality, channel protection, and conveyance and flood control requirements for new development and redevelopment. As stated earlier, it is suggested that Delmar reference the State of Delaware Sediment and Stormwater Regulations in the Planning and Zoning Regulations.

#### **Off-site Mitigation**

There are no provisions in the regulations for off-site mitigation when on-site management does not meet the performance criteria. DNREC is in the final phases of developing an offset tool called the *Nutrient and Sediment Loading Assessment Protocol*. The tool allows developers to determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. This is a useful tool in determining whether or not a proposed development meets the TMDL or will need additional on-site

management or off-site mitigation. Delmar may want to consider requiring developers to use this tool during the planning process before presenting the site plan to the planning and zoning commission for review.

### **3.6 GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Sediment and Erosion Control Regulations**

DNREC's final draft sediment and stormwater regulations (June 2011) require construction site stormwater management controls to be put in place for all construction activities exceeding 5,000 square feet of disturbance. As stated earlier, it is suggested that Delmar reference the State of Delaware Sediment and Stormwater Regulations in the Planning and Zoning Regulations.

### **3.7 GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WIP AND DNREC REGULATIONS**

Delmar's Planning and Zoning Regulations require that where a public sanitary sewerage is located within five hundred feet of the boundary of the subdivision, then the developer shall, upon recommendation of feasibility by the Town Engineer, extend the main to the subdivision and provide sewers accessible to each lot in the subdivision.

The Planning and Zoning Regulations also require mandatory connection to public sewer systems if a public sanitary sewer is placed in a street or alley abutting a property. If public sanitary sewer is accessible by a property, it is unlawful for that property to maintain an individual sewerage disposal system.

If public sewer facilities are not available an individual disposal system shall be determined by percolation tests and requirements of the State and County Health Authorities.

## **4 Accounting and Tracking of BMP Implementation**

The Town of Delmar has discussed tracking BMP implementation; however, it is a difficult task because they are a bi-state town. It is suggested that DNREC provide the Delmar with a list of BMPs approved for use in the Chesapeake Bay watershed TMDL model and request that Delmar notify DNREC if any of these types of BMPs are installed in the town so they can be appropriately credited in the Bay model.

## **5 Conclusions**

Review of Delmar's Planning and Zoning regulations resulted in several key findings. The first finding is that the Town of Delmar's Planning and Zoning regulations have a number of strong features including, but not limited to:

- Sidewalks width of 4 feet
- Cluster development allowed in R1 and R4 zoning districts
- Open space requirements

There are some direct barriers to the use of LID techniques, such as specifications and allowances for required screening, landscape and open space areas. To allow or encourage the use of LID techniques, the

Town would need to explicitly exempt these techniques or allow them as-of-right in these areas. The Town should consider allowing bioretention and bioswales in the right-of-way way area typically used as a grassed strip.

In some cases, there are barriers of omission in the ordinances: by not expressly allowing the LID technique or providing for exemptions, the ordinances generate uncertainty regarding approval and thus unintentionally provide disincentives for some LID practices.

The Town does not have an ordinance that directly addresses sediment and stormwater management. Rather, Delmar currently follows the provisions and requirements contained in the Sussex Conservation District's Sediment Control and Stormwater Management Program. Considering the new federal stormwater regulations due out in late 2011 and new state stormwater regulations due in 2012, it is suggested that the Town of Delmar reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance, and the agency implementing the regulations (DNREC or its Delegated Agency).

Reducing impervious area in new developments can be an important part of stormwater management. Delmar may want to consider allowing narrower street and right of way widths in all new developments, while employing techniques such as curb pullouts and staggered pull-out parking areas to meet the needs of service and emergency vehicles as well as on-street parking. Delmar might also want to consider allowing a smaller number of parking spaces as well as smaller parking stalls and aisles in new multi-family and commercial developments.

Finally, Delmar might want to consider adopting DNREC's *Nutrient and Sediment Loading Assessment Protocol* as part of their Planning and Zoning Regulations. The tool can help developers determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. The tool can help to quantify the number and types of BMPs necessary on a new development site to meet the TMDL requirements.

## References

Center for Watershed Protection (CWP). 1998. *Better Site Design: A Handbook for Changing Development Rules in Your Community*.

Delmar Planning and Zoning Regulations

DNREC (Department of Natural Resources and Environmental Control). 2011. *Final Draft Sediment and Stormwater Regulations*. June 2011.

Delaware Department of Transportation (DelDOT). 2010. *Standards and Regulations for Subdivision Streets and State Highway Access*. Dover, DE.

Delaware State Fire Marshall. 2009. *Delaware State Fire Prevention Regulations*

Sussex Conservation District. 2011. *Sediment and Stormwater Management Checklist* <http://sussexconservation.org/> Accessed August 2011.

## Appendices

Appendix A. Ordinance Review Checklist

## Appendix A. Ordinance Review Checklist

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# Local Development Ordinance Tools/Techniques for Implementing Delaware's Chesapeake Bay Watershed Implementation Plan & DNREC Final Draft Sediment and Stormwater Regulations

## Town of Delmar Ordinance Review Checklist

### Town of Delmar Ordinances Reviewed Planning and Zoning Regulations

*[Note: The following Ordinance Checklist is based on Delaware's Phase I Chesapeake Bay Watershed Implementation Plan (November 2010); Final Draft Sediment and Stormwater Regulations (DNREC, June 2011); Protecting Water Quality with Smart Growth Strategies and Natural Stormwater Management in Sussex County (January, 2009); Better Site Design: A Handbook for Changing Development Rules in Your Community (CWP, 1998); Low-Impact Development Design Strategies, An Integrated Approach (USEPA, 2000); and Tetra Tech's review of numerous local ordinances to identify opportunities and barriers to green infrastructure and low impact development techniques].*

**Degree of Importance Key to Symbols:**

- Essential
- ◐ Very important
- Important

**GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

- Objective: Minimize impervious area associated with streets.
- Objective: Minimize impervious area associated with parking.
- Objective: Minimize impervious area associated with driveways and sidewalks.
- Objective: Clustering development.
- Objective: Incorporate sustainable hydrology practices into urban redevelopment.

GOAL #1 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Overall Effective Impervious Area</b>			
<ul style="list-style-type: none"> <li>• Is impervious area required to be controlled such that there is no direct contribution of stormwater runoff (i.e., the equivalent of 0% effective impervious area)?</li> </ul>	●	√	<p>Note: DNREC's Final Draft stormwater regulations require that after runoff reduction practices have been implemented on disturbed area, the site's impervious area shall not directly contribute stormwater runoff during a rain event that has an 99% annual probability of occurring. See Goal # 5 performance criteria.</p> <p>Ordinance Findings: No</p>
<b>Streets</b> (Note: Also check Fire Marshal's Code to see how it impacts the following goals)			
<ul style="list-style-type: none"> <li>• For residential development, are the street pavement widths allowed to be between 18 to 22 feet, with curb pullouts for passing of large vehicles?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Are travel lanes allowed to be from 12 to 10 feet (or less), with curb pullouts for passing of large vehicles?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Are curb bumpouts/extensions allowed near intersections and mid-block for traffic-calming and bioretention opportunities?</li> </ul>	◐		<p>Ordinance Findings: Limited opportunity</p> <p>Planning and Zoning Regulations, Section 3 (G)</p> <p>Plantings above a height of 3 ft shall not be permitted within 10 feet of the intersection of</p>

			the right- of-way lines of two streets.
• Is pervious paving allowed for on-street parking and alleyways?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• Are grass swales or bioretention swales allowed instead of curb and gutter or with curb cuts (where slopes allow)?	<input checked="" type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• If there are cul-de-sacs, is the radius required to be 35 feet or less?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.  2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads >300 ft in length.
• If there are cul-de-sacs, are landscaped islands or bioretention islands allowed or encouraged?	<input type="radio"/>		Ordinance Findings: No  2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads >300 ft in length.
• Are site designs required to promote the most efficient street layout to reduce overall street length?	<input type="radio"/>		Ordinance Findings: No
<b>Parking</b>			
• Is the minimum stall width for a standard parking space 9 ft. or less?	<input checked="" type="radio"/>		Ordinance Findings: No Planning and Zoning Regulations Section 22, §125 (A)(2) 10 ft width required
• Are parking stall lengths allowed to be 15 ft.?	<input checked="" type="radio"/>		Ordinance Findings: No Planning and Zoning Regulations Section 22, §125 (A)(2)20 ft length required
• Are parking lot drive aisles allowed to be 22 ft.?	<input checked="" type="radio"/>		Ordinance Findings: Not addressed
• Are bioretention cells allowed in parking medians?	<input checked="" type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• Are consolidated travel lanes and on-street parking allowed to create space for bioretention?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• Are pervious surfaces such as paver stones, porous	<input checked="" type="radio"/>		Ordinance Findings: Not expressly allowed or

pavement, or grass pavers allowed for on-street parking?			prohibited.
• For office buildings, is the required parking ratio 3.0 spaces per 1,000 sq.ft. of gross floor area or less?	<input checked="" type="radio"/>		Ordinance Findings: No Planning and Zoning Regulations Section 22, §125 (11)(s) 1 space per 200 sq.ft.
• For commercial centers, is the required parking ratio 2 to 4.5 spaces per 1,000 sq.ft. of gross floor area or less?	<input checked="" type="radio"/>		Ordinance Findings: No Planning and Zoning Regulations Section 22, §125 (11)(g) 1 space per 200 sq.ft.
• Are proposed developments allowed to take advantage of opportunities for shared parking?	<input type="radio"/>		Ordinance Findings: Yes
• Are proposed developments allowed to have parking stalls under the second floor podium?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<b>Driveways/Sidewalks</b>			
• Are driveway standards 9 feet or less in width?	<input checked="" type="radio"/>		Ordinance Findings: Not addressed in ordinance
• Are shared driveways allowed?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• If sidewalks are required, are they required to be designed to the narrowest allowable width (e.g, 4 ft.)?	<input type="radio"/>		Ordinance Findings: Yes
• Are sidewalks allowed to be on one side of the street only?	<input type="radio"/>		Ordinance Findings: No
<b>Clustering Development</b>			
• Is redevelopment encouraged in lieu of greenfield development through site performance standards?	<input checked="" type="radio"/>	√	Note: DNREC's Final Draft stormwater regulations recognize the benefit of redevelopment, and have less stringent performance standards for proposed development in existing developed areas. See Goal # 5 performance criteria. Ordinance Findings: No
• Is Conservation or Open Space Design an option?	<input checked="" type="radio"/>		Ordinance Findings: No

<ul style="list-style-type: none"> <li>• To encourage clustering and open space design, are setbacks minimized (e.g., for residential lots that are 1/2-acre or less in size, is the front set back 20 feet or less, the rear setback 25 feet or less, and the side setback 8 feet or less?)</li> </ul>	<p style="text-align: center;">●</p>		<p>Ordinance Findings: Partially</p> <p>Cluster development allowed inherently in R4 zoning district (mixed use) allows front setback of 20 ft, rear setback of 30 ft, and side setback of 5 ft for interior lot side.</p> <p>Cluster development allowed as a Special Exception in R1 zoning district requires a front setback of 20 ft, rear setback of 30 ft, and side setback of 10 ft for interior lot side.</p>
<ul style="list-style-type: none"> <li>• Are site designs required to have development focused on areas of lesser slopes and farther from watercourses?</li> </ul>	<p style="text-align: center;">◐</p>		<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Are policies effective in encouraging higher density development to be centered around transportation corridors?</li> </ul>	<p style="text-align: center;">○</p>		<p>Note that it is important for towns to allow density bonuses for protecting certain features, preserving open space, and limiting sprawl.</p> <p>Ordinance Findings: No</p>

## GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS

Objective: Minimize building footprint/envelope area.

Objective: Preserve topsoil structure.

Objective: Preserve sensitive wetlands.

Objective: Preserve sensitive soils.

Objective: Preserve sensitive stream buffers.

GOAL #2 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Topsoil Structure &amp; Building Footprint</b>			
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas required to be phased?</li> </ul>	●	√	Note: DNREC's performance criteria for construction site management include limits on site disturbance. See Goal #6 performance criteria. Ordinance Findings: Yes Conservation District Checklist
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas and riparian areas required to be minimized?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are building envelopes required/encouraged to avoid sensitive environmental areas such as riparian areas, wetlands, high infiltration soils, and steep slopes?</li> </ul>	◐		Ordinance Findings: No
<b>Wetlands</b>			
<ul style="list-style-type: none"> <li>Are site designs required to minimize hydrologic alteration to existing wetlands?</li> </ul>	●	√	Note: there are state regulations prohibiting the disturbance of certain wetlands.
<b>Sensitive Soils</b>			
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid highly erodible soils?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid soils with high permeability (e.g., Hydrologic Soil Group A and B)?</li> </ul>	◐		Ordinance Findings: No
<b>Stream Buffers</b>			
<ul style="list-style-type: none"> <li>Is a 60- to 100-foot stream buffer required/encouraged for new development?</li> </ul>	●		Note: The Phase I WIP recommends 100 ft for primary waters and 60 ft for secondary waters; can be reduced if

			combined with other pollution reduction actions. This buffer recommendation is applicable to those areas where buffers are voluntary (i.e., not the Dept. of Ag's 30 ft buffer or CAFO buffers) Ordinance Findings: No
• Are stream buffers for new development required to remain in a natural state?	<input checked="" type="radio"/>		Ordinance Findings: No
• Are site designs required to preserve existing runoff pathways to adequately support existing wetlands?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is a 50-foot wetland buffer required/encouraged?	<input type="radio"/>		Ordinance Findings: No

**GOAL #3: HAVEST RAINWATER**

Objective: Allow rainwater harvesting through plumbing code provisions.

Objective: Allow the use of downspout disconnection/redirection, rain barrels, and above-and below-ground cisterns for rainwater harvesting

GOAL #3 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<ul style="list-style-type: none"> <li>• Can downspouts be disconnected or redirected to discharge into a rain barrel or yard?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are interior or exterior cisterns allowed?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Can rain barrels be placed within standard zoning setback areas?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Do zoning and building provisions allow cisterns to be placed on rooftops to harvest rainwater?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Is harvested rainwater allowed to be used for nonpotable interior uses such as toilet flushing?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.

**GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

Objective: Allow and encourage stormwater controls as multiple use in open space areas.

Objective: Allow and encourage stormwater controls as multiple use in landscaped areas.

GOAL #4 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Landscaped Areas</b>			
<ul style="list-style-type: none"> <li>Are bioretention areas allowed to be constructed in the development's designated landscape areas, if properly designed?</li> </ul>	●		<p>Ordinance Findings: No Location of bioretention is not included in the ordinance Planning and Zoning Regulations Section 11, §67.G Landscaping and Screening in Highway/Regional Commercial Districts A 50 ft. wide strip of landscaping following right of way of major highways and 25 ft. strip along access roads with consideration of landscaping on adjoining property. If adjacent to residential areas (or zoned residential) the planting shall serve as a screen such as evergreen hedgerows.</p> <p>The Conservation District's Sediment and Stormwater checklist expressly prohibits infiltration practices from being located within 20 feet of basement walls.</p> <p>Street Construction and Design Standards were not located in the review. Typically these standards include requirements for grass strips in the street right-of-ways such that bioswales and bioretention areas are prohibited.</p>
<ul style="list-style-type: none"> <li>Are bioretention areas given "credit" as landscape area to count as a percent of the required landscaping?</li> </ul>	●		<p>Ordinance Findings: No Location of bioretention is not included in the ordinance</p>
<ul style="list-style-type: none"> <li>Do landscaping requirements allow plantings conducive to bioretention, bioswales,</li> </ul>	●		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>

raingardens , and other LID BMPs?			
<ul style="list-style-type: none"> <li>Do tree planting requirements allow use of raingardens, tree boxes, and other LID BMPs?</li> </ul>	●		Ordinance Findings: No Location of bioretention and other LID BMPs is not included in the ordinance
<b>Open Space Areas</b>			
<ul style="list-style-type: none"> <li>Are there open space preservation requirements or incentives?</li> </ul>	◐		Ordinance Findings: Partially There is a 20 percent Open Space requirement in R1, R2, R3, R4, and Cluster Development districts, 25 to 40 percent in Apartment (depending on density) and 25 percent in Townhouse districts. However, the open space can include active and passive recreation area.
<ul style="list-style-type: none"> <li>Is preserved open space required to be managed in a natural condition?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are structural LID techniques such as constructed wetlands, swales, and bioretention areas allowed to be constructed in a development's designated open space, if properly designed?</li> </ul>	●		Ordinance Findings: No With the exception of R4 zoning District
<ul style="list-style-type: none"> <li>Are structural LID techniques such as constructed wetlands, swales, and bioretention areas given "credit" as open space to count as a percent of the required open space area, if properly designed?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Does protection of sensitive, natural areas and habitat qualify as credit for local open space dedication?</li> </ul>	●		Ordinance Findings: Not expressly allowed or prohibited.

**GOAL #5: MANAGE STORMWATER TO MEET WATERSHED IMPLEMENTATION PLAN & DNREC STORMWATER REGULATIONS**

- Objective: Meet DNREC stormwater regulations
- Objective: Replicate the predevelopment hydrology of the site, to the extent practicable.
- Objective: Maintain water quality functions of the watershed.
- Objective: Minimize channel erosion impacts.
- Objective: Minimize flooding impacts.
- Objective: Inspect BMPs to ensure proper construction and design.
- Objective: Long-term maintenance.

GOAL #5 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Stormwater Ordinance Provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• Is stormwater required to be retained/infiltrated onsite (through bioretention, natural areas, and swale infiltration) where possible?</li> </ul>	●	√	Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC Resource Protection Criteria</li> </ul>	●	√	<p>Note: For the 1-yr, 24 hour rainfall event, meet the following standards:                      Predevelopment wood/meadow – runoff reduction practices will yield the equivalent wooded condition for these areas.                      All remaining disturbed area shall achieve the equivalent of 0% effective imperviousness.                      The remaining discharge, if any, shall not exceed the 24-hour detention of the 1yr, 24 hr storm and an offsite offset is required for the portion of the storm not meeting the minimum requirements.                      Additional water quality treatment BMPs shall be required if runoff reduced is not sufficient to meet the TMDL.</p> <p>Ordinance Findings: No                      The Conservation District’s Sediment and Stormwater checklist SM 11 requires wet ponds to be designed to release the quality of stormwater runoff over a 24 hour period. Practices that have a permanent pool are to be designed to</p>

			release the first inch of runoff from the site over a 24 hour period. SM 12 requires infiltration practices to accept, at least, the first inch of runoff from all streets, roadways, and parking lots.
<ul style="list-style-type: none"> <li>• DNREC Conveyance Criteria for Channel Protection</li> </ul>	●	√	<p>Note: Conveyance Volume is the 10 yr, 24 hr rainfall event (or the volume of runoff produced by the post-development storm having a 10% chance of occurring)- less any volume reduction achieved through meeting the Resource Protection Criteria.</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Yes (it appears that the Conservation District standard below could meet this requirement.)</p> <p>The Conservation District's Sediment and Stormwater checklist SM 10 states that the pos-development peak rates of discharge for the 2- and 10-year storm events shall not exceed the predevelopment peak rates of discharge for the 2- and 10- year storm events.</p>
<ul style="list-style-type: none"> <li>• DNREC Flood Event Criteria</li> </ul>	●	√	<p>Volume of runoff produced by 100 yr, 24 hr rainfall event (or post-development storm having a 1% probability of occurrence).</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Not addressed in ordinance reviewed.</p>
<ul style="list-style-type: none"> <li>• Alternative Criteria</li> </ul>	●	√	Land development that discharges to state waters included in a Designated

			Watershed or other watershed management plan approved in accordance with DNREC stormwater regulations shall meet alternative criteria in the approved plan.
<ul style="list-style-type: none"> <li>• Redevelopment Criteria</li> </ul>	●	√	<p>Recognizing the importance of redevelopment over greenfield development, redevelopment areas are required to only achieve a 50% reduction in effective impervious area based on existing conditions. Only the <u>increases</u> in the rate, volume, and duration of flow for the channel volume and flooding volume will need to comply with the DNREC stormwater regulations.</p> <p>A brownfield development remediation plan may meet the stormwater goals and intent of the DNREC stormwater regulations if approved by DNREC.</p> <p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	●	√	<p>Agricultural land having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meets DOA requirements.</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes</p> <p>Conservation District Program</p>
<b>Inspections</b>			
<ul style="list-style-type: none"> <li>• Are inspections required during construction and routinely after construction?</li> </ul>	●	√	<p>Ordinance Findings: Yes</p> <p>Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	●	√	<p>Note: DNREC requires a Certified Construction Reviewer</p> <p>Ordinance Findings: Yes</p> <p>Conservation District Checklist</p>
<b>Maintenance</b>			

• Are maintenance agreements required?	<input checked="" type="radio"/>	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	<input checked="" type="radio"/>	√	Ordinance Findings: No
<b>Off-Site Mitigation</b>			
• Is offsite mitigation required when on-site management does not meet the performance criteria (unless there is proof of no adverse impact)?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is the DE Nutrient Protocol program required to calculate offsets?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for forested area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for riparian area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for BMP retrofit allowed in the same named watershed?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is nutrient banking or the equivalent land banking allowed in the same named watershed? Is redevelopment encouraged in lieu of greenfield development?	<input type="radio"/>		Ordinance Findings: No
<b>Local Stormwater Utility Ordinance</b>			
• Does an ordinance exist to support the development of a local stormwater utility?	<input checked="" type="radio"/>		Ordinance Findings: No

**GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

Objective: Meet DNREC stormwater regulations

Objective: Minimize erosion and sedimentation and delivery of nonpoint source pollutants during construction activities.

Objective: Inspect BMPs ensure proper construction and design.

Objective: Maintain BMPs.

GOAL #6 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Sedimentation and Erosion Control provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• DNREC Turbidity Stormwater Management</li> </ul>	●	√	Best Available Technology shall be employed to manage turbid waters in accordance with state regulations. Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC requirement of Sediment and Stormwater Management Plans</li> </ul>	●	√	Ordinance Findings: Yes Conservation District Checklist
<ul style="list-style-type: none"> <li>• DNREC Land Disturbance Criteria</li> </ul>	●	√	Use of standard details for DE Erosion and Sedimentation Control Handbook-limited to sites where no more than 10 acres draining to a common discharge point will be disturbed at any one time. Ordinance Findings: No  Construction site BMPs intended to manage areas greater than 10 acres shall have supporting design computations. Ordinance Findings: No  In no case shall an area of disturbance draining to a common point exceed 20 acres. Grading within that drainage area shall not proceed unless temporary or permanent stabilization has been accomplished. All plans shall include a limit of disturbance line. Ordinance Findings: Yes Conservation District Checklist

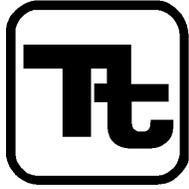
<ul style="list-style-type: none"> <li>• DNREC Site Stabilization Criteria</li> </ul>	<p>●</p>	<p>√</p>	<p>Following soil disturbance or redisturbance, permanent or temporary stabilization shall be completed for all perimeter sediment controls, topsoil stockpiles, or other graded/disturbed areas within 14 calendar days unless a more restrictive federal requirement applies.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p> <p>Documentation of soil testing and materials used for stabilization shall be provided for verification.</p> <p>Ordinance Findings: Not addressed</p> <p>Release of financial guarantee and or issuance of Notice of Completion shall not occur until final stabilization of all exposed areas is achieved.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	<p>●</p>	<p>√</p>	<p>Agricultural having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meet DOA requirements</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<p><b>Inspections</b></p>			
<ul style="list-style-type: none"> <li>• Are weekly inspections required during construction?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>

<b>Maintenance</b>			
• Are maintenance agreements required?	●	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	●	√	Ordinance Findings: No

**GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

**Note: Onsite Wastewater Treatment and Disposal provisions are still in draft form and may not be subject to this ordinance review.**

GOAL #7 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards</b>			
<p>Where do local governments allow/encourage/ban standard systems versus community systems and how does that impact growth patterns</p>			<p>This question will likely not apply to towns with sewer. Most likely a county issue.</p> <p>Planning and Zoning Regulations require mandatory connection to public sewer systems if a public sanitary sewer is placed in a street or alley abutting upon property...it shall be unlawful for any such owner or occupant to maintain upon any such property an individual sewerage disposal system.</p> <p>If public sewer facilities are not available an individual disposal system shall be determined by percolation tests and requirements of the State and County Health Authorities.</p>



## TETRA TECH

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### MEMORANDUM

**To:** Eugene Dvornick (Town of Georgetown)

**From:** Eugenia Hart and Kimberly Brewer

**Cc:** Jennifer Walls (DNREC); Bryan Hall (DNREC); Jennifer Volk (DNREC)

**Date:** January 24, 2012

**Subject:** Review of the Town of Georgetown's Local Land Use Ordinances to Identify Barriers to Implementing the Chesapeake Bay Watershed Implementation Plan

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## 1 Introduction

Delaware has developed a Watershed Implementation Plan (WIP) to accompany the Chesapeake Bay nutrient and sediment total maximum daily loads (TMDLs). The WIP lays out plans for addressing existing pollutant load to the Bay as well as new pollutant loads from future land use changes. DNREC has tasked Tetra Tech with assisting local Delaware municipalities in the Chesapeake Bay watershed to conduct a review of existing local municipal ordinances with regulations pertaining to new development.

The goal of the ordinance review is to provide a service to local governments in Delaware by reviewing existing land use ordinances to look for barriers to implementing the Chesapeake Bay WIP as well as identify potential opportunities for improving communities and allowing more techniques to be used to help property owners address nutrient and sediment loads from new developments. These include techniques such as green infrastructure, low impact development, conservation design, and performance standards that can allow flexibility. There are often unintended barriers to these techniques in local ordinances.

This memorandum presents the results of Tetra Tech's review of these local ordinances for the Town of Georgetown, DE. Note that recommendations for consideration of code revisions are not mandatory. They are intended only to provide more flexibility and effectiveness in meeting resource protection goals and regulations.

## 2 Approach

In August 2011 Tetra Tech contacted the Town of Georgetown to obtain the most recent versions of the following types of ordinances, if available:

- Subdivision ordinance
- Zoning ordinance
- Sedimentation and erosion control ordinance or regulations

- Onsite wastewater ordinance or regulations

Georgetown staff provided their subdivision and zoning ordinances for review. Sedimentation and erosion control is handled by the Sussex County Conservation District (SCD). Note that SCD does not have their own stormwater, sedimentation, and erosion control standards, but adheres to Delaware's State Sediment and Stormwater Regulations (see section 3.1 below). The Town of Georgetown does not have specific on-site wastewater regulations as all new developments hook to public water and sewer.

Once the ordinances were obtained, they were reviewed based on the Ordinance Review Checklist developed by Tetra Tech (Appendix A). The checklist contains items related to the following seven goals:

1. Minimize Effective or Connected Impervious Area
2. Preserve and Enhance the Hydrologic Function of Unpaved Areas
3. Harvest Rainwater
4. Allow and Encourage Multi-Use Stormwater Controls
5. Manage Stormwater to Meet WIP and DNREC Regulations
6. Manage Construction Site Stormwater to Meet WIP and DNREC Regulations
7. Manage On-Site Wastewater Systems to Meet WIP and DNREC Regulations

The Town of Georgetown staff reviewed the draft memo, and recommended revisions and corrections as needed.

Barriers to each of the items on the Checklist are summarized below in Section 3 along with potential solutions to overcome these barriers.

### 3 Summary of Barriers and Potential Solutions for Implementation

This section of the memo provides a summary of the barriers identified for each of the seven goals indicated on the Ordinance Review Checklist (Appendix A). Following the summary of each barrier, potential solutions are provided.

#### 3.1 GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA

##### Mitigation of Runoff from Effective Impervious Area

DNREC's final draft stormwater regulations (DNREC 2011) require that local regulations and standards mitigate stormwater runoff such that there is no direct contribution of stormwater runoff from a development. Georgetown does not have an ordinance that directly addresses this issue; however, Georgetown currently follows the provisions and requirements contained in the Sussex Conservation District's Sediment Control and Stormwater Management Program. SCD follows the State of Delaware's Sediment and Stormwater Regulations as a delegated agency. It is suggested that Georgetown reference State of Delaware Sediment and Stormwater Regulations in their subdivision ordinance.

##### Flexibility in Locating BMP Techniques On-site

The location of low impact development (LID) best management practices (BMPs) in street and parking areas (e.g., parking medians, grass strips between sidewalk and curb, swales, etc.) is for the most part not explicitly prohibited or allowed in the ordinance. Lack of certainty about approval of these techniques can pose a barrier to implementation. It appears that height and setback limitations for landscaping at intersections would directly prohibit the use of LID techniques such as curb bumpouts/extensions with bioretention or bioswales.

### **Street and Right-of-Way Widths**

Georgetown's current zoning regulations do not allow minor streets to have narrow street pavement and travel lane widths to help minimize impervious area. In addition to the environmental benefits of narrowing streets, some studies have found that narrow residential streets are safer than wide streets (Center for Watershed Protection 1998).

In the last decade, numerous neo-traditional developments have been built using techniques to narrow street and right of way width. Techniques such as curb pullouts, staggered pull-out parking areas (rather than continuous lanes), or having a parking lane on one side of the street only have been employed. These developments have been able to meet the needs of access for service and emergency vehicles as well as on-street parking while also using narrower streets and public right-of-ways than do conventional subdivisions. That said, it should be recognized that concerns about these components of LID—narrow streets and right-of-ways—make it challenging to implement. In each community, moving forward requires a great deal of discussion and problem solving with staff from the fire department, public works, engineering, and other potentially affected departments in order to address concerns and develop mutually supported ordinance and code revisions. Note that Delaware State Fire Prevention Regulations do not appear to regulate street widths in residential developments, but do provide turn-around and cul-de-sac standards that allow for fire apparatus access.

### **Minimum Parking Requirements**

Current zoning establishes a high minimum parking space requirement and requires overly large parking stalls and drive aisles. Together these minimum parking requirements can unnecessarily increase the overall imperviousness of the development site. Some communities allow a smaller number of parking spaces per square feet of floor area in the development, as well as allow smaller stalls and aisles (e.g., stall width of 9 feet, minimum stall length to 15 feet, and minimum drive aisle width of 22 feet). These standards minimize paved area, provide adequate parking space, and reduce development costs.

### **Incentives for Infill Development and Redevelopment of Existing Areas over "Greenfield" Development**

DNREC's final draft sediment and stormwater regulations (June 2011) require that local regulations and standards impose less stringent runoff reduction requirements for proposed development in existing developed areas, thus providing incentives to develop in these areas rather than undeveloped or "greenfield" areas. Local zoning and subdivision requirements will need to be amended accordingly.

## **3.2 GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

### **Encouraging or Requiring Stream Buffers**

The Phase I WIP calls for local regulations and standards that encourage or require buffers of 60 feet for secondary waterbodies and 100 feet for primary waterbodies for new development proposals. These buffers can be reduced if combined with other pollution reduction actions. The town's current zoning and subdivision ordinances do not require such riparian buffers. Local zoning and subdivision requirements would need to be amended accordingly.

### **Minimizing Disturbance in Environmentally Sensitive Areas**

It appears that the local regulations currently allow disturbance of riparian areas, erodible soils, steep slopes, and areas of high soil infiltration. LID uses these landscape features as a part of natural stormwater management and seeks to minimize their disturbance during and after construction. Local zoning and subdivision requirements should be amended to address the protection of environmentally sensitive areas.

### **3.3 GOAL #3: HARVEST RAINWATER**

#### **Explicitly Allowing or Encouraging Rainwater Harvest**

Rainwater harvesting is not explicitly prohibited or allowed in the ordinances. However, lack of certainty about approval of these techniques can pose a barrier to implementation.

### **3.4 GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

#### **Flexibility in Locating LID Techniques in Designated Landscape and Open Space Areas**

Due to specifications and allowances, it appears that LID techniques such as bioretention, bioswales, constructed wetlands, etc. are effectively not allowed in required landscape, screening, and open space areas. Where these BMPs can be designed to support landscape and open space functions, flexibility should be provided in locating these BMPs where they can be most effective in managing water quality, drainage, and flooding impacts. Explicit exemptions, as-of-right use, or even incentives, should be made for the use of vegetative LID techniques in screening, buffer, and landscape areas. Additionally, consideration should be given allowing bioretention and bioswales in the right-of-way area typically used as a grassed strip.

#### **Credit for LID Techniques that Provide Landscape and Natural Open Space Functions**

LID BMPs are not given credit by the Town as part of the required landscaping and open space areas. Explicitly providing such credit would provide an incentive for developers to use LID techniques.

### **3.5 GOAL #5: MANAGE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Stormwater Regulations**

DNREC's final draft sediment and stormwater regulations require new minimum water quality, channel protection, and conveyance and flood control requirements for new development and redevelopment. As stated earlier, it is suggested that Georgetown reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance.

#### **Off-site Mitigation**

There are no provisions in the ordinance for off-site mitigation when on-site management does not meet the performance criteria. DNREC is in the final phases of developing an offset tool called the *Nutrient and Sediment Loading Assessment Protocol*. The tool allows developers to determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. This is a useful tool in determining whether or not a proposed development meets the TMDL or will need additional on-site management or off-site mitigation. Georgetown may want to consider requiring developers to use this tool during the planning process before presenting the site plan to the planning and zoning commission for review.

### **3.6 GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Sediment and Erosion Control Regulations**

DNREC's final draft sediment and stormwater regulations require construction site stormwater management controls to be put in place for all construction activities exceeding 5,000 square feet of disturbance. As stated earlier, it is suggested that Georgetown reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance.

### **3.7 GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WIP AND DNREC REGULATIONS**

Georgetown does not have specific on-site wastewater regulations as all new developments are connected to public water and sewer.

## **4 Accounting and Tracking of BMP Implementation**

The Town of Georgetown is interested in helping to track BMP implementation. Georgetown's stormwater staff would like to work with DNREC on tracking this information. It is suggested that DNREC provide the Town of Georgetown with a list of BMPs approved for use in the Chesapeake Bay watershed TMDL model and have the Town of Georgetown notify DNREC if any of these types of BMPs are installed in the town so they can be appropriately credited in the Bay model.

## **5 Conclusions**

Review of Georgetown's subdivision and zoning ordinances identified some direct barriers to the use of LID techniques, such as such as such as specifications and allowances for required screening, landscape and open space areas. To allow or encourage the use of LID techniques, the Town would need to explicitly exempt these techniques or allow them as-of-right in these areas. Additionally, consideration should be given to allowing bioretention and bioswales in the right-of-way way area typically used as a grassed strip.

In some cases, the review of the Town's ordinances identified barriers of omission: by not expressly allowing the LID technique or providing for exemptions, the ordinances generate uncertainty regarding approval and thus unintentionally provide disincentives for some LID practices. For example, there is no explicit allowance or prohibition for the disconnection of downspouts and placement of rainbarrels or cistern in zoning setback areas.

The Town does not have an ordinance that directly addresses sediment and stormwater management. Rather, Georgetown follows the Sussex Conservation District's Sediment Control and Stormwater Management Program. Considering the new federal stormwater regulations due out in late 2011 and new state stormwater regulations due in 2012, it is suggested that the Town of Georgetown reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance, and the agency implementing the regulations (DNREC or its Delegated Agency).

Reducing impervious area in new developments can be an important part of stormwater management. Georgetown may want to consider allowing narrower street and right of way widths in all new

developments, while employing techniques such as curb pullouts and staggered pull-out parking areas to meet the needs of service and emergency vehicles as well as on-street parking. Georgetown might also want to consider allowing a smaller number of parking spaces as well as smaller parking stalls and aisles in new multi-family and commercial developments.

Finally, Georgetown might want to consider adopting DNREC's *Nutrient and Sediment Loading Assessment Protocol* as part of their subdivision ordinance. The tool can help developers determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. The tool can help to quantify the number and types of BMPs necessary on a new development site to meet the TMDL requirements.

## References

Center for Watershed Protection (CWP). 1998. *Better Site Design: A Handbook for Changing Development Rules in Your Community*.

DNREC (Department of Natural Resources and Environmental Control). 2011. *Final Draft Sediment and Stormwater Regulations*. June 2011.

Delaware Department of Transportation (DelDOT). 2010. *Standards and Regulations for Subdivision Streets and State Highway Access*. Dover, DE.

Delaware State Fire Marshall. 2009. *Delaware State Fire Prevention Regulations*

Georgetown Zoning Ordinance

Georgetown Subdivision of Land Ordinance

Georgetown Property Maintenance (Brush, Grass, and Weeds) Ordinance

Georgetown Design and Construction Standards for Water, Sewer, and Streets

Sussex Conservation District. 2011. *Sediment and Stormwater Management Checklist*  
<http://sussexconservation.org/> Accessed August 2011.

## Appendices

Appendix A. Ordinance Review Checklist

# Appendix A. Ordinance Review Checklist

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# Local Development Ordinance Tools/Techniques for Implementing Delaware's Chesapeake Bay Watershed Implementation Plan & DNREC Final Draft Sediment and Stormwater Regulations

## Town of Georgetown Ordinance Review Checklist

### Town of Georgetown Ordinances Reviewed

Zoning

Subdivision of Land

Property Maintenance (Brush, Grass, and Weeds)

Design and Construction Standards for Water, Sewer, and Streets

*[Note: The following Ordinance Checklist is based on Delaware's Phase 1 Chesapeake Bay Watershed Implementation Plan (November 2010); Final Draft Sediment and Stormwater Regulations (DNREC, June 2011); Protecting Water Quality with Smart Growth Strategies and Natural Stormwater Management in Sussex County (January, 2009); Better Site Design: A Handbook for Changing Development Rules in Your Community (CWP, 1998); Low-Impact Development Design Strategies, An Integrated Approach (USEPA, 2000); and Tetra Tech's review of numerous local ordinances to identify opportunities and barriers to green infrastructure and low impact development techniques].*

**Degree of Importance Key to Symbols:**

- Essential
- ◐ Very important
- Important

**GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

- Objective: Minimize impervious area associated with streets.
- Objective: Minimize impervious area associated with parking.
- Objective: Minimize impervious area associated with driveways and sidewalks.
- Objective: Clustering development.
- Objective: Incorporate sustainable hydrology practices into urban redevelopment.

GOAL #1 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Overall Effective Impervious Area</b>			
<ul style="list-style-type: none"> <li>• Is impervious area required to be controlled such that there is no direct contribution of stormwater runoff (i.e., the equivalent of 0% effective impervious area)?</li> </ul>	●	√	<p>Note: DNREC's Final Draft stormwater regulations require that after runoff reduction practices have been implemented on disturbed area, the site's impervious area shall not directly contribute stormwater runoff during a rain event that has a 99% annual probability of occurring. See Goal # 5 performance criteria.</p> <p>Ordinance Findings: No</p>
<b>Streets</b> (Note: Also check Fire Marshal's Code to see how it impacts the following goals)			
<ul style="list-style-type: none"> <li>• For residential development, are the street pavement widths allowed to be between 18 to 22 feet, with curb pullouts for passing of large vehicles?</li> </ul>	●		<p>Ordinance Findings: No</p> <p>Zoning 230, Article XX, § 151(F)</p> <p>Interior roadways shall be a minimum of 25 feet if off-street parking is prohibited.</p> <p>Article XIA Residential Planned Community § 75.18</p> <p>Street width may be reduced in designated areas of RPC if applicant can demonstrate that the design does not compromise the health, safety, and welfare of the community. In no case shall the minimum street width be less than 24 feet.</p>

<ul style="list-style-type: none"> <li>• Are travel lanes allowed to be from 12 to 10 feet (or less), with curb pullouts for passing of large vehicles?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Are curb bumpouts/extensions allowed near intersections and mid-block for traffic-calming and bioretention opportunities?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: Limited opportunity                      Zoning 230, Article XXI, § 159                      No planting or landscaping in excess of three feet above established street grade can be erected or maintained within the area of a corner lot between two intersecting streets at points 25 feet in distance from the intersecting lines. This may pose barriers to bioretention bumpouts and extensions.</p>
<ul style="list-style-type: none"> <li>• Is pervious paving allowed for on-street parking and alleyways?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: No                      Concrete and bituminous surface is required per the Town's construction specifications.</p>
<ul style="list-style-type: none"> <li>• Are grass swales or bioretention swales allowed instead of curb and gutter or with curb cuts (where slopes allow)?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, is the radius required to be 35 feet or less?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: Not expressly allowed or prohibited.                       2009 Fire Code: No                      Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in length.</p>
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, are landscaped islands or bioretention islands allowed or encouraged?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: No                       2009 Fire Code: No                      Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in length.</p>
<ul style="list-style-type: none"> <li>• Are site designs required to promote the most efficient street layout to reduce overall street length?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: No</p>

<b>Parking</b>			
• Is the minimum stall width for a standard parking space 9 ft. or less?	<input checked="" type="radio"/>		Ordinance Findings: No Zoning Article XX 151 §151 A. 10 ft width required
• Are parking stall lengths allowed to be 15 ft.?	<input checked="" type="radio"/>		Ordinance Findings: No Zoning Article XX 151 §151 A. 20 ft length required
• Are parking lot drive aisles allowed to be 22 ft.?	<input type="radio"/>		Ordinance Findings: Not addressed
• Are bioretention cells allowed in parking medians?	<input checked="" type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• Are consolidated travel lanes and on-street parking allowed to create space for bioretention?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• Are pervious surfaces such as paver stones, porous pavement, or grass pavers allowed for on-street parking?	<input type="radio"/>		Ordinance Findings: No
• For office buildings, is the required parking ratio 3.0 spaces per 1,000 sq.ft. of gross floor area or less?	<input type="radio"/>		Ordinance Findings: No Zoning Article XX § 148 1 space per 200 sq.ft.
• For commercial centers, is the required parking ratio 2 to 4.5 spaces per 1,000 sq.ft. of gross floor area or less?	<input type="radio"/>		Ordinance Findings: No Zoning Article XX § 148 5 spaces per 1,000 sq.ft.
• Are proposed developments allowed to take advantage of opportunities for shared parking?	<input type="radio"/>		Ordinance Findings: Yes
• Are proposed developments allowed to have parking stalls under the second floor podium?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<b>Driveways/Sidewalks</b>			
• Are driveway standards 9 feet or less in width?	<input type="radio"/>		Ordinance review did not identify driveway width standards.
• Are shared driveways allowed?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• If sidewalks are required, are they required to be designed to the narrowest allowable width (e.g, 4 ft.)?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.

<ul style="list-style-type: none"> <li>• Are sidewalks allowed to be on one side of the street only?</li> </ul>	○		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>
<p><b>Clustering Development</b></p>			
<ul style="list-style-type: none"> <li>• Is redevelopment encouraged in lieu of greenfield development through site performance standards?</li> </ul>	●	√	<p>Note: DNREC’s Final Draft stormwater regulations recognize the benefit of redevelopment, and have less stringent performance standards for proposed development in existing developed areas. See Goal # 5 performance criteria. Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Is Conservation or Open Space Design an option?</li> </ul>	●		<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• To encourage clustering and open space design, are setbacks minimized (e.g., for residential lots that are 1/2-acre or less in size, is the front set back 20 feet or less, the rear setback 25 feet or less, and the side setback 8 feet or less?)</li> </ul>	●		<p>Ordinance Findings: Yes Article XIA Residential Planned Community § 75.18</p>
<ul style="list-style-type: none"> <li>• Are site designs required to have development focused on areas of lesser slopes and farther from watercourses?</li> </ul>	◐		<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Are policies effective in encouraging higher density development to be centered around transportation corridors?</li> </ul>	○		<p>Note that it is important for towns to allow density bonuses for protecting certain features, preserving open space, and limiting sprawl. Ordinance Findings: No</p>

## GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS

Objective: Minimize building footprint/envelope area.

Objective: Preserve topsoil structure.

Objective: Preserve sensitive wetlands.

Objective: Preserve sensitive soils.

Objective: Preserve sensitive stream buffers.

GOAL #2 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Topsoil Structure &amp; Building Footprint</b>			
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas required to be phased?</li> </ul>	●	√	Note: DNREC's performance criteria for construction site management include limits on site disturbance. See Goal #6 performance criteria. Ordinance Findings: Yes Conservation District Checklist
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas and riparian areas required to be minimized?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are building envelopes required/encouraged to avoid sensitive environmental areas such as riparian areas, wetlands, high infiltration soils, and steep slopes?</li> </ul>	◐		Ordinance Findings: No
<b>Wetlands</b>			
<ul style="list-style-type: none"> <li>Are site designs required to minimize hydrologic alteration to existing wetlands?</li> </ul>	●	√	Note: there are state regulations prohibiting the disturbance of certain wetlands.
<b>Sensitive Soils</b>			
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid highly erodible soils?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid soils with high permeability (e.g., Hydrologic Soil Group A and B)?</li> </ul>	◐		Ordinance Findings: No
<b>Stream Buffers</b>			
<ul style="list-style-type: none"> <li>Is a 60- to 100-foot stream buffer required/encouraged for new development?</li> </ul>	●		Note: The Phase I WIP recommends 100 ft for primary waters and 60 ft for secondary waters; can be reduced if

			combined with other pollution reduction actions. This buffer recommendation is applicable to those areas where buffers are voluntary (i.e., not the Dept. of Ag's 30 ft buffer or CAFO buffers) Ordinance Findings: No
• Are stream buffers for new development required to remain in a natural state?	<input checked="" type="radio"/>		Ordinance Findings: No
• Are site designs required to preserve existing runoff pathways to adequately support existing wetlands?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is a 50-foot wetland buffer required/encouraged?	<input type="radio"/>		Ordinance Findings: No

**GOAL #3: HAVEST RAINWATER**

Objective: Allow rainwater harvesting through plumbing code provisions.

Objective: Allow the use of downspout disconnection/redirection, rain barrels, and above-and below-ground cisterns for rainwater harvesting

GOAL #3 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<ul style="list-style-type: none"> <li>• Can downspouts be disconnected or redirected to discharge into a rain barrel or yard?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are interior or exterior cisterns allowed?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Can rain barrels be placed within standard zoning setback areas?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Do zoning and building provisions allow cisterns to be placed on rooftops to harvest rainwater?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Is harvested rainwater allowed to be used for nonpotable interior uses such as toilet flushing?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.

**GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

Objective: Allow and encourage stormwater controls as multiple use in open space areas.

Objective: Allow and encourage stormwater controls as multiple use in landscaped areas.

GOAL #4 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Landscaped Areas</b>			
<ul style="list-style-type: none"> <li>Are bioretention areas, bioswales, or constructed wetlands allowed to be constructed in the development's designated landscape areas, if properly designed?</li> </ul>	●		<p>Ordinance Findings: No Location of bioretention is not included in the ordinances, however a number of ordinance provisions would effectively prohibit their use.</p> <p>Zoning Ordinance Article V, § 230-22 Screening Required near residential areas. When commercial, business, or industrial development is proposed near a residential district, the Planning Commission may require installation of a continuous visual screen consisting of compact evergreen hedge, trees, or foliage.</p> <p>Zoning Ordinance Article XIA, § 230-75.19 Residential Planned Community design elements and conditions.</p> <p>Open Space requirements: 5,000 to 10,000 sq.ft. common open space which is surrounded by dwellings. This may result in less effective use of LID techniques.</p> <p>Landscaping require: Street trees/adequate planting strip between street and sidewalk. This may prohibit use of bioswales and bioretention.</p> <p>Landscape buffers using a combination of berms and plantings shall be used to buffer uses within RPC and arterial or major collector roads.</p> <p>Property Maintenance</p>

			<p>Ordinance 165 Article I, Brush, Grass, and Weeds</p> <p>§ 165-4 It shall be unlawful for the owner of any property or tenant to permit or maintain the growth of any grass more than 8 inches.</p> <p>§ 165-7 It shall be unlawful for the owner of any property or tenant to permit or maintain the growth of any other vegetation more than 8 inches in height except for trees, flowers, and other ornamental plants.</p> <p>The Town’s Construction Standards for streets requires grass strips (planted with 4’ topsoil, seed, and mulch) in the street right-of-way that effectively prohibit use of bioswales and bioretention.</p> <p>The Conservation District’s Sediment and Stormwater checklist expressly prohibits infiltration practices from being located within 20 feet of basement walls.</p>
<ul style="list-style-type: none"> <li>• Are bioretention areas given “credit” as landscape area to count as a percent of the required landscaping?</li> </ul>	●		<p>Ordinance Findings: No Location of bioretention is not included in the zoning and subdivision ordinances</p>
<ul style="list-style-type: none"> <li>• Do landscaping requirements allow plantings conducive to bioretention, bioswales, raingardens , and other LID BMPs?</li> </ul>	●		<p>Ordinance Findings: No See landscaping notes above</p>
<ul style="list-style-type: none"> <li>• Do tree planting requirements allow use of raingardens, tree boxes, and other LID BMPs?</li> </ul>	●		<p>Ordinance Findings: No Location of bioretention and other LID BMPs is not included in the zoning and subdivision ordinances</p>
<b>Open Space Areas</b>			
<ul style="list-style-type: none"> <li>• Are there open space</li> </ul>	◐		<p>Ordinance Findings: No</p>

preservation requirements or incentives?			
<ul style="list-style-type: none"> <li>Is preserved open space required to be managed in a natural condition?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are structural LID techniques such as constructed wetlands, swales, and bioretention areas allowed to be constructed in a development's designated open space, if properly designed?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are structural LID techniques such as constructed wetlands, swales, and bioretention areas given "credit" as open space to count as a percent of the required open space area, if properly designed?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Does protection of sensitive, natural areas and habitat qualify as credit for local open space dedication?</li> </ul>	●		Ordinance Findings: Not expressly allowed or prohibited.

**GOAL #5: MANAGE STORMWATER TO MEET WATERSHED IMPLEMENTATION PLAN & DNREC STORMWATER REGULATIONS**

- Objective: Meet DNREC stormwater regulations
- Objective: Replicate the predevelopment hydrology of the site, to the extent practicable.
- Objective: Maintain water quality functions of the watershed.
- Objective: Minimize channel erosion impacts.
- Objective: Minimize flooding impacts.
- Objective: Inspect BMPs to ensure proper construction and design.
- Objective: Long-term maintenance.

GOAL #5 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Stormwater Ordinance Provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• Is stormwater required to be retained/infiltrated onsite (through bioretention, natural areas, and swale infiltration) where possible?</li> </ul>	●	√	Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC Resource Protection Criteria</li> </ul>	●	√	<p>Note: For the 1-yr, 24 hour rainfall event, meet the following standards:                      Predevelopment wood/meadow – runoff reduction practices will yield the equivalent wooded condition for these areas.                      All remaining disturbed area shall achieve the equivalent of 0% effective imperviousness.                      The remaining discharge, if any, shall not exceed the 24-hour detention of the 1yr, 24 hr storm and an offsite offset is required for the portion of the storm not meeting the minimum requirements.                      Additional water quality treatment BMPs shall be required if runoff reduced is not sufficient to meet the TMDL.</p> <p>Ordinance Findings: No                      The Conservation District’s Sediment and Stormwater checklist SM 11 requires wet ponds to be designed to release the quality of stormwater runoff over a 24 hour period. Practices that have a permanent pool are to be designed to</p>

			release the first inch of runoff from the site over a 24 hour period. SM 12 requires infiltration practices to accept, at least, the first inch of runoff from all streets, roadways, and parking lots.
<ul style="list-style-type: none"> <li>• DNREC Conveyance Criteria for Channel Protection</li> </ul>	●	√	<p>Note: Conveyance Volume is the 10 yr, 24 hr rainfall event (or the volume of runoff produced by the post-development storm having a 10% chance of occurring)- less any volume reduction achieved through meeting the Resource Protection Criteria.</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Yes (it appears that the Conservation District standard below could meet this requirement.)</p> <p>The Conservation District's Sediment and Stormwater checklist SM 10 states that the pos-development peak rates of discharge for the 2- and 10-year storm events shall not exceed the predevelopment peak rates of discharge for the 2- and 10- year storm events.</p>
<ul style="list-style-type: none"> <li>• DNREC Flood Event Criteria</li> </ul>	●	√	<p>Volume of runoff produced by 100 yr, 24 hr rainfall event (or post-development storm having a 1% probability of occurrence).</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Not addressed in ordinances and standards reviewed.</p>
<ul style="list-style-type: none"> <li>• Alternative Criteria</li> </ul>	●	√	Land development that discharges to state waters included in a Designated

			Watershed or other watershed management plan approved in accordance with DNREC stormwater regulations shall meet alternative criteria in the approved plan.
<ul style="list-style-type: none"> <li>• Redevelopment Criteria</li> </ul>	●	√	<p>Recognizing the importance of redevelopment over greenfield development, redevelopment areas are required to only achieve a 50% reduction in effective impervious area based on existing conditions. Only the <u>increases</u> in the rate, volume, and duration of flow for the channel volume and flooding volume will need to comply with the DNREC stormwater regulations.</p> <p>A brownfield development remediation plan may meet the stormwater goals and intent of the DNREC stormwater regulations if approved by DNREC.</p> <p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	●	√	<p>Agricultural land having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meets DOA requirements.</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes Conservation District Program</p>
<b>Inspections</b>			
<ul style="list-style-type: none"> <li>• Are inspections required during construction and routinely after construction?</li> </ul>	●	√	<p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	●	√	<p>Note: DNREC requires a Certified Construction Reviewer</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>

<b>Maintenance</b>			
• Are maintenance agreements required?	<input checked="" type="radio"/>	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	<input checked="" type="radio"/>	√	Ordinance Findings: No
<b>Off-Site Mitigation</b>			
• Is offsite mitigation required when on-site management does not meet the performance criteria (unless there is proof of no adverse impact)?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is the DE Nutrient Protocol program required to calculate offsets?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for forested area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for riparian area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for BMP retrofit allowed in the same named watershed?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is nutrient banking or the equivalent land banking allowed in the same named watershed? Is redevelopment encouraged in lieu of greenfield development?	<input type="radio"/>		Ordinance Findings: No
<b>Local Stormwater Utility Ordinance</b>			
• Does an ordinance exist to support the development of a local stormwater utility?	<input checked="" type="radio"/>		Ordinance Findings: No

**GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

Objective: Meet DNREC stormwater regulations

Objective: Minimize erosion and sedimentation and delivery of nonpoint source pollutants during construction activities.

Objective: Inspect BMPs ensure proper construction and design.

Objective: Maintain BMPs.

GOAL #6 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Sedimentation and Erosion Control provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• DNREC Turbidity Stormwater Management</li> </ul>	●	√	Best Available Technology shall be employed to manage turbid waters in accordance with state regulations. Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC requirement of Sediment and Stormwater Management Plans</li> </ul>	●	√	Ordinance Findings: Yes Conservation District Checklist
<ul style="list-style-type: none"> <li>• DNREC Land Disturbance Criteria</li> </ul>	●	√	Use of standard details for DE Erosion and Sedimentation Control Handbook-limited to sites where no more than 10 acres draining to a common discharge point will be disturbed at any one time. Ordinance Findings: No  Construction site BMPs intended to manage areas greater than 10 acres shall have supporting design computations. Ordinance Findings: No  In no case shall an area of disturbance draining to a common point exceed 20 acres. Grading within that drainage area shall not proceed unless temporary or permanent stabilization has been accomplished. All plans shall include a limit of disturbance line. Ordinance Findings: Yes Conservation District Checklist

<ul style="list-style-type: none"> <li>• DNREC Site Stabilization Criteria</li> </ul>	<p>●</p>	<p>√</p>	<p>Following soil disturbance or redisturbance, permanent or temporary stabilization shall be completed for all perimeter sediment controls, topsoil stockpiles, or other graded/disturbed areas within 14 calendar days unless a more restrictive federal requirement applies.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p> <p>Documentation of soil testing and materials used for stabilization shall be provided for verification.</p> <p>Ordinance Findings: Not addressed</p> <p>Release of financial guarantee and or issuance of Notice of Completion shall not occur until final stabilization of all exposed areas is achieved.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	<p>●</p>	<p>√</p>	<p>Agricultural having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meet DOA requirements</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<p><b>Inspections</b></p>			
<ul style="list-style-type: none"> <li>• Are weekly inspections required during construction?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>

<b>Maintenance</b>			
• Are maintenance agreements required?	●	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	●	√	Ordinance Findings: No

**GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

**Note: Onsite Wastewater Treatment and Disposal provisions are still in draft form and may not be subject to this ordinance review.**

<b>GOAL #7 KEY QUESTIONS</b>	<b>DEGREE OF IMPORTANCE</b>	<b>REQUIRED BY DNREC</b>	<b>COMMENTS</b>
<b>Performance Standards</b>			
Where do local governments allow/encourage/ban standard systems versus community systems and how does that impact growth patterns			<p>Ordinance Findings: The Town requires all new development to hook to its public sewerage system.</p>



## TETRA TECH

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### MEMORANDUM

**To:** John McDonnell (Town of Greenwood)

**From:** Eugenia Hart and Kimberly Brewer

**Cc:** Jennifer Walls (DNREC); Bryan Hall (DNREC); Jennifer Volk (DNREC)

**Date:** January 24, 2012

**Subject:** Review of the Town of Greenwood's Local Land Use Ordinances to Identify Barriers to Implementing the Chesapeake Bay Watershed Implementation Plan

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## 1 Introduction

Delaware has developed a Watershed Implementation Plan (WIP) to accompany the Chesapeake Bay nutrient and sediment total maximum daily loads (TMDLs). The WIP lays out plans for addressing existing pollutant load to the Bay as well as new pollutant loads from future land use changes. DNREC has tasked Tetra Tech with assisting local Delaware municipalities in the Chesapeake Bay watershed to conduct a review of existing local municipal ordinances with regulations pertaining to new development.

The goal of the ordinance review is to provide a service to local governments in Delaware by reviewing existing land use ordinances to look for barriers to implementing the Chesapeake Bay WIP as well as identify potential opportunities for improving communities and allowing more techniques to be used to help property owners address nutrient and sediment loads from new developments. These include techniques such as green infrastructure, low impact development, conservation design, and performance standards that can allow flexibility. There are often unintended barriers to these techniques in local ordinances.

This memorandum presents the results of Tetra Tech's review of these local ordinances for the Town of Greenwood, DE. Note that recommendations for consideration of code revisions are not mandatory. They are intended only to provide more flexibility and effectiveness in meeting resource protection goals and regulations.

## 2 Approach

In August 2011 Tetra Tech contacted the Town of Greenwood to obtain the most recent versions of the following types of ordinances, if available:

- Subdivision ordinance
- Zoning ordinance

- Sedimentation and erosion control ordinance or regulations
- Onsite wastewater ordinance or regulations

Greenwood staff provided their subdivision and zoning ordinances for review. Sedimentation and erosion control is handled by the Sussex County Conservation District (SCD). Note that SCD does not have their own stormwater, sedimentation, and erosion control standards, but adheres to Delaware's State Sediment and Stormwater Regulations (see section 3.1 below). Greenwood does not have specific on-site wastewater regulations as all new developments hook to public water and sewer.

Once the ordinances were obtained, they were reviewed based on the Ordinance Review Checklist developed by Tetra Tech (Appendix A). The checklist contains items related to the following seven goals:

1. Minimize Effective or Connected Impervious Area
2. Preserve and Enhance the Hydrologic Function of Unpaved Areas
3. Harvest Rainwater
4. Allow and Encourage Multi-Use Stormwater Controls
5. Manage Stormwater to Meet WIP and DNREC Regulations
6. Manage Construction Site Stormwater to Meet WIP and DNREC Regulations
7. Manage On-Site Wastewater Systems to Meet WIP and DNREC Regulations

The Town of Greenwood staff reviewed the draft memo, and recommended revisions and corrections as needed.

Barriers to each of the items on the Checklist are summarized below in Section 3 along with potential solutions to overcome these barriers.

### **3 Summary of Barriers and Potential Solutions for Implementation**

This section of the memo provides a summary of the barriers identified for each of the seven goals indicated on the Ordinance Review Checklist (Appendix A). Following the summary of each barrier, potential solutions are provided.

#### **3.1 GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

##### **Mitigation of Runoff from Effective Impervious Area**

DNREC's final draft stormwater regulations (DNREC 2011) require that local regulations and standards mitigate stormwater runoff such that there is no direct contribution of stormwater runoff from a development. Greenwood does not have an ordinance that directly addresses this issue; however, Greenwood currently follows the Sussex Conservation District's Sediment Control and Stormwater Management Program. SCD follows the State of Delaware's Sediment and Stormwater Regulations as a delegated agency. It is suggested that Greenwood reference State of Delaware Sediment and Stormwater Regulations in their subdivision ordinance.

##### **Flexibility in Locating BMP Techniques On-site**

The location of low impact development (LID) best management practices (BMPs) in street and parking areas (e.g., parking medians, grass strips between sidewalk and curb, swales, etc.) is for the most part not explicitly prohibited or allowed in the ordinance. However, current design requirements and lack of certainty about approval of these techniques can pose a barrier to implementation. It appears that height

and setback limitations for landscaping at intersections would directly prohibit the use of LID techniques such as curb bumpouts/extensions with bioretention or bioswales.

### **Street and Right-of-Way Widths**

Greenwood's current zoning regulations do not allow minor streets to have narrow street pavement and travel lane widths to help minimize impervious area. In addition to the environmental benefits of narrowing streets, some studies have found that narrow residential streets are safer than wide streets (Center for Watershed Protection 1998).

In the last decade, numerous developments have been built using techniques to narrow street and right of way width. Techniques such as curb pullouts, staggered pull-out parking areas (rather than continuous lanes), or having a parking lane on one side of the street only have been employed. These developments have been able to meet the needs of access for service and emergency vehicles as well as on-street parking while also using narrower streets and public right-of-ways than do conventional subdivisions. That said, it should be recognized that concerns about these components of LID—narrow streets and right-of-ways—make it challenging to implement. In each community, moving forward requires a great deal of discussion and problem solving with staff from the fire department, public works, engineering, and other potentially affected departments in order to address concerns and develop mutually supported ordinance and code revisions. Note that Delaware State Fire Prevention Regulations do not appear to regulate street widths in residential developments, but do provide turn-around and cul-de-sac standards that allow for fire apparatus access.

### **Minimum Parking Requirements**

Current zoning establishes a high minimum parking space requirement and requires overly large parking stalls and drive aisles. Together these minimum parking requirements can unnecessarily increase the overall imperviousness of the development site. Some communities allow a smaller number of parking spaces per square feet of floor area in the development, as well as allow smaller stalls and aisles (e.g., stall width of 9 feet, minimum stall length to 15 feet, and minimum drive aisle width of 22 feet). These standards minimize paved area, provide adequate parking space, and reduce development costs.

### **Incentives for Infill Development and Redevelopment of Existing Areas over “Greenfield” Development**

DNREC's draft sediment and stormwater regulations (June 2011) require that local regulations and standards impose less stringent runoff reduction requirements for proposed development in existing developed areas, thus providing incentives to develop in these areas rather than undeveloped or “greenfield” areas. Local zoning and subdivision requirements will need to be amended accordingly.

## **3.2 GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

### **Encouraging or Requiring Stream Buffers**

The Phase I WIP calls for local regulations and standards that encourage or require buffers of 60 feet for secondary waterbodies and 100 feet for primary waterbodies for new development proposals. These buffers can be reduced if combined with other pollution reduction actions. The town's current zoning and subdivision ordinances do not require such riparian buffers. Local zoning and subdivision requirements will need to be amended accordingly.

### **Minimizing Disturbance in Environmentally Sensitive Areas**

It appears that the local regulations currently allow disturbance of riparian areas, erodible soils, steep slopes, and areas of high soil infiltration. LID uses these landscape features as a part of natural stormwater management and seeks to minimize their disturbance during and after construction. Local zoning and subdivision requirements should be amended to address the protection of environmentally sensitive areas.

### **3.3 GOAL #3: HARVEST RAINWATER**

#### **Explicitly Allowing or Encouraging Rainwater Harvest**

Rainwater harvesting is not explicitly prohibited or allowed in the ordinances. However, lack of certainty about approval of these techniques can pose a barrier to implementation.

### **3.4 GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

#### **Flexibility in Locating LID Techniques in Designated Landscape and Open Space Areas**

Due to specifications and allowances, it appears that LID techniques such as bioretention, bioswales, constructed wetlands, etc. are effectively not allowed in required landscape, screening, and open space areas. Where these BMPs can be designed to support landscape and open space functions, flexibility should be provided in locating these BMPs where they can be most effective in managing water quality, drainage, and flooding impacts. Explicit exemptions, as-of-right use, or even incentives, should be made for the use of vegetative LID techniques in screening, buffer, and landscape areas. Additionally, consideration should be given allowing bioretention and bioswales in the right-of-way area typically used as a grassed strip.

#### **Credit for LID Techniques that Provide Landscape and Natural Open Space Functions**

LID BMPs are not given credit by the Town as part of the required landscaping and open space areas. Explicitly providing such credit would provide an incentive for developers to use LID techniques.

#### **Landscaping and Grass Control**

Certain landscape and grass control requirements could limit the use of bioretention, bioswales, and other LID techniques. One such requirement is the Brush, Grass, and Weed Ordinance, which requires that no weeds, grass, or other ground cover vegetation shall exceed a height of 8" at any time. Explicit exemptions should be made for bioretention, bioswale, and similar LID techniques properly designed.

### **3.5 GOAL #5: MANAGE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Stormwater Regulations**

DNREC's final draft sediment and stormwater regulations require new minimum water quality, channel protection, and conveyance and flood control requirements for new development and redevelopment. As stated earlier, it is suggested that Greenwood reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance.

#### **Off-site Mitigation**

There are no provisions in the ordinance for off-site mitigation when on-site management does not meet the performance criteria. DNREC is in the final phases of developing an offset tool called the *Nutrient and Sediment Loading Assessment Protocol*. The tool allows developers to determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. This is a useful tool in determining whether or not a proposed development meets the TMDL or will need additional on-site management or off-site mitigation. Greenwood may want to consider requiring developers to use this tool during the planning process before presenting the site plan to the planning and zoning commission for review.

### **3.6 GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Sediment and Erosion Control Regulations**

DNREC's final draft sediment and stormwater regulations require construction site stormwater management controls to be put in place for all construction activities exceeding 5,000 square feet of disturbance. As stated earlier, it is suggested that Greenwood reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance.

### **3.7 GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WIP AND DNREC REGULATIONS**

Greenwood does not have specific on-site wastewater regulations as all new developments are connected to public water and sewer.

## **4 Accounting and Tracking of BMP Implementation**

Greenwood is interested in helping to track the implementation of BMPs in the town. It is suggested that DNREC provide the Town of Greenwood with a list of BMPs approved for use in the Chesapeake Bay watershed TMDL model and have the Town of Greenwood notify DNREC if any of these types of BMPs are installed in the town so they can be appropriately credited in the Bay model.

## **5 Conclusions**

Review of Greenwood's subdivision and zoning ordinances result in several key findings. The first finding is that the Town of Greenwood's zoning and subdivision ordinances have a number of strong features including, but not limited to the minimization of setbacks to encourage clustering and open space design in Residential Planned Communities.

There are some direct barriers to the use of LID techniques, such as such as specifications and allowances for required screening, landscape and open space areas. To allow or encourage the use of LID techniques, the Town would need to explicitly exempt these techniques or allow them as-of-right in these areas. The Town should consider allowing bioretention and bioswales in the right-of-way way area typically used as a grassed strip.

In some cases, the ordinances have barriers of omission: by not expressly allowing the LID technique or providing for exemptions, the ordinances generate uncertainty regarding approval and thus unintentionally provide disincentives for some LID practices. Examples of this include disconnection of downspouts and allowing rainbarrels or cisterns to be placed in the zoning setback areas.

The Town does not have an ordinance that directly addresses sediment and stormwater management. Rather, Greenwood's follows the provisions and requirements contained in the Sussex Conservation District's Sediment Control and Stormwater Management Program. Considering the new federal stormwater regulations due out in late 2011 and new state stormwater regulations due in 2012, it is suggested that the Town of Greenwood reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance, and the agency implementing the regulations (DNREC or its Delegated Agency).

Reducing impervious area in new developments can be an important part of stormwater management. Greenwood may want to consider allowing narrower street and right of way widths in all new developments, while employing techniques such as curb pullouts and staggered pull-out parking areas to meet the needs of service and emergency vehicles as well as on-street parking. Greenwood might also want to consider allowing a smaller number of parking spaces as well as smaller parking stalls and aisles in new multi-family and commercial developments.

Finally, Greenwood might want to consider adopting DNREC's *Nutrient and Sediment Loading Assessment Protocol* as part of their subdivision ordinance. The tool can help developers determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. The tool can help to quantify the number and types of BMPs necessary on a new development site to meet the TMDL requirements.

## References

Center for Watershed Protection (CWP). 1998. *Better Site Design: A Handbook for Changing Development Rules in Your Community*.

DNREC (Department of Natural Resources and Environmental Control). 2011. *Final Draft Sediment and Stormwater Regulations*. June 2011.

Delaware Department of Transportation (DelDOT). 2010. *Standards and Regulations for Subdivision Streets and State Highway Access*. Dover, DE.

Delaware State Fire Marshall. 2009. *Delaware State Fire Prevention Regulations*

Greenwood Grass Ordinance

Greenwood Subdivision Ordinance

Greenwood Zoning Ordinance

Sussex Conservation District. 2011. *Sediment and Stormwater Management Checklist* <http://sussexconservation.org/> Accessed August 2011.

## Appendices

Appendix A. Ordinance Review Checklist

# Appendix A. Ordinance Review Checklist

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# Local Development Ordinance Tools/Techniques for Implementing Delaware's Chesapeake Bay Watershed Implementation Plan & DNREC Final Draft Sediment and Stormwater Regulations

## Town of Greenwood Ordinance Review Checklist

### Town of Greenwood Ordinances Reviewed

Zoning Ordinance

Subdivision Ordinance

Grass Ordinance

Sussex Conservation District Sediment and Stormwater Management Checklist

*[Note: Ordinance checklist that follow is based on Delaware's Phase I Chesapeake Bay Watershed Implementation Plan (November 2010); Final Draft Sediment and Stormwater Regulations (DNREC, June 2011); Protecting Water Quality with Smart Growth Strategies and Natural Stormwater Management in Sussex County (January, 2009); Better Site Design: A Handbook for Changing Development Rules in Your Community (CWP, 1998); Low-Impact Development Design Strategies, An Integrated Approach (USEPA, 2000); and Tetra Tech's review of numerous local ordinances to identify opportunities and barriers to green infrastructure and low impact development techniques.]*

**Degree of Importance Key to Symbols:**

- Essential
- ◐ Very important
- Important

**GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

- Objective: Minimize impervious area associated with streets.
- Objective: Minimize impervious area associated with parking.
- Objective: Minimize impervious area associated with driveways and sidewalks.
- Objective: Clustering development.
- Objective: Incorporate sustainable hydrology practices into urban redevelopment.

GOAL #1 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Overall Effective Impervious Area</b>			
<ul style="list-style-type: none"> <li>• Is impervious area required to be controlled such that there is no direct contribution of stormwater runoff (i.e., the equivalent of 0% effective impervious area)?</li> </ul>	●	√	<p>Note: DNREC’s Final Draft stormwater regulations require that after runoff reduction practices have been implemented on disturbed area, the site’s impervious area shall not directly contribute stormwater runoff during a rain event that has an 99% annual probability of occurring. See Goal # 5 performance criteria.</p> <p>Ordinance Findings: No</p>
<b>Streets</b> (Note: Also check Fire Marshal’s Code to see how it impacts the following goals)			
<ul style="list-style-type: none"> <li>• For residential development, are the street pavement widths allowed to be between 18 to 22 feet, with curb pullouts for passing of large vehicles?</li> </ul>	●		<p>Ordinance Findings: No</p> <p>Subdivision Ordinance A7A, § VII (B.16.)</p> <p>All minor roadways shall be 34 feet between curbs.</p>
<ul style="list-style-type: none"> <li>• Are travel lanes allowed to be from 12 to 10 feet (or less), with curb pullouts for passing of large vehicles?</li> </ul>	●		<p>Ordinance Findings: No</p> <p>Subdivision Ordinance A7A, § VII (B.16.)</p> <p>All minor roadways shall be 34 feet between curbs. This implies a larger travel lane requirement.</p>

<ul style="list-style-type: none"> <li>• Are curb bumpouts/extensions allowed near intersections and mid-block for traffic-calming and bioretention opportunities?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: Limited opportunity</p> <p>Zoning Ordinance Article 5, §5.10 states that no planting above a height of 3 feet shall be permitted within 15 feet of the intersection of the right of way lines of two or more intersecting streets.</p>
<ul style="list-style-type: none"> <li>• Is pervious paving allowed for on-street parking and alleyways?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: No Concrete and bituminous surface is required per the Town's construction specifications.</p>
<ul style="list-style-type: none"> <li>• Are grass swales or bioretention swales allowed instead of curb and gutter or with curb cuts (where slopes allow)?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, is the radius required to be 35 feet or less?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: Not expressly allowed or prohibited.</p> <p>2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in length.</p>
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, are landscaped islands or bioretention islands allowed or encouraged?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: No</p> <p>2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in length.</p>
<ul style="list-style-type: none"> <li>• Are site designs required to promote the most efficient street layout to reduce overall street length?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: No</p>
<b>Parking</b>			
<ul style="list-style-type: none"> <li>• Is the minimum stall width for a standard parking space 9 ft. or less?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: No</p> <p>Zoning Ordinance Article 9, §9.1.2 10 ft width required</p>
<ul style="list-style-type: none"> <li>• Are parking stall lengths allowed to be 15 ft.?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: No</p> <p>Zoning Ordinance Article 9, §9.1.2 20 ft length required</p>
<ul style="list-style-type: none"> <li>• Are parking lot drive aisles allowed to be 22 ft.?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: Not addressed</p>
<ul style="list-style-type: none"> <li>• Are bioretention cells allowed in parking medians?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>

<ul style="list-style-type: none"> <li>• Are consolidated travel lanes and on-street parking allowed to create space for bioretention?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are pervious surfaces such as paver stones, porous pavement, or grass pavers allowed for on-street parking?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• For office buildings, is the required parking ratio 3.0 spaces per 1,000 sq.ft. of gross floor area or less?</li> </ul>	◐		Ordinance Findings: No Zoning Ordinance Article 9, §9.2.2 1 space per 200 to 250 sq.ft.
<ul style="list-style-type: none"> <li>• For commercial centers, is the required parking ratio 2 to 4.5 spaces per 1,000 sq.ft. of gross floor area or less?</li> </ul>	◐		Ordinance Findings: No Zoning Ordinance Article 9, §9.2.2 1 spaces per 200 sq.ft.
<ul style="list-style-type: none"> <li>• Are proposed developments allowed to take advantage of opportunities for shared parking?</li> </ul>	○		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Are proposed developments allowed to have parking stalls under the second floor podium?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.
<b>Driveways/Sidewalks</b>			
<ul style="list-style-type: none"> <li>• Are driveway standards 9 feet or less in width?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are shared driveways allowed?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• If sidewalks are required, are they required to be designed to the narrowest allowable width (e.g, 4 ft.)?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are sidewalks allowed to be on one side of the street only?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.
<b>Clustering Development</b>			
<ul style="list-style-type: none"> <li>• Is redevelopment encouraged in lieu of greenfield development through site performance standards?</li> </ul>	●	√	Note: DNREC's Final Draft stormwater regulations recognize the benefit of redevelopment, and have less stringent performance standards for proposed development in existing developed areas. See Goal # 5 performance criteria.

			Ordinance Findings: No
• Is Conservation or Open Space Design an option?	<input checked="" type="radio"/>		Ordinance Findings: No
• To encourage clustering and open space design, are setbacks minimized (e.g., for residential lots that are 1/2-acre or less in size, is the front set back 20 feet or less, the rear setback 25 feet or less, and the side setback 8 feet or less?)	<input checked="" type="radio"/>		Ordinance Findings: Yes Zoning Article 6 Residential Planned Community § 6.7
• Are site designs required to have development focused on areas of lesser slopes and farther from watercourses?	<input type="radio"/>		Ordinance Findings: No
• Are policies effective in encouraging higher density development to be centered around transportation corridors?	<input type="radio"/>		Note that it is important for towns to allow density bonuses for protecting certain features, preserving open space, and limiting sprawl. Ordinance Findings: No

**GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

Objective: Minimize building footprint/envelope area.

Objective: Preserve topsoil structure.

Objective: Preserve sensitive wetlands.

Objective: Preserve sensitive soils.

Objective: Preserve sensitive stream buffers.

GOAL #2 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Topsoil Structure &amp; Building Footprint</b>			
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas required to be phased?</li> </ul>	●	√	Note: DNREC’s performance criteria for construction site management include limits on site disturbance. See Goal #6 performance criteria. Ordinance Findings: Yes Conservation District Checklist
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas and riparian areas required to be minimized?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are building envelopes required/encouraged to avoid sensitive environmental areas such as riparian areas, wetlands, high infiltration soils, and steep slopes?</li> </ul>	◐		Ordinance Findings: No
<b>Wetlands</b>			
<ul style="list-style-type: none"> <li>Are site designs required to minimize hydrologic alteration to existing wetlands?</li> </ul>	●	√	Note: there are state regulations prohibiting the disturbance of certain wetlands.
<b>Sensitive Soils</b>			
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid highly erodible soils?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid soils with high permeability (e.g., Hydrologic Soil Group A and B)?</li> </ul>	◐		Ordinance Findings: No
<b>Stream Buffers</b>			
<ul style="list-style-type: none"> <li>Is a 60- to 100-foot stream buffer required/encouraged for new development?</li> </ul>	●		Note: The Phase I WIP recommends 100 ft for primary waters and 60 ft for secondary waters; can be reduced if

			combined with other pollution reduction actions. This buffer recommendation is applicable to those areas where buffers are voluntary (i.e., not the Dept. of Ag's 30 ft buffer or CAFO buffers) Ordinance Findings: No
• Are stream buffers for new development required to remain in a natural state?	<input checked="" type="radio"/>		Ordinance Findings: No
• Are site designs required to preserve existing runoff pathways to adequately support existing wetlands?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is a 50-foot wetland buffer required/encouraged?	<input type="radio"/>		Ordinance Findings: No

**GOAL #3: HAVEST RAINWATER**

Objective: Allow rainwater harvesting through plumbing code provisions.

Objective: Allow the use of downspout disconnection/redirection, rain barrels, and above-and below-ground cisterns for rainwater harvesting

GOAL #3 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<ul style="list-style-type: none"> <li>• Can downspouts be disconnected or redirected to discharge into a rain barrel or yard?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are interior or exterior cisterns allowed?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Can rain barrels be placed within standard zoning setback areas?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Do zoning and building provisions allow cisterns to be placed on rooftops to harvest rainwater?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Is harvested rainwater allowed to be used for nonpotable interior uses such as toilet flushing?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.

**GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

Objective: Allow and encourage stormwater controls as multiple use in open space areas.

Objective: Allow and encourage stormwater controls as multiple use in landscaped areas.

GOAL #4 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Landscaped Areas</b>			
<ul style="list-style-type: none"> <li>Are bioretention areas allowed to be constructed in the development's designated landscape areas, if properly designed?</li> </ul>	●		<p>Ordinance Findings: No Location of bioretention, bioswales, etc. is not included in the ordinances; however landscape and screening requirements will pose barriers to use of bioretention in landscape areas including but not limited to:</p> <p>Zoning Article 6 Highway Commercial § 6.10.g There shall be a minimum of a 10 foot landscaped buffer along all lot lines with screening at least 6 feet high.</p> <p>Zoning Article 10 Landscape Screening § 10.1 (1) In any R-1, R-2, or R-3 District a landscape screen a minimum of six feet in height shall be planted to separate residential and non-residential uses.</p> <p>Zoning Article 10 Landscape Screening § 10.1 (2) In any R-3 District, garden apartments and townhouses shall have a minimum 6-foot landscape screen between contiguous R-1 and R-2 lots.</p> <p>Grass Ordinance A3B § 4 It is unlawful for the owner or tenant of any property to permit or maintain the growth of any grass more than 8 inches in height.</p> <p>The Conservation District's Sediment and Stormwater checklist expressly prohibits infiltration practices from being located within 20 feet of basement walls.</p>

			The ordinance review did not identify street construction and design standards related to vegetation in the right-of-way. Typically, the standards require a grass strip (topsoil, seed, and mulch) that effectively prohibit the use of bioretention and bioswales.
<ul style="list-style-type: none"> <li>• Are bioretention areas given “credit” as landscape area to count as a percent of the required landscaping?</li> </ul>	●		Ordinance Findings: No Bioretention is not included in the zoning and subdivision ordinances
<ul style="list-style-type: none"> <li>• Do landscaping requirements allow plantings conducive to bioretention, bioswales, raingardens, and other LID BMPs?</li> </ul>	●		Ordinance Findings: No See landscaping findings above
<ul style="list-style-type: none"> <li>• Do tree planting requirements allow use of raingardens, tree boxes, and other LID BMPs?</li> </ul>	●		Ordinance Findings: No Bioretention is not included in the zoning and subdivision ordinances
<b>Open Space Areas</b>			
<ul style="list-style-type: none"> <li>• Are there open space preservation requirements or incentives?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Is preserved open space required to be managed in a natural condition?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Are structural LID techniques such as constructed wetlands, swales, and bioretention areas allowed to be constructed in a development’s designated open space, if properly designed?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Are structural LID techniques such as constructed wetlands, swales, and bioretention areas given “credit” as open space to count as a percent of the required open space area, if properly designed?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Does protection of sensitive, natural areas and habitat qualify as credit for local open space dedication?</li> </ul>	●		Ordinance Findings: Not expressly allowed or prohibited.

**GOAL #5: MANAGE STORMWATER TO MEET WATERSHED IMPLEMENTATION PLAN & DNREC STORMWATER REGULATIONS**

- Objective: Meet DNREC stormwater regulations
- Objective: Replicate the predevelopment hydrology of the site, to the extent practicable.
- Objective: Maintain water quality functions of the watershed.
- Objective: Minimize channel erosion impacts.
- Objective: Minimize flooding impacts.
- Objective: Inspect BMPs to ensure proper construction and design.
- Objective: Long-term maintenance.

GOAL #5 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Stormwater Ordinance Provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• Is stormwater required to be retained/infiltrated onsite (through bioretention, natural areas, and swale infiltration) where possible?</li> </ul>	●	√	Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC Resource Protection Criteria</li> </ul>	●	√	<p>Note: For the 1-yr, 24 hour rainfall event, meet the following standards:                      Predevelopment wood/meadow – runoff reduction practices will yield the equivalent wooded condition for these areas.                      All remaining disturbed area shall achieve the equivalent of 0% effective imperviousness.                      The remaining discharge, if any, shall not exceed the 24-hour detention of the 1yr, 24 hr storm and an offsite offset is required for the portion of the storm not meeting the minimum requirements.                      Additional water quality treatment BMPs shall be required if runoff reduced is not sufficient to meet the TMDL.</p> <p>Ordinance Findings: No                      The Conservation District’s Sediment and Stormwater checklist SM 11 requires wet ponds to be designed to release the quality of stormwater runoff over a 24 hour period. Practices that have a permanent pool are to be designed to release the first inch of runoff</p>

			from the site over a 24 hour period. SM 12 requires infiltration practices to accept, at least, the first inch of runoff from all streets, roadways, and parking lots.
<ul style="list-style-type: none"> <li>• DNREC Conveyance Criteria for Channel Protection</li> </ul>	●	√	<p>Note: Conveyance Volume is the 10 yr, 24 hr rainfall event (or the volume of runoff produced by the post-development storm having a 10% chance of occurring)- less any volume reduction achieved through meeting the Resource Protection Criteria.</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Yes (it appears that the Conservation District standard below could meet this requirement.)</p> <p>The Conservation District's Sediment and Stormwater checklist SM 10 states that the pos-development peak rates of discharge for the 2- and 10-year storm events shall not exceed the predevelopment peak rates of discharge for the 2- and 10- year storm events.</p>
<ul style="list-style-type: none"> <li>• DNREC Flood Event Criteria</li> </ul>	●	√	<p>Volume of runoff produced by 100 yr, 24 hr rainfall event (or post-development storm having a 1% probability of occurrence).</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Not addressed in ordinances and standards reviewed.</p>
<ul style="list-style-type: none"> <li>• Alternative Criteria</li> </ul>	●	√	Land development that discharges to state waters included in a Designated Watershed or other watershed

			management plan approved in accordance with DNREC stormwater regulations shall meet alternative criteria in the approved plan.
<ul style="list-style-type: none"> <li>• Redevelopment Criteria</li> </ul>	●	√	<p>Recognizing the importance of redevelopment over greenfield development, redevelopment areas are required to only achieve a 50% reduction in effective impervious area based on existing conditions. Only the <u>increases</u> in the rate, volume, and duration of flow for the channel volume and flooding volume will need to comply with the DNREC stormwater regulations.</p> <p>A brownfield development remediation plan may meet the stormwater goals and intent of the DNREC stormwater regulations if approved by DNREC.</p> <p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	●	√	<p>Agricultural land having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meets DOA requirements.</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes</p> <p>Conservation District Program</p>
<b>Inspections</b>			
<ul style="list-style-type: none"> <li>• Are inspections required during construction and routinely after construction?</li> </ul>	●	√	<p>Ordinance Findings: Yes</p> <p>Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	●	√	<p>Note: DNREC requires a Certified Construction Reviewer</p> <p>Ordinance Findings: Yes</p> <p>Conservation District Checklist</p>

<b>Maintenance</b>			
• Are maintenance agreements required?	<input checked="" type="radio"/>	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	<input checked="" type="radio"/>	√	Ordinance Findings: No
<b>Off-Site Mitigation</b>			
• Is offsite mitigation required when on-site management does not meet the performance criteria (unless there is proof of no adverse impact)?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is the DE Nutrient Protocol program required to calculate offsets?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for forested area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for riparian area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for BMP retrofit allowed in the same named watershed?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is nutrient banking or the equivalent land banking allowed in the same named watershed? Is redevelopment encouraged in lieu of greenfield development?	<input type="radio"/>		Ordinance Findings: No
<b>Local Stormwater Utility Ordinance</b>			
• Does an ordinance exist to support the development of a local stormwater utility?	<input checked="" type="radio"/>		Ordinance Findings: No

**GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

Objective: Meet DNREC stormwater regulations

Objective: Minimize erosion and sedimentation and delivery of nonpoint source pollutants during construction activities.

Objective: Inspect BMPs ensure proper construction and design.

Objective: Maintain BMPs.

GOAL #6 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Sedimentation and Erosion Control provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• DNREC Turbidity Stormwater Management</li> </ul>	●	√	Best Available Technology shall be employed to manage turbid waters in accordance with state regulations. Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC requirement of Sediment and Stormwater Management Plans</li> </ul>	●	√	Ordinance Findings: Yes Conservation District Checklist
<ul style="list-style-type: none"> <li>• DNREC Land Disturbance Criteria</li> </ul>	●	√	Use of standard details for DE Erosion and Sedimentation Control Handbook-limited to sites where no more than 10 acres draining to a common discharge point will be disturbed at any one time. Ordinance Findings: No  Construction site BMPs intended to manage areas greater than 10 acres shall have supporting design computations. Ordinance Findings: No  In no case shall an area of disturbance draining to a common point exceed 20 acres. Grading within that drainage area shall not proceed unless temporary or permanent stabilization has been accomplished. All plans shall include a limit of disturbance line. Ordinance Findings: Yes Conservation District Checklist

<ul style="list-style-type: none"> <li>• DNREC Site Stabilization Criteria</li> </ul>	<p>●</p>	<p>√</p>	<p>Following soil disturbance or redisturbance, permanent or temporary stabilization shall be completed for all perimeter sediment controls, topsoil stockpiles, or other graded/disturbed areas within 14 calendar days unless a more restrictive federal requirement applies.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p> <p>Documentation of soil testing and materials used for stabilization shall be provided for verification.</p> <p>Ordinance Findings: Not addressed</p> <p>Release of financial guarantee and or issuance of Notice of Completion shall not occur until final stabilization of all exposed areas is achieved.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	<p>●</p>	<p>√</p>	<p>Agricultural having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meet DOA requirements</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes Conservation District Program</p>
<p><b>Inspections</b></p>			
<ul style="list-style-type: none"> <li>• Are weekly inspections required during construction?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>

<b>Maintenance</b>			
• Are maintenance agreements required?	●	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	●	√	Ordinance Findings: No

**GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

**Note: Onsite Wastewater Treatment and Disposal provisions are still in draft form and may not be subject to this ordinance review.**

<b>GOAL #7 KEY QUESTIONS</b>	<b>DEGREE OF IMPORTANCE</b>	<b>REQUIRED BY DNREC</b>	<b>COMMENTS</b>
<b>Performance Standards</b>			
Where do local governments allow/encourage/ban standard systems versus community systems and how does that impact growth patterns			All new development connects to the Town's public sewerage system



## TETRA TECH

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### MEMORANDUM

**To:** Mary Ellen Gray (Kent County)

**From:** Eugenia Hart and Kimberly Brewer

**Cc:** Jennifer Walls (DNREC); Bryan Hall (DNREC); Jennifer Volk (DNREC)

**Date:** January 24, 2012

**Subject:** Review of Kent County's Local Land Use Ordinances to Identify Barriers to Implementing the Chesapeake Bay Watershed Implementation Plan

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## 1 Introduction

Delaware has developed a Watershed Implementation Plan (WIP) to accompany the Chesapeake Bay nutrient and sediment total maximum daily loads (TMDLs). The WIP lays out plans for addressing existing pollutant load to the Bay as well as new pollutant loads from future land use changes. Delaware's Department of Natural Resources and Environmental Control (DNREC) has tasked Tetra Tech with assisting local Delaware municipalities in the Chesapeake Bay watershed to conduct a review of existing local municipal ordinances with regulations pertaining to new development.

The goal of the ordinance review is to provide a service to local governments in Delaware by reviewing existing land use ordinances to look for barriers to implementing the Chesapeake Bay WIP as well as identify potential opportunities for improving communities and allowing more techniques to be used to help property owners address nutrient and sediment loads from new developments. These include techniques such as green infrastructure, low impact development (LID), conservation design, and performance standards that can allow flexibility. There are often unintended barriers to these techniques in local ordinances.

This memorandum presents the results of Tetra Tech's review of these local ordinances for Kent County, DE. Note that recommendations for consideration of code revisions are not mandatory. They are intended only to provide more flexibility and effectiveness in meeting resource protection goals and regulations.

## 2 Approach

In August 2011 Tetra Tech contacted Kent County to obtain the most recent versions of the following types of ordinances, if available:

- Subdivision ordinance
- Zoning ordinance

- Sedimentation and erosion control ordinance or regulations
- Onsite wastewater ordinance or regulations

Kent County staff provided their Subdivision, Zoning, On-site wastewater, Transfer of Development Rights, Cluster, and Environmental ordinances for review. The County follows the Kent County Conservation District's (KCD) stormwater, sedimentation, and erosion control program. Note that KCD does not have their own stormwater, sedimentation, and erosion control standards, but adheres to Delaware's State Sediment and Stormwater Regulations (see section 3.1 below).

Once the ordinances were obtained, they were reviewed based on the Ordinance Review Checklist developed by Tetra Tech (Appendix A). The checklist contains items related to the following seven goals:

1. Minimize Effective or Connected Impervious Area
2. Preserve and Enhance the Hydrologic Function of Unpaved Areas
3. Harvest Rainwater
4. Allow and Encourage Multi-Use Stormwater Controls
5. Manage Stormwater to Meet WIP and DNREC Regulations
6. Manage Construction Site Stormwater to Meet WIP and DNREC Regulations
7. Manage On-Site Wastewater Systems to Meet WIP and DNREC Regulations

Kent County staff reviewed the draft memo, and recommended revisions and corrections as needed.

Barriers to each of the items on the Checklist are summarized below in Section 3 along with potential solutions to overcome these barriers.

### **3 Summary of Barriers and Potential Solutions for Implementation**

This section of the memo provides a summary of the barriers identified for each of the seven goals indicated on the Ordinance Review Checklist (Appendix A). Following the summary of each barrier, potential solutions are provided.

#### **3.1 GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

##### **Mitigation of Runoff from Effective Impervious Area**

DNREC's draft stormwater regulations (DNREC 2011) require that local regulations and standards mitigate stormwater runoff such that there is no direct contribution of stormwater runoff from a development. Kent County does not have an ordinance that directly addresses this issue; however, Kent County currently follows the Kent Conservation District's (KCD) Sediment Control and Stormwater Management Program. KCD follows the State of Delaware's Sediment and Stormwater Regulations as a delegated agency. It is suggested that Kent County reference DNREC or its Delegated Agency (such as KCD), and reference the State of Delaware Sediment and Stormwater Regulations in their subdivision ordinance. The County could also consider adding a definition of "effective impervious area" to its zoning and/or subdivision code.

##### **Flexibility in Locating BMP Techniques On-site**

Outside of the designated Growth Zone, the County encourages the use of vegetated swales and biofiltration (and other open drainage) instead of curb and gutter as a key component of stormwater management. Such low impact design (LID) techniques can also be used effectively in urban and suburban areas; the County may wish to amend its ordinance and Comprehensive Plan to allow or even encourage LID in its Growth Zone as well. Additionally, it appears that weed and "deleterious growth"

regulations (that limit growth to a height of less than 12 inches) could prohibit the use of vegetated swales and biofiltration. Although this height limitation has not limited the use of these BMPs to-date, the County could consider making an explicit exemption for vegetated LID practices such as bioretention and bioswales. The location of LID best management practices (BMPs) in parking areas is for the most part not explicitly prohibited or allowed in the ordinances. Lack of certainty about approval of these techniques can pose a barrier to implementation.

### **Street and Right-of-Way Widths**

Except for private streets in rural subdivisions, current zoning regulations do not allow minor streets to have narrow street pavement and travel lane widths to help minimize impervious area. The ordinance does permit the Regional Planning Commission to approve more narrow streets. And the County's Transfer of Development Rights (TDR) ordinance actually calls for more narrow streets in developments where sending and receiving zones are established and implemented.

In addition to the environmental benefits of narrowing streets, some studies have found that narrow residential streets are safer than wide streets (Center for Watershed Protection 1998). In the last decade, numerous neo-traditional developments have been built using techniques to narrow street and right-of-way width such as curb pullouts, staggered, pull-out parking areas (rather than continuous lanes) or having a parking lane on one side of the street only have been employed. These developments have been able to meet the needs of access for service and emergency vehicles, on-street parking, etc. while also using narrower streets and public right-of-ways than do conventional subdivisions. That said it should be recognized that concerns about these component of LID—narrow streets and right-of-ways—make it challenging to implement. In each community, moving forward requires a great deal of discussion and problem solving with staff from the fire department, public works, engineering, and other potentially affected departments in order to address concerns and develop mutually supported ordinance and code revisions. Note that Delaware State Fire Prevention Regulations do not appear to regulate street widths in residential developments, but do provide turn-around and cul-de-sac standards that allow for fire apparatus access.

### **Minimum Parking Requirements**

Current zoning requires overly large parking stall lengths and drive aisles. Together these minimum parking requirements can unnecessarily increase the overall imperviousness of the development site. Some communities allow minimum stall length of 15 feet and minimum drive aisle width of 22 feet. These standards minimize paved area, provide adequate parking space, and reduce development costs.

## **3.2 GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

### **Minimizing Disturbance in Environmentally Sensitive Areas**

It appears that the local regulations currently do not prohibit disturbance of erodible soils, steep slopes, and areas of high soil infiltration, or encourage their preservation on development sites. LID uses these landscape features as a part of natural stormwater management and seeks to minimize their disturbance during and after construction. Local subdivision provisions regarding passive open space could be amended to include these features as among those that could count toward satisfaction of passive open space requirements.

### **3.3 GOAL #3: HARVEST RAINWATER**

#### **Explicitly Allowing or Encouraging Rainwater Harvest**

Rainwater harvesting is not explicitly prohibited or allowed in the ordinances. However, lack of certainty about approval of these techniques can pose a barrier to implementation.

### **3.4 GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

#### **Flexibility and Credit for Locating LID Techniques in Landscaping, Buffering, and Other Planting Areas**

The Development Ordinance does allow LID techniques to be constructed in designated “passive open space” areas and active recreation areas, and indeed receives credit toward the required open space and recreation area. However, it appears that LID techniques such as constructed wetlands, bioretention, bioswales, etc. are not allowed in the required landscaping and planting areas. This includes the areas along the perimeter of residential, industrial, and commercial lots where buffering and berms are requirement to provide privacy and screening, parking lot landscaping and screening requirements, tree planting requirements, and grass strips adjacent to sidewalks. Where LID BMPs can be designed to support landscaping and planting functions, flexibility should be provided in locating these BMPs where they can be most effective in managing water quality, drainage, and flooding impacts. Moreover, explicitly providing credit for LID BMPs toward meeting landscaping, buffering, and other planting requirements would provide an added incentive for developers to use LID techniques.

The Subdivision and Land Development Ordinance requires stormwater management ponds/basins to have a 30 foot setback from parcel lines and to be 100 feet from the nearest residential dwelling setback line. These setbacks could be a constricting factor in the proper placement of LID practices depending on the interpretation of the definition of stormwater management pond/basins. Kent County may want to consider providing exemptions from these setbacks for particular LID practices.

### **3.5 GOAL #5: MANAGE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Stormwater Regulations**

DNREC’s draft sediment and stormwater regulations require new minimum water quality, channel protection, and conveyance and flood control requirements for new development and redevelopment. As stated earlier, it is suggested that Kent County reference DNREC or its Delegated Agency (such as KCD), and reference the State of Delaware Sediment and Stormwater Regulations in its subdivision ordinance.

#### **Use of LID within the Growth Zone Overlay**

The Comprehensive Plan encourages the use of LID practices outside of the designated Growth Zone and in more rural areas within the Growth Zone Overlay that lie in the Chesapeake Bay watershed. In fact, the County policies and regulations actively encourage development within the Growth Zone and discourage development outside of the Growth Zone. As a result, new development is generally taking place within the Growth Zone. In practice, LID BMPs such as bioretention, bioswales, constructed wetlands, etc. can be used effectively in urban and suburban areas; and although LID BMPs are not actually prohibited within the County’s Growth Zone, the County may wish to amend its ordinance and Comprehensive Plan to explicit allow or even encourage LID in its Growth Zone as well.

### Off-site Mitigation

There are no provisions in the ordinance for off-site mitigation when on-site management does not meet the performance criteria. DNREC is in the final phases of developing an offset tool called the *Nutrient and Sediment Loading Assessment Protocol*. The tool allows developers to determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. This is a useful tool in determining whether or not a proposed development meets the TMDL or will need additional on-site management or off-site mitigation. Currently, the County requires applicants' compliance with TMDL requirements, and confirmation from DNREC regarding an applicant's satisfactorily meeting standards and protocols. The County may wish to require applicants to submit the analysis from the *Nutrient and Sediment Loading Assessment Protocol* as a part of confirming adherence to DNREC's protocols and standards.

### **3.6 GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### Meeting New DNREC Sediment and Erosion Control Regulations

DNREC's draft sediment and stormwater regulations require construction site stormwater management controls to be put in place for all construction activities exceeding 5,000 square feet of disturbance. As stated earlier, it is suggested that Kent County reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance, and the agency implementing the regulations (DNREC or its Delegated Agency).

### **3.7 GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WIP AND DNREC REGULATIONS**

Where a public sanitary sewer is not available, Kent County's Sanitary Standards require that new buildings shall be connected to a private sewage disposal system complying with DNREC's septic tank installation requirements. Kent County prohibits community wastewater systems. An ordinance provision does exist that requires individual residential on-site sewage disposal systems located in a TMDL watershed to meet the TMDL nutrient loading limits or use best available technology.

## **4 Accounting and Tracking of BMP Implementation**

Kent County would consider tracking the implementation of BMPs; however, before committing to this task they would like to be provided with additional information from DNREC on what it would entail.

It is suggested that DNREC provide Kent County with a list of BMPs approved for use in the Chesapeake Bay watershed TMDL model and have the County notify DNREC if any of these types of BMPs are installed in the County so they can be appropriately credited in the Bay model.

## **5 Conclusions**

Review of Kent County's subdivision and zoning ordinances resulted in several key findings. The first finding is that County's zoning and subdivision ordinances have a number of strong features including, but not limited to:

- encouragement of the use of vegetated swales and biofiltration devices as key components of stormwater management plans

- encouragement of subdivisions with water resource conservation practices including open drainage systems
- standard parking stall widths of 9 feet
- encouragement of cluster developments
- designated growth areas around transportation corridors
- minimization of hydrologic alteration to wetlands
- requirement of a 100 foot stream buffer to remain in natural state
- encouragement of open space to remain in natural condition
- LID techniques allowed to be included in open space area
- requirement of tree mitigation for removed woodlands

The ordinance review did identify possible barriers to the use of LID techniques. In some cases, the ordinance included barriers of omission: by not expressly allowing the LID technique or providing for exemptions, the ordinance generates uncertainty regarding approval and thus unintentionally provides disincentives for some LID practices. Examples of this include allowance of downspouts and location of rain barrels or cisterns in zoning setback areas.

The County does not have an ordinance that directly addresses sediment and stormwater management. Rather, Kent County follows the Kent Conservation District's Sediment Control and Stormwater Management Program. Considering the new federal stormwater regulations due out in late 2011 and new state stormwater regulations due in 2012, it is suggested that Kent County reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance, and the agency implementing the regulations (DNREC or its Delegated Agency).

Reducing impervious area in new developments can be an important part of stormwater management. Kent County may want to consider allowing narrower street and right of way widths in all new developments, while employing techniques such as curb pullouts and staggered pull-out parking areas to meet the needs of service and emergency vehicles as well as on-street parking. Kent County might also want to consider allowing a smaller number of parking spaces as well as smaller parking stalls and aisles in new multi-family and commercial developments.

Finally, Kent County might want to consider adopting DNREC's *Nutrient and Sediment Loading Assessment Protocol* as part of their subdivision ordinance, and requiring confirmation from DNREC that the applicant has satisfactorily used this protocol along with DNREC's other protocols and standards. The tool can help developers determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. The tool can help to quantify the number and types of BMPs necessary on a new development site to meet the TMDL requirements.

## References

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Kent County Property Maintenance Ordinance

Kent County Sanitary Standards

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Kent County Zoning Ordinance

Kent Conservation District. Undated. *Sediment and Stormwater Management Detailed Plan Checklist (Draft)* <http://kentcd.org/ssforms.htm> Accessed August 2011.

## Appendices

Appendix A. Ordinance Review Checklist

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## Appendix A. Ordinance Review Checklist

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# Local Development Ordinance Tools/Techniques for Implementing Delaware's Chesapeake Bay Watershed Implementation Plan & DNREC Final Draft Sediment and Stormwater Regulations

## Kent County Ordinance Review Checklist

### Kent County Ordinances Reviewed

Zoning Ordinance

Subdivision and Land Development Ordinance

Sanitary Standards

Property Maintenance Ordinance

Kent Conservation District Sediment and Stormwater Management Detailed Plan Checklist (Draft)

*[Note: Ordinance Checklist that follows is based on Delaware's Phase I Chesapeake Bay Watershed Implementation Plan (November 2010); Final Draft Sediment and Stormwater Regulations (DNREC, June 2011); Protecting Water Quality with Smart Growth Strategies and Natural Stormwater Management in Sussex County (January, 2009); Better Site Design: A Handbook for Changing Development Rules in Your Community (CWP, 1998); Low-Impact Development Design Strategies, An Integrated Approach (USEPA, 2000); and Tetra Tech's review of numerous local ordinances to identify opportunities and barriers to green infrastructure and low impact development techniques].*

**Degree of Importance Key to Symbols:**

- Essential
- ◐ Very important
- Important

**GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

- Objective: Minimize impervious area associated with streets.
- Objective: Minimize impervious area associated with parking.
- Objective: Minimize impervious area associated with driveways and sidewalks.
- Objective: Clustering development.
- Objective: Incorporate sustainable hydrology practices into urban redevelopment.

GOAL #1 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Overall Effective Impervious Area</b>			
<ul style="list-style-type: none"> <li>• Is impervious area required to be controlled such that there is no direct contribution of stormwater runoff (i.e., the equivalent of 0% effective impervious area)?</li> </ul>	●	√	<p>Note: DNREC's Final Draft stormwater regulations require that after runoff reduction practices have been implemented on disturbed area, the site's impervious area shall not directly contribute stormwater runoff during a rain event that has an 99% annual probability of occurring. See Goal # 5 performance criteria.</p> <p>Ordinance Findings: No</p>
<b>Streets</b> (Note: Also check Fire Marshal's Code to see how it impacts the following goals)			
<ul style="list-style-type: none"> <li>• For residential development, are the street pavement widths allowed to be between 18 to 22 feet, with curb pullouts for passing of large vehicles?</li> </ul>	●		<p>Ordinance Findings: No (except private streets in rural subdivisions and the TDR). The ordinance does allow the Regional Planning Commission to approve more narrow streets.</p> <p>Subdivision and Land Development Ordinance 187, Article XI, § 187-59 (A) Street Design Standards</p> <p>All publicly dedicated roads and right of ways shall be a minimum of 28 feet in width measured from the edge of paving, and shall be constructed according to DelDOT standards.</p>

			<p>Article XI, § 187-58 (J) Private streets in rural subdivisions shall have a minimum roadway width of 18 feet.</p> <p>DelDOT: No. 24 ft – 36 ft for subdivision street with curb and 22 ft – 32 ft for subdivision street without curb. Width depends on street type.</p> <p>Section 3.6.7 allows reduced right-of-ways. Minimum width shall be 28 ft; however, turnarounds must be provided at the end of the streets to permit maneuvering of service and emergency vehicles (see Figure 5-4 of Standards and Regs).</p>
<ul style="list-style-type: none"> <li>• Are travel lanes allowed to be from 12 to 10 feet (or less), with curb pullouts for passing of large vehicles?</li> </ul>	●		<p>Ordinance Findings: No Ordinance Findings: No (except private streets in rural subdivisions) Subdivision and Land Development Ordinance 187, Article XI, § 187-59 (A) Street Design Standards All publicly dedicated roads and right of ways shall be a minimum of 28 feet in width measured from the edge of paving, and shall be constructed according to DelDOT standards.</p> <p>Article XI, § 187-58 (J) Private streets in rural subdivisions shall have a minimum roadway width of 18 feet.</p> <p>DelDOT: Yes. Travel lanes of 11 and 12 ft for Type I subdivision street with and without curbs.</p>
<ul style="list-style-type: none"> <li>• Are curb bumpouts/extensions allowed</li> </ul>	◐		<p>Ordinance Findings: Limited</p>

<p>near intersections and mid-block for traffic-calming and bioretention opportunities?</p>			<p>opportunity                      Zoning 205, Article IV, § 205-23 (C)(8)                      A planting more than two feet above street surface may not be placed or maintained on a corner lot within a triangular area formed by intersecting street lines. The sides of the triangular area shall measure 25 feet from the point where the street lines will intersect if extended to an apex.</p>
<ul style="list-style-type: none"> <li>• Is pervious paving allowed for on-street parking and alleyways?</li> </ul>	<p style="text-align: center;">○</p>		<p>Ordinance Findings: Not addressed in ordinance.</p> <p>DelDOT: No.                      5.6.1: All subdivision streets and entrances shall be paved with a hot-mix asphalt or Portland cement concrete surface.</p>
<ul style="list-style-type: none"> <li>• Are grass swales or bioretention swales allowed instead of curb and gutter or with curb cuts (where slopes allow)?</li> </ul>	<p style="text-align: center;">●</p>		<p>Ordinance Findings: Yes                      Zoning 205, Article X, § 187-53 (B) (5)                      Wherever practicable, and particularly outside of the designated growth zone, the County encourages the use of vegetated swales and biofiltration devices as key components of stormwater management plans</p> <p>Subdivision and Land Development Ordinance 187, Article X, § 187-53 (A)(2)(b)                      Subdivisions with water resource conservation practices including open drainage systems are encouraged.                      Conservation District Checklist 7.4                      Preferred options for water quality shall be Green Technology BMPs</p> <p>The Comprehensive Plan also recommends LID/green design</p>

			<p>for projects; however, this applies more to the rural areas of the Growth Overlay Zone and areas outside the Growth Overlay Zone.</p> <p>Potential barrier: Zoning 205, Article IV, § 205-41</p> <p>It shall be unlawful and considered a public nuisance for the owner, occupant, or tenant to permit any weeds, underbrush, or deleterious growth to grow to a height of 12 inches or more.</p>
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, is the radius required to be 35 feet or less?</li> </ul>	○		<p>Ordinance Findings: No Zoning 205, Article XI, § 187-58 (G) (2)</p> <p>Curbed cul-de-sac or dead end streets shall be provided a turnaround bulb area having a paved diameter of at least 80 feet.</p> <p>2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in length.</p>
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, are landscaped islands or bioretention islands allowed or encouraged?</li> </ul>	○		<p>Ordinance Findings: No</p> <p>2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in length.</p>
<ul style="list-style-type: none"> <li>• Are site designs required to promote the most efficient street layout to reduce overall street length?</li> </ul>	○		<p>Ordinance Findings: No</p>
<b>Parking</b>			
<ul style="list-style-type: none"> <li>• Is the minimum stall width for a standard parking space 9 ft. or less?</li> </ul>	●		<p>Ordinance Findings: Yes Zoning Article XVII §205-221 (A) I</p>
<ul style="list-style-type: none"> <li>• Are parking stall lengths allowed to be 15 ft.?</li> </ul>	●		<p>Ordinance Findings: No Zoning Article XVII §205-221 (A) I 18 ft length required</p>

<ul style="list-style-type: none"> <li>• Are parking lot drive aisles allowed to be 22 ft.?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: No Zoning Article XVII §205-221 (B) 1 24 ft width required
<ul style="list-style-type: none"> <li>• Are bioretention cells allowed in parking medians?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are consolidated travel lanes and on-street parking allowed to create space for bioretention?</li> </ul>	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are pervious surfaces such as paver stones, porous pavement, or grass pavers allowed for on-street parking?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings:  DelDOT: No. 5.6.1: All subdivision streets and entrances shall be paved with a hot-mix asphalt or Portland cement concrete surface.
<ul style="list-style-type: none"> <li>• For office buildings, is the required parking ratio 3.0 spaces per 1,000 sq.ft. of gross floor area or less?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: Not addressed
<ul style="list-style-type: none"> <li>• For commercial centers, is the required parking ratio 2 to 4.5 spaces per 1,000 sq.ft. of gross floor area or less?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: Not addressed
<ul style="list-style-type: none"> <li>• Are proposed developments allowed to take advantage of opportunities for shared parking?</li> </ul>	<input type="radio"/>		Ordinance Findings: Yes
<ul style="list-style-type: none"> <li>• Are proposed developments allowed to have parking stalls under the second floor podium?</li> </ul>	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<b>Driveways/Sidewalks</b>			
<ul style="list-style-type: none"> <li>• Are driveway standards 9 feet or less in width?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: Not addressed
<ul style="list-style-type: none"> <li>• Are shared driveways allowed?</li> </ul>	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• If sidewalks are required, are they required to be designed to the narrowest allowable width (e.g, 4 ft.)?</li> </ul>	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are sidewalks allowed to be on one side of the street only?</li> </ul>	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.

Clustering Development			
<ul style="list-style-type: none"> <li>Is redevelopment encouraged in lieu of greenfield development through site performance standards?</li> </ul>	●	√	<p>Note: DNREC's Final Draft stormwater regulations recognize the benefit of redevelopment, and have less stringent performance standards for proposed development in existing developed areas. See Goal # 5 performance criteria.</p> <p>Ordinance Findings: No However, the Comprehensive Plan does envision future Implementation of a Transfer of Development Rights program if possible.</p>
<ul style="list-style-type: none"> <li>Is Conservation or Open Space Design an option?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>To encourage clustering and open space design, are setbacks minimized (e.g., for residential lots that are 1/2-acre or less in size, is the front set back 20 feet or less, the rear setback 25 feet or less, and the side setback 8 feet or less?)</li> </ul>	●		<p>Ordinance Findings: Yes Zoning 205, Article I-IV AC, AR, RS1, and RS5 allow cluster development with conditional use permit</p> <p>Note that the Comprehensive Plan Table I detailing contemplated lots sizes for different subdivision scales appears to not allow for clustering of houses or preservation of open space. In addition, community wastewater systems which may be needed for cluster development are not allowed per the Comprehensive Plan.</p>
<ul style="list-style-type: none"> <li>Are site designs required to have development focused on areas of lesser slopes and farther from watercourses?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are policies effective in encouraging higher density development to be centered around transportation corridors?</li> </ul>	○		<p>Note that it is important for towns to allow density bonuses for protecting certain features, preserving open space, and limiting sprawl.</p> <p>Ordinance Findings: Yes Designated Growth Areas are established</p>

**GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

- Objective: Minimize building footprint/envelope area.
- Objective: Preserve topsoil structure.
- Objective: Preserve sensitive wetlands.
- Objective: Preserve sensitive soils.
- Objective: Preserve sensitive stream buffers.

GOAL #2 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Topsoil Structure &amp; Building Footprint</b>			
<ul style="list-style-type: none"> <li>• Is disturbance of vegetated areas required to be phased?</li> </ul>	●	√	<p>Note: DNREC’s performance criteria for construction site management include limits on site disturbance. See Goal #6 performance criteria.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Is disturbance of vegetated areas and riparian areas required to be minimized?</li> </ul>	◐		<p>Ordinance Findings: No However, the Comprehensive Plan recommends reducing the amount of woodland clearing permitted outside the Growth Zone to 15% and to 50% within the Growth Overlay Zone, with an emphasis on maintaining forest blocks.</p>
<ul style="list-style-type: none"> <li>• Are building envelopes required/encouraged to avoid sensitive environmental areas such as riparian areas, wetlands, high infiltration soils, and steep slopes?</li> </ul>	◐		<p>Ordinance Findings: No</p>
<b>Wetlands</b>			
<ul style="list-style-type: none"> <li>• Are site designs required to minimize hydrologic alteration to existing wetlands?</li> </ul>	●	√	<p>Note: there are state regulations prohibiting the disturbance of certain wetlands.</p> <p>Ordinance Findings: Yes Subdivision and Land Development Ordinance 187, Article XII, § 187-77 (C) No portions of wetlands areas shall be filled, developed, cleared of vegetation unless granted permission from the</p>

			Corps of Engineers (D) No buildings, structures, impervious surface, fill, or obstructions to drainage or land disturbance shall be situated nearer than 25 feet to a delineated wetland.
<b>Sensitive Soils</b>			
• Are building footprints required/encouraged to avoid highly erodible soils?	●		Ordinance Findings: No
• Are building footprints required/encouraged to avoid soils with high permeability (e.g., Hydrologic Soil Group A and B)?	●		Ordinance Findings: No
<b>Stream Buffers</b>			
• Is a 60- to 100-foot stream buffer required/encouraged for new development?	●		<p>Note: The Phase I WIP recommends 100 ft for primary waters and 60 ft for secondary waters; can be reduced if combined with other pollution reduction actions. This buffer recommendation is applicable to those areas where buffers are voluntary (i.e., not the Dept. of Ag's 30 ft buffer or CAFO buffers)</p> <p>Ordinance Findings: Yes</p> <p>Subdivision and Land Development Ordinance 187, Article XII, § 187-78 (B)</p> <p>100 ft buffers are required from tidal stream, marsh, and non-tidal fresh water body, lake, pond or blue-line stream. 50 ft buffers for non-blue-line streams, creeks, and ditches.</p> <p>Subdivision and Land Development Ordinance 187, Article XI, § 187-78 (C)</p> <p>For projects located within a promulgated TMDL basin, the property owner or applicant shall be responsible for the preservation or reestablishment of riparian buffers to facilitate the</p>

			reduction of nutrients and other pollutants to the level necessary to ensure compliance with TMDL reductions.
<ul style="list-style-type: none"> <li>• Are stream buffers for new development required to remain in a natural state?</li> </ul>	●		<p>Ordinance Findings: Yes</p> <p>Subdivision and Land Development Ordinance 187, Article XI, § 187-78 (A)-(C)</p> <p>No buildings, structures, or paved surfaces (with a few exceptions) shall be permitted within the required buffer area.</p>
<ul style="list-style-type: none"> <li>• Are site designs required to preserve existing runoff pathways to adequately support existing wetlands?</li> </ul>	●		<p>Ordinance Findings: Yes</p> <p>Ordinance Findings: Yes</p> <p>Subdivision and Land Development Ordinance 187, Article XII, § 187-77 (C)</p> <p>No portions of wetlands areas shall be filled, developed, cleared of vegetation unless granted permission from the Corps of Engineers</p> <p>(D) No buildings, structures, impervious surface, fill, or obstructions to drainage or land disturbance shall be situated nearer than 25 feet to a delineated wetland.</p>
<ul style="list-style-type: none"> <li>• Is a 50-foot wetland buffer required/encouraged?</li> </ul>	○		<p>Ordinance Findings: No</p> <p>25 ft buffer required (see note above)</p>

**GOAL #3: HAVEST RAINWATER**

Objective: Allow rainwater harvesting through plumbing code provisions.

Objective: Allow the use of downspout disconnection/redirection, rain barrels, and above-and below-ground cisterns for rainwater harvesting

GOAL #3 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<ul style="list-style-type: none"> <li>• Can downspouts be disconnected or redirected to discharge into a rain barrel or yard?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are interior or exterior cisterns allowed?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Can rain barrels be placed within standard zoning setback areas?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Do zoning and building provisions allow cisterns to be placed on rooftops to harvest rainwater?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Is harvested rainwater allowed to be used for nonpotable interior uses such as toilet flushing?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.

**GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

Objective: Allow and encourage stormwater controls as multiple use in open space areas.

Objective: Allow and encourage stormwater controls as multiple use in landscaped areas.

GOAL #4 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Landscaped Areas</b>			
<ul style="list-style-type: none"> <li>Are bioretention areas allowed to be constructed in the development's designated landscape areas, if properly designed?</li> </ul>	●		<p>Ordinance Findings: No Location of bioretention is not included in the zoning and subdivision ordinances; however, the provisions below could limit the use of bioretention, swales, and other vegetated stormwater facilities.</p> <p>Subdivision Ordinance Article XII § 187-79 (A) &amp; (B) buffer requirements for nonresidential uses and for agricultural uses requires a wall, berm, or dense, continuous evergreen tree planted screen of at least 6 ft. in height at the time of planting and arranged to achieve an opaque visual buffer..</p> <p>The Conservation District's Sediment and Stormwater checklist expressly prohibits infiltration practices from being located within 20 feet of basement walls.</p> <p>Zoning 205, Article IV, § 205-41 It shall be unlawful and considered a public nuisance for the owner, occupant, or tenant to permit any weeds, underbrush, or deleterious growth to grow to a height of 12 inches or more.</p>
<ul style="list-style-type: none"> <li>Are bioretention areas given "credit" as landscape area to count as a percent of the required landscaping?</li> </ul>	●		<p>Ordinance Findings: No Location of bioretention is not included in the zoning and subdivision ordinances</p>

<ul style="list-style-type: none"> <li>Do landscaping requirements allow plantings conducive to bioretention, bioswales, raingardens, and other LID BMPs?</li> </ul>	<p style="text-align: center;">●</p>		<p>Ordinance Findings: No Potential barriers: Subdivision and Land Development Ordinance 187, Article X, § 187-53 Minimum Requirements Stormwater management ponds/basins required to have setbacks of 30-100 ft</p>
<ul style="list-style-type: none"> <li>Do tree planting requirements allow use of raingardens, tree boxes, and other LID BMPs?</li> </ul>	<p style="text-align: center;">●</p>		<p>Ordinance Findings: No Location of bioretention and other LID BMPs is not included in the zoning and subdivision ordinances</p>
<p><b>Open Space Areas</b></p>			
<ul style="list-style-type: none"> <li>Are there open space preservation requirements or incentives?</li> </ul>	<p style="text-align: center;">◐</p>		<p>Ordinance Findings: Yes Ordinance Findings: Yes Subdivision and Land Development Ordinance 187, Article XI, § 187-73 Woodland Preservation Establishes percentage of existing woodland (20% to 60%) to be preserved based on development density/intensity</p>
<ul style="list-style-type: none"> <li>Is preserved open space required to be managed in a natural condition?</li> </ul>	<p style="text-align: center;">◐</p>		<p>Ordinance Findings: Yes Subdivision and Land Development Ordinance 187, Article XI, § 187-67 Passive Open Space Subdivision and Land Development Ordinance 187, Article XI, § 187-73 Woodland Preservation</p>
<ul style="list-style-type: none"> <li>Are structural LID techniques such as constructed wetlands, swales, and bioretention areas allowed to be constructed in a development's designated open space, if properly designed?</li> </ul>	<p style="text-align: center;">●</p>		<p>Ordinance Findings: Yes Development Ordinance 187, Article XI, § 187-67 (D)(8) Passive Open Space Definition Includes stormwater detention ponds when suitably designed to emulate natural features by incorporating irregular shapes, gradual slopes, and appropriate landscape plantings.</p>

<ul style="list-style-type: none"> <li>• Are structural LID techniques such as constructed wetlands, swales, and bioretention areas given “credit” as open space to count as a percent of the required open space area, if properly designed?</li> </ul>			<p>Ordinance Findings: Yes See note above</p>
<ul style="list-style-type: none"> <li>• Does protection of sensitive, natural areas and habitat qualify as credit for local open space dedication?</li> </ul>			<p>Ordinance Findings: Yes Subdivision and Land Development Ordinance 187, Article XI, § 187-67 Passive Open Space Subdivision and Land Development Ordinance 187, Article XI, § 187-73 Woodland Preservation</p>

**GOAL #5: MANAGE STORMWATER TO MEET WATERSHED IMPLEMENTATION PLAN & DNREC STORMWATER REGULATIONS**

- Objective: Meet DNREC stormwater regulations
- Objective: Replicate the predevelopment hydrology of the site, to the extent practicable.
- Objective: Maintain water quality functions of the watershed.
- Objective: Minimize channel erosion impacts.
- Objective: Minimize flooding impacts.
- Objective: Inspect BMPs to ensure proper construction and design.
- Objective: Long-term maintenance.

GOAL #5 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Stormwater Ordinance Provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• Is stormwater required to be retained/infiltrated onsite (through bioretention, natural areas, and swale infiltration) where possible?</li> </ul>	●	√	<p>Ordinance Findings: Yes Zoning 205, Article X, § 187-53 (B) (5) Wherever practicable, and particularly outside of the designated growth zone, the County encourages the use of vegetated swales and biofiltration devices as key components of stormwater management plans</p> <p>Subdivision and Land Development Ordinance 187, Article X, § 187-53 (A)(2)(b) Subdivisions with water resource conservation practices including open drainage systems are encouraged. Conservation District Checklist 7.4 Preferred options for water quality shall be Green Technology BMPs</p> <p>The Comprehensive Plan encourages the use of LID for projects in more rural areas of the Growth Zone Overlay and areas outside the Growth Zone Overlay.</p>
<ul style="list-style-type: none"> <li>• DNREC Resource Protection Criteria</li> </ul>	●	√	<p>Note: For the 1-yr, 24 hour rainfall event, meet the following standards: Predevelopment wood/meadow</p>

			<p>– runoff reduction practices will yield the equivalent wooded condition for these areas.</p> <p>All remaining disturbed area shall achieve the equivalent of 0% effective imperviousness.</p> <p>The remaining discharge, if any, shall not exceed the 24-hour detention of the 1yr, 24 hr storm and an offsite offset is required for the portion of the storm not meeting the minimum requirements.</p> <p>Additional water quality treatment BMPs shall be required if runoff reduced is not sufficient to meet the TMDL.</p> <p>Ordinance Findings: No</p> <p>The Conservation District's Sediment and Stormwater checklist 6.5 requires water quality practices to be designed to manage the rate and volume of flow from the 2.0" NRCS rainfall event up to a maximum of 1.0" of runoff.</p>
<ul style="list-style-type: none"> <li>• DNREC Conveyance Criteria for Channel Protection</li> </ul>	<p>●</p>	<p>√</p>	<p>Note: Conveyance Volume is the 10 yr, 24 hr rainfall event (or the volume of runoff produced by the post-development storm having a 10% chance of occurring) - less any volume reduction achieved through meeting the Resource Protection Criteria.</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Yes</p> <p>The Conservation District's Sediment and Stormwater checklist 6.3 requires post development peak rates of discharge for the 2 and 10 year frequency storm to not exceed the predevelopment peak rates for the design storms.</p>

<ul style="list-style-type: none"> <li>• DNREC Flood Event Criteria</li> </ul>	<p style="text-align: center;">●</p>	<p style="text-align: center;">√</p>	<p>Volume of runoff produced by 100 yr, 24 hr rainfall event (or post-development storm having a 1% probability of occurrence). Use runoff reduction and management measures, or show no adverse impact. Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p><b>Ordinance Findings: No</b>                  The Conservation District's Sediment and Stormwater checklist 6.4 requires that stormwater facilities be designed to safely pass the 100-year storm. No proof is required that there is no adverse downstream impact.</p>
<ul style="list-style-type: none"> <li>• Alternative Criteria</li> </ul>	<p style="text-align: center;">●</p>	<p style="text-align: center;">√</p>	<p>Land development that discharges to state waters included in a Designated Watershed or other watershed management plan approved in accordance with DNREC stormwater regulations shall meet alternative criteria in the approved plan.</p>
<ul style="list-style-type: none"> <li>• Redevelopment Criteria</li> </ul>	<p style="text-align: center;">●</p>	<p style="text-align: center;">√</p>	<p>Recognizing the importance of redevelopment over greenfield development, redevelopment areas are required to only achieve a 50% reduction in effective impervious area based on existing conditions. Only the <u>increases</u> in the rate, volume, and duration of flow for the channel volume and flooding volume will need to comply with the DNREC stormwater regulations.</p> <p>A brownfield development remediation plan may meet the stormwater goals and intent of the DNREC stormwater regulations if approved by DNREC.</p> <p><b>Ordinance Findings: No</b></p>

<ul style="list-style-type: none"> <li>Exemptions</li> </ul>	<p>●</p>	<p>√</p>	<p>Agricultural land having a soil and water conservation plan                  Developments or construction disturbing less than 5,000 sq.ft..                  Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.                  Commercial forest harvesting that meets DOA requirements.                  Permitted land application of biosolids and residuals.                  Ordinance Findings: Yes                  Conservation District Program</p>
<p><b>Inspections</b></p>			
<ul style="list-style-type: none"> <li>Are inspections required during construction and routinely after construction?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes                  Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>Are inspectors required to be trained and certified?</li> </ul>	<p>●</p>	<p>√</p>	<p>Note: DNREC requires a Certified Construction Reviewer                  Ordinance Findings: No</p>
<p><b>Maintenance</b></p>			
<ul style="list-style-type: none"> <li>Are maintenance agreements required?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes                  Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>Is maintenance required to be performed by a certified professional?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: No</p>
<p><b>Off-Site Mitigation</b></p>			
<ul style="list-style-type: none"> <li>Is offsite mitigation required when on-site management does not meet the performance criteria (unless there is proof of no adverse impact)?</li> </ul>	<p>●</p>		<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>Is the DE Nutrient Protocol program required to calculate offsets?</li> </ul>	<p>◐</p>		<p>Ordinance Findings: In practice, the County requires the applicant to follow the Conservation District's protocols.</p>
<ul style="list-style-type: none"> <li>Is offsite mitigation for forested area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?</li> </ul>	<p>◐</p>		<p>Ordinance Findings: Yes                  Subdivision and Land Development Ordinance 187, Article XII, § 187-75 Tree Mitigation                  New woodlands shall be created at a rate of 1.25 times the amount of woodlands to be</p>

			removed in the growth zone, and at 1.5 times for area outside the growth zone. For unauthorized tree removal, new woodlands must be created at a rate of 1.75 times the area illegally removed.
<ul style="list-style-type: none"> <li>Is offsite mitigation for riparian area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Is offsite mitigation for BMP retrofit allowed in the same named watershed?</li> </ul>	●		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Is nutrient banking or the equivalent land banking allowed in the same named watershed? Is redevelopment encouraged in lieu of greenfield development?</li> </ul>	○		Ordinance Findings: No However there is a Transfer of Development Rights Ordinance.
<b>Local Stormwater Utility Ordinance</b>			
<ul style="list-style-type: none"> <li>Does an ordinance exist to support the development of a local stormwater utility?</li> </ul>	●		Ordinance Findings: No

**GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

Objective: Meet DNREC stormwater regulations

Objective: Minimize erosion and sedimentation and delivery of nonpoint source pollutants during construction activities.

Objective: Inspect BMPs ensure proper construction and design.

Objective: Maintain BMPs.

GOAL #6 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Sedimentation and Erosion Control provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• DNREC Turbidity Stormwater Management</li> </ul>	●	√	Best Available Technology shall be employed to manage turbid waters in accordance with state regulations. Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC requirement of Sediment and Stormwater Management Plans</li> </ul>	●	√	Ordinance Findings: Yes Conservation District Checklist
<ul style="list-style-type: none"> <li>• DNREC Land Disturbance Criteria</li> </ul>	●	√	Use of standard details for DE Erosion and Sedimentation Control Handbook-limited to sites where no more than 10 acres draining to a common discharge point will be disturbed at any one time. Ordinance Findings: No  Construction site BMPs intended to manage areas greater than 10 acres shall have supporting design computations. Ordinance Findings: No  In no case shall an area of disturbance draining to a common point exceed 20 acres. Grading within that drainage area shall not proceed unless temporary or permanent stabilization has been accomplished. All plans shall include a limit of disturbance line. Ordinance Findings: Yes Conservation District Checklist

<ul style="list-style-type: none"> <li>• DNREC Site Stabilization Criteria</li> </ul>	<p>●</p>	<p>√</p>	<p>Following soil disturbance or redisturbance, permanent or temporary stabilization shall be completed for all perimeter sediment controls, topsoil stockpiles, or other graded/disturbed areas within 14 calendar days unless a more restrictive federal requirement applies.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p> <p>Documentation of soil testing and materials used for stabilization shall be provided for verification.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p> <p>Release of financial guarantee and or issuance of Notice of Completion shall not occur until final stabilization of all exposed areas is achieved.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	<p>●</p>	<p>√</p>	<p>Agricultural having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meet DOA requirements</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Unclear Applicability not defined</p>
<p><b>Inspections</b></p>			
<ul style="list-style-type: none"> <li>• Are weekly inspections required during construction?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: No</p>

<b>Maintenance</b>			
• Are maintenance agreements required?	●	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	●	√	Ordinance Findings: No

**GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

<b>GOAL #7 KEY QUESTIONS</b>	<b>DEGREE OF IMPORTANCE</b>	<b>REQUIRED BY DNREC</b>	<b>COMMENTS</b>
<b>Performance Standards</b>			
<p>Where do local governments allow/encourage/ban standard systems versus community systems and how does that impact growth patterns</p>			<p>Subdivision and Land Development Ordinance 187, Article X, § 187-53 (D) Sanitary Sewerage Facilities Kent County prohibits community wastewater systems. Private individual systems are handled by DNREC.</p> <p>Individual residential on-site sewage disposal systems sited in watersheds with an established TMDL shall be designed and installed in accordance with nutrient load reductions prescribed by the TMDL or they shall use the best available technologies to achieve the required nutrient reduction targets.</p>



## TETRA TECH

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### MEMORANDUM

**To:** Jamie Smith (Town of Laurel); Woody Smith (Town of Laurel)

**From:** Eugenia Hart and Kimberly Brewer

**Cc:** Jennifer Walls (DNREC); Bryan Hall (DNREC); Jennifer Volk (DNREC)

**Date:** January 24, 2012

**Subject:** Review of the Town of Laurel's Local Land Use Ordinances to Identify Barriers to Implementing the Chesapeake Bay Watershed Implementation Plan

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## 1 Introduction

Delaware has developed a Watershed Implementation Plan (WIP) to accompany the Chesapeake Bay nutrient and sediment total maximum daily loads (TMDLs). The WIP lays out plans for addressing existing pollutant load to the Bay as well as new pollutant loads from future land use changes. Delaware's Department of Natural Resources and Environmental Control (DNREC) has tasked Tetra Tech with assisting local Delaware municipalities in the Chesapeake Bay watershed to conduct a review of existing local municipal ordinances with regulations pertaining to new development.

The goal of the ordinance review is to provide a service to local governments in Delaware by reviewing existing land use ordinances to look for barriers to implementing the Chesapeake Bay WIP as well as identify potential opportunities for improving communities and allowing more techniques to be used to help property owners address nutrient and sediment loads from new developments. These include techniques such as green infrastructure, low impact development, conservation design, and performance standards that can allow flexibility. There are often unintended barriers to these techniques in local ordinances.

This memorandum presents the results of Tetra Tech's review of these local ordinances for the town of Laurel, DE. Note that recommendations for consideration of code revisions are not mandatory. They are intended only to provide more flexibility and effectiveness in meeting resource protection goals and regulations.

## 2 Approach

In August 2011 Tetra Tech contacted the Town of Laurel to obtain the most recent versions of the following types of ordinances, if available:

- Subdivision ordinance

- Zoning ordinance
- Sedimentation and erosion control ordinance or regulations
- Onsite wastewater ordinance or regulations

Laurel staff provided their subdivision and zoning ordinances for review. The Town follows the Sussex County Conservation District's (SCD) stormwater, sedimentation, and erosion control program. Note that SCD does not have their own stormwater, sedimentation, and erosion control standards, but adheres to Delaware's State Sediment and Stormwater Regulations (see section 3.1 below). Laurel does not have specific on-site wastewater regulations as all new developments hook to public water and sewer.

Once the ordinances were obtained, they were reviewed based on the Ordinance Review Checklist developed by Tetra Tech (Appendix A). The checklist contains items related to the following seven goals:

1. Minimize Effective or Connected Impervious Area
2. Preserve and Enhance the Hydrologic Function of Unpaved Areas
3. Harvest Rainwater
4. Allow and Encourage Multi-Use Stormwater Controls
5. Manage Stormwater to Meet WIP and DNREC Regulations
6. Manage Construction Site Stormwater to Meet WIP and DNREC Regulations
7. Manage On-Site Wastewater Systems to Meet WIP and DNREC Regulations

The Town of Laurel staff reviewed the draft memo, and recommended revisions and corrections as needed.

Barriers to each of the items on the Checklist are summarized below in Section 3 along with potential solutions to overcome these barriers.

### **3 Summary of Barriers and Potential Solutions for Implementation**

This section of the memo provides a summary of the barriers identified for each of the seven goals indicated on the Ordinance Review Checklist (Appendix A). Following the summary of each barrier, potential solutions are provided.

#### **3.1 GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

##### **Mitigation of Runoff from Effective Impervious Area**

DNREC's final draft stormwater regulations (DNREC 2011) require that local regulations and standards mitigate stormwater runoff such that there is no direct contribution of stormwater runoff from a development. Laurel does not have an ordinance that directly addresses this issue; however, Laurel currently follows the Sussex Conservation District's Sediment Control and Stormwater Management Program. SCD follows the State of Delaware's Sediment and Stormwater Regulations as a delegated agency. It is suggested that Laurel reference State of Delaware Sediment and Stormwater Regulations in their subdivision ordinance.

##### **Flexibility in Locating BMP Techniques On-site**

The location of low impact development (LID) best management practices (BMPs) in street and parking areas (e.g., parking medians, grass strips between sidewalk and curb, swales, etc.) is for the most part not explicitly prohibited or allowed in the ordinance. Lack of certainty about approval of these techniques can pose a barrier to implementation. It appears that height and setback limitations for landscaping at

intersections would directly prohibit the use of LID techniques such as curb bumpouts/extensions with bioretention or bioswales.

### **Street and Right-of-way Widths**

Except in the Large Parcel Development Overlay District, current zoning regulations do not allow minor streets to have narrow street pavement and travel lane widths to help minimize impervious area. In addition to the environmental benefits of narrowing streets, some studies have found that narrow residential streets are safer than wide streets (Center for Watershed Protection 1998).

In the last decade, numerous developments have been built using techniques to narrow street and right of way width. Techniques such as curb pullouts, staggered pull-out parking areas (rather than continuous lanes), or having a parking lane on one side of the street only have been employed. These developments have been able to meet the needs of access for service and emergency vehicles as well as on-street parking while also using narrower streets and public right-of-ways than do conventional subdivisions. That said, it should be recognized that concerns about these components of LID—narrow streets and right-of-ways—make it challenging to implement. In each community, moving forward requires a great deal of discussion and problem solving with staff from the fire department, public works, engineering, and other potentially affected departments in order to address concerns and develop mutually supported ordinance and code revisions. Note that Delaware State Fire Prevention Regulations do not appear to regulate street widths in residential developments, but do provide turn-around and cul-de-sac standards that allow for fire apparatus access.

### **Minimum Parking Requirements**

Current zoning establishes a high minimum parking space requirement and requires overly large parking stalls and drive aisles. Together these minimum parking requirements can unnecessarily increase the overall imperviousness of the development site. Some communities allow a smaller number of parking spaces per square feet of floor area in the development, as well as allow smaller stalls and aisles (e.g., stall width of 9 feet, minimum stall length to 15 feet, and minimum drive aisle width of 22 feet). These standards minimize paved area, provide adequate parking space, and reduce development costs.

### **Incentives for Infill Development and Redevelopment of Existing Areas over “Greenfield” Development**

DNREC’s draft sediment and stormwater regulations require that local regulations and standards impose less stringent runoff reduction requirements for proposed development in existing developed areas, thus providing incentives to develop in these areas rather than undeveloped or “greenfield” areas. Local zoning and subdivision requirements will need to be amended accordingly.

## **3.2 GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

### **Encouraging or Requiring Stream Buffers**

The Phase I WIP calls for local regulations and standards that encourage or require buffers of 60 feet for secondary waterbodies and 100 feet for primary waterbodies for new development proposals. These buffers can be reduced if combined with other pollution reduction actions. The town’s current zoning and subdivision ordinances do not require such riparian buffers. However, the Conservation and Open Space Standards in the Subdivision Ordinance do require consideration of stream protection. Local zoning and subdivision requirements would need to be amended if the Town desires more certainty regarding the preservation of streamside areas in natural vegetation.

### **3.3 GOAL #3: HARVEST RAINWATER**

#### **Explicitly Allowing or Encouraging Rainwater Harvest**

Rainwater harvesting is not explicitly prohibited or allowed in the ordinances. However, lack of certainty about approval of these techniques can pose a barrier to implementation.

### **3.4 GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

#### **Flexibility in Locating LID Techniques in Designated Landscape and Open Space Areas**

Due to specifications and allowances, it appears that LID techniques such as bioretention, bioswales, constructed wetlands, etc. are effectively not allowed in required landscape, screening, and open space areas. Where these BMPs can be designed to support landscape and open space functions, flexibility should be provided in locating these BMPs where they can be most effective in managing water quality, drainage, and flooding impacts. Explicit exemptions, as-of-right use, or even incentives, should be made for the use of vegetative LID techniques in screening, buffer, and landscape areas. Additionally, consideration should be given allowing bioretention and bioswales in the right-of-way area typically used as a grassed strip.

#### **Credit for LID Techniques that Provide Landscape and Natural Open Space Functions**

While LID BMPs are given credit by the Town as part of the required open space area, they are not credited for required landscaping area. Explicitly providing such credit would provide an extra incentive for developers to use LID techniques.

#### **Landscaping and Grass Control**

Certain landscape and grass control requirements could limit the use of bioretention, bioswales, and other LID techniques. One such requirement is the Housing Standards Code Article 8, § 87-33 Growth of Weeds, which requires that no weeds, grass, or other ground cover vegetation shall exceed a height of 8" at any time. Explicit exemptions should be made for bioretention, bioswale, and similar LID techniques properly designed.

### **3.5 GOAL #5: MANAGE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Stormwater Regulations**

DNREC's final draft sediment and stormwater regulations require new minimum water quality, channel protection, and conveyance and flood control requirements for new development and redevelopment. As stated earlier, it is suggested that Laurel reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance.

#### **Off-site Mitigation**

There are no provisions in the ordinance for off-site mitigation when on-site management does not meet the performance criteria. DNREC is in the final phases of developing an offset tool called the *Nutrient and Sediment Loading Assessment Protocol*. The tool allows developers to determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. This is a useful tool in determining whether or not a proposed development meets the TMDL or will need additional on-site management or off-site mitigation. Laurel may want to consider requiring developers to use this tool

during the planning process before presenting the site plan to the planning and zoning commission for review.

### **3.6 GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Sediment and Erosion Control Regulations**

DNREC's final draft sediment and stormwater regulations require construction site stormwater management controls to be put in place for all construction activities exceeding 5,000 square feet of disturbance. As stated earlier, it is suggested that Laurel reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance.

### **3.7 GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WIP AND DNREC REGULATIONS**

Laurel does not have specific on-site wastewater regulations as all new developments are connected to public water and sewer.

## **4 Accounting and Tracking of BMP Implementation**

Laurel would consider tracking the implementation of BMPs in the town; however, before committing to this task they would like to be provided with additional information from DNREC on what it would entail.

It is suggested that DNREC provide the Town of Laurel with a list of BMPs approved for use in the Chesapeake Bay watershed TMDL model and have the Town of Laurel notify DNREC if any of these types of BMPs are installed in the town so they can be appropriately credited in the Bay model.

## **5 Conclusions**

Review of Laurel's subdivision and zoning ordinances result in several key findings. The first finding is that the Town of Laurel's Zoning and Subdivision ordinances have a number of strong features including, but not limited to:

- Encouragement of efficient street layout
- Encouragement of open space design and allowance of clustering of homes and other uses
- Requirement of all subdivisions and land development to minimize impacts to sensitive areas including wetlands, streams, swales, and riparian buffers.

There are some direct barriers to the use of LID techniques, such as such as specifications and allowances for required screening, landscape and open space areas. To allow or encourage the use of LID techniques, the Town would need to explicitly exempt these techniques or allow them as-of-right in these areas. In other cases, there are barriers of omission: by not expressly allowing the LID technique or providing for exemptions, the ordinances generate uncertainty regarding approval and thus unintentionally provide disincentives for some LID practices.

The Town does not have an ordinance that directly addresses sediment and stormwater management. Rather, Laurel follows the Sussex Conservation District's Sediment Control and Stormwater Management Program. Considering the new federal stormwater regulations due out in late 2011 and new state stormwater regulations due in 2012, it is suggested that the Town of Laurel reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance, and the agency implementing the regulations (DNREC or its Delegated Agency).

Reducing impervious area in new developments can be an important part of stormwater management. Laurel may want to consider allowing narrower street and right of way widths in all new developments, while employing techniques such as curb pullouts and staggered pull-out parking areas to meet the needs of service and emergency vehicles as well as on-street parking. Laurel might also want to consider allowing a smaller number of parking spaces as well as smaller parking stalls and aisles in new multi-family and commercial developments.

Finally, Laurel might want to consider adopting DNREC's *Nutrient and Sediment Loading Assessment Protocol* as part of their subdivision ordinance. The tool can help developers determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. The tool can help to quantify the number and types of BMPs necessary on a new development site to meet the TMDL requirements.

## References

Center for Watershed Protection (CWP). 1998. *Better Site Design: A Handbook for Changing Development Rules in Your Community*.

DNREC (Department of Natural Resources and Environmental Control). 2011. *Final Draft Sediment and Stormwater Regulations*. June 2011.

Delaware Department of Transportation (DelDOT). 2010. *Standards and Regulations for Subdivision Streets and State Highway Access*. Dover, DE.

Delaware State Fire Marshall. 2009. *Delaware State Fire Prevention Regulations*

Laurel Subdivision and Land Development Ordinance

Laurel Utility Ordinance (Construction Specifications)

Laurel Zoning Ordinance

Sussex Conservation District. 2011. *Sediment and Stormwater Management Checklist*  
<http://sussexconservation.org/> Accessed August 2011.

## Appendices

Appendix A. Ordinance Review Checklist

## Appendix A. Ordinance Review Checklist

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## Appendix A

# Local Development Ordinance Tools/Techniques for Implementing Delaware's Chesapeake Bay Watershed Implementation Plan & DNREC Final Draft Sediment and Stormwater Regulations

## Town of Laurel Ordinance Review Checklist

### Town of Laurel Ordinances Reviewed

Zoning Ordinance

Subdivision and Land Development Ordinance

Utility ordinance (Construction Specifications)

Sussex Conservation District Sediment and Stormwater Management Checklist

DelDOT Standards and Regulations for Subdivision Streets and State Highway Access

Delaware State Fire Prevention Regulations

*[Note: The Ordinance Checklist that follows is based on Delaware's Phase I Chesapeake Bay Watershed Implementation Plan (November 2010); Final Draft Sediment and Stormwater Regulations (DNREC, June 2011); Protecting Water Quality with Smart Growth Strategies and Natural Stormwater Management in Sussex County (January, 2009); Better Site Design: A Handbook for Changing Development Rules in Your Community (CWP 1998); Low-Impact Development Design Strategies, An Integrated Approach (USEPA 2000); and Tetra Tech's review of numerous local ordinances to identify opportunities and barriers to green infrastructure and low impact development techniques.]*

**Degree of Importance Key to Symbols:**

- Essential
- ◐ Very important
- Important

**GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

- Objective: Minimize impervious area associated with streets.
- Objective: Minimize impervious area associated with parking.
- Objective: Minimize impervious area associated with driveways and sidewalks.
- Objective: Clustering development.
- Objective: Incorporate sustainable hydrology practices into urban redevelopment.

GOAL #1 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Overall Effective Impervious Area</b>			
<ul style="list-style-type: none"> <li>• Is impervious area required to be controlled such that there is no direct contribution of stormwater runoff (i.e., the equivalent of 0% effective impervious area)?</li> </ul>	●	√	<p>Note: DNREC's Final Draft stormwater regulations require that after runoff reduction practices have been implemented on disturbed area, the site's impervious area shall not directly contribute stormwater runoff during a rain event that has an 99% annual probability of occurring. See Goal # 5 performance criteria.</p> <p>Ordinance Findings: No However, the following existing zoning provision can be used to enforce stream standards. Zoning Ordinance, Article 4, § 4.10</p> <p>No effluent or matter of any kind shall be discharged into any stream or body of water which violates established stream standards or otherwise causes objectionable odors or fumes, or is injurious to human, plant or animal life.</p>
<b>Streets</b>			
<ul style="list-style-type: none"> <li>• For residential development, are the street pavement widths allowed to be</li> </ul>	●		<p>Ordinance Findings: No (except potentially allowed in Large Parcel Development)</p>

<p>between 18 to 22 feet, with curb pullouts for passing of large vehicles?</p>			<p>Overlay Districts)</p> <p>Utility Ordinance Construction Specifications for Minor Streets requires 30 feet minimum curb to curb paving,</p> <p>Zoning Ordinance Article 4, § 4.8 Large Parcel Development Overlay District</p> <p>4.8.16.5 The Planning and Zoning Commission may allow street width, design, and layout standards to be modified.</p>
<ul style="list-style-type: none"> <li>• Are travel lanes allowed to be from 12 to 10 feet (or less), with curb pullouts for passing of large vehicles?</li> </ul>	<p>●</p>		<p>Ordinance Findings: No (except potentially allowed in Large Parcel Development Overlay Districts)</p> <p>Utility Specifications for Minor Streets requires 30 feet minimum curb to curb paving,</p> <p>Zoning Ordinance Article 4, § 4.8 Large Parcel Development Overlay District</p> <p>4.8.16.5 The Planning and Zoning Commission may allow street width, design, and layout standards to be modified.</p>
<ul style="list-style-type: none"> <li>• Are curb bumpouts/ extensions allowed near intersections and mid-block for traffic-calming and bioretention opportunities?</li> </ul>	<p>◐</p>		<p>Ordinance Findings: Limited opportunity</p> <p>Zoning Ordinance, Article 7, § 7.6.1</p> <p>Where a driveway meets a street, no planting shall be installed and maintained which exceeds 3 feet in height above grade or street pavement, whichever is greater, to within 8 feet of the public right of way.</p> <p>7.6.2</p> <p>The minimum distance for clear vision at a street intersection shall be 25 feet measured from the intersection along the lot lines of the lot.</p>

<ul style="list-style-type: none"> <li>• Is pervious paving allowed for on-street parking and alleyways?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: No Concrete and bituminous surface is required per the Town's Utility Ordinance specifications.</p>
<ul style="list-style-type: none"> <li>• Are grass swales or bioretention swales allowed instead of curb and gutter or with curb cuts (where slopes allow)?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, is the radius required to be 35 feet or less?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: Not expressly allowed or prohibited.</p> <p>2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in length.</p>
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, are landscaped islands or bioretention islands allowed or encouraged?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: Not expressly allowed or prohibited.</p> <p>2009 Fire Code: No. Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in length.</p>
<ul style="list-style-type: none"> <li>• Are site designs required to promote the most efficient street layout to reduce overall street length?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: Yes Zoning Ordinance, Article 4, § 4.2 (R-2 Districts); 4.3 (R-3 Districts); and 4.8 (Large Parcel Development Overlay Districts) expressly encourage efficient street layout and allow clustering of homes and other uses.</p> <p>Subdivision Ordinance Article 4, § 4 (Major Subdivision Requirements) encourages open space design and efficient street design.</p>
<p><b>Parking</b></p>			
<ul style="list-style-type: none"> <li>• Is the minimum stall width for a standard parking space 9 ft. or less?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: No Zoning Ordinance Article 7 §7.2.3 10 ft width required</p>
<ul style="list-style-type: none"> <li>• Are parking stall lengths allowed to be 15 ft.?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: No Zoning Ordinance Article 7 §7.2.3 20 ft length required</p>

<ul style="list-style-type: none"> <li>• Are parking lot drive aisles allowed to be 22 ft.?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: Not addressed
<ul style="list-style-type: none"> <li>• Are bioretention cells allowed in parking medians?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are consolidated travel lanes and on-street parking allowed to create space for bioretention?</li> </ul>	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are pervious surfaces such as paver stones, porous pavement, or grass pavers allowed for on-street parking?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• For office buildings, is the required parking ratio 3.0 spaces per 1,000 sq.ft. of gross floor area or less?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: No Zoning Ordinance Article 7 § 7.2.2 1 space per 300 sq.ft.
<ul style="list-style-type: none"> <li>• For commercial centers, is the required parking ratio 2 to 4.5 spaces per 1,000 sq.ft. of gross floor area or less?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: No Zoning Ordinance Article 7 § 7.2.2 1 space per 200 sq.ft.
<ul style="list-style-type: none"> <li>• Are proposed developments allowed to take advantage of opportunities for shared parking?</li> </ul>	<input type="radio"/>		Ordinance Findings: Yes Zoning Ordinance Article 7 § 7.2.1.8
<ul style="list-style-type: none"> <li>• Are proposed developments allowed to have parking stalls under the second floor podium?</li> </ul>	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<b>Driveways/Sidewalks</b>			
<ul style="list-style-type: none"> <li>• Are driveway standards 9 feet or less in width?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: No Utility Ordinance Specification: 10 feet
<ul style="list-style-type: none"> <li>• Are shared driveways allowed?</li> </ul>	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• If sidewalks are required, are they required to be designed to the narrowest allowable width (e.g, 4 ft.)?</li> </ul>	<input type="radio"/>		Ordinance Findings: No Utility Ordinance Specification: 5 feet
<ul style="list-style-type: none"> <li>• Are sidewalks allowed to be on one side of the street only?</li> </ul>	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.

<b>Clustering Development</b>			
<ul style="list-style-type: none"> <li>• Is redevelopment encouraged in lieu of greenfield development through site performance standards?</li> </ul>	●	√	<p>Note: DNREC's Final Draft stormwater regulations recognize the benefit of redevelopment, and have less stringent performance standards for proposed development in existing developed areas. See Goal # 5 performance criteria.</p> <p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Is Conservation or Open Space Design an option?</li> </ul>	●		<p>Ordinance Findings: Yes</p> <p>Subdivision Ordinance Article 4, § 4 (Major Subdivision Requirements) encourages open space design.</p> <p>Subdivision Ordinance Article 6 Conservation and Open Space Standards § 6.1 requires all subdivisions and land development to minimize impacts to slopes exceeding 15 percent and to wetlands, streams, swales, and riparian buffers.</p> <p>§ 6.2 For major subdivisions and land development projects, wetlands, floodplain areas, slopes of 15 percent or more are considered primary conservation areas and subtracted from the Total Tract Area to yield an Adjusted Tract Area. A minimum of 30 percent of the adjusted tract area shall be set aside for passive or active recreation (considering woodlands, significant natural features, etc.)</p>
<ul style="list-style-type: none"> <li>• To encourage clustering and open space design, are setbacks minimized (e.g., for residential lots that are ½-acre or less in size, is the front set back 20 feet or less, the rear setback 25 feet or less, and the side setback 8 feet or less?)</li> </ul>	●		<p>Ordinance Findings: Yes</p> <p>Zoning Ordinance, Article 4, § 4.2 (R-2 Districts); 4.3 (R-3 Districts); and 4.8 (Large Parcel Development Overlay Districts) expressly allow clustering of homes and other uses.</p> <p>Subdivision Ordinance Article</p>

			<p>4, § 4 (Major Subdivision Requirements) encourages open space design.</p>
<ul style="list-style-type: none"> <li>• Are site designs required to have development focused on areas of lesser slopes and farther from watercourses?</li> </ul>	<p style="text-align: center;">●</p>		<p>Ordinance Findings: Yes</p> <p>Subdivision Ordinance Article 6 Conservation and Open Space Standards § 6.1 requires all subdivisions and land development to minimize impacts to slopes exceeding 15 percent and to wetlands, streams, swales, and riparian buffers.</p> <p>§ 6.2 For major subdivisions and land development projects, wetlands, floodplain areas, slopes of 15 percent or more are considered primary conservation areas and subtracted from the Total Tract Area to yield an Adjusted Tract Area. A minimum of 30 percent of the adjusted tract area shall be set aside for passive or active recreation (considering woodlands, significant natural features, etc.)</p> <p>Subdivision Ordinance Article 4, § 4 (Major Subdivision Requirements) encourages open space design.</p>
<ul style="list-style-type: none"> <li>• Are policies effective in encouraging higher density development to be centered around transportation corridors?</li> </ul>	<p style="text-align: center;">○</p>		<p>Note that it is important for towns to allow density bonuses for protecting certain features, preserving open space, and limiting sprawl.</p> <p>Ordinance Findings: No</p>

**GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

- Objective: Minimize building footprint/envelope area.
- Objective: Preserve topsoil structure.
- Objective: Preserve sensitive wetlands.
- Objective: Preserve sensitive soils.
- Objective: Preserve sensitive stream buffers.

GOAL #2 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Topsoil Structure &amp; Building Footprint</b>			
<ul style="list-style-type: none"> <li>• Is disturbance of vegetated areas required to be phased?</li> </ul>	●	√	<p>Note: DNREC’s performance criteria for construction site management include limits on site disturbance. See Goal #6 performance criteria.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Is disturbance of vegetated areas and riparian areas required to be minimized?</li> </ul>	◐		<p>Ordinance Findings: Yes Subdivision Ordinance Article 6 Conservation and Open Space Standards § 6.1 requires all subdivisions and land development to minimize impacts to slopes exceeding 15 percent and to wetlands, streams, swales, and riparian buffers.</p> <p>§ 6.2 For major subdivisions and land development projects, wetlands, floodplain areas, slopes of 15 percent or more are considered primary conservation areas and subtracted from the Total Tract Area to yield an Adjusted Tract Area. A minimum of 30 percent of the adjusted tract area shall be set aside for passive or active recreation (considering woodlands, significant natural features, etc.)</p> <p>Subdivision Ordinance Article 4, § 4 (Major Subdivision Requirements) encourages open space design.</p>
<ul style="list-style-type: none"> <li>• Are building envelopes</li> </ul>	◐		<p>Ordinance Findings: Yes</p>

<p>required/encouraged to avoid sensitive environmental areas such as riparian areas, wetlands, high infiltration soils, and steep slopes?</p>			<p>Subdivision Ordinance Article 6 Conservation and Open Space Standards § 6.1 requires all subdivisions and land development to minimize impacts to slopes exceeding 15 percent and to wetlands, streams, swales, and riparian buffers.</p> <p>§ 6.2 For major subdivisions and land development projects, wetlands, floodplain areas, slopes of 15 percent or more are considered primary conservation areas and subtracted from the Total Tract Area to yield an Adjusted Tract Area. A minimum of 30 percent of the adjusted tract area shall be set aside for passive or active recreation (considering woodlands, significant natural features, etc.)</p> <p>Subdivision Ordinance Article 4, § 4 (Major Subdivision Requirements) encourages open space design.</p>
<p><b>Wetlands</b></p>			
<ul style="list-style-type: none"> <li>Are site designs required to minimize hydrologic alteration to existing wetlands?</li> </ul>	<p>●</p>	<p>√</p>	<p>Note: there are state regulations prohibiting the disturbance of certain wetlands.</p> <p>Ordinance Findings: Yes</p>
<p><b>Sensitive Soils</b></p>			
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid highly erodible soils?</li> </ul>	<p>●</p>		<p>Ordinance Findings: Yes (strongly encouraged, but not required)</p> <p>Subdivision Ordinance Article 4, § 4 (Major Subdivision Requirements) encourages open space design.</p>
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid soils with high permeability (e.g., Hydrologic Soil Group A and B)?</li> </ul>	<p>●</p>		<p>Ordinance Findings: No</p> <p>However, Subdivision Ordinance Article 4, § 4 (Major Subdivision Requirements) encourages open space design.</p>
<p><b>Stream Buffers</b></p>			

<ul style="list-style-type: none"> <li>• Is a 60- to 100-foot stream buffer required/encouraged for new development?</li> </ul>	<p style="text-align: center;">●</p>		<p>Note: The Phase I WIP recommends 100 ft for primary waters and 60 ft for secondary waters; can be reduced if combined with other pollution reduction actions. This buffer recommendation is applicable to those areas where buffers are voluntary (i.e., not the Dept. of Ag's 30 ft buffer or CAFO buffers)</p> <p>Ordinance Findings: No</p> <p>However, Subdivision Ordinance Article 6 Conservation and Open Space Standards § 6.1 requires all subdivisions and land development to minimize impacts to slopes exceeding 15 percent and to wetlands, streams, swales, and riparian buffers.</p> <p>§ 6.2 For major subdivisions and land development projects, wetlands, floodplain areas, slopes of 15 percent or more are considered primary conservation areas and subtracted from the Total Tract Area to yield an Adjusted Tract Area. A minimum of 30 percent of the adjusted tract area shall be set aside for passive or active recreation (considering woodlands, significant natural features, etc.)</p> <p>Subdivision Ordinance Article 4, § 4 (Major Subdivision Requirements) encourages open space design.</p>
<ul style="list-style-type: none"> <li>• Are stream buffers for new development required to remain in a natural state?</li> </ul>	<p style="text-align: center;">●</p>		<p>Ordinance Findings: Yes, for major subdivisions and developments.</p> <p>Ordinance Article 6 § 6.2 For major subdivisions and land development projects, wetlands, floodplain areas, slopes of 15 percent or more</p>

			<p>are considered primary conservation areas and subtracted from the Total Tract Area to yield an Adjusted Tract Area. A minimum of 30 percent of the adjusted tract area shall be set aside for passive or active recreation (considering woodlands, significant natural features, etc.)</p> <p>Subdivision Ordinance Article 4, § 4 (Major Subdivision Requirements) encourages open space design.</p>
<ul style="list-style-type: none"> <li>• Are site designs required to preserve existing runoff pathways to adequately support existing wetlands?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: Yes, for major subdivisions and developments)</p> <p>Ordinance Article 6 § 6.2 (see notes above)</p>
<ul style="list-style-type: none"> <li>• Is a 50-foot wetland buffer required/encouraged?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: No</p>

**GOAL #3: HAVEST RAINWATER**

Objective: Allow rainwater harvesting through plumbing code provisions.

Objective: Allow the use of downspout disconnection/redirection, rain barrels, and above-and below-ground cisterns for rainwater harvesting

GOAL #3 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<ul style="list-style-type: none"> <li>• Can downspouts be disconnected or redirected to discharge into a rain barrel or yard?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are interior or exterior cisterns allowed?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Can rain barrels be placed within standard zoning setback areas?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Do zoning and building provisions allow cisterns to be placed on rooftops to harvest rainwater?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Is harvested rainwater allowed to be used for non-potable interior uses such as toilet flushing?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.

**GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

Objective: Allow and encourage stormwater controls as multiple use in open space areas.

Objective: Allow and encourage stormwater controls as multiple use in landscaped areas.

GOAL #4 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Landscaped Areas</b>			
<ul style="list-style-type: none"> <li>Are bioretention areas allowed to be constructed in the development's designated landscape areas, if properly designed?</li> </ul>	●		<p>Ordinance Findings: No</p> <p>Zoning Ordinance Article 7, § 7.13. Buffer and Landscaping Requirements The intent of the buffers and landscaping is for visual separation/screening. Planting standards for trees include an average crown spread of 15 ft. (or groupings with a 15 ft. crown) with a requirement of a minimum 7 ft. height at planting. Shrubs and hedges must be a minimum 2 ft. in height at planting and form a continuous visual screen two years after planting. Such requirements preclude effective use of LID techniques such as bioretention, bioswales, and constructed wetlands.</p> <p>Zoning Ordinance Article 7, § 7.1.3.4 Storm Water Management Ponds The use of the storm water management areas for other than parkland or additional open space shall be prohibited.</p> <p>Housing Standards Code Article 8, § 87-33 Growth of Weeds All premises in residential areas shall be kept free from weeds or plant growth which are noxious or detrimental to the public health and shall be trimmed to a height of not more than 8 inches.</p> <p>Construction Specifications Utility Ordinance</p>

			<p>Grass strips required in Town right-of-way (topsoil, seed, mulch) which preclude use of bioswales or bioretention areas.</p> <p>The Conservation District's Sediment and Stormwater checklist expressly prohibits infiltration practices from being located within 20 feet of basement walls.</p> <p>The provisions above could limit the use of bioretention, swales, and other vegetated stormwater facilities.</p>
<ul style="list-style-type: none"> <li>• Are bioretention areas given "credit" as landscape area to count as a percent of the required landscaping?</li> </ul>	●		<p>Ordinance Findings: No</p> <p>Zoning Ordinance Article 7, § 7.1.3.4 Storm Water Management Ponds</p> <p>The use of the storm water management areas for other than parkland or additional open space shall be prohibited.</p>
<ul style="list-style-type: none"> <li>• Do landscaping requirements allow plantings conducive to bioretention, bioswales, raingardens , and other LID BMPs?</li> </ul>	●		<p>Ordinance Findings: No</p> <p>See landscaping notes above</p>
<ul style="list-style-type: none"> <li>• Do tree planting requirements allow use of raingardens, tree boxes, and other LID BMPs?</li> </ul>	●		<p>Ordinance Findings: No</p> <p>Location of bioretention and other LID BMPs is not included in the zoning and subdivision ordinances</p> <p>Zoning Ordinance, Article 7, § 7.2.B (Street and Shade Trees) and 7.2.C (Streetscape Standards) have sizing and spacing requirements which could prohibit the use of bioswale, bioretention areas, raingardens, and tree boxes)</p>
<p><b>Open Space Areas</b></p>			
<ul style="list-style-type: none"> <li>• Are there open space preservation requirements or incentives?</li> </ul>	◐		<p>Ordinance Findings: Yes</p> <p>Subdivision Ordinance Article 6 Conservation and Open Space Standards § 6.1 requires all</p>

			<p>subdivisions and land development to minimize impacts to slopes exceeding 15 percent and to wetlands, streams, swales, and riparian buffers.</p> <p>§ 6.2 For major subdivisions and land development projects, wetlands, floodplain areas, slopes of 15 percent or more are considered primary conservation areas and subtracted from the Total Tract Area to yield an Adjusted Tract Area. A minimum of 30 percent of the adjusted tract area shall be set aside for passive or active recreation (considering woodlands, significant natural features, etc.)</p> <p>Subdivision Ordinance Article 4, § 4 (Major Subdivision Requirements) encourages open space design.</p> <p>Zoning Ordinance, Article 4, § 4.2 (R-2 Districts); 4.3 (R-3 Districts); and 4.8 (Large Parcel Development Overlay Districts) expressly allow clustering of homes and other uses.</p>
<ul style="list-style-type: none"> <li>Is preserved open space required to be managed in a natural condition?</li> </ul>	<p>◐</p>		<p>Ordinance Findings: Partially. A portion of the open space can be active recreation area.</p>
<ul style="list-style-type: none"> <li>Are structural LID techniques such as constructed wetlands, swales, and bioretention areas allowed to be constructed in a development’s designated open space, if properly designed?</li> </ul>	<p>●</p>		<p>Ordinance Findings: No</p> <p>Zoning Ordinance Article 7, § 7.1.3.4 Storm Water Management Ponds</p> <p>The use of the storm water management areas for other than parkland or additional open space shall be prohibited.</p>
<ul style="list-style-type: none"> <li>Are structural LID techniques such as constructed wetlands, swales, and bioretention areas given “credit” as open space to count as a percent</li> </ul>	<p>●</p>		<p>Ordinance Findings: No</p> <p>Zoning Ordinance Article 7, § 7.1.3.4 Storm Water Management Ponds</p> <p>The use of the storm water management areas for other</p>

<p>of the required open space area, if properly designed?</p>			<p>than parkland or additional open space shall be prohibited.</p>
<ul style="list-style-type: none"> <li>Does protection of sensitive, natural areas and habitat qualify as credit for local open space dedication?</li> </ul>	<p>●</p>		<p>Ordinance Findings: Yes                      Zoning Ordinance, Article 4, § 4.2 (R-2 Districts); 4.3 (R-3 Districts); and 4.8 (Large Parcel Development Overlay Districts) expressly allow clustering of homes and other uses.                      Subdivision Ordinance Article 4, § 4 (Major Subdivision Requirements) encourages open space design.                      The natural area preserved qualifies for open space credit.</p>

**GOAL #5: MANAGE STORMWATER TO MEET WATERSHED IMPLEMENTATION PLAN & DNREC STORMWATER REGULATIONS**

- Objective: Meet DNREC stormwater regulations
- Objective: Replicate the predevelopment hydrology of the site, to the extent practicable.
- Objective: Maintain water quality functions of the watershed.
- Objective: Minimize channel erosion impacts.
- Objective: Minimize flooding impacts.
- Objective: Inspect BMPs to ensure proper construction and design.
- Objective: Long-term maintenance.

GOAL #5 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Stormwater Ordinance Provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• Is stormwater required to be retained/infiltrated onsite (through bioretention, natural areas, and swale infiltration) where possible?</li> </ul>	●	√	Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC Resource Protection Criteria</li> </ul>	●	√	<p>Note: For the 1-yr, 24 hour rainfall event, meet the following standards:                      Predevelopment wood/meadow – runoff reduction practices will yield the equivalent wooded condition for these areas.                      All remaining disturbed area shall achieve the equivalent of 0% effective imperviousness.                      The remaining discharge, if any, shall not exceed the 24-hour detention of the 1yr, 24 hr storm and an offsite offset is required for the portion of the storm not meeting the minimum requirements.                      Additional water quality treatment BMPs shall be required if runoff reduced is not sufficient to meet the TMDL.</p> <p>Ordinance Findings: No                      The Conservation District’s Sediment and Stormwater checklist SM 11 requires wet ponds to be designed to release the quality of stormwater runoff over a 24 hour period. Practices that have a permanent pool are to be designed to</p>

			release the first inch of runoff from the site over a 24 hour period. SM 12 requires infiltration practices to accept, at least, the first inch of runoff from all streets, roadways, and parking lots.
<ul style="list-style-type: none"> <li>• DNREC Conveyance Criteria for Channel Protection</li> </ul>	●	√	<p>Note: Conveyance Volume is the 10 yr, 24 hr rainfall event (or the volume of runoff produced by the post-development storm having a 10% chance of occurring)- less any volume reduction achieved through meeting the Resource Protection Criteria.</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Yes (it appears that the Conservation District standard below could meet this requirement.)</p> <p>The Conservation District's Sediment and Stormwater checklist SM 10 states that the pos-development peak rates of discharge for the 2- and 10-year storm events shall not exceed the predevelopment peak rates of discharge for the 2- and 10- year storm events.</p>
<ul style="list-style-type: none"> <li>• DNREC Flood Event Criteria</li> </ul>	●	√	<p>Volume of runoff produced by 100 yr, 24 hr rainfall event (or post-development storm having a 1% probability of occurrence).</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Not addressed in ordinances and standards reviewed.</p>
<ul style="list-style-type: none"> <li>• Alternative Criteria</li> </ul>	●	√	<p>Land development that discharges to state waters included in a Designated</p>

			Watershed or other watershed management plan approved in accordance with DNREC stormwater regulations shall meet alternative criteria in the approved plan.
<ul style="list-style-type: none"> <li>• Redevelopment Criteria</li> </ul>	●	√	<p>Recognizing the importance of redevelopment over greenfield development, redevelopment areas are required to only achieve a 50% reduction in effective impervious area based on existing conditions. Only the <u>increases</u> in the rate, volume, and duration of flow for the channel volume and flooding volume will need to comply with the DNREC stormwater regulations.</p> <p>A brownfield development remediation plan may meet the stormwater goals and intent of the DNREC stormwater regulations if approved by DNREC.</p> <p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	●	√	<p>Agricultural land having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meets DOA requirements.</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes</p> <p>Conservation District Program</p>
<b>Inspections</b>			
<ul style="list-style-type: none"> <li>• Are inspections required during construction and routinely after construction?</li> </ul>	●	√	<p>Ordinance Findings: Yes</p> <p>Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	●	√	<p>Note: DNREC requires a Certified Construction Reviewer</p> <p>Ordinance Findings: Yes</p> <p>Conservation District Checklist</p>

<b>Maintenance</b>			
• Are maintenance agreements required?	●	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	●	√	Ordinance Findings: No
<b>Off-Site Mitigation</b>			
• Is offsite mitigation required when on-site management does not meet the performance criteria (unless there is proof of no adverse impact)?	●		Ordinance Findings: No
• Is the DE Nutrient Protocol program required to calculate offsets?	◐		Ordinance Findings: No
• Is offsite mitigation for forested area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	◐		Ordinance Findings: No
• Is offsite mitigation for riparian area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	◐		Ordinance Findings: No
• Is offsite mitigation for BMP retrofit allowed in the same named watershed?	◐		Ordinance Findings: No
• Is nutrient banking or the equivalent land banking allowed in the same named watershed? Is redevelopment encouraged in lieu of greenfield development?	○		Ordinance Findings: No
<b>Local Stormwater Utility Ordinance</b>			
• Does an ordinance exist to support the development of a local stormwater utility?	◐		Ordinance Findings: No

**GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

Objective: Meet DNREC stormwater regulations

Objective: Minimize erosion and sedimentation and delivery of nonpoint source pollutants during construction activities.

Objective: Inspect BMPs ensure proper construction and design.

Objective: Maintain BMPs.

GOAL #6 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Sedimentation and Erosion Control provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• DNREC Turbidity Stormwater Management</li> </ul>	●	√	Best Available Technology shall be employed to manage turbid waters in accordance with state regulations. Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC requirement of Sediment and Stormwater Management Plans</li> </ul>	●	√	Ordinance Findings: Yes Conservation District Checklist
<ul style="list-style-type: none"> <li>• DNREC Land Disturbance Criteria</li> </ul>	●	√	Use of standard details for DE Erosion and Sedimentation Control Handbook-limited to sites where no more than 10 acres draining to a common discharge point will be disturbed at any one time. Ordinance Findings: No  Construction site BMPs intended to manage areas greater than 10 acres shall have supporting design computations. Ordinance Findings: No  In no case shall an area of disturbance draining to a common point exceed 20 acres. Grading within that drainage area shall not proceed unless temporary or permanent stabilization has been accomplished. All plans shall include a limit of disturbance line. Ordinance Findings: Yes Conservation District Checklist

<ul style="list-style-type: none"> <li>• DNREC Site Stabilization Criteria</li> </ul>	<p>●</p>	<p>√</p>	<p>Following soil disturbance or redisturbance, permanent or temporary stabilization shall be completed for all perimeter sediment controls, topsoil stockpiles, or other graded/disturbed areas within 14 calendar days unless a more restrictive federal requirement applies.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p> <p>Documentation of soil testing and materials used for stabilization shall be provided for verification.</p> <p>Ordinance Findings: Not addressed</p> <p>Release of financial guarantee and or issuance of Notice of Completion shall not occur until final stabilization of all exposed areas is achieved.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	<p>●</p>	<p>√</p>	<p>Agricultural having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meet DOA requirements</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<p><b>Inspections</b></p>			
<ul style="list-style-type: none"> <li>• Are weekly inspections required during construction?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>

<b>Maintenance</b>			
• Are maintenance agreements required?	●	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	●	√	Ordinance Findings: No

**GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

**Note: Onsite Wastewater Treatment and Disposal provisions are still in draft form and may not be subject to this ordinance review.**

<b>GOAL #7 KEY QUESTIONS</b>	<b>DEGREE OF IMPORTANCE</b>	<b>REQUIRED BY DNREC</b>	<b>COMMENTS</b>
<b>Performance Standards</b>			
Where do local governments allow/encourage/ban standard systems versus community systems and how does that impact growth patterns			This question will likely not apply to towns with sewer. Most likely a county issue.



## TETRA TECH

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### MEMORANDUM

**To:** Charles Anderson (City of Seaford)

**From:** Eugenia Hart and Kimberly Brewer

**Cc:** Jennifer Walls (DNREC); Bryan Hall (DNREC); Jennifer Volk (DNREC)

**Date:** January 24, 2012

**Subject:** Review of the City of Seaford's Local Land Use Ordinances to Identify Barriers to Implementing the Chesapeake Bay Watershed Implementation Plan

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## 1 Introduction

Delaware has developed a Watershed Implementation Plan (WIP) to accompany the Chesapeake Bay nutrient and sediment total maximum daily loads (TMDLs). The WIP lays out plans for addressing existing pollutant load to the Bay as well as new pollutant loads from future land use changes. Delaware's Department of Natural Resources and Environmental Control (DNREC) has tasked Tetra Tech with assisting local Delaware municipalities in the Chesapeake Bay watershed to conduct a review of existing local municipal ordinances with regulations pertaining to new development.

The goal of the ordinance review is to provide a service to local governments in Delaware by reviewing existing land use ordinances to look for barriers to implementing the Chesapeake Bay WIP as well as identify potential opportunities for improving communities and allowing more techniques to be used to help property owners address nutrient and sediment loads from new developments. These include techniques such as green infrastructure, low impact development, conservation design, and performance standards that can allow flexibility. There are often unintended barriers to these techniques in local ordinances.

This memorandum presents the results of Tetra Tech's review of these local ordinances for the City of Seaford, DE. Note that recommendations for consideration of code revisions are not mandatory. They are intended only to provide more flexibility and effectiveness in meeting resource protection goals and regulations.

## 2 Approach

In August 2011 Tetra Tech contacted the City of Seaford to obtain the most recent versions of the following types of ordinances, if available:

- Subdivision ordinance
- Zoning ordinance

- Sedimentation and erosion control ordinance or regulations
- Onsite wastewater ordinance or regulations

Seaford staff provided their subdivision and zoning ordinances for review. The City follows the Sussex County Conservation District's (SCD) stormwater, sedimentation, and erosion control program. Note that SCD does not have their own stormwater, sedimentation, and erosion control standards, but adheres to Delaware's State Sediment and Stormwater Regulations (see section 3.1 below). Seaford does not have specific on-site wastewater regulations as all new developments hook to public water and sewer.

Once the ordinances were obtained, they were reviewed based on the Ordinance Review Checklist developed by Tetra Tech (Appendix A). The checklist contains items related to the following seven goals:

1. Minimize Effective or Connected Impervious Area
2. Preserve and Enhance the Hydrologic Function of Unpaved Areas
3. Harvest Rainwater
4. Allow and Encourage Multi-Use Stormwater Controls
5. Manage Stormwater to Meet WIP and DNREC Regulations
6. Manage Construction Site Stormwater to Meet WIP and DNREC Regulations
7. Manage On-Site Wastewater Systems to Meet WIP and DNREC Regulations

The City of Seaford staff reviewed the draft memo, and recommended revisions and corrections as needed.

Barriers to each of the items on the Checklist are summarized below in Section 3 along with potential solutions to overcome these barriers.

### **3 Summary of Barriers and Potential Solutions for Implementation**

This section of the memo provides a summary of the barriers identified for each of the seven goals indicated on the Ordinance Review Checklist (Appendix A). Following the summary of each barrier, potential solutions are provided.

#### **3.1 GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

##### **Mitigation of Runoff from Effective Impervious Area**

DNREC's final draft stormwater regulations (DNREC 2011) require that local regulations and standards mitigate stormwater runoff such that there is no direct contribution of stormwater runoff from a development. Seaford does not have an ordinance that directly addresses this issue; however, Seaford currently follows the Sussex Conservation District's Sediment Control and Stormwater Management Program. SCD follows the State of Delaware's Sediment and Stormwater Regulations as a delegated agency. It is suggested that Seaford reference State of Delaware Sediment and Stormwater Regulations in their subdivision ordinance, and that Seaford develop a formal Memorandum of Understanding (MOU) with the SCD (or DNREC Delegated Agency) regarding implementation of the sediment and stormwater management program (if a formal MOU does not already exist).

Seaford has specifically shown an interest in allowing pervious surfaces such as paver stones, porous pavement, or grass pavers in parking areas. The zoning and subdivision ordinances do not expressly allow or prohibit pervious surfaces for parking. The zoning and subdivision ordinances will need to be amended accordingly to provide more certainty regarding the allowance of pervious parking surfaces, with special

attention to appropriate use, design and installation of pervious parking surfaces in environmentally sensitive areas.

### **Flexibility in Locating BMP Techniques On-site**

The location of low impact development (LID) best management practices (BMPs) in street and parking areas (e.g., parking medians, grass strips between sidewalk and curb, swales, etc.) is for the most part not explicitly prohibited or allowed in the ordinance. Lack of certainty about approval of these techniques can pose a barrier to implementation. It appears that height and setback limitations for landscaping at intersections would directly prohibit the use of LID techniques such as curb bumpouts/extensions with bioretention or bioswales.

### **Street and Right-of-Way Widths**

Current subdivision regulations do not allow minor streets to have narrow street pavement and travel lane widths to help minimize impervious area. In addition to the environmental benefits of narrowing streets, some studies have found that narrow residential streets are safer than wide streets (Center for Watershed Protection 1998).

In the last decade, numerous neo-traditional developments have been built using techniques to narrow street and right of way width. Techniques such as curb pullouts, staggered pull-out parking areas (rather than continuous lanes), or having a parking lane on one side of the street only have been employed. These developments have been able to meet the needs of access for service and emergency vehicles as well as on-street parking while also using narrower streets and public right-of-ways than do conventional subdivisions. That said, it should be recognized that concerns about these components of LID—narrow streets and right-of-ways—make it challenging to implement. In each community, moving forward requires a great deal of discussion and problem solving with staff from the fire department, public works, engineering, and other potentially affected departments in order to address concerns and develop mutually supported ordinance and code revisions. Note that Delaware State Fire Prevention Regulations do not appear to regulate street widths in residential developments, but do provide turn-around and cul-de-sac standards that allow for fire apparatus access.

### **Minimum Parking Requirements**

Current zoning establishes a high minimum parking space requirement and requires overly large parking stalls and drive aisles. Together these minimum parking requirements can unnecessarily increase the overall imperviousness of the development site. Some communities allow a smaller number of parking spaces per square feet of floor area in the development, as well as allow smaller stalls and aisles (e.g., stall width of 9 feet, minimum stall length to 15 feet, and minimum drive aisle width of 22 feet). These standards minimize paved area, provide adequate parking space, and reduce development costs. Seaford's zoning regulations currently allow parking stall widths of 9 ft in residential areas. Seaford might want to consider applying the 9 feet width in non-residential parking areas as well.

### **Incentives for Infill Development and Redevelopment of Existing Areas over “Greenfield” Development**

DNREC's draft sediment and stormwater regulations (June 2011) require that local regulations and standards impose less stringent runoff reduction requirements for proposed development in existing developed areas, thus providing incentives to develop in these areas rather than undeveloped or “greenfield” areas. Local zoning and subdivision requirements will need to be amended accordingly.

### **3.2 GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

#### **Encouraging or Requiring Stream Buffers**

The Phase I WIP calls for local regulations and standards that encourage or require buffers of 60 feet for secondary waterbodies and 100 feet for primary waterbodies for new development proposals. These buffers can be reduced if combined with other pollution reduction actions. The City's current zoning and subdivision ordinances do not require such riparian buffers. However, the Storm Drainage requirements in the Subdivision Ordinance do require a drainage easement adequate to preserve the unimpeded flow of natural drainage. Local zoning and subdivision requirements would need to be amended if the City desires more certainty regarding the preservation of streamside areas in natural vegetation.

#### **Minimizing Disturbance in Environmentally Sensitive Areas**

It appears that the local regulations currently allow disturbance of riparian areas, erodible soils, steep slopes, and areas of high soil infiltration. LID uses these landscape features as a part of natural stormwater management and seeks to minimize their disturbance during and after construction. Local zoning and subdivision requirements should be amended to address the protection of environmentally sensitive areas where feasible.

### **3.3 GOAL #3: HARVEST RAINWATER**

#### **Explicitly Allowing or Encouraging Rainwater Harvest**

Rainwater harvesting is not explicitly prohibited or allowed in the ordinances. However, lack of certainty about approval of these techniques can pose a barrier to implementation.

### **3.4 GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

#### **Flexibility in Locating LID Techniques in Designated Landscape and Open Space Areas**

Due to existing ordinance specifications and allowances, it appears that LID techniques such as bioretention, bioswales, constructed wetlands, etc. are effectively not allowed in required landscape, screening, and open space areas. Where these BMPs can be designed to support landscape and open space functions, flexibility should be provided in locating these BMPs where they can be most effective in managing water quality, drainage, and flooding impacts. Explicit exemptions, as-of-right use, or even incentives, should be made for the use of vegetative LID techniques in screening, buffer, and landscape areas. Additionally, consideration should be given allowing bioretention and bioswales in the right-of-way area typically used as a grassed strip.

#### **Credit for LID Techniques that Provide Landscape and Natural Open Space Functions**

LID BMPs do not appear to be given credit as part of the City's required landscaping and open space area. Explicitly providing such credit would provide an extra incentive for developers to use LID techniques.

### **3.5 GOAL #5: MANAGE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Stormwater Regulations**

DNREC's final draft sediment and stormwater regulations require new minimum water quality, channel protection, and conveyance and flood control requirements for new development and redevelopment. As stated earlier, it is suggested that Seaford reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance and develop a formal MOU with the Conservation District regarding implementation of the sediment and stormwater management program (if a formal MOU does not already exist).

#### **Off-site Mitigation**

There are no provisions in the ordinance for off-site mitigation when on-site management does not meet the performance criteria. DNREC is in the final phases of developing an offset tool called the *Nutrient and Sediment Loading Assessment Protocol*. The tool allows developers to determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. This is a useful tool in determining whether or not a proposed development meets the TMDL or will need additional on-site management or off-site mitigation. Seaford may want to consider requiring developers to use this tool during the planning process before presenting the site plan to the planning and zoning commission for review.

### **3.6 GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

#### **Meeting New DNREC Sediment and Erosion Control Regulations**

DNREC's final draft sediment and stormwater regulations require construction site stormwater management controls to be put in place for all construction activities exceeding 5,000 square feet of disturbance. As stated earlier, it is suggested that Seaford reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance, and that Seaford develop a formal MOU with the Conservation District (or DNREC's Delegated Agency) regarding implementation of the sediment and stormwater management program (if a formal MOU does not already exist).

### **3.7 GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WIP AND DNREC REGULATIONS**

Seaford does not have specific on-site wastewater regulations as all new developments are connected to public water and sewer. There are only about 5-7 septic systems currently in Seaford. The rest of the town is sewerred.

## **4 Accounting and Tracking of BMP Implementation**

Seaford would consider tracking the implementation of BMPs in the City; however, before committing to this task they would like to be provided with additional information from DNREC on what it would entail.

It is suggested that DNREC provide the City of Seaford with a list of BMPs approved for use in the Chesapeake Bay watershed TMDL model and have the City of Seaford notify DNREC if any of these types of BMPs are installed in the town so they can be appropriately credited in the Bay model.

Note that Seaford is interested in applying effluent to the recently acquired golf course and would like credit for that as well.

## 5 Conclusions

Review of Seaford's subdivision and zoning ordinances result in several key findings. The first finding is that the City of Seaford's Zoning and Subdivision ordinances have a number of strong features including, but not limited to:

- parking stall widths of 9 feet for residential areas
- sidewalks required to be designed to the narrowest allowable width of 4 ft
- residential building setbacks are minimized to encourage open space design and clustering
- elements of the comprehensive plan that encourage future growth near the city limits and commercial developments along major roadways

The ordinance review did identify a number of direct barriers to the use of LID techniques, such as specifications and allowances for required screening, landscape and open space areas. To allow or encourage the use of LID techniques, the City would need to explicitly exempt these techniques or allow them as-of-right in these areas. The City should consider allowing bioretention and bioswales in the right-of-way area typically used as a grassed strip.

In some cases, the ordinance included barriers of omission: by not expressly allowing the LID technique or providing for exemptions, the ordinance generates uncertainty regarding approval and thus unintentionally provides disincentives for some LID practices. Examples of this include allowance of downspouts and location of rain barrels or cisterns in zoning setback areas.

The City does not have an ordinance that directly addresses sediment and stormwater management. Rather, Seaford follows the Sussex Conservation District's Sediment Control and Stormwater Management Program. Considering the new federal stormwater regulations due out in late 2011 and new state stormwater regulations due in 2012, it is suggested that, in addition to specifically referring to the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance, Seaford develop a formal MOU with the SCD (or DNREC's Delegated Agency) regarding implementation of the sediment and stormwater management program if a formal MOU does not already exist. Since the federal and state stormwater regulations and the Chesapeake Bay WIP will require local governments to make changes related to stormwater management, and a significant piece of the requirement is being passed on to the SCD for implementation, it is recommended that a MOU be developed to formalize this agreement.

Reducing impervious area in new developments can be an important part of stormwater management. Seaford may want to consider allowing narrower street and right of way widths in all new developments, while employing techniques such as curb pullouts and staggered pull-out parking areas to meet the needs of service and emergency vehicles as well as on-street parking. Seaford might also want to consider allowing a smaller number of parking spaces, smaller parking stalls and aisles, and porous pavement in parking areas in new multi-family and commercial developments.

Finally, Seaford might want to consider adopting DNREC's *Nutrient and Sediment Loading Assessment Protocol* as part of their subdivision ordinance. The tool can help developers determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. The tool can help to quantify the number and types of BMPs necessary on a new development site to meet the TMDL requirements.

## References

Center for Watershed Protection (CWP). 1998. *Better Site Design: A Handbook for Changing Development Rules in Your Community*.

DNREC (Department of Natural Resources and Environmental Control). 2011. *Final Draft Sediment and Stormwater Regulations*. June 2011.

Delaware Department of Transportation (DelDOT). 2010. *Standards and Regulations for Subdivision Streets and State Highway Access*. Dover, DE.

Delaware State Fire Marshall. 2009. *Delaware State Fire Prevention Regulations*

Seaford Standard Design Specifications

Seaford Subdivision Code

Seaford Zoning Code

Sussex Conservation District. 2011. *Sediment and Stormwater Management Checklist*  
<http://sussexconservation.org/> Accessed August 2011.

## Appendices

Appendix A. Ordinance Review Checklist

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## Appendix A. Ordinance Review Checklist

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# Local Development Ordinance Tools/Techniques for Implementing Delaware's Chesapeake Bay Watershed Implementation Plan & DNREC Final Draft Sediment and Stormwater Regulations

## City of Seaford Ordinance Review Checklist

### City of Seaford Ordinances Reviewed

Subdivision Code

Zoning Code

Standard Design Specifications

Sussex Conservation District Sediment and Stormwater Management Checklist

DeIDOT Standards and Regulations for Subdivision Streets and State Highway Access

Delaware State Fire Prevention Regulations

*[Note: The Ordinance Checklist that follows is based on Delaware's Phase I Chesapeake Bay Watershed Implementation Plan (November 2010); Final Draft Sediment and Stormwater Regulations (DNREC, June 2011); Protecting Water Quality with Smart Growth Strategies and Natural Stormwater Management in Sussex County (January, 2009); Better Site Design: A Handbook for Changing Development Rules in Your Community (CWP 1998); Low-Impact Development Design Strategies, An Integrated Approach (USEPA 2000); and Tetra Tech's review of numerous local ordinances to identify opportunities and barriers to green infrastructure and low impact development techniques].*

**Degree of Importance Key to Symbols:**

- Essential
- ◐ Very important
- Important

**GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

- Objective: Minimize impervious area associated with streets.
- Objective: Minimize impervious area associated with parking.
- Objective: Minimize impervious area associated with driveways and sidewalks.
- Objective: Clustering development.
- Objective: Incorporate sustainable hydrology practices into urban redevelopment.

GOAL #1 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Overall Effective Impervious Area</b>			
<ul style="list-style-type: none"> <li>• Is impervious area required to be controlled such that there is no direct contribution of stormwater runoff (i.e., the equivalent of 0% effective impervious area)?</li> </ul>	●	√	<p>Note: DNREC's Final Draft stormwater regulations require that after runoff reduction practices have been implemented on disturbed area, the site's impervious area shall not directly contribute stormwater runoff during a rain event that has an 99% annual probability of occurring. See Goal # 5 performance criteria.</p> <p>Ordinance Findings: No</p>
<b>Streets</b> (Note: Also check Fire Marshal's Code to see how it impacts the following goals)			
<ul style="list-style-type: none"> <li>• For residential development, are the street pavement widths allowed to be between 18 to 22 feet, with curb pullouts for passing of large vehicles?</li> </ul>	●		<p>Ordinance Findings: No</p> <p>Subdivision Code §603 states cartway (pavement) widths range from 30-60 ft (20 ft for service road)</p>
<ul style="list-style-type: none"> <li>• Are travel lanes allowed to be from 12 to 10 feet (or less), with curb pullouts for passing of large vehicles?</li> </ul>	●		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>
<ul style="list-style-type: none"> <li>• Are curb bumpouts/extensions allowed near intersections and mid-block for traffic-calming and bioretention opportunities?</li> </ul>	◐		<p>Ordinance Findings: Limited opportunity.</p> <p>Zoning Ordinance Section 15-69 Visibility at Intersection: On the corner lot or any entry on a public road, nothing shall be erected, placed or allowed to grow in such a manner which obscures the vision above the</p>

			<p>height of 2 ½ feet and below 10 ft. measured from the centerline grade of the intersecting streets or driveways and within the area bounded by the same street lines of such corner lots and a line joining points on these streets center lines 75 ft from the intersection along lot lines. Subdivision Ordinance Section 609: Clear sight triangles shall be provided at all street intersections. Within such triangles, no vision-obstructing object shall be permitted which obscures vision above the height of 30 inches and below 10 ft measured from the centerline grade of intersecting streets.</p>
<ul style="list-style-type: none"> <li>• Is pervious paving allowed for on-street parking and alleyways?</li> </ul>	<p style="text-align: center;">○</p>		<p>Ordinance Findings: No</p> <p>Subdivision Code §702: All streets intended to be dedicated to public use shall be paved in accordance with City regulations. (City's Standards and Specifications do not seem to provide details on types of paving allowed).</p> <p>DelDOT 5.6.1: All subdivision streets and entrances shall be paved with a hot-mix asphalt or Portland cement concrete surface.</p>
<ul style="list-style-type: none"> <li>• Are grass swales or bioretention swales allowed instead of curb and gutter or with curb cuts (where slopes allow)?</li> </ul>	<p style="text-align: center;">◐</p>		<p>Ordinance Findings: No</p> <p>Subdivision Code §702: Curbs shall be installed along both sides of all streets</p>
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, is the radius required to be 35 feet or less?</li> </ul>	<p style="text-align: center;">○</p>		<p>Ordinance Findings: No</p> <p>Subdivision Code §611: if parking prohibited, 40 ft; if parking permitted, 50 ft</p> <p>State Fire Code: Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in</p>

			length.
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, are landscaped islands or bioretention islands allowed or encouraged?</li> </ul>	○		<p>Ordinance Findings: No</p> <p>Subdivision Code §611: All cul-de-sacs...shall be provided at the closed end with a fully paved turnaround.</p> <p>State Fire Code: Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in length.</p>
<ul style="list-style-type: none"> <li>• Are site designs required to promote the most efficient street layout to reduce overall street length?</li> </ul>	○		Ordinance Findings: No
<b>Parking</b>			
<ul style="list-style-type: none"> <li>• Is the minimum stall width for a standard parking space 9 ft. or less?</li> </ul>	●		Ordinance Findings: Yes, for residential only; 10ft for all other uses
<ul style="list-style-type: none"> <li>• Are parking stall lengths allowed to be 15 ft.?</li> </ul>	●		<p>Ordinance Findings: No</p> <p>Zoning Code §15-74: Residential parking = 9' x 18' minimum All other uses = 10' x 20' minimum</p>
<ul style="list-style-type: none"> <li>• Are parking lot drive aisles allowed to be 22 ft.?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are bioretention cells allowed in parking medians?</li> </ul>	●		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are consolidated travel lanes and on-street parking allowed to create space for bioretention?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are pervious surfaces such as paver stones, porous pavement, or grass pavers allowed for on-street parking?</li> </ul>	◐		<p>Ordinance Findings: Not expressly allowed or prohibited.</p> <p>Subdivision Code §702: All streets intended to be dedicated to public use shall be paved in accordance with City regulations. (City's Standards and Specifications do not seem to provide details on types of paving allowed).</p>

<ul style="list-style-type: none"> <li>• For office buildings, is the required parking ratio 3.0 spaces per 1,000 sq.ft. of gross floor area or less?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: No. 1:200 sq. ft. (or 3:600)
<ul style="list-style-type: none"> <li>• For commercial centers, is the required parking ratio 2 to 4.5 spaces per 1,000 sq.ft. of gross floor area or less?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: No 1:200 or 7:1,000
<ul style="list-style-type: none"> <li>• Are proposed developments allowed to take advantage of opportunities for shared parking?</li> </ul>	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are proposed developments allowed to have parking stalls under the second floor podium?</li> </ul>	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<b>Driveways/Sidewalks</b>			
<ul style="list-style-type: none"> <li>• Are driveway standards 9 feet or less in width?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are shared driveways allowed?</li> </ul>	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• If sidewalks are required, are they required to be designed to the narrowest allowable width (e.g, 4 ft.)?</li> </ul>	<input type="radio"/>		Ordinance Findings: Yes. Must be 4 ft. Subdivision §705
<ul style="list-style-type: none"> <li>• Are sidewalks allowed to be on one side of the street only?</li> </ul>	<input type="radio"/>		Ordinance Findings: Yes. Installed on one side of marginal access streets. Subdivision §705
<b>Clustering Development</b>			
<ul style="list-style-type: none"> <li>• Is redevelopment encouraged in lieu of greenfield development through site performance standards?</li> </ul>	<input checked="" type="radio"/>	√	Note: DNREC's Final Draft stormwater regulations recognize the benefit of redevelopment, and have less stringent performance standards for proposed development in existing developed areas. See Goal # 5 performance criteria. Ordinance Findings: No
<ul style="list-style-type: none"> <li>• Is Conservation or Open Space Design an option?</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: No
<ul style="list-style-type: none"> <li>• To encourage clustering and open space design, are setbacks minimized (e.g., for residential lots that are 1/2-acre or less in size, is the</li> </ul>	<input checked="" type="radio"/>		Ordinance Findings: Yes Zoning Article 2 §15-15 and 15-16

<p>front set back 20 feet or less, the rear setback 25 feet or less, and the side setback 8 feet or less?)</p>			
<ul style="list-style-type: none"> <li>• Are site designs required to have development focused on areas of lesser slopes and farther from watercourses?</li> </ul>	<p><input checked="" type="radio"/></p>		<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Are policies effective in encouraging higher density development to be centered around transportation corridors?</li> </ul>	<p><input type="radio"/></p>		<p>Note that it is important for towns to allow density bonuses for protecting certain features, preserving open space, and limiting sprawl.</p> <p>Ordinance Findings: Limited. See Chapter 9 in Comprehensive Plan. Zoning Article 1 §15-2 cites the Comprehensive Plan, which encourages growth near the center of town.</p>

## GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS

Objective: Minimize building footprint/envelope area.

Objective: Preserve topsoil structure.

Objective: Preserve sensitive wetlands.

Objective: Preserve sensitive soils.

Objective: Preserve sensitive stream buffers.

GOAL #2 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Topsoil Structure &amp; Building Footprint</b>			
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas required to be phased?</li> </ul>	●	√	<p>Note: DNREC's performance criteria for construction site management include limits on site disturbance. See Goal #6 performance criteria.</p> <p>Ordinance Findings: Yes. Conservation District's Sediment and SW Management Checklist</p>
<ul style="list-style-type: none"> <li>Is disturbance of vegetated areas and riparian areas required to be minimized?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are building envelopes required/encouraged to avoid sensitive environmental areas such as riparian areas, wetlands, high infiltration soils, and steep slopes?</li> </ul>	◐		Ordinance Findings: No
<b>Wetlands</b>			
<ul style="list-style-type: none"> <li>Are site designs required to minimize hydrologic alteration to existing wetlands?</li> </ul>	●	√	<p>Note: there are state regulations prohibiting the disturbance of certain wetlands.</p> <p>Ordinance Findings: No</p>
<b>Sensitive Soils</b>			
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid highly erodible soils?</li> </ul>	◐		Ordinance Findings: No
<ul style="list-style-type: none"> <li>Are building footprints required/encouraged to avoid soils with high permeability (e.g., Hydrologic Soil Group A and B)?</li> </ul>	◐		Ordinance Findings: No
<b>Stream Buffers</b>			
<ul style="list-style-type: none"> <li>Is a 60- to 100-foot stream buffer required/encouraged?</li> </ul>	●		Note: The Phase I WIP recommends 100 ft for primary

<p>for new development?</p>			<p>waters and 60 ft for secondary waters; can be reduced if combined with other pollution reduction actions. This buffer recommendation is applicable to those areas where buffers are voluntary (i.e., not the Dept. of Ag's 30 ft buffer or CAFO buffers)</p> <p>Ordinance Findings: No Subdivision Ordinance §625 F states that where a subdivision is traversed by a water course, drainage way, channel, or stream, there shall be provided a drainage easement conforming substantially with the line of such water-course...and of such width as will be adequate to preserve the unimpeded flow of natural drainage, or for the purpose of widening, deepening, relocating, or improving or protecting such drainage facilities...</p>
<ul style="list-style-type: none"> <li>• Are stream buffers for new development required to remain in a natural state?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Are site designs required to preserve existing runoff pathways to adequately support existing wetlands?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Is a 50-foot wetland buffer required/encouraged?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: No</p>

**GOAL #3: HAVEST RAINWATER**

Objective: Allow rainwater harvesting through plumbing code provisions.

Objective: Allow the use of downspout disconnection/redirection, rain barrels, and above-and below-ground cisterns for rainwater harvesting

GOAL #3 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<ul style="list-style-type: none"> <li>• Can downspouts be disconnected or redirected to discharge into a rain barrel or yard?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are interior or exterior cisterns allowed?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Can rain barrels be placed within standard zoning setback areas?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Do zoning and building provisions allow cisterns to be placed on rooftops to harvest rainwater?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Is harvested rainwater allowed to be used for nonpotable interior uses such as toilet flushing?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.

**GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

Objective: Allow and encourage stormwater controls as multiple use in open space areas.

Objective: Allow and encourage stormwater controls as multiple use in landscaped areas.

GOAL #4 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Landscaped Areas</b>			
<ul style="list-style-type: none"> <li>Are bioretention, bioswale, and other LID vegetated areas allowed to be constructed in the development's designated landscape areas, if properly designed?</li> </ul>	●		<p>Ordinance Findings: Limited Bioretention, bioswales, etc. are not included in the ordinances or construction standards, but certain ordinance provisions effectively prohibit their use in landscape areas:</p> <p>Potential barriers include:                      Zoning Code §15-92 Screening Requirements – landscape screen shall mean a completely planted visual barrier of evergreen plants and trees arranged to form both a low level (2 ft) and high screen level (5 ft), at least, and spaced at intervals of not more than 5 ft on center.</p> <p>Zoning Code §15-93 Landscaping – Any part or portion of the site which is not used for buildings, other structures, loading or parking spaces and aisles, sidewalks or designated storage areas shall be planted with an all season ground cover and shall be landscaped with trees and shrubs in accordance with an overall landscape plan and shall be in keeping with natural surroundings.</p> <p>The Conservation District's Sediment and Stormwater checklist expressly prohibits infiltration practices from being located within 20 feet of basement walls.</p> <p>Street construction and design standards require a grass strip</p>

			(topsoil, seed, and mulch) in the right-of-way.
<ul style="list-style-type: none"> <li>• Are bioretention areas given “credit” as landscape area to count as a percent of the required landscaping?</li> </ul>	●		Ordinance Findings: No Bioretention is not included in the ordinances
<ul style="list-style-type: none"> <li>• Do landscaping requirements allow plantings conducive to bioretention, bioswales, raingardens , and other LID BMPs?</li> </ul>	●		Ordinance Findings: Limited  Potential barriers include: Zoning Code §15-92 Screening Requirements – landscape screen shall mean a completely planted visual barrier of evergreen plants and trees arranged to form both a low level (2 ft) and high screen level (5 ft), at least, and spaced at intervals of not more than 5 ft on center.  Zoning Code §15-93 Landscaping – Any part or portion of the site which is not used for buildings, other structures, loading or parking spaces and aisles, sidewalks or designated storage areas shall be planted with an all season ground cover and shall be landscaped with trees and shrubs in accordance with an overall landscape plan and shall be in keeping with natural surroundings.
<ul style="list-style-type: none"> <li>• Do tree planting requirements allow use of raingardens, tree boxes, and other LID BMPs?</li> </ul>	●		Ordinance Findings: Limited  Potential barriers include Subdivision Code §713 Landscaping: Shade trees placed at intervals of 50 ft between the sidewalk and building setback line at least 5 ft from sidewalk. No trees shall be planted between the sidewalk and curb.
<b>Open Space Areas</b>			
<ul style="list-style-type: none"> <li>• Are there open space preservation requirements or incentives?</li> </ul>	◐		Ordinance Findings: Yes Subdivision §626
<ul style="list-style-type: none"> <li>• Is preserved open space required to be managed in a natural condition?</li> </ul>	◐		Ordinance Findings: No

<ul style="list-style-type: none"> <li>• Are structural LID techniques such as constructed wetlands, swales, and bioretention areas allowed to be constructed in a development's designated open space, if properly designed?</li> </ul>	<p style="text-align: center;">●</p>		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>
<ul style="list-style-type: none"> <li>• Are structural LID techniques such as constructed wetlands, swales, and bioretention areas given "credit" as open space to count as a percent of the required open space area, if properly designed?</li> </ul>	<p style="text-align: center;">●</p>		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>
<ul style="list-style-type: none"> <li>• Does protection of sensitive, natural areas and habitat qualify as credit for local open space dedication?</li> </ul>	<p style="text-align: center;">●</p>		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>

**GOAL #5: MANAGE STORMWATER TO MEET WATERSHED IMPLEMENTATION PLAN & DNREC STORMWATER REGULATIONS**

- Objective: Meet DNREC stormwater regulations
- Objective: Replicate the predevelopment hydrology of the site, to the extent practicable.
- Objective: Maintain water quality functions of the watershed.
- Objective: Minimize channel erosion impacts.
- Objective: Minimize flooding impacts.
- Objective: Inspect BMPs to ensure proper construction and design.
- Objective: Long-term maintenance.

GOAL #5 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Stormwater Ordinance Provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• Is stormwater required to be retained/infiltrated onsite (through bioretention, natural areas, and swale infiltration) where possible?</li> </ul>	●	√	<p>Ordinance Findings: No</p> <p>Subdivision ordinance §625 provides requirements for proper storm drainage from the site, but doesn't discuss onsite retention or infiltration.</p>
<ul style="list-style-type: none"> <li>• DNREC Resource Protection Criteria</li> </ul>	●	√	<p>For the 1-yr, 24 hour rainfall event, meet the following standards:</p> <p>Predevelopment wood/meadow – runoff reduction practices will yield the equivalent wooded condition for these areas.</p> <p>All remaining disturbed area shall achieve the equivalent of 0% effective imperviousness.</p> <p>The remaining discharge, if any, shall not exceed the 24-hour detention of the 1yr, 24 hr storm and an offsite offset is required for the portion of the storm not meeting the minimum requirements.</p> <p>Additional water quality treatment BMPs shall be required if runoff reduced is not sufficient to meet the TMDL.</p> <p>Ordinance Findings: No</p> <p>The Conservation District's Sediment and Stormwater checklist SM 11 requires wet ponds to be designed to release the quality of stormwater runoff over a 24 hour period.</p>

			Practices that have a permanent pool are to be designed to release the first inch of runoff from the site over a 24 hour period. SM 12 requires infiltration practices to accept, at least, the first inch of runoff from all streets, roadways, and parking lots.
<ul style="list-style-type: none"> <li>• DNREC Conveyance Criteria for Channel Protection</li> </ul>	●	√	<p>Conveyance Volume is the 10 yr, 24 hr rainfall event (or the volume of runoff produced by the post-development storm having a 10% chance of occurring)- less any volume reduction achieved through meeting the Resource Protection Criteria.</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Yes (it appears that the Conservation District standard below could meet this requirement.)</p> <p>The Conservation District's Sediment and Stormwater checklist SM 10 states that the pos-development peak rates of discharge for the 2- and 10-year storm events shall not exceed the predevelopment peak rates of discharge for the 2- and 10- year storm events.</p>
<ul style="list-style-type: none"> <li>• DNREC Flood Event Criteria</li> </ul>	●	√	<p>Volume of runoff produced by 100 yr, 24 hr rainfall event (or post-development storm having a 1% probability of occurrence).</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Not addressed in ordinances and standards reviewed.</p>

<ul style="list-style-type: none"> <li>• Alternative Criteria</li> </ul>	<p>●</p>	<p>√</p>	<p>Land development that discharges to state waters included in a Designated Watershed or other watershed management plan approved in accordance with DNREC stormwater regulations shall meet alternative criteria in the approved plan.</p> <p>Ordinance Findings: Not addressed in ordinances and standards reviewed.</p>
<ul style="list-style-type: none"> <li>• Redevelopment Criteria</li> </ul>	<p>●</p>	<p>√</p>	<p>Recognizing the importance of redevelopment over greenfield development, redevelopment areas are required to only achieve a 50% reduction in effective impervious area based on existing conditions. Only the <u>increases</u> in the rate, volume, and duration of flow for the channel volume and flooding volume will need to comply with the DNREC stormwater regulations.</p> <p>A brownfield development remediation plan may meet the stormwater goals and intent of the DNREC stormwater regulations if approved by DNREC.</p> <p>Ordinance Findings: No</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	<p>●</p>	<p>√</p>	<p>Agricultural land having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meets DOA requirements.</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes.</p> <p>Conservation District Checklist</p>
<p><b>Inspections</b></p>			
<ul style="list-style-type: none"> <li>• Are inspections required during construction and routinely after construction?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes</p> <p>Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to</li> </ul>	<p>●</p>	<p>√</p>	<p>Note: DNREC requires a Certified Construction</p>

be trained and certified?			Reviewer Ordinance Findings: Yes Conservation District Checklist
<b>Maintenance</b>			
• Are maintenance agreements required?	●	✓	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	●	✓	Ordinance Findings: No
<b>Off-Site Mitigation</b>			
• Is offsite mitigation required when on-site management does not meet the performance criteria (unless there is proof of no adverse impact)?	●		Ordinance Findings: Not addressed in ordinances and standards reviewed.
• Is the DE Nutrient Protocol program required to calculate offsets?	◐		Ordinance Findings: Not addressed in ordinances and standards reviewed.
• Is offsite mitigation for forested area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	◐		Ordinance Findings: Not addressed in ordinances and standards reviewed.
• Is offsite mitigation for riparian area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	◐		Ordinance Findings: Not addressed in ordinances and standards reviewed.
• Is offsite mitigation for BMP retrofit allowed in the same named watershed?	◐		Ordinance Findings: Not addressed in ordinances and standards reviewed.
• Is nutrient banking or the equivalent land banking allowed in the same named watershed? Is redevelopment encouraged in lieu of greenfield development?	○		Ordinance Findings: Not addressed in ordinances and standards reviewed.
<b>Local Stormwater Utility Ordinance</b>			
• Does an ordinance exist to support the development of a local stormwater utility?	◐		Ordinance Findings: Yes Don't have a copy, but personal communication with SCD staff indicates that Seaford has a stormwater utility.

## GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS

Objective: Meet DNREC stormwater regulations

Objective: Minimize erosion and sedimentation and delivery of nonpoint source pollutants during construction activities.

Objective: Inspect BMPs ensure proper construction and design.

Objective: Maintain BMPs.

GOAL #6 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Sedimentation and Erosion Control provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• DNREC Turbidity Stormwater Management</li> </ul>	●	√	Best Available Technology shall be employed to manage turbid waters in accordance with state regulations. Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC requirement of Sediment and Stormwater Management Plans</li> </ul>	●	√	Ordinance Findings: Yes Conservation District Checklist
<ul style="list-style-type: none"> <li>• DNREC Land Disturbance Criteria</li> </ul>	●	√	Use of standard details for DE Erosion and Sedimentation Control Handbook-limited to sites where no more than 10 acres draining to a common discharge point will be disturbed at any one time. Ordinance Findings: No Construction site BMPs intended to manage areas greater than 10 acres shall have supporting design computations. Ordinance Findings: No In no case shall an area of disturbance draining to a common point exceed 20 acres. Grading within that drainage area shall not proceed unless temporary or permanent stabilization has been accomplished. All plans shall include a limit of disturbance line. Ordinance Findings: Yes Conservation District Checklist

<ul style="list-style-type: none"> <li>• DNREC Site Stabilization Criteria</li> </ul>	<p>●</p>	<p>√</p>	<p>Following soil disturbance or redisturbance, permanent or temporary stabilization shall be completed for all perimeter sediment controls, topsoil stockpiles, or other graded/disturbed areas within 14 calendar days unless a more restrictive federal requirement applies.</p> <p>Ordinance Findings: Yes (Conservation District)</p> <p>Documentation of soil testing and materials used for stabilization shall be provided for verification.</p> <p>Ordinance Findings: Not addressed</p> <p>Release of financial guarantee and or issuance of Notice of Completion shall not occur until final stabilization of all exposed areas is achieved.</p> <p>Ordinance Findings: Yes (Conservation District)</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	<p>●</p>	<p>√</p>	<p>Agricultural having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meet DOA requirements</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<p><b>Inspections</b></p>			
<ul style="list-style-type: none"> <li>• Are weekly inspections required during construction?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>

<b>Maintenance</b>			
• Are maintenance agreements required?	●	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	●	√	Ordinance Findings: No

**GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

**Note: Onsite Wastewater Treatment and Disposal provisions are still in draft form and may not be subject to this ordinance review.**

GOAL #7 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards</b>			
Where do local governments allow/encourage/ban standard systems versus community systems and how does that impact growth patterns			This question will likely not apply to towns with sewer. Most likely a county issue. Only about 5-7 septic systems currently in Seaford. The rest of the town is sewerred.



## TETRA TECH

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### MEMORANDUM

**To:** Shane Abbott (Sussex County)

**From:** Eugenia Hart and Kimberly Brewer

**Cc:** Jennifer Walls (DNREC); Bryan Hall (DNREC); Jennifer Volk (DNREC)

**Date:** January 24, 2012

**Subject:** Review of Sussex County's Local Land Use Ordinances to Identify Barriers to Implementing the Chesapeake Bay Watershed Implementation Plan

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## 1 Introduction

Delaware has developed a Watershed Implementation Plan (WIP) to accompany the Chesapeake Bay nutrient and sediment total maximum daily loads (TMDLs). The WIP lays out plans for addressing existing pollutant load to the Bay as well as new pollutant loads from future land use changes. Delaware's Department of Natural Resources and Environmental Control (DNREC) has tasked Tetra Tech with assisting local Delaware municipalities in the Chesapeake Bay watershed to conduct a review of existing local municipal ordinances with regulations pertaining to new development.

The goal of the ordinance review is to provide a service to local governments in Delaware by reviewing existing land use ordinances to look for barriers to implementing the Chesapeake Bay WIP as well as identify potential opportunities for improving communities and allowing more techniques to be used to help property owners address nutrient and sediment loads from new developments. These include techniques such as green infrastructure, low impact development, conservation design, and performance standards that can allow flexibility. There are often unintended barriers to these techniques in local ordinances.

This memorandum presents the results of Tetra Tech's review of these local ordinances for Sussex County, DE. Note that recommendations for consideration of code revisions are not mandatory. They are intended only to provide more flexibility and effectiveness in meeting resource protection goals and regulations.

## 2 Approach

In August 2011 Tetra Tech contacted Sussex County to obtain the most recent versions of the following types of ordinances, if available:

- Subdivision ordinance
- Zoning ordinance

- Sedimentation and erosion control ordinance or regulations
- Onsite wastewater ordinance or regulations

County staff provided their subdivision and zoning ordinances for review. Sussex County follows the Sussex County Conservation District's (SCD) stormwater, sedimentation, and erosion control program. Note that SCD does not have their own stormwater, sedimentation, and erosion control standards, but adheres to Delaware's State Sediment and Stormwater Regulations (see section 3.1 below).

Once the ordinances were obtained, they were reviewed based on the Ordinance Review Checklist developed by Tetra Tech (Appendix A). The checklist contains items related to the following seven goals:

1. Minimize Effective or Connected Impervious Area
2. Preserve and Enhance the Hydrologic Function of Unpaved Areas
3. Harvest Rainwater
4. Allow and Encourage Multi-Use Stormwater Controls
5. Manage Stormwater to Meet WIP and DNREC Regulations
6. Manage Construction Site Stormwater to Meet WIP and DNREC Regulations
7. Manage On-Site Wastewater Systems to Meet WIP and DNREC Regulations

The Sussex County staff reviewed the draft memo, and recommended revisions and corrections as needed.

Barriers to each of the items on the Checklist are summarized below in Section 3 along with potential solutions to overcome these barriers.

### **3 Summary of Barriers and Potential Solutions for Implementation**

This section of the memo provides a summary of the barriers identified for each of the seven goals indicated on the Ordinance Review Checklist (Appendix A). Following the summary of each barrier, potential solutions are provided.

#### **3.1 GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

##### **Mitigation of Runoff from Effective Impervious Area**

DNREC's final draft stormwater regulations (DNREC 2011) require that local regulations and standards mitigate stormwater runoff such that there is no direct contribution of stormwater runoff from a development. Sussex County currently follows the Sussex Conservation District's Sediment Control and Stormwater Management Program. SCD follows the State of Delaware's Sediment and Stormwater Regulations as a delegated agency. It is suggested that Sussex County reference State of Delaware Sediment and Stormwater Regulations in its subdivision ordinance.

##### **Flexibility in Locating BMP Techniques On-site**

The location of low impact development (LID) best management practices (BMPs) in street and parking areas (e.g., parking medians, grass strips between sidewalk and curb, swales, etc.) is for the most part not explicitly prohibited or allowed in the ordinance. Lack of certainty about approval of these techniques can pose a barrier to implementation. It appears that height and setback limitations for landscaping at intersections would directly prohibit the use of LID techniques such as curb bumpouts/extensions with bioretention or bioswales.

### **Minimum Parking Requirements**

Current zoning establishes a high minimum parking space requirement and requires overly large parking stalls and drive aisles. Together these minimum parking requirements can unnecessarily increase the overall imperviousness of the development site. Some communities allow a smaller number of parking spaces per square feet of floor area in the development, as well as allow smaller stalls and aisles (e.g., stall width of 9 feet, minimum stall length to 15 feet, and minimum drive aisle width of 22 feet). These standards minimize paved area, provide adequate parking space, and reduce development costs.

### **Incentives for Infill Development and Redevelopment of Existing Areas over “Greenfield” Development**

DNREC’s draft sediment and stormwater regulations require that local regulations and standards impose less stringent runoff reduction requirements for proposed development in existing developed areas, thus providing incentives to develop in these areas rather than undeveloped or “greenfield” areas. Local zoning and subdivision requirements will need to be amended accordingly. In the existing zoning ordinance, higher density is allowed for cluster development where central sewer is provided (compared to developments that are not tied to central sewer). When public water and sewer lines are extended to serve a development, often there is excess capacity on these lines that can service additional development and indeed there is an economy of scale realized by tying in additional homes. Therefore, the existing zoning ordinance cluster development policy regarding wastewater treatment could be an unintended incentive for development in greenfield and environmentally sensitive areas.

## **3.2 GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

### **Encouraging or Requiring Stream Buffers**

The Phase I WIP calls for local regulations and standards that encourage or require buffers of 60 feet for secondary waterbodies and 100 feet for primary waterbodies for new development proposals. These buffers can be reduced if combined with other pollution reduction actions. The County’s current zoning and subdivision ordinances do not require riparian buffers of these widths. However, the zoning code does require a 50 ft buffer for wetlands and tidal and perennial nontidal waters. Local zoning and subdivision requirements would need to be amended if the County desires more protection of waterbodies.

## **3.3 GOAL #3: HARVEST RAINWATER**

### **Explicitly Allowing or Encouraging Rainwater Harvest**

Rainwater harvesting is not explicitly prohibited or allowed in the ordinances. However, lack of certainty about approval of these techniques can pose a barrier to implementation.

## **3.4 GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

### **Flexibility in Locating LID Techniques in Designated Landscape and Open Space Areas**

It appears that LID techniques such as constructed wetlands, bioretention, bioswales, etc. are not expressly allowed or prohibited in required landscape areas. Where these BMPs can be designed to support landscape and open space functions, flexibility should be provided in locating these BMPs where they can be most effective in managing water quality, drainage, and flooding impacts.

### **Credit for LID Techniques that Provide Landscape and Natural Open Space Functions**

While LID BMPs are given credit by the County as part of the required open space area, they are not credited for required landscaping area. Explicitly providing such credit would provide an incentive for developers to use LID techniques.

### **Landscape Requirements**

Tree planting requirements such as the types, sizing, and spacing of required trees in the forested and landscape buffer strips could pose barriers to use of LID BMPs in these buffer strips. Explicit exemptions should be made for bioretention, bioswale, and similar properly designed LID techniques.

## **3.5 GOAL #5: MANAGE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

### **Meeting New DNREC Stormwater Regulations**

DNREC's final draft sediment and stormwater regulations require new minimum water quality, channel protection, and conveyance and flood control requirements for new development and redevelopment. As stated earlier, it is suggested that Sussex County reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance.

### **Off-site Mitigation**

There are no provisions in the ordinance for off-site mitigation when on-site management does not meet the performance criteria. DNREC is in the final phases of developing an offset tool called the *Nutrient and Sediment Loading Assessment Protocol*. The tool allows developers to determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. This is a useful tool in determining whether or not a proposed development meets the TMDL or will need additional on-site management or off-site mitigation. Sussex County may want to consider requiring developers to use this tool during the planning process before presenting the site plan to the planning and zoning commission for review.

## **3.6 GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WIP AND DNREC REGULATIONS**

### **Meeting New DNREC Sediment and Erosion Control Regulations**

DNREC's final draft sediment and stormwater regulations require construction site stormwater management controls to be put in place for all construction activities exceeding 5,000 square feet of disturbance. As stated earlier, it is suggested that Sussex County reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance.

## **3.7 GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WIP AND DNREC REGULATIONS**

Sussex County's subdivision ordinance requires that where public water and sewage is not available or not to be provided, all residential lots shall comply with minimum lot dimensions established by DNREC after appropriate water percolation tests and soil evaluations have been performed.

### **Development in Greenfield and Environmentally Sensitive Areas**

In the existing zoning ordinance, higher density is allowed for cluster development where central sewer is provided (compared to developments that are not tied to central sewer). When public water and sewer

lines are extended to serve a development, often there is excess capacity on these lines that can service additional development and indeed there is an economy of scale realized by tying in additional homes. Therefore, the existing zoning ordinance cluster development policy regarding wastewater treatment could be an unintended incentive for development in greenfield and environmentally sensitive areas.

## 4 Accounting and Tracking of BMP Implementation

Sussex County does not currently track BMP installation; however, it is possible that Public Works may have this type of information. It is suggested that DNREC provide Sussex County with a list of BMPs approved for use in the Chesapeake Bay watershed TMDL model and have the County notify DNREC if any of these types of BMPs are installed in the County so they can be appropriately credited in the Bay model.

## 5 Conclusions

Review of Sussex County's subdivision and zoning ordinances result in several key findings. The first finding is that Sussex County's zoning and subdivision ordinances have a number of strong features including, but not limited to:

- Narrow pavement width and travel lanes on Type I and Type II Residential Streets
- Requirement of all subdivisions and land development to minimize impacts to sensitive areas including floodplains and wetlands; minimize tree, vegetation, and soil removal; and preserve natural features
- Encouragement of open space design and allowance of clustering of homes
- The Comprehensive Plan encourages green design, including grass swales and landscaped cul-de-sac islands
- Cluster developments are required to have stormwater management that promotes groundwater recharge
- Open space areas can include stormwater management facilities

There are some direct barriers to the use of LID techniques, such as such as specifications and allowances for required screening, landscape and open space areas. To allow or encourage the use of LID techniques, the County would need to explicitly exempt these techniques or allow them as-of-right in these areas. In other cases, there are barriers of omission: by not expressly allowing the LID technique or providing for exemptions, the ordinances generate uncertainty regarding approval and thus unintentionally provide disincentives for some LID practices.

The County does not have an ordinance that directly addresses sediment and stormwater management. Rather, Sussex County follows the Sussex Conservation District's Sediment Control and Stormwater Management Program. Considering the new federal stormwater regulations due out in late 2011 and new state stormwater regulations due in 2012, it is suggested that Sussex County reference the State of Delaware Sediment and Stormwater Regulations in the subdivision ordinance, and the agency implementing the regulations (DNREC or its Delegated Agency).

Reducing impervious area in new developments can be an important part of stormwater management. Sussex County might also want to consider allowing a smaller number of parking spaces as well as smaller parking stalls and aisles in new multi-family and commercial developments.

Finally, Sussex County might want to consider adopting DNREC's *Nutrient and Sediment Loading Assessment Protocol* as part of their subdivision ordinance. The tool can help developers determine whether or not a proposed development plan meets the TMDL requirements for a particular watershed. The tool can help to quantify the number and types of BMPs necessary on a new development site to meet the TMDL requirements.

## References

Center for Watershed Protection (CWP). 1998. *Better Site Design: A Handbook for Changing Development Rules in Your Community*.

DNREC (Department of Natural Resources and Environmental Control). 2011. *Final Draft Sediment and Stormwater Regulations*. June 2011.

Delaware Department of Transportation (DelDOT). 2010. *Standards and Regulations for Subdivision Streets and State Highway Access*. Dover, DE.

Delaware State Fire Marshall. 2009. *Delaware State Fire Prevention Regulations*

Sussex Conservation District. 2011. *Sediment and Stormwater Management Checklist*  
<http://sussexconservation.org/> Accessed August 2011.

Sussex County Housing Standards Ordinance

Sussex County Lot Maintenance Ordinance

Sussex County Private Road Standard Details

Sussex County Sediment Control and Stormwater Management Ordinance

Sussex County Subdivision of Land Ordinance

Sussex County Zoning Ordinance

## Appendices

Appendix A. Ordinance Review Checklist

## Appendix A. Ordinance Review Checklist

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# Local Development Ordinance Tools/Techniques for Implementing Delaware's Chesapeake Bay Watershed Implementation Plan & DNREC Final Draft Sediment and Stormwater Regulations

## Sussex County Ordinance Review Checklist

### Sussex County Ordinances Reviewed

Sussex Conservation District Sediment and Stormwater Management Checklist

*[Note: The Ordinance Checklist that follows is based on Delaware's Phase I Chesapeake Bay Watershed Implementation Plan (November 2010); Final Draft Sediment and Stormwater Regulations (DNREC, June 2011); Protecting Water Quality with Smart Growth Strategies and Natural Stormwater Management in Sussex County (January, 2009); Better Site Design: A Handbook for Changing Development Rules in Your Community (CWP, 1998); Low-Impact Development Design Strategies, An Integrated Approach (USEPA, 2000); and Tetra Tech's review of numerous local ordinances to identify opportunities and barriers to green infrastructure and low impact development techniques.]*

**Degree of Importance Key to Symbols:**

- Essential
- ◐ Very important
- Important

**GOAL #1: MINIMIZE EFFECTIVE OR CONNECTED IMPERVIOUS AREA**

- Objective: Minimize impervious area associated with streets.
- Objective: Minimize impervious area associated with parking.
- Objective: Minimize impervious area associated with driveways and sidewalks.
- Objective: Clustering development.
- Objective: Incorporate sustainable hydrology practices into urban redevelopment.

GOAL #1 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Overall Effective Impervious Area</b>			
<ul style="list-style-type: none"> <li>● Is impervious area required to be controlled such that there is no direct contribution of stormwater runoff (i.e., the equivalent of 0% effective impervious area)?</li> </ul>	●	√	<p>Note: DNREC's Final Draft stormwater regulations require that after runoff reduction practices have been implemented on disturbed area, the site's impervious area shall not directly contribute stormwater runoff during a rain event that has an 99% annual probability of occurring. See Goal # 5 performance criteria.</p> <p>Ordinance Findings: No</p>
<b>Streets</b> (Note: Also check Fire Marshal's Code to see how it impacts the following goals)			
<ul style="list-style-type: none"> <li>● For residential development, are the street pavement widths allowed to be between 18 to 22 feet, with curb pullouts for passing of large vehicles?</li> </ul>	●		<p>Ordinance Findings: Yes, partially</p> <p>Private Road Standard Details allow 20 to 22 ft pavement width on Type I and Type II Residential Streets (private). According to staff, most developers use the County standards (for private roads) rather than the DelDOT standards for public roads.</p> <p>Chapter 99 Subdivision of Land, Article VII, § 99-34 Residential Planned Community Districts are not allowed to narrow street</p>

			<p>requirements on these or other types of private streets. It appears that Cluster Developments are also required to meet standard County and/or State street width requirements.</p> <p>Also see DelDOT standards.</p>
<ul style="list-style-type: none"> <li>• Are travel lanes allowed to be from 12 to 10 feet (or less), with curb pullouts for passing of large vehicles?</li> </ul>	●		<p>Ordinance Findings: Yes, partially. Type I streets are allowed to have 10 ft travel lanes and Type II is allowed to have 11 ft travel lanes.</p> <p>Chapter 99 Subdivision of Land, Article VII, § 99-34 Residential Planned Community Districts are not allowed to narrow street requirements on these or other types of private streets. It appears that Cluster Developments are also required to meet standard County and/or State street width requirements.</p> <p>Also see DelDOT requirements.</p>
<ul style="list-style-type: none"> <li>• Are curb bumpouts/extensions allowed near intersections and mid-block for traffic-calming and bioretention opportunities?</li> </ul>	◐		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>
<ul style="list-style-type: none"> <li>• Is pervious paving allowed for on-street parking and alleyways?</li> </ul>	○		<p>Ordinance Findings: Not expressly allowed or prohibited.</p> <p>However, Chapter 99, Subdivision of Land, Article III, § 99-18(C) (4) requires developments with an average lot area of fewer than 2 acres to have a bituminous pavement or concrete; crushed, compacted stone is expressly allowed for less dense developments.</p> <p>DelDOT: No. 5.6.1: All</p>

			subdivision streets and entrances shall be paved with a hot-mix asphalt or Portland cement concrete surface.
<ul style="list-style-type: none"> <li>• Are grass swales or bioretention swales allowed instead of curb and gutter or with curb cuts (where slopes allow)?</li> </ul>	●		<p>Ordinance Findings: Not expressly allowed or prohibited.</p> <p>However, Chapter 115, Zoning, Article IV, § 115-25 (E)(3)(a)[5] All Cluster Subdivision Developments filed after 1-1-09 must use natural drainage flows, and allow green technology to the greatest extent possible.</p> <p>The Comprehensive Plan encourages green design, including grass swales.</p>
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, is the radius required to be 35 feet or less?</li> </ul>	○		<p>Ordinance Findings: No</p> <p>County Private Road Standards require a larger radius except for single access streets serving no more than 300 ADTs</p> <p>2009 Fire Code: No.</p> <p>Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in length.</p>
<ul style="list-style-type: none"> <li>• If there are cul-de-sacs, are landscaped islands or bioretention islands allowed or encouraged?</li> </ul>	○		<p>Ordinance Findings: Not expressly allowed or prohibited.</p> <p>The Comprehensive Plan encourages green design, including landscaped islands.</p> <p>2009 Fire Code: No.</p> <p>Requires minimum paved radius of 38 ft. on dead end roads &gt;300 ft in length.</p>
<ul style="list-style-type: none"> <li>• Are site designs required to promote the most efficient street layout to reduce overall street length?</li> </ul>	○		<p>Ordinance Findings: No</p>

**Parking**

<ul style="list-style-type: none"> <li>• Is the minimum stall width for a standard parking space 9 ft. or less?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: No Chapter 115 Zoning Article XXII § 115-166 (1) &amp; (2) Requires parking spaces to have area of not less than 162 sq.ft. (except the limited compact spaces that may have a width of 8 ft.)</p>
<ul style="list-style-type: none"> <li>• Are parking stall lengths allowed to be 15 ft.?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: No Chapter 115 Zoning Article XXII § 115-166 (1) &amp; (2) Requires parking spaces to have area of not less than 162 sq.ft.</p>
<ul style="list-style-type: none"> <li>• Are parking lot drive aisles allowed to be 22 ft.?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: No Chapter 115 Zoning Article XXII § 115-166 (2) (D) Drive aisles shall be a minimum of 24 ft</p>
<ul style="list-style-type: none"> <li>• Are bioretention cells allowed in parking medians?</li> </ul>	<input checked="" type="radio"/>		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>
<ul style="list-style-type: none"> <li>• Are consolidated travel lanes and on-street parking allowed to create space for bioretention?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: Not expressly allowed or prohibited.</p>
<ul style="list-style-type: none"> <li>• Are pervious surfaces such as paver stones, porous pavement, or grass pavers allowed for on-street parking?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: Not in Private Road Standards Pavement Design Data specifies Type C hot mix surface course  DelDOT: No. 5.6.1: All subdivision streets and entrances shall be paved with a hot-mix asphalt or Portland cement concrete surface.</p>
<ul style="list-style-type: none"> <li>• For office buildings, is the required parking ratio 3.0 spaces per 1,000 sq.ft. of gross floor area or less?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: No Zoning Ordinance Article XXII § 115-162 1 space per 200 sq.ft.</p>
<ul style="list-style-type: none"> <li>• For commercial centers, is the required parking ratio 2 to 4.5 spaces per 1,000 sq.ft. of gross floor area or less?</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: No Zoning Ordinance Article XXII § 115-162 1 space per 200 sq.ft.</p>
<ul style="list-style-type: none"> <li>• Are proposed developments allowed to take advantage of</li> </ul>	<input type="radio"/>		<p>Ordinance Findings: Yes Zoning Ordinance Article XXII</p>

opportunities for shared parking?			§ 115-165
• Are proposed developments allowed to have parking stalls under the second floor podium?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
<b>Driveways/Sidewalks</b>			
• Are driveway standards 9 feet or less in width?	<input checked="" type="radio"/>		Ordinance Findings: Not allowed in Private Roads Standards (10 ft. driveway specified)
• Are shared driveways allowed?	<input type="radio"/>		Ordinance Findings: Not expressly allowed or prohibited.
• If sidewalks are required, are they required to be designed to the narrowest allowable width (e.g, 4 ft.)?	<input type="radio"/>		Ordinance Findings: No Private Road Standard Details: 5 feet  No, minimum width of 5 ft required (5.1.5.1)
• Are sidewalks allowed to be on one side of the street only?	<input type="radio"/>		Ordinance Findings: Only in Cluster Developments
<b>Clustering Development</b>			
• Is redevelopment encouraged in lieu of greenfield development through site performance standards?	<input checked="" type="radio"/>	✓	Note: DNREC's Final Draft stormwater regulations recognize the benefit of redevelopment, and have less stringent performance standards for proposed development in existing developed areas. See Goal # 5 performance criteria. Ordinance Findings: No However, the Comprehensive Plan notes that the County hopes to adopt incentives to direct future growth to Town Centers, such as increased density and building height allowances.
• Is Conservation or Open Space Design an option?	<input checked="" type="radio"/>		Ordinance Findings: Yes Zoning Ordinance Article IV Agricultural Residential Districts, § 115-25 Specifies a cluster development option for lots using on-site septic system. Note that lots on central sewer are allowed to be

			<p>significantly smaller, thus providing an incentive to extension of central sewer. (Question there doesn't seem to be a similar incentive for private community systems. Is this true?)</p> <p>All cluster developments proposed in this District after 1-1-09 must follow a conservation or open space design process.</p> <p><b>Article XVI Residential Planned Community District</b> Although not explicitly stated, it appears that cluster development is allowed in this District through flexibility on lots sizes, minimum yard requirements, etc.</p> <p><b>Article XXV Supplementary Regulations, § 115-194.3 ES-1 Environmentally Sensitive Development District</b> Cluster development is also allowed in residential zoning districts. Significantly smaller lots are allowed in Districts using central water and sewer (7,500 sq. ft. v 1/2 acre). (Question there doesn't seem to be a similar incentive for private community systems. Is this true?) Note that Environmentally Sensitive Development District shall include all lands designated as "Environmentally Sensitive Developing Area" in the Comprehensive Plan. For these areas, all rezoning, subdivision, business, or industrial site plans and conditional use applications involving a planned community application, development with more than 50 units, development with 75,000 sq.ft. ore more of floor area for commercial or industrial uses, and activity that requires a</p>
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			<p>permit in the Coastal Zone must follow the Environmentally Sensitive Area process and standards.</p>
<ul style="list-style-type: none"> <li>To encourage clustering and open space design, are setbacks minimized (e.g., for residential lots that are 1/2-acre or less in size, is the front set back 20 feet or less, the rear setback 25 feet or less, and the side setback 8 feet or less?)</li> </ul>	●		<p>Ordinance Findings: No, except in the Residential Planned Community District</p>
<ul style="list-style-type: none"> <li>Are site designs required to have development focused on areas of lesser slopes and farther from watercourses?</li> </ul>	◐		<p>Ordinance Findings: Partially</p> <p>Chapter 99 Subdivision of Land Article II</p> <p>Approval of subdivision requires consideration of minimal use of floodplains and wetlands, preservation of natural features, minimization of grade changes and prevention of pollution.</p> <p>Chapter 115 Zoning § 115-193 (Note: Not county-wide. Unclear what this buffer requirement applies to.)</p> <p>50 foot buffer zones are required along tidal and non-tidal streams, rivers, and wetlands.</p>
<ul style="list-style-type: none"> <li>Are policies effective in encouraging higher density development to be centered around transportation corridors?</li> </ul>	○		<p>Note that it is important for towns to allow density bonuses for protecting certain features, preserving open space, and limiting sprawl.</p> <p>Ordinance Findings: No</p>

**Goal #1 Issues/Barriers:**

**Mitigation of runoff from effective impervious area.** DNREC's final draft stormwater regulations require that local regulations and standards mitigate stormwater runoff such that there is no direct contribution of stormwater runoff from a development. Conservation District requirements will need to be amended accordingly to meet this requirement.

**Flexibility in locating BMP techniques on-site.** The location of LID BMPs in street and parking areas (e.g. parking medians, grass strips between sidewalk and curb, , swales, etc.) is for the most part not explicitly prohibited or allowed in the ordinance. Lack of certainty about approval of these techniques can pose a barrier to implementation. It appears that height and setback limitations for landscaping at intersections would directly prohibit the use of curb bumpouts/extensions with bioretention or bioswales.

**Minimum Parking Requirements.** Current zoning establishes a high minimum parking space requirement and requires overly large parking stalls and drive aisles. Together these minimum parking requirements can unnecessarily increase the overall imperviousness of the development site. Some communities allow a smaller number of parking spaces per square feet of floor area in the development, as well as allow smaller stalls and aisles (e.g. stall width of 9 feet, minimum stall length to 15 feet, and minimum drive aisle width of 22 feet). These standards minimize paved area, provide adequate parking space, and reduce development costs.

**Incentives for infill development and redevelopment of existing areas over "greenfield" development.** DNREC's final draft stormwater regulations require that local regulations and standards impose less stringent runoff control requirements for proposed development in existing developed areas, thus providing incentives to develop in these areas rather than undeveloped or "greenfield" areas. Local zoning, subdivision, and conservation district requirements will need to be amended accordingly. In the existing zoning ordinance, higher density is allowed for cluster development where central sewer is provided (compared to developments that are not tied to central sewer). When public water and sewer lines are extended to serve a development, often there is excess capacity on these lines that can service additional development and indeed there is an economy of scale realized by tying in additional homes. Therefore, the existing zoning ordinance cluster development policy regarding wastewater treatment could be an unintended incentive for development in greenfield and environmentally sensitive areas.

**GOAL #2: PRESERVE AND ENHANCE THE HYDROLOGIC FUNCTION OF UNPAVED AREAS**

- Objective: Minimize building footprint/envelope area.
- Objective: Preserve topsoil structure.
- Objective: Preserve sensitive wetlands.
- Objective: Preserve sensitive soils.
- Objective: Preserve sensitive stream buffers.

GOAL #2 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Topsoil Structure &amp; Building Footprint</b>			
<ul style="list-style-type: none"> <li>• Is disturbance of vegetated areas required to be phased?</li> </ul>	●	√	<p>Note: DNREC’s performance criteria for construction site management include limits on site disturbance. See Goal #6 performance criteria.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Is disturbance of vegetated areas and riparian areas required to be minimized?</li> </ul>	◐		<p>Ordinance Findings: Partially</p> <p>Chapter 99 Subdivision of Land Article II</p> <p>Approval of subdivision requires consideration of minimal use of floodplains and wetlands, minimization of tree, vegetation, and soil removal; preservation of natural features</p> <p>Chapter 115 Zoning Ordinance Article IV Agricultural Residential Districts, § 115-25 Allows cluster development and requires that such development follow an open space design.</p> <p>Article XXV Supplementary Regulations, § 115-194.3 ES-1 Environmentally Sensitive Development District</p> <p>Cluster development is allowed in residential zoning districts; this type of development must use an open space design process.</p>
<ul style="list-style-type: none"> <li>• Are building envelopes required/encouraged to avoid</li> </ul>	◐		<p>Ordinance Findings: Partially</p> <p>See notes above</p>

sensitive environmental areas such as riparian areas, wetlands, high infiltration soils, and steep slopes?			
<b>Wetlands</b>			
• Are site designs required to minimize hydrologic alteration to existing wetlands?	●	√	Note: there are state regulations prohibiting the disturbance of certain wetlands. Ordinance Findings: Yes
<b>Sensitive Soils</b>			
• Are building footprints required/encouraged to avoid highly erodible soils?	◐		Ordinance Findings: No
• Are building footprints required/encouraged to avoid soils with high permeability (e.g., Hydrologic Soil Group A and B)?	◐		Ordinance Findings: No
<b>Stream Buffers</b>			
• Is a 60- to 100-foot stream buffer required/encouraged for new development?	●		Note: The Phase I WIP recommends 100 ft for primary waters and 60 ft for secondary waters; can be reduced if combined with other pollution reduction actions. This buffer recommendation is applicable to those areas where buffers are voluntary (i.e., not the Dept. of Ag's 30 ft buffer or CAFO buffers) Ordinance Findings: No
• Are stream buffers for new development required to remain in a natural state?	◐		Ordinance Findings: No except in Cluster Developments
• Are site designs required to preserve existing runoff pathways to adequately support existing wetlands?	◐		Ordinance Findings: No
• Is a 50-foot wetland buffer required/encouraged?	○		Ordinance Findings: No Except for areas covered by Chapter 115 Zoning § 115-193: requires 50 ft buffer for wetlands and tidal and perennial nontidal waters

**Goal #2 Issues/Barriers:**

**Encouraging or requiring stream buffers.** DNREC's final draft stormwater regulations require that local regulations and standards encourage or require 60- to 100-foot stream buffers for new development proposals. Local zoning, subdivision, and conservation district requirements will need to be amended accordingly.

**GOAL #3: HAVEST RAINWATER**

Objective: Allow rainwater harvesting through plumbing code provisions.

Objective: Allow the use of downspout disconnection/redirection, rain barrels, and above-and below-ground cisterns for rainwater harvesting

GOAL #3 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<ul style="list-style-type: none"> <li>• Can downspouts be disconnected or redirected to discharge into a rain barrel or yard?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Are interior or exterior cisterns allowed?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Can rain barrels be placed within standard zoning setback areas?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Do zoning and building provisions allow cisterns to be placed on rooftops to harvest rainwater?</li> </ul>	◐		Ordinance Findings: Not expressly allowed or prohibited.
<ul style="list-style-type: none"> <li>• Is harvested rainwater allowed to be used for nonpotable interior uses such as toilet flushing?</li> </ul>	○		Ordinance Findings: Not expressly allowed or prohibited.

**Goal #3 Issues/Barriers:**

**Explicitly allowing or encouraging rainwater harvest.** Rainwater harvesting is not explicitly prohibited or allowed in the ordinances. However, lack of certainty about approval of these techniques can pose a barrier to implementation.

**GOAL #4: ALLOW AND ENCOURAGE MULTI-USE STORMWATER CONTROLS**

Objective: Allow and encourage stormwater controls as multiple use in open space areas.

Objective: Allow and encourage stormwater controls as multiple use in landscaped areas.

GOAL #4 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Landscaped Areas</b>			
<ul style="list-style-type: none"> <li>Are bioretention areas allowed to be constructed in the development’s designated landscape areas, if properly designed?</li> </ul>	●		<p>Ordinance Findings: Not expressly allowed or prohibited.</p> <p>Chapter 99 Subdivision of Land § 99-5 definition of forested and/or landscape buffer does not include stormwater management facilities.</p> <p>Chapter 115 Article IV §115-25 For cluster development Requires that stormwater management be designed to promote groundwater recharge; natural drainage flows shall be maintained to the extent possible, drainage from rooftops shall be directed to vegetated areas or allow green technology. Stormwater detention and retention facilities should resemble natural ponds.</p>
<ul style="list-style-type: none"> <li>Are bioretention areas given “credit” as landscape area to count as a percent of the required landscaping?</li> </ul>	●		<p>Ordinance Findings: Not expressly allowed or prohibited.</p> <p>Chapter 99 Subdivision of Land § 99-5 definition of forested and/or landscape buffer does not include stormwater management facilities.</p>
<ul style="list-style-type: none"> <li>Do landscaping requirements allow plantings conducive to bioretention, bioswales, raingardens , and other LID BMPs?</li> </ul>	●		<p>Ordinance Findings: No landscaping requirements identified in the ordinances</p>

<ul style="list-style-type: none"> <li>Do tree planting requirements allow use of raingardens, tree boxes, and other LID BMPs?</li> </ul>			<p>Ordinance Findings: Few tree planting requirements identified in ordinances</p> <p>Chapter 99 Subdivision of Land § 99-5 (A)-(C) Tree Planting requirements for Forested and/or Landscape Buffer Strips</p> <p>The types, sizing, and spacing of required trees could pose a barrier to use of LID BMPs in these buffer strips</p>
<p><b>Open Space Areas</b></p>			
<ul style="list-style-type: none"> <li>Are there open space preservation requirements or incentives?</li> </ul>			<p>Ordinance Findings: Partially</p> <p>Chapter 99 Subdivision of Land Article III § 99-21</p> <p>For residential subdivision, a minimum of 10% -25% of the total site shall be set aside for parks and open space ( 10% for developments with a density of 2-5 dwelling units per acre and 25% or greater for developments with 10 or more dwelling units).</p> <p>Chapter 115 Zoning Article IV § 115-25 Cluster Development for Agricultural Districts requires that open space be set aside. No minimum percentage was identified. Agricultural and park land may be included in the open space requirements</p>
<ul style="list-style-type: none"> <li>Is preserved open space required to be managed in a natural condition?</li> </ul>			<p>Ordinance Findings: Partially.</p> <p>A portion of the open space can be active recreation area and agricultural land.</p>
<ul style="list-style-type: none"> <li>Are structural LID techniques such as constructed wetlands, swales, and bioretention areas allowed to be constructed in a development's designated open space, if properly designed?</li> </ul>			<p>Ordinance Findings: Yes</p> <p>Chapter 99 Subdivision of Land Article I § 99-5 Definition of Open Space includes stormwater management facilities</p> <p>Chapter 115 Article IV § 115-25 For cluster development Requires that stormwater</p>

			management be designed to promote groundwater recharge; natural drainage flows shall be maintained to the extent possible, drainage from rooftops shall be directed to vegetated areas or allow green technology. Stormwater detention and retention facilities should resemble natural ponds.
<ul style="list-style-type: none"> <li>• Are structural LID techniques such as constructed wetlands, swales, and bioretention areas given “credit” as open space to count as a percent of the required open space area, if properly designed?</li> </ul>	●		Ordinance Findings: Yes Chapter 99 Subdivision of Land Article I § 99-5 Definition of Open Space includes stormwater management facilities.
<ul style="list-style-type: none"> <li>• Does protection of sensitive, natural areas and habitat qualify as credit for local open space dedication?</li> </ul>	●		Ordinance Findings: Yes Chapter 99 Subdivision of Land Article I § 99-5 Definition of Open Space includes areas protected by perpetual conservation easements as well as forested areas and buffers.

**Goal #4 Issues/Barriers:**

**Flexibility in locating LID techniques in designated landscape and open space areas.** It appears that LID techniques such as constructed wetlands, bioretention, bioswales, etc. are not expressly allowed or prohibited in required landscape areas. Where these BMPs can be designed to support landscape and open space functions, flexibility is should be provided in locating these BMPs where they can be most effective in managing water quality, drainage, and flooding impacts.

**Credit for LID techniques that provide landscape and natural open space functions.** While LID BMPs are given credit as part of the required open space area, they are not credited for required landscaping area. Explicitly providing such credit would provide an extra incentive for developers to use LID techniques.

**Landscape Requirements.** Tree planting requirements in the forested and landscape buffer strips could pose barriers to use of LID BMPs.

**GOAL #5: MANAGE STORMWATER TO MEET WATERSHED IMPLEMENTATION PLAN & DNREC STORMWATER REGULATIONS**

- Objective: Meet DNREC stormwater regulations
- Objective: Replicate the predevelopment hydrology of the site, to the extent practicable.
- Objective: Maintain water quality functions of the watershed.
- Objective: Minimize channel erosion impacts.
- Objective: Minimize flooding impacts.
- Objective: Inspect BMPs to ensure proper construction and design.
- Objective: Long-term maintenance.

GOAL #5 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Stormwater Ordinance Provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• Is stormwater required to be retained/infiltrated onsite (through bioretention, natural areas, and swale infiltration) where possible?</li> </ul>	●	√	<p>Ordinance Findings: No Except cluster developments</p>
<ul style="list-style-type: none"> <li>• DNREC Resource Protection Criteria</li> </ul>	●	√	<p>Note: For the 1-yr, 24 hour rainfall event, meet the following standards:                      Predevelopment wood/meadow – runoff reduction practices will yield the equivalent wooded condition for these areas.                      All remaining disturbed area shall achieve the equivalent of 0% effective imperviousness.                      The remaining discharge, if any, shall not exceed the 24-hour detention of the 1yr, 24 hr storm and an offsite offset is required for the portion of the storm not meeting the minimum requirements.                      Additional water quality treatment BMPs shall be required if runoff reduced is not sufficient to meet the TMDL.</p> <p>Ordinance Findings: No                      The Conservation District’s Sediment and Stormwater checklist SM 11 requires wet ponds to be designed to release the quality of stormwater runoff over a 24 hour period. Practices that have a permanent pool are to be designed to release the first inch of runoff</p>

			from the site over a 24 hour period. SM 12 requires infiltration practices to accept, at least, the first inch of runoff from all streets, roadways, and parking lots.
<ul style="list-style-type: none"> <li>• DNREC Conveyance Criteria for Channel Protection</li> </ul>	●	√	<p>Note: Conveyance Volume is the 10 yr, 24 hr rainfall event (or the volume of runoff produced by the post-development storm having a 10% chance of occurring)- less any volume reduction achieved through meeting the Resource Protection Criteria.</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Yes (it appears that the Conservation District standard below could meet this requirement.)</p> <p>The Conservation District's Sediment and Stormwater checklist SM 10 states that the pos-development peak rates of discharge for the 2- and 10-year storm events shall not exceed the predevelopment peak rates of discharge for the 2- and 10- year storm events.</p>
<ul style="list-style-type: none"> <li>• DNREC Flood Event Criteria</li> </ul>	●	√	<p>Volume of runoff produced by 100 yr, 24 hr rainfall event (or post-development storm having a 1% probability of occurrence).</p> <p>Use runoff reduction and management measures, or show no adverse impact.</p> <p>Projects qualifying for and meeting standard plan criteria developed by the state will be considered in compliance.</p> <p>Ordinance Findings: Not addressed in ordinances and standards reviewed.</p>
<ul style="list-style-type: none"> <li>• Alternative Criteria</li> </ul>	●	√	Land development that discharges to state waters included in a Designated Watershed or other watershed

			management plan approved in accordance with DNREC stormwater regulations shall meet alternative criteria in the approved plan.
• Redevelopment Criteria	●	√	Recognizing the importance of redevelopment over greenfield development, redevelopment areas are required to only achieve a 50% reduction in effective impervious area based on existing conditions. Only the <u>increases</u> in the rate, volume, and duration of flow for the channel volume and flooding volume will need to comply with the DNREC stormwater regulations. A brownfield development remediation plan may meet the stormwater goals and intent of the DNREC stormwater regulations if approved by DNREC. <b>Ordinance Findings: No</b>
• Exemptions	●	√	Agricultural land having a soil and water conservation plan Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt. Commercial forest harvesting that meets DOA requirements. Permitted land application of biosolids and residuals. <b>Ordinance Findings: Yes</b> <b>Conservation District Program</b>
<b>Inspections</b>			
• Are inspections required during construction and routinely after construction?	●	√	<b>Ordinance Findings: Yes</b> <b>Conservation District Checklist</b>
• Are inspectors required to be trained and certified?	●	√	Note: DNREC requires a Certified Construction Reviewer <b>Ordinance Findings: Yes</b> <b>Conservation District Checklist</b>

<b>Maintenance</b>			
• Are maintenance agreements required?	<input checked="" type="radio"/>	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	<input checked="" type="radio"/>	√	Ordinance Findings: No
<b>Off-Site Mitigation</b>			
• Is offsite mitigation required when on-site management does not meet the performance criteria (unless there is proof of no adverse impact)?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is the DE Nutrient Protocol program required to calculate offsets?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for forested area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for riparian area conservation allowed in the same named watershed? Is the replacement ratio at least 1:1?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is offsite mitigation for BMP retrofit allowed in the same named watershed?	<input checked="" type="radio"/>		Ordinance Findings: No
• Is nutrient banking or the equivalent land banking allowed in the same named watershed? Is redevelopment encouraged in lieu of greenfield development?	<input type="radio"/>		Ordinance Findings: No
<b>Local Stormwater Utility Ordinance</b>			
• Does an ordinance exist to support the development of a local stormwater utility?	<input checked="" type="radio"/>		Ordinance Findings: No

**Goal #5 Issues/Barriers:**

**Meeting New DNREC Stormwater Regulations.** DNREC’s final draft stormwater regulations require new minimum water quality, channel protection, and flood control requirements for new development and redevelopment. Conservation District requirements will need to be amended accordingly.

**GOAL #6: MANAGE CONSTRUCTION SITE STORMWATER TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

Objective: Meet DNREC stormwater regulations

Objective: Minimize erosion and sedimentation and delivery of nonpoint source pollutants during construction activities.

Objective: Inspect BMPs ensure proper construction and design.

Objective: Maintain BMPs.

GOAL #6 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards (note: Sedimentation and Erosion Control provisions will be needed for the following DNREC regulations.)</b>			
<ul style="list-style-type: none"> <li>• DNREC Turbidity Stormwater Management</li> </ul>	●	√	Best Available Technology shall be employed to manage turbid waters in accordance with state regulations. Ordinance Findings: No
<ul style="list-style-type: none"> <li>• DNREC requirement of Sediment and Stormwater Management Plans</li> </ul>	●	√	Ordinance Findings: Yes Conservation District Checklist
<ul style="list-style-type: none"> <li>• DNREC Land Disturbance Criteria</li> </ul>	●	√	Use of standard details for DE Erosion and Sedimentation Control Handbook-limited to sites where no more than 10 acres draining to a common discharge point will be disturbed at any one time. Ordinance Findings: No  Construction site BMPs intended to manage areas greater than 10 acres shall have supporting design computations. Ordinance Findings: No  In no case shall an area of disturbance draining to a common point exceed 20 acres. Grading within that drainage area shall not proceed unless temporary or permanent stabilization has been accomplished. All plans shall include a limit of disturbance line. Ordinance Findings: Yes Conservation District Checklist

<ul style="list-style-type: none"> <li>• DNREC Site Stabilization Criteria</li> </ul>	<p>●</p>	<p>√</p>	<p>Following soil disturbance or redisturbance, permanent or temporary stabilization shall be completed for all perimeter sediment controls, topsoil stockpiles, or other graded/disturbed areas within 14 calendar days unless a more restrictive federal requirement applies.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p> <p>Documentation of soil testing and materials used for stabilization shall be provided for verification.</p> <p>Ordinance Findings: Not addressed</p> <p>Release of financial guarantee and or issuance of Notice of Completion shall not occur until final stabilization of all exposed areas is achieved.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Exemptions</li> </ul>	<p>●</p>	<p>√</p>	<p>Agricultural having a soil and water conservation plan</p> <p>Developments or construction disturbing less than 5,000 sq.ft.. Individual disturbances of less than 5,000 sq.ft. that accumulate to exceed 5,000 sq.ft. are not exempt.</p> <p>Commercial forest harvesting that meet DOA requirements</p> <p>Permitted land application of biosolids and residuals.</p> <p>Ordinance Findings: Yes Conservation District Checklist</p>
<p><b>Inspections</b></p>			
<ul style="list-style-type: none"> <li>• Are weekly inspections required during construction?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>
<ul style="list-style-type: none"> <li>• Are inspectors required to be trained and certified?</li> </ul>	<p>●</p>	<p>√</p>	<p>Ordinance Findings: Yes Conservation District Checklist</p>

<b>Maintenance</b>			
• Are maintenance agreements required?	●	√	Ordinance Findings: Yes Conservation District Checklist
• Is maintenance required to be performed by a certified professional?	●	√	Ordinance Findings: No

**Goal #6 Issues/Barriers:**

**Meeting New DNREC Sediment and Erosion Control Regulations.** DNREC’s final draft sediment and erosion control regulations require new minimum turbidity control, land disturbance, and maintenance requirements for construction activity. Conservation District requirements will need to be amended accordingly.

**GOAL #7: MANAGE ON-SITE WASTEWATER SYSTEMS TO MEET WATERSHED IMPROVEMENT PLAN & DNREC REGULATIONS**

Note: Onsite Wastewater Treatment and Disposal provisions are still in draft form and may not be subject to this ordinance review.

GOAL #7 KEY QUESTIONS	DEGREE OF IMPORTANCE	REQUIRED BY DNREC	COMMENTS
<b>Performance Standards</b>			
<p>Where do local governments allow/encourage/ban standard systems versus community systems and how does that impact growth patterns</p>			<p>Chapter 99 Subdivision of Land Article II § 99-19 Where public water and sewage is not available or not to be provided, all residential lots shall comply with minimum lot dimensions established by DNREC after appropriate water percolation tests and soil evaluations have been performed.</p> <p>Chapter 99 Subdivision of Land Article VI § 99-29(E) Community sewerage disposal plants must meet the requirements of DNREC. If built independently (not connecting to county or municipal system) must meet nationally recognized standards adopted by County engineer.</p> <p>Chapter 115 Zoning Ordinance Article IV Agricultural Residential Districts, § 115-25 Specifies a cluster development option for lots using on-site septic system. Note that lots on central sewer are allowed to be significantly smaller, thus providing an incentive to extension of central sewer. (Question there doesn't seem to be a similar incentive for private community systems. Is this true?)</p> <p>Chapter 115 Article XXV Supplementary Regulations, § 115-194.3 ES-1 Environmentally Sensitive Development District</p>

			<p>Cluster development is also allowed in residential zoning districts. Significantly smaller lots are allowed in Districts using central water and sewer (7,500 sq. ft. v 1/2 acre). (Question there doesn't seem to be a similar incentive for private community systems. Is this true?)</p> <p>Note that Environmentally Sensitive Development District shall include all lands designated as "Environmentally Sensitive Developing Area" in the Comprehensive Plan.</p>
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**Goal #7 Issues/Barriers:**

**Development in Greenfield and Environmentally Sensitive Areas.** In the existing zoning ordinance, higher density is allowed for cluster development where central sewer is provided (compared to developments that are not tied to central sewer). When public water and sewer lines are extended to serve a development, often there is excess capacity on these lines that can service additional development and indeed there is an economy of scale realized by tying in additional homes. Therefore, the existing zoning ordinance cluster development policy regarding wastewater treatment could be an unintended incentive for development in greenfield and environmentally sensitive areas.