

**Community  
Rating  
System**



**EXAMPLE PLANS**



# Federal Emergency Management Agency

Washington, D.C. 20472

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BURGESS & NIPLE, INC.  
Payson, Arizona

MEMORANDUM FOR: Community Rating System (CRS)  
Coordinator

FROM: C. M. "Bud" Schauer, Administrator  
Federal Insurance Administration

SUBJECT: National Flood Insurance Program (NFIP)  
Community Rating System -  
CRS Coordinators Manual and Application Forms

Thank you for your interest in the Community Rating System.

October 1, 1990, was the effective date of the National Flood Insurance Program's Community Rating System (CRS) initiative. As Federal Insurance Administrator, I am pleased to send you a copy of the CRS Coordinator's Manual, October 1990, which contains detailed information concerning CRS requirements. The Manual also contains a reference copy and a tear-out, reproducible, copy of the CRS application form. Sources of information and assistance for the completion of the CRS application are contained in the Manual.

Over 2,600 state and local government officials, representing some 1,400 communities, registered for the 75 workshops conducted to promote CRS awareness and explain the application process. The October 1990 CRS Coordinator's Manual reflects the comments and recommendations obtained from workshop attendees and those resulting from CRS field testing, critiques and reviews conducted with public interest organizations and the Association of State Floodplain Managers; you should specifically note the one year delay in the requirement for the submission of a repetitive loss plan. Also enclosed are example community floodplain management and repetitive loss plans, as well as a new publication, "CRS Update." I trust you will find them valuable in evaluating your community's efforts and in preparing your application.

I strongly encourage responsible officials in all NFIP communities (already participating in the "Regular Program") to apply for CRS. The qualifying activities, to reduce flood losses and/or increase the number of flood insurance policies, will ultimately result in greater protection for community residents along with the flood insurance premium credits.

## National Flood Insurance Program

### Community Rating System

### EXAMPLE PLANS

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## National Flood Insurance Program

### Community Rating System

#### EXAMPLE PLANS

**Background:** Programs that are based on a comprehensive plan address all of a community's flood problems more effectively. Accordingly, the Community Rating System (CRS) encourages comprehensive floodplain management plans and provides additional credit points for activities that are based on them.

Many communities have asked for more information on floodplain management plans and for examples of acceptable ones. This document provides examples from three fictitious communities. The objective of these examples is to convey the process followed and an idea of the variety of activities that should be considered. They are not meant to include everything that could possibly be included in a plan, to specify a style or organization of a plan, or to dictate what activities a community should implement.

While fictitious, all three communities' histories, growth patterns, and flood hazards are typical of thousands of communities participating in the NFIP. The plans' recommended activities are realistic and would be effective in preventing and reducing flood losses.

These three communities and their flood problems may appear too simple. For example, the two small cities' floodplain maps can fit on one page. Their land use maps have only four or five land use categories. This simplification was done intentionally to help the reader focus on the planning process.

Planton has a riverine flood problem that was addressed by a planning committee during a ten month planning process. Its "Flood Protection Plan" was adopted before the town heard of the Community Rating System, so several creditable activities, such as maintaining elevation certificates, were not considered. It had been implementing its plan for a year before it applied for CRS classification.

Sand Island is a Florida coastal community that was hit by a hurricane. When its "Hazard Mitigation Plan" was prepared, a concerted effort was made to maximize post-disaster funding possibilities and CRS credit points. However, this did not deter the staff from preparing a plan that meets the city's needs, including activities that are not credited by the CRS.

The third community is a western county. Hill County opted to prepare only a repetitive loss plan so it could make the December 15, 1990, application deadline. Its plan is shorter and addresses only the repetitive loss area, not the entire community. Therefore, it is not a floodplain management plan and it can only be credited under Activity 510 - Repetitive Loss Projects.

**Plan Criteria:** Because each community is different, each floodplain management plan will be different. The objective of the CRS credit incentive is to ensure that a process was followed that selected the best measures for the community and its flood hazard. Therefore, the key elements for crediting a floodplain management plan focus on the process used to prepare it. Section 241 of the CRS Commentary describes the criteria for recognizing local plans.

Following Planton's plan is a memo from the Mayor that shows how it complies with the planning process criteria of Section 241 (page P-17). Communities are encouraged to include such notes with their applications to help document how the credit criteria have been met. Sand Island's and Hill County's plans used the same headings as Section 241, so the criteria are readily identifiable.

It must be noted that all three example plans are proposals. They need separate documentation to show that they were adopted and are being implemented. Adoption was not a big problem in Planton because of the involvement of the public and City Council member.

Sand Island's plan, on the other hand, was quickly drafted by staff. It includes some very controversial recommendations, such as a moratorium and eminent domain. Both Sand Island's and Hill County's plans must still be adopted and implemented before they can be credited.

The memo from Planton's mayor (page P-17) also describes how well the plan has fared. This memo does not include all of the elements needed to qualify as the annual evaluation report required by Sections 241g and 242c. An example of such a report will be published by the CRS in 1991.

**Scoring Planned Activities:** Following Planton's and Sand Island's plans are Application Worksheets AW-240 that show the "p" credit points for those activities implemented pursuant to the plans (pages P-21 and S-24). The worksheets show that "p" credits of either 1.1 or 1.05 are provided according to whether an activity was underway before the plan was adopted. For example, Planton's open space program existed when the first floodplain park was set aside many years ago. Enacting a floodway development prohibition pursuant to the plan is an additional open space preservation measure, so pCOS = 1.05.

For the most part, the two cities' activities are new and receive the 1.1 credit points. This is because local officials either had not addressed their flood problems or they had only considered flood control projects. The planning process worked: people reviewed the whole variety of activities that can affect flooding and realized that there is more than one way to prevent and reduce flood losses. They selected those activities that are appropriate for their communities' needs, goals, and budgets.

Three types of activities are not credited.

1. Activities not implemented. The credit calculation described in Section 243 is based on activities that have been implemented pursuant to the plans, not on the plans' recommendations. No "p" credit and no activity credit is provided for Planton's acquisition program (Project 8.4).

While none of Sand Island's or Hill County's projects have been implemented, the worksheets show what points they will receive once the projects are underway during the coming year. If the verification visit finds that the planned activities have not been implemented, the credit points will be adjusted accordingly.

2. Plans, research, and other projects that are preparatory to a credited activity. These include Planton's City Planner's research (Projects 8.1.2 and 8.4.2), drafting the stream maintenance SOP (Project 8.2.1) and advising Sand Island's residents about retrofitting funds (Activity 6). Credit is provided for maintaining channels and retrofitting buildings.
3. Projects not recognized by the CRS, such as the Planton's walking/biking path and 8th Street drainage improvements (Projects 8.1.1 and 8.3) and updating Sand Island's maps (Activity 3). While floodplain recreation projects are encouraged, only those activities that impact on the three goals of the CRS are credited. As noted on page 500-1 of the Commentary, the NFIP recognizes flood control projects by amending maps, not by CRS credit.

It must be remembered that these activities are important to the example communities' overall goals and objectives. Communities should not be deterred from including them in their plans just because the CRS does not give them points. A community's first priority should be to develop a plan that meets its needs, not one designed solely on the basis of CRS credit.

**Repetitive Loss Plans:** To receive a CRS classification, repetitive loss communities must submit an adopted repetitive loss plan. As noted in Activity 510 - Repetitive Loss Projects, page 510-2, the repetitive loss plan must meet the same criteria as Section 240's floodplain management plan.

Three approaches to preparing a repetitive loss plan are included in these examples:

1. A past plan (Planton's) was reviewed. Since the city can document how the plan included the repetitive loss areas, it can be credited. The city's documentation is on page P-22.
2. Repetitive losses were intentionally addressed when a comprehensive plan was drafted. When its hazard mitigation plan was being prepared, Sand Island made sure it addressed the repetitive loss areas (page S-12).
3. Hill County prepared a site-specific plan that only covers the repetitive loss area (page H-1). It's plan can be credited as a repetitive loss plan under Activity 510, but does not qualify as a floodplain management plan under Section 240.

In all three cases, the plans were prepared in the same manner. The same process was followed. Where the process is not apparent, as in Planton's, a separate letter or memo is needed to document that the planning criteria of Section 240 were met (page P-17).

As with Hill County, a repetitive loss plan will be shorter in communities with small repetitive loss areas. The public input could be simpler, such as a meeting with the residents of the areas. However, other than a possible difference in scale, the CRS treats repetitive loss plans the same as floodplain management plans.

Application Worksheets, with notations on how the points were calculated for Activity 510 - Repetitive Loss Projects, are included for all three communities beginning on pages P-23, S-25, and H-8.

By comparing the three example worksheets, AW-511, it can be seen that the CRS scoring system encourages communities to identify large repetitive loss areas. Planton has 290.58 points before the impact adjustment, Sand Island has 594, and Hill County has 222. Because Planton's repetitive loss areas represent 85% of its flood-prone buildings,  $c510 = 123$ . On the other hand, Sand Island's two areas account for only 8% of its flood problem and  $c510 = 24$ .

Hill County gets only three points because of this impact adjustment. The repetitive loss area accounts for only 3% of its flood-prone buildings. The County prepared the plan because it is a requirement to apply for a CRS classification, not because it would receive a lot of points (see the Commentary, page 510-1).

As these examples show, the CRS encourages comprehensive approaches to a local flood problem. Repetitive loss information should be considered as one more item that helps describe a local flood problem. Communities with complete floodplain management plans receive higher scores than those that only deal with a small repetitive loss area.

**Alternative Repetitive Loss Documentation:** Activity 510 - Repetitive Loss Projects is modified for 1990 only to allow repetitive loss communities more time to prepare effective plans. Instead of submitting a complete plan, a community may submit a partial application by December 15, 1990, and complete the plan during 1991. A new section 511d is added to page 510-6 of the Commentary that reads as follows:

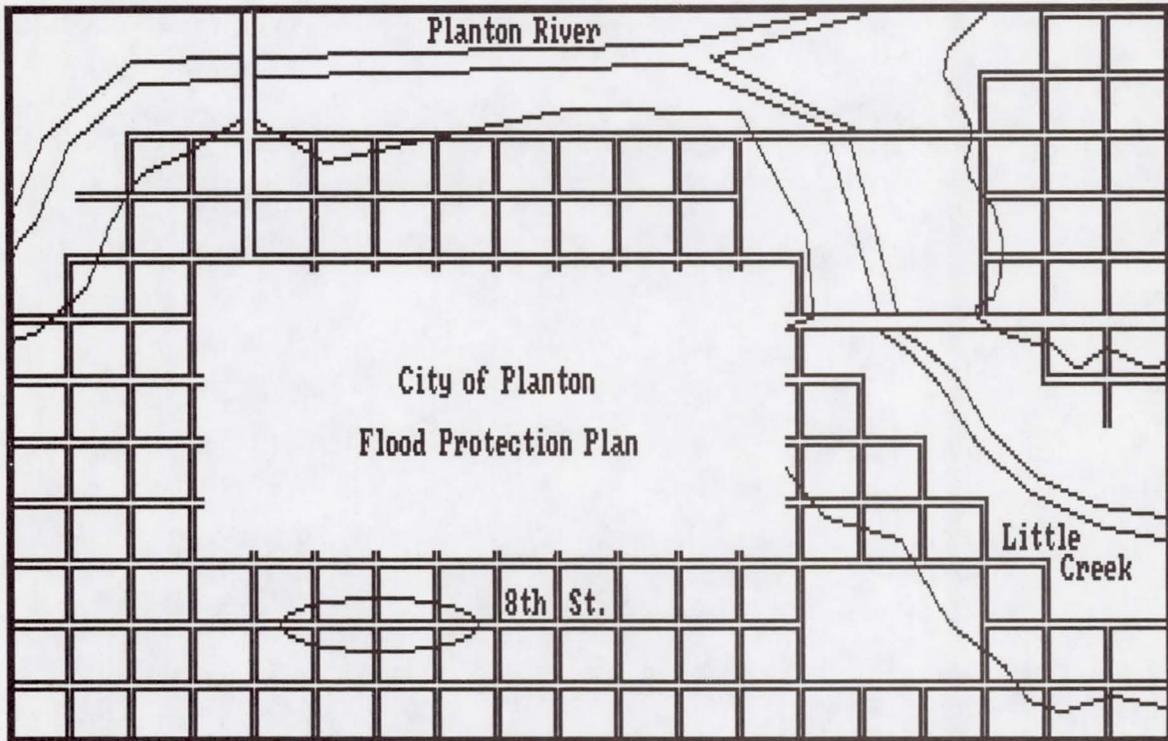
- d. A community has the option to submit the following four documents by December 15, 1990, in lieu of the plan required under section 511a. The plan must be completed in 1991.
1. The map with repetitive loss areas identified (see example on page 510-3 of the Commentary);
  2. A description of errors found on the address list provided by FEMA, such as properties listed under the wrong NFIP community number;
  3. A description of the causes of the repetitive losses; and

4. The community's timetable for preparing the final plan, including steps to be performed, identification of who will perform them, and when they will be completed.

No credit points are provided for submitting this documentation. This revised documentation only fulfills the requirement for repetitive loss communities to apply for Activity 510 by December 15, 1990. Failure to submit a complete repetitive loss plan by December 15, 1991, will result in a community being reclassified as a Class 10.

The rest of Activity 510 is not changed. A sample of this optional 1990 documentation is attached for Planton on pages P-26 through P-28. Note that this alternative would only be used if Planton had not done the work that is shown on pages P-1 through P-25.

**Plan Implementation:** To continue to receive CRS credit, at least 50% of the plan's projects must be implemented each year. The requirement applies to both the floodplain management plan and the repetitive loss plan. The 50% applies to all projects, including those not credited by the CRS. If a community completes a project or is unable to implement a project, it should revise its plan as part of its annual evaluation.



Prepared by the  
Planton Flood Planning Committee

September 5, 1989

**CITY OF PLANTON**  
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## CITY OF PLANTON

### FLOOD PROTECTION PLAN

#### 1. Introduction

The City of Planton has experienced three floods in the last 15 years, resulting in extensive private property damage and contamination of the area's rivers. In September 1988, the Mayor appointed a Flood Planning Committee to review the problem, assess possible solutions, and recommend actions for the City to take. This report summarizes the Committee's findings and recommendations.

#### 2. Planning Process

On October 4, 1988, the Planton Flood Planning Committee held its organizational meeting. The committee was composed of four residents of the flooded areas, two businessmen with flood-prone property, and a representative of the School Board. A city councilwoman representing the district hit hardest by the last flood was appointed Chair by the Mayor. The City Planner acted as a non-voting secretary and provided staff support.

A series of monthly meetings was held for the Committee to review various topics and gather data from the experts. Most of the research was conducted by the Planner who prepared drafts and background papers that were reviewed at each meeting. The following sessions were held:

11/1/88: Problem description: Review of past flooding and reports on the potential 100-year flood. A survey of floodplain property owners was approved for distribution.

12/6/88: Problem description: Review of the survey results and the city planner's land use inventory. The latter included data on buildings and vacant lands in the 100-year floodplains. Special flood problems and critical facilities were identified.

1/2/89: Community development trends and goals: Review of the city's comprehensive plan and expected development trends. This session also reviewed the concerns and desires of the floodplain residents who responded to the survey. Goals for this plan were agreed on.

2/7/89: Flood control activities: Review of alternative construction projects that can control flooding. Presentations by the U.S. Army Corps of Engineers and the Director of Public Works.

3/7/89: Public information and floodproofing activities: Review of flood insurance, ways to protect buildings and property from flood damage, and how to advise property owners about these activities. Presentation by the State Flood Insurance Coordinator on flood insurance and state and federal public information materials.

4/4/89: Emergency management activities: Presentations by the City and County Emergency Managers on flood warning programs, sandbagging procedures, and their emergency preparedness plans.

5/2/89: Regulatory activities: Presentation by the City Building Commissioner and the District Conservationist of the USDA Soil Conservation Service. Review of local zoning and building codes and ways to regulate stormwater runoff and erosion.

6/6/89: Open space: The Committee met with the heads of the City and County Park Departments and citizen groups interested in increasing open space and park land.

7/5/89: Plan outline: The Committee reviewed the draft outline of the flood protection plan prepared by the staff, discussed the activities that were reviewed, and selected those appropriate to the City's goals.

8/1/89: Draft plan: A summary of the draft plan was published in the local newspaper and the public was invited to the meeting. Approximately 25 people attended and 12 made statements or asked questions. The Committee reviewed and commented on the draft.

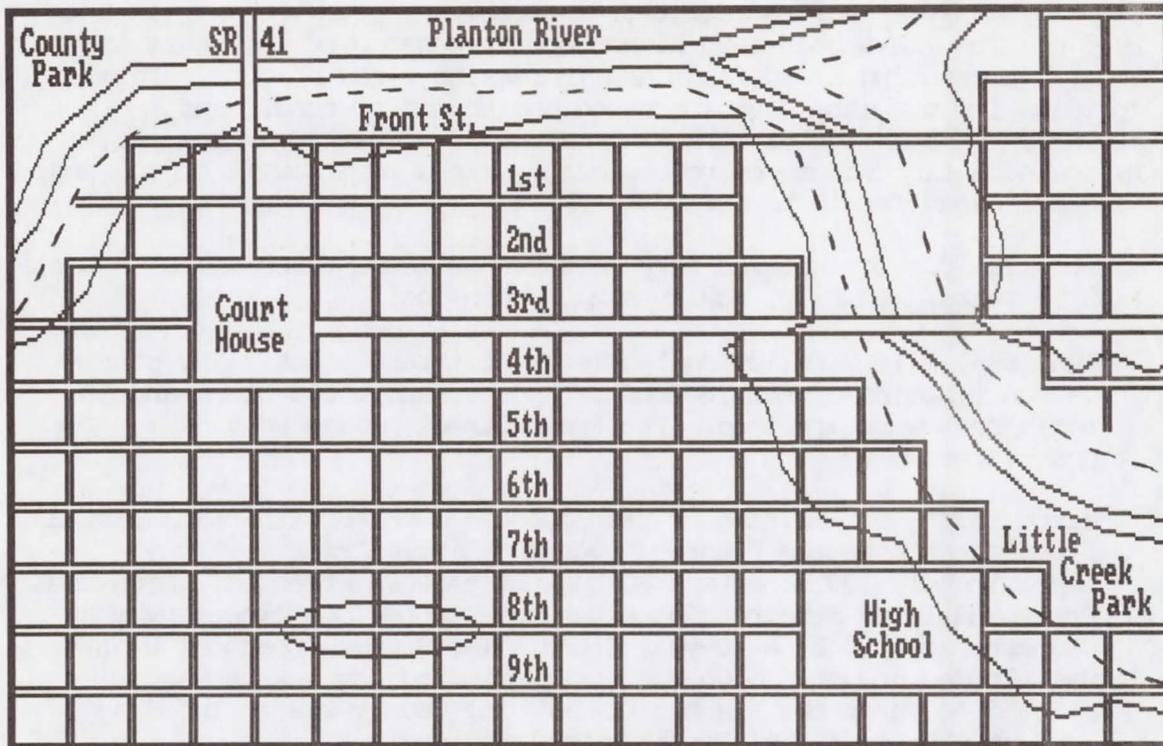
9/5/89: Second draft plan: The Committee reviewed and approved the draft plan (with changes) and forwarded it to the Mayor and City Council.

### **3. A Short History of Planton's Flooding Problem**

The city of Planton was settled in the mid 1800's. At that time, the Planton River was navigable by canoes and shallow draft vessels. Being on high ground near the river, the site provided flood-free river access. The settlement initially served as a service center for the surrounding agricultural lands. Historical records describe the 1844 flood that wiped out docks and supplies that were stored near the river. For the most part, though, early settlers built their homes and businesses on the higher ground, south of Front Street.

In 1847, Planton was selected to be the county seat. A court house was erected on the present site on Highway 41 and Third Street. Land around the courthouse became more valuable and properties closer to the river were built on. The city grew to the south and east and by 1900 was encroaching on the Little Creek floodplain.

Climatologists say the period between 1930 and 1970 was a "dry cycle" for this area. The lack of serious flooding lulled people into a false feeling that there was no threat. Floodplain land that had previously been avoided became developed because of the need to be near the city's downtown, on the major highways, and near public schools. Vacant properties on Front Street were developed by businesses serving the motorist, such as gas stations and fast food restaurants.



~~~~~ 100-year floodplain boundary - - - Floodway boundary

**Map 1. Planton's Flood Problem Areas**

When it was built in 1960, students in Planton High School had an unrestricted view of Little Creek. Now there are several blocks of single-family homes between the school and the creek.

Development in the floodplain was not the only man-made activity that caused flood problems. The Highway 41 bridge was replaced by the State in 1965 with a bridge that is higher (and dry during floods). However, while floods used to flow over the old bridge, the new one obstructs floodwaters, increasing flood heights along Front Street.

Development is closest to the streams on Little Creek between Third and Front Streets. In order to increase the amount of buildable land near Front Street, in 1970 the adjacent businesses paid for Little Creek to be straightened and deepened from Third Street to the Planton River. This (combined with the obstruction afforded by the Third Street bridge) reduced the amount of flooding. However, the riparian owners have not maintained their project and the stream has become overgrown and choked with debris.

Farm levees were built across the Planton River from the city in the 1920's. They have been made higher and stronger over the years since then, constricting flood flows and increasing flood heights. Farm drainage improvements have increased the amount of runoff and siltation of both the Planton River and Little Creek. In sum, there is now more floodwater coming downstream, less room for it to go, and more buildings for it to damage.

Substantial portions of the City have been flooded three times in the last 15 years. Luckily, no lives have been lost.

June 5-6, 1974: Following two weeks of intermittent rain, storms caused flooding of Little Creek. Approximately 800 homes and 10 businesses were affected. The Front Street bridge went underwater.

March 15, 1979: Melting of record snows coupled with rains caused flooding on both the Planton River and Little Creek. Approximately 100 homes and 20 businesses were affected. Both the Front and Third Street bridges were overtopped and closed by what was estimated to be a 40-year flood. The Sewage Treatment Plant was flooded and shut down for three days and raw sewage was allowed to enter the Planton River. The County was included as part of a Presidential Disaster Declaration.

August 3, 1988: A flood similar to the 1974 flood covered the same areas. In addition to the damage caused by high water, there was a substantial fish kill in the Planton River. This was apparently caused by chemicals released when the Farm Service Company property was flooded.

Increased urban development has overloaded the city's storm sewer system in the older section of town. As a result, streets are flooded more frequently by smaller storms. Some homes along Eighth Street have been flooded four times in the last ten years: June 6, 1980, July 23, 1982, July 4, 1986, and August 3, 1988.

In 1983, Planton joined the Regular Phase of the National Flood Insurance Program. A floodplain ordinance was passed and greater amounts of flood insurance coverage were made available to residents. Some buildings have been built in the floodplain since then, but none of them were affected by the 1988 flood.

#### **4. Flood Data**

While the worst flood of recent history is estimated to have been a 40-year flood, the Committee selected the 100-year flood for planning purposes. It is felt that Planton has been lucky in the past and that this plan should address the future threat. The 100-year flood is also the flood used by the floodplain ordinance to set protection levels on new construction in the floodplain.

Planton has three areas affected by the 100-year flood: the Planton River floodplain, the Little Creek floodplain, and the Eighth Street drainage problem area. The first two have been studied by the Federal Emergency Management Agency (FEMA) and detailed data on them have been published in the Flood Insurance Study for the City.

The 100-year floodplain and the floodway shown in Map 1 on page 3 are based on the Flood Boundary and Floodway Map prepared as part of the Flood Insurance Study. The Flood Boundary and Floodway Map and the Flood Insurance Rate Map comes in three panels. Only one panel was printed as there is no mapped floodplain in the southern portions of the city. Therefore, the maps used in this plan cover only the northern one-third of Planton (but all of its flood problem).

The Planton River has a drainage area of 1,250 square miles. It is a flat, slow moving river that drains farm and forest land. Flood velocities do not exceed two feet per second. By monitoring snow depths, ground saturation, river gages, and rain gages, the National Weather Service can provide at least a 24 hour warning of an impending flood.

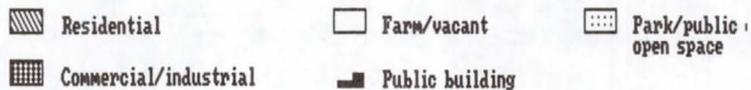
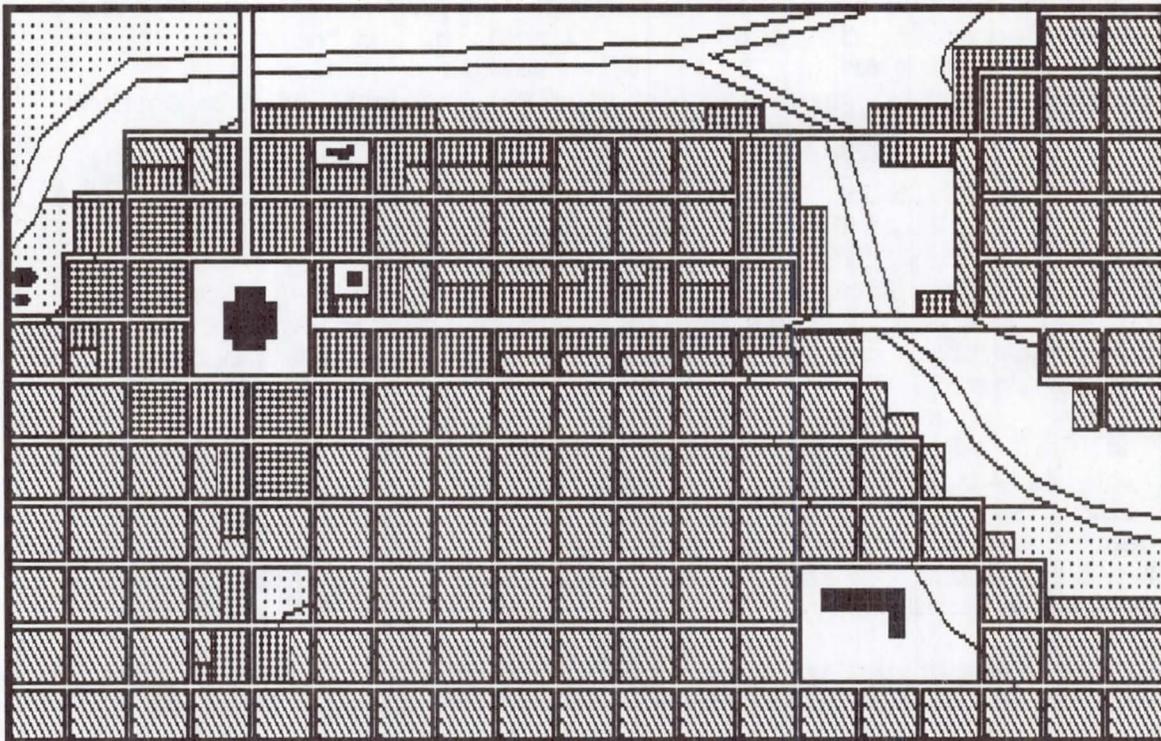
Little Creek drains 140 square miles of farm land. Because of the smaller drainage area, the creek is more responsive to local storms. According to the Flood Insurance Study, flood velocities at the upstream city limits can be as high as 6 feet per second. The Weather Service does not monitor the Creek or its watershed. It can only provide a general flood watch for the area when storms are threatening.

The boundary of the Eighth Street drainage problem area shown on Map 1 is one foot above the high water marks recorded during the August 3, 1988, flood. This was the highest flood of record for this area and the additional foot approximates a 100-year flood level. Many nearby streets were flooded and intersections closed on these dates, but the mapped area is the only area where water is high enough to enter onto private property.

The Eighth Street drainage area was not included in the Flood Insurance Study and does not show as floodplain on the FEMA map. Flooding is caused when heavy local rains are severe enough to overload the storm sewer system. The backed up waters do not have a velocity. There is no National Weather Service flood warning, other than a severe storm warning.

## **5. Floodplain Development**

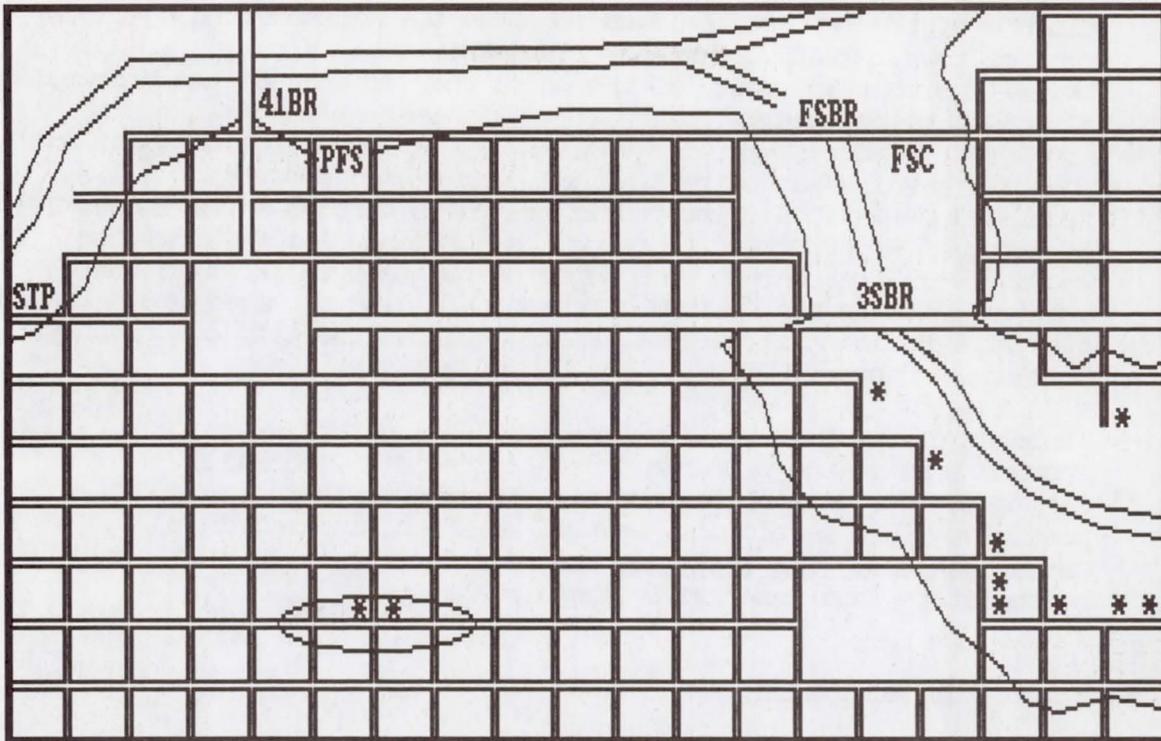
Under natural conditions, a flood causes little or no damage. Nature ensures that floodplain flora and fauna can survive the more frequent inundations. Flood problems actually only exist when human development is damaged by nature's water. Unfortunately, Planton has a lot of human development exposed to flooding (see Map 2, next page).



**Map 2. Current Land Use**

An inventory of the City's three floodplains shows the following:

- Along the two streams there are 187 flood-prone buildings: 151 single family homes, 8 multi-family buildings with 32 units, and 28 business properties. Only 12 of these buildings have been built or improved since floodplain regulations went into effect in 1983. Many of the older buildings have basements.
- There are 20 single family homes in the Eighth Street drainage area, all with basements.
- The area subject to the greatest damage is the Little Creek floodplain upstream of Third Street. This area suffered the worst during the last three floods, in part because the bridge is an obstruction to flood flows but primarily because of residential development in the floodplain. This area has 139 single family homes and two multi-family buildings.



STP Sewage treatment plant  
 PFS Police and fire station  
 FSC Farm Service Company

41BR Highway 41 bridge  
 FSBR Front Street bridge  
 3SBR Third Street bridge

*\* - FEMA Repetitive  
 Loss Properties*

**Map 3. Critical Facilities**

-- All of the 28 businesses are located downstream of Third Street, with the greatest concentration between Third and Front Streets. Two of these businesses have not reopened since the August 1988 flood.

The Committee identified six critical facilities in the three floodplains. Critical facilities are buildings or sites that deserve special attention because they are vital to the community or pose a special hazard during a flood. These are identified on Map 3, above.

-- The City's sewage treatment plant was out of commission during the 1979 flood, resulting in pollution of the Planton River. A 100-year flood would damage the control and laboratory building. The City would then be without sewage treatment for weeks.

-- Three bridges cross the two streams on State Route 41, Front Street and Third Street. The first is high enough so it should still be usable during a 100-year flood, but it must be monitored to ensure that it is safe to use. The Front Street bridge is flooded during a 25-year flood and the Third Street bridge went under during the 1979 40-year flood.

Closure of the two City bridges isolates the northeastern 20-block area of town. Traffic can only reach this area by taking a two-mile circuitous route to the north that depends on the Highway 41 bridge being open.

- The City's Police and Fire Station is on the edge of the floodplain. In 1979, fire trucks had to go through a few inches of water on Front Street to reach the station. A 100-year flood would cover Front Street to a depth of two feet in front of the station, cutting off vehicular access. It also probably would flood the building's basement, which includes the City's Emergency Operations Center (EOC).
- Flooding of the Farm Service Company's agricultural chemical storage yard is the probable cause of the 1988 fish kill. Chemicals stored in above ground tanks include fertilizers, pesticides, and herbicides, several of which are kept in toxic concentrations. The fish kill is the subject of a lawsuit brought by the state Environmental Protection Agency.

## 6. Future Development

Within Planton's corporate limits, there is little room for new development in the north part of town. The Planton River and Little Creek floodplains offer the only vacant land. However, as most of this land is floodway, the City's floodplain regulations prohibit new obstructions to flood flows. Construction of new buildings on open stilts is unlikely but not prohibited.

The Committee concluded that floodplain development will be of two kinds: home improvements and repairs and redevelopment of business properties. Except for substantially improved or damaged homes (which must be brought up to floodplain regulation standards), the former will have little impact on the flood problem.

On the other hand, business property is at a premium, particularly between Front and Third Streets. Commercial redevelopment can include expansion of storage or other non-building development into the floodplain. It also can include conversion of businesses to more hazardous enterprises, such as an expansion of the Farm Service Company. There are currently no zoning or other regulations to prevent commercial expansion or conversion that meets the floodplain regulation standards.

Development outside the city limits has been constrained by ownership. To the northwest is the county park. To the north and east are family farms on prime agricultural land that have resisted development. It is suspected that if the ownership changes, especially to absentee owners, development would soon follow. There is no County zoning or other development restriction, other than the County's floodplain regulations.

Flooding can be aggravated by development in the watershed, especially in a smaller drainage area like Little Creek's. According to a state Department of Natural Resources map, approximately 30% of the Little Creek watershed is wetland and the rest is farmed. The wetlands serve to detain stormwater runoff to the creek.

If the wetlands were replaced by urban or agricultural development, Planton would see faster and higher floods. The only constraint on this possibility is the U.S. Army Corps of Engineers' Section 404 regulations that prohibit filling the wetlands but do not prohibit draining them.

## **7. Planning Goals**

The City's 1985 Comprehensive Plan lists eight goals for Planton. Four are appropriate to this Flood Protection Plan:

1. Develop vacant lands for uses that are compatible with existing uses and the environment.
3. Improve housing conditions and the maintenance of the existing housing stock.
4. Increase recreational opportunities and expand the amount of open space available for recreation and education.
6. Strengthen the City's economic base through business development and diversity.

To these general goals, the planning committee added the following goals and guidelines for selecting the flood protection activities that it would recommend:

1. The flood protection plan must be consistent with the City's goals as presented in the Comprehensive Plan.
2. The first priority of the flood protection plan is to reduce the threat to health and safety caused by flooding.
3. The second priority of the plan is to reduce property damage caused by flooding.
4. The third priority of the plan is to prevent the flood problems from getting worse.
5. The Planton River and Little Creek should be viewed as community assets. The plan should promote the proper use of these resources as well as address flood damage.
6. Where appropriate, flood damage protection activities also should be used to improve the environment, water quality, and the City's appearance.

7. The following guidelines should be followed when selecting projects that need funding:
  - a. Flood protection activities should be funded with existing local resources or outside financial assistance.
  - b. The top priority for use of City funds should be for activities that protect the public health and safety.
  - c. The City's role in protection of private property should be limited to technical assistance and guidance provided by available staff resources.

## **8. Recommended Activities**

The Committee spent four months reviewing a wide variety of activities that can affect flooding and flood damage. The planner and Committee members contacted the other City departments; several County offices; the state Department of Natural Resources, Environmental Protection Agency, and Emergency Management Agency; and the U.S. Army Corps of Engineers, Soil Conservation Service, National Weather Service, and Federal Emergency Management Agency. Input was also received from floodplain residents and businesses through the survey, the public meeting, and discussions with Planning Committee members.

All of these resources provided background information, ideas and suggestions. Possible activities ranged from "do nothing, people who are dumb enough to live in a floodplain should take care of themselves," to dredging the Planton River at an estimated cost of \$10 million.

Various ways to stop flooding on the River and Creek were reviewed and are not recommended because they would be either too expensive or too disruptive. Levees, a dam, enlarging the channel, and opening up the bridges were all reviewed and not chosen because of the cost or environmental impact.

There is no room for a levee high enough to contain the 100 year flood without removing large numbers of homes and businesses. Dredging and channel improvements cannot be made large enough to carry the 100-year flood. The cost of constructing a reservoir on flat prime agricultural land makes an upstream dam infeasible, especially in a county with an economy that depends on agriculture. Opening up the Third Street bridge would simply transfer the flood levels downstream.

The Committee has concluded that the Planton River and Little Creek will continue to periodically overflow their banks in the future. Therefore, this plan recommends activities that minimize the effects of that flooding. The following recommended activities are affordable, doable, and will have an impact on present or future flood damage. Timetables start upon approval of the plan by the City Council.

## **8.1 Greenway**

The Planton River and Little Creek offer some of the only remaining open space readily available to Planton's residents. While these streams are often viewed as sources of flood hazards and pains to keep clean, they also can be unique visual and recreation resources. They should be preserved as open space and developed as a greenway that includes public and private property.

Lands to the south of the two streams should be identified for greenway purchase or access easements. This would allow construction of a walkway/bikeway connecting the Sewage Treatment Plant and Little Creek Park. Lands on the other side of the streams should be reserved as visual open space through development setback easements. This would prevent inappropriate development and preserve the open space appearance of the riverfronts.

Project 8.1.1: The City's Park Department should construct a walking/bicycle path along the streams in Little Creek Park and on the Sewage Treatment Plant land. Timetable: By the end of next fiscal year. Budget: \$10,000 should be allocated from next year's capital budget.

Project 8.1.2: The City Planner should pursue state and federal funds for acquisition of vacant land, greenway access easements, and development setback easements on properties along the two streams. Acquisition of greenway land is the preferred approach, but cost and owner's interest may make access easements more feasible. Timetable: Report on status in six months.

Budget: Up to \$200,000, depending on the amount of outside financial assistance obtained. If each year's local share is under \$10,000, it could be funded from the Park Department operating budget. Otherwise a bond issue may be needed. A bond issue has been considered to fund improved park and recreation opportunities pursuant to the Comprehensive Plan.

Project 8.1.3: The City Attorney should obtain easements from owners of properties that would be included in a greenway. There may be some property owners, particularly civic-minded businesses, willing to donate the easements. The rest should be purchased with funds obtained in Project 8.1.2. This work should be coordinated with Project 8.2.2. Timetable: Report on status in one year. Budget: N/A (staff time).

## **8.2 Stream Maintenance**

Smaller storms are now causing overbank flooding because we have allowed the channels to become clogged with silt, vegetation, and debris. It would take a small crew only a day or two each year to clean out the overgrowth, logs, and trash. However, a maintenance program that complies with state regulations on channel work should be prepared first. The permission of adjacent landowners also must be obtained.

Project 8.2.1: The Director of Public Works and the City Planner should prepare a stream maintenance standard operating procedure (SOP) and have it approved by the Department of Natural Resources. Timetable: six months. Budget: N/A (staff time).

Project 8.2.2: The City attorney should obtain the necessary rights-of-way for the City to enter private property to clear vegetation and debris. All future subdivisions should include a maintenance easement in their plats of survey. Timetable: within one year. Budget: N/A (staff time).

Project 8.2.3: The Department of Public Works should inspect and clear the streams on a regular basis. Timetable: At least annually, more frequently where identified by the SOP. Budget: N/A (staff time).

### **8.3 Eighth Street Drainage Improvements**

The area flooded along Eighth Street is a low depression that was probably a wetland before it was developed. It is now drained by a storm sewer that also drains nearly one-quarter of the City to the south. As new subdivisions have been built to the south, the sewer has had to carry more and more stormwater. During heavy rains, it runs full so that streets cannot drain. It also backs up into the Eighth street depression.

There are three possible solutions to this problem that warrant further study before one is funded: enlarge the sewer, construct an overflow retention basin in the adjacent city park, or put restrictors on inlets in the drainage basin. Under the last approach, water could be purposely stored in the streets until the sewer can handle it.

Project 8.3: The City's consulting engineer should review the costs, benefits, and environmental impacts of these and other possible alternatives to stop Eighth Street flooding. Timetable: Report in six months. Budget: \$20,000 should be allocated from next year's capital budget. This also could be funded from the Gasoline Tax Fund because it will improve street drainage.

### **8.4 Acquisition of Flood-Damaged Buildings**

As many as 20 homes east of the High School could be destroyed or substantially damaged following another large flood. They are low and in the floodway. The owners of these homes have been flooded before and have voiced an interest in moving. The City would be interested in obtaining more land to expand Little Creek Park and connect the greenway to the High School grounds.

While there are no funds to relocate them, such funds often become available after a flood. Programs such as the National Flood Insurance Program and FEMA post-disaster mitigation planning are often interested in getting damage-prone buildings out of harm's way.

Project 8.4.1: The City Building Commissioner should "red-tag" destroyed or substantially damaged buildings after a flood or other disaster. These houses should not be reconstructed until the Planner meets with the owners and explains alternatives to rebuilding on site. Timetable: Within 24 hours of a flood. Budget: N/A (staff time).

Project 8.4.2: The Planner should become familiar with acquisition and relocation funding programs and post-disaster procedures for obtaining those funds. Timetable: Provide a status report within six months. Budget: N/A (staff time).

### **8.5 Property Owner Protection Assistance**

There are many ways property owners can protect themselves from flood losses. These include knowing the correct emergency actions to take, purchasing flood insurance, and floodproofing buildings. However, many property owners, even recent flood victims, are not aware of these measures. For example, while there are 187 buildings in the floodplain, FEMA records show that there are only 42 flood insurance policies in the entire city.

Project 8.5.1: The City Planner should collect information and materials on insurance, floodproofing, flood safety, and related topics. Information on available sources of technical and financial assistance also should be collected. Appropriate documents should be provided to the Planton Public Library for use by area residents. Timetable: Within three months. Budget: N/A (staff time and supplies accounts).

Project 8.5.2: The City Planner should become familiar with these flood protection measures and be available to answer owners' questions on them. A special effort should be made to work with the business owners to help ensure that they can reopen quickly after a flood. The Planner should develop a list of names and telephone numbers of resource people who can help with questions beyond his expertise. These could include the Building Commissioner, insurance agents, the U.S. Army Corps of Engineers, and the State Flood Insurance Coordinator. Timetable: Within three months. Budget: N/A (staff time).

Project 8.5.3: The City Planner, in coordination with the Mayor's office, should prepare a brochure on the City's flood protection program and ways that property owners can protect themselves. This brochure should include information on sources of assistance, including the Library and the Planner's office. It should be mailed or delivered to every floodplain resident and business owner in the Spring. It should be updated and redistributed each year. Timetable: By March 1 each year. Budget: N/A (staff time).

## **8.6 Flood Warning**

The National Weather Service only issues flood warnings for the Planton River. Little Creek flooding occurs faster and causes more damage. A flood warning system on Little Creek would allow residents and businesses time to move their vehicles and contents to high ground or higher floors.

Project 8.6: The City's Emergency Manager should work with the County Emergency Manager and the National Weather Service to develop a local flood warning system for Little Creek. The system should include procedures for warning the public and owners of critical facilities.

Timetable: Status report within six months. Budget: N/A (staff time). There may be a need to purchase rain and river gages from the operating budget supplies account.

## **8.7 Flood Preparedness Plan**

The City's emergency preparedness plan does not address any individual hazard in detail. While plans for sheltering evacuees and post-disaster clean-up procedures are adequate, specific actions to take immediately after a flood warning are not included. A detailed flood preparedness plan is needed that can quickly guide city crews to maximize their effectiveness before and during a flood.

Project 8.7: The City Emergency Manager should work with the County and State Emergency Management agencies to develop a detailed flood preparedness plan that specifies what actions to take when the streams reach certain flood levels. The plan should include procedures for monitoring river conditions, closing bridges and redirecting traffic, evacuating residents, protecting critical facilities, sandbagging, and providing necessary services to the northeast area when it is isolated. Timetable: Six months. Budget: N/A (staff time).

## **8.8 Critical Facilities**

The flood preparedness plan (Project 8.7) should include procedures for monitoring the condition of the three bridges. The other three critical facilities could be floodproofed or otherwise protected to minimize the impact of being flooded. Due to their importance, the 500-year flood should be used as the protection level for these critical facilities.

Project 8.8.1: The City Emergency Manager, the Police Chief, and the Fire Chief should develop a plan for protecting the Police and Fire Station during a 500-year flood. This plan should include ensuring vehicular access to the building. Relocation of the EOC to the County Courthouse's EOC should be investigated. Timetable: Six months. Budget: N/A (staff time).

Project 8.8.2: After he has researched into floodproofing (Project 8.5.1) the City Planner should work with the Director of Public Works and the Farm Service Company (FSC) to develop floodproofing plans for the Sewage Treatment Plant and the FSC property. Timetable: Six months. Budget: N/A (staff time).

### **8.9 Floodplain Regulations**

The City's building code does not mention flood protection. There is a separate floodplain development ordinance that was enacted to meet the minimum requirements of the National Flood Insurance Program (NFIP). Minimum requirements are just that: minimum national standards designed for a generic flooding situation. Planton's code should reinforce the need to keep the greenway areas open and protect new buildings from bridge obstructions and other things that can make floods go higher than predicted.

Project 8.9.1: The Building Commissioner should draft amendments to the building code to prohibit new buildings in the floodways and require new buildings in the flood fringe to be built one foot above the 100-year flood level. It also should be enforced in the Eighth Street drainage problem area as delineated on Map 1. Timetable: Six months. Budget: N/A (staff time).

With a separate building code, zoning ordinance, and floodplain regulations ordinance, there has often been confusion over which rules apply. A consolidated code is needed to better coordinate the programs and reduce confusion.

Project 8.9.2: The City Planner should draft the appropriate amendments to consolidate the various codes. The digitized mapping system developed for tax records and used in this plan, should incorporate all property regulations data, such as floodplain, floodway, and zoning district boundaries. Timetable: Six months. Budget: N/A (staff time).

### **8.10 Watershed Management**

Floodwaters come to Planton from out of town. Activities in the watershed beyond the City's jurisdiction can aggravate our problem. Sediment in the channels from farmland erosion and faster floods from improved drainage are two examples. If the upstream wetlands are filled or drained, these problems will get even worse. Several County Board members share this concern, but feel that the County lacks the resources to develop an appropriate program.

Project 8.10: The Planner should work with the Soil Conservation Service, the Soil and Water Conservation District, and the County Board to develop a watershed management plan for the Little Creek watershed and those parts of the Planton River watershed within the County. The plan should review farm drainage practices, County, state and federal development regulations, and plans for watershed development.

A County ordinance regulating wetland development and setting standards for new subdivisions should be one product of this work. The plan also should consider a County zoning ordinance, tax incentives, and other approaches to preserving floodplain land for agriculture or other appropriate use. Timetable: One year. Budget: N/A (staff time).

**9. Recap of Recommendations by Lead Person**

| <u>Project</u>                                  | <u>Timetable</u> | <u>Budget</u> |
|-------------------------------------------------|------------------|---------------|
| City Planner:                                   |                  |               |
| 8.1.2 Obtain greenway funding                   | 6 months         | (1)           |
| 8.4.2 Research post-disaster funding programs   | 6 months         | (2)           |
| 8.5.1 Collect flood protection info & materials | 3 months         | (2)           |
| 8.5.2 Advise property owners                    | 3 months         | (2)           |
| 8.5.3 Distribute flood protection brochure      | Annually         | (2)           |
| 8.8.2 Critical facilities protection plans      | 6 months         | (2)           |
| 8.9.2 Consolidate codes and maps                | 6 months         | (2)           |
| 8.10 County watershed plan                      | 1 year           | (2)           |
| Superintendent of the Park Department:          |                  |               |
| 8.1.1 Park pathway construction                 | 1 year           | (3) \$10,000  |
| City Attorney:                                  |                  |               |
| 8.1.3 Obtain greenway easements                 | 1 year           | (2)           |
| 8.2.2 Obtain maintenance rights of way          | 1 year           | (2)           |
| Director of Public Works:                       |                  |               |
| 8.2.1 Draft stream maintenance SOP              | 6 months         | (2)           |
| 8.2.3 Inspect & maintain channels               | Annually         | (2)           |
| Building Commissioner:                          |                  |               |
| 8.4.1 Red-tag damaged buildings                 | After flood      | (2)           |
| 8.9.1 Draft building code amendments            | 6 months         | (2)           |
| Emergency Manager:                              |                  |               |
| 8.6 Develop a local flood warning system        | 6 months         | (2)           |
| 8.7 Develop a flood preparedness plan           | 6 months         | (2)           |
| 8.8.1 Protect the Police & Fire Station         | 6 months         | (2)           |
| Consulting Engineer:                            |                  |               |
| 8.3 Prepare Eighth St. drainage plan            | 6 months         | (3) \$20,000  |

- (1) Budget cannot be set until further planning is done
- (2) Paid from Operating Budget by rearranging staff priorities
- (3) Capital Budget

# City of Planton

"City of Progress in the Country"

Leo Lepetomaine, Mayor

December 1, 1990

TO WHOM IT MAY CONCERN

FROM: *Leo* Leo Lepetomaine, Mayor

SUBJECT: Planton's Flood Protection Plan

The attached is submitted for credit as a Floodplain Management Plan under Section 240 of the Community Rating System Schedule. The requirements for a creditable floodplain management plan are described in Section 241 of the CRS Commentary. These requirements are listed in the left column below and the section and page number where they are addressed in our plan are listed in the right column.

| <u>Section 241</u>               | <u>Planton's Plan</u>                                                                                                                                                                        |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a. Problem identification        | Sections 3 and 4, pages 2-5                                                                                                                                                                  |
| b. Flood hazard area inventory   |                                                                                                                                                                                              |
| 1. Building data                 | Section 5, pages 5-7                                                                                                                                                                         |
| 2. Development trends            | Section 6, page 8                                                                                                                                                                            |
| 3. Development constraints       | Section 6, pages 8-9                                                                                                                                                                         |
| 4. Critical facilities           | Section 5 and Map 3, pages 7-8                                                                                                                                                               |
| 5. Community needs and goals     | Section 7, pages 9-10                                                                                                                                                                        |
| c. Review of possible activities | Done February - May 1989, see Section 2, pages 1-2 and Section 8, pages 10-16                                                                                                                |
| d. Select appropriate activities | Section 8, pages 10-16                                                                                                                                                                       |
| e. Public input                  | Section 2, pages 1-2. The process included a planning committee, a survey of residents, and a public meeting.                                                                                |
| f. Implementation                | The plan was adopted by the City Council on November 6, 1989. The City's FY 1990 budget included adequate funds for salaries and supplies and the amounts needed for Projects 8.1.1 and 8.3. |

Section 241g calls for an annual evaluation report. Here is the status of plan implementation by project as of one year after its adoption by the City Council. A report that meets the requirements of Section 241g will be provided to the State Flood Insurance Coordinator and FEMA with each annual recertification.

- 8.1.1 Park pathway construction: Pathways were built in both the park and the Treatment Plant grounds and have proven to very popular.
- 8.1.2 Obtain greenway funding: The City Planner researched seven different programs and submitted applications to three of them. We are on the "short list" for one of them that would provide \$50,000 on a 50/50 match basis. \$50,000 is being added to next year's budget.
- 8.1.3 Obtain greenway easements: Fifteen properties were identified as needing pathway easements and 8 need development setback easements. The City Attorney has obtained donated easements from six property owners. The rest will be obtained as funds are available.
- 8.2.1 Draft stream maintenance SOP: This was completed and submitted to the State Department of Natural Resources. The section on dredging to remove sedimentation was omitted in order to obtain state approval.
- 8.2.2 Obtain maintenance rights of way: These have been easier to obtain than walkway and setback easements. All property owners on Little Creek upstream of Front Street have signed access easements for annual maintenance crews. A few farmers and the County Park Department have yet to agree.
- 8.2.3 Inspect & clear channels: This has been done on City property and where maintenance easements have been obtained. It is expected that when people see the improvements from the maintenance, the rest will sign the agreements.
- 8.3 Prepare Eighth Street drainage plan: The plan was completed, but the cost of the alternatives is so high that nothing will be built without outside funding. The City Planner is looking for funding sources.
- 8.4.1 Flag damaged buildings: The Building Commissioner is prepared for this activity should a flood occur.
- 8.4.2 Research post-disaster funding programs: Done. Materials on the following programs were reviewed and their staff were contacted: FEMA Hazard Mitigation, FEMA Public Assistance, U.S. Army Corps of Engineers, Small Business Administration, Community Development Block Grant, and the Land and Water Conservation Fund.

TO WHOM IT MAY CONCERN  
December 1, 1990  
Page 3.

- 8.5.1 Collect flood protection info & materials: Done. The Public Library has cataloged 12 flood protection and flood-related references, including the City's brochure (Project 8.5.3).
- 8.5.2 Advise property owners: The Planner has talked to 22 property owners. Seven building permits have been issued for floodproofing projects. The number of flood insurance policies sold in Planton has increased from 42 to 60.
- 8.5.3 Distribute flood protection brochure: A brochure was distributed in March. It will be revised to include a discussion of the floodproofing activities undertaken by local property owners and the benefits of the stream maintenance program.
- 8.6 Develop a local flood warning system: A flood warning system for Little Creek is still underway as County officials negotiate with residents to be rain and river gage readers. A warning system for the Planton River has been developed. A standard operating procedure for disseminating the Weather Service's flood warning to residents and critical facilities has been adopted.
- 8.7 Develop a flood preparedness plan: A preliminary plan has been completed and can be used. However, a final, more detailed plan is waiting for a warning system (Project 8.6).
- 8.8.1 Protect the Police & Fire Station: A plan has been developed. The EOC has been consolidated with the County's in the basement of the Court House.
- 8.8.2 Critical facilities protection plans: The plans have been prepared. \$5,000 will be budgeted next year for modifications to the Sewage Treatment Plant control and laboratory building. The Farm Service Company has purchased property out of the floodplain for storage of its hazardous chemicals.
- 8.9.1 Draft building code amendments: Done. The building code was amended in April. It now prohibits new buildings in the floodway and requires lowest floors of new buildings to be one foot above the 100-year flood elevation. The ordinance includes the Eighth Street drainage problem area as floodplain subject to the code.
- 8.9.2 Consolidate codes and maps: Done. The April building code amendments repealed the separate NFIP ordinance and adopted the digitized mapping for all regulations.

TO WHOM IT MAY CONCERN  
December 1, 1990  
Page 4.

8.10 County watershed plan: The project is still underway. There are many different organizations, property owners, and other interests in the watershed. It may take another year or two to reach an acceptable plan.

Attached is Application Worksheet AW-240 that is based on the above accomplishments that have been made pursuant to our Flood Protection Plan. Also attached is a memo that addresses the Repetitive Loss Plan credited under Activity 510. This memo shows how the City's Flood Protection Plan qualifies as a repetitive loss plan.

Questions on this memo and Planton's plans should be addressed to Mr. Bill D. Best, City Planner, at City Hall.

Attachments:

Planton's Flood Protection Plan  
Application Worksheet AW-240  
Memo on repetitive losses

LL:BDB:mlw

**240 FLOODPLAIN MANAGEMENT PLAN:**

Credit for a floodplain management plan is not being applied for.

Attached is the community's floodplain management plan for which credit is being applied. The appropriate values for the "p" variables are shown below.

| Element | Credit      | Applicable Section of the Plan                              |
|---------|-------------|-------------------------------------------------------------|
| 310     | pECPO = 1.  |                                                             |
|         | pECPR = 1.  |                                                             |
|         | pECCF = 1.  |                                                             |
| 320     | pMD = 1.    |                                                             |
| 330     | pOPC = 1.   |                                                             |
|         | pOPF = 1.1  | 8.5.3 Annual distribution of brochures                      |
|         | pOPA1 = 1.  |                                                             |
|         | pOPA2 = 1.  |                                                             |
|         | pOPA3 = 1.  |                                                             |
| 340     | pDFH = 1.   |                                                             |
|         | pREB = 1.   |                                                             |
|         | pDOH = 1.   |                                                             |
|         | pODR = 1.   |                                                             |
| 350     | pLTB = 1.1  | 8.5.1                                                       |
|         | pLPD = 1.1  | 8.5.3 Flood Protection Brochure                             |
| 360     | pFPA = 1.1  | 8.5.2                                                       |
| 410     | pNDS = 1.1  | 8.9.1 Regulating the Eighth Street drainage area            |
|         | pSSA = 1.   |                                                             |
|         | pHED = 1.   |                                                             |
| 420     | pCOS = 1.05 | 8.9.1 Floodway building prohibition                         |
|         | pCLZ = 1.   |                                                             |
|         | pDR = 1.1   | 8.1.3 Development setback easements                         |
| 430     | pFRB = 1.1  | 8.9.1 One foot freeboard added to building code             |
|         | pFDN = 1.   |                                                             |
|         | pCSI = 1.   |                                                             |
|         | pLSI = 1.   |                                                             |
|         | pPCF = 1.   |                                                             |
|         | pPSC = 1.   |                                                             |
|         | pSHR = 1.   |                                                             |
| 440     | pCMD = 1.05 | 8.9.2 Include regulations on digitized map system           |
|         | PERM = 1.   |                                                             |
|         | PMAM = 1.   |                                                             |
|         | pCM = 1.    |                                                             |
| 450     | pSMR = 1.   |                                                             |
|         | pSMP = 1.   |                                                             |
|         | pFRX = 1.   |                                                             |
| 520     | pAR = 1.    |                                                             |
| 530     | pRB = 1.1   | 8.5.2 Retrofitting pursuant to public info (see Commentary) |
| 540     | pCDR = 1.1  | 8.2.3 Inspecting + clearing channels P.530-6                |
|         | pSDR = 1.   |                                                             |
|         | pESC = 1.   |                                                             |
| 610     | pWD = 1.1   | 8.6 Warning System for the Planton River                    |
|         | pFRP = 1.1  | 8.7 For the Platan River                                    |
|         | pLSDS = 1.  |                                                             |
| 620     | pLP = 1.    |                                                             |
| 630     | pDFR = 1.   |                                                             |
|         | pDFP = 1.   |                                                             |

# City of Planton

"City of Progress in the Country"

Leo Lepetomaine, Mayor

November 15, 1990

TO: Mayor Leo Lepetomaine

FROM: <sup>BDB</sup> Bill D. Best, City Planner

SUBJECT: Planton's Repetitive Loss Plan

According to the FEMA list, there are 13 repetitive loss properties in the City. A review of the list revealed that 2 of the properties had the wrong NFIP community number and are actually in the County. By letter of September 4, 1990, I advised the FEMA Regional Office of the error. The 11 remaining properties are plotted on Map 3, page 7, of the 1989 Flood Protection Plan.

The identification of these properties as repetitive losses is no surprise to us. Two are in the Eighth Street drainage problem area that was flooded in 1980, 1982, 1986, and 1988. The surprising thing is that there are not more repetitive loss properties there. The small number is probably due to the lack of knowledge about flood insurance at that time.

The other nine properties are located along Little Creek, upstream of Third Street. As noted on page 6 of our plan, we had identified this area as the hardest hit by flooding. Some of these buildings were also slated for acquisition if funds can be found for greenway acquisition or a post-flood mitigation project.

Because our plan already addressed these two repetitive loss areas, we should not have to prepare a separate repetitive loss plan to comply with the requirements of Activity 510 of the Community Rating System. I sent a copy of the plan to the Insurance Services Office and requested that they confirm this.

The ISO CRS Specialist called me today and confirmed that since the Flood Protection Plan includes a map that shows the 11 FEMA repetitive loss properties and the Plan addresses the repetitive loss areas, it will suffice to meet the requirement. Accordingly, the issue should be deleted from next Monday night's Council agenda.

Attachment:

Application Worksheet AW-510, Repetitive Loss Projects

BDB:mlw

**510 REPETITIVE LOSS PROJECTS:**

**511 Credit Documentation:**

The community must submit the following documentation with its application:

- ✓ a. A copy of the plan prepared in accordance with Section 240.  
[Flood Protection Plan]  
 The community must submit the following documentation with its annual recertification (see Section 214):

- ✓ b. The progress report.

The community must have the following documentation available to verify implementation of this activity:

- ✓ c. Documentation showing how the community calculated the variables in Section 512b: bRL, cARr1, cRBrl, and cLPrl.

**512 Credit Points:**

- a. OPF [Brochure included topics 1,3,4,5:  $4 \times 13 = 52$ ]      OPF = 52
- OPA1      OPA1 = \_\_\_\_\_
- OPA2      OPA2 = \_\_\_\_\_
- OPA3      OPA3 = \_\_\_\_\_
- FPA [Planner helps on all topics except floor elevations:  $7+7+25+20=59$ ]      FPA = 59
- CSI      CSI = \_\_\_\_\_
- LSI      LSI = \_\_\_\_\_
- CDR [Annual maintenance on Little Creek upstream of Front Street includes all open channels in repetitive loss areas  $\frac{150}{1} = 150$ ]      CDR = 150
- SDR      SDR = \_\_\_\_\_
- ESC      ESC = \_\_\_\_\_
- WD [No credit because warning system on Planton River does not affect repetitive loss areas]      WD = \_\_\_\_\_
- FRP      FRP = \_\_\_\_\_
- b. bRL = 159 [20 m Eighth Street, 139 upstream of Third Street in Little Creek]
- bARr1 = \_\_\_\_\_
- cARr1 =  $1600 \times \frac{\text{bARr1}}{\text{bRL} + \text{bARr1}} = \text{_____}$       cARr1 = \_\_\_\_\_

$$RBr1 = 3.36 \text{ [See attached AW-531]}$$

$$cRBr1 = 1400 \times \frac{RBr1 \ 3.36}{bRL \ 159} = 29.58$$

$$cRBr1 = 29.58$$

$$LPL = \underline{\hspace{2cm}}$$

$$bLPr1 = \underline{\hspace{2cm}}$$

$$cLPr1 = LPL \underline{\hspace{1cm}} \times \frac{bLPr1 \underline{\hspace{1cm}}}{bRL \underline{\hspace{1cm}}} = \underline{\hspace{2cm}}$$

$$cLPr1 = \underline{\hspace{2cm}}$$

513 Impact Adjustment:

$$bSF = 187$$

$$rRL = \frac{bRL \ 159}{bSF \ 187} = 0.85$$

$$rRL = 0.85$$

514 Credit Calculation:

$$c510 = \{ OPF \ 52 + OPA1 \underline{\hspace{1cm}} + OPA2 \underline{\hspace{1cm}} + OPA3 \underline{\hspace{1cm}} + \\ FPA \ 59 + CSI \underline{\hspace{1cm}} + LSI \underline{\hspace{1cm}} + \\ (CDR \ 150 \times (1 + SDR \ 0)) + ESC \underline{\hspace{1cm}} + \\ WD \underline{\hspace{1cm}} + FRP \underline{\hspace{1cm}} + cARr1 \underline{\hspace{1cm}} + cRBr1 \ 29.58 + \\ cLPr1 \underline{\hspace{1cm}} \} \times rRL \ 0.85 \times 0.5 = 123.49 \quad c510 = 123$$

TABLE 530. RETROFITTING CALCULATIONS

| Building # | Address                                           | TU  | FPL | TU X FPL |
|------------|---------------------------------------------------|-----|-----|----------|
| 1          | 217 E. 8 <sup>TH</sup> street-basement protection | 0.2 | 0.7 | 0.14     |
| 2          | 301 E. " " " "                                    | 0.2 | 0.7 | 0.14     |
| 3          | 1202 E. 6 <sup>TH</sup> " - dry floodproof        | 0.6 | 0.6 | 0.36     |
| 4          | 1301 E. 7 <sup>TH</sup> " " "                     | 0.6 | 0.6 | 0.36     |
| 5          | 1502 E. 4 <sup>TH</sup> " " "                     | 0.6 | 0.6 | 0.36     |
| 6          | 1501 E. 9 <sup>TH</sup> " elevation               | 1.0 | 1.0 | 1.0      |
| 7          | 1503 E. " " "                                     | 1.0 | 1.0 | 1.0      |

Note: all buildings are located in the two repetitive loss areas

$$RB = \Sigma(TU_i \times FPL_i) = \text{Total of above} = \underline{3.36}$$

- NOTES: 1. See Section 532 for the values of TU and FPL.
2. If there are more than 40 retrofitted buildings, make additional copies of this worksheet as needed. Add the total of each page to obtain  $\Sigma(TU_i \times FPL_i)$  for the value of RB.

# City of Planton

## "City of Progress in the Country"

Leo Lepetomaine, Mayor

December 3, 1990

TO WHOM IT MAY CONCERN

FROM:  Leo Lepetomaine, Mayor

SUBJECT: Alternative Repetitive Loss Documentation

In accordance with the revised criteria for Activity 510 - Repetitive Loss Projects, Planton is submitting the following documentation. A complete plan will be provided with our 1991 CRS Recertification.

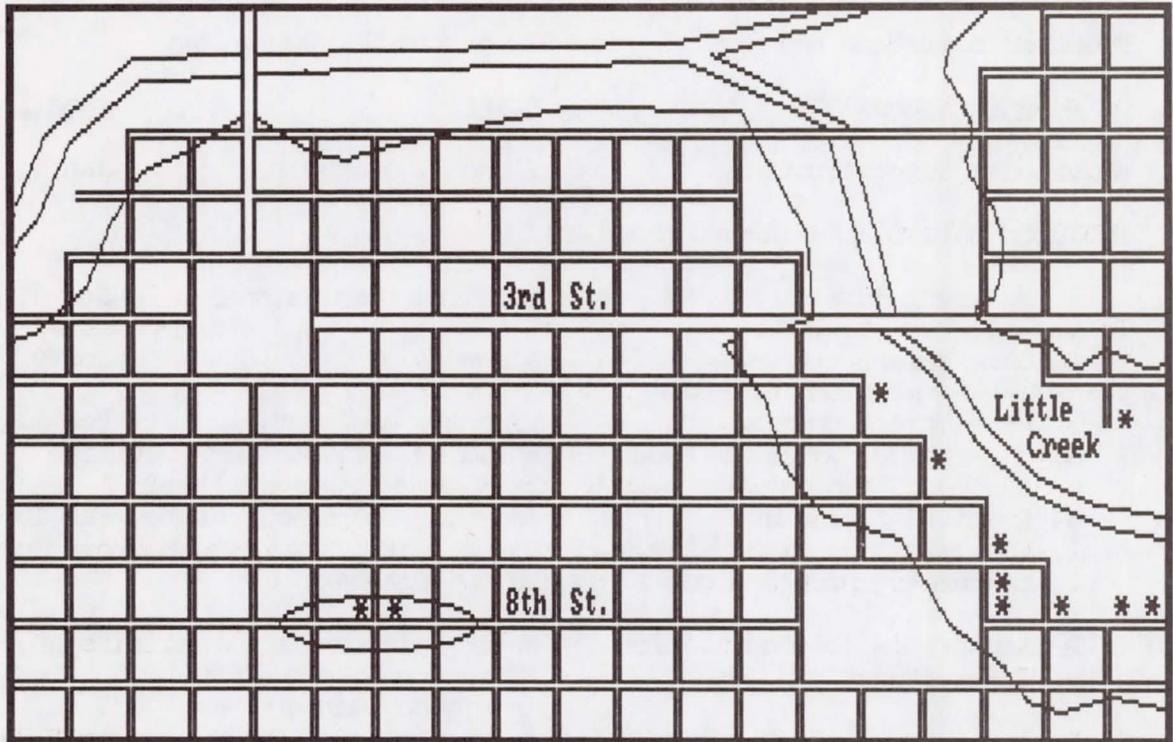
1. Map: Attached is a map showing the location of our 11 repetitive loss properties. Two repetitive loss areas have been identified:
  1. Area #1 is on Eighth Street where the storm sewer becomes overloaded and backs up into streets, yards, and houses.
  2. Area #2 is the reach of Little Creek between our city limits and Third Street.
2. Errors: Our list of repetitive loss properties provided by the FEMA Regional Office had 13 addresses. Two of them are not in the City of Planton. The one at 1605 East 9th Street is just outside our corporate limits, in the Little Creek floodplain. We do not know the location of the property on Rural Route #2. There are no rural routes in Planton.
3. Causes of flooding: Area #1 is a depression that collects street drainage when the storm sewers are full and also is a "holding pond" when the sewers back up. Increased urban development has overloaded the city's storm sewer system in this section of town. Homes in this area have been flooded four times in the last ten years: June 6, 1980, July 23, 1982, July 4, 1986, and August 3, 1988.

Area #2 was flooded by Little Creek in 1974 and 1988 following heavy summer thunderstorms that fell on saturated ground. In 1979 melting of a record snow combined with rains caused flooding on the Creek and on the Planton River. This flood was higher, longer, and caused more damage than the other two, although it has been rated as only a 40-year flood.
4. Timetable: Attached is our proposed schedule for preparing and adopting our repetitive loss plan. The work will be coordinated by the City Planner with support from other staff as listed. They will meet on the second Tuesday of each month to review each planning step.

If you have any questions on this memo, please contact Bill D. Best, City Planner and CRS Coordinator.

Attachments

FEMA Repetitive Loss Properties



\* = Repetitive Loss Property

City of Planton

Repetitive Loss Planning Schedule

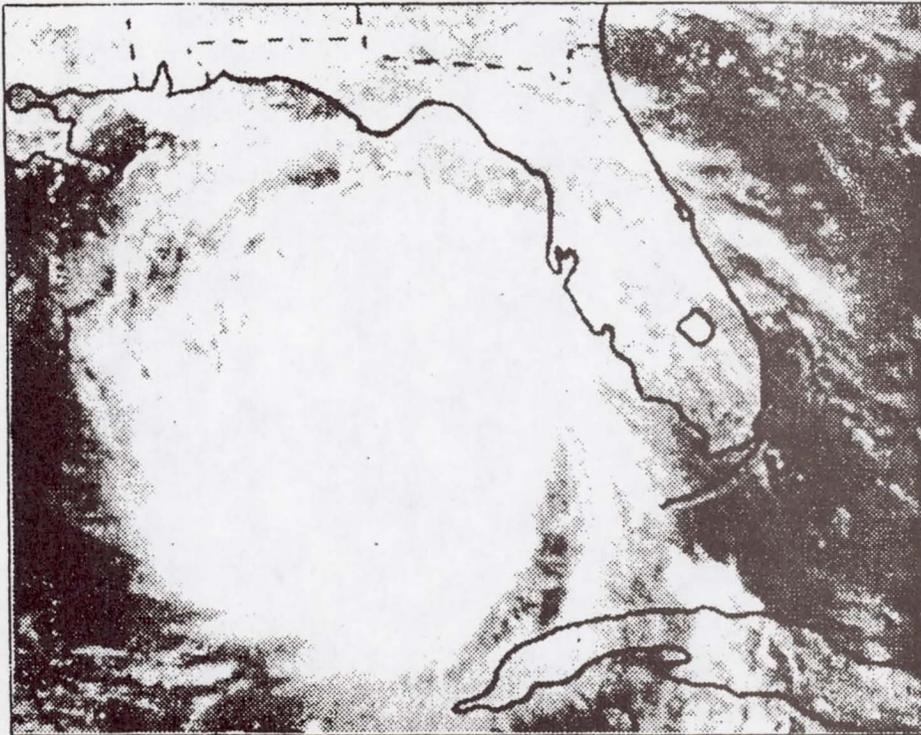
Planning steps are based on Section 241 of the CRS Commentary

| <u>Planning steps</u>                         | <u>Staff</u>                                                                  | <u>Deadline</u> |
|-----------------------------------------------|-------------------------------------------------------------------------------|-----------------|
| a. Problem identification                     | Planner, engineer                                                             | Jan 9, 91       |
| b. Flood hazard area inventory                |                                                                               |                 |
| 1. Building data                              | Building Commissioner                                                         | Jan 9, 91       |
| 2. Development trends                         | Planner                                                                       | Jan 9, 91       |
| 3. Development constraints                    | Planner, engineer,<br>Building Commissioner                                   | Feb 13, 91      |
| 4. Critical facilities                        | Emergency manager, planner                                                    | Feb 13, 91      |
| 5. Community needs and goals                  | Mayor, Planner                                                                | Mar 13, 91      |
| c. Review of possible activities              | Mayor, planner, engineer,<br>director of public works,<br>emergency manager * | May 8, 91       |
| Prepare 1st draft plan                        | Planner                                                                       | Jun 12, 91      |
| d. Select appropriate activities              | Mayor                                                                         | Jun 12, 91      |
| Prepare 2nd draft plan                        | Planner                                                                       | Jul 10, 91      |
| e. Public input: public meeting               | Mayor, planner                                                                | Jul 10, 91      |
| Submit 3rd draft to City<br>Council Committee | Mayor, planner                                                                | Aug 14, 91      |
| Submit recommended plan to<br>City Council    | Committee Chair                                                               | Sep 3, 91       |
| f. Implementation: adopt plan                 | City Council                                                                  | Oct 1, 91       |

\* To include contacting or meeting with the County Emergency Management Coordinator, County Parks Department, County Soil and Water Conservation District, the State NFIP Coordinator, the State Emergency Management Agency, the State Department of Natural Resources, the U.S. Army Corps of Engineers, and the Soil Conservation Service.

**Hazard Mitigation Plan**

**City of Sand Island, Florida**



Draft for Public Review

October 28, 1990

City of Sand Island, Florida

Hazard Mitigation Plan

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City of Sand Island, Florida

Hazard Mitigation Plan

1. Introduction and Purpose

On October 7, 1990, the west coast of Florida was hit by a Category 2 hurricane which caused extensive damage to Palm Bay County and the City of Sand Island. On October 9, Palm Bay County and seven other counties were declared disaster areas by the President.

On October 11, the City was visited by the Federal-State Interagency Hazard Mitigation Team. Team members were given a tour of the damage sites. They offered many useful suggestions for rebuilding so that the island will be better prepared for the next hurricane.

At an emergency session on October 12 the City Council enacted a redevelopment moratorium for the three areas hardest hit (Areas 2, 4, and 10 on Map 2, page 11). Owners were told that the moratorium would be lifted once a redevelopment plan was prepared and acquisition programs could be researched and discussed with them. Meanwhile, owners in the rest of the City are cleaning up and rebuilding. Substantially damaged buildings are required to meet the Building Code's standards for new buildings.

This document is the City of Sand Island's Hazard Mitigation Plan. It is prepared to guide reconstruction and redevelopment of the City and to assist state and federal mitigation planning and funding efforts. It also provides recommendations on the moratorium and on reconstruction.

This document has also been prepared to qualify as a "floodplain management plan" to be credited under the Community Rating System (CRS) of the National Flood Insurance Program (NFIP). Under the CRS, flood insurance rates will be reduced if the City implements activities that go beyond the minimum requirements of the NFIP. The City had been planning to submit an application for CRS classification by the December 15, 1990, deadline.

Additional credit is provided if the activities are implemented based on a floodplain management plan that meets the criteria in Section 241 of the Community Rating System Commentary. The approach selected for preparing this plan was taken from Section 241 and this plan's section headings coincide with Section 241's headings.

The Director of Community Development drafted this plan, with input from other City department heads and the agencies listed on pages 15-16. This plan has been prepared somewhat quickly in order to capitalize on the opportunities presented by areas having been cleared out by the hurricane and to obtain special sources of funds that are available after a disaster declaration.

While the graphics and type may reflect this haste in preparation, the content of this document is based on a careful, proven planning process. It focuses on short-range activities that should be done immediately and identifies long-range activities that can be planned out in more detail over time.

## 2. Topography

Sand Island is a barrier island located 1/2 mile off the coast of Florida. It is bounded on the west by the Gulf of Mexico, on the east by Palm Bay and on the north and south by North and South Passes. It is 3.2 miles long, north to south, and averages 1/3 mile wide (see Map 1, facing page).

The island has a sandy beach on the Gulf side which used to rise up to dunes. The dunes were removed to allow development and access to the beach. The bay side of the island has also been modified by man. It's primary features are steel and concrete retaining walls which average 2-3 feet above the waterline.

There is a "ridge" that runs approximately along Beachview Boulevard. The top of the ridge is 10-12 feet above sea level. The land slopes east to Palm Bay. The base flood is predicted to be 10-16 feet above sea level and would inundate the entire island.

## 3. History of Sand Island

The following is taken from "Sand Island: City of Sun, Sand & Surf" prepared by the Sand Island Chamber of Commerce and Tourism, 1988.

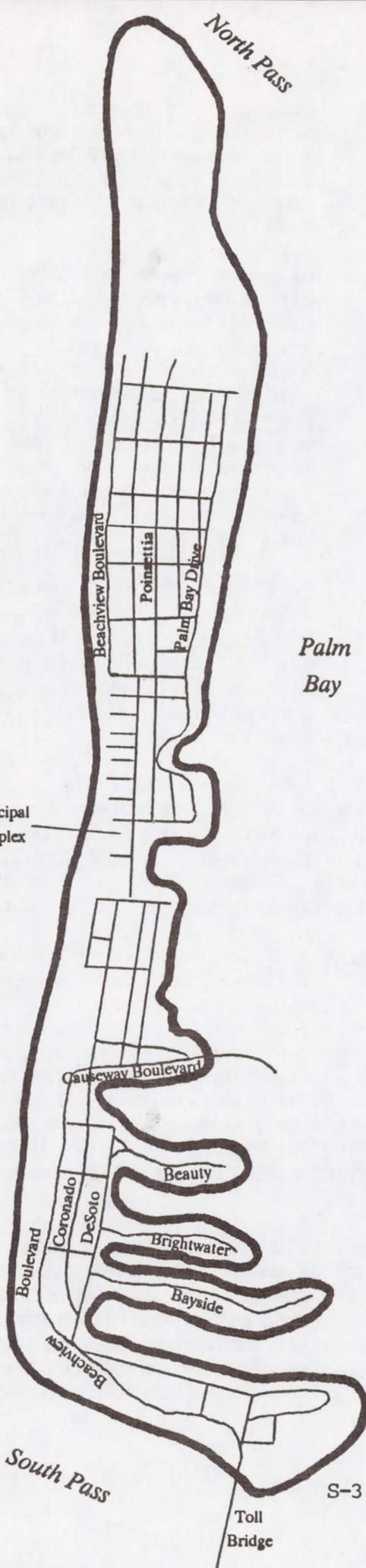
Sand Island was visited often by Indians, sailors, and an occasional pirate during the 1700's and 1800's. The island received it's name when Captain Jonathan Richards was charting the area for the U.S. Navy. Noticing that the island's shoreline had shifted from where it was located on previous maps, he declared the place was "a hot, empty pile of sand, that is moved back and forth by wind and wave and not fit for human settlement."

Little did Captain Richards know what can be accomplished by modern technology! The enterprising residents of Sand Island have turned a pile of sand into pleasant homes, high rise hotels, great resaurants, and one of the world's most beautiful recreation beaches!

Sand Island was settled in the 1890's. A few homesteaders eked out livings as farmers and fishermen until 1921. In 1921 a hurricane surge covered the land below 10 feet with salt water, dealing a death blow to the small agricultural industry. The farmers left, leaving only a few fishermen as occupants.

In 1927 a few well-to-do New York City friends bought up most of the island and intended to build large estates on it. Their plans were disrupted by the Depression and the island stayed relatively undeveloped. A winter home was built on the northernmost area by the Van Dine family. To this day, there is only one building on the northern 3/4 mile of the island, the Van Dine family estate.

Gulf of Mexico



Map 1. City of Sand Island

Palm Bay

**Sand Island, Florida**

*"City of Sun, Sand & Surf"*

After World War II, development of tourism began a 20 year building boom. The resident fishermen became fishing and tour guides. Winter homes started going up along the shoreline on Beachview Boulevard and Palm Bay Drive in the northern two-thirds of the island. A few motels, restaurants, and shops were built along Coronado and DeSoto Drives.

In 1950 the island incorporated in order to develop a public water system that could support the increasing development. Due to the transient nature of most of the island's winter residents, the majority of the elected officials were small businessmen and motel owners. With great foresight, a bond issue was passed to purchase the beach on the Gulf side and reserve it as a public beach.

The other top priority of the early civic leaders was to have the island connected to the mainland. Their efforts were rewarded in 1957 with the opening of a bridge between the mainland and the

renamed street of "Causeway Boulevard." Within five years the remaining vacant land in the city was built on. In 1965, a toll bridge was built to the island across South Pass.

As available properties became developed, it looked like the island would stop growing. Again, modern technology overcame this hurdle. In 1962, a developer from the mainland purchased the southeast shoreline and built three streets on fill to create canalfront homesites. Homeowners on Beauty, Brightwater, and Bayside Drives have the best of both worlds: sheltered mooring for their boats and a short walk to the beach.

Since the boom quieted down after 1962, the only major commercial development has been the conversion of some of the smaller motels on Beachview Boulevard to high rise hotels. By the 1970's, most of the winter homes had become permanent residences when the owners retired.

The population of Sand Island is now 6,250. Approximately one-half of the residents are retirees. The rest work on the island or commute to jobs on the mainland. During November through April, there are an additional 6,000 tourists. During other times of the year there are usually 2,000 - 3,000 visitors with up to 5,000 on weekends.

#### 4. Problem Identification

##### Hurricanes

The major threats faced by Sand Island are hurricanes and coastal storms. There are three types of hazards presented by these storms: wind, surge, and rain. The following description of these three hazards has been taken from the Bay County, Florida, "Hurricane Evacuation Implementation Guide," 1987.

- "a. High winds: A hurricane is defined by its wind speed (see description of hurricane categories on the next page). A storm with velocities of more than 74 miles per hour is classified as a hurricane. These winds can blow roofs off of buildings and destroy mobile homes. All evacuation activities must be completed prior to winds reaching tropical storm status (40 mph).

"A related problem is tornadoes spawned by hurricanes, which will develop fast, inflict tremendous destruction, and vanish as fast as they appeared. It is impossible to predict tornadoes and where they will strike.

- "b. Storm surge: This is a great dome of water caused by winds and pressure differences in the air. Areas are flooded by water that can be up to 18 feet higher than normal sea levels. On the west coast of Florida, the maximum storm surge is experienced south of where the eye makes landfall. This surge, especially when coupled with the breaking waves, causes great destruction and accounts for nine out of ten hurricane deaths.
- "c. Rainfall: Six to twelve inches of rainfall generally accompanies a hurricane. This causes flooding of streets before and during the worst part of a hurricane and river flooding inland after the storm passes."

### Hurricane Categories

Category 1: Winds 74-95 mph. Damage to shrubbery, trees, unanchored mobile homes, and some signs. Storm surge 5-7 feet above normal. Some damage to piers and exposed small craft.

Category 2: Winds 96-110 mph. Some trees blown down. Major damage to mobile homes and signs. Some damage to building roofs and windows. Storm surge 8-10 feet. Considerable damage to piers, marinas and small craft.

Category 3: Winds 111-130 mph. Large trees and many signs blown down. Mobile homes substantially damaged. Some structural damage to small buildings. Storm surge 11-12 feet. In addition to water damage, structures severely damaged by waves and floating debris.

Category 4: Winds 131-155 mph. All signs blown down. Mobile homes destroyed. Extensive damage to roofing, windows, and doors. Storm surge of 13-18 feet above normal water levels.

Category 5: Winds over 155 mph. Some complete building failures. Storm surge over 18 feet. Major damage to structures less than 15 feet above sea level within 500 yards of shore.

The above was taken from page 7 of the Bay County, Florida, "Hurricane Evacuation Implementation Guide," 1987.

### Flood Hazard Data

The three most recent storms, "no-name," Elena, and Frank produced storm surges of 5.5, 6, and 10 feet, respectively. The Flood Insurance Rate Map (FIRM) for Sand Island shows the base flood elevation as high as 16 feet for the V Zone closest to the Gulf. The lowest elevation is the A Zone on the Palm Bay side, 10 feet. Needless to say, all of Sand Island is in either a V or an A Zone. The base flood will cover the entire city.

The combination of storm surge and wave hazard is represented by the V Zone on the FIRM. This area is where waves during the base flood are at least three feet higher than the stillwater elevation. This "coastal high hazard area" is the most dangerous part of the island. According to the FIRM, the V Zone is roughly the area west and south of Beachview Boulevard. The beach and the houses on Beachview act as "wave busters," making them break and protecting the areas inland.

The FIRM's description of the hazard is now outdated because Hurricane Frank eliminated much of the beach and many of the wave buster houses. A re-study of the City would probably move the V Zone further east. The base flood hazard is now greater than that shown on the FIRM.

A related concern is that it only takes a Category 3 hurricane to produce the base flood. Larger hurricanes, like Hugo and Gilbert, have occurred in the last few years. This Mitigation Plan therefore recommends activities to protect the City and its population from threats that are greater than Hurricane Frank and the base flood.

### Flood History

Sand Island has not experienced anything worse than a Category 2 hurricane since it was built up after 1945. The following review of past flooding is taken from the Sand Island Flood Insurance Study, pages 5-6.

Flooding in the Sand Island area results primarily from tropical storms and hurricanes that cause intense rainfall, excessive runoff, and tidal surge (and associated wave action) in coastal areas. Not all storms that pass close to the study area produce extremely high tides. Similarly, storms that produce extreme conditions in one area may not necessarily produce critical conditions in other parts of the study.

Storms passing in the vicinity of Sand Island have produced a number of major floods causing significant damage. A brief description of several significant tropical storms provides historic information to which and tidal flood hazards and the projected flood depths can be compared.

October 21-31, 1921: This storm originated in the western Caribbean Sea and entered Florida north of Tarpon Springs. Wind speed was estimated at 70 to 90 knots. The coast from Tarpon Springs south to Fort Myers experienced tides from 7 to 10 feet. Sand Island sustained an estimated \$30,000 in damage to houses, piers and boats. Flooding conditions were prolonged because of the slow forward movement of the storm.

August 31-September 8, 1935: This storm, called the "Labor Day Hurricane," was one of the most severe tropical disturbances ever recorded. The storm was first located east of Turks Island, traveled toward the Florida Straits, recurved across the Florida Keys, then passed up the west coast of Florida on a broad recurve that brought it inland near Cedar Key. Along the beach areas from Sarasota northward to Clearwater, homes were undermined and badly damaged. Mass evacuation of those areas was accomplished before the storm.

September 1-7, 1950: This hurricane originated over the western Caribbean Sea, passed northward over Cuba and the Gulf of Mexico, then moved north-north-westward parallel to the Florida coastline. It made two loops near Cedar Key, moved inland southeastward, passed approximately 30 miles north of Tampa, recurved, and traveled northward. Sand Island areas sustained heavy damage, principally from the long duration of high tides and waves that caused considerable erosion and recession of the shoreline. This small, but severe hurricane was also accompanied by intense rainfall. A total of 12.7 inches of rain in 2 days was reported in Sand Island.

June 4-14, 1966: This storm, Hurricane Alma, originated in the Gulf of Honduras, passed between Dry Tortugas and Key West, and landed in the Apalachee Bay area, causing variable tides ranging up to 10 feet above normal on the west coast of Florida. Besides structural damage in west Florida, the mango crop in the southwestern portion of the state and the grapefruit crop around Palm Bay County were severely damaged.

June 19, 1972: Hurricane Agnes originated on the northeastern tip of the Yucatan Peninsula and traveled westward. The storm was of large diameter, and, although the center of this storm passed approximately 150 miles west of the Florida Peninsula, it produced a high, damaging tidal surge. In Palm Bay County, tides averaged 3 to 6 feet above normal in the coastal areas. Beaches and causeways were flooded. Damage in Palm Bay County from this storm was estimated at \$12.5 million.

June 18, 1982: The "no-name" storm recorded winds up to 49 mph and rainfall amounts between 4 to 6 inches. The storm came ashore from the Gulf of Mexico during a high tide situation, which resulted in abnormally high tides of 5.5 feet in Palm Bay County. The areas flooded were very similar to those damaged in June 1972. The estimated public and private property damage from the "no-name" storm was over 16 million dollars (\$16,000,000).

September 1-4, 1985: Hurricane Elena threatened Florida's west coast on Labor Day weekend. More than 500,000 residents left their homes in the largest regional evacuation in U.S. history. Public shelters housed 200,000 people for up to three days because the storm stalled over the Gulf of Mexico. Damages totaled more than \$150 million, even though the eye was over 100 miles off shore.

### Hurricane Frank

(Chronology based on data from the Palm Bay County Office of Emergency Services (PBCOES))

On October 3 the National Hurricane Center in Miami classified Tropical Storm Frank as a Category I hurricane (winds of 74-95 mph). It moved south of Cuba, causing minor damage along the Cuban and Yucatan coastlines. It continued northwesterly, apparently heading for New Orleans. Missing major land masses, it slowly increased in force.

On October 5, the Hurricane Center redesignated Frank as a Category II (winds of 96-110 mph). The Palm Bay County Office of Emergency Services announced "Hurricane Condition 4," an advisory telling people that a potential threat exists.

On Saturday morning, October 6, Frank was 400 miles northwest of Cuba, apparently stalling. It started to inch to the northeast (see photo on cover of this plan). PBCOES announced "Hurricane Condition 3." A Hurricane Watch was issued on local radio and television, advising people that Frank could hit the area in 36-48 hours.

On Saturday afternoon Frank appeared to be aiming directly at Sand Island. All people in designated zones were ordered by the County to evacuate. All of Sand Island is in the evacuation zone.

The City's Police Chief called up the auxiliaries and set up control points to keep traffic moving. The Police dispatcher called all the hotels and advised them of the evacuation order. Squad cars went up and down streets and issued the order with loudspeakers. Beaches were closed and cleared.

The County's evacuation plan calls for everyone north of Causeway Boulevard to use the causeway and everyone south of Causeway to go south across the toll bridge. As the evacuation progressed, it was discovered that the toll bridge was settling and weakening. It was agreed that the bridge should not be used to carry the heavy load of a continuous stream of cars, trucks and recreational vehicles. The Mayor ordered the bridge closed and traffic rerouted to the causeway.

As the rain increased into the evening, streets became flooded and it got darker. Cars, trucks and RVs jammed up on Beachview Boulevard, not sure which way to go. Tempers flared when people were told to turn around. There were similar jams and cursing at the boat ramp and marina as people scurried to get their boats out of the water.

By sunrise Sunday morning, October 7, Sand Island was considered evacuated. The causeway was closed at the mainland. A few policemen and paramedics stayed in the Municipal Complex and some residents stayed in their homes. The hotels all reported that they were empty. PBCOES issued "Hurricane Condition 1" when landfall was expected in 12 hours.

By Sunday afternoon the rain became torrential. Winds coupled with high water due to the storm surge created waves 10 to 15 feet high that hammered the beaches. As the winds were out of the southwest, hotels along the south end of Beachview and the toll bridge were hit the hardest. The tide was rising.

By Sunday evening, the eye of the storm was only 50 miles from Sand Island. Winds were estimated at 100 mph. Waves pounded as far in as Beachview Boulevard. The combination of high tide and storm surge raised the level of the water to 10 feet above sea level. Continuing to be unpredictable, Hurricane Frank turned north-northwest and later hit the Mobile-Pensacola area.

On Monday morning, October 8, the rains and winds subsided at Sand Island. Emergency crews were allowed back on the island to make preliminary damage assessments. The general population was kept off for another day.

#### Preliminary Damage Assessment

(Data courtesy of Palm Bay County Office of Emergency Services)

The evacuation was declared a success by all involved. Evacuation planning had been greatly improved after the experiences of Hurricane Elena in 1985. In spite of closing a bridge and changing the plan in midstream, over 9,000 people were evacuated over one bridge in less than 10 hours. Emergency preparedness paid off.

There were no deaths or serious injuries. A few homeowners who stayed on the island swore they'll never try to ride out a hurricane again.

Twelve damage areas are identified as shown on Map 2 on page 11. Area 1 is the Van Dine property. The area is primarily vacant, so there was little property damage, except to the Van Dine house.

Much of the Gulf beach is gone (Areas 2, 5, and 7). Bathhouses on the beach were destroyed by waves or undermining. There is no beach left in front of the hotels facing South Pass (Area 11).

There is a 3½ block stretch at the north end of Beachview where all homes between the street and the Gulf were destroyed (Area 2). Reconstruction was deferred until water and electrical service could be restored to the area. The moratorium has prevented rebuilding in this area.

Most of Area 7 is public beach and parking lot. There were no buildings on the Gulf side of Beachview Boulevard. Much of the beach has been eroded away and two bathhouses are gone, but Beachview is usable.

The newer condominiums and multi-family buildings in Areas 8 and 12 fared well. They are elevated over parking lots and did not receive much wave action.

The new high-rise hotels on the South Pass side of Beachview Boulevard suffered broken glass (Area 11). Waves flooded into their first floors and soaked them nearly to the ceilings. However, their contents had been moved upstairs. They have lost all their beaches and there are a few cracks in their swimming pools and seawalls.

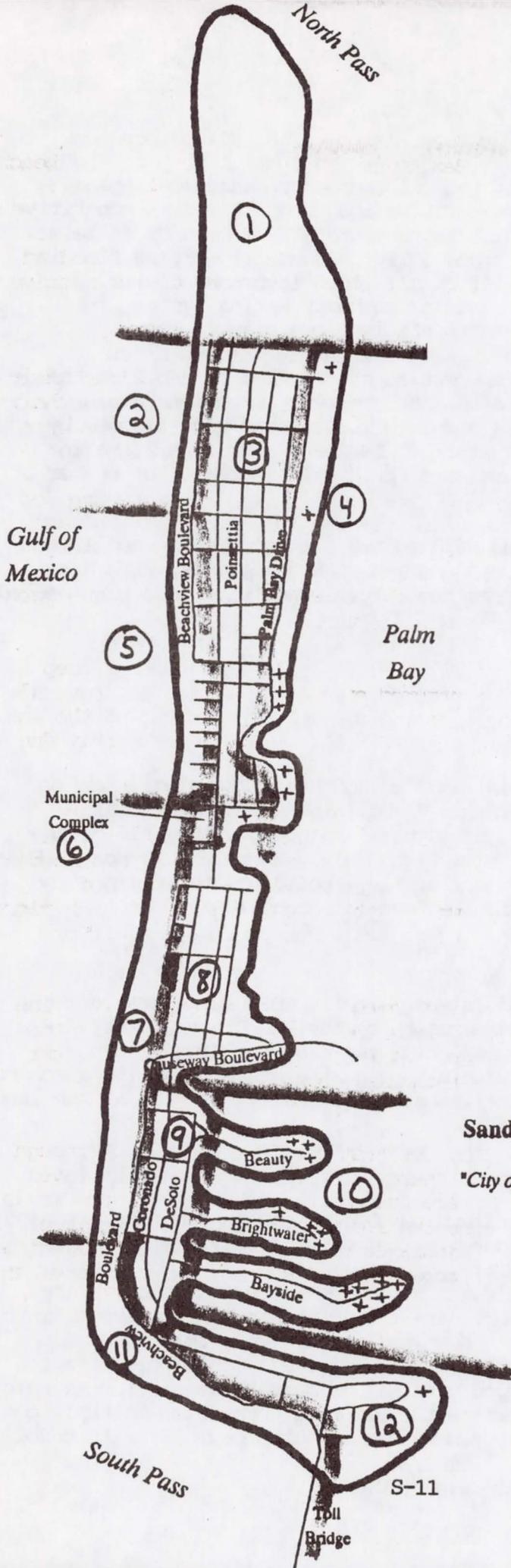
The older hotels and restaurants along DeSoto and Coronado were not built above flood levels (Area 9). They suffered some wind damage and 2-3 feet of flooding from the surge. Being one and two story buildings, most of their rooms were damaged. They will need extensive clean up before they can reopen. Several hotel signs were blown down. One landed on a car and crushed its roof.

The houses built on fill into Palm Bay were flooded 3-4 feet deep (Area 10). Their yards have suffered extensive erosion and several houses are in danger of being undermined. Several houses on the end of Bayside Drive have visible cracks in their walls, apparently due to loss of supporting fill.

Homes in Area 5 along the beach side of Beachview Boulevard were battered and many were heavily damaged. With two exceptions, the newer homes that were elevated according to the floodplain management ordinance standards suffered only broken windows and some roof damage. What remains of the two exceptions are eight foot high piers sticking out of the ground. The houses on top were blown off or blown apart.

Homes east of Beachview have wind damage to windows and roofs. The east half of Area 3 was flooded from the surge. At Poinsettia the sea water was a few inches deep. At Palm Bay Drive (Area 4) water was four feet, resulting in substantial damages to most of the buildings.

The Municipal Complex survived, but just barely (Area 6). Although 1/2 block back from the beach, there was nothing to stop the waves from hitting the building. There are cracks appearing in some walls and the first floor of the Fire Station was flooded by two feet of sea water. A fire truck and ambulance were left with the paramedics who stayed. They were both flooded three feet deep in salt water and need repair.



Map 2. Damage Areas  
From Hurricane Frank

+ Repetitive Loss Property

**Sand Island, Florida**  
 "City of Sun, Sand & Surf"

## Repetitive Loss Areas

Based on a printout from the Federal Emergency Management Agency (FEMA), Sand Island has 22 repetitive loss properties. A repetitive loss property is one for which two or more NFIP losses of at least \$1,000 each have been paid since 1978. Because repetitive flooding accounts for approximately 40% of all flood insurance claims payments, a community that wants a Community Rating System classification must prepare a repetitive loss plan.

The City's repetitive loss properties are plotted on Map 2 on the preceding page. It can be seen that the repetitive loss areas coincide with Damage Areas 4 and 10. These areas were flooded by surges during the "no-name" storm of 1982 and Hurricane Elena in 1985. It is likely that Hurricane Frank will increase the number of repetitive loss properties.

Because this Mitigation Plan will address Damage Areas 4 and 10 and it is being prepared in accordance with CRS guidelines, FEMA has agreed that it will qualify as the City's repetitive loss plan needed for the CRS.

## 5. Hazard Area Inventory

### Damage-prone Buildings

Based on water meter records, Sand Island has 1,784 single-family homes, 976 multi-family units in 98 buildings, 133 commercial properties and 8 city-owned buildings. As noted above, all of the 2,023 buildings are in the base floodplain. There are 22 post-FIRM houses and three post-FIRM hotels, i.e., buildings built since the floodplain ordinance went into effect in March, 1983.

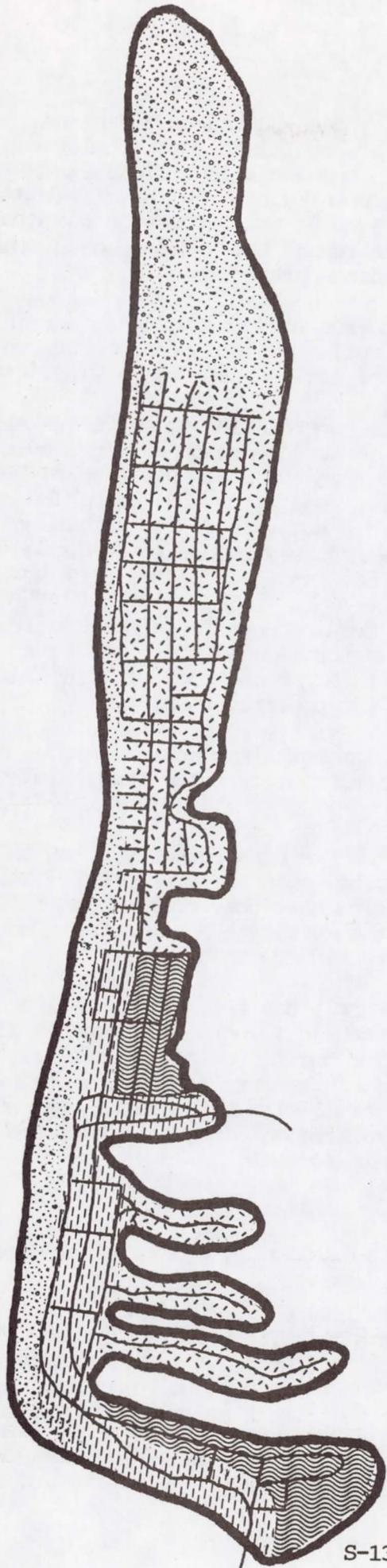
### Development Trends

See Map 3, next page. Sand Island is built up. There are no privately-owned vacant lands except for the Van Dine property. New construction is limited to replacing existing buildings. Redevelopment will remain within the constraints of the City's zoning ordinance. The zoning districts are practically the same as the land use map on the next page.

### Development Constraints

There are four major constraints to development in the City: zoning, floodplain regulations, ownership, and water supply.

- a. Zoning: The zoning ordinance preserves the status quo. No new commercial development or multi-family housing will encroach into the single-family zones. However, it is likely that the commercial and multi-family areas, especially those close to the water, will be redeveloped with higher density uses. For example, there is one proposal before the Planning Commission to replace a building with six townhouses with an eight story, 75 unit condo.



Map 3. Current Land Use

-  Single-family residential
-  Multi-family residential
-  Commercial
-  Beach/open space

Source: "Comprehensive Land Use Plan for the City of Sand Island, Florida," 1980

- b. Floodplain regulations: The City has adopted an ordinance that meets the minimum NFIP rules. New buildings must be elevated above the base flood elevation. Commercial buildings can be floodproofed. In the V Zone, new buildings must be elevated on open pilings or piers so that waves do not batter the building walls. Sand dunes cannot be altered in the V Zone because they provide protection for the buildings behind them.

The effectiveness of these standards was proven during Hurricane Frank. No post-FIRM buildings suffered flood damage. However, two post-FIRM buildings were apparently destroyed by wind.

The Florida Coastal Construction Control Line is set to restrict development that may adversely impact the beach and dune system. New structures require a permit from the State Division of Beaches & Shores. Currently the CCC line runs along the beach side of the buildings on Beachview Boulevard. However, due to the change in terrain from Hurricane Frank, a resurvey should be conducted by the State to move the line inland.

There are some other new State requirements for comprehensive plans with coastal and post-disaster redevelopment elements. These were mandated by the Growth Management Act of 1985, but unfortunately the City has not yet prepared them.

- c. Ownership: The City of Sand Island owns the most hazardous area: the public beach. The State of Florida owns the land below the water line.

The only other vacant area is the Van Dine property. As long as the family patriarch was alive, he resisted development. However, after he died last year, his heirs have been considering selling to a resort developer. After the hurricane damaged their house, selling could be even more attractive to them.

- d. Water supply: The City water supply has reached its limits. The pipe from the mainland is only so big. The water tower is filled up every night and nearly emptied during the day, especially on hot days. On some days, the water pressure has dropped below the needed fire flow pressure. Improvements to the water system, such as a second pipe will be very expensive. They have been resisted by those opposed to a water rate increase.

#### Critical Facilities

Five critical facilities have been identified:

- a. The most important critical facility on Sand Island is the Municipal Complex (Area 6 on Map 2). The complex includes City Hall, the Police Station, the Fire Station, the Street Department garage, and the water tower. There are no medical facilities on the island, so preservation of the Fire Station and its ambulances is vital for public health and safety.

- b. The two bridges are also considered critical facilities. As was shown during the evacuation before Hurricane Frank, closing either one greatly complicates the process of getting people to safety. If both were lost, hundreds, if not thousands, of people could die during a large hurricane.
- c. Two more critical facilities have been designated in Damage Area 8: the Sea Breeze and Bayview Nursing Homes. These deserve special attention during evacuation to ensure that they have enough lead time and that disruption of the residents' lives is minimized.

#### Community Needs, Goals and Plans

Although the City has not prepared the latest required comprehensive plan, several needs and goals are apparent:

- a. Protect lives and property from the hazards of wind, surge, and rain.
- b. Preserve and restore the public beach which is essential to the economy of the City and protects the island from destructive waves.
- c. Preserve the existing land use pattern.
- d. Ensure continuous police, fire, ambulance, and other public services by repairing and protecting the Municipal Complex from storm and flood damage.
- e. Ensure an adequate supply of water for present and future needs.

#### 6. Review of Possible Activities

During the two weeks following the visit by the Hazard Mitigation Team, the Director of Community Development researched into mitigation tools. This work included contacting the following organizations:

- The Sand Island Departments of Police, Fire, Streets, Water, Code Enforcement, and Beach and Recreation, the City Attorney and the City Treasurer.
- The Palm Bay County Office of Emergency Services, Department of Transportation, and Beaches and Parks Department.
- The Florida Department of Community Affairs, Divisions of Emergency Management, Housing and Community Development, and Resource Planning and Management.

- The Florida Department of Commerce, Division of Economic Development; the Florida Department of Environmental Regulation, Division of Water Management, and the Florida Department of Natural Resources, Division of Beaches and Shores.
- University of Florida Sea Grant Program.
- U.S. Army Corps of Engineers, Jacksonville District.
- Federal Emergency Management Agency, Region IV.
- Association of State Floodplain Managers' Floodplain Management Resource Center
- Sand Island Chamber of Commerce and Tourism.
- Palm Bay County Board of Realtors

## 7. Selection of Appropriate Activities

Based on the research and discussions with the groups listed above, 11 activities are recommended to meet the needs and goals listed on page 15. Activities 1-6 are short-range and Activities 7-11 are long-range solutions. These activities and this plan will be the subject of a public meeting to be held on October 30. A revised plan will be presented to the City Council on November 5.

The 11 activities are listed below, along with who is responsible for them and when they should be completed. Most of these activities can be accomplished by staff resources. A budget is included for those activities that need funds.

Following each recommended activity is a note on how it would be credited by the Community Rating System (CRS). This plan includes activities that are not recognized by the CRS, but are nevertheless important to mitigate future losses and meet the City's needs and goals.

### Short-Range Activities

1. Continue the moratorium on lots where the buildings have been destroyed and freeze development at its current density. An extension of the current moratorium will assist in the acquisition of properties in Area 2. In Areas 4 and 10, it be enforced on a lot by lot basis. If a category 2 hurricane destroys buildings, the sites are unsafe for construction. "Taking" is not an issue, because the City intends to acquire the properties (see next activity).

Preventing an increase in development densities is necessary until the water system can handle more hook-ups. If this City allows more water users, we jeopardize our fire protection and our fire insurance rating. We would be asking for another type of disaster. By converting existing water users to open space (see next activity), we can reduce water usage so our supply becomes adequate.

Responsible person: Building Inspector.

Support agencies: City Attorney.

Deadline: N/A

CRS Credit: Preventing new buildings on vacant lots is recognized under Activity 420 - Open Space Preservation. Protecting the water supply is not recognized by the CRS for flood insurance, but is recognized by the fire insurance rating system.

2. Acquire destroyed and substantially damaged buildings on the beach and the bay. With the loss of beach along the Gulf shore, the properties on Beachview Boulevard are even more susceptible to damage by a coastal storm. All of Damage Area 2, where the buildings have been eliminated, should be purchased and added to the City's beach. Lots in Areas 4 and 10 should be purchased to provide public open space and access to the bayfront.

Responsible person: Director of Community Development

Support agencies: The National Flood Insurance Program (NFIP) has two programs that can help purchase flood-damaged properties or properties that are in imminent threat of destruction due to erosion. Other sources of funds, such as the Community Development Block Grant and FEMA's Hazard Mitigation Grant Program could help purchase or move buildings not eligible for the NFIP programs (e.g., those without flood insurance). The City Attorney can provide support on the legal aspects of eminent domain.

Deadlines: November 15: Prepare descriptions of how financial assistance programs operate.

November 30: Meet with all affected property owners and discuss the options with them.

Budget: By December 15, a budget should be prepared, based on outside funds available.

CRS credit: Credit will be provided after the properties are acquired under Activity 520 - Acquisition and Relocation.

Additional credit will be made available under Activity 420 - Open Space Preservation for those properties that are cleared and kept in open space. More credit is possible if we add deed restrictions to the acquired properties to keep them permanently in open space.

3. Revise the regulatory maps. Reconstruction should be in accordance with the true hazard, not yesterday's maps. An interim FIRM and Coastal Construction Control Line are needed before the moratorium is lifted. A map of erosion rates would also help guide reconstruction away from areas that will be underwater in thirty years.

Responsible person: Director of Community Development

Support agencies: U.S. Army Corps of Engineers, Florida Department of Natural Resources, Division of Beaches and Shores.

Deadline: December 31

CRS credit: None. The CRS does not credit providing new data in areas already studied in detail.

4. Revise the City's Building Code. The state has recently published new recommended guidelines for protecting buildings from damage by hurricanes. These should be reviewed and the following amendments should be incorporated into the Building Code:

- Wind protection anchoring and connector standards.
- Raise the minimum flood protection level from the base flood elevation (BFE) to two feet above the BFE.
- New critical facilities should be protected to five feet above the BFE, two feet above the 500-year flood elevation.
- Improvements to buildings should be counted cumulatively so that eventually all buildings will be brought up to flood protection standards.
- The Building Inspector should require and maintain FEMA Elevation Certificates for all permits for new buildings or improvements to buildings.

Responsible person: Building Inspector.

Support agencies: City Attorney.

Deadline: Draft revisions should be presented to the City Council for its November 5 meeting.

CRS Credit: Except for the wind protection standards, all of the recommended changes are credited under Activity 430 - Higher Regulatory Standards or Activity 310 - Elevation Certificate.

5. Advise and assist property owners on retrofitting their buildings. "Retrofitting" means modifying an existing building or its yard to protect it from flood damage. Homes on crawlspaces can be elevated at a cost of \$5,000-\$10,000. Buildings on slabs, subject to water less than three feet deep, can be made watertight or "dry floodproofed." Hotels with floodable first floors can "wet floodproof" their first floors by using materials that are not damaged by salt water.

Property owners need to be made aware of retrofitting, particularly those measures, such as wet floodproofing, that can be incorporated in reconstruction. There are many documents on the topic that the Director of Community Development will turn over to the Sand Island Library. He will also begin a series of articles on retrofitting for the City's newsletter. The Building Inspector will tell interested property owners about historical flood and flood protection levels and provide the names of contractors who have built retrofitting measures in the area.

Responsible person: Director of Community Development, Building Inspector

Support agencies: Sand Island Library, Consulting Engineer, U.S. Army Corps of Engineers

Deadline: Begin services by October 30

CRS credit: Credit for these public information programs is available under Activities 330 - Outreach Projects, 350 - Flood Protection Library, and 360 - Flood Protection Assistance.

6. Property owners also need to be aware of sources of financial assistance for retrofitting. Several disaster assistance programs can fund retrofitting now. The Director of Community Development will develop an article on financial assistance. If there are enough funds available after Activity 2 is budgeted, he will prepare a proposal for a FEMA Hazard Mitigation Grant to help fund retrofitting.

Responsible person: Director of Community Development

Support agencies: FEMA, Small Business Administration

Deadline: Begin services by November 10

CRS credit: There is no credit for this activity. However, if buildings are retrofitted, credit is available under Activity 530 - Retrofitting.

## Long-Range Activities

7. The most important long-range activity is to restore Sand Island's beaches. There are three possible approaches to do this: import sand and build a new beach, construct jetties or other barriers to speed up the natural process of moving sand back to the beach, and let the beach return at its natural pace. It is unlikely that Sand Island's economy can wait for the third approach.

In fact, all of these approaches will take years. The first is the fastest but most expensive and will require financial assistance from the U.S. Army Corps of Engineers. The Corps also has the expertise on beach restoration, so the best first step is to ask for their help.

In the interim, the Van Dine property could be purchased. Because it has been left in its natural state, most of its beach has survived the storm. A shuttle trolley can be established between the hotel area and the property to get tourists to the water. The Director of Community Development should include the Van Dine property in his work on Activity 2.

Responsible person: Director of Community Development

Support agencies: U.S. Army Corps of Engineers, Florida Division of Beaches & Shores, Palm Bay County Department of Beaches & Parks.

Deadline: Enter into a study agreement with the Corps by December 31, 1990.

Have a preliminary status report by December 31, 1991.

Budget: The City may have to pay part of the Corps' study costs. More details on this will be provided when the study agreement is sent to the City Council.

CRS credit: Credit is based on the amount of land preserved as open space under Activity 420 - Open Space Preservation. A publicly-owned beach is counted as preserved open space. In fact, credit is doubled for preserving open beaches and sand dune fields, which are considered a special flood-related hazard areas.

Extra credit can also be obtained by adding deed restrictions to the public lands. Acquiring the Van Dine property would double our credit points by doubling the acreage of public open space.

8. Prepare and implement a hazard awareness program. The City possesses a lot of technical information on hurricanes, coastal storms, and flooding. The average newcomer and tourist is unaware of the extent of the threat or what to do to protect themselves. Most are surprised that banks require flood insurance as a condition of a mortgage.

The hazards cannot be hidden. There is a lawsuit pending against a real estate firm in another county by a property owner who was not advised of the presence of sinkholes in the area. This City and its businesses can best serve the public by full disclosure of the natural hazards and by providing information to people on how to minimize the effect of those hazards.

The hazard awareness program should be carefully developed with the cooperation of the banks, real estate agents, and insurance agents. It should include the following:

- The City Building Inspector should prepare Elevation Certificates on the 25 post-FIRM buildings and, as noted in Activity 4, keep them on all new buildings. He should provide Elevation Certificates and flood hazard data from the FIRM to inquirers.
- The Director of Community Development will draft a booklet on the hazards, the City's storm warning system, safety precautions, evacuation procedures, flood insurance, and property protection measures. The booklet should be reproduced by the Chamber of Commerce and Tourism and provided to all local businesses.
- In June of each year, the City should conduct a Hurricane Awareness Week to remind everyone of the hazard and protection measures. The booklet should be mailed to everyone with the June water bill. A practice evacuation should be conducted as a drill for participants and to provide added publicity. Appropriate City or County officials should give presentations to groups such as the Chamber and the Board of Realtors.
- The Palm Bay County Board of Realtors should amend its Multiple Listing Service forms to include a notice of flood hazard and the requirement to purchase flood insurance for all properties in Sand Island.
- The Consulting Engineer should recommend locations for elevation awareness signs. These would show the elevations of the high water during Hurricane Frank, the base flood, and the base flood plus two feet. These should be surveyed in, so they can also serve as elevation reference marks. Likely locations include the Municipal Complex and public beach bathhouses. They must be maintained and replaced if damaged or stolen.

Responsible person: Director of Community Development

Support agencies: City Building Inspector, PBCOES, FEMA, Florida Division of Emergency Management, Palm Bay County Board of Realtors, Sand Island Chamber of Commerce and Tourism, Consulting Engineer.

Deadline: A draft program should be presented to the City Council by April 1, 1991. This should include letters of agreement with cooperating agencies, such as the Board of Realtors.

CRS credit: Credit for these activities is provided under Activities 310 - Elevation Certificate, 320 - Map Determinations, 330 - Outreach Projects, 340 - Hazard Disclosure, and 440 - Flood Data Maintenance. The annual mailing of the booklet is a prerequisite for credit for Activity 610 - Flood Preparedness.

9. While the evacuation was a success, there is room for improvement of the City's hurricane warning and response plans. For example, several trucks carrying hazardous chemicals were allowed to crowd onto the bridge in the bumper to bumper traffic. Some people insisted on evacuating with boat trailers, contrary to PBCOES' policies. Therefore, the Police Chief should work with PBCOES to assess the evacuation and make appropriate changes in the warning and response systems.

Special attention should be given to warning and evacuating the critical facilities, getting every person off the island, moving public vehicles to safety, and controlling over what vehicles are allowed onto the city's only evacuation route. The City should also investigate the benefits of appointing its own emergency manager instead of having the job filled by the Police Chief as an extra duty. The plan should be reviewed to ensure that maximum credit is obtained under the CRS.

Responsible person: Police Chief

Supporting agencies: PBCOES, Florida Division of Emergency Management, Director of Community Development

Deadline: Have a revised warning and response plan prepared and submitted to the City Council by April 1, 1991.

CRS credit: The warning system and the response plan are credited under Activity 610 - Flood Preparedness.

10. The Municipal Complex presents a special problem. Its operation is vital to the town but there is no flood-free site that it could be moved to. It is old and somewhat damaged. Its water tower storage capacity is too small. A thorough evaluation of the Complex's structural condition is needed. The evaluation should include recommendations for protecting critical parts, such as the police and fire command center. Where possible, such parts should be rebuilt at an elevation of five feet above the BFE. Replacing the undersized water tower (which is exposed to the force of hurricane winds) with a larger, safer water storage tank, should also be investigated.

Responsible person: Consulting Engineer

Supporting agencies: Funding assistance may be possible from insurance payments, FEMA disaster assistance, FEMA's Hazard Mitigation Grant Program, a bond issue, and water revenue.

Deadline: The evaluation report with recommendations should be submitted to the City Council by April 1, 1991.

CRS credit: None. However, if the City wants CRS credit for protecting critical facilities to the 500-year flood level (Activity 430 - Higher Regulatory Standards), it must enforce the provisions on its own construction projects.

11. The toll bridge across South Pass also needs a thorough evaluation and, if necessary, reconstruction or replacement. Since the bridge is on a County road, this is the responsibility of the Palm Bay County Department of Transportation. However, because it is so vital to the safety of Sand Island residents, the County's works should be closely monitored and encouraged.

Responsible person: Consulting Engineer

Supporting agencies: Florida Department of Transportation.  
Funding assistance may be possible from FEMA disaster assistance.

Deadline: Submit status reports to the City Council every other month, beginning on November 5, 1990.

CRS credit: None.

**240 FLOODPLAIN MANAGEMENT PLAN:**

— Credit for a floodplain management plan is not being applied for.

✓ Attached is the community's floodplain management plan for which credit is being applied. The appropriate values for the "p" variables are shown below.

| Element | Credit      | Applicable Section of the Plan                       |
|---------|-------------|------------------------------------------------------|
| 310     | pecpo = 1.1 | Activity 8, page 21                                  |
|         | pecpr = 1.  |                                                      |
|         | peccf = 1.  |                                                      |
| 320     | pmd = 1.1   | " " " "                                              |
| 330     | popc = 1.   | " " " "                                              |
|         | popf = 1.1  | " " " " Annual mailing of brochures                  |
|         | popa1 = 1.1 | " " " " Hurricane Awareness Week                     |
|         | popa2 = 1.1 | " " " " Presentations to groups                      |
|         | popa3 = 1.1 | Activity 5, page 19 Retrofitting articles            |
| 340     | pdfh = 1.1  | " 8 " 21 Multiple Listing Service forms              |
|         | preb = 1.   |                                                      |
|         | pdoh = 1.   |                                                      |
|         | podr = 1.   |                                                      |
| 350     | pltb = 1.1  | Activity 5, page 19                                  |
|         | plpd = 1.   |                                                      |
| 360     | pfpA = 1.1  | Activity 5, page 19                                  |
| 410     | pnds = 1.   |                                                      |
|         | pssa = 1.   |                                                      |
|         | phed = 1.   |                                                      |
| 420     | poos = 1.05 | Activities 1, 2, 7, pages 16, 17, 20                 |
|         | pclz = 1.   |                                                      |
|         | pdr = 1.1   | Activity 2, page 18                                  |
| 430     | pfrb = 1.1  | Activity 4, page 18                                  |
|         | pfdn = 1.   |                                                      |
|         | pcsi = 1.1  | " " " "                                              |
|         | plsi = 1.   |                                                      |
|         | ppcf = 1.1  | " " " "                                              |
|         | ppsc = 1.   |                                                      |
|         | pshr = 1.   |                                                      |
| 440     | pdmd = 1.   |                                                      |
|         | perfm = 1.1 | Activity 8, page 21, flood elevation awareness signs |
|         | pmam = 1.   |                                                      |
|         | pom = 1.    |                                                      |
| 450     | psmr = 1.   |                                                      |
|         | psmp = 1.   |                                                      |
|         | pfrx = 1.   |                                                      |
| 520     | par = 1.1   | Activity 2, page 17                                  |
| 530     | pirb = 1.1  | Activities 5 + 6, page 19                            |
| 540     | pcdr = 1.   |                                                      |
|         | psdr = 1.   |                                                      |
|         | pesc = 1.   |                                                      |
| 610     | pwd = 1.05  | Activity 9, page 22                                  |
|         | pfrp = 1.05 | " " " "                                              |
|         | plSDS = 1.  |                                                      |
| 620     | pLP = 1.    |                                                      |
| 630     | pDFR = 1.   |                                                      |
|         | pDFP = 1.   |                                                      |

**510 REPETITIVE LOSS PROJECTS:**

**511 Credit Documentation:**

The community must submit the following documentation with its application:

- ✓ a. A copy of the plan prepared in accordance with Section 240.

The community must submit the following documentation with its annual recertification (see Section 214):

- ✓ b. The progress report.

The community must have the following documentation available to verify implementation of this activity:

- ✓ c. Documentation showing how the community calculated the variables in Section 512b: bRL, cARr1, cRBrl, and cLPrl.

**512 Credit Points:**

a. OPF [Booklet covers 5 topics,  $5 \times 13 = 65$ ] OPF = 65

OPA1 [Hurricane Awareness week, same 5 topics,  $2 \times 5 = 10$ ] OPA1 = 10

OPA2 [Presentations to groups on the 5 topics] OPA2 = 10

OPA3 [Retrofitting articles on property protection] OPA3 = 2

FPA [Flood protection levels + names of contractors  $7 + 7 = 14$ ] FPA = 14

CSI CSI = 90

LSI LSI =     

CDR CDR =     

SDR SDR =     

ESC ESC =     

WD [ $8 \times 24$  hours warning time]  $8 = 75.2$ ] WD = 75

FRP [Plan developed to cover all CRS criteria] FRP = 100

b. bRL = 160 - [Number of buildings in Damage areas 4 + 10]

bARr1 = 10 [Number of damaged/destroyed homes purchased by 12/15/90]

cARr1 =  $1600 \times \frac{\text{bARr1 } 10}{\text{bRL } 160 + \text{bARr1 } 10} = 94.12$  cARr1 = 94.12

$RBr1 = 15.3$  [17 buildings raised 2 feet above the base flood elevation:  $TU=1.0, FPL=0.9, 17 \times 1.0 \times 0.9 = 15.3$ ]

$cRBr1 = 1400 \times \frac{RBr1 \ 15.3}{bRL \ 160} = 133.88$   $cRBr1 = 133.88$

LPL = \_\_\_\_\_

bLPrl = \_\_\_\_\_

$cLPrl = LPL \ \_\_\_\_\_ \times \frac{bLPrl \ \_\_\_\_\_}{bRL \ \_\_\_\_\_} = \_\_\_\_\_$   $cLPrl = \_\_\_\_\_$

513 Impact Adjustment:

$bSF = 2,023$

$rRL = \frac{bRL \ 160}{bSF \ 2,023} = 0.08$   $rRL = 0.08$

514 Credit Calculation:

$c510 = \{ OPF \ \underline{65} + OPA1 \ \underline{10} + OPA2 \ \underline{10} + OPA3 \ \underline{2} +$   
 $FPA \ \underline{14} + CSI \ \underline{90} + LSI \ \_\_\_\_\_ +$   
 $(CDR \ \_\_\_\_\_ \times (1 + SDR \ \_\_\_\_\_)) + ESC \ \_\_\_\_\_ +$   
 $WD \ \underline{75} + FRP \ \underline{100} + cARr1 \ \underline{94.12} + cRBr1 \ \underline{133.88} +$   
 $cLPrl \ \_\_\_\_\_ \} \times rRL \ \underline{0.08} \times 0.5 = \underline{23.76}$   $c510 = \underline{24}$

MEMORANDUM TO: Hill County Board

FROM: Francis Steele, County Engineer

SUBJECT: CRS Repetitive Loss Plan

DATE: October 7, 1990

As per the Board's direction at the August 6 meeting, the County is intending to apply for classification under the National Flood Insurance Program's Community Rating System (CRS). Based on the activities undertaken by this and other departments, residents of the unincorporated areas of the County may have their flood insurance premium rates reduced by 5% on October 1, 1991.

One of the requirements for the County's application is that a Repetitive Loss Plan be prepared and adopted by the governing body. The County has an area on Flash Creek that must be addressed because FEMA has paid two flood insurance claims on two buildings in the area since 1978.

As I stated at the August meeting, I would prefer that we prepare a complete floodplain management plan for the entire county that includes the repetitive loss area. In fact, my budget request for next year will include an estimate of the cost of preparing a comprehensive flood plan so we can get CRS credit for a floodplain management plan. Because we had only four months until the application deadline, I recommended that this year we use the same planning approach but only deal with the repetitive loss area.

Attached to this memo is our recommended repetitive loss plan. It describes how the plan was prepared and recommends five activities that will prevent or reduce flood damage to the repetitive loss area. It follows the planning process identified in Section 241 of the CRS Commentary. It has been reviewed by FEMA and the CRS Specialist who say it meets the application requirements of the CRS.

Other than staff time, there is no direct cost to the County so no budget has been included. A vote by the Board to adopt this plan is considered as a directive to the appropriate County staff members to carry these five recommendations out. I will prepare the annual evaluation and do the rest of the CRS coordination work.

I recommend that the Board adopt this plan and direct County staff to implement Section D.

Attachment

## Hill County

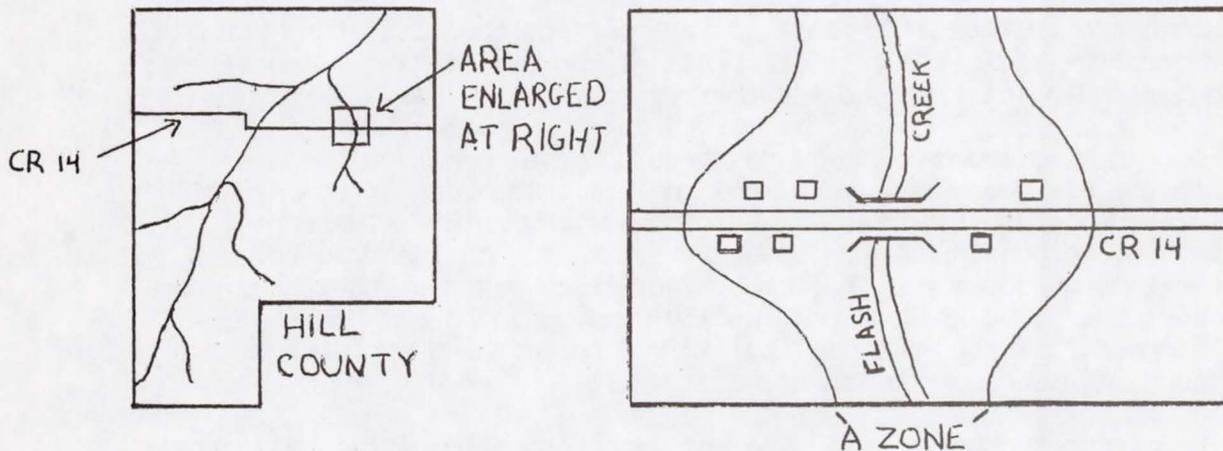
### CRS Repetitive Loss Plan

#### A. Problem Identification

Hill County has approximately 175 buildings in the floodplains of its seventeen creeks and rivers. Heavy rains in 1985 caused most of them to flood. However, since 1978, only one stream has flooded high enough to damage buildings more than once.

1. Source of problem: Flash Creek is located in the Northeastern portion of Hill County. It is a tributary of the Indian River. It drains approximately 15 square miles of the Indian Hills. The hills in this area are particularly steep and rocky, causing most rainwater to run off very quickly. As its name implies, Flash Creek has been known to flood on short notice during or following local storms.

There is little development in the Flash Creek floodplain, primarily because of the rugged terrain. The Hill County Historical Society says that an early settler's cabin next to the creek was washed away by a flood. The area was used only for grazing until County Road 14 was improved in 1967. The road crosses Flash Creek in one of the few places where the valley widens and appears to be flat (see map).



2. Flood data: There has been no study of flooding on Flash Creek. The area is shown as an "Unnumbered A Zone" on the County's Flood Insurance Rate Map. This means that the area was identified as the base floodplain but no more data were provided, such as how high or how fast the base flood will go. The following information is from the residents' recollections of past floods and a site visit made by the County Engineer and the County Highway Superintendent.

While the base flood elevation has not been calculated, it is known that the road was overtopped in 1976, 1981 and 1985. Flood warning time is short. In 1981, the Creek had left its banks before the rain stopped. Velocities upstream and downstream of the area are high, probably as fast as ten feet per second. The widening of the floodplain and the presence of the road slow Flash Creek's velocities at this site to probably less than five feet per second.

3. Recent flood history: This area has been flooded several times since 1967 but no one has systematically recorded water levels. After the 1976 flood, two of the residents bought flood insurance. After the 1981 flood, the rest are believed to have insured themselves (not all residents were available to confirm this). The two who had insurance since 1976 were paid claims in 1981 and 1985, thereby making Hill County a "Repetitive Loss Community."

#### B. Flood Hazard Area Inventory

1. Building data: Within four years after County Road 14 was finished, six homes were built along the road (see map, previous page). All six owners intended to retire in this very scenic and somewhat secluded area. The County had zoning or other land development regulations to keep people out of this area. All six buildings are "pre-FIRM," meaning they were built before the County's Flood Insurance Rate Map went into effect in 1986.

The homes' first floors are 1-2 feet higher than the road, although the flood or building elevations have not been calculated. The 1985 flood, which was the worst so far, went into the first floors of four of the homes. It was up to three feet deep in two of them. Water reached the two homes farthest to the west for the first time but did not get over their first floors. All of the residents are concerned about flooding of the road and their yards.

2. Development trends: There has been no development in the area since the six homes were completed in 1971. The lack of roads has limited use of this portion of the County to grazing. There have been "For Sale" signs up on several vacant lots on the road between the existing houses and the Creek. Residents say that they have been up for several years and occasionally someone looks at them. Development off the road will be limited to ranching activities such as fencing and construction of water wells.

3. Development constraints: The only development constraints in the repetitive loss area is the County's floodplain regulations ordinance which was enacted in 1986 as a requirement of Regular Phase the National Flood Insurance Program. Contrary to popular belief, this ordinance does not prohibit buildings from the floodplain. In unnumbered A Zones, where there are no flood elevations or floodway maps available, the ordinance only requires that a new building:

- "1. Be adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy;

- "2. Be constructed with materials resistant to flood damage;
- "3. Be constructed by methods and practices that minimize flood damages; and
- "4. Be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the component during conditions of flooding."

The four buildings that have been flooded probably meet these performance standards, yet they still suffered flood damage because they are not high enough. The ordinance does require the County to use available flood data to set building elevations. Bridge records were checked and several agencies were contacted, but no such data were discovered. Without flood elevations, future construction could be exposed to flooding.

4. Critical facilities: There are no critical facilities in the repetitive loss area.

5. Community needs, goals, and plans: The County has no land use plan or zoning ordinance. It has not specified any needs, goals or plans for the area. The Highway Department's main concern is that County Road 14 should be maintained as economically as possible. The road and bridge were designed to be overtopped. There should be no traffic on them during or soon after a flood.

#### C. Review of Possible Activities

The CRS requires that Hill County contact other agencies and look at a variety of possible ways to prevent and reduce flood losses. The following agencies have been contacted during the last two months:

- U.S. Army Corps of Engineers, Calgary District
- Federal Emergency Management Agency, Region XI
- U.S. Department of Agriculture, Soil Conservation Service,  
District Conservationist
- National Weather Service, State Hydrologist
- U.S. Department of the Interior, Bureau of Reclamation
- State Natural Resources Commission, NFIP Coordinator
- State Emergency Management Agency
- Hill County Soil and Water Conservation District
- Hill County Emergency Manager
- Hill County Building Inspector

None of these agencies have any pending or proposed projects in the County that might help in this area. Because flooding is shallow and affects so few people, it is "highly unlikely" that a state or federal agency would build or support a flood control project. Several of the agencies did offer valuable advice and are available to provide technical assistance to the County in the future.

## FLOOD HAZARD MITIGATION ACTIVITIES

### FLOOD CONTROL

- LEVEES / FLOODWALLS
- RESERVOIRS / DETENTION
- CHANNEL IMPROVEMENTS
- CONTROL GATES / BACK-UP VALVES
- TERRACING / RUN-OFF CONTROLS

### PROPERTY PROTECTION

- BUILDING RELOCATION / ACQUISITION
- BUILDING ELEVATION
- FLOODPROOFING
- SELF-HELP ADVICE / ASSISTANCE
- FLOOD INSURANCE

### EMERGENCY SERVICES

- FLOOD WARNING
- SANDBAGGING
- EVACUATION / RESCUE
- PUBLIC HEALTH / SAFETY MAINTENANCE

### FLOODPLAIN MANAGEMENT

- PLANNING / ZONING
- FLOODPLAIN DEVELOPMENT REGULATIONS
- OPEN SPACE ACQUISITION / EASEMENTS
- STORMWATER MANAGEMENT
- EROSION / SEDIMENT CONTROL
- STREAM MAINTENANCE

Figure 1. *Flood Hazard Mitigation Activities*

The State NFIP Coordinator provided a handbook on "Flood Hazard Mitigation." Figure 1 from that book was used as a checklist to ensure that a variety of activities were reviewed. Figure 1 appears on the previous page. This list was reviewed with FEMA, the Corps, the State NFIP Coordinator, and residents of the repetitive loss area. The following are the findings for each of the activities.

1. Flood control: Levees, floodwalls, reservoirs, detention, and channel improvements were reviewed and found to be too expensive for this area. Control gates and back-up valves are not appropriate for Flash Creek. Terracing and run-off controls are not appropriate for the rocky slopes; they are more useful in agricultural or urbanized areas.

2. Property protection: The property owners are not interested in moving to avoid what they consider "nuisance flooding." They wanted to live in this area because of the site's other amenities. The County is not interested in forcing these people to relocate.

It would be possible to elevate three of the buildings and/or floodproof all six. One resident has already done a minor floodproofing project. She replaced her destroyed air conditioning compressor unit with one raised up on blocks.

The owners could use more information on flood warnings and floodproofing. A better informed property owner will take steps to protect him or herself. Publications, information and self-help advice is available from some state and federal agencies, notably the Calgary District of the Corps of Engineers.

State and Federal assistance programs require a significant flood that is beyond the County's abilities to respond to. This did not occur in 1976 or 1981. Therefore, the residents should purchase and maintain flood insurance and not depend on government assistance to finance repairs and reconstruction. It is believed that all six properties are insured.

3. Emergency services: The watershed is very small and there are no people upstream who could be rain or river gage readers. The only workable flood warning system is the Weather Service's flash flood advisories when thunderstorms threaten the area. However, residents can develop their own system that uses a NOAA Weather Radio to give them more warning.

Floods come too fast for sandbagging to do much good. The area is too small and remote for the County Emergency Manager to send a crew to the site when a flood warning is issued. The residents have accepted that they need to take care of themselves until the water has subsided and the road is reopened. They could use some expert advice on flood safety and what to do during and after a flood.

4. Floodplain management: The County has no comprehensive plan or zoning ordinance and is not likely to adopt any in the near future. The only floodplain regulations in effect are the County's. In this type of floodplain they will not prevent construction of more buildings like the ones that have already been flooded. Since there are no state or federal regulations, it is up to the County to ensure that future development is protected from flooding. This can be done with an amendment to the County's floodplain ordinance.

There are already several state parks and a national forest in Hill County, so the County is unlikely to get outside funds to expand the amount of open space. Stormwater management and erosion and sediment control, like terracing, are not appropriate measures for the rocky, undeveloped watershed of Flash Creek.

The channel of Flash Creek was somewhat constricted when the bridge was built. Minor flows can cause the creek to leave its banks when debris, such as logs or fencing, clog the bridge opening. A channel maintenance program for developed areas of the county will be prepared in time for the CRS application.

#### D. Appropriate Activities

Based on the review of the flood hazard mitigation list, it is recommended that the County implement the following activities. The first two will help keep the area's repetitive flood problem from getting worse. The last three will help the residences protect themselves.

1. Amend the floodplain regulations ordinance so that where there is no available base flood elevation data, new buildings in unnumbered A Zones must be built at least two feet above the highest known flood of record. If new buildings are located in the repetitive loss area (or if the existing buildings are damaged or improved), their lowest floors must be at least two feet above the 1985 flood. This would be five feet higher than the lowest buildings there now.

The amendment should be drafted by the County Attorney and reviewed by the Building Inspector, the Engineer, FEMA, and the State NFIP Coordinator. It should be presented to the County Board for adoption by April 1, 1991.

2. Monitor debris on Flash Creek near the bridge. At least every spring and within a week after a flood, the Highway Superintendent should check the creek. If there is debris, it should be removed before the creek or the bridge becomes obstructed. The first inspection should be done by April 1, 1991.
3. Provide each of the area's residents with a manual on floodproofing. The following books are available for free from FEMA and the Corps. They are designed for lay persons:

Flood Emergency and Residential Repair Handbook  
Design Manual for Retrofitting Flood-prone Residential  
Structures  
Flood Proofing Systems & Techniques

The County Engineer should obtain ten copies of each of these and distribute one to each home by December 1, 1990. The rest should be given to the library.

4. Provide technical advice to residents who want to know more about flood protection and flood preparedness. After the handbooks are received, the Engineer and the Emergency Manager should meet with the residents to review flood warning and floodproofing ideas by February 28, 1991.

Each resident should be given the Engineer's telephone number. If he cannot answer the question, he can direct the inquiry to the appropriate county, state, or federal office. Permission to do this has been granted by the State NFIP Coordinator and the Calgary District of the Corps of Engineers.

5. Mail an annual notice to the residents. The notice should remind them about the hazard, the need to keep insurance in force, and related topics. It should be sent each year before the Summer storm season. The first should be mailed by May 1, 1991.

#### E. Public Input

This draft plan was developed after a meeting with the residents of the repetitive loss area. It was held on September 22 and attended by four of the six property owners. They have been sent a copy of this draft and were advised that if they have comments they should come to the next Board meeting.

**510 REPETITIVE LOSS PROJECTS:**

**511 Credit Documentation:**

The community must submit the following documentation with its application:

- a. A copy of the plan prepared in accordance with Section 240.

The community must submit the following documentation with its annual recertification (see Section 214):

- b. The progress report.

The community must have the following documentation available to verify implementation of this activity:

- c. Documentation showing how the community calculated the variables in Section 512b: bRl, cARr1, cRBrl, and cLPrl.

**512 Credit Points:**

a. OPF [annual notice includes topics 1,3,4,5+6] OPF = 65

OPA1 OPA1 = \_\_\_\_\_

OPA2 OPA2 = \_\_\_\_\_

OPA3 OPA3 = \_\_\_\_\_

FPA [Advice limited to flood data] FPA = 7

CSI CSI = \_\_\_\_\_

LSI LSI = \_\_\_\_\_

CDR [1.50] CDR = 150

SDR SDR = \_\_\_\_\_

ESC ESC = \_\_\_\_\_

WD [No credit because county is leaving it up to residents to prepare their own system] WD = \_\_\_\_\_

FRP FRP = \_\_\_\_\_

b. bRl = 6

bARr1 = \_\_\_\_\_

$$cARr1 = 1600 \times \frac{bARr1}{bRl + bARr1} = \underline{\hspace{2cm}} \quad cARr1 = \underline{\hspace{2cm}}$$

$$RBr1 = \underline{\hspace{2cm}}$$

$$cRBr1 = 1400 \times \frac{RBr1}{bRL} = \underline{\hspace{2cm}}$$

$$cRBr1 = \underline{\hspace{2cm}}$$

$$LPL = \underline{\hspace{2cm}}$$

$$bLPrl = \underline{\hspace{2cm}}$$

$$cLPrl = LPL \times \frac{bLPrl}{bRL} = \underline{\hspace{2cm}}$$

$$cLPrl = \underline{\hspace{2cm}}$$

513 Impact Adjustment:

$$bSF = \underline{175}$$

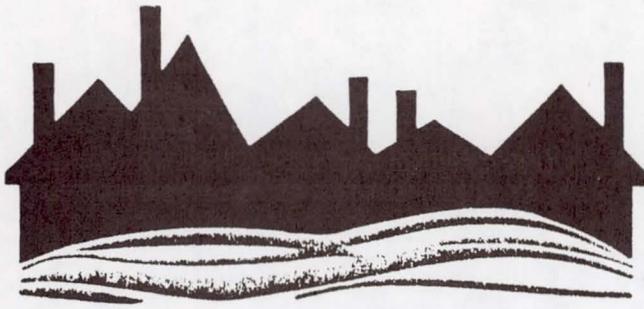
$$rRL = \frac{bRL}{bSF} = \frac{6}{175} = \underline{0.0343}$$

$$rRL = \underline{0.03}$$

514 Credit Calculation:

$$c510 = \{OPF \underline{65} + OPA1 \underline{\hspace{1cm}} + OPA2 \underline{\hspace{1cm}} + OPA3 \underline{\hspace{1cm}} + \\ FPA \underline{7} + CSI \underline{\hspace{1cm}} + LSI \underline{\hspace{1cm}} + \\ (CDR \underline{150} \times (1 + SDR \underline{\hspace{1cm}})) + ESC \underline{\hspace{1cm}} + \\ WD \underline{\hspace{1cm}} + FRP \underline{\hspace{1cm}} + cARrl \underline{\hspace{1cm}} + cRBr1 \underline{\hspace{1cm}} + \\ cLPrl \underline{\hspace{1cm}}\} \times rRL \underline{0.03} \times 0.5 = \underline{3.33}$$

$$c510 = \underline{3}$$



## NFIP/CRS UPDATE

October 1990

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### Statement of Purpose

This is the first of what we hope to be many editions of *NFIP/CRS Update*, an official publication of the National Flood Insurance Program's Community Rating System (NFIP/CRS). Our purpose is to provide local officials and others interested in the Community Rating System with news they can use.

Most of our articles will be clarifications, examples, and helpful information on the CRS Commentary. The appropriate Commentary section numbers will follow the article titles. We will also have information on particularly effective approaches to the CRS activities, useful references, helpful federal programs, and outstanding local approaches.

*NFIP/CRS Update* will be printed whenever it's needed. It will be sent to local officials, state officials, consulting engineers, and others who tell us that they'd like to be on the mailing list. This first edition is going to every community that signed up for one of the Spring CRS Workshops. The next edition will go to everyone who sends in the subscription form on page 7.

*NFIP/CRS Update* will be mailed to subscribers free. However, to keep costs down, we must limit subscriptions to one per community. There is no charge because we have found this to be one of the most economical ways to keep people posted on a program that will be undergoing many changes and refinements over the next few years.

If you have a topic that you would like addressed, write us at: NFIP/CRS Update, P.O. Box 501016, Indianapolis, IN 46250-6016

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### Repetitive Loss Breather 510, 511d (new)

Activity 510 - Repetitive Loss Projects has been modified for 1990 only in order to allow repetitive loss communities more time to prepare effective plans. A community may submit a partial application by December 15, 1990, and complete the plan during 1991.

Under a new section 511d which has been added to the Commentary, a community has the option to submit the following four documents by December 15, 1990, in lieu of the plan required under section 511a. The plan must be completed in 1991.

1. The map with repetitive loss areas identified;
2. A description of errors found on the address list provided by FEMA.
3. A description of the causes of the repetitive losses; and
4. The community's timetable for preparing the final plan.

This new option is explained in more detail on page 510-6 of the October 1990 Commentary which is being sent to all communities with this issue of the *NFIP/CRS Update*.

No credit points are provided for submitting this documentation. This revised documentation only fulfills the requirement for repetitive loss communities to apply for Activity 510 by December 15, 1990. Failure to submit a complete repetitive loss plan by December 15, 1991, will result in a community being reclassified as a Class 10.

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## **Are Public Hearings Required?** *241e*

Page 240-3 of the CRS Commentary notes that one of the requirements for an acceptable floodplain management or repetitive loss plan is that one or more public meetings must be held. There has been some confusion on this.

The requirement for a public hearing varies from state to state and depends on the type of plan. Usually a hearing is required by state law before a community can adopt or amend a land use plan that forms the basis for land use regulations. Usually a hearing is a legal process that must be announced with a legal notice in a newspaper and must follow formal procedures, such as swearing in witnesses and keeping transcripts. They can be expensive and involved.

The CRS does not require public hearings. To receive credit for a floodplain management or repetitive loss plan (which are not land use or regulatory documents), there must be public input. This can be in the form of public meetings, which are simply well publicized meetings where the proposals are explained and people can ask questions or submit their comments.

A floodplain management or repetitive loss plan is not bound by the comments or outcome of the public input. However, these plans must be adopted by the governing boards who are concerned about the public's comments.

A stormwater management plan is not credited unless it has been adopted in local land development regulations. Therefore, it (or, more likely, the ordinance adopting its regulatory standards) would probably have to be reviewed at a public hearing.

State and local laws take precedence. Even though we say a public hearing is not needed for something, it is the local attorney who must agree that one is not required.

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## **Example Plans Available** *240, 510*

Want to know what a floodplain management plan or repetitive loss plan looks like? Actually, it doesn't matter what they look like, what counts is how they were prepared.

As noted on page 240-1 of the CRS Commentary, "Because each community is different, each floodplain management plan will be different. The objective of this CRS credit incentive is to ensure that a process was followed that selected the best measures for the community and its flood hazard."

Many communities have asked for more information on floodplain management and repetitive loss plans and for examples of acceptable ones. In response to these requests, ISO has just published a document with examples from three fictitious communities.

"Planton's" flood problems include a large river, a small creek, and local sewers. "Sand Island" is on the Gulf Coast and was hit by a hurricane. "Hill County" is a western county with a repetitive loss problem in a sparsely developed hilly area. All three plans offer good examples to communities of all sizes with any kind of flood problem.

The objective of these examples is to convey the process followed and the variety of activities that should be considered. They are not meant to be models, to include everything that could possibly be included in a plan, or to specify a style or organization of a plan.

The document also includes an example of how Planton would submit the optional 1990 repetitive loss documentation (see article on page 1). Copies are being included in the mailing that includes this edition of *NFIP/CRS Update*. If you did not get a copy of "Example Plans," write to Bill Trakimas, ISO Commercial Risk Services, 7321 Shadeland Station, Suite 175, Indianapolis, IN 46256 or call 317/845-1750.

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## Watershed Calculations

453

Credit for a local stormwater management program under Activity 450 must be adjusted to account for the amount of the watershed subject to the program. As stated in Section 453, Impact Adjustment, on page 450-6 of the Commentary:

Because this activity only has an impact in watersheds under the jurisdiction of the stormwater management regulations, there must be an impact adjustment that factors in the area of the watersheds affected. This is done by multiplying the credit points by the area under the community's jurisdiction and dividing by the total area of the watershed (aW). Area may be measured as acreage or square miles. *Watersheds greater than 100 square miles are not counted.*

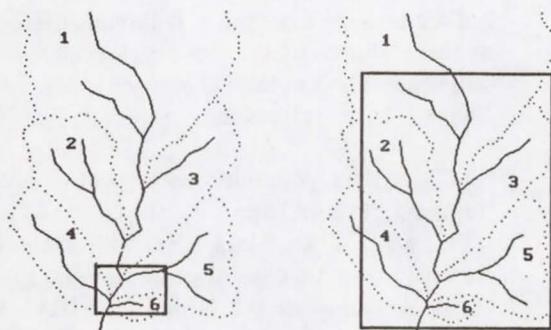
The last sentence has caused much confusion. The impact of stormwater management activities on flood discharges diminishes as watersheds get larger. Calculating watershed areas outside a community's area is also difficult. When the Schedule was drafted, it was felt that the City of New Orleans should not have to calculate the area of the Mississippi River's watershed (which includes 29 states and 2 provinces).

Accordingly, the Schedule allows communities to eliminate watersheds larger than 100 square miles. As shown in the Commentary's example on page 450-9, Riverview is given full credit if it and its neighbors, regulate all the watersheds under the 100 square mile threshold. The watershed of Big River is not counted.

The objective of eliminating large watersheds is to simplify the calculations and help communities where large watersheds are outside their jurisdiction. Although the Commentary is not clear on this, communities with large watersheds in their jurisdiction do not have to eliminate them.

For example, there could be many watersheds over 100 square miles in a county. Since they are all subject to the county's program, they should be included in both aW and aSMR or aSMP. The county must identify watersheds less than 100 square miles that are outside the county boundaries; but it does not have to try to break down all the watersheds within its jurisdiction.

Examples of calculations for a city and a county are shown below.



City

County

Areas of Watersheds (square miles)

|   |     |
|---|-----|
| 1 | 400 |
| 2 | 150 |
| 3 | 135 |
| 4 | 60  |
| 5 | 80  |
| 6 | 15  |

The city must include areas 4, 5, and 6 in its calculations for aW. That portion of areas 2 and 3 outside the corporate limits do not need to be counted. The county's calculations for aW should include all of areas 2-6 and that portion of area 1 inside the county's limits. The county can only include the area of the county toward aSMR or aSMP, because it does not regulate development outside of its boundaries. Therefore, aSMR or aSMP will not include those parts of areas 2 and 4 outside the county boundary.

## Rounding 223

ISO visited over 100 communities this summer and checked their preliminary applications. These communities had volunteered at the Spring workshops to help ISO estimate the workload and expected problems it will encounter during verification visits next year.

Almost all communities' application worksheets had mathematical errors. The most common error was due to rounding. As noted on the top of page 220-4 of the Commentary, all calculations should be rounded to two decimal points. The computer program that checks application worksheets rounds every calculation. With today's calculators and computers, it is easy for many communities to carry an equation through and not round a number until the end.

An example of what this can do is seen with the equation at the bottom of page 530-5 of the Commentary:

$$c530 = 1400 \times rRb \times pRB$$

$$rRB = \frac{9.2}{272} = 0.033823529 = 0.03 \text{ (rounded)}$$

The equation produces different answers, depending on whether rounding was done at every step:

$$c530 = 1400 \times 0.03382529 \times 1.1 = 52.09$$

$$c530 = 1400 \times 0.03 \times 1.1 = 46.2$$

In most cases, the rounding rule will not make more than a point or two of difference. However, it can make a bigger difference in Activities 520 and 530 because of their higher scores. For example, a community that bought and relocated one building in a floodplain with 225 buildings would receive no credit under Activity 520:

$$c520 = 1600 \times rAR \times pAR$$

$$rAR = \frac{1}{225} = 0.0044 = 0 \text{ (rounded)}$$

If the community does not round at every step,  $c520 = 1600 \times 0.0044 \times 1.1 = 7.744 = 8$ . While eight points are not a lot, at least the community's effort has been recognized by the CRS. Accordingly, the following rounding rule should be followed for this year's applications. It should be added to the end of the first paragraph on page 220-4 of the Commentary.

"For Activities 520 and 530 only, no calculations may result in more than 4 decimal points."

Under this rule, the community that buys one building out of 225 would receive 8 credit points for c520. This issue will be addressed next year with a different formula.

---

## Credit Points for No Buildings 312a and b

Under Activity 310 - Elevation Certificate, the basic credit for EC, 56 points, is based on the community's assurance that it will maintain elevation certificates on all new buildings that will be built in the floodplain. If the community does not allow buildings in the floodplain, it should still apply for this credit because its assurance is still valid: if any buildings are ever built, they will have certificates.

Similarly, if a community has no post-FIRM buildings, it should apply for the 56 credit points for cECPO. The CRS considers this a "reward" for not having any new buildings in the floodplain since the date of the FIRM. On the application worksheet, AW-310, bPO = 0. Because the rest of the formula in 313a will not work, show rECPO = 1.0 in the right column on the application worksheet. Write a short note that states that no new buildings have been built in the SFHA since the initial date of the FIRM.

## Common Application Errors

During the late spring and summer, ISO CRS Specialists visited over 100 communities to measure local understanding and interest in the Community Rating System. The communities volunteered to submit applications for verification. A review of the applications has found the following more common errors.

In order to obtain CRS credit, a community must make its own application. Even if floodplain management by another entity, such as a state or county, provides sufficient credit for Class 9 or better, the community must submit its own application, certifying that the activities are being undertaken.

If, for example, a county regulates all floodplain activity within an incorporated community, the application must be signed by the Chief Executive Officer of the community. The documentation provided for the county's application may suffice for the community, but the areas and buildings within the community must be used to calculate the community's credit.

Section 240, Floodplain Management Plan: On a number of community applications, the "p" variables for plan credits on the application worksheets (AW-310 through AW-630) do not agree with the credits claimed on AW-240.

Activity 410 - Additional Flood Data: In general, the impact adjustments for HED, NDS and SSA will add up to 1.0. Remember that HED credit is only given for the floodplain studied in detail and shown on the FIRM. NDS and SSA credit are usually given for floodplains not shown on the FIRM with base flood elevations.

Because these floodplains are mutually exclusive, their areas cannot add up to greater than 1.0. However, as with every rule, there can be some possible exceptions. Here are two that we came up with:

1. The FIRM mapped a floodplain with higher hydrology standards but with no floodway. The community mapped a floodway and claims HED credit for HHS and NDS credit for the floodway mapping for the same area.

2. The community mapped a floodplain not shown on the FIRM with 100-year flood elevations and floodway. Later it adopted a requirement for site-specific analysis due to a recognition of an ice jam or other special hazard. It may claim credit for NDS and SSA for the same area.

Activity 420 - Open Space Preservation: If a community claims OS credit for a regulation which prohibits development in all or part of a floodplain (e.g., the floodway), it can only get credit for parcels which are actually vacant now. All parcels with buildings on them must be excluded from aOS.

Note that OS and LZ credits are mutually exclusive. If a community has 5-acre zoning throughout its floodplains and claims OS credit for 40% of aRF,  $rLZ5 = 0.6$ .

Activity 430 - Higher Regulatory Standards: If OS credit is claimed in Activity 420, the short form Application Worksheet, AW-430SF, cannot be used because it assumes that the impact adjustment for each element is 1.0. The areas of the elements in 430 must be reduced by aOS, so rFRB, rFDC, etc. will be less than 1.0 and the long form, AW-430, must be used.

Activity 310 - Elevation Certificate and the 500 Series - Flood Damage Reduction: If a community has bPO and bPR in Activity 310, their sum should equal bSF for the 500 Series activities. The sum of pre-FIRM and post-FIRM buildings should equal all buildings in the floodplain ( $bPO + bPR = bSF$ ). Further, bSF for Activity 610 must equal bSF for activities 510, 520 and/or 530.

Activity 610 - Flood Warning Program. Many communities are not picking up on all the requirements for crediting flood warning systems. Activity 330 - Outreach Projects is a prerequisite for Activity 610 - Flood Warning Program. You can't get credit for a warning system if you don't have a program for telling people what the warnings are and what they should do after one is issued. See Section 611d on page 610-3 of the Commentary.

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## The Insurance Purchase Requirement 212e, 320, 340

The National Flood Insurance Act, as amended in 1973, requires "the purchase of flood insurance by property owners who are being assisted by Federal programs or by Federally supervised, regulated, or insured agencies or institutions in the acquisition or improvement of land or facilities located or to be located in identified areas having special flood hazards."

This means that a person who wants a mortgage or home improvement loan from a bank that is insured or regulated by the Federal government, must buy a flood insurance policy if the building is in a Special Flood Hazard Area. Activity 320 - Map Determinations was designed to help people comply with this law. Activity 340 - Hazard Disclosure encourages real estate agents to advise house hunters about the requirement. As noted on page 320-5 of the Commentary, more information can be obtained from several FEMA references.

As a property owner, the law applies to a local government as well. If a city or county received Federal financial assistance, including disaster assistance, for a building in the floodplain, the city or county is required to have a flood insurance policy on that building. That requirement is on the list of things the community agreed to when it received Federal aid after the 1973 amendments took effect.

Over the years, communities tend to forget this requirement and the insurance coverage may lapse. Section 212e (Commentary page 210-4) is a reminder to communities about their legal obligation. As part of a community's application, its Chief Executive Officer (CEO) must certify that any building that was supposed to be covered by insurance is now insured.

The CRS is not concerned about whether the insurance may have lapsed for a few years. What counts is that buildings are now insured. The insurance must stay in force because the CEO must certify each year that the community is continuing to implement the activities as described in its application.

Actually, buying flood insurance is even more important now. In 1988 Congress amended the Disaster Relief Act. Federal disaster assistance for a flooded public building will be reduced by the amount of flood insurance coverage the community should have on that building.

It does not matter whether the building is insured; the Federal government will still only provide assistance for damage that exceeded the level of insurance.

Example: The maximum amount of flood insurance available for a non-residential building is \$200,000. Floodville's city hall is flooded and receives \$300,000 in damage. If the city hall is in a Special Flood Hazard Area, the disaster assistance folks will assume it's insured for \$200,000. Federal aid to repair or rebuild the city hall will be 75% of \$100,000 (\$300,000 - \$200,000).

Floodville will receive \$75,000 in disaster assistance for a building that suffered \$300,000 in damage. If the city hall was not insured, Floodville's taxpayers are going to have to come up with the balance. If it was insured, the city will have \$275,000 (less the deductible) toward repairs and reconstruction.

Flood insurance is also a good idea because not every flood warrants Federal disaster aid. Whether or not a community wants to apply for a CRS classification, the moral of the story is to make sure that all publicly owned buildings subject to flooding have flood insurance.

**Self-insurance:** Many communities are self-insured or participants in government insurance pools. If the Federal funding agency recognized this insurance arrangement as sufficing for the flood insurance purchase requirement, then a separate flood insurance policy does not have to be taken out to meet the CRS requirement. However, communities should carefully examine these arrangements to ensure that flooding is covered. In some cases, there are very large deductibles and the community will find Federal disaster assistance of little help.

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**Initial Class 9 Activities**

720

There are 18 activities that are eligible for credit under the Community Rating System. However, only 14 of them can be credited toward the initial Class 9 without a verification visit.

As noted on page 220-4 of the Commentary, Activities 360, 530, 610, and 620 can be credited only after they are verified. [Note that there is a typo on this page. There are four such activities, not three.]

The reason for this deferral of credit is because these activities are complicated and easily misunderstood. Rather than provide credit based on the application papers and then take the credit away when the verification visit finds the community is not doing what the CRS credits, the program opted for crediting these four only after the visit confirms their implementation.

Unfortunately, the 2/1/90 version of Application Worksheet AW-720, did not differentiate between activities that are credited toward the initial Class 9 and those that are credited later. As a result, communities may miscalculate their initial scores. To rectify this, a new AW-720 has been published as part of the October 1, 1990 Commentary.

As noted in the 10/1/90 Commentary, if the worksheet was completed with the Floodville example used on page 720-2, Floodville would receive 1,089 points toward its initial Class 9. During the verification visit, Activities 360 and 530 would be checked and the city's verified total points would be 1,172.

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Please keep me on your mailing list for *NFIP/CRS Update*.

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Are you the CRS Coordinator? Yes  No

Mail to: NFIP/CRS Update  
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Indianapolis, IN 46250-6016

## Reconsideration

### *New 235*

The next two pages should be added to your Commentary. There is no change to page 230-3. Page 230-4 adds a new section 235, Reconsideration, which spells out how communities can request a review of their classification.

This is a somewhat formal process related to the final classification. The process is not used if the scoring does not affect the classification. Communities may request more information on scoring activities at any time.

The 30 day deadlines ensure that the classification is accepted or reconsidered as quickly as possible. FEMA must have the final classifications confirmed by May of each year in order to include them in the calculation of the flood insurance premiums that take effect on October 1.

The FEMA Regional Office will review the request and discuss it with the CRS Specialist. A meeting may be held, depending on the need for additional communication. The Region will forward the request and its recommendation to Federal Insurance Administrator. The Administrator will send the community a written response to its request for reconsideration.

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## Spring Workshop Findings

This Spring ISO held 74 CRS Workshops across the country. Those who attended remember completing a form that asked if they thought their communities would apply for a CRS classification and, if so, what activities would they likely submit. The following activities were identified by more than 60% of the respondents:

- 310 - Elevation Certificate
  - 320 - Map Determinations
  - 330 - Outreach Projects
  - 350 - Flood Protection Library
  - 450 - Stormwater Management
  - 540 - Drainage System Maintenance
- 

## CRS Unfair to Coastal Communities?

Many of the examples in the Commentary use rivers, creeks and ditches. Both Floodville and Watertown are riverine communities. Even though the examples are just that, examples, some people have accused the CRS of being biased against coastal communities.

This is not the case. Coastal beaches and parks can be credited as open space under Activity 420 - Open Space Preservation. Coastal set back regulations that prohibit new buildings seaward of a line can also be credited as open space. Beach and dune areas that are preserved as open space receive double credit points under Activity 420.

Regulations restricting traffic or the removal of sand or requiring beach or dune nourishment projects warrant extra credit under Activity 430 - Higher Regulatory Standards.

In fact, coastal communities can receive points easier than riverine communities in some activities. Coastal islands can receive a great deal of credit for Activity 450 - Stormwater Management because the area subject to regulations equals the entire watershed (rSMR = 1.0). Every community on the Atlantic and Gulf coasts can receive some credit under Activity 610 - Flood Warning Program, for the National Hurricane Center's work.

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## Things to Come

New guidance on the CRS will be coming out during 1991. Future editions of *NFIP/CRS Update* will announce the publication of these documents:

- 1991 edition of the CRS Commentary. Changes will include more detailed credits for managing special flood-related hazards and state dam safety programs.
  - An example stormwater management plan.
  - An example flood warning plan.
  - A computer program for elevation certificates and the application worksheets.
-

## PROCEDURES

Example: If the community applied for credit for Activity 540 - Drainage System Maintenance, it must provide the CRS Specialist with a copy of the description of the routine inspection and debris removal program (541c, page 540-3). If the community does not have the document, it will receive no credit for Activity 540.

### 233 Implementation Documentation:

Communities are also expected to maintain adequate records of implementation of the activities. In most cases, the types of records kept are self-explanatory so this Schedule does not specify them. If the community does not have records of activity implementation, its credit points will be reduced by 20%.

Example: If the community applied for credit for Activity 540 - Drainage System Maintenance, the CRS Specialist will check a sample of ditches and retention basins to verify debris clearance. If the ditches appear to have debris that has obviously been there for several years, the credit points will be adjusted to reflect the number of such sites checked.

The community must also provide records showing that the channels were inspected each year. These could be in the form of time sheets for public works crews or a copy of an inspection report. Even though the channels look cleared, a community will lose 20% of the points earned for Activity 540 if it cannot document that the activity was implemented according to the frequency stated in the application worksheet.

### 234 Post-visit Actions:

The CRS Specialist will report the findings of the visit to FEMA. FEMA will advise the community of the results. If the community's classification will be retrograded (e.g., from a Class 9 to a Class 10), then FEMA will also explain the reasons for the change and identify what the community could do to restore its earlier CRS classification.

Community visits are repeated according to a schedule based on the community's classification. For example, Class 2 communities are visited more frequently than Class 5 or 6 communities.

Visits can also be conducted when FEMA learns of problems in a community that sheds doubt as to whether it is fully implementing its activities. For example, if there was a flood that damaged areas protected by a credited levee or it appeared that flood warnings were not disseminated, then FEMA may want to review the community's program. Visits may also be conducted in response to a modified application that appears to change the community's class.

## PROCEDURES

### 235 Reconsideration:

If a community believes that its scoring is incorrect, it may request an explanation of the verified scores for one or more activities within 30 days of receipt of the notification from FEMA.

During the verification visit, the community will be advised of mathematical errors in its application. There will also be an "exit interview" at the end of the visit when the CRS Specialist reviews the tentative findings. The notification from FEMA will include the verified total points for each activity and a short narrative of where the CRS Specialist's findings differ from the Community's application. If the community needs more information as to why an activity's score is different than what the community expected, it may ask for more information from the FEMA Regional Office (see Appendix A).

If the community believes that the verification visit missed or misinterpreted something, it may request a reconsideration of its classification. Requests for reconsideration can only be submitted to change a classification based on the activities described in the community's application.

Requests to change a community's credit points that do not result in a change of classification are not accepted. Requests for a different classification based on activities started after, or not included in, the community's application are not accepted. The community may contact the FEMA Regional Office if it has questions on scoring of activities.

**Example:** The CRS Specialist calculated Floodville's total points at 1,167. Floodville feels that one additional activity should have been considered and calculated its total points as 1,353. Floodville cannot submit a request for reconsideration because its classification would not change (see Appendix C). However, it may ask the Region for a clarification as to why the activities' points were calculated differently.

If a community wants credit for new activities begun between the date of application and the date of the verification visit, those new activities must be submitted as part of the next year's recertification and modification (see page 210-7). They will be reviewed during a future verification visit.

A request for reconsideration must be submitted to the FEMA Regional Office, Attn: Chief, Natural and Technological Hazards, within 30 days of receipt of the verification explanation. The request must include a description of how the community would credit the activity and the pages from the Commentary that support the community's position.