

**SURFACE WATER MANAGEMENT COMMITTEE
FLOOD MITIGATION PLAN
2008 ANNUAL EVALUATION REPORT**

Prepared by

the CITY OF HUNTSVILLE, ALABAMA

October 2008

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1. INTRODUCTION AND BACKGROUND INFORMATION

On August 23, 2000 the City Council of Huntsville passed Resolution 00-712 creating a Flood Mitigation Planning Committee (FMPC). The resolution authorized and directed the Mayor to appoint a committee of members representing the City, the general public developers, builders, community professionals including planners, engineers, scientist, environmentalist, and other interest groups.

The purpose of the FMPC was to develop a long range Flood Mitigation Plan (the Plan) that would serve as a blueprint for enhancing existing stormwater runoff control and flood mitigation within the City of Huntsville (the City). The City contracted with Mr. French Wetmore a well known consultant and expert in flood mitigation planning to lead and work with the Flood Mitigation Planning Committee to develop the Plan. The FMPC meet and worked on the Plan for approximately ten (10) months. A DRAFT of the Plan was completed on June 1, 2001 and was adopted by the City of Huntsville.

After the Plan was completed the Flood Mitigation Committee was formed to track the implementation of the Flood Mitigation Plan. In 2003, the name of the committee was changed to the Surface Water Management Committee (SWMC) to better reflect the goals of managing and mitigating flooding and protecting water quality for Huntsville streams. Table 1-1 lists the latest members of that Committee.

This report is an evaluation of progress made in implementation of the Flood Mitigation Plan conducted by the FMPC. For information on how to obtain a copy of the complete Flood Mitigation Plan see Chapter 2 of this Annual Report.

Table 1-1. Surface Water Management Committee members

Surface Water Management Committee

- | | |
|-----------------------|--|
| 1) Ed Starnes | Chair, financial planner, Planning Commission, former School Board Chair |
| 2) Dr. Ben Ferrill | City Planning, City Geologist/Environmental Planner |
| 3) Susan Weber | Recreation Services, City Wetlands Ecologist |
| 4) Dr. Earl Gooding | Planning Commission, sociologist, professor of urban planning – Dist. 1 Rep. |
| 5) Dr. Sam Lowry | Computational Fluid Dynamics, Dist. 2 Rep. |
| 6) Ed Kiessling | NASA Executive, Dist. 3 Rep. |
| 7) Benny Dishroon | Engineer, retired from the Army, Dis. 4 Rep. |
| 8) James Ledbetter | Developer |
| 9) Steve Abbott | Director, Public Works Services |
| 10) Terry Hatfield | Mayor's Assistant |
| 11) Rusty Russell | Director of Huntsville, Madison County Emergency Management |
| 12) Dr. John Christy | Director, UAH Earth System Science Center, State Climatologist |
| 13) Marjorie Holderer | Planning/Cyclist |
| 14) Ken Crane | Engineering Manager, Dist. 5 Rep. |
| 15) Gary Gleason | City Engineering |

2. Review of Progress on the Flood Mitigation Plan

The City and SWMC is required to prepare an annual evaluation report to the Mayor and City Council on the implementation of the Flood Mitigation Plan. The report is also required in order to receive credit and receive points under FEMA's Community Rating System. This report represents the 2008 Annual Evaluation of the Flood Mitigation Plan through October 30, 2008. A complete copy of the Flood Mitigation Plan can be downloaded from the City of Huntsville web page (www.ci.huntsville.al.us).

Community Rating System

In October 2003 the City of Huntsville achieved one of the goals of the FMP by advancing in the Community Rating System (CRS) to a Class 7 Community. This means an additional 5 percent (15 % total) reduction in flood insurance rates for residents living in the floodplain. The City of Huntsville desires to advance to a Class 6 Rating. It is believed that Huntsville can reach a Class 6 rating with implementation of additional flood management activities within the community.

New Watershed Modeling and Flood Studies

The Flood Mitigation Plan action plan recommends that the City of Huntsville prepare new floodplain maps for all of the City's floodplain areas. The May 2003 flood reinforced and demonstrated to the City of Huntsville the need for new watershed models and floodplain maps. To that end, City staff and consultants began modeling efforts on several watersheds.

In addition to updating new floodplain maps in studied areas, the City has started flood studies along unstudied streams. City annexation and development in western Huntsville and the Little Cove area of Huntsville has prompted the necessity for new flood studies to establish base flood elevations and floodways along unstudied streams in Huntsville. The following is an update of the flood studies that are currently in progress to address the needs of the City's floodplain management goals.

1. Big Cove Creek/ Peevey Creek /Robinson Mill Creek

Assistance is being provided by the Alabama Department of Economic and Community Affairs (ADECA) and their contractors. City staff began hydrologic modeling of the Big Cove Creek watershed above Dug Hill Road, and also modeled the Peevey Creek watershed. ADECA contractors have taken these models and are expanding them into a large single model that will include Robinson Mill Creek. This work is needed because relatively recent floods and City modeling have shown that flood elevations established by FEMA in these developing watersheds are potentially too low.

2. Huntsville Spring Branch / Pinhook Creek Watershed

AMEC has completed the Pinhook Creek Watershed Modeling which includes the tributaries to Huntsville Spring Branch. The streams included in the watershed modeling are listed in Table 1.1. The City has elected to submit only a portion of the updated watershed model and flood study to FEMA for review. The portion of the models submitted to FEMA for a Letter of Map Revision (LOMR) request is referred to as the Pinhook Creek Segment LOMR. This submittal reflects updated hydrology and channel hydraulics through the downtown area between Island Circle off Leeman Ferry Road on Huntsville Spring Branch (downstream end) and Abington Ave. on Pinhook Creek (upstream end).

FEMA has made a preliminary review of the flood study and has requested additional information from AMEC and the City through correspondence dated 8/22/08 and 9/10/08. AMEC is preparing a response to FEMA and providing the additional data as requested.

• Pinhook Creek and Dallas Branch Bypass Project (Flood Mitigation grant Project)

This is a flood control project that includes channel and structure improvements along Pinhook Creek and Dallas Branch from the twin railroad bridges just north of Holmes Avenue upstream to the confluence of Pinhook Creek and Dallas Branch and then along Dallas Branch to Coleman Street. The project involves a large detention area east of the railroad and the rerouting of Dallas Branch along the railroad and a new structure under the railroad. The project includes updated hydrology and hydraulics. The City for several years has been acquiring property within the project limits anticipating this project to be approved for grant funding for design and construction.

The City of Huntsville has received a federal grant to perform Phase 1 preliminary engineering design with a level of detail to determine good project cost estimates and re-analyze the Cost/Benefit Ratio. We are currently working with a consulting engineer on the contractual details for the Phase 1 work. The completion date for Phase 1 will be around September 1, 2009 (an extension may be sought from FEMA if needed). After Phase 1 is completed and the Phase 2 money is available the City plans on proceeding into Phase 2 which includes finalizing plans and completing all requirements for bidding and construction. The construction phase of the project will take approximately 36 months to complete.

• Pinhook Creek & Huntsville Spring Branch (US Army Corps of Engineers Project)

This is a flood control project including channel widening and bridge modifications along Huntsville Spring Branch and Pinhook Creek between Memorial Parkway and the twin railroad bridges just upstream of Holmes Avenue. The project includes updated hydrology and hydraulics. The City continues to seek a federal funding for this project through the US Army Corps of Engineers and legislation sponsored by Congressman Cramer.

Table 1.1 Studied Stream Reaches

Stream	Initials	Study Area Description	River Miles
Broglan Branch	BB	From confluence with Pinhook Creek to Approx. 2,959-ft. upstream of Grizzard Rd.	4.46
Broglan Branch Trib. A	BBA	From confluence with Broglan Branch to Approx. 2,791-ft. upstream of Commercial Drive	1.52
Broglan Branch Trib. B	BBB	From confluence with Broglan Branch to Approx. 926-ft. upstream of Kyle Lane	0.45
Dallas Branch	DB	From confluence with Pinhook Creek to Approx. 215-ft. upstream of Saddletree Boulevard	2.94
Dallas Branch Bypass	DBP	From confluence with Pinhook Creek to Approx. 3,669-ft. upstream of Meridian St.	1.34
Dallas Branch Trib. A	DBA	From confluence with Dallas Branch to Approx. 312-ft. upstream of Vinyard Street	0.87
Dallas Branch Trib. B	DBB	From confluence with Dallas Branch to Approx. 157-ft. upstream of Randy Avenue	0.47
Dry Creek (1)	DC	From confluence with Broglan Branch to Approx. 2,247-ft. upstream of Mastin Lake Road	2.75
Dry Creek (1) Trib. A	DCA	From confluence with Dry Creek to Approx. 245-ft. upstream of Campus Road	1.11
Dry Creek (1) Trib. B	DCB	From confluence with Dry Creek to Approx. 1781-ft. upstream of Grizzard Road	0.63
East Fork Pinhook Trib. A	EFA	From confluence with East Fork Pinhook to Approx. 2,156-ft. upstream of Ricky Road	0.89
Fagan Creek	FC	From confluence with Pinhook Creek to Approx. 3,700-ft. upstream of Tel-Fair Drive	3.19
Fagan Creek Trib. A (Mountain Brook Branch)	FCA	From confluence with Fagan Creek to Approx. 1,748-ft. upstream of Darnell Road	0.78
Normal Branch	NB	From confluence with Pinhook Creek to Approx. 165-ft. upstream of Winchester Road	5.14
Normal Branch Trib. A	NBA	From confluence with Normal Branch to 182-ft. upstream of Wholesale Circle	1.74
Pinhook Creek	PC	From Approx. 119-ft. downstream of Martin Road to Approx. 500-ft. downstream of Spragins Hollow Road including the upper portion of Huntsville Spring Branch, Pinhook Creek proper, and East Fork Pinhook Creek ¹	10.99
Pinhook Creek Trib. A	PCA	From confluence with Pinhook Creek to Approx. 62-ft. upstream of Mastin Lake Road	2.42
Pinhook Creek Trib. B (Blue Spring Creek)	PCB	From confluence with Pinhook Creek to Approx. 147-ft. upstream of Pulaski Pike	1.91
Pinhook Creek Trib. C	PCC	From confluence with Pinhook Creek Trib. 2 to Approx. 745-ft. upstream of Pulaski Pike	0.70
West Fork Pinhook	WF	From confluence with Pinhook Creek/East Fork Pinhook Creek to Approx. 614-ft. upstream of dirt road crossing (northeast off Pulaski Pike-Approx. 860-ft. southeast of its intersection with Monica Road)	2.46
West Fork Pinhook Trib. A	WFA	From confluence with West Fork Pinhook to Approx. 130-ft. upstream of green Meadow Road	0.78

¹Detailed Study Areas are shown graphically in Figure 2.1

²In the effective FIS, Huntsville Spring Branch is defined from downstream of Martin Road to the confluence of Pinhook Creek and Fagan Creek, Pinhook Creek is defined from the confluence with Fagan Creek to the confluence of East Fork Pinhook Creek and West Fork Pinhook Creek, and East Fork Pinhook Creek is from the confluence with Pinhook Creek to Hollow Road.

3. Fagan Creek

The City has contracted with AMEC to perform a flood study along Fagan Creek from its confluence with Huntsville Spring Branch to just upstream of Cleermont Drive. The flood study will include new hydrology and hydraulics along the stream as a follow-up to the Conditional LOMR (CLOMR) for relocation and culvert addition related to the Embassy Suites Hotel and downtown redevelopment plan. A draft report has been submitted to City Engineering for review and comments. Plans are to submit the study to FEMA by February 2009.

4. Aldridge Creek Restudy (Channelization Project)

The City of Huntsville completed the Aldridge Creek Channelization Improvements Project in 2007. This channel improvement project was planned and developed after the June 28, 1999 flood to reduce flooding potential along Aldridge Creek. The June 1999 flood resulted in severe flooding along Aldridge Creek that caused substantial damage to many homes and properties. The City of Huntsville developed the Aldridge Creek Flood Control Project to improve the capacity of the stream and reduce future risk and potential for flooding. The project included purchasing houses in the floodway using FEMA and City funds, overflow bench notching, and bridge improvements.

The City contracted with AMEC to perform a new hydrologic and hydraulic model to include the bridge and channel improvements in a New Flood Study for Aldridge Creek. The new watershed model and hydraulic study of Aldridge Creek has been submitted to FEMA for a Letter of Map Revision (LOMR). The New Study removes approximately 800 structures from the Special Flood Hazard Area (Zone AE) and 50 structures from the Floodway. The new flood study has been completed and submitted to FEMA. FEMA has completed a preliminary review of the flood study and has requested additional information. AMEC has furnished FEMA the additional data as requested and implied that they need nothing further from the City to complete their review.

5. Broglan Branch

The Pinhook Creek Watershed Modeling and Flood Study include Broglan Branch from its confluence with Huntsville Spring Branch upstream to a point on the stream just east of intersection of Brookline Drive and Nelson Drive. The study was completed and then revised by AMEC to include a proposed bridge and channel improvements at the Clinton Avenue crossing. The proposed bridge at Clinton Avenue provides a substantial decrease in flood elevations on the upstream side of the street. The flood study along Broglan Branch which includes the proposed Clinton Avenue bridge was submitted to FEMA as a CLOMR on August 25, 2008. Late in September of 2008, FEMA responded requesting additional information, which the City is currently working on supplying. A follow-up Letter of Map Revision will be required after publication of the CLOMR and completion of the bridge project.

6. McDonald Creek

The Engineering Division will start the watershed modeling on McDonald Creek this year. A Scope of Work will be prepared by the City and the work will be contracted out as soon as a proposal for services is received and approved by the Engineering Division. The study will be scheduled for completion and submitted to FEMA for review by June 2009.

7. Indian Creek

The City has contracted with AMEC to perform a flood study along Indian Creek between University Drive (Highway 72W) and Old Monrovia Road. The new flood study will update hydraulics to include new development, updated bridge data, as well as proposed development. A revised draft report has been submitted by AMEC waiting for City Engineering review and comments. Plans are to submit the flood in the form of a CLOMR to FEMA by January 2009.

The City Engineering Division will be meeting to decide if prudence dictates re-studying the entire Indian Creek watershed in 2009 with a scheduled bridge replacement and improvements planned for Old Madison Pike. At a minimum, the Old Madison Pike project will require a level of hydraulic analysis to either indicate a “No-Rise” or develop a CLOMR application to be submitted and published by FEMA (which would ultimately require a LOMR application and publication as well).

8. Barren Fork & Swan Pond

The City has contracted with AMEC to perform a flood study along Barren Fork, Betts Spring Branch, and Swan Pond roughly from the Tennessee River upstream to 1,000 feet downstream of Martin Rd. The new study will include updated hydrology and hydraulics and will replace the current Zone A with a Zone AE. A revised draft report has been submitted by AMEC waiting for City Engineering review and comments. The study is about 80 – 85% complete. Plans are to have the study submitted to FEMA by January 2009.

9. Knox Creek

The City has contracted with Brown & Caldwell to perform a flood study along Knox Creek from just upstream of its confluence with Limestone Creek to Balch Rd. The new study will include updated hydrology and hydraulics and will replace the current Zone A and unstudied Zone C areas with a Zone AE. A revised draft report has been submitted by Brown & Caldwell and awaiting City Engineering review and comments. The study is about 80 – 85% complete. Plans are to have the study submitted to FEMA by February 2009.

10. Limestone Creek (LOMR)

The City of Huntsville initially contracted with AMEC, Inc. (AMEC) to perform a detailed flood study of Limestone Creek from Highway 72W to about 6,000-ft. north of the

Capshaw Rd. crossing in West Huntsville. Proposed subdivision development along Limestone Creek prompted the need to establish Base Flood Elevations (BFEs) and floodway changing this portion of Limestone Creek from a Zone A to a Zone AE. This study, which included new hydrology and hydraulics, is in the process of being revised by AMEC as a result of some development in the area outside of the City limits which occurred after the initial study was done.

11. Limestone Creek (South of Highway 72West)

The City of Huntsville plans on contracting a flood study along Limestone Creek from about 2,000-feet downstream/south of Highway 72W to I-565. The flood study will include new hydrology and hydraulics and change an existing Zone A to a Zone AE. Proposed new development along Limestone Creek has prompted the need to establish Base Flood Elevations (BFEs) and floodway data along Limestone Creek. This study is proposed for 2009.

Chapter 1 - Introduction

This chapter describes the process used for flood mitigation planning. This process is consistent with widely accepted methods used across the country.

Chapter 2 - Problem Description

Chapter 2 describes sources of flooding in Huntsville. One of the tables presents the number of floodplain addresses. Addresses were used because the data was readily available in this form. The total number of structures with addresses in the floodplain is currently about 6,800.

During 2003, the City began working on a Disaster Mitigation Plan in accordance with the Disaster Mitigation Act of 2000. The draft of this plan uses portions of the Flood Mitigation Plan. This federal law requires that a community must have a pre-disaster mitigation plan, and the plan must cover all applicable natural hazards for the community to receive federal hazard mitigation grants. The Disaster Mitigation Plan was completed by the City's Emergency Management Division and adopted by the City in August 2004. The City of Huntsville completed an update of the Disaster Mitigation Plan in December 2006.

Chapter 3 - Goals

The Flood Mitigation Planning Committee spent much time discussing the goals of the Flood Mitigation Plan. The five goals for flood mitigation in order of priority were:

- 1) Protect life and health from flooding
- 2) Mitigate the effect of flooding on existing development
- 3) Protect new development from damage by the base flood
- 4) Improve the quality of life in the city
- 5) Secure the resources needed to implement the Flood Mitigation Plan

The Aldridge Creek channel improvements recently completed by the City promoted Goals 1, 2, and 4. Initial estimates indicated that channel and bridge improvements along Aldridge Creek have reduced the floodplain so that several hundred homes will no longer be in a Special Flood Hazard Area. This promotes both Goals 1 and 2.

Properties along Aldridge Creek in a section of the stream from Four Mile post Road to Sherwood Drive that were purchased in order to expand the channel have become greenspace with a walking trail along the creek. Other properties acquired for the channel

improvements, at some point, may be added to the City greenway system which would in turn promote Goal 4.

Fagan Creek channel relocation work has been completed near the new Embassy Suites Hotel site in downtown Huntsville. Channel improvements and bridge expansion projects are being designed to include a section of Pinhook Creek near the Von Braun Center. This work includes a flood control channel that promotes Goals 1 - 3, and walkways and water amenities that will promote Goal 4. It is expected that this work will encourage redevelopment of many areas near downtown Huntsville.

A Bridge Replacement Project is currently being designed for the Clinton Avenue bridge at Broglan Branch. The proposed bridge and associated channel modifications will significantly improve the hydraulic capacity and decrease the flood elevations upstream of the bridge. After the improvements have been completed the City of Huntsville will submit the required information to FEMA in order to change the existing flood map (likely in conjunction with other revisions). Initial estimates indicate that the proposed bridge will pass the 100 year flood without overtopping the roadway, which is a significant improvement to the existing conditions. Design will be completed in October 2007, construction slated to begin in early 2008, with planned completion by late 2008. This project promotes Goals 1, 2, and 3.

According to current City regulations, new development within the flood fringe must be elevated or flood proofed to one foot above the BFE. This existing regulation promotes Goal 3.

Also, the City has recently completed an Open Space Plan that designates areas to be set aside and protected from development. In the past year, the City has received donations of more than 500 acres consisting mostly of wetland and floodway in the Flint and Tennessee River watersheds. A 1.75 mile extension of the Big Cove Creek Greenway was completed. The City also received federal grants to extend the Big Cove Creek Greenway an additional 0.6 mile and to construct a Greenway along the Flint River. The Big Cove Greenway project has been completed. The Flint River Greenway Phase 1 has been completed. Phase 2 of the Flint River Greenway is being designed. These projects provide further flood mitigation efforts and promote Goals 1 - 4.

Chapter 4 - Preventive Measures

One of the recommendations of the Plan is that Huntsville stormwater regulations be reviewed. The City has plans to begin a comprehensive evaluation, review and assessment of all City storm and flood related regulations. A committee will be selected of engineers, developers, planners, builders, and citizens to look at regulations such as City storm drainage design criteria, detention requirements, loss of storage impacts on flooding, and other issues to determine the financial and technical feasibility of modifying the regulations. The committee will make recommendations of needed changes to the regulations to the SWMC, Mayor, and City Council.

In addition, modeling of various watersheds is in progress or has been completed. These include the Big Cove Creek/Peevey Creek/Robinson Mill Creek watershed modeling (Figure 2-1) by contractors for the Alabama Department of Economic and Community Affairs (ADECA). The Big Cove Creek basin above Dug Hill Road has at least two highly variable springs with peak flows exceeding 100 cubic feet per second (cfs). These are Sycamore Spring and Blue Spring. Flow from Blue Spring ceases in the dry season and may approach 1000 cfs in heavy flooding. These springs are large enough to impact flooding in these watersheds. Blue Spring captures significant volumes of water from the large north valley (McKay Hollow) of the upper Big Cove Creek basin and shunts the water under the ridge. The City, with the help of Dr. Chris Smart of the University of Western Ontario, previously performed a dye trace that demonstrated the connection between the McKay Hollow branch and Blue Spring. Groundwater north of the ridge passes under it to Blue Spring, additionally water infiltrating on the ridge flows along the ridge to discharge at Sycamore Spring. Figure 2-2 shows the groundwater connections inferred from the dye traces.

Besides the Big Cove Creek/Peevey Creek/Robinson Mill Creek models, the City plans modeling of the McDonald Creek basin and other smaller basins that experienced some degree of flooding in 2003.

Besides the above modeling, the Huntsville Spring Branch/Pinhook Creek/Fagan Creek/Dallas Branch/Brogan Branch/Normal Branch models have been completed. This composite model includes much of the central, north, and northwest parts of Huntsville.

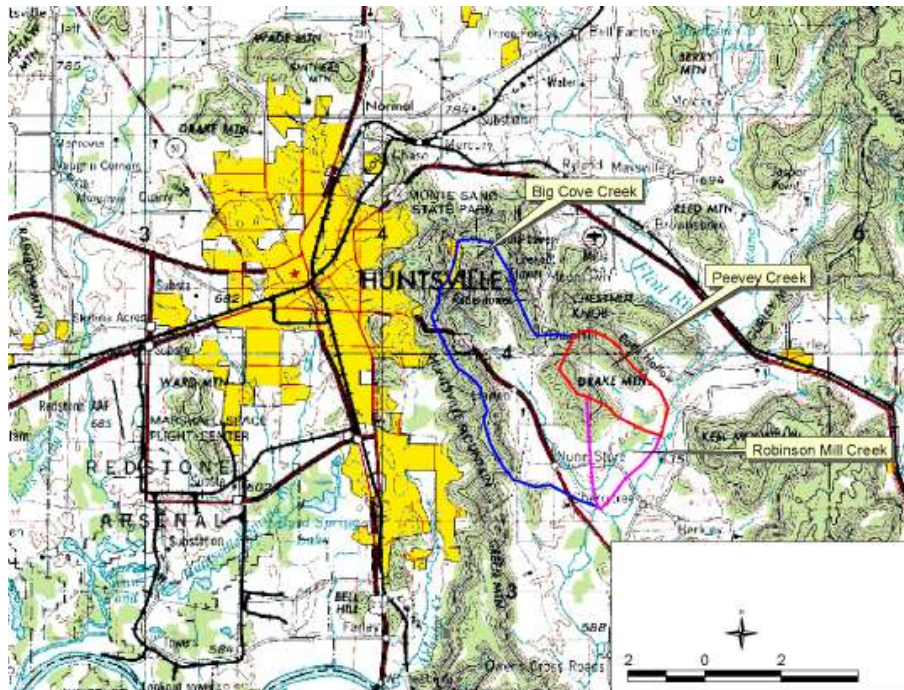


Figure 2-1: Big Cove Creek, Peevey Creek, and Robinson Mill Creek Watersheds.

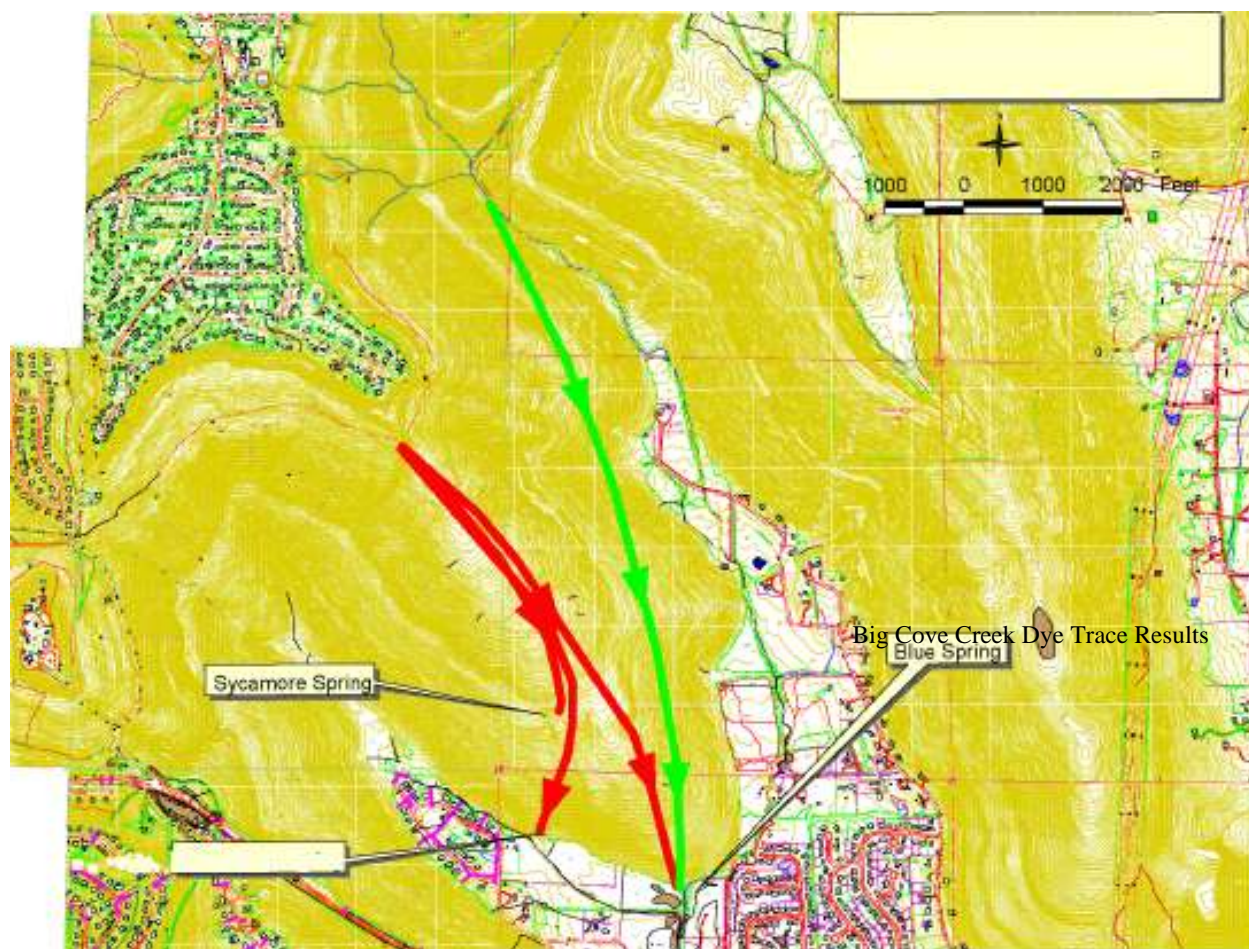


Figure 2-2: Big Cove Creek dye trace results

Chapter 5 - Property Protection

Property protection measures are usually divided into 8 categories:

- 1) Relocation
- 2) Acquisition
- 3) Building elevation
- 4) Local barriers
- 5) Dry flooding proofing
- 6) Wet flood proofing
- 7) Sewer backup protection
- 8) Insurance

The City of Huntsville has acquired several properties located within designated flood hazard areas since October 2005. These properties were acquired for proposed flood control projects along Huntsville Spring Branch, Pinhook Creek and Dallas Branch. Table 5-1 lists these properties.

Table 5-1

<u>Owner</u>	<u>Address/Location</u>	<u>Project</u>	<u>Purchase Date</u>
Kenny Hunter	805 Dickson Street	Dallas Branch Bypass	4/18/2006
Estate of Mary Hunter	807 Dickson Street	Dallas Branch Bypass	4/18/2006
Bobbie Jean Shelton	Lot 14, McCullough Addition to City of Huntsville (Dallas Street)	Dallas Branch Bypass	10/16/2006
W. Dewayne Mullins	Lot 15 and 16, McCullough Addition to City of Huntsville (Dallas Street)	Dallas Branch Bypass	11/15/2006
Edith and Usher Mosley	405 Darryl Avenue	Dallas Branch Bypass	12/2/2005
Huntsville/Madison County Railroad Authority	Block 290, Quigley Map for City of Huntsville	Huntsville Spring Branch	12/16/2005
Ronald E. Kemp	1009 Dallas Street	Dallas Branch Bypass	6/13/2007
Loretta Patterson	Lots 9, 10, 11, 12 & 13, Blk. 32, East Huntsville Addition, P.B. 1, page 35	Dallas Branch Bypass	6/10/2008
Thomas Rosenblum	Lots 4 & 5, Blk. 33, East Huntsville Addition, PB1, Page 35	Dallas Branch Bypass	5/23/2008

Chapter 6 - Emergency Services

There is no additional progress to report on a flood warning system.

Chapter 7 - Structural Projects

The City has completed several structural projects. These are: 1) Aldridge Creek channel and bridge improvements at select locations from Four Mile Post Road south to Mountain Gap Road, (2) Toney Drive Culvert Expansion, (3) Lee High Drive Slope Paving and the 4) the Fagan Creek culvert project. Several other structural projects are under design or ready for construction including (1) Meridian Street culvert replacement, (2) the Pinhook Creek flood control project from Holmes Avenue south to Governor's Drive, (3) Granada Drive Culvert, and (4) Clinton Avenue bridge over Broglan Branch.

All of the Aldridge Creek improvements have been completed including: overflow bench notching, Sherwood Drive bridge, the pedestrian bridge at Green Mountain Road, Lily Flagg bridge (Figure 2-3), and berms protecting the Savannah Court - Old Albany area.

The Meridian Street culvert at Howe is a single 12 ft. by 5 ft. culvert probably constructed before World War II. The projected replacement of this culvert is in FY2008.



Figure 2-3: Widening of the Lily Flagg Bridge, October 16, 2003.

Another significant drainage project was completed downtown: the rerouting of Fagan Creek into a 900 ft long culvert (Figure 2-4 and 2-5). This project has little impact on flooding, but enhances the Big Spring ecology by moving 300 ft of the Big Spring channel from a concrete culvert to a partially shaded surface channel similar to the one near the spring rise. The project also included moving the downtown substation away from the Von Braun Civic Center (VBCC). These changes made room for a new high rise hotel adjacent to the VBCC. The spring channel runs between the hotel and the VBCC, with a very attractive water feature nearby. This, along with the Pinhook Creek project, will enhance the appearance of downtown, make it more appealing to residents and visitors, and encourage redevelopment downtown.



Figure 2-4: New Fagan Creek culvert under construction, December 12, 2003

Huntsville has begun studying approaches for stream restoration that will improve the water quality and biodiversity of Huntsville streams by restoring natural stream dynamics and habitat. Pinhook Creek and Huntsville Spring Branch are prime candidates for this kind of restoration. The City has begun preliminary design work on Pinhook Creek channel improvements near the VBCC. Construction has begun on a new bridge crossing Pinhook Creek and the demolition of three (3) bridges near the VBCC. Decades ago, nearby sections of the creek were straightened and the slopes were paved with concrete. As a part of a proposed flood control project, a low flow channel will be created with natural meanders. The flood channel above the normal high water mark will be widened. In the future, a greenway/river walk may be established in the low flow channel. This reconstruction should accomplish two major goals: first, it will reduce flood levels and improve water quality and biodiversity of the stream, and second, it will provide an amenity for residents and visitors that should promote downtown redevelopment.



Figure 2-5: Original Plan for Fagan Creek realignment and new hotel (Complete).

Chapter 8 - Natural Resource Protection

In past decades, cities were more likely to drain wetlands for development than protect them. With the passage of the Safe Drinking Water Act in the 1974, people became more aware of wetland functions such as flood storage, water quality improvement, flood scour amelioration, fisheries and wildlife habitat, and sequestering of sediments and pollutants. Since 1947, Huntsville has lost about 90 percent of its wetlands. In the last decade, efforts have begun to protect wetlands by acquiring land, building greenways, and encouraging donations of land in floodways and floodplains that is unsuitable for development.

Huntsville still has some pristine aquatic sites such as headwater streams, and efforts begun in the last 10 years should help preserve and protect them. The Aldridge Creek, Indian Creek, and Big Cove Creek greenways have preserved some beautiful areas for future generations. In 1999, a 538 acre tract of land near the confluence of Big Cove Creek and the Flint River was donated to the City for use as a nature preserve. This is a lovely area that many residents will be able to enjoy after the Big Cove Creek Greenway is extended into the nature preserve. This is an excellent way to protect hundreds of acres of bottomlands and wetlands while providing flood protection to downstream residents.

The City has received donations of 375 acres of wetland and other land near the Flint River basin from the Goldsmith-Schiffman and the Ellett families. The City also received a gift of 128 acres from General Shale that includes floodway and wetlands along the Tennessee River. This land will be kept as a nature preserve. The Big Cove Creek Greenway has been extended from the Hampton Cove School downstream to the confluence with the Flint River. The City has received an additional federal grant to extend the Big Cove Creek Greenway an additional 0.6 mile. Plans for another segment of the Indian Creek Greenway from Highway 72 to the new Providence development near Old Monrovia Road have been completed. The total length of the addition will be close to a mile and will bring the total length to nearly three miles. The new City Open Space Plan and these acquisitions further flood mitigation efforts and promote Goals 1 - 4.

Though development has occurred around many streams, some of these streams still possess fairly diverse ecosystems, and these areas would make good sites for creation of greenways and linear parks. The amount of wildlife in some areas is surprising, given the amount of development around the streams. Some areas where greenways could be developed include the East Fork of Pinhook Creek north of Medaris, and Broglan Branch north of University Drive.

Chapter 9 - Public Information

Many people flooded in the June 28, 1999 Aldridge Creek flood did not even know they were in the floodplain. The Flood Mitigation Plan proposed that annual mailings be sent to residents in the floodplain, and the City sent out more than 6800 letters to floodplain residents this year. Other letters have been sent to repetitive loss properties and residents of adjacent properties. Repetitive loss properties are those that have made more than one flood insurance claim within a specified number of years.

During the last year, City staff members have made a significant effort to provide public information on flooding. The City staff members have attended meetings with realtors, home builders, surveyors, and developers to discuss flooding related issues.

In an average day, City staff members receive several calls requesting flood information or elevation certificates needed for flood insurance. These calls come from residents, mortgage companies, flood insurance companies, etc.

Generally, the City has continued its public outreach programs by having a staff member available to meet with organizations concerning flood related topics.

Chapter 10 - Action Plan

It is generally recognized that competing demands on limited resources impact implementation of the Flood Mitigation Plan. Accordingly, while it is hoped that additional resources can be found for Plan implementation, involved parties are tasked with working within these limitations by prioritizing the implementation.

A high priority in accomplishing the Plan is the development of models for City watersheds. Though watershed modeling continues, it is clear that within the current funding levels, watershed models will not all be completed by the scheduled deadline of 2006. The Pinhook Creek/ Huntsville Spring Branch Model all the way south to Martin Road is complete. This model includes Pinhook Creek, Broglan Branch, Dallas Branch, Fagan Creek, Normal Branch et al.

3. Review of Floods

Huntsville was fortunate to not have a significant flood along the main channels in this reporting year. The City did experience some localized flooding in Southeast Huntsville on August 21, 2007 due to a very intense thunderstorm that dumped from 2.0 to 3.41 inches in a 45 minute period of time. Street flooding on Balmoral Drive near Airport Road, and streets in the Jones Valley Drive area near Chadwell Road was reported. There was also flooding near Mayfair Park in the back yards of houses on Thornton Avenue, and significant flooding of yards and streets at the intersection of Stanford and Auburn Drive.

4. Review of Mitigation Action Items

Engineering Division

Table 4-1: Mitigation Action Items Completion Schedules

Number	Action	Revised Date
1.d.1	Prepare flood stage forecast map for Aldridge Creek	December 31, 2007
1.d.2	Prepare floodplain, floodway, and flood stage forecast maps for Huntsville Spring Branch and tributaries	July 2008
1.d.3	Develop watershed models for the remaining watersheds in Huntsville	December 31, 2012
2.d.1	Prepare watershed plan for Aldridge Creek	December 31, 2007
2.d.2	Complete the watershed plan for the Pinhook Creek area	December 31, 2008
2.d.3	Develop a priority list for plans for the remaining watersheds	Complete
3.d	Submit a report on the stormwater management regulations review	December 31, 2007
4.d	Submit a report on the floodplain regulations review	Ongoing
12.d.1	Publicize existing property protection projects	Ongoing
12.d.2	Incorporate a flood protection web page on City's web site	Complete
12.d.3	Provide flood-related videos to the public access cable TV channel	Complete
12.d.4	Publish a homeowner's flood protection manual	December 31, 2007
12.d.5	Annual mailing to floodplain property owners	Ongoing

Table 4-2: Mitigation Actions Items Status Report

Number	Status
1.d.1	The flood stage forecast map for Aldridge Creek (Aldridge Creek Watershed Model and Flood Study) which includes the improvements to Aldridge Creek and existing watershed conditions is underway with completion in early 2008. Review by FEMA and the official changes to the flood maps through a LOMR anticipated by December 2008.
1.d.2	The forecast maps for Huntsville Spring Branch and tributaries. The watershed model and flood study is essentially complete with plans to submit to FEMA and approved through a LOMR by 12/31/08.
1.d.3	Work is ongoing. Watershed Models for Limestone Creek, Betts Spring, Peevey Creek and the Eastern Boundary Canal are underway and work will continue as shown in Table 4-3.
2.d.1	Work will begin on the watershed plan for Aldridge Creek as soon as the Watershed Model and Flood Study have been approved by FEMA. See 1.d.1 for schedule on Flood Study.
2.d.2	Work will begin on the Pinhook Creek Watershed plan as soon as the Watershed Model and Flood Study have been approved by FEMA. See 1.d.2 for schedule on Pinhook Creek Flood Study.
2.d.3	Complete
3.d	In house review of the stormwater management regulation and floodplain regulations have been in process for several months with plans to modify the regulations to meet current needs and demands. See Chapter 4, paragraph 1 for the City's plans on stormwater regulations and floodplain regulations review.
4.d	See 3.d
12.d.1	Ongoing
12.d.2	Complete
12.d.3	Complete
12.d.4	Draft Complete
12.d.5	Continuing

Development of watershed models is critical for intelligent floodplain management. New models being developed and to be developed by the City of Huntsville will provide better information for planning and development decisions, and promote the judicious use of available resources.

Huntsville's watershed modeling efforts received a boost in recent years from the Alabama Department of Economic and Community Affairs (ADECA). The Big Cove Creek, Robinson Mill Creek, and Peevey Creek models are scheduled for completion next year by ADECA and its contractors. Table 4-2 has been revised since last year to reflect progress on watershed modeling.

Indian Creek is an upcoming priority because of the large amount of development planned in that watershed. This includes the construction of Columbia High School (Western Technology High School), recent construction of apartments near the creek just off Slaughter Road and Old Madison Pike. Potter's Mill is currently being developed, and developments in Madison are also in this watershed. The high density Providence Development is under construction north of Highway 72. Development in this watershed is accelerating with the construction of new schools in the area.

Looking beyond the Flint River Area and Indian Creek modeling, significant development is expected near the western boundary of the City and some of the priority of some of the western watersheds may need to be raised in the future. For example, because of extension of runways at the airport and proposed development in the area, a preliminary hydrology model of Miller Branch was completed.

(12.d.7) The sinkhole risk map project is on hold as a lesser priority and due to staff limitations.

Table 4-3: Watershed Model Priority List

Priority	Creek	Status
1)	Aldridge Creek	Projected completion 2008
2)	Huntsville Spring Branch	Complete 08/2004
	a. Pinhook Creek	Complete 08/2004
	b. Broglan Branch	Complete 08/2004
	c. Fagan Creek	Complete 08/2004
	d. Dallas Branch	Complete 08/2004
	e. McDonald Creek	Begin 2009
	f. Normal Branch	Complete 08/2004
3)	Flint River	Begin 2010
	a. Big Cove Creek	Complete 2007
	b. Beaverdam Creek East	*
	c. Chase Creek	*
	d. Peevey Creek	Projected completion 2007
	e. Robinson Mill Creek	Projected completion 2007
4)	Indian Creek	Begin 2009
	a. Dry Creek	*
5)	Betts Spring Branch	LOMRs by others complete 2008
6)	Western Watersheds	
	a. Barren Fork	Begin 2009
	b. Knox Creek	Begin 2009
	c. Beaverdam Creek West	*
	d. Limestone Creek	Begin 2006
	e. Bradford Creek	Begin 2009
	f. Miller Branch	Begin 2008
	g. Piney Creek	Begin 2009
	h. Wheeler Lake Wetlands	*
	i. Blackwell Swamp Basin	*
	j. Withers Spring Branch	*
7)	Eastern Boundary Canal	Begin 2006 – In process by others; complete in 2009
8)	Byrd Spring Wetlands	Begin 2010
9)	Tennessee River Tributary	Begin 2009

* Schedule based on identified problems, development, and funding.

Planning Division

Table 4-4: Planning action items

Number	Item	Due	Status
5.d	Review of zoning ordinance	12/31/2002	In Process
6.d	Open Space Plan	06/30/2002	Complete
12.d.7	Prepare landslide hazard map	12/31/2003	Complete

Inspection Division

Table 4-5: Inspection action items

Number	Item	Status
7.d.1	Identify multi-office procedures	Complete
7.d.2	Determine appropriate measures to correct problems	Complete
1.a.3	Annual review of procedures	Continuing

Table 4-6 lists identified multi-office procedures. A multi-office procedure is a function that involves more than one City office for accomplishing the process. For instance, a Building Permit is a multi-office function because it involves the Inspection, Engineering, and Planning departments' approval before the Building Permit is issued. Usually, each of the functions shown in the table is executed smoothly between departments. These procedures should be reviewed annually or more frequently as needed.

Table 4-6: Multi-department functions

Multi-department Function	Departments
Floodplain development permits	Inspection, Engineering
Subdivision development plans	Planning, Engineering
Drainage work orders	Public Works, Engineering
Building permits	Inspection, Engineering, Planning

Public Works Services

The single action item for Public Works was to prepare new drainage system maintenance procedures. The deadline will be extended to December 31, 2008.

Emergency Management Agency

EMA has only two action items, the preparation of a pilot flood response plan, and critical facilities plans. The deadline for completion of the flood response plan is within 6 months of completion of the flood stage forecast map. This map is the responsibility of Engineering and with channel improvements on Aldridge Creek, it has been delayed so that the new channel can be included in the map. EMA already has a generic flood response plan, which can be adapted to Aldridge Creek as soon as the flood forecast map is completed.

Mayor and City Council

Item 13.b was the adoption of the Flood Mitigation Plan. On a 5-0 vote, the City Council adopted the Flood Mitigation Plan on September 27, 2001.

Surface Water Management Committee

Table 4-7 shows the action items for the Surface Water Management Committee. Item 15.d is delayed pending required state enabling legislation; although attempts in getting the legislation have been made at the State and continued efforts are planned.

Table 4-7: Surface Water Management Committee action items

Item	Description	Deadline	Status
14.c.1	Annual Report of the Committee	October each year	Behind schedule
14.c.2	Five year update to the Plan for CRS credit	July 31, 2009	On schedule
15.d	Report on feasibility of a stormwater utility	Sept. 30, 2001	Awaiting enabling legislation

5. Discussion of Incomplete Action Items

Implementation of the Flood Mitigation Plan is dependent on the availability of resources. The City has been successful in meeting targeted dates in those areas where staff could devote the necessary time for their completion. Currently, the development of watershed models is behind original schedule due to availability of resources. The goal and desire, however, is to ensure that the required resources, staff, and funds are available to meet each of the Plan target dates.

6. Recommendations for New Projects and Revised Action Items

Table 6-1 is a summary of action item deadline revision requests. The requests for these modifications were discussed in Chapter 4.

Item	Description	Plan Original Date	Revised Date Request
1.d.1	Aldridge Creek flood stage forecast map	12/31/2001	1/1/2009
1.d.3	Watershed models for all Huntsville Watersheds	12/31/2006	12/31/2012
2.d.1	Watershed plan for Aldridge Creek	12/31/2001	12/31/2009
5.d	Review of Zoning Ordinance	12/31/2002	12/31/2009
8.d	Draft of drainage maintenance procedures	6/30/2002	12/31/2008
9.d	Pilot Flood Response Plan	7/1/2002	6/1/2009
15.d	Stormwater utility report	9/30/2001	Indefinite

Table 6-2 summarizes additional projects recommended by the Committee.

Table 6-2: Additional project recommendations

Item	Description
1.	New City base maps with 2 ft contours
2.	Dallas Branch Bypass
3.	Floodway acquisition plan
4.	Stream restoration/bioengineering pilot study
5.	Map Huntsville stormwater system (x, y, z)

Item 1: Update City base maps with two foot contours to enhance computer modeling and floodplain mapping. This has been completed.

Item 2: Dallas Branch Bypass improvements potentially have large benefits for the City. Dallas Branch Bypass improvements are in the City's Capital Improvement Plans. Design and funding efforts are ongoing with Alabama Emergency Management Agency (AEMA)/Federal EMA (FEMA) and the U.S. Army Corps of Engineers (USACE).

Item 3: The Flood Mitigation Plan recommends removal of all structures from Huntsville City floodways. Currently, the City has not prepared a plan for implementation of this recommendation although some removal and/or purchasing is ongoing. Item 3 recommends preparation of this plan. It should contain a list of every building address in City floodways and assessed values of these properties, and should prioritize areas for structural and other

improvements that will remove them from the floodway. Once this plan identifies properties for acquisition, the City should begin preparing FEMA grant applications for acquisition funding.

Item 4: This is a recommendation for a study of stream restoration using bioengineering methods rather than the traditional use of concrete. Huntsville has several smaller streams with erosion problems. Rather than paving the channels, the City should choose one of these streams and attempt restoration with more eco-friendly methods. Any method tested should be evaluated based on conveyance of stormwater, erosion control, and improvement of water quality and biodiversity.

Items 5: By mapping storm sewer systems, the City can more efficiently and accurately evaluate the impact of modifications to existing drainage systems.

In addition to these items, the City of Huntsville would like to improve its Community Rating System (CRS) rating from Class 7 to Class 6. City staff members have had numerous conversations with FEMA, David Van Troost, and French Wetmore, and Huntsville can reach Class 6 by doing any combination of the following that results in an increase of 500 points.

- 1) Aldridge Creek channel improvements (84 to 265 pts)
- 2) Future critical facilities out of 500-yr floodplain (100 pts)
- 3) Open Space Preservation (5 pts)
- 4) Two feet of Freeboard (100 pts)
- 5) City revisions to flood maps (50 to 100 pts)
- 6) Flood hazard disclosure by real estate agents (46 pts)

In discussions with FEMA and their contractors who review CRS credit, the point increase for the Aldridge Creek channel improvements that will take more than 500 buildings out of the floodplain, the credit will be no less than 84 points, but no more than 265. The formula for calculating credit for this activity is very complex and the City staff members could not get a firm number.

Critical facilities, such as nursing homes, day care facilities, police and fire stations, and schools, should be restricted to being outside the 500-yr floodplain. This would prohibit the construction or relocation of such facilities into the 500-yr floodplain.

The City has received donations or acquired nearly 1000 acres of floodplain land in the past few years. Huntsville has already earned the additional 5 points and will earn more as similar land is donated or acquired in the future.

The City requires 1 ft of freeboard. This means that all new floodplain development must be elevated or flood proofed to 1 ft above the 100-yr flood elevation. If we go two feet, this gives the additional credits.

The City is revising several flood maps at its own expense. This is in progress and includes Aldridge Creek, Huntsville Spring Branch/Pinhook Creek/Brogan Branch/Fagan Creek/Dallas Branch/Normal Branch, and Big Cove Creek/Peevey Creek/Robinson Mill Creek. The latter was done with significant help from the state of Alabama. According to French Wetmore, FEMA is revising/revised the CRS manual and more credit will be given for a community doing its own flood mapping.

Beyond the ability to call the City of Huntsville Engineering Department for flood hazard information, the City should explore providing a simple database that realtors can access that tells them the FEMA flood zone for a specific property.

7. Summary

The City continues efforts to revise the current/effective FEMA models and mapping with updated models that include new hydrology and new hydraulics. In areas where development has expanded into areas where there are unstudied streams and areas where there no floodways or base flood determinations, the City has made efforts to contract work with engineering firms that can perform flood studies that can be approved by FEMA and provide new floodplain mapping adopted for regulatory purposes.

The past year has shown a continued constant rate of development in the area and subsequently a slight increase in development as well as structure and site improvements within the City's floodplains. In 2005 a total of 80 Floodplain Development Permits were issued in comparison to the more than double that amount of 220 permits in 2006 (as of the end of September alone). As of October 18, 2007 there were already 205 Flood Development Permits. This year the City has hired a Floodplain Assistant to improve the efficiency and organization of this permitting process. Between October 17, 2007 and October 1, 2008 there were 189 Flood Development Permits issued by the Engineering Division.

8. Acknowledgements

Thanks to Mayor Loretta Spencer and the members of the City Council for bringing their constituents' concerns to the attention of the City staff, and for supporting the Flood Mitigation Plan and implementation efforts.