# Stormwater Management, Grading, Erosion and Sediment Control Ordinance Draft Update Effect of MDE Model Ordinance

Prepared by:

St. Mary's County Department of Public Works & Transportation

For:



The St. Mary's County Board of County Commissioners

October 27, 2009

### The Current Ordinance

(Stormwater Management, Grading, Erosion & Sediment Control Ordinance)

Counties in Maryland were required to adopt ordinances necessary to implement a stormwater management program.

On April 16, 2002, the BOCC held a Public Hearing

April 22, 2002 the MDE accepted the County's Ordinance

On May 13, 2002, the current Ordinance was made effective

The new County ordinance was based on the State's model Ordinance and included new provisions for:

Redevelopment, partially developed sites, specific SWM design requirements, drainage easements, over-lot grading, best management practices...

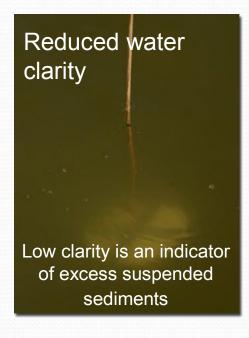
...and a specific grandfathering provision "to provide for the continuance of certain development activities that would otherwise be subject to the requirements of this Ordinance." (July 1, 2001)

#### **Water Quality**

Water quality is a critical measure of the Chesapeake Bay's health. For the Bay to be healthy and productive, the water **must be safe for people and must support aquatic life**, such as fish, crabs and oysters. The water should be fairly clear, have enough oxygen, contain the proper amount of algae and be free from chemical contamination.

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Excess nitrogen, phosphorus and sediment lead to murky water and algae blooms, which block sunlight from reaching underwater bay grasses and create low levels of oxygen for aquatic life.





Excess nutrients and sediment from the land and the air are the major causes of pollution in the Bay and it's tributaries.

### Sources of Pollution

Currently the Bay and its rivers receive too much nitrogen, phosphorus and sediment for the ecosystem to remain healthy.

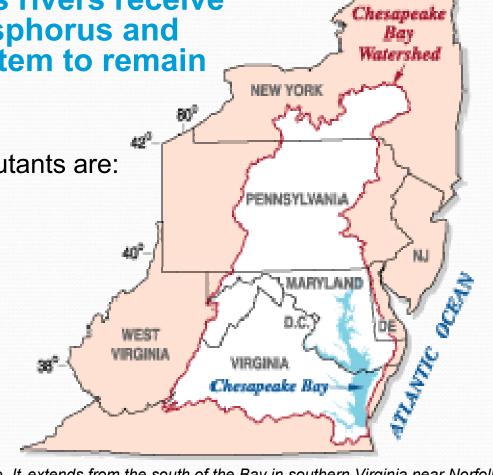
The main sources of these pollutants are:

Agriculture;

Land development;

Wastewater; and

Atmospheric deposition.



<u>NOTE</u>: The Chesapeake Bay watershed is huge. It extends from the south of the Bay in southern Virginia near Norfolk to the headwaters of the Susquehanna River in New York and west to the middle of Pennsylvania. It encompasses 64,000 square miles of land and is the largest watershed on the eastern seaboard of North America.

#### **Agriculture**

Agriculture covers about 25 percent of the watershed, representing the largest intensively managed land use. There are an estimated 87,000 farms covering about 8.5 million acres.

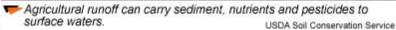
Agriculture is the number one source of nutrient and sediment pollution to the Bay.

While significant efforts and progress have been made, improperly applied fertilizers and pesticides still flow into creeks, streams and rivers, which carry excess nitrogen, phosphorus and chemicals into the Chesapeake Bay. Tilling cropland and irrigating fields can cause major erosion. Additionally, the nutrients and bacteria found in animal manure can seep into groundwater and run off into waterways.











#### Land Development

Human development, ranging from small subdivisions to large cities, is a major source of pollution for the Chesapeake. There are about 17 million people living in the Chesapeake Bay watershed. In fact, because of the region's continued population growth and related construction, runoff from urban and suburban lands is the one source of pollution that is increasing.

These areas are covered by impervious surfaces (such as roads, rooftops and parking lots) that do not let water penetrate. As a result, water runs off into waterways instead of filtering into the ground. This runoff carries pollutants including lawn fertilizer, pet waste, chemicals and trash.

By working together at the federal, state and local levels, the State hopes to halt the growing loads of nutrients, sediment and chemical contaminants coming from developed and developing lands.

# Impacts of development





Stream bank and land erosion are primary sources of sediment in the Bay region





# Impacts of development





Nutrients, sediment and chemical contaminant runoff from developed & developing lands





# Impacts of development





Oil and grease runoff from existing parking lots flow into pipes, streams and rivers



#### Wastewater

There is a tremendous volume of sewage that must be treated in the watershed. Hundreds of wastewater treatment facilities throughout the Bay watershed are being upgraded to reduce the amount of nutrients discharged into the Bay and its rivers.

The pollution reduction technologies used in the past by the 483 major municipal and industrial wastewater treatment plants did not remove enough pollution, particularly nitrogen and phosphorus.

Upgrading these facilities is now underway so they can remove more pollution from the water, but this effort will take time and is very expensive.

#### Air Deposition

When pollution is released into the air, it eventually falls onto land and water. Nitrogen and chemical contaminants (such as mercury and PCBs) from air pollution contribute to poor water quality in the region.



Air pollution is generated by a variety of sources, including power plants, industrial facilities, farming operations and automobiles and other gas-powered vehicles.

About 21-28 percent of nitrogen loading to the Bay comes from non-agricultural atmospheric deposition (ie. vehicles, industries, power plants, dry cleaners, gas-powered lawn tools and other emissions sources), more than from all municipal and industrial wastewater treatment plants.

### Chesapeake 2000 "C2K" Agreement

Signed by the governors of Virginia, Maryland Pennsylvania, and the mayor of the District of Columbia, the Chesapeake Bay Commission, and the EPA — is focused on coordinating and integrating restoration efforts to bring about the bay's recovery.

There are over 100 specific commitments identified in the C2K Agreement. They are impressive and concrete in nature and include the following:

•Increase native oysters 10-fold by 2010.

- •Achieve no-net loss of wetlands, and a net gain by restoring 25,000 acres of tidal and non-tidal wetlands.
  - •Plant riparian buffer strips along 2010 miles of waterways in the Chesapeake Bay watershed by 2010.
- •Work with local governments, community groups and watershed organizations to develop and implement locally supported <u>watershed management plans</u> in two-thirds of the Bay watershed.
  - •Correct all nutrient-related problems in the Chesapeake Bay to remove the Bay from the "impaired waters" list for nutrients.
  - •Reduce the amount of sediment entering the Chesapeake Bay and its tidal rivers sufficiently to remove the Bay from the "impaired waters" list by 2010.

### Chesapeake 2000 "C2K" Agreement

In the year 2000, an ambitious multi-state, multi-jurisdictional agreement was signed, as the states of VA, MD, PA, and the District of Columbia committed themselves to a renewed 10-year effort to restore the health of the Chesapeake Bay.

Most recently, West Virginia also agreed to commit to meeting these goals.

√ As the nation's largest estuary, supporting more than 3,600 species of plants, fish and animals, the Chesapeake Bay has long been one of the most important and productive watersheds in the world.

√ The watershed itself encompasses around 7,000 square miles, and includes parts of six states (Delaware, MD, NY, PA, VA and WVA) and the District of Columbia.

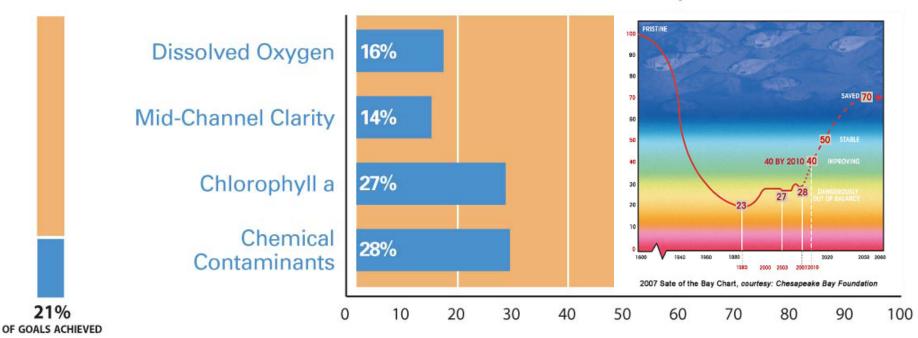
√ More than 15 million people live in its basin, and more than 100,000 streams and rivers drain into the Bay.

Today, the Chesapeake Bay is suffering from the pollution carried into its waters every day, and its future health is by no means assured with growing populations and the urbanization of our landscape. However, with defined and concrete goals with targeted timelines, it is hoped that by the year 2010, Chesapeake Bay will be on the road to recovery.

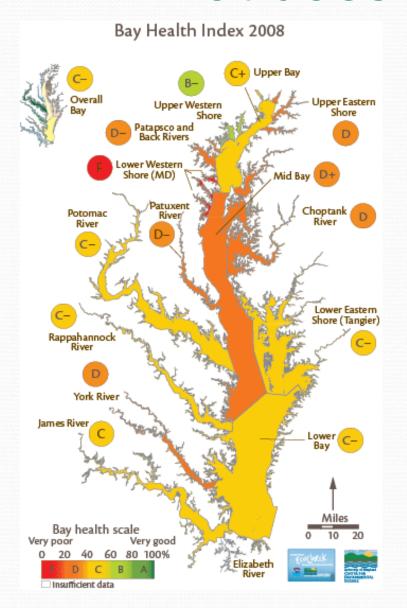
### How are we doing?

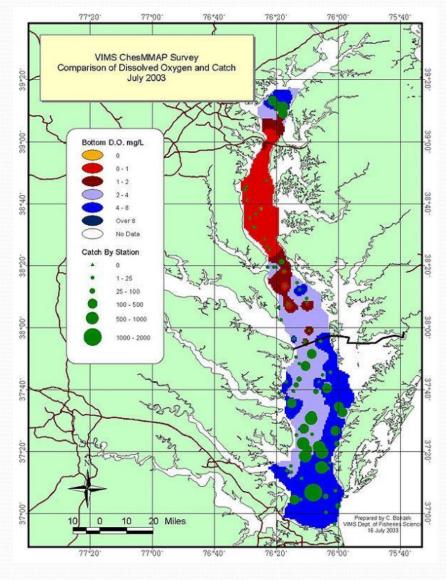
According to the EPA in 2008, water quality was again very poor, meeting only 21 percent of the goals established in the Chesapeake 2000 Agreement. (FACT SHEET: 10-19-2009)





### What does this mean?





### **Bottom Line**

Future conditions of the watershed will be affected by human-population increase and the associated impact on land use, water quality, water availability, and habitat loss and fragmentation.

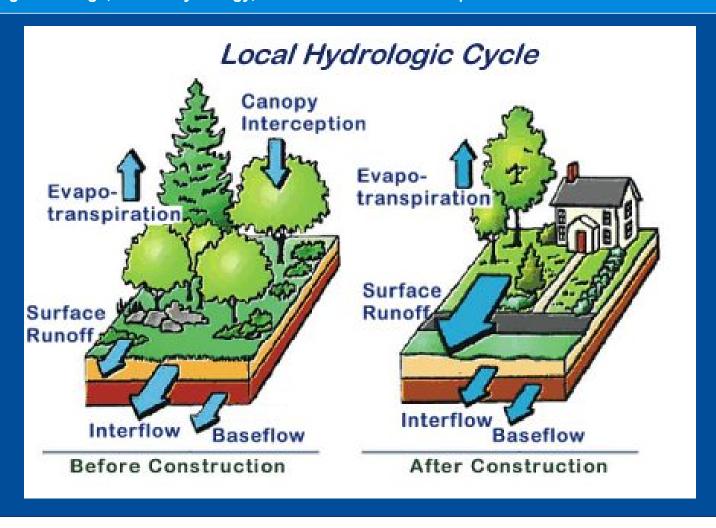
All of these factors will continue to have negative impacts on habitats and biological communities in both the watershed and the estuary.

The degree to which waterquality and ecological conditions improve in the future will likely depend on the degree of implementation and effectiveness of management actions.



#### Requirements of the Stormwater Management Act of 2007

The primary goal of Maryland's stormwater management program is to maintain after development, as nearly as possible, the predevelopment runoff characteristics. Traditional strategies and designs are less able to mimick predevelopment conditions because they focus on managing large volumes of polluted stormwater rather than treating runoff closer to the source. A new strategy, known as Environmental Site Design (aka "ESD") relies on integrating site design, natural hydrology, and smaller controls to capture and treat runoff.



#### **Planning Techniques & Practices**

The "Act" also defines the following planning techniques that SHALL be applied according to the new Design manual to satisfy the requirements of the new Model Ordinance, intended to better:

- Preserve and protect natural resources
- Conserve natural drainage patterns
- Minimize Impervious area
- Reduce runoff volume

- Use green roofs,
   permeable pavement,
   reinforced turf and other
   alternative surfaces
- Limit soil disturbance, mass grading and compaction
- Cluster Development
- Use **ESD** practices to maintain 100 % of the annual predevelopment groundwater recharge volume

# Local Ordinance Update(s)

- To comply with the SWM Act of 2007
- Signed into law by Governor on 4-24-2007
- Became effective on October 1, 2007
- Incorporation of State mandated Model
   Ordinance adopted on May 4, 2009
- Changes to the 2000 Maryland Stormwater
   Management Design Manual are significant

# Local Ordinance Update(s)

- Major changes to how stormwater runoff is managed throughout the State
- The way SWM is conceived, designed, reviewed and built will be different than the procedures used before
- Local adoption by 5-4-2010 is mandated

# Local Ordinance Update(s)

- Require developers, designers, and plan review agencies to consider runoff control from the start of the land development process and to...
- Implement Environmental Site Design (ESD) to The Maximum Extent Practicable (MEP)

#### The "Act" Establishes Performance Standards

### Designers will now be required and must now ensure that the stormwater management plans are designed to better:

- -Prevent soil erosion from development projects;
- -Prevent increases in non-point pollution;
- -Minimize pollutants for new and re-development projects;
- -Restore, enhance and maintain chemical, physical and biological integrity of receiving waters to protect public health and enhance reuse;
- -Maintain 100% of the average annual predevelopment groundwater recharge volume;
- -Capture and treat storm-water runoff to remove pollutants;
- -Implement as channel protection strategy to protect receiving streams;
- -Prevent increases in the frequency and magnitude of out-of-bank flooding from large, less frequent storms; and
- -Protect public safety through the proper design and operation of stormwater management facilities.

#### **MDE** tools for the Toolbox

#### What is ESD (Environmental Site Design)?

Rooftop disconnect

Infiltration berms

Non-Rooftop disconnect

- Dry wells

Sheetflow to conservation areas
 Micro-bioretention

Rainwater harvesting - cisternsRain gardens

- Submerged gravel wetlands

- Swales

Landscape infiltration

Enhanced filters

- Alternative surfaces (green roofs, porous pavement, pavers, reinforced turf, etc.)

..and any practices approved by the MDE Water Management Administration

# Rainwater Harvesting



### Cisterns are not "new"

- Cisterns are one of several old water collection technologies. They have been historically used used for irrigation, water for cleaning, laundry, toilet flushing, bathing and even for supplemental drinking water.
- Extensive use of cisterns has been historically documented for along time.

12,500 gallon cisterns in the Isle of Crete (1700 B.C.)
2M gallon network of cisterns in ancient Masada (100 B.C.)

During the Byzantine empire, in Istanbul where a 20M gallon cistern was built, in Venice where cisterns integrated with sand filters, in ancient Rome where roofs were pitched and drained (by pipes) to cisterns, and by the first North American settlers

# What did they look like?



**Ancient Rome** 



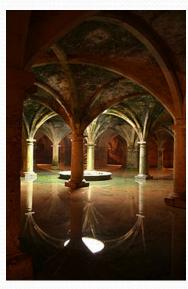
North Africa



Ancient Istanbul



**Ancient Egypt** 



**Ancient Morocco** 



**Ancient Carthage** 

### Rain Gardens

Are similar to our natural ecosystem. Originating guidelines were developed in P.G. County during 1993. Rain Gardens use infiltration and bio-retention to remove pollutants.





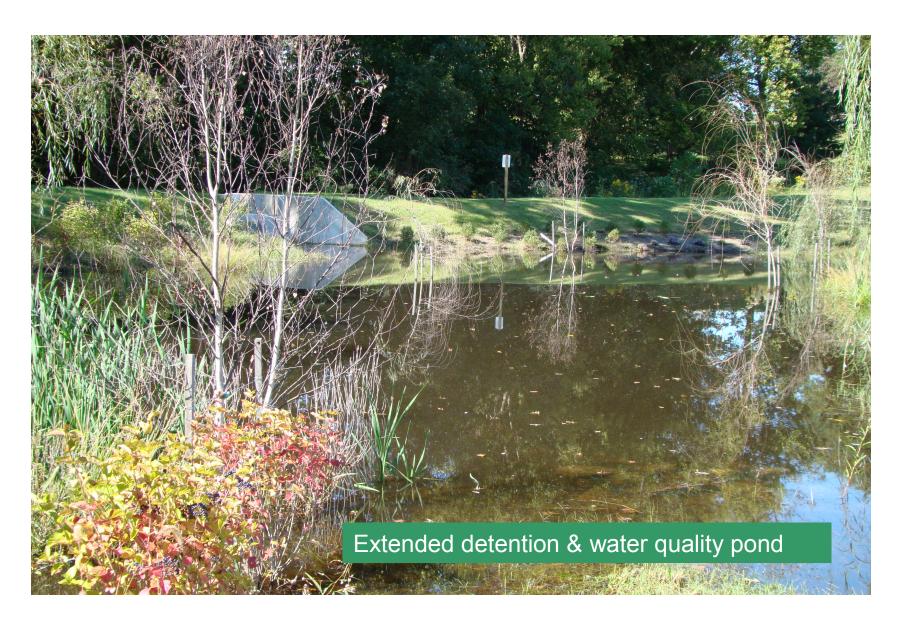




### Effects of the new Ordinance

- New designs with numerous small non-structural practices throughout the site...intended to better control runoff and reduce water quality impacts.
- Consider a long-term vegetation management strategy...
  by keeping in mind the "maintenance legacy" for the future
  owner(s).
- Movement away from conventional "pipe and pond" designs... such as SWM ponds that controlled larger drainage areas.
- In the future, we may not see facilities like the following:

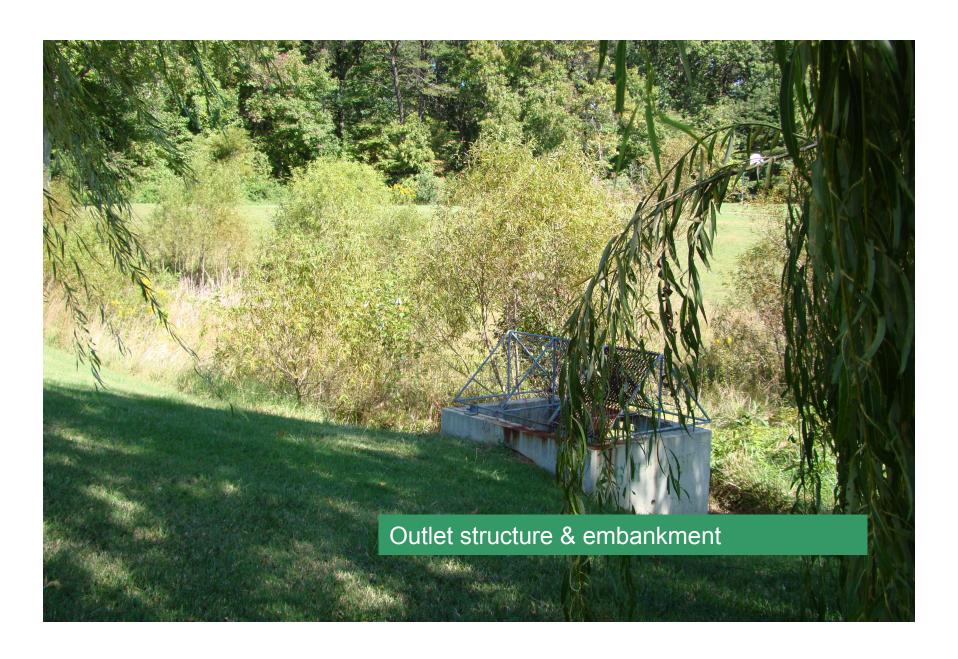
### **Governmental Center**



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### Lancaster Park



### Lancaster Park



# Indian Bridge Road



# Indian Bridge Road



# Great Mills High School



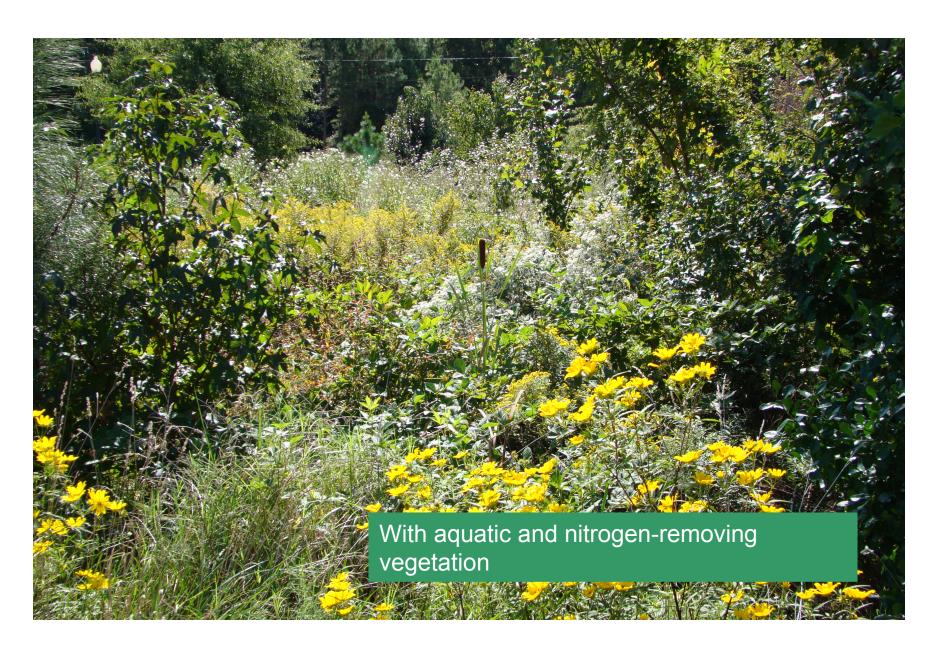
# Great Mills High School



### Lexington Park Library



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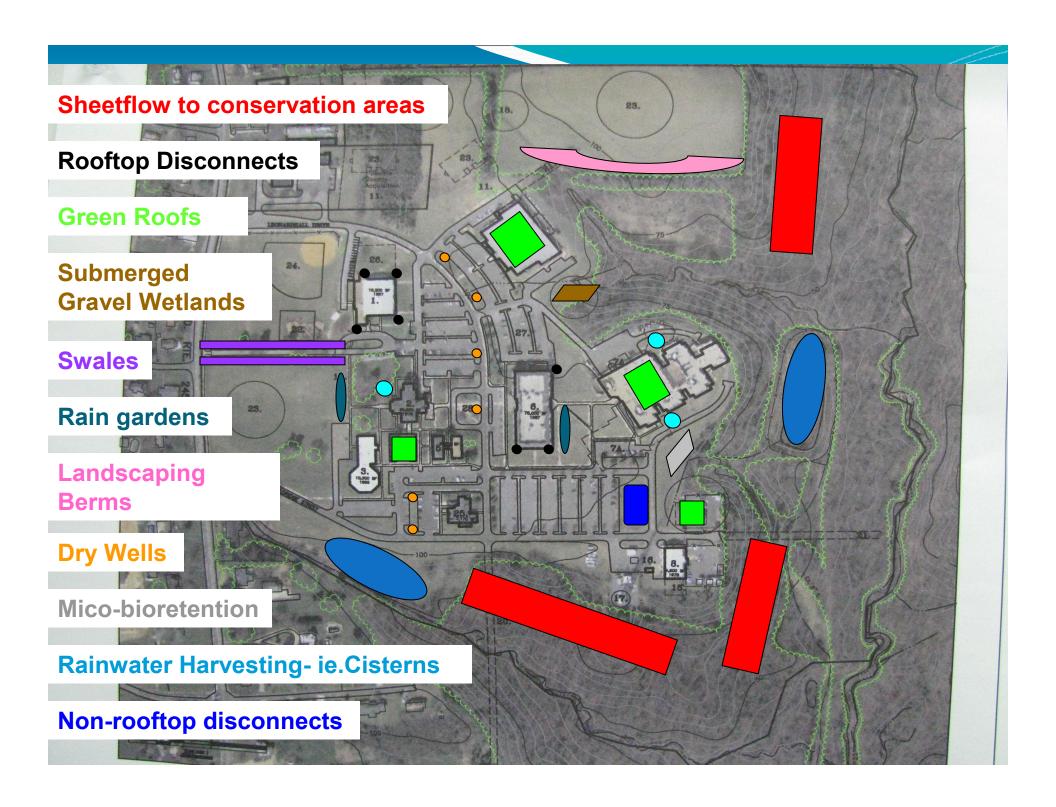


### Willow Gate off Pegg Road



## Willow Gate off Pegg Road





#### **Green Roofs**

This technology started as far back as Babylon (now Iran) in the 7th century B.C.









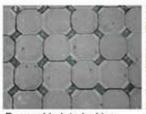




#### Permeable / "Green" Pavement

Water percolates, as in a coffee pot, when it seeps through the pavement to a cleansing layer of gravel. The gravel or stone acts as a natural filter, clearing the water of pollutants.

There are several types of permeable pavements:



Permeable Interlocking Concrete Pavers (PICP)



Concrete Grid Pavers (CGP) "Turfstone"



Porous Concrete (PC)



Porous Asphalt (PA)



Plastic Turf Reinforcing Grids (PTRG)

## There are always "drawbacks"

While green pavement has promise, it also has several significant drawbacks.

- Pavers can <u>pose a problem</u> for snowplows.
- Porous / permeable pavement is <u>more expensive to install</u> than traditional pavement.
- Permeable pavement is also <u>prone to clogging</u>. Its maintenance demands are different from traditional pavement. If not maintained properly (vacuum), sand and other fine sediments can block the spaces between pavers.
- In addition, porous pavement <u>isn't as strong as traditional pavement</u>. Consistent pressure, such as heavy vehicle braking, can collapse the pores of the pavement, causing it to fail. Therefore, the pavement is not advised for airport runways or highways (especially those with heavy truck traffic). However, more reinforced versions of permeable pavement are in development.



#### Considerations

- ESD's to handle 1 year (Cp<sub>v</sub>) and 1" (WQ<sub>v</sub>). No 2 cfs waivers and new ESD design volume chart
- Adequate outfall analysis re-includes the 2 yr storm and revises maximum permissible channel velocities
- More design and sizing up-front to avoid going "too far" in site design. Now three steps; concept, site devel & final
- County must now allow non-structural ESD's in public road r/w's (recall Wicomico Shores) may result in reduced roadside maintenance



### Considerations (con't)

- Projects qualify for redevelopment when only 40% of the existing site is developed (prior 75% at LOD)
- Increase from 20 % to 50% required treatment or removal of existing impervious area for redevelopment projects
- Standard non engineered "in-the-field" Plan for Single Lot Residential Construction (MDE drafted 12-2-1002, but not locally adopted)
- Other: Maximum slopes from 2:1 to 3:1,a 2" topsoil requirement for temporary & permanent stabilization, etc.

### Initial Review & Comment

MDE adopts Model Ordinance	5-04-09
Copy to engineers w/ request for input	6-09-09
Formal MDE notice received	7-10-09
Local copy to LUGM	7-24-09
Informational copy to BOCC	7-28-09
Soil Conservation District comments	9-10-09
MDE cursory review	9-22-09
Chamber of Commerce letter	9-25-09
MDE letter to MD-NCBIA	10-06-09
DRF & Subcommittee position	10-21-09
Draft due to MDE by	11-11-09

#### Some Concerns Voiced

- Inflexible grandfathering with no "transitioning" provisions
- Possible increased construction, inspection & maintenance costs
- Possible increased design fees
- Possible loss of developable ground
- Possible increase in County review fees
- More complex reviews –ie. Building Permits
- Need for additional building permit review staff (FTE's)

#### Some Concerns Voiced

- Possible minor Zoning Ordinance text amendment(s) along w/ the Comp Plan
- Possible Subdivision Regulations text amendment(s) to modify plan processing
- Sediment Control Plan expirations occurring after
   5-4-2010 will require ESD's
- Possible Road Ordinance revisions to X reference
   State Design manual and allow SWM in r/w
- Possible re-allocation of responsibilities (TBD)

# Grandfathering

- Any project that does not have final approval for erosion and sediment control and stormwater management before May 4, 2010 must comply with the new design criteria.
- There will be no transitioning provisions.
- This includes projects where regional facilities were approved and constructed but that site plans or building permits have not yet been approved.

**DPW&T Pilot Project** 





- -Authorize staff to submit draft to MDE by 11-11-2009 deadline with all comments received to date
- -Request any concerns the BOCC wishes to raise to the MDE be included in the formal transmittal letter
- -Continue to receive comments from and hold informational sessions with all interested parties and include in a future presentation (s) to the BOCC prior to scheduling a Public Hearing
- -Discuss duties, responsibilities, possible consolidations and any fiscal impacts during the operating budget work-sessions
- -Obtain Planning Commission recommendations
- -Target a Public Hearing date that accommodates the FY 2011 approved budget calendar and mandated May 4, 2010 adoption date



- November 11, 2009: Submission deadline of draft to MDE
- December 2009: Receive MDE comments / concurrence to move forward with local public hearing process
- January 2010: Obtain Planning Commission recommendations after worksessions, as needed.
- February 2010: Public Hearing first formal reading of Ordinance
- March 2010: Public Hearing second reading of Ordinance
- April 27, 2010: Local Adoption of Ordinance
- May 4, 2010: Effective Date of Ordinance (impact on other Ordinances)

NOTE: Dialogue for receiving stakeholder input will be open-ended: work-sessions (Airport Terminal), letters, e-mails, committees, commissions, boards, Development Review Forum, etc.