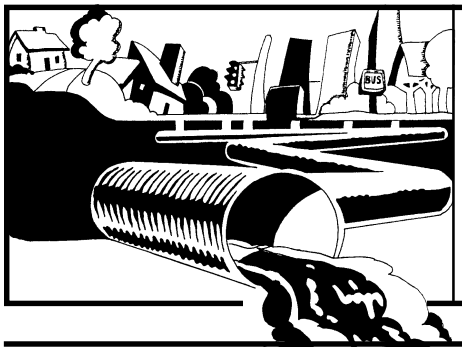

Plan Early For Stormwater In Your New Development

Stormwater Fact Sheet No. 8

This fact sheet is part of a series for local government officials and citizens on stormwater runoff problems and control strategies. The series covers:

1. Stormwater Problems And Impacts
2. Control Principles And Practices
3. Rules And Regulations
4. Local Program Elements And Funding Alternatives
5. Municipal Pollution Prevention Planning
6. Managing Stormwater In Small Communities: How To Get Started
7. Maintaining Wet Detention Ponds
8. Plan Early For Stormwater In Your New Development
9. How Citizens Can Help Control Stormwater Pollution

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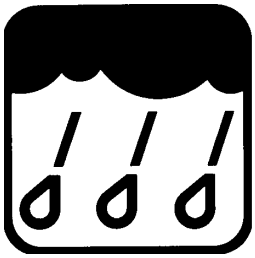
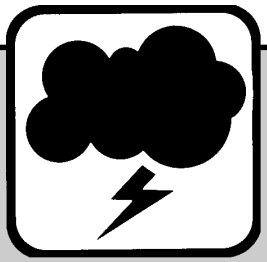
Introduction



When development occurs, there is usually an increase in impervious surfaces. This causes a significant increase in the volume and rate of stormwater runoff leaving the developed site. Unmanaged stormwater runoff causes downstream flooding, streambank erosion and pollutes our valuable streams, rivers, lakes and coastal waters. The cumulative effects of stormwater runoff on water bodies are evident across the state. Streams draining urbanized areas have fair to poor water quality. Some shellfish waters along the coast have been contaminated and closed due to stormwater runoff and other pollution sources. In response, local, state and federal governments have enacted various regulations to address this problem.

Suggestions for Effective Stormwater Planning

Effective stormwater management requires early consideration and planning for stormwater runoff. Unfortunately, stormwater management is often considered too late in the development planning process. This wastes the developer's valuable time and money and causes unnecessary impacts from unmanaged runoff. Several suggestions for effective stormwater planning are listed below.

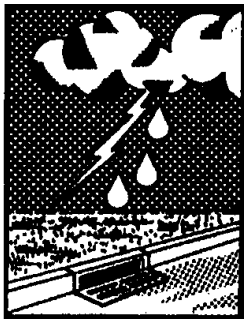


Effective Stormwater Planning

1. **Understand the Impacts & Rules**
2. **Good Site Planning & Design**
3. **Infiltrate What You Can**
4. **Reduce Your Pollution Load**
5. **Structural Controls as a Last Resort**
6. **Have a Good O&M Program**

1. Understand the Impacts and Rules

Be aware of the water quantity and quality impacts of unmanaged stormwater runoff. For example, stormwater runoff is a significant source of water pollution and can destroy the aesthetic value of water bodies and impair their various uses, including fishing, boating, swimming, drinking water supply, shellfishing, etc.



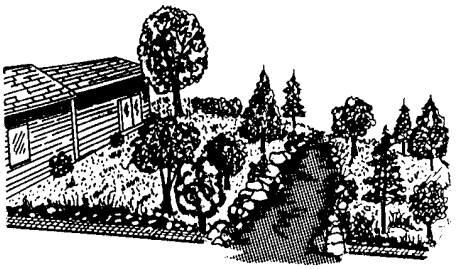
To minimize these impacts, the state and some local governments have adopted stormwater management regulations that apply within certain areas of the state. For example, developments affecting sensitive waterways (e.g., wetlands, water supply watersheds, high quality waters, outstanding resource waters, coastal waters) may be subject to state and/or local stormwater management rules. Know the classification of waters affected by your development and consult state and local officials.

Be aware of all other existing development regulations (e.g., state/local erosion control, Army Corps wetland/dredge and fill, local floodplain/zoning/subdivision/open space/recreation/landscaping rules, state building/plumbing codes, chemical spill containment requirements, etc.) and consider these requirements in planning your development and stormwater management system. Hold early predevelopment meetings with all agency personnel.

Regardless of any regulations, always incorporate good stormwater management practices into the design and construction of your development to minimize any impacts on downstream waters.

2. Good Site Planning and Design

Good site planning and design is the key to effective stormwater management. First, study your site characteristics (e.g., soils, topography, hydrology, etc.) and identify development limitations and opportunities. Plan stormwater practices so they serve as amenities within your development (e.g., greenways with trails). Delineate and protect all environmentally sensitive areas like floodplains, wetlands, etc. Retain vegetative stream buffers and establish development setbacks. Retain or plant tree cover especially along waterways to shade the water and maintain water temperatures.

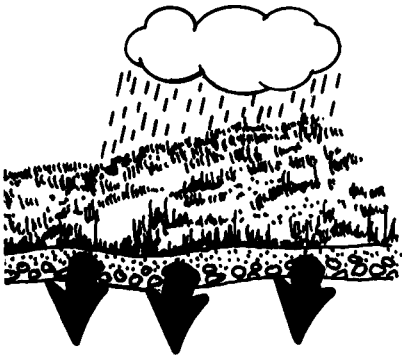


Minimize the amount of impervious area to the maximum extent possible. Cluster development in suitable areas to minimize roads and retain natural areas. If possible, use angled and smaller parking spaces and narrower road widths to reduce impervious area. Consider using more pervious construction materials in seldom used parking areas.

Eliminate direct discharges of stormwater to waterways. Minimize the use of curb and gutter and maximize the use of vegetated swales. If curb and gutter is necessary, consider curb cuts to divert runoff into stable areas for infiltration. Develop a landscaping plan that uses landscaped areas (e.g., parking islands) as infiltration or detention/retention areas. Instead of grass/turf that requires chemical applications, use trees, shrubs, mulch or other materials that require little or no chemical applications.

3. Infiltrate What You Can

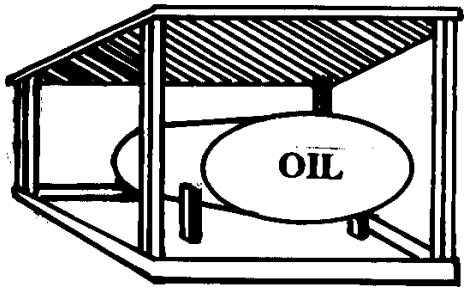
Retain vegetated areas to the maximum extent possible and utilize them fully to infiltrate, detain, filter and evaporate stormwater runoff. Design parking areas, roads, driveways, patios and other impervious areas to drain in a sheet flow into vegetated areas. Discharge downspouts to stable vegetated areas.



4. Reduce Your Pollution Load

There are many source reduction and pollution prevention techniques you can use, especially in the design of commercial and industrial developments.

It begins with soil erosion and sedimentation control on your site. Sediment is the number one pollutant in stormwater runoff. Restrict clearing and grading on highly erodable slopes and minimize the total area disturbed. Install and maintain all necessary practices for stabilizing disturbed areas.



Cover all machinery, storage tanks, waste and raw material piles, dumpsters, recycle bins and other structures that can leach, leak or spill contaminants into stormwater runoff.

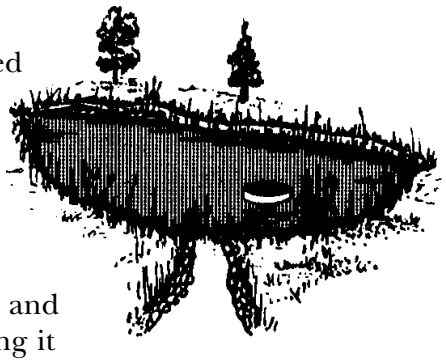
Provide spill containment structures and develop an effective spill response plan. Make sure that floor drains and other outlets exposed to contaminants discharge to the wastewater treatment plant, sanitary sewer or other appropriate facility and not to surface waters.

Stencil storm drain inlets in your development with "Don't Dump – Drains to Stream" warnings.

Educate homeowners/tenants on pollution prevention measures to avoid problems. Develop an environmentally sensitive lawn care maintenance program that minimizes the use of chemicals and uses safe application methods.

5. Structural Controls as a Last Resort

If necessary, use structural controls to reduce peak flows and pollutant loadings. Examples include detention/retention basins, artificial wetlands, bioretention areas, infiltration basins/trenches, sand filters and porous pavement/blocks.

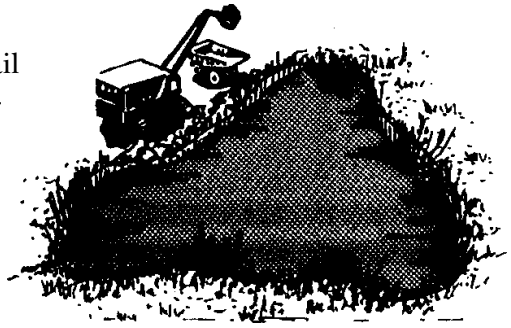


If properly sited, designed, constructed and regularly maintained, these devices can be very effective.

Each practice has different advantages and disadvantages, making it suitable or unsuitable for use in different situations (e.g., land requirements, size of drainage area, soils, topography, etc.). An effective stormwater management plan will utilize a number of practices in an integrated system. Early planning for these systems is critical.

6. Have a Good O&M Program

Develop a good operation and maintenance plan/program with clear responsibilities and adequate funding. Frequent inspections should be made of all stormwater practices to ensure they are functioning as designed. Erosion/sedimentation and stormwater management measures will fail without maintenance, which can cause offsite impacts and possible fines.



Make sure there is adequate space and access to detention basins and other practices to allow proper maintenance.

Designate onsite areas for sediment disposal to lower maintenance costs. Inform property buyers/tenants of the location, purpose, and O&M responsibilities of structures (e.g., deed restrictions, lease agreements, etc.).

If necessary, establish an O&M fee to fund necessary maintenance. Encourage all parties to use good housekeeping practices to prevent and manage stormwater runoff impacts.

For More Information

❑ **Reference Documents**

• Stormwater Management in NC: A Guide For Local Officials, 1994, Land-of-Sky Regional Council - (704) 251-6622.

• Stormwater Management Guidance Manual, 1994, NC Cooperative Extension Service and NC DEHNR - (919) 515-3723.

• Fundamentals of Urban Runoff Management,1994,Terrene Institute - (202) 296-4071.

• Watershed Protection Techniques, Quarterly Bulletin, Center for Watershed Protection - (301) 589-1890.

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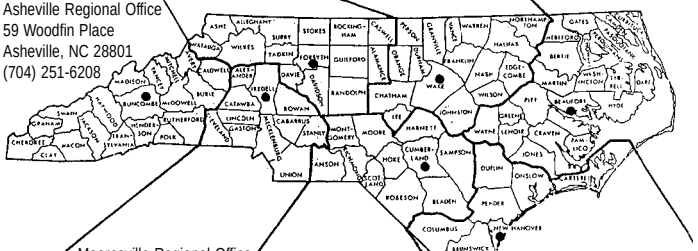

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❑ **Contacts**

- NC DEM Stormwater Management Group - (919) 733-5083, and DEM Regional Offices.
- U.S. Army Corps of Engineers.
- Appropriate Local Government Officials.

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