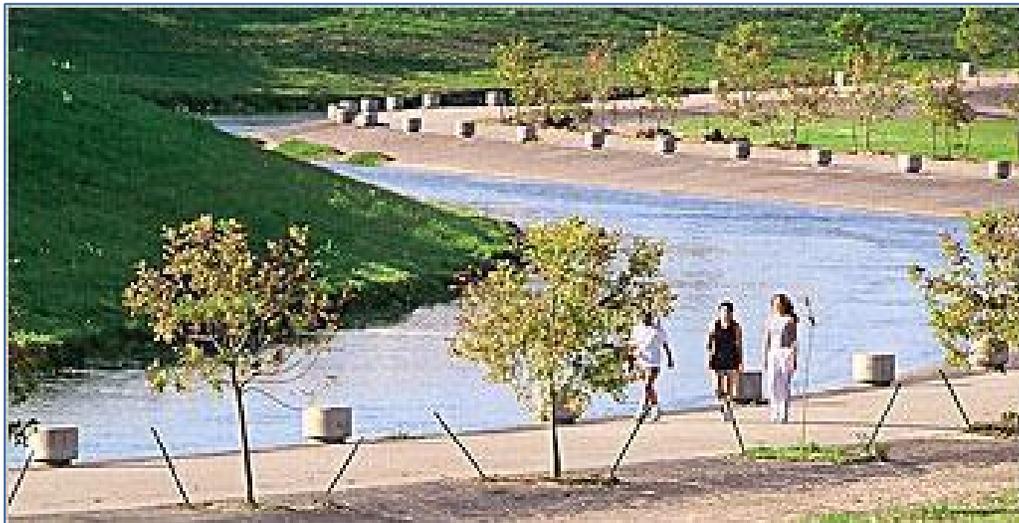


# City of Houston Floodplain Management Plan



*Photo Courtesy of HCFC*



## 2014 Progress Report

## Progress Report

The City of Houston 2012 Floodplain Management Plan (FMP) Local officially replaced the City of Houston Hazard Mitigation Plan (HMAP) when the FMP was adopted in August 2012. As part of the activities outlined in the FMP, an annual progress report is required to be prepared by the City's Floodplain Management Office to document the status of mitigation actions and floodplain management planning in the City of Houston. This document is the 2014 Floodplain Management Progress Report.

A description of each mitigation action that is part of the Floodplain Management Plan follows along with the 2013 status of each mitigation action. The appendix includes documentation of Public Participation, Floodplain Information Outreach, Outreach to Floodplain Areas and Repetitive Loss Areas and sample agendas of Floodplain Management Meetings with City of Houston Departments and other agencies.

The approved City of Houston 2012 Floodplain Management Plan and this 2014 Floodplain Management Progress Report are available to the public in the following locations:

- On the City of Houston website at <http://edocs.publicworks.houstontx.gov/engineering-and-construction/3557-floodplain-management-plan.html?path=>
- City's Floodplain Management Office at 1002 Washington, 3<sup>rd</sup> Floor, Houston, TX 77002
- City's Central Library at 500 McKinney, Houston, TX 77002

## Mitigation Actions with Updated Status

Mitigation Action	
<b>Title</b>	<b>Improvements to Floodplain Management Regulations</b>
<b>Category</b>	Preventative - Flooding
<b>Objective(s)</b>	1.2; 4.3
<b>Description</b>	Project provides for the evaluation and revision of Chapter 19, the City of Houston Floodplain Management Ordinance and Guidelines as needed. The process will determine if the implementation of additional higher standards and/or changes to administrative procedures are warranted.
<b>Department</b>	Public Works and Engineering; Floodplain Management Office
<b>Time frame</b>	2015
<b>Cost</b>	\$0; staff time
<b>Funding source</b>	City of Houston Operating Budget
<b>Priority</b>	High
<b>Benefit</b>	Improved mitigation of flood damage and loss. Additionally, implementation of additional higher standards could result in an improvement of the City's CRS score and an increased discount to NFIP policyholders in Houston.

### Status as of August 2014

Mitigation action planned for 2015.

Mitigation Action	
<b>Title</b>	<b>Improvements to Storm Water Management Regulations</b>
<b>Category</b>	Preventative - Flooding
<b>Objective (s)</b>	1.2; 4.3
<b>Description</b>	Project provides for the evaluation and revision of Chapter 9, Storm Water Design Requirements, and Chapter 13, Storm Water Quality Design Requirements of the City's Infrastructure Design Manual (IDM). All of the chapters of IDM are reviewed and revised on a rotating five-year cycle to ensure that the manual's design criteria incorporate changes in technology, construction practices, related regulations, and the goals of the community.
<b>Department</b>	Public Works and Engineering; Office of City Engineer; Standards Review Section
<b>Time frame</b>	2014
<b>Cost</b>	\$0; staff time
<b>Funding source</b>	City of Houston Operating Budget
<b>Priority</b>	High
<b>Benefit</b>	Improved storm water management regulations will improve drainage in the City related to new private and public projects. Improved drainage will reduce the likelihood and frequency of street and structural flooding. Additionally, implementation of changes to storm water management regulations could result in improvement of the City's CRS score and an increased discount to NFIP policy holders in the City of Houston.

#### **Status as of August 2014**

Mitigation action plan is ongoing. Draft regulations are currently under review and pending implementation.

The draft of Chapter 9 is available for review at:

[http://edocs.publicworks.houstontx.gov/documents/design\\_manuals/chapter\\_9\\_draft\\_revision\\_4\\_13.pdf](http://edocs.publicworks.houstontx.gov/documents/design_manuals/chapter_9_draft_revision_4_13.pdf)

Mitigation Action	
<b>Title</b>	<b>Arbor Oaks Buyout Project</b>
<b>Category</b>	Property protection - flooding
<b>Objective(s)</b>	1.1; 3.3; 4.2
<b>Description</b>	Acquisition of 244 total parcels
<b>Department</b>	Harris County Flood Control District
<b>Time frame</b>	As property owners volunteer for the voluntary project
<b>Cost</b>	Variable, dependent on owner participation
<b>Funding source</b>	HCFCDD's capital project funds and FEMA mitigation grant programs
<b>Priority</b>	High
<b>Benefit</b>	An acquisition in this area would eliminate the repetitive loss properties that are a drain on the NFIP and restore the land to its natural function as a floodplain.

#### **Status as of August 2014**

Mitigation action is ongoing. 155 acquisitions in this area were made in 2014.

Mitigation Action	
<b>Title</b>	<b>Glenburnie/Cashiola Buyout Project</b>
<b>Category</b>	Property protection - flooding
<b>Objective(s)</b>	1.1; 3.3; 4.2
<b>Description</b>	Acquisition of 134 total parcels
<b>Department</b>	Harris County Flood Control District
<b>Time frame</b>	As property owners volunteer for the voluntary project
<b>Cost</b>	Variable, dependent on owner participation
<b>Funding source</b>	HCFCD's capital project funds and FEMA mitigation grant programs
<b>Priority</b>	High
<b>Benefit</b>	An acquisition in this area would eliminate the repetitive loss properties that are a drain on the NFIP and restore the land to its natural function as a floodplain.

**Status as of August 2014**

Mitigation action is ongoing. 34 acquisitions in this area were made in 2014.

Mitigation Action	
<b>Title</b>	<b>Wood Shadows, Section 2 Buyout Project</b>
<b>Category</b>	Property protection - flooding
<b>Objective(s)</b>	1.1; 3.3; 4.2
<b>Description</b>	Acquisition of 127 total parcels
<b>Department</b>	Harris County Flood Control District
<b>Time frame</b>	As property owners volunteer for the voluntary project
<b>Cost</b>	Variable, dependent on owner participation
<b>Funding source</b>	HCFCD's capital project funds and FEMA mitigation grant programs
<b>Priority</b>	High
<b>Benefit</b>	An acquisition in this area would eliminate the repetitive loss properties that are a drain on the NFIP and restore the land to its natural function as a floodplain.

**Status as of August 2014**

Mitigation action is ongoing. 45 acquisitions in this area were made in 2014.

Mitigation Action	
<b>Title</b>	<b>Lake Forest Buyout Project</b>
<b>Category</b>	Property protection - flooding
<b>Objective(s)</b>	1.1; 3.3; 4.2
<b>Description</b>	Acquisition of 71 total parcels
<b>Department</b>	Harris County Flood Control District
<b>Time frame</b>	As property owners volunteer for the voluntary project
<b>Cost</b>	Variable, dependent on owner participation
<b>Funding source</b>	HCFCD's capital project funds and FEMA mitigation grant programs
<b>Priority</b>	High
<b>Benefit</b>	An acquisition in this area would eliminate the repetitive loss properties that are a drain on the NFIP and restore the land to its natural function as a floodplain.

**Status as of August 2014**

Mitigation action is ongoing. 22 acquisitions in this area were made in 2014.

Mitigation Action	
<b>Title</b>	<b>Lakewood Estates Buyout Project</b>
<b>Category</b>	Property protection - flooding
<b>Objective(s)</b>	1.1; 3.3; 4.2
<b>Description</b>	Acquisition of 70 total parcels
<b>Department</b>	Harris County Flood Control District
<b>Time frame</b>	As property owners volunteer for the voluntary project
<b>Cost</b>	Variable, dependent on owner participation
<b>Funding source</b>	HCFCD's capital project funds and FEMA mitigation grant programs
<b>Priority</b>	High
<b>Benefit</b>	An acquisition in this area would eliminate the repetitive loss properties that are a drain on the NFIP and restore the land to its natural function as a floodplain.

**Status as of August 2014**

Mitigation action is ongoing. 13 acquisitions in this area were made in 2014.

Mitigation Action	
<b>Title</b>	<b>Home Owned Estates Buyout Project</b>
<b>Category</b>	Property protection - flooding
<b>Objective(s )</b>	1.1; 3.3; 4.2
<b>Description</b>	Acquisition of 55 total parcels
<b>Department</b>	Harris County Flood Control District
<b>Time frame</b>	As property owners volunteer for the voluntary project
<b>Cost</b>	Variable, dependent on owner participation
<b>Funding source</b>	HCFCD's capital project funds and FEMA mitigation grant programs
<b>Priority</b>	High
<b>Benefit</b>	An acquisition in this area would eliminate the repetitive loss properties that are a drain on the NFIP and restore the land to its natural function as a floodplain.

**Status as of August 2014**

Mitigation action is ongoing. 39 acquisitions in this area were made in 2014.

Mitigation Action	
<b>Title</b>	<b>Braeburn Glen Buyout Project</b>
<b>Category</b>	Property protection - flooding
<b>Objective(s)</b>	1.1; 3.3; 4.2
<b>Description</b>	Acquisition of 47 total parcels
<b>Department</b>	Harris County Flood Control District
<b>Time frame</b>	As property owners volunteer for the voluntary project
<b>Cost</b>	Variable, dependent on owner participation
<b>Funding source</b>	HCFCDC's capital project funds and FEMA mitigation grant programs
<b>Priority</b>	High
<b>Benefit</b>	An acquisition in this area would eliminate the repetitive loss properties that are a drain on the NFIP and restore the land to its natural function as a floodplain.

**Status as of August 2014**

Mitigation action is ongoing. 12 acquisitions in this area were made in 2014.

Mitigation Action	
<b>Title</b>	<b>Langwood Buyout Project</b>
<b>Category</b>	Property protection - flooding
<b>Objective (s)</b>	1.1; 3.3; 4.2
<b>Description</b>	Acquisition of 46 total parcels
<b>Department</b>	Harris County Flood Control District
<b>Time frame</b>	As property owners volunteer for the voluntary project
<b>Cost</b>	Variable, dependent on owner participation
<b>Funding source</b>	
<b>Priority</b>	High
<b>Benefit</b>	An acquisition in this area would eliminate the repetitive loss properties that are a drain on the NFIP and restore the land to its natural function as a floodplain.

Mitigation Action	
<b>Title</b>	<b>Wood Shadows Buyout Project</b>
<b>Category</b>	Property protection - flooding
<b>Objective (s)</b>	1.1; 3.3; 4.2
<b>Description</b>	Acquisition of 40 total parcels
<b>Department</b>	Harris County Flood Control District
<b>Time frame</b>	As property owners volunteer for the voluntary project
<b>Cost</b>	Variable, dependent on owner participation
<b>Funding source</b>	
<b>Priority</b>	High
<b>Benefit</b>	An acquisition in this area would eliminate the repetitive loss properties that are a drain on the NFIP and restore the land to its natural function as a floodplain.

#### **Status as of August 2014**

Mitigation action is ongoing. 22 acquisitions in Langwood area were made in 2014.

#### **Status as of August 2014**

Mitigation action is ongoing. 24 acquisitions in Wood Shadows area were made in 2014.

<b>Mitigation Action</b>	
<b>Title</b>	<b>Improvements to the Disaster Assistance and Recovery Manual</b>
<b>Category</b>	Emergency Services - flooding; Post-disaster
<b>Objective(s)</b>	1.3; 2.2; 5.2; 5.3
<b>Description</b>	Project provides for the evaluation and revision of the Disaster Assistance and Recovery Manual (DARM) as needed based on feedback from deployment of the process described in the manual in a disaster event.
<b>Department</b>	Public Works and Engineering; Floodplain Management Office; Office of Emergency Management
<b>Timeframe</b>	Ongoing
<b>Cost</b>	\$0; staff time
<b>Funding source</b>	City of Houston Operating Budget
<b>Priority</b>	Medium (The priority is ranked medium because the current DARM incorporates learning from previous events including Tropical Storm Allison and Hurricane Ike. The processes outlined in the manual have worked in the past. Optimization is desired, but not required.)
<b>Benefit</b>	This project will leverage feedback and lessons learned from deployment of the DARM to make improvements to the processes outlined in the manual. The result will be improved disaster response, assistance, and recovery.

**Status as of August 2014**

Mitigation action is ongoing. The annual City of Houston Disaster Assistance and Recovery Training and Review Session was held in July 2014. No changes were recommended at that time.

Mitigation Action	
<b>Title</b>	<b>Brays Bayou Flood Damage Reduction Project ("Project Brays")</b>
<b>Category</b>	Structural - flooding
<b>Objective(s)</b>	2.3; 3.4; 4.1; 5.1
<b>Description</b>	Partnership project between the USACE and HCFCFCD; includes 21 miles of channel improvements, several storm water detention basins, and environmental enhancements along Brays Bayou and some of its tributaries.
<b>Department</b>	Harris County Flood Control District
<b>Time frame</b>	Ongoing, scheduled for completion in 2014
<b>Cost</b>	\$450 million
<b>Funding source</b>	HCFCFCD - 50%, Federal funding - 50%
<b>Priority</b>	High
<b>Benefit</b>	Significantly reduces the potential for flood damage along the channel including area occupied by the Texas Medical Center.

#### Status as of August 2014

Mitigation action is ongoing. See below for construction activity update per Harris County Flood Control District. This was the latest update available as of August 2014.

#### Construction Activities Update

Jul-14

(Schedule is updated quarterly)

#### Completed Construction

The following chart highlights construction that has been completed as of July 2014, as well as each project's total percent completion to date.

Project	Segments Complete	Total % Complete
Eldridge Road Basin	8 (of 9)	90%
Old Westheimer Basin and Upstream Channel Modifications	3 (of 3)	100%
Arthur Storey Park Basin	12 (of 12)	100%
Willow Waterhole Basin	4 (of 8)	60%
Channel Modifications	7 (of 13)	56%
Bridges	9 (of 32)	28%

#### Current Construction

The following construction projects are currently under construction.

Project	Segment	Start*	Finish*
Eldridge Road Basin	9 (of 9)	3 <sup>rd</sup> Quarter 2012	3 <sup>rd</sup> Quarter 2014
Bridges (Wheeler/Lidstone Bridge)	10 (of 32)	2 <sup>nd</sup> Quarter 2013	3 <sup>rd</sup> Quarter 2014
Willow Waterhole Basin	5 (of 8)	2 <sup>nd</sup> Quarter 2014	4 <sup>th</sup> Quarter 2015

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### Scheduled Construction Next 6 Months

*The following construction projects are anticipated to begin in the next 6 months.*

Project	Segment	Start*	Finish*
Control Structures	DS 19	1 <sup>st</sup> Quarter 2015	4 <sup>th</sup> Quarter 2015
Channel Modifications, Lidstone to Calhoun	8 (of 13)	4 <sup>th</sup> Quarter 2014	4 <sup>th</sup> Quarter 2015
Galveston RR Bridge	11 (of 32)	1 <sup>st</sup> Quarter 2015	1 <sup>st</sup> Quarter 2016
Channel Modifications, Bertner to Buffalo Speedway	9 (of 13)	1 <sup>st</sup> Quarter 2015	1 <sup>st</sup> Quarter 2016

\*Note: construction schedule is anticipated and subject to change.

Mitigation Action	
<b>Title</b>	<b>White Oak Bayou Federal Flood Damage Reduction Project</b>
<b>Category</b>	Structural - flooding
<b>Objective (s)</b>	2.3; 3.4; 4.1; 5.1
<b>Description</b>	Partnership project between the USACE and HCFCD; includes channel improvements and detention storage along the upper portion of White Oak Bayou. Includes property acquisitions.
<b>Department</b>	Harris County Flood Control District
<b>Time frame</b>	Ongoing, scheduled completion date not available at this time
<b>Cost</b>	\$195 million
<b>Funding source</b>	HCFCD, FEMA, other Federal
<b>Priority</b>	High
<b>Benefit</b>	Will significantly reduce the potential for flood damage along the channel which extends from the suburban northwest to the central city. Areas along White Oak Bayou incurred extensive flood damage during TS Allison in 2001.

#### Status as of August 2014

Mitigation action is ongoing. See below for construction activity update per Harris County Flood Control District.

#### ACTIVE MAINTENANCE PROJECTS

**Cole Creek Erosion Repair Project** . The Cole Creek Erosion Repair Project will repair and rebuild eroded side slopes of Cole Creek from its confluence with White Oak Bayou upstream to the Burlington Northern Santa Fe Railroad bridge east of Antoine Drive. Erosion has resulted in damage to the slopes and various storm sewer and outfall pipes in the project area. The maintenance project will include the removal and replacement of damaged outfall pipes and installation of buried riprap on the creek's slopes and toe line, which is the lowest point of a channel's banks. Riprap in Harris County is typically recycled concrete that is processed to fit together like natural rock. Riprap is usually buried to allow grass to grow over it and helps armor a channel's banks to prevent future erosion. Construction on the project began in early October 2012 and is expected to be complete in 2013. The project is estimated to cost \$576,000. Project was completed on schedule in October 2013.

**E127-00-00 Maintenance Project** . The channel formally identified as HCFCD Unit E127-00-00 has experienced severe erosion that has created unstable banks and damaged outfall pipes. The E127-00-00 Maintenance Project will repair erosion and replace damaged outfall pipes along E127-00-00 and install a drop structure at the confluence of White Oak Bayou and E127-00-00. When water passes through a drop structure, it falls to a lower elevation. This structure helps slow the water's energy and velocity, thereby helping to prevent erosion. The overall goal of the project is to restore the channel's stability and improve its ability to convey storm water. The project will also replace damaged concrete slope paving along White Oak Bayou. Project construction is expected to begin in April 2013 and be complete in late 2013. Project was completed in late 2013.

Mitigation Action	
<b>Title</b>	<b>Buffalo Bayou Detention Basin</b>
<b>Category</b>	Structural - flooding
<b>Objective (s)</b>	2.3; 3.4; 4.1; 5.1
<b>Description</b>	Project addresses watershed storm water quantity and quality; includes construction of storm water detention
<b>Department</b>	City of Houston Department of Public Works and Engineering
<b>Time frame</b>	2013-2014 (CFY2013-2017 CIP)
<b>Cost</b>	\$6,847,000
<b>Funding source</b>	City of Houston Storm water Capital Projects/Rebuild Houston
<b>Priority</b>	High - On hold
<b>Benefit</b>	Project is necessary for mitigation of impacts resulting from combined storm water drainage projects improvements in the vicinity of this project site. This project is under review based on public comment. Refer to Appendix B.

**Status as of August 2014**

Mitigation action is ongoing. This project is currently on hold. The FY 2014 Capital Improvement Plan shows design funding in FY 2017.

Mitigation Action	
<b>Title</b>	<b>Southpark and Southacre St Drainage and Paving</b>
<b>Category</b>	Structural - flooding
<b>Objective (s)</b>	2.3; 3.4; 4.1; 5.1
<b>Description</b>	Project provides for the design and construction of storm drainage improvements, necessary concrete paving, curbs, sidewalks, driveways and underground utilities.
<b>Department</b>	City of Houston Department of Public Works and Engineering
<b>Time frame</b>	2013-2015 (CFY2013-2017 CIP)
<b>Cost</b>	\$9,390,000
<b>Funding source</b>	City of Houston Stormwater Capital Projects/Rebuild Houston
<b>Priority</b>	High
<b>Benefit</b>	Project will construct storm drainage improvements to address and reduce the risk of structural flooding. Improvements include modification of street conveyance and sheet flow, and provide detention as needed for mitigation.

**Status as of August 2014**

Mitigation action is ongoing. Design is complete. Construction was substantially complete as of August 2014.

Mitigation Action	
<b>Title</b>	<b>Rampart Street Drainage and Paving</b>
<b>Category</b>	Structural - flooding
<b>Objective(s)</b>	2.3; 3.4; 4.1; 5.1
<b>Description</b>	Project provides for the design and construction of storm drainage improvements in the area, necessary concrete paving, curbs, sidewalks, driveways and underground utilities. Project will serve the Westmoreland, Sharpstown, Breaburn, and Maplewood areas.
<b>Department</b>	City of Houston Department of Public Works and Engineering
<b>Time frame</b>	2012-2017 (CFY2013-2017 CIP)
<b>Cost</b>	\$31,886,000
<b>Funding source</b>	City of Houston Stormwater Capital Projects/Rebuild Houston
<b>Priority</b>	High
<b>Benefit</b>	Project will construct storm drainage improvements to address and reduce the risk of structural flooding. Improvements include modification of street conveyance and sheet flow, and provide detention as needed for mitigation.

**Status as of August 2014**

Mitigation action is ongoing. Currently in design phase. Construction scheduled to begin August 2014. Construction is scheduled to be substantially complete by 4<sup>th</sup> quarter 2015.

Mitigation Action	
<b>Title</b>	<b>Mitigation Program for Capital Improvement Projects</b>
<b>Category</b>	Structural - flooding
<b>Objective (s)</b>	2.3; 3.4; 4.1; 5.1
<b>Description</b>	This project provides for the right-of-way acquisition, design and construction of detention basins. This includes analyzing the feasibility of providing detention for mitigation of impacts due to City of Houston projects; existing infrastructure limited areas, and potential development. Preliminary engineering for regional detention projects for Halls, Little White Oak, Hunting, Sims, and White Oak bayous.
<b>Department</b>	City of Houston Department of Public Works and Engineering
<b>Time frame</b>	2012-2016 (CFY2013-2017 CIP)
<b>Cost</b>	\$15,684,000
<b>Funding source</b>	City of Houston Stormwater Capital Projects/Rebuild Houston
<b>Priority</b>	High
<b>Benefit</b>	The City constructs many projects that require determination and mitigation of impacts. Designing and contracting on a regional or sub-regional basis for multiple projects would reduce upfront and long-term maintenance costs at multiple sites.

#### **Status as of August 2014**

Mitigation action is ongoing. This project is shown in the FY15 Capital Improvement Plan with funding from FY 2015 thru FY 2019.

Mitigation Action	
<b>Title</b>	<b>Floodplain Information Outreach</b>
<b>Category</b>	Public information - flooding
<b>Objective (s)</b>	2.1; 5.2; 5.3
<b>Description</b>	Project provides for conveyance of floodplain information to the community by publishing floodplain information in the community section of the Yellow Pages phonebook. Flood insurance is promoted in the floodplain information and public information advertisements in the insurance section of the Yellow Pages phonebook.
<b>Department</b>	Public Works and Engineering; Floodplain Management Office
<b>Time frame</b>	Ongoing
<b>Cost</b>	\$0; staff time
<b>Funding source</b>	City of Houston Operating Budget
<b>Priority</b>	High
<b>Benefit</b>	Increased awareness contributes to compliance with floodplain regulations, purchase of flood insurance, and disaster preparedness. This activity is credited as part of the City's CRS submittal and contributes to the City's CRS rating which affords NFIP policy holders in the City of Houston discounted flood insurance premiums.

Mitigation Action	
<b>Title</b>	<b>Outreach to Floodplain Areas and Repetitive Loss Areas</b>
<b>Category</b>	Public information - flooding
<b>Objective (s)</b>	2.1; 5.2; 5.3
<b>Description</b>	Project provides for sending a letter with floodplain information to all special flood hazard area and repetitive loss area property owners.
<b>Department</b>	Public Works and Engineering; Floodplain Management Office
<b>Time frame</b>	Ongoing
<b>Cost</b>	\$5,000; staff time
<b>Funding source</b>	City of Houston Operating Budget
<b>Priority</b>	High
<b>Benefit</b>	Increased awareness contributes to compliance with floodplain regulations, purchase of flood insurance, and disaster preparedness. This activity is credited as part of the City's CRS submittal and contributes to the City's CRS rating which affords NFIP policy holders in the City of Houston discounted flood insurance premiums.

**Status as of August 2014**

Mitigation action is ongoing. Refer to appendix for documentation of 2013 Floodplain Information Outreach.

**Status as of August 2014**

Mitigation action is ongoing. Refer to appendix for documentation of 2013 Outreach to Floodplain Areas and Repetitive Loss Areas.

Mitigation Action	
<b>Title</b>	<b>Outreach on Improvements to Storm Water Management Regulations</b>
<b>Category</b>	Public information - flooding
<b>Objective (s)</b>	2.1; 5.2; 5.3
<b>Description</b>	Project provides for the evaluation and revision of Chapter 9, Storm Water Design Requirements, and Chapter 13, Storm Water Quality Design Requirements of the City's Infrastructure Design Manual (IDM). All of the chapters of IDM are reviewed and revised on a rotating five year cycle to ensure that the manual's design criteria incorporate changes in technology, construction practices, related regulations and the goals of the community.
<b>Department</b>	Public Works and Engineering; Floodplain Management Office; Standards Review Section
<b>Time frame</b>	2013
<b>Cost</b>	\$0; staff time
<b>Funding source</b>	City of Houston Operating Budget
<b>Priority</b>	High
<b>Benefit</b>	Improved storm water management regulations will improve drainage in the City related to new private and public projects. Improved drainage will reduce the likelihood and frequency of street and structural flooding. Implementation of changes to storm water management regulations could result in improvement of the City's CRS score and an increased discount to NFIP policy holders in the City of Houston.

#### **Status as of August 2014**

Mitigation action is ongoing. Draft regulations are currently under review and pending implementation. Draft Chapter 9 is available for review on [http://edocs.publicworks.houstontx.gov/documents/design\\_manuals/chapter\\_9\\_draft\\_revision\\_4\\_1\\_3.pdf](http://edocs.publicworks.houstontx.gov/documents/design_manuals/chapter_9_draft_revision_4_1_3.pdf)

Mitigation Action	
<b>Title</b>	<b>Improvements to Map Information</b>
<b>Category</b>	Public information - flooding
<b>Objective (s)</b>	2.1; 5.2; 5.3
<b>Description</b>	Develop an upgraded GIS interface to provide improved web-based map information to the community. Incorporate preliminary maps, historic maps, and more current map changes into the GIS interface.
<b>Department</b>	Public Works and Engineering; Floodplain Management Office; Public Works and Engineering, Engineering and Construction Division
<b>Time frame</b>	Ongoing
<b>Cost</b>	\$0; staff time
<b>Funding source</b>	City of Houston Operating Budget
<b>Priority</b>	Low (The priority of this action is ranked low because the existing GIS interface and consultation with the Floodplain Management Office Staff provides the public with adequate map information service. This project will reduce the need for consultation staff.)
<b>Benefit</b>	Increased awareness contributes to compliance with floodplain regulations and purchase of flood insurance. This activity is credited as part of the City's CRS submittal and contributes to the City's CRS rating which affords NFIP policy holders in the City of Houston discounted flood insurance premiums.

#### **Status as of August 2014**

Mitigation action is ongoing. Phase I of planned upgrades to the city GIS system were completed in August 2014. FMO are developing project scope for additional phases of work..

Mitigation Action	
<b>Title</b>	<b>Sheltering Project</b>
<b>Category</b>	Post-disaster; Other hazards - hurricane, tropical storm, tornado
<b>Objective(s)</b>	1.3; 2.1; 5.2; 5.3
<b>Description</b>	Utilize Existing GIS data to identify large facilities to serve as potential refuges of last resort, either during or after a disaster. Develop vulnerability assessment for identified facilities. Conduct site visits to evaluate structural capabilities and resistance to identified hazards. Develop prioritized implementation procedures for use of these facilities during or after disaster events. Identify required retrofit enhancements needed for each facility identified. Identify capacity of each facility to house refugees.
<b>Department</b>	Public Works and Engineering; Office of Emergency Management
<b>Time frame</b>	Two to three years after grant funds are available
<b>Cost</b>	\$100,000
<b>Funding source</b>	HMGP funds, Office of Emergency Management Operating Budget
<b>Priority</b>	High
<b>Benefit</b>	During and after Hurricanes Katrina, Rita, and Ike the City of Houston was tasked with sheltering a large number of its own residents and residents from other states and areas for extended periods of time. It is imperative that the city identify, prioritize, and develop vulnerability assessments for potential facilities to be use as refuges of last resort or as host to evacuees from other areas.

Mitigation Action	
<b>Title</b>	<b>Data Collection Improvement</b>
<b>Category</b>	Other hazards - expansive soils
<b>Objective(s)</b>	1.3; 5.2; 5.3
<b>Description</b>	Improve the data collection capabilities of expansive soils incidents. This may include using the City's 3-1-1 help line to maintain a database of reports called in regarding cracked slabs and other evidence of expansive soils. A database would be compiled with the information and the most vulnerable facilities could then be identified.
<b>Department</b>	Office of Emergency Management
<b>Time frame</b>	Two to three years after grant funds are available
<b>Cost</b>	\$100,000
<b>Funding source</b>	HMGP funds, Office of Emergency Management Operating Budget
<b>Priority</b>	High
<b>Benefit</b>	Improve information and data that is needed and will be used to protect critical facilities and general population of city.

**Status as of August 2014**

Mitigation action is ongoing. Projects awaiting funding.