



## 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 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 Subdivision Ordinance A7A, § VII (B.16.) 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 Subdivision Ordinance A7A, § VII (B.16.) 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>
<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</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>	●	√	<p>Land development that discharges to state waters included in a Designated Watershed or other watershed</p>

			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