



Hurricane Harvey Recovery: A Progress Report

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INTRODUCTION AND SUMMARY

On August 25, 2017, Hurricane Harvey made landfall along the middle Texas coast. Harvey stalled over the greater Houston area for days, dumping close to 50 inches of rain - more than produced by any other hurricane in U.S. history and nearly triple the amount of rain that fell during the 2016 Tax Day flood. The storm dropped enough water on Harris County to fill the Astrodome 3,200 times and enough to keep Niagara Falls flowing for 15 days. Thirteen of the 22 watersheds in Harris County reached record levels, and the weight of the water depressed the earth's crust in the region by as much as half an inch.

Estimates peg Harvey as the second-costliest natural disaster in U.S. history, second only to Hurricane Katrina. Over 60,000 people across the region had to be rescued to escape the flood waters. Some 208,000 homes were impacted, causing nearly \$16 billion in residential damage within the city limits alone.

Most devastatingly of all, at least 88 people across the state lost their lives.

The efforts of first responders during the storm were nothing less than heroic, with government agencies, nonprofit organizations, businesses and private citizens turning out in force to save lives, provide shelter, and offer emergency support. The leadership provided by Mayor Sylvester Turner and Harris County Judge Ed Emmett was a beacon of tireless commitment, consistency and partnership.

As the flood waters receded it was clear that the task of recovering from the storm would be no less monumental than the emergency response, requiring continuing strong leadership, billions of dollars and collaboration over the course of months and years.

To launch this effort, Mayor Turner turned to native Houstonian and global business leader Marvin Odum, former head of Shell Oil Company, who assembled a team comprising City department leaders, City subject matter experts, loaned corporate executives from Shell and McKinsey, and experienced disaster recovery consultants.

With a strong mandate and clear guidance from the Mayor, this team worked continually for the past 14 months with a focus on four strategic priorities:

- **Restoring and strengthening Houston's housing**
- **Repairing city-owned assets and protecting them from future risk**
- **Enhancing and accelerating the City's work on flood mitigation**
- **Helping people and their neighborhoods recover**

Mayor Turner was especially clear from the beginning that recovery from Hurricane Harvey must be about *building forward, not just building back*. That is, it is not enough simply to repair the damage and brace for the next disaster; rather, the City and its regional partners must strengthen the resilience of the area's economy, people, communities and physical infrastructure.

To that end, the recovery team has sought to lay a new foundation for the City's long-term strategy with the guiding objectives of:

- **Protecting the ability of Houston's nation-leading economy to thrive**
- **Strategically address the (region-wide) need for improved flood mitigation through both engineered and natural (green) systems**
- **Getting help to those most in need and least able to recover on their own**
- **Improving the overall quality of life in Houston**

This has involved securing billions in disaster recovery funding at the federal and state level; building the City of Houston's capacity to manage those funds; establishing collaborative relationships across public, private and nonprofit organizations; and outlining a long-term resilience and flood mitigation blueprint.

Recovery to Date: A "Snapshot" Summary

As the first phase of the recovery winds down, Marvin Odum is preparing to step down from his 14-month volunteer role as chief recovery officer for the City. The Mayor has appointed Stephen Costello – the City's head of flood mitigation – to lead the recovery into its next phase. This report details how the recovery team has worked and what it has delivered so far – even as the City continues to await the arrival of federal disaster recovery funds. It also underscores the challenges remaining and priorities ahead as the recovery moves into a second phase.

The report is a snapshot in time. The challenges will continue to evolve, numbers will continue to be adjusted and new developments will inevitably emerge. Nevertheless the report offers the City's leaders and residents a clear view of the trajectory of Harvey recovery to date and a preview of the work ahead.

Following is a brief summary of the topics that are developed in more detail later in the report:

► Advocacy for Disaster Relief Funding

It is critical to Houston's recovery from Harvey that it receive its fair share of federal recovery assistance. Under Mayor Turner's leadership and in close collaboration with the Houston City Council, Harris County, the Texas Government Land Office (GLO), the Texas Governor's Office, the Texas Department of Emergency Management (TDEM), Texas Congressional Delegation and the Greater Houston Partnership, the City was successful in securing \$1.17 billion in Community Development Block Grant – Disaster Recovery (CDBG-DR) funds from the U.S. Department of Housing and Urban Development (HUD). This is in addition to approximately \$250 million from FEMA's Hazard Mitigation Grant Program (HMGP); over \$2 billion in expected funding for city infrastructure repair and mitigation projects; over \$4 billion in FEMA individual assistance and National Flood Insurance Program funds; and over \$250 million generously donated by private citizens and foundations. The City's Recovery Team and its partners have advocated for and expect to receive approximately \$1 billion in additional HUD CDBG-DR funding

that has been earmarked for flood mitigation projects. In addition, more billions are being considered by the U.S. Army Corps of Engineers for large scale flood mitigation projects across the region. It is important to note that the successful County \$2.5 billion bond proposal and the re-authorization of ReBuild Houston (Proposition A, with approximately \$6 billion to be raised over the next decades) will have an enormous impact on our ability to change the recent trajectory of funding for our area.

► ***Policy Actions***

To protect future homes and the residents who will live in them, Mayor Turner and the Houston City Council took bold action by voting to change the building standards for new and reconstructed homes in the city's floodplains and other vulnerable areas. In addition, the City moved forward with the recommendations made by the Redevelopment and Drainage Task Force, convened by flood czar Stephen Costello before Hurricane Harvey hit. These recommendations will enable the City to continue to grow and prosper through development that puts the region's residents, communities and economy at *less* – not *more* – risk to flooding. The City continues to review all of the codes and ordinances that affect how and where residents build to ensure maximum safety for residents, and further changes are being evaluated from a cost/benefit perspective.

► ***Housing Recovery***

Among the most urgent priorities of the recovery effort is preparing for the \$1.17 billion CDBG-DR funds that are expected to arrive in December. Preparations have entailed the development of a detailed program action plan aimed at allocating assistance where it is most needed and strategically addressing the shortage of affordable housing in Houston – both within the strict guidelines issued by HUD. This work has been informed by extensive community engagement and HUD-provided technical assistance. It has also been supported with comprehensive, innovative and nation-leading flood damage data analysis that accurately detailed the unmet housing needs for the City – a data analysis model that will support advocacy for additional federal CDBG-DR appropriation. The City faces the stark reality that the recovery funds earmarked to date are still not enough to cover the identified unmet need, requiring hard and careful choices on how to allocate these funds most fairly.

► ***Restoring and Strengthening City Assets***

The City suffered an estimated \$2 to \$3 billion in damage to over 400 City-owned buildings, water/wastewater facilities, roads, bridges and public utilities. FEMA's Public Assistance program will cover up to 90 percent of the cost of these repairs. The recovery team is working through the detailed process of assessing damage, scoping repairs, and negotiating with FEMA on the cost of each project – including, importantly, the potential for upgrading the design of certain assets to help prevent similar damage from future storms.

► ***Hazard Mitigation Grant Program***

A dedicated FEMA program administrated through the Texas Department of Emergency Management (TDEM) provides funding for selected flood mitigation projects. Houston expects to receive as much as \$250 million of the Hazard Mitigation Grant Program (HMGP) funds and is negotiating with FEMA and TDEM on priorities for deploying them.

► ***Neighborhood Restoration Program***

Through partnerships with Memorial Assistance Ministries (MAM), BakerRipley, LISC Houston, University of Houston and others, the City established 14 Neighborhood Restoration Centers in affected neighborhoods across Houston, connecting residents to information and services to help them in their recovery. This collaboration between the City of Houston and its partners will continue to help serve, guide and support residents through their recovery process – allowing the City to coordinate with the philanthropic community, leveraging the available money from all sources and improving the efficiency with which it is delivered to residents in need. This approach will also be standardized for response to future disasters.

► ***FEMA's Donated Resources Policy***

As a result of the City of Houston's initiative, FEMA will now credit the value of donated resources for permanent repairs to the 10 percent local cost share of FEMA Public Assistance projects – a nationwide first. The pool of potential value of this new program in Houston is as much as \$250 million. The City is working with a joint federal, state and city team on specific processes for implementing this new program.

► ***Process Compliance***

Strict laws and regulations govern the use and administration of HUD and FEMA disaster recovery funding. Failure to comply with the letter of these rules could result in millions – if not billions – in recovery funding being “clawed back” from the City in the future. To eliminate the risk, the recovery team has designed into its processes rigorous layers of oversight and internal audit. The Finance Department along with contract services from Deloitte & Touche, LLP will provide the audit capacity and assurance of compliance.

Looking Ahead: Key Challenges

As the recovery moves into the next phase, some specific challenges loom large:

► ***Continuing Collaboration***

The success of the recovery so far has rested in large measure on integrating and coordinating the efforts of multiple players across multiple organizations at multiple levels. This collaboration mindset will need to continue into the next, implementation-focused phase of the recovery program. Within the City that means working across departmental boundaries under the leadership of the Mayor's newly appointed recovery lead, Stephen Costello. At the regional level it means continuing the strong coordination and joined-up advocacy between the City, Harris and the surrounding counties, the Greater Houston Partnership, key nonprofit entities and many other jurisdictions. At the state and federal level it means continuing to work closely with the GLO, TDEM, FEMA and HUD, with frequent engagements in Austin and Washington to ensure transparency and clarity of intent.

► ***Expanding Implementation Capacity within City Teams***

In order to implement the recovery strategies and plans and to effectively deploy the federal recovery dollars coming to Houston, many City departments are having to expand their capacity. This is especially true for the Housing and Community Development Department but also for Houston Public Works, Finance, the Mayor's Office and others. New staff with expertise in, for example, disaster recovery, financing, communication, community

engagement, permitting and development are needed to plan and execute the recovery programs successfully. The cost of nearly all of these additional staffers are reimbursable via federal disaster recovery funds; but recruiting them requires time and careful vetting.

► ***Timing of Arrival of Federal Recovery Funds***

While billions of dollars in federal aid have been distributed directly to survivors, no significant federal funding has yet been delivered to the City for execution of the major recovery programs. This is not unusual for major disasters like Hurricane Harvey, but the wait creates stress for residents and institutions that are awaiting assistance. The recovery team continues to pull every possible lever to accelerate the arrival of funds, and the first tranche of housing CDBG-DR funding is now expected in December. FEMA funding for City infrastructure repair will occur on a project by project basis and is currently underway.

► ***Pace of Repairs on City Assets (Public Assistance)***

332 City assets have been inspected for FEMA-funded rebuilds; 97 percent are moving through planning phase; 2 percent are in construction phase. This is a massive program with over 350 major projects in various stages of design, engineering and execution. FEMA, the federal agency that will fund these projects, is significantly overstretched given the number of disasters which have occurred across the nation over the past two years. This has resulted in slow progress in moving these projects to the execution phase and will continue to require close coordination with TDEM and FEMA. In many cases, funding above the cost of repair are required to 'mitigate' these assets so that a repeat of an event like Hurricane Harvey would not result in similar damage. Obtaining these mitigation funds is an individual 'negotiation' with FEMA on each project. While pursuing these mitigation funds does slow the process, the effort is critical to "building Houston forward" and remains a priority.

► ***Local Match on Public Assistance Projects***

HMGP requires a 25 percent local match on funded projects. FEMA Public Assistance projects require a 10 percent local match. These two combined could add up to over \$300 million for the City – a sum that is currently unfunded. While the City will meet as much of the local match with the FEMA Donated Resources program as possible, identifying funding for the local match requirement is a key challenge moving forward. CDBG funds can be used to cover this match, but that would divert them from badly needed housing programs; therefore the City sees an opportunity for the State to use the so-called "rainy day fund" to cushion the local match burden on local jurisdictions across the State. This would provide a simple, equitable methodology of fund distribution and should be a priority in the upcoming state legislative session.

► ***The "Long View" and the Case for Additional Housing Funding***

Detailed data analysis undertaken as part of developing Houston's housing action plan has revealed that at least \$2 billion in housing need is still unmet by the CDBG-DR funding that has been allocated to the City. This is need that would meet the criteria for HUD CDBG-DR funding. In addition, estimates for the cost of a long-term flood mitigation plan for the region (including coastal surge protection) range up to \$30 billion. These are just two of the financial challenges to be overcome as the City builds forward. A priority over the next months will be working together with public and private partners to gather data, agree on planning roadmaps, engage publics and explore innovative financing models for long-term unmet needs. It will also be important for the region to speak with one

voice in Washington as it advocates for additional disaster recovery appropriations – especially as the nation's resources are stretched by the unprecedented number of disasters in multiple states over the last two years.

► *A Transformational Opportunity*

Houston and its residents demonstrated their extraordinary resilience, courage, generosity and care for one another during Hurricane Harvey and in its immediate aftermath. Significant work remains to be done to implement the recovery plans and spend the recovery money wisely. To this end, the City, its leaders and its partners are demonstrating their extraordinary vision as they leverage the recovery to build Houston forward.

Houston has become the most recent member of the Rockefeller Foundation's 100 Resilient Cities program, designed to bring international resources, expertise and creativity to the development of a comprehensive action strategy for making Houston stronger, safer and smarter. The City has convened a "Living with Water" initiative designed to build on local, national and international flood mitigation skills to create a long term flood mitigation blueprint for the region. The Mayor and City Council will continue to adjust building codes and policies to ensure that the City's vibrant economic growth is not hobbled by unnecessary and costly risks of future flooding. The recently-passed ReBuild Houston program (Proposition A) ensures that funding will be available for much-needed street and drainage projects within the city. The City strongly supported the recent Harris County bond issue that will make available billions in funding for regional flood mitigation projects.

In short, Hurricane Harvey ravaged the greater Houston community and upended hundreds of thousands of lives. But with the Mayor and City Council's leadership, the recovery from the storm represents a transformational opportunity to set a new baseline for how the City works with its partners and envisions its future.

HARVEY RECOVERY AT A GLANCE: PROGRESS TO DATE

- Allocation to the City of Houston of \$1.17 billion in Community Development Block Grant - Disaster Recovery (CDBG-DR) funds.
- Anticipated allocation of approximately \$1 billion in HUD CDBG-DR flood mitigation funds.
- Record-breaking debris removal effort.
- Allocation of approximately \$250 million in additional funding from FEMA's Hazard Mitigation Grant Program.
- Established "strike group" process with TDEM and FEMA to accelerate public assistance project negotiations and implementation.
- Negotiated mitigation strategies for FEMA-funded public assistance projects for repairing and rebuilding city assets.
- Passage of updated building codes designed to ensure the safety of future homes built in the city's floodplains.
- Comprehensive flooding damage data analysis to identify and accurately validate the unmet needs.
- New FEMA policy on using the value of donated resources to offset the local match on FEMA-funded public assistance projects.
- Comprehensive housing recovery action plan, approved by the City Council, the Texas General Land Office.
- Process efficiencies for the City's recovery-related procurements along with plans for robust compliance oversight to eliminate risk of future de-obligation of federal funding.
- Development and implementation of a Neighborhood Restoration Center (NRC) program in partnership with key nonprofit agencies.
- Collaborative and aligned advocacy platform for joint messaging strategies from City of Houston, Harris County and Greater Houston Partnership.
- Open and regular communication channels with key state and federal stakeholders.
- Initiation of Resilient Houston, the City's partnership program with the Rockefeller Foundation's 100 Resilient Cities.

ADVOCACY FOR DISASTER FUNDING: SECURING HOUSTON'S FAIR SHARE

In September 2017, Congress passed an emergency appropriation of \$7.4 billion in Community Development Block Grant – Disaster Recovery (CDBG-DR) funding to the U.S. Department of Housing and Urban Development (HUD) for Hurricane Harvey recovery in Texas and Hurricane Irma recovery in Florida. In February 2018, HUD announced that it was awarding Texas \$5 billion of these funds, with an emphasis on housing recovery (*see Table 1 for more detail the disaster recovery appropriations addressing the 2017 hurricane season*).

Through the first quarter of 2018, the recovery team and Mayor Turner and City Council members worked closely with Harris County, the Texas General Land Office (GLO), the Texas Governor's Office and HUD to determine how these funds would be distributed within Texas. Following multiple meetings with senior state and federal officials in Houston, Austin and Washington, DC, HUD and GLO agreed to the City's case for an allocation of \$1.17 billion in HUD CDBG-DR funds to Houston and a similar amount to Harris County.

Importantly, the City and the County were also authorized local control over the use and administration of those funds, a high priority for the City of Houston's Disaster Recovery delivery. (*Houston and Harris County are the only two municipalities in the state to be authorized local control*.)

In addition to addressing unmet housing needs, Congress allocated CDBG-DR funds for mitigation – e.g. strengthening infrastructure and enhancing resilience – of which \$4.2 billion will be coming to Texas. The City and County have been actively working with HUD to develop the rules and definitions for mitigation projects, and HUD is expected to issue specific guidance on the distribution and administration of those funds before the end of 2018. The recovery team and Mayor Turner – with support from Harris County, the Greater Houston Partnership and City Council Members – are also actively advocating for, and anticipate receiving, a proportional allocation and control of these mitigation funds similar to the earlier \$1.17 billion housing distribution. The City and its partners are also in advanced discussions on key elements to accelerate the delivery of these projects.

The City is working to maximize the benefit to residents from the allocated funds and is taking a data-driven approach to making its case for appropriate funding. In February, City Council approved an innovative new contract with DC-based firm Civis Analytics to conduct a first-of-its-kind detailed damage assessment from Harvey. Working with the City's Housing and Community Development Department (HCDD), a team of Civis data scientists and flood engineers have developed sophisticated models of the flood and its effect on residential structures and vulnerable communities. The work has revealed remaining unmet needs that would qualify for federal disaster assistance from Harvey's impact in Houston amounting to \$2 billion, a data point that will form the basis of the City's ongoing advocacy for additional disaster appropriation from the federal government.

The best opportunity to achieve this additional funding is likely as an add-on during the appropriations process for Hurricanes Florence and Michael. We are in active discussions with the state and the regional congressional delegation on this topic.

Table 1: Federal Disaster Recovery Appropriations Designed to Address 2017 Hurricane Season

Appropriations Bill	Title	Total Amount	Description	Notes
First Supplemental Appropriations Bill <i>September 2017</i>	Small Business Administration Disaster Loans	\$450 million + other appropriations	SBA loans are low-interest loans available to homeowners, renters, businesses and nonprofit agencies for rebuilding.	\$904 million total to Houstonians for Harvey recovery
First Supplemental Appropriations Bill <i>September 2017</i>	Community Development Block Grants – Disaster Recovery (Traditional)	\$7.4 billion	CDBG-DR funds are awarded at the discretion of the HUD Secretary. They may be awarded to the State or directly to local governments.	\$1.17 billion – City of Houston
First Supplemental Appropriations Bill <i>September 2017</i>	Disaster Relief Fund	\$7.4 billion	The Robert T. Stafford Disaster Relief and Emergency Assistance Act authorizes Congress to appropriate funds to FEMA to administer for a broad range of disaster relief efforts, including public assistance, individual assistance and hazard mitigation. Funds are awarded by FEMA.	\$536 million – FEMA Individual Assistance to Houstonians
Second Supplemental Appropriations Bill <i>October 2017</i>	National Flood Insurance Fund	\$16 billion	The fund, which pays out claims for the federal insurance program, had largely been depleted.	\$2.85 billion – NFIP payouts to Houston policyholders
Third Supplemental Appropriations Bill <i>February 2018</i>	Army Corps of Engineers Construction	\$17.39 billion	Includes \$4.88 billion of U.S. Army Corps of Engineers construction funding and over \$15.9 million in funding for the State of Texas to study future projects.	\$500 million* – Houston area projects
Third Supplemental Appropriations Bill <i>February 2018</i>	Community Development Block Grants – Disaster Recovery (Mitigation)	\$12 billion	Earmarked broadly for mitigation projects – e.g. strengthening infrastructure and enhancing resilience.	\$4 billion – Texas; \$1 billion* to Houston
Third Supplemental Appropriations Bill <i>February 2018</i>	Community Development Block Grants – Disaster Recovery (Traditional)	\$16 billion	Puerto Rico and the U.S. Virgin Islands will receive at least \$11 billion of this total.	\$650 million – Texas; \$89.6 million to Houston

*Estimated

POLICY ACTIONS: SETTING HOUSTON ON A SMARTER PATH

In parallel with securing funds for the physical recovery of the City – including funds for housing, infrastructure repair and new mitigation projects – the recovery team focused on policy as a means of strengthening Houston's defense against future disasters and of preserving and advancing our thriving economy.

Floodplain Regulations

A key step was to update the City's floodplain regulations, contained in Chapter 19 of the City's code of ordinances. Chapter 19 contains rules and regulations governing development as well as redevelopment within the city's floodplains and floodways. Data gathered after Hurricane Harvey demonstrated the need to revise existing Chapter 19 requirements to protect residents and property from likely future flooding events (see *Figure 1*).

For example, nearly a third of structures in the 100-year and 500-year floodplains were impacted by Harvey flooding (compared to 19 percent in areas of the City outside of either floodplain). In addition, the data showed that Harvey impacted 38 percent of homes in the 100-year floodplain that *complied with the existing regulations*.

The team also considered so-called "500-year floods" that occurred in 2015 and 2016. Preliminary results of NOAA climate studies indicate that the frequency and intensity of rainfall events are likely to increase in the future, resulting in a 100-year floodplain that is much closer to the today's official 500-year floodplain.

Based on the data, feedback from city stakeholders, and the Mayor's charge to "build forward, not just build back," City Council approved new standards for construction in the 100-year and 500-year floodplains, including some of the most restrictive floodplain development in the nation (see *Table 2*). One of the key changes requires new structures in the 100- and 500-year floodplains to be elevated 2 feet above the 500-year flood elevation. Modeling data showed that this new standard would have protected 84 percent of the homes that flooded during Harvey. A lower standard would have left too many structures at risk; a higher standard would have diluted the benefits versus the costs of the regulation (see *Figure 2*).

Figure 1

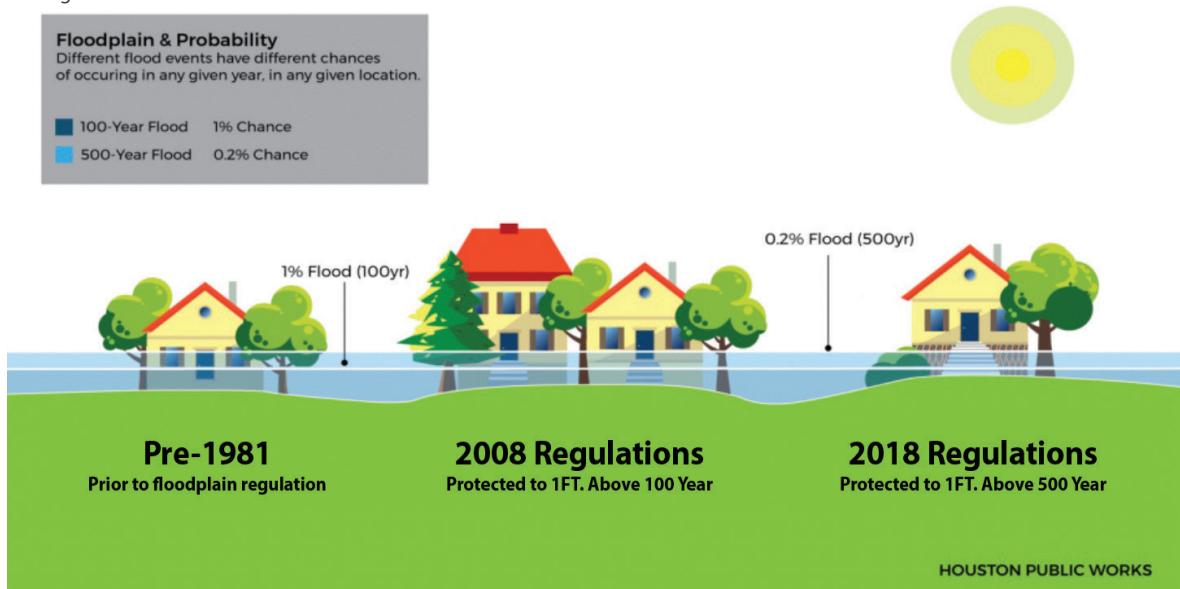
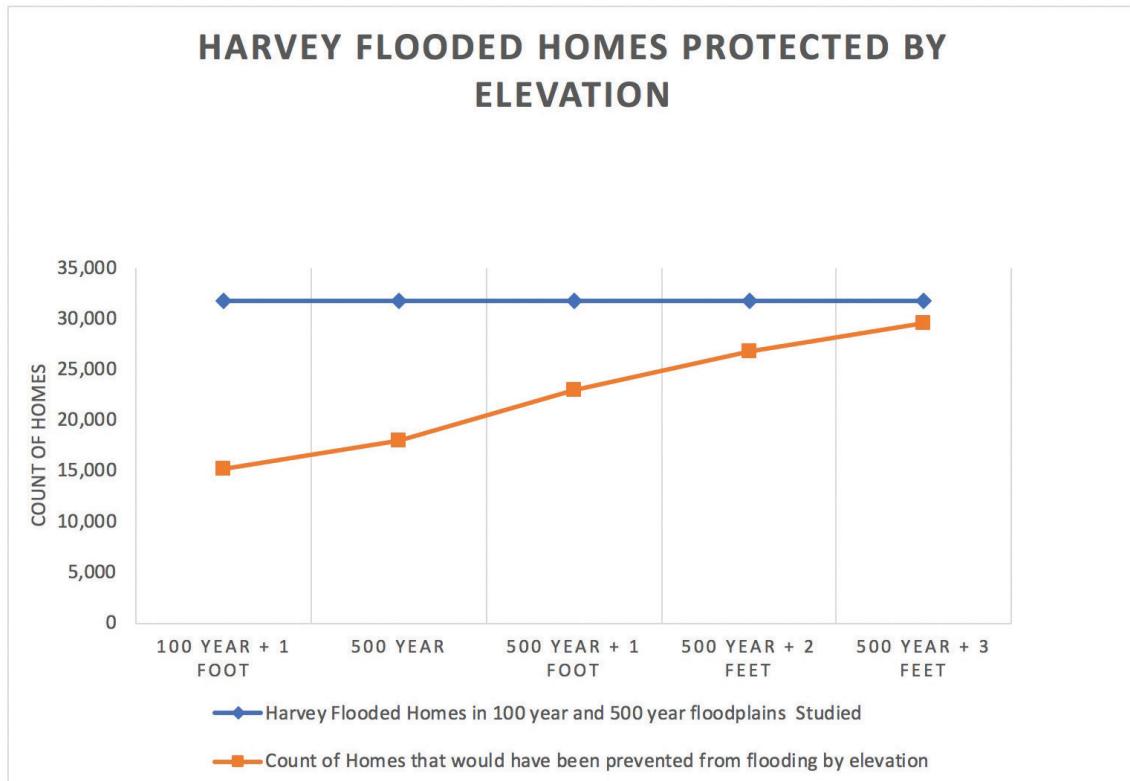


Table 2: Updated Chapter 19 Requirements (effective as of 9/1/2018)

	100-year Floodplain	500-year Floodpaing
Elevation - New Structures (flood-protection permitted for Non-residential Structures)	500-year + 2 feet	500-year + 2 feet
Elevation of Residential Additions 1/3 of footprint or smaller	100-year + 1 foot	No requirement
Elevation of Residential Additions greater than 1/3 of footprint and all Non-residential Additions	500-year + 2 feet	500-year + 2 feet
Substantial Improvement	500-year + 2 feet	No requirement
Substantial Damage	Applies	Does not apply
Mitigation	Compensate for fill placed below the 500-year flood elevation	Compensate for fill placed below the 500-year flood elevation No mitigation required if applicant demonstrates no impact to 100-year overland sheet flow
Parking, Access and Storage Enclosures	Flood openings required if below 500-year flood elevation	Flood openings required if below 500-year flood elevation
Conveyance	No change	Does not apply
Mitigation Recertification	All mitigation facilities permitted under new ordinance	All mitigation facilities permitted under new ordinance

New regulations for construction in the 100- and 500-year floodplains

Figure 2



Design Standards: The Redevelopment and Drainage Task Force

Even prior to Hurricane Harvey, the City recognized numerous urban drainage issues associated with redevelopment. To address them, the City commissioned a Redevelopment and Drainage Task Force to review storm water regulations and building codes and identify changes needed to mitigate redevelopment impacts on surrounding properties and drainage system. The task force included members from the engineering, architecture, development and homebuilding industries; policy makers from the City and county; and community activists. It focused on three specific issues impacted by redevelopment: detention, site fill and encroachment into the existing roadside drainage systems.

Hurricane Harvey reinforced the urgent need for the task force's work, and the Harvey recovery team leveraged its effort as part of strengthening the City's defense against future disasters.

Eleven recommendations were presented to the City in February 2018, and in August, City Council passed a resolution of support for changes to the Infrastructure Design Manual and Building Code (see *Table 3*). Changes were adopted to end detention credits for redevelopment, protect existing sheet flow patterns, accommodate natural drainage patterns and require engineered grading plans for more developments.¹

¹ The task force final report may be accessed at <https://houstonrecovers.org/wp-content/uploads/2018/10/Final-Task-Force-Report-04.12.18.pdf>.

The infrastructure design manual may be accessed at <https://edocs.publicworks.houstontx.gov/engineering-and-construction/design-manuals/city-of-houston-infrastructure-design-manual/3024-city-of-houston-infrastructure-design-manual.html>.

Table 3: Redevelopment and Drainage Task Force Recommendations

Type	Description	Action
Detention	Eliminate detention credit for existing impervious cover	Implemented
	Provide detention credit for low impact development techniques	Implemented and to be complemented by Low Impact Development (LID) study in progress
	Allow for the sale of excess detention capacity	Study in progress
	Encourage private sector involvement	Implemented
	Payment of fee in lieu of detention	LID study in progress
Fill	Remove the one-acre threshold in Chapter 9 section 9.02 (c)	Implemented
	Clarify contradictory language in IDM Chapter 9 section 9.02 (c)	Implemented
	Clearly define "engineered grading" in Houston amendments to 2012 IBC	Implemented
	Change threshold amount for engineered grading from 5000 CY to 1000 CY in Houston amendments to 2012 IBC	Implemented
Encroachments	Fully enforce all applicable rules to re-establish drainage in the public right of way	Implemented and to be complemented by public education campaign
	Initiate public education campaign to inform citizens of their responsibilities regarding roadside drainage	In progress

Houston Green Infrastructure Program

The integration of “green” or “nature-based” flood management systems with so-called “gray” or “engineered” infrastructure is a key element of the City’s strategy for reducing storm water flooding risks. Green infrastructure solutions typically increase permeable cover, provide alternative storm water capture mechanisms and increase on-site storm water detention and retention to relieve the burden on existing drainage infrastructure. Hurricane Harvey, along with Mayor Turner’s charge to “build forward,” has provided the City with new and urgent opportunities to evaluate Houston’s drainage infrastructure system with innovative and “green” approaches in mind. Collateral benefits will include improving drainage system levels of service and water quality and beautifying blighted areas.

A threefold plan is in advanced development to: 1) construct neighborhood revitalization projects, including the integration of amenities and access to green space into large-scale flood mitigation projects; 2) offer incentives to developers and property owners; and 3) lead by example by employing green infrastructure at City-owned facilities and right-of-ways. In May 2018, the Houston Endowment provided a one-year grant to the City to conduct the “Houston Green Storm water Infrastructure Incentives Study.” The study will identify key incentives and provide specific recommendations for stimulating the private sector’s use of green infrastructure in new development and redevelopment. In addition, the City will continue to work with various stakeholders to identify areas to showcase green infrastructure projects in the right-of way and continue to demonstrate leadership through projects such as Almeda Street, Bagby Street and the Cottage Grove projects (*see Image 1 for more detail*).

Image 1



Almeda Road Reconstruction - Bioswales: A pilot project for Low Impact Development that widened the roadway, improved safety of intersection, and provided dual-purpose pedestrian/bike path and storm water filtering and storage system.

Forthcoming Policy Recommendations

Many of the 208,000 Houston households that were impacted during Harvey were located outside the boundaries of the regulatory floodplain and flooded for the first time. Some were affected by emergency discharges from the Addicks and Barker Dams and in the Kingwood area due to discharges from Lake Conroe. But many more flooded as a result of inadequate urban infrastructure: undersized storm sewer systems, poorly maintained roadside ditches and lack of adequate sheet flow paths from neighborhoods to flood control channels. The magnitude of the infrastructure is extremely large (16,000 lane miles, 3,000 miles of storm sewers and 3,000 miles of roadside ditches) such that rebuilding the infrastructure will take decades.

The recovery team identified the need to revalidate the City's "ReBuild Houston" pay-as-you-go funding program, which was reauthorized by Houston voters under Proposition A in November 2018. ReBuild Houston secures revenues from drainage fees and other funding sources for infrastructure improvements, and local funds can be used to supplement, complement, or add to recovery projects within neighborhoods that have flooded.

Harvey also triggered the re-evaluation of additional development and redevelopment standards, especially in light of Houston's continuing rapid growth. Current criteria for construction standards may not be adequate to mitigate the threat of new and redevelopment activity. Therefore, Houston Public Works (HPW) is surveying areas where urban flooding occurred during Harvey to determine whether higher standards should be adopted. This could include, for example, raising minimum slab elevations for both residential and commercial development, in parallel with reprioritization of local funds for infrastructure improvements in flood-prone areas of the City. These recommendations will be made in conjunction with the planned drainage infrastructure modifications (and timing), to prevent unnecessary risk-assessed spending on protection.

HOUSING RECOVERY: HARD CHOICES FOR UNMET NEEDS

Housing recovery means rebuilding, relocating or replacing people's damaged homes, while also increasing the resilience and availability of affordable housing in strong communities. In line with the Mayor's mandate to "build forward," the Harvey housing recovery – funded by the \$1.17 billion Community Development Block Grant - Disaster Recovery (CDBG-DR) allocated to the City – is designed to support the City's long-term housing vision: to ensure that every Houstonian has a safe, affordable place to live, and that neighborhoods provide economic opportunities for Houstonians to thrive.

To receive this funding, the City was required to submit a local action plan to the Texas General Land Office (GLO), to be incorporated into the State of Texas "Plan for Disaster Recovery: Hurricane Harvey – Round 1" as a substantial amendment. This local action plan is prescribed by the GLO and includes a local needs assessment, budget, program descriptions and expenditure timelines for the City's expected allocation of CDBG-DR funds.

In February 2018, the City's recovery team secured technical assistance from HUD to underpin and accelerate the integration of recovery planning with the housing strategy and to ensure the adoption of best practices. Further, the City's work on a housing recovery action plan has proceeded in close collaboration with Harris County, the Texas GLO in Austin and HUD in Washington, DC.

In May and June 2018, the City's Housing and Community Development Department (HCDD) worked with local partners to launch a major community engagement program to ensure community input to the plan. Working with City Council members, Super Neighborhoods, and nonprofit groups like LISC, AARP and the Texas Organizing Project, HCDD reached more than 4,500 Houstonians. In total, HCDD held 18 public meetings, an online survey and two tele-town hall meetings. These engagements were important to informing the budget priorities and programs in the Local Action Plan, in addition to building trust between the community and HCDD. In keeping with principles of transparency and clear communication, concise summaries of the action plan were published for Houston's general public.²

Table 4 outlines the key elements of the plan. The recovery team has completed "end-to-end" tests of the delivery process. A sample "tip sheet" for a specific program appears in the appendix. These are being developed and published to help clients track the steps they will follow to receive assistance

Development of HCDD capacity – new hires, resourcing

The scope, scale and complexity of the housing recovery effort requires significant surge capacity in the form of expertise, headcount and contractor support. HCDD is growing from a staff of about 150 to more than 200 full-time employees to administer the \$1 billion + program. At the same time, the City has rigorously vetted and selected contractors that have deep experience working on recovery from previous disasters, including Hurricanes Katrina and Sandy. Contractor selection is also adhering to the City's policy of including local minority and women-owned businesses.

² <https://houstontx.gov/housing/Local%20Action%20Plan%20Summary%20V-5.pdf>

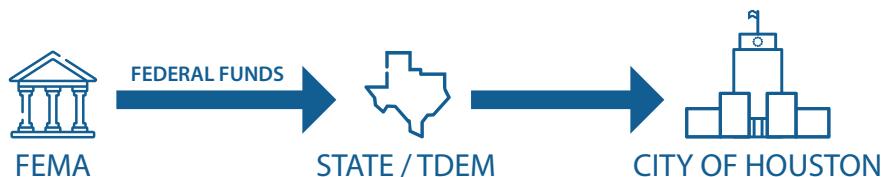
Table 4: Housing Programs for Disaster Recovery

Program	Amount	Percent of Total	Description
Homeowner Assistance Program	\$392,729,436	33%	Five program options to assist eligible homeowners with their rehabilitation and reconstruction needs: City Managed Rehabilitation and Reconstruction, Reimbursement, Acquisition, Homeowner Managed Rehabilitation and Interim Mortgage Assistance.
New Single-Family Development Program	\$204,000,000	17%	Provide new affordable single-family homes for low- and moderate-income homebuyers to help replace affordable housing stock damaged/lost in Hurricane Harvey.
Multifamily Rental Program	\$321,278,580	27%	The development of new multifamily rental housing, the acquisition and/or rehabilitation of flood-damaged multifamily rental housing and strategic land acquisition for multifamily development to address the shortage of quality, affordable housing.
Small Rental Program	\$61,205,100	5%	Improve the affordable rental housing stock by rehabilitating small rental properties (1 – 7 units) damaged by Hurricane Harvey and creating new housing stock.
Homebuyer Assistance Program	\$21,741,300	2%	Provide funds for down payment, closing cost, principal buy-down and other direct financial assistance to homebuyers to finance the purchase of a home.
Buyout Program	\$40,800,000	4%	Residential structures that have flooded more than once will be purchased and demolished to create park amenities, open space, or detention areas.
Public Services	\$60,000,000	5%	Services to support residents to find housing, remedy housing issues, or to become more resilient in future disasters, whether they be natural, economic or personal.
Economic Revitalization Program	\$30,264,834	3%	Help create jobs that will improve the economic viability for Houstonians and neighborhoods. Assistance may be provided through loans or grants.
Planning	\$23,100,000	2%	Community engagement to inform the City's recovery plan development. Funds may also be used to study specific topics related to mitigation or resilience or plan for specific projects.
Housing Administration	\$20,835,088	2%	Improve capacity to plan for and deliver high-quality programs and services with appropriate oversight.
Total	\$1,175,954,338	100%	

RESTORING AND STRENGTHENING CITY ASSETS: LEVERAGING FEMA'S PUBLIC ASSISTANCE FUNDS

Hurricane Harvey caused an estimated \$2 to \$3 billion in damage to City of Houston public assets, including buildings, water and wastewater systems, parks and utilities. As a declared major disaster, the storm triggered the City's eligibility for FEMA's Public Assistance Program, which is governed by the Robert T. Stafford Disaster Assistance Act and FEMA's Public Assistance Program and Policy Guide. The program is designed to cover up to 90 percent of the cost of eligible expenses tied to the Harvey response and the rebuild of damaged infrastructure.

FEMA provides funding to the City through the Texas Department of Emergency Management (TDEM), which serves as an advocate for Houston. TDEM is also responsible for compliance review and disbursement of funds. The City has received strong support and collaboration from TDEM throughout this process.



The City of Houston has deployed a team of internal and contracted experts to work closely with both TDEM and FEMA on a project funnel that begins with site identification through to final audit. The process ensures that eligible PA projects are identified and project specifications (or "project worksheets") are negotiated for funding and managing the overall effort. This team has also collaborated on insurance allocation methods and has convened inter-agency "Listening Sessions" to identify and implement ongoing process improvements across organizational boundaries.



Strict and detailed rules for administering this assistance must be followed to the letter to avoid possible future de-obligation – or “claw-back” – of the funds from the City. FEMA tracks each type of damage into categories of work that range from emergency to “put back” activities to reconstruction.

So far \$166.4 million in public assistance funding across all categories has been disbursed or obligated for Harvey recovery. The pace has been largely dictated by availability of FEMA resources, which are stretched thin across multiple national disasters over the past two years. While there is a long way to go, mitigation funding negotiations between the City of Houston and FEMA are underway and are expected to accelerate in the coming months.

Debris Removal and Emergency Measures

Immediately after the storm, the City mobilized crews, contractors and other resources from around the entire State of Texas to address debris removal, funded by “Category A” FEMA public assistance funds. Currently in its 15th month, the disaster debris management effort has included debris removal in neighborhoods, parks, bayous and within Lake Houston. Outstanding projects include silt remediation in Lake Houston and debris remediation in Harris County Flood Control District waterways within the City limits.

"Category B" funds cover emergency protective measures to protect public health and safety and City facilities in the immediate aftermath of a storm; due to the size and scope of Harvey, FEMA will fully reimburse the City for out-of-pocket expenses at 100 percent for the first 30 days after the event and at 90 percent after that time (up to 18 months).

So far in the recovery, the City has received \$166.4 million in Category A and B funds. Additional details on both categories appear in Tables 5 and 6; examples of public assistance projects in all categories appear in Table 7.

Table 5: Key Facts - Debris Removal (Category A)

575,000 Tons of debris removed from Harvey impacted neighborhoods
67,600 Truckloads of debris collected citywide
21,000 Tons of debris removed from Lake Houston
379,000 Hours worked by City employees on Harvey debris removal
3 Mutual Aid Jurisdictions came to assist - City of San Antonio, City of Austin and TxDOT
15 Months of debris removal
Estimated \$259M for debris removal activities in the City of Houston
14 Debris sites and landfills used for disposal

Table 6: Key Facts - Emergency Response and Temporary Repairs (Category B)

\$190 Million in total estimated Emergency Protective Measures (CAT B) Harvey Costs, to date
\$66 Million of Emergency repair and stabilization costs to the Theater District
\$93 Million in City labor, equipment usage, and materials as well as relocation expenses and temporary offices
\$26 Million of Emergency Purchase Orders (EPOs)
\$4.5 Million in additional emergency operational expenses including sheltering and contract costs collected and submitted for reimbursement

Table 7: Examples of FEMA Public Assistance Projects

Damages	Examples	Cost Estimate	Estimated Projects
Category A - Debris Management	Citywide debris removal, Lake Houston debris	\$259 million	3
Category B - Emergency Repairs	Sheltering operation, clean-up of facilities, police and fire overtime	\$190 million	48
Category C - Road and Bridge Repairs	West Lake Houston Parkway Bridge	\$65 million	TBD
Category D - Stormwater	Drainage channels	\$10 million	TBD
Category E - Buildings	Wortham Theater and garage, City Hall, libraries, fire stations and other City assets	\$625 million	180
Category F - Water/Wastewater Utility	Waste water treatment plants, lift stations, pump stations and drinking water facilities	\$1.1 billion	182
Category G - Other	Parks, flooded vehicles	\$40 million	20
Total		\$2.28 billion	436

Permanent Repairs to Public Facilities

Permanent repairs and reconstruction of the Harvey-damaged facilities, such as police stations, theater facilities and City Hall will occur over the next several years. FEMA's PA program will fund repairs or replacement of these facilities. Importantly, the funding will also cover mitigation strategies, i.e. redesigns that will avoid the cost of damage from future disasters.

Work toward permanent repairs during the first phase of Harvey recovery has included the collection of visual, digital and document data of damaged sites.

Over the last year the City has focused on the need to assess the extent of damages and gain concurrence from FEMA. The City is well advanced in developing approximately 400 site inspection project worksheets based on joint damage assessments with FEMA.

FLOOD MITIGATION STRATEGIES



Demolish and rebuild outside flood zone



Elevating offices and important systems to higher floors



Build flood walls around facility to divert flow of water



Add flood water detention ponds



Improve drainage around facility

Table 8: Priority Repair / Construction Projects

Municipal Government	Municipal Court Complex, City Hall, City Hall Annex, Lanier Building, Annex Garage
Arts	Wortham Theater & Garages
Police	Central Police Station, Midwest Station, North Station, Southwest Station
Fire	Stations #104, #26
Libraries	Kendall, Stella Link, Flores, Meyer, Lakewood, McCrane-Kashmere Gardens
Parks	Buffalo Bayou, Lake Houston Wilderness
Community Centers, Etc.	Sagemont Community Center, Braeswood Health Laboratory

Permanent Repairs to Infrastructure

Harvey caused significant wind and inundation damage to Houston Public Works (HPW) Department's water and wastewater operations. Specifically, some 400 wastewater operations and drinking water service lines throughout the City were impacted. The City has deployed technical experts to assess the electrical and mechanical damages and will be working with FEMA over the next year on a plan for wastewater treatment plant consolidation in order to mitigate damages in future disasters.

Permanent Repairs to Infrastructure:

- Lake Houston Silt Removal (collaboration with USACE)
- Wastewater Treatment Facilities - 69th Street, Kingwood Area, Forest Cove, West District, Northeast, Turkey Creek
- Water Purification Facilities
- Water Wells - Kingwood, Westside

Strike Team

The City has facilitated the Public Assistance Strike Team, comprising City staff, TDEM and FEMA to address issues related to Houston's recovery. This innovative approach supports better collaboration and is producing results. The topics covered by the Strike Team include:

- Payroll and Vendor Proof of Payment
- Mitigation
- Alternative Rebuilds - Justice Center
- "428" Program
- Disaster Financing
- Donated Resources
- Insurance
- Systems and Processes
- Project Formulation
- Hardening
- Floodwalls

Additional Funding

In addition to FEMA PA funding, a number of other sources of funding for City asset and infrastructure repair has been provided or are being actively pursued. The City will continue to leverage all of these possible sources throughout the recovery life-cycle. Beyond this list, the City is exploring even more innovative public-private funding models, for example “resilience bonds” which seek to use capital markets to monetize mitigation projects by way of capturing the value of reduced insurance risk.

Table 9: Additional Funding for Infrastructure

Program	Projects
Federal Highway Administration - Emergency Relief Program	Harvey-damaged signals, roads, bridges
\$50M Office of the Governor Grant	Insurance deductible, flood insurance reinstatement, debris removal
Donated Resources	Off-sets for emergency and permanent repairs
HUD Community Development Block Grant - Disaster Recovery	10% match for some Harvey-related projects
Insurance	Business interruption at airports and downtown garages, flood coverage and other peril payments

HAZARD MITIGATION GRANT PROGRAM: QUICK WINS FOR PRIORITY PROJECTS

FEMA's Hazard Mitigation Grant Program (HMGP) provides funds to states, tribes and local communities after a disaster declaration to protect public or private property through various mitigation measures. Hazard mitigation includes long-term efforts to reduce the impact of future events. HMGP recipients have the primary responsibility for prioritizing, selecting, and administering state and local hazard mitigation projects.

Following Hurricane Harvey, FEMA allocated an initial \$500 million in HMGP grants to the State of Texas for mitigation measures. The total amount of HMGP funds for Texas is anticipated to increase to over \$1 billion. HMGP is a cost-sharing program, which means that the federal government funds up to 75 percent of total project costs with the remaining 25 percent covered by the local sponsor.

Resilience Projects: Scope and Scale of Opportunity

Prior to Hurricane Harvey, the City of Houston's Resilience Office was working on several drainage and flood control projects to address riverine and localized urban flooding. These projects will improve urban drainage infrastructure and supplement ongoing flood control projects being managed by the Harris County Flood Control District (HCFCD). The resilience projects include channel improvements, diversion channels, sub-regional detention and urban storm sewer improvements. Several of these projects became the initial candidates for HMGP funding, and a list totaling an initial estimate of \$908 million in project costs (summarized in Table 10) was presented to City Council on April 2018.

FEMA has a defined procedure for evaluating the eligibility of each project; therefore, in advance of the submittal of projects for evaluation, this list was modified and grouped according to the federal funding sources the City would pursue.

Program Management and Project Applications

The Texas Department of Emergency Management (TDEM) assists with HMGP project selection and manages the flow of funds from FEMA. Completion and approval of a Notice of Interest (NOI) for each candidate project is required prior to submitting a complete application. TDEM and FEMA use the NOIs to gather general project information and provide guidance on project eligibility. Following NOI approval, complete project applications are submitted to TDEM and FEMA for final evaluation. Applications include extensive technical data and benefit-cost analysis. HMGP allocations are competitively based, which means projects must yield positive benefit-to-cost ratios. To date the City has submitted HMGP applications for funding the Inwood Golf Course, North Canal, Lake Houston Dam and TIRZ 17 detention projects. An application has also been submitted to fund residential mitigation projects which include home elevations and demolition-and-rebuild. All applications are in various phases of review with either TDEM or FEMA.

HMGP is funded 75 percent by FEMA; 25 percent in matching funds is required. Potential sources of local match funding for each project have been identified.

Potential matching fund sources:

- State of Texas Rainy Day Fund
- HUD CDBG-DR Mitigation
- Harris County Flood Control District Bond Program
- ReBuild Houston
- Other Partner (TxDOT, TIRZ, Metro, etc.)

Path Forward

Based on extensive engagement with TDEM and FEMA, the City's Recovery Team estimates that Houston will be eligible for approximately \$250 million of HMGP project grants. To speed up the delivery of funds, the City has submitted a request to modify internal agency guidelines to authorize pre-award activities such as right of way acquisition, environmental assessments, and engineering design and construction phasing when local funds are available. Additionally, since the environmental and historical assessments and impact statements require long lead times before grants are awarded, the City is requesting a programmatic review citywide as an alternative to the individual project requirements. Authorizing these activities can expedite the timeline and further enhance the regional coordination required to protect life and property.

Table 10: Priority Infrastructure and Mitigation Projects

Resilience Project	District	Watershed	Description	Total Cost Estimate (\$ Millions)
Inwood Golf Course	A, C, & B	White Oak	227-acre golf course to be converted to a set of detention basins, providing approximately 1,300 acre-feet of storage	\$48.6
North Canal	C, H, & I	Buffalo, White Oak	Diversion channel at the confluence of White Oak and Buffalo bayous, southern/downstream channel for additional mitigation following I-45 realignment, and upstream reconstruction bridges in Heights and Yale for overall 100-year WSE reduction along White Oak and Buffalo Bayou	\$151
TIRZ 17 Detention	G	Buffalo	Underground detention basins and storm water system improvements and connections for additional storage and conveyance capacity	\$60.4
Lake Houston Dam	E	San Jacinto	Addition of 10-gate structure to complement existing dam to allow for controlled releases	\$48.5
Individual Home Mitigation	All	All	Buyouts, elevations, demolition, and rebuild application for individual homes	\$46

PROJECT SELECTED FOR HMGP FUNDING

OTHER PROJECTS (HMGP ALTERNATIVE, CDBG-DR, ETC.)

Resilience Project	District	Watershed	Description	Total Cost Estimate (\$ Millions)
West Fork Dredging	E	San Jacinto	Removal of sand/silt from U.S. 59 to Lake Houston	\$40
Fifth Ward Urban Drainage	B	Hunting, Buffalo	Neighborhood revitalization including reconstruction of streets and utilities	\$20
Keegans Bayou Channel Improvement	C, F, J, & K	Brays	Improvement options aimed at removing hundreds of structures from 100-year floodplain	\$50
Ruffino Landfill Detention	C, F, J, & K	Brays	Reclaim 175-acre landfill site and prepare for use as flood detention for Keegans and Brays watershed. Will provide 2,400 acre-feet of flood mitigation storage	\$198
Reconstruction Projects (Pine Gully and Plum Creek)	I	Sims	Replace collapsed outfalls, regrade and desilt ditches, minor erosion repairs and reconstruction of low flow channel	\$20
Turkey Gully (E106)	C, H, & I	White Oak	Diversion of urban drainage from Turkey Gully to White Oak Bayou	\$30
Sunnyside Detention/Bellfort Landfill	D	Sims	Flood detention on the east side of the former Sunnyside incinerator/landfill site	\$5
Country Creek/Westwood Detention	J	Brays	TIRZ purchased land for a basin that will also incorporate detention features in the Westwood golf course	\$10

NEIGHBORHOOD RESTORATION PROGRAM: A GRASSROOTS COLLABORATION

While County, City, corporate and nonprofit organizations responded with characteristic energy, commitment and generosity to the recovery needs of Houston's residents, the scale of the disaster exposed significant gaps in the community's capacity to coordinate and deliver grassroots recovery support to many survivors across such a wide range of neighborhoods. To help meet this need, the City of Houston established a Neighborhood Restoration Program (NRP) to marshal, and coordinate delivery of public and private disaster recovery services to Harvey survivors through a network of Neighborhood Restoration Centers (NRCs).

The NRP is overseen by a collaborative public-private committee that includes the City of Houston Department of Neighborhoods, City of Houston Health Department, City of Houston Planning and Development, the Local Initiatives Support Corporation (LISC) Houston, University of Houston, BakerRipley and MAM.

The NRCs are staffed with case managers who counsel residents to assess their needs, help them prepare a recovery plan and connect them to needed services and resources. NRC case managers also work with local agencies to identify and reach out to residents in need of assistance. They work with community partners to establish plans for the disaster preparedness and resilience of neighborhoods. Outreach activities include recovery workshops, resource fairs and special events. NRC staffs make a particular effort to serve vulnerable populations, including elderly, disabled and undocumented people.

Fourteen NRCs were established citywide, located near neighborhoods hit the hardest by Hurricane Harvey. Six are operated by City of Houston; two by Memorial Assistance Ministries; and six by BakerRipley.

Acres Homes Multi-Service Center
6719 West Montgomery Rd., 77091
Mon – Wed, 8 a.m. - 5 p.m.
832-393-4145 or 823-393-5427

Montrose - Metropolitan Multi-Services Center
1475 W. Gray St., Houston, TX 77019
Monday - Friday, 8 a.m. - 5 p.m.
832-395-7333

Northeast Multi-Service Center
9720 Spaulding St., 77016
Mon - Fri, 8 a.m. - 5 p.m.
832-395-0470

Edgebrook - BakerRipley at St Francis Cabrini Church
10727 Hartsook St., 77034
Tues, 8:30 a.m. - noon & Fri, 8:30 a.m. - 2 p.m.
713-944-9186

Golfcrest, Bellfort, Reveille and Greater Hobby at BakerRipley Campus
6225 Northdale St., 77087
Tues, 10 a.m. - 2 p.m. & Thurs, 2 - 6 p.m.
713-640-7100

Memorial Assistance Ministries (MAM)
1625 Blalock Rd., 77080
Mon - Fri, 8:30 a.m. - 5 p.m.
713-468-4516 Ext. 177

Kashmere Gardens Multi-Service Center
4802 Lockwood Dr., 77026
Mon - Fri, 8 a.m. - 6 p.m.
832-393-5503

Sunnyside Multi-Service Center
9314 Cullen Blvd, Houston, TX 77033
Mon - Fri, 8 a.m. - 5 p.m.
832-395-0069

West End Multi-Service Center
170 Heights Blvd., 77007
Mon – Fri, 8 a.m. - 5 p.m.
832-393-5950

East Aldine BakerRipley Campus
3000 Aldine Mail Route Rd., 77039
Tues & Thurs, 10 a.m. - 2 p.m.
346-267-0487

Edgebrook - BakerRipley at St Stephen Church
2217 Theta St., 77034
Fri, 8:30 a.m. - 4 p.m.
713-944-9186

Greenspoint - BakerRipley Mobile Bus at Teloloapan Meat Market
159 Aldine Bender Rd., 77060
Fri, 10 a.m. - 2 p.m.
346-267-0487

Gulfton-Sharpstown BakerRipley Campus
6500 Rookin St., 77074
Tues & Thurs, 10 a.m. - 1 p.m.
713-273-3701

Pasadena at BakerRipley Cleveland Campus
720 Fairmont Pkwy., Pasadena, TX 77504
Thurs, 9 a.m. - 2 p.m.
713-944-9186

Path Forward

The Neighborhood Restoration Program committee is evaluating improvements to the NRC model and crafting an institutionalized program for future disasters. Among the needs identified are clear and direct accountabilities to the Mayor and County Judge; engagement and alignment of key partners at the county and Citywide as well as neighborhood levels; pre-agreed and/or contracted roles and responsibilities for key recovery organizations.

The capacity for effective neighborhood-level recovery in the future will also depend on pre-identified and secured locations for recovery facilities; annual reviews and exercises of the City/County's community recovery capability; and robust data and analytics platform that can quickly assess needs and share operational information across organizational boundaries.

Specific recommendations are being finalized for delivery to the Mayor and Harris County Judge by the end of the year.

Figure 3



FEMA'S NEW DONATED RESOURCES PROGRAM: A HOUSTON-LED INNOVATION

With the City of Houston's recommendation and encouragement, FEMA approved an innovative nationwide revision to its Public Assistance Donated Resources Policy. The new rules allow local governments applying for disaster recovery public assistance to offset their local share of permanent project costs with the value of materials and professional services donated by public and private organizations.

FEMA established the new policy retroactively to the date of Harvey's landfall.

Given damage estimates after Harvey in the range of \$2 to \$3 billion and the 10 percent required local match, the new donated resources policy represents a potential cost saving pool of up to \$300 million.

The City may apply the offset if all of the following conditions are met for donated resources:

- They are received from a third party (private entity or individual that is not a paid employee of the applicant, Federal or State government).
- They are necessary and reasonable for accomplishment of the project.
- They are used in the performance of eligible work and within the respective project's period of performance.
- They are tracked, including description, specific locations and hours and tied to a specific Project Worksheet.

The City is actively developing language for procurement RFPs seeking donated resources in the following areas. (*see Figure 4*). At the same time, the City continues to work with FEMA and TDEM on processes and policies for implementing the new policy. (*see Table 11*)

What type of Donated Resources will the City look for?



Table 11: Donated Resources Policy Implementation Workstreams

Committee Name	Participants	Tasks
Contracts and Procurement	Strategic Procurement, Legal, Houston Public Works, Finance, General Services Department	Formulate federal compliant language for inclusion in all permanent work procurements.
Data Collection	Department of Neighborhoods, Finance	Ensure all data collected is FEMA/TDEM compliant.
Collaboration	FEMA, TDEM, Finance, Harris County	Identify key questions on the implementation of the new policy.
Valuation	FEMA, TDEM, Finance	Determine when the valuation of services would occur and on what basis.

PROCESS COMPLIANCE: PREVENTING EXPENSIVE MISTAKES

A top priority for the Harvey recovery team has been to ensure compliance with all federal and state laws and regulations for the expenditures of disaster recovery funds. Compliance is critical not only to ensuring responsible use of taxpayer funds but also to eliminating the risk that future audit findings could result in de-obligation – or “claw-back” – of billions of dollars in disaster recovery funds from the City.

A first step the City took after Harvey was to increase the scope of an existing contract with Tetra Tech, the City’s consultant on public assistance projects. The expanded contract includes support for substantiating the City’s compliance with federal disaster grant regulations. Tetra Tech also provides site inspection, project formulation and technical support to the City.

In October 2018, City Council approved a professional services contract with Deloitte & Touche, LLP to provide financial modelling, reporting and support for all disaster recovery funding received from Hurricane Harvey and other disasters. Additionally, it provides financial oversight services and assistance to the City regarding:

- cash flow modeling,
- reviewing budgetary matters,
- preparing a working capital advance plan,
- summarizing all funding sources and risks,
- providing compliance integrity monitoring and
- pursuing an internal financial audit for potential violations of restrictions in receiving funding.

In other words, the City will perform real-time auditing for maximum assurance of proper oversight.

It is the City’s intention to seek Federal reimbursement for any eligible services performed under this contract, which will supplement internal Finance Department staffing.

Table 12: Public Assistance Compliance Review Areas

Review Type	Examples	Number of Reviews
Eligibility	2 CFR 200 compliance	10
Research	Repair/replace analysis	1
Contracts	Provided for GSD, ARA, HITS, Legal, HFC, HPW, HCD	79
Emergency Purchase Orders	Document review, eligible costs, vendor questions	117
Solicitation	Procurement reviews	36
Memorandum Preparations	Audit, disaster manual open competition reviews	13
Tasks	Mutual Aid and policy and procedures review	66
TOTAL		322

COMMUNICATIONS AND TRANSPARENCY: KEEPING STAKEHOLDERS INFORMED

The scale and impact of Hurricane Harvey on Houston and its residents called for a major focus on communications, not only during the emergency response but for months into the recovery as well. The core Recovery Leadership Team includes a key role for communications to ensure that the most up-to-date and accurate information reached the public.

The communications campaign leveraged the City's official channels, social media, local print and broadcast media, town hall meetings, stakeholder engagements, and third-party partners such as United Way and BakerRipley. Mayor Turner and Chief Recovery Officer Marvin Odum are among the leaders who continue to provide regular face-to-face updates and statements to multiple audiences.

To that end, the recovery team provided the Mayor's communications team with weekly talking points on the recovery progress. These were used by the Mayor at the beginning of City Council meetings on Wednesday mornings, and provided City Council members, the press and the general public with a regular cadence of high-level updates after the storm. As the months progressed, these shifted from facts and figures about how many Houstonians were still in temporary housing, for example, to longer-term goals and strategies.

The Recovery Leadership Team also benefited from significant pro bono communications support, including many hours of donated time by high-level communications executives, in particular from Helen Vollmer Caudle of 4C Communications.

In addition, a number of corporate partners also donated in-kind support for recovery communications efforts. BBVA Compass bank donated in-kind support for the production of a series of videos documenting the recovery across the city. Richards/Carlberg designed PowerPoint templates and graphics at no cost to the City.

Throughout this entire process, the recovery team has coordinated closely with other government entities (particularly Harris County) and nonprofit and community partners. This was to ensure alignment on messaging, press outreach and joint events.

For the one-year anniversary of the storm, the team worked with the Long-Term Recovery Committee (LTRC), hosted by the United Way, which put together a joint communications plan to leverage full community participation in anniversary commemorations. These efforts ensured that the LTRC and its various partner organizations presented a united and coordinated vision of the recovery process to the greater Houston community and beyond, and provided a shared, agreed-upon database of information as a basis for media outreach.

The one-year commemoration included visits by Mayor Turner to impacted families in five affected neighborhoods to call attention to ongoing recovery needs. The commemoration also convened volunteers for "Days of Action" on Harvey-related projects.

BUILDING FORWARD: LAYING THE GROUNDWORK FOR A MORE RESILIENT 21st CENTURY HOUSTON

The Mayor's mandate for the Harvey recovery effort has been to "build forward, not just build back" – to ensure that the recovery strategy included initiatives to strengthen Houston's resilience to future disasters.

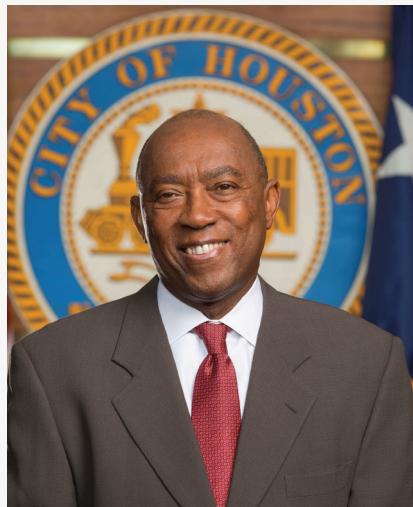
To that end, the City announced in August of 2018 that it would be joining the Rockefeller Foundation's 100 Resilient Cities (100RC) program, with underwriting support from Shell Oil Company.

The 100RC network is a global effort to build urban resilience around the world. Through the partnership with 100RC, Houston will create and implement a comprehensive resilience strategy to enhance the city's long-term goal to address potential shocks — such as hurricanes, flooding and pandemics — and stresses that can weaken the fabric of a city, such as lack of affordable housing, mobility and workforce development.

With 100RC grant funding, Houston will hire a Chief Resilience Officer (CRO) to work directly with leaders and stakeholders across the city in developing the resilience strategy. The City will also have access to more than 120 100RC-affiliated nonprofit, for-profit, academic and government institutions that have pledged more than \$200 million in pro-bono services in the form of critical tools, services, and technical assistance. Locally the 100RC program is supported by the Kinder Institute for Urban Research, the Asakura Robinson Architectural Firm, and the Center for Houston's Future.

In conjunction with the 100RC program, the City is sponsoring a "Living With Water" (LWW) initiative, facilitated by the Water Institute of the Gulf, which convenes local, national and international experts in a flood mitigation and urban water management. An objective of the LWW initiative is to develop a comprehensive long-term regional blueprint for flood mitigation. Such a blueprint will represent not only a clear path to stronger regional flood resilience but also a roadmap for the necessary long-term funding.

IN CONCLUSION: A MESSAGE FROM MAYOR TURNER



Mayor Sylvester Turner

Hurricane Harvey devastated the lives of thousands of Houston's residents, including many of its most vulnerable. Homes, property and jobs were lost. In the most tragic cases, loved ones were lost.

But even as Harvey visited the worst on Houstonians as individuals, it has brought out the best from Houston as a community.

This report details much of the work done by the team I assigned under Marvin Odum to lead the City's recovery but it cannot do justice to the work of hundreds of organizations and thousands of people across Houston and Harris County to build the city back from the destruction of Harvey... and then to build it forward.

These include other City departments that supported the recovery team. The Office of Business Opportunity, for example, developed and facilitated disaster recovery hiring events to provide temporary work for

people who had lost their jobs in the storm; the department worked with the Home Builder's Institute and panel-maker Norbord to create a program for training and certifying young people to help fill the increased demand for construction skills after the storm. The Office of Innovation developed innovative data tracking systems to help accelerate debris removal and other large-scale recovery work. The Police and Fire departments have used the lessons of Harvey to strengthen their disaster response capacity; so has the Houston Health Department. The City's homelessness initiative addressed an increase in the number of people made homeless after the flooding. These are just a few examples.

But the work of recovery was in no way limited to City departments. Non-profits, churches, businesses, social clubs, sports teams, schools, medical professionals, legal professionals, financial institutions, academic centers, trade groups, architects, engineers, media outlets, Harris County government, other neighboring jurisdictions, Texas state departments, federal agencies and many more are playing roles in making Houston even more vibrant and resilient than before. Indeed, the model of partnership and collaboration among multiple public, private and non-profit players may emerge as best practices resulting from the work of our recovery from Hurricane Harvey.

Looking ahead, I am proud that leaders and doers across the region have taken up the call for this recovery to be transformational:

- *A new burst of leadership, energy and resource is tackling the housing needs of our city that were unmet even before Hurricane Harvey; we are writing into our codes new policies for improving the safety of future homes and developments.*
- *The partnership with the Rockefeller Foundation's 100 Resilient Cities program, underwritten by Shell Oil Company, is accelerating the path to a Houston that can even more confidently grow and thrive in the 21st century.*

- City and county leaders, in partnership with local, national and international experts, are making progress on the long-needed blueprint for regional flood mitigation
- Recognizing Houston's exposure to the impacts – including from storms like Harvey – of a changing climate, my administration has launched Houston's Climate Action Plan. This initiative, with technical advice from the Houston Advanced Research Center (HARC), will convene stakeholders from across the community to develop cost-effective energy efficiency, renewable energy and transportation measures to reduce greenhouse gas emissions.
- The alignment and teamwork of our congressional delegation, the City, the County and the Greater Houston Partnership have given more persuasive power to our region's advocacy voice in Washington, DC.
- The United Way is facilitating the creation of an integrated, standing neighborhood recovery plan for future disasters.
- The recovery effort has provided additional stimulus and pace on initiatives ranging from Verizon's roll out of its 5G network in Houston to the City's cornerstone "Complete Communities" program.

There are years of work ahead to complete the Harvey recovery, but a vision for what a safer, stronger, smarter Houston will look like is already beginning to take shape.

— Mayor Sylvester Turner

Appendix 1

Homeowner Reimbursement Program Tip Sheet

COMING SOON

Homeowner Reimbursement Program Tip Sheet

**Are you working on repairs for your Harvey-damaged home?
You may be eligible for reimbursement in the future.**



One of the first recovery programs the City of Houston will offer this fall is homeowner reimbursement for repairs to homes damaged by Hurricane Harvey. Homeowners spending personal money to repair a Hurricane Harvey-damaged home can prepare now by keeping in mind the following:

- Reimbursement is only for expenses associated with repairing storm damage from Hurricane Harvey for homes within the City of Houston (verify your tax jurisdiction at www.hcad.org).
- All costs must be reasonable, which means appropriate and typical for modest housing in Houston. Luxury items like marble countertops, jacuzzis, pools, or high-end appliances are not eligible for reimbursement.
- "Soft costs" like architectural, engineering, planning, and permit approval services are reimbursable, as long as there is a receipt or invoice.
- If homeowners conduct their own repairs ("sweat equity"), those labor costs are not eligible for reimbursement.
- The City will review all repairs for cost reasonableness and eligibility, and will perform inspections to verify work. Homeowners may be asked to provide invoices and photographs to document evidence of the repairs.
- An official City site inspection and Certificate of Compliance are required before expenses can be reimbursed to the homeowner.
- Participants in the Reimbursement Program who reside in the floodplain are required to maintain flood insurance. Failure to maintain flood insurance in a floodplain may result in being denied future federal assistance.
- The Reimbursement Program is one of five Homeowner Assistance Programs that will be available starting this fall.



The Housing and Community Development Department is now developing specific program guidelines and application language. Residents will be able to start applying for the Homeowner Reimbursement Program in fall 2018.

Not everyone who applies will be eligible to participate in the program.

Visit www.houstontx.gov/housing often for program updates and final guidelines.



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