

# DEVELOPMENT ORDINANCES TO PROTECT STREAMS

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**Abstract.** Communities across the State of Georgia unknowingly contribute to nonpoint source pollution of local streams through their adopted land development ordinances. By dictating excessive quantities of impervious surfaces and the continuation of sprawling patterns of land use, these ordinances are a major factor in the degradation of local streams. This paper presents some alternatives that communities could incorporate into their own development codes to reduce the impacts of new land development.

## INTRODUCTION

Impacted and degraded streams are not a necessary consequence of land development in urban and urbanizing areas of Georgia. Many of the impacts that new development has upon local streams can be reduced by simply changing the ways in which communities require land to be developed within their jurisdictions. Combining land uses to reduce dependence upon the automobile, requiring fewer impermeable pavements, providing alternative forms of transportation, and allowing alternative means to transport collected stormwater are just a few of the methods by which communities across Georgia can reduce the impacts of new land development upon local streams.

This paper will provide an overview of fifteen provisions that local communities could incorporate within their own ordinances to reduce the impacts of development. The provisions were refined through a series of meetings with a statewide task force containing elected local officials, municipal planners, real estate developers, and representatives of several environmental-interest groups. Communities can use the provisions as a menu from which to select specific ones to modify to fit local conditions and requirements.

## BACKGROUND

The quality of urban streams reflects the quality of land management and land development activities within the watershed. Reducing the quantity of impervious pavements dictated by many land development ordinances is one of the best methods to reduce the quantity of nonpoint source pollutants in urban streams. Allowing stormwater to infiltrate into the soil provides an opportunity to filter pollutants before they reach the stream. Unfortunately, the zoning and development ordinances of many municipalities unintentionally dictate excessive quantities of impervious pavements as they attempt to segregate land uses and facilitate the use of the automobile for virtually all personal travel.

Across the U.S., many municipalities have adopted zoning codes and land development ordinances of other communities without adequately considering the impacts those ordinances may have upon the environment or upon the quality of life of the community's residents. This is a particular problem for smaller or rapidly-growing urban areas whose planning departments lack the time or funding to consider the implications of these ordinances or to consider alternatives to them. The result is that the codes of many municipalities unintentionally contribute to urban sprawl and diminished water quality. The quantity of impervious surfaces dictated by these development codes in excessive street widths, cul de sac radii, and quantities of parking are major contributors to nonpoint source pollutant loads of urban streams. The result is that streams in urban and urbanizing areas are typically highly disturbed and degraded (Mikalsen, 1993).

In 1996, a team of consultants from the University of Georgia's School of Environmental Design contracted with the Georgia Environmental Protection Division to develop alternatives to typical development ordinances. The contract was funded

by a Section 319(h) grant from the U.S. Environmental Protection Agency. In Georgia, the EPD is charged with protecting the state's water resources, but has no authority to manage land use. All land use decisions are the responsibility of local governments. The purpose of the project was to provide information to municipalities that could be incorporated into their own ordinances. The resulting provisions go beyond simply reducing the impacts of land development upon stream water quality. They can also serve to reduce some of the costs associated with typical land development, and improve the safety of the community's residents. They are intended to address only new development, not the retrofit of existing development.

The fifteen provisions are divided into four categories. The first category, Overall Measures of Development, involves land use and zoning issues. The other three categories, Streets and Pavements, Drainage, and Construction Process focus upon specific components of new land development. All of the provisions work together to reinforce the effect of every other.

## LAND DEVELOPMENT PROVISIONS

### Overall Measures Of Development

**Density Zoning.** This provision is intended to allow some flexibility in the way that property is subdivided and developed. A typical ordinance dictates that all lots within a development be designed to have a minimum number of square feet. For example, the ordinance might require 20,000 or 40,000 square feet as a minimum. This provision would not change the density of the overall development, but would allow flexibility in how the project was designed. Instead of requiring 20,000 square foot lots, the ordinance would allow a maximum density of 2 lots per acre. Density zoning would allow the developer to preserve sensitive areas of a site, whether or not those areas are protected by other ordinances.

**Land Use Combination.** This provision is intended to address the common zoning ordinance that requires the separation of virtually every land use type from all others. Segregating land uses requires the use of the automobile for virtually all personal trips. This dependence on the auto dictates more streets, larger streets to accommodate more traffic, and larger parking lots to accommodate all

the cars. Until the late 1940s or early 1950s, we allowed multiple uses throughout our towns and cities. Today, multiple land uses are not allowed in the zoning ordinances of many municipalities.

**Infill Zoning.** Cities and towns have large amounts of land that are either undeveloped or are underdeveloped. Often times these sites are paved as parking lots, but they may just be small vacant parcels. This provision is intended to facilitate relatively dense development of these parcels rather than continuing to sprawl further from the core of the urban area. This accommodates some of a municipality's growth without destroying pristine areas, and without requiring large quantities of pavement to support routine automobile use.

**Impervious Cover.** This provision is intended to provide mitigation of all stormwater runoff on sites in which impervious surfaces exceed 10% of the site. Studies have shown that streams become impacted with just 10% impervious cover in their watersheds. As the amount of imperviousness exceeds 30%, the streams become degraded. This provision suggests a variety of methods to address stormwater on developments so that as the amount of impervious cover exceeds 10%, the stormwater is treated before it flows into streams. It is important to note that this is separate from any stormwater detention to prevent stream flooding.

**Stream Buffers.** Currently in Georgia, state law only requires a 25' buffer between land disturbance activities and flowing streams. This provision is intended to increase the amount of undisturbed area adjacent to streams by proposing that all land disturbance activities occur no closer than 75' and outside the 100 year flood zone of all perennial streams.

**Paths for Biking and Walking.** Most ordinances don't provide any alternatives to automobile transportation. This ordinance suggests that local governments consider alternative forms of transportation. It may be as simple as requiring sidewalks, or providing bicycle lanes on new streets.

### Streets and Pavements

**Limited Street Width.** This provision is intended to limit street width to only what is needed for the function of each specific street. It would require that the street widths be determined by the

Average Daily Traffic volume of those streets. In most instances, this would narrow street widths in typical subdivisions to 18 feet, in some instances, they may be as narrow as 16 feet. This provision would reduce the amount of impervious surfaces, lower the cost of development by reducing the quantity of pavement required, slow down traffic, and make neighborhood streets safer.

**Limited Pavement in Turn-Arounds.** Typical ordinances require that cul de sacs have a paved radius of 45 to 50 feet. This is intended to insure that emergency vehicles have adequate space to turn around. This provision proposes maintaining an adequate radius and pavement width for vehicles in the cul de sac, while providing a vegetated area in the center. Runoff from the pavement could be treated in this vegetated area. Again, this provision could reduce the cost of development by reducing the quantity of required paving.

**Limited Amount of Parking.** Typical development ordinances require a set number of parking spaces per thousand square feet of building area. Typically, this is 4 spaces per thousand. Research has shown that, in many instances, this is excessive. A requirement of 2.8 spaces more closely meets requirements. This provision suggests that local governments review how many parking spaces are actually needed for the specific land use rather than issuing a blanket number for all types of land uses. It also encourages the use of shared parking areas between compatible uses. Again, this provision could reduce the cost of development.

**Porous Pavement Materials.** This provision is intended to allow the use of permeable materials to replace traditional impermeable materials so that runoff can be treated and infiltrated in the underlying soil. Permeable materials such as porous asphalt and porous concrete are becoming more widespread in use. The Georgia DOT has been resurfacing interstate highways with porous asphalt for over five years. Materials such as these are suitable for residential streets, sidewalks, bicycle lanes, private drives, and numerous other uses.

## **Drainage**

**Drainage in Vegetated Swales.** Encouraging the use of vegetated swales for drainage rather than collecting drainage in curb

gutters and transporting it through pipes and paved channels is the intent of this provision. Vegetated swales allow the runoff to be treated by vegetation before it reaches a stream. In addition to mitigating the runoff, this provision could reduce the cost of the development by reducing the quantity of storm sewer pipes and inlet boxes required on a site.

**Swale Biofiltration Velocity Control.** This provision recommends specific technical design standards for vegetated swales to assure effective runoff treatment. It recommends that flow velocity in the swale not exceed 0.5 feet per second and offers examples of how this can be achieved.

**Treatment of Hot Spots.** Hot spots are concentrated sources of pollutants such as hydrocarbons from automobile maintenance shops or bacteria and nutrients from garbage dumpsters. This provision is intended to recommend treatment of runoff from these sources. For example, many municipalities require that dumpsters be placed in parking lots on paved surfaces. This provision points out that by simply placing dumpsters on porous surfaces and allowing the runoff to be treated by vegetation, many pollutants could be treated at their source.

**Inlet Labeling.** Educating the public about where the stormwater goes is the purpose of this provision. A number of communities around the country are already identifying the entry points to their storm drainage systems with permanent stencils or specially-fabricated inlet covers. The purpose is to discourage the dumping of household or industrial pollutants into these systems.

## **Construction Process**

**Limited Clearing, Grading, and Disturbance.** Preserving existing vegetation and uncompacted soils around development sites allows those areas to attenuate, treat, and infiltrate the runoff. Too often, developers clear and grade an entire site, portions of which may not be actually developed for years in the future. This provision suggests that tree clearing, soil grading, and land disturbance be limited to only those portions of the site that are actually required for the construction. If additional areas will be developed in the future, those portions of the site should be graded at that time.

## RESULTS

All fifteen of the provisions are published in a document entitled, *Land Development Provisions to Protect Georgia Water Quality*. Intended primarily for elected local officials who may be unfamiliar with the problems and sources of nonpoint source pollutants, the document contains numerous illustrations and a minimum amount of technical terms. The document is available from the Nonpoint Source Program of the Georgia Environmental Protection Division which can be reached at (404) 656-4887.

## DISCUSSION

There were a few issues that the task force felt should not be addressed by this effort. One issue was that of erosion and sediment control. The task force's reasoning was that there are state regulations already in place that all local governments must adhere to. And even though enforcement of those regulations may be lacking, to repeat those regulations would be redundant.

There are also no recommendations for tree protection in the final version approved by the task force. While many municipalities already have tree protection ordinances on their books that cover new construction, the task force felt that those ordinances could not prevent individual property owners from removing those trees at a later date.

Finally, the task force felt they only had enough time to consider provisions that address new development. Obviously, as urban areas continue to sprawl further from their core, they leave behind older areas that become underutilized. In order to fully control sources of nonpoint pollution in urban streams, municipalities will need ideas on ways to address these older areas of development. Hopefully, at some point in the near future, the EPD will feel the need to help in the development of methods to assist urban areas in solving those problems. Following publication of *Land Development Provisions to Protect Georgia Water Quality*, the consultants traveled across Georgia and the Southeast giving presentations to numerous groups who were in a position to influence local development ordinances. The consultants remain committed to helping local communities understand there are alternatives to their current ordinances.

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