



Description

The comprehensive planning process provides an opportunity to regulate certain land-use activities in areas where water quality and flooding are sensitive to development. All sites that are developed vary in their suitability for development. Typically, the function of the developed site is determined prior to construction, despite the environmental conditions (i.e., soil type, topography, natural landscape value, flood potential, drainage patterns, etc.). A comprehensive planning process can help develop the best procedures for addressing potential environmental problems while achieving compliance with human restrictions and needs.

Zoning, ordinances, and codes are mechanisms by which the comprehensive planning process can be regulated and provide assurance that the program has long-term stability. The purpose of zoning in a municipality is to foster a proper balance of land uses such that recreation, environmental conservation, and residential, commercial, and industrial development all can be achieved. Ordinances and codes are important to control both the quality and quantity of stormwater runoff from developed sites. Unless post-development stormwater runoff is controlled, discharge from developed sites can be detrimental not only to local streams, but to human welfare and safety as well.

Selection Criteria

Comprehensive planning and corresponding zoning, ordinances, and codes are perhaps more effective in controlling stormwater impacts in undeveloped rural and urban areas. Areas that have already been developed usually need to rely on expensive retrofit practices to comply with new regulations that accompany the implementation of a comprehensive planning program, whereas undeveloped areas can implement these practices into their original design. Although planning and regulations can be helpful in urbanized areas that are experiencing new development or redevelopment, the process is most successful and cost-effective if it is implemented before a majority of development has taken place.

Comprehensive Planning

Comprehensive planning is a detailed process that requires more than simply managing or treating a stormwater problem, it should involve a careful, well-thought-out, organized approach that is centered around the solution that can bring about sustainable development while providing longevity and ecological and economic amenities. The comprehensive planning process does not need to be complex, but should include the following steps or phases:

1. Identify the major short term and long term stormwater problems/issues.
2. Collect, review and comprehend all existing local, state, and federal governmental

- or agency regulations, ordinances, codes, zoning requirements, permits, etc.
3. Determine objectives on how the site will be used, what site characteristics should be enhanced, what codes or restrictions should be addressed and develop clear-cut water quality and quantity goals.
 4. Inventory the site resources (i.e., soil, water, air, vegetation, wildlife, etc.) and potential offsite impacts contributed to development through hydrologic and water quality studies and modeling.
 5. Analyze the gathered resource information and quantify/qualify the site’s resources and potential development impacts in order to prioritize the stormwater and environmental goals and estimate impacts of various structural BMPs.
 6. Develop recommendations and alternative development strategies in order to address the identified stormwater objectives and goals. New zoning, ordinances, and/or codes can be proposed in this step that can help achieve the objectives and goals.
 7. Present recommendations to a political body for acceptance and implementation.
 8. Implement the recommendations and practices accepted by the local government within the developing community.
 9. Conduct continuous evaluations of the plan through periodic inspections, monitoring, and revisions.

An important initial part of comprehensive site planning is to locate environmentally sensitive areas and assure that these locations are preserved. Critical areas, such as riparian zones, are areas that harbor ecologically valuable and sensitive water resources (i.e., wetlands, springs, seeps, streams, etc.). Buffer zones surrounding critical water resource areas can help reduce the impact of stormwater and should be preserved as well. Critical areas and their associated buffer zones require long-term protection that is typically provided in the form of zoning, ordinances, and codes. Both setback requirements and easements can also be effective tools in preserving critical water resources on a development site.

Zoning

Zoning is a land use control that dictates the type and density of development within a specific area. Proper zoning should allow for residential, commercial, and industrial development in an area, while still allowing for recreation, ecological conservation, and limited flood storage. Zoning should prevent or limit development in environmentally sensitive and critical areas and restrict land uses that pose a high potential for producing water pollutants. Zoning ordinances must be supported by a comprehensive planning process such that they are not used for pollution prevention purposes, which can be politically circumvented. (ASCE, 1998).

Stormwater Ordinances and Codes

Ordinances and codes are typically required to implement and enforce comprehensive plans and stormwater quality and quantity. A good stormwater ordinance should include, but is not limited to, the following aspects:

- Submittal and approval of a stormwater management plan for the proposed development that would explain the measures to address stormwater concerns
- Performance standards descriptions

- No net increase in the peak rate or volume of runoff after development based on design storms
- Control of first flush through the use of BMPs to remove majority of pollutants (i.e., sediment, hydrocarbons, metals, nutrients, etc.)
- Design and maintenance standards and permanent BMPs: the local government can include such standards, or refer to a separate resource or design manual containing detailed specifications. In addition, the government should define exemptions and size thresholds.
- Dedication of drainage easements to allow for proper maintenance of all control practices and structures.
- Prohibition of illicit connections or illegal discharges to the stormwater drainage systems or water bodies.
- Administrative and enforcement procedures which explains the permitting, inspection, enforcement, appeals and other administrative processes.
- Inspection of facility before releasing bond.

Local stormwater ordinances take many different forms. Some municipalities adopt separate stormwater ordinances, while others include their stormwater regulations within other land use ordinances such as subdivision regulations, erosion control, flood prevention, or watershed protection ordinances.

Local municipalities must adapt their stormwater ordinances to address water quantity and quality impacts. Public education is an important part of getting a stormwater ordinance passed. The public must understand and support the regulations and codes in order for the ordinance to be successful.

With the proper application of these comprehensive planning strategies and their corresponding enforcement mechanisms (zoning, ordinances, and codes), low-impact hydrologic objectives can be attained during the development process. The techniques discussed in this section can allow for the full utilization of a site while maintaining the predevelopment hydrologic conditions (i.e., peak flow, runoff volume, flood frequency, etc.) to the maximum extent possible. In addition to the preservation of pre-development hydrologic conditions, planning and regulation practices can reduce and even prevent water quality degradation that is associated with urban development, by providing for natural (i.e., vegetative buffer zones, infiltration) and structural (i.e., constructed wetlands, filter strips, adsorption beds, retention ponds, etc.) pollutant removal mechanisms.

The reader is referenced to the model stormwater ordinance contained in the Appendix of this manual.

References

American Public Works Association. *Designing and Implementing an Effective Storm Water Management Program, Proposed Storm Water NPDES Phase II Regulations*. 1998.

American Society of Engineers (ASCE). *Urban Runoff Quality Management*. Urban

Water Resources Research Council. Reston, VA, 1998.

Department of Environmental Resources Prince George's County, Maryland. *Low-Impact Development Design Manual*. 1997.

Eaker, William, Director of Environmental Programs. *Stormwater Management in North Carolina: A Guide for Local Officials*. Land-of-Sky Regional Council, Asheville, NC, 1994.

Hayden, Kelie A. *Selection and Design Criteria for Structural Stormwater Best Management Practices*, M.S. Thesis, University of Tennessee, Civil and Environmental Engineering Department, Knoxville, May, 2000, 173 pp.

Illinois Environmental Protection Agency, Division of Water Pollution Control. *Illinois Urban Manual: A Technical Manual Designed for Urban Ecosystem Protection and Enhancement*. Springfield, IL, 1995.

Phillips, Nancy, U.S. EPA, Watershed Unit. *Decisionmaker's Stormwater Handbook: A Primer*. Region 5, Chicago, IL. Terrene Institute, 1992

Terrene Institute. *Local Ordinances: A User's Guide*. U.S. EPA, Region 5, Water Division. Chicago, IL, 1995.