

**SECTION VI**

**FLOODPLAIN MANAGEMENT PROGRAM**

A Floodplain Management Program provides the directives to achieve flood protection for political areas by implementing construction of drainage facilities that adequately convey rainfall runoff at selected levels for current conditions and establishes guidelines and regulations required for new developments for conformity to drainage standards that are reasonably necessary to prevent injury to health, safety or other property. The contents of this report will give local officials the necessary data to evaluate present flood conditions and predict future drainage problems for proposed developments. The use of these evaluations with the required legislation should maximize the City's resources through sound land and water use practices. It is recommended that the City of Charleston take appropriate action to adopt a Floodplain Management Plan to regulate stormwater facility development within its boundaries.

Many communities have adopted such plans in an effort to protect their citizens from the hardships associated with flooding. The plan can be described as a process by which to evaluate the short and long-term impacts of accelerated surface water runoff from a particular area as a result of land development and to develop and implement methods to control the duration, volume, and velocity of stormwater runoff to achieve certain objectives. Once implemented, a floodplain management plan would seek to reduce the damaging effects of floods, preserve and enhance the natural values and provide for optimal use of the floodplain.

The topography of the Charleston City area is such that most of the land area is subject to inundation during periods of heavy rainfall. As a result, any plan which would eventually be passed should function not only to regulate these areas within the floodplain, but also those areas adjacent to it. A floodplain management program is based upon the magnitude of rainfall which is expected. Most plans assume that storms of small duration are to be handled by the stormwater drainage system, and that steps will be taken to protect health and property during storms of larger magnitude. This assumption should be made for the City of Charleston area.

To date, the City of Charleston has taken the first step in implementation of a Floodplain Management Plan when it agreed to conform to the National Flood Insurance Act of 1968 (Title XIII of Public Law 90-448, Public Law 93-234, Public Law 95-128) by passing Ordinance 1977-61 followed by Ordinance 1984-22. To participate in this program, the City agreed to regulate the development which takes place in the floodprone areas. The City also receives some assistance in regulation of floodprone area development from federal and state agencies such as the Army Corps of Engineers, South Carolina Coastal Council, and South Carolina Water Resources Commission, which monitors development that takes place in the coastal regions of South Carolina.

It is recommended that the City take one of two basic approaches to Floodplain Management:

1. The maximum rate of runoff is no greater after development than prior to development;

or

2. The quantity, velocity, concentration and direction of runoff is managed or controlled in a manner which does not create a health hazard or damage to property greater than that which existed prior to development.

The selected approach may be implemented by one of two ways; (1) regulate development, (2) develop a separate floodplain management plan. By far the most effective of the two methods is a floodplain management plan which will require that all new developments address the problem of stormwater drainage prior to commencing development and comply with the Master Drainage Plan.

The procedures which are used to control the amount of stormwater runoff from a development varies. At the present time the most rational effective approach to floodplain management is to maintain the natural runoff characteristics prior to development. This can be accomplished either by augmenting the infiltration process or by physically controlling the release of increased stormwater runoff as a result of the development. Stormwater management techniques employed can be structural (relying on engineering design) or non-structural (based on land use planning). Both techniques should be utilized as complementary elements of a management plan. Some of the structural techniques for

floodplain management are discussed in the following paragraphs and include:

1. Channel alterations.
2. On-site detention.
3. Floodproofing.

#### Channel Alterations

Channel alteration is the improvement of the water carrying capacity of a natural or artificial channel by enlargement, cleaning, bank stabilization or other means. This is generally the only feasible method of stormwater management which is applicable for developed floodplains. However, it is also the most costly for the City since all of the expense for improvements would be absorbed by the taxpayers. The existing stormwater drainage facilities within the City of Charleston are analyzed in Section IV of this report, and recommended improvements made for those systems which have inadequate capacity.

#### On-site Detention

The use of detention basins has received increased popularity in recent years. On-site detention is applicable for new developments where the outfall is inadequate and revisions to the outfall are not practical due to economical consideration.

For on-site detention, the developer provides an area to store runoff from the development, releasing the runoff at a rate which the downstream drainage facilities can accept. The storage area may be in the form of a lake or an open grassed area which can be used for recreational activities during periods of dry weather. The major advantages of on-site detention are the avoidance of capital cost for the improvement of downstream drainage facilities and that provisions for the management of stormwater runoff generated as a result of development becomes the responsibility of the land developer.

The amount of on-site storage which is provided depends upon the stipulations set by each county or municipality. A typical ordinance requires that the post development peak rate of discharge will not exceed the pre-developed peak rate of discharge from the site during a chosen year frequency storm event that would coincide with the municipalities design standards.

Without proper maintenance, detention basin can become ineffective after several years. Maintenance for detention basins should be clearly addressed in any stormwater management ordinance. The maintenance should address the public safety of the facility as well as the landscaping appearance and mosquito control.

### Floodproofing

For those areas of the City which are currently developed, one method of providing protection from flooding is floodproofing. Floodproofing consist of adjustments to property, buildings, and building contents which are designed to reduce damages which results from flood waters. These measures are generally paid for by the property owner. City of Charleston Ordinance 1977-61, Section 7 and Ordinance 1984-22 currently provide for floodproofing requirements.

### Recommendations

In order to better regulate the development of presently undeveloped areas of the City of Charleston, it is recommended that the following items be required for each new development:

1. All new stormwater drainage facilities shall be designed for a 5 year frequency storm event for all areas except the lower Peninsular City area which shall be designed for a 10 year frequency storm event.
2. The peak rate of discharge from a given site shall not exceed that of a 5 year frequency storm event.
3. Stormwater detention facilities shall be designed on a basis of providing adequate control for all storm frequencies of a

24 hour duration up to and including the 50 year frequency event. The detention volume required shall be that necessary to handle the runoff of a 50 year, 24 hour duration storm, less the volume discharged during the same duration at the 5 year storm event discharge rate for all areas of the City except the Peninsular City area, for which the discharge rate shall be that produced by a 10 year storm event.

4. All developments shall require that a Stormwater Management Plan to be submitted and approved by the City Engineer, prior to development.
5. The developer shall be required to make all downstream drainage improvements necessary to accommodate the runoff from the site, or provide adequate detention so that post development runoff does not exceed pre-development runoff.
6. Where runoff from a development does not adversely affect the capacity of the drainage system but future development of the watershed will result in overloading the drainage system, the developer shall pay a fee on a prorated basis to cover construction cost for upgrading or replacing the system as the need arises.
7. The responsibility and funding for maintenance should be designated by the City of Charleston. The maintenance of all detention basins shall be the responsibility of the land owner.

8. All new drainage canals or pipes which are given to the City shall be constructed within a drainage easement of a width greater than or equal to that given in the "Standard Specifications for Design and Construction of Road and Drainage Systems".