



CITY OF HOUSTON

Office of the Mayor

Interoffice

Correspondence

To: Neal Rackleff, Assistant Secretary of Housing and Urban Development for Community Planning and Development

From: Marvin Odum, Chief Recovery Officer

Date: November 9, 2017

Subject: Hurricane Harvey housing damage

The memo below outlines the City of Houston's work to determine Hurricane Harvey's impact on housing units across the city. Analysis of city data suggest that relying solely on FEMA and SBA data will yield underreporting of Harvey's true impact.

Summary

In response to H.R.3672, the City of Houston undertook a data collection and review initiative to better understand Hurricane Harvey's effects on housing across the city, and to provide a comprehensive, defensible assessment of the hurricane's true impact via a count of affected housing units in Houston (for purposes of this discussion, an "affected" housing unit is defined as a housing unit that suffered damage from wind, rain or floodwaters during Hurricane Harvey).

Federal Emergency Management Administration (FEMA) Individual Assistance (IA) data and National Flood Insurance Program (NFIP) data have been instrumental in determining impact, but the City has looked beyond this data to identify a larger universe of affected homes. This was achieved by consolidating FEMA data sets into unique addresses within the City's corporate limits, then incorporating information collected by City of Houston employees during damage assessments, debris pickup, and other service to citizens.

The City believes the table below provides a more accurate and holistic look at the current known universe of affected housing units in the city of Houston, and believes ongoing analysis will further increase the number.

<u>Type of Structure</u>	<u>Estimated Affected Units</u>	<u>Unique Addresses</u>
Single-Family	148,413	148,413
Multi-Family	163,446	1,198
Total	311,859	149,611

Methodology

Estimates above were developed on a foundation of four data sets: The City's 311, 911 and debris removal lists, along with National Flood Insurance Program claim information. FEMA Individual Assistance data, high-water marks as noted by the City's Flood Plain Management Office, and

information from “windshield assessments” by the City’s Department of Neighborhoods were layered on to provide greater clarity and help in confirming unique affected addresses. Further the methodology for compiling the various data set gives us high confidence that all of these properties were affected.

Single-family residences were separated from multi-family residences to identify the total number of units. To understand how many individual units in multi-family addresses were likely affected, the following methodology was used:

- For all multi-family structures that were one-story, a 1:1 factor was used
 - E.g. 10 potential units in an affected, one-story structure = 10 units
- For all multi-family structures that were two-store, a divisor of two was used
 - E.g. 10 potential units in an affected, two-story structure = 5 units
- For all multi-family structures there were 3+ story, a divisor of three was used
 - E.g. 15 potential units in an affected, 3+ story structure = 5
 - It is worth noting that affected 3+ stories were <5% of known affected addresses, meaning it was a statistically insignificant contributor to our overall number

Data Sources and Description

Data Set	Brief Description
City of Houston Public Works and Engineering Floodplain Management Office Visual High Water Mark Inspection Data	Visual inspection of all structures inside the 100-year floodplain, and when a water mark was present, and measurement was taken
City of Houston Solid Waste Department Debris Collection Data	Geolocated data based on where debris was picked up by Solid Waste Trucks
City of Houston Department of Neighborhoods Windshield Inspection Data	Visual inspection of external damage by Department of Neighborhoods employees
City of Houston 911 Emergency Call Data for Flood Rescues	Geolocated calls for flood rescue by citizens
City of Houston 311 Data for Harvey-Related Calls	Geolocated calls for flooding by citizens
City of Houston Public Works and Engineering Multi-Family Habitability Master List with Unit Count	Address-based data set that tracks all multi-family structures and number of units
FEMA NFIP Point-level Claims Data	Flood insurance claims information collected by FEMA
FEMA IA Data	Individual assistance data collected by FEMA

Next Steps

To continue to have the most accurate data set of total effect from Hurricane Harvey, the City is currently pursuing the following:

- Collection and application of Small Business Administration (SBA) point-level data to our known universe.
- Awarding a Data Analytics RFP for the purposes of creating a machine-learning algorithm that will help determine housing and businesses that received damage but are otherwise unknown to the City, as well as help quantify unmet needs and prioritize spatial and temporal delivery of services. As part of this project, the City may pursue additional data sets including utility service shutoffs and U.S. Postal Service records.