

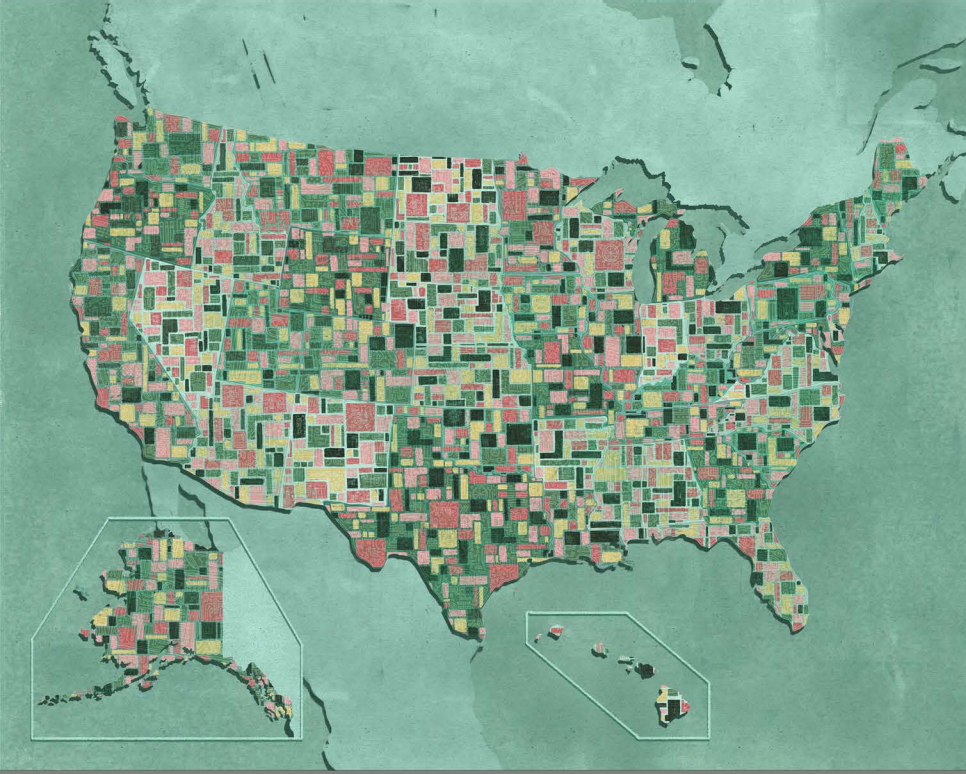


AFTER THE FIRE

Assessing the impact of fires in Detroit,
January 1st to July 31st, 2015



A report by Loveland Technologies
www.Makeloveland.com



LOVELAND welcomes all questions, comments, or concerns about this document.

Contact: team@makeloveland.com

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MADE WITH SITE CONTROL

LOVELAND Technologies is a Detroit-based company creating a public database of every property in America, along with tools for understanding and improving land use.

This report was prepared using our Site Control system for mobile and desktop property data collection and analysis.

To use Site Control for a project of your own anywhere in the country, see SiteControl.us. To consult with LOVELAND call us at 313.338.3825 or email team@makeloveland.com.

What this report covers

"Speramus meliora; resurget cineribus."

"We hope for better things; it will arise from the ashes"

The motto of the City of Detroit dates back to 1805, when a great fire burned nearly the entire city to the ground. Father Gabriel Richard, a French Roman Catholic priest who had moved to Detroit in 1798 wrote these words in the hope that the city would be rebuilt. It reflected the deep sense of spirit and commitment in the people of the city, which resolved into moving forward and starting anew.

In the 210 years since, Detroit has undergone a tumultuous rise and decline. After peaking at the height of the auto industry in the 1960's, the city has struggled with shrinking population and financial resources. Today over 50,000 buildings stand vacant - about 1 out of every 5 buildings in the city. Some have stood for over 10 or 20 years, as the city lacks the money to demolish them in a timely manner. These vacant buildings, unwatched and unsecured, breed crime, vice, and most devastating of all - fire.

For over 155 years, the Detroit Fire Department has stood watch over the city of Detroit and its residents. On an average night, the men and women of the Detroit Fire Department respond to anywhere between 5 and 15 structure fires.

There are few jobs so demanding as being a firefighter in Detroit. It is a dirty, wet, exhausting job, with long hours of fighting fires in buildings ranging from small houses to giant factories, each with its own hazards and dangers.

Why does Detroit have so many fires? What causes them? What are the consequences of fires on the fabric of the city?

Starting in September of 2014, Loveland Technologies began tracking all structure damaging fires as part of an effort to quantify the causes of and impact that fires have on residents, structures, neighborhoods, and the city. The goal of this report is to clearly and accurately visualize the impact of fires in Detroit, using data collected from January 1st to July 31st 2015 by recording and transcribing fire radio audio, and following up fire reports by Loveland surveyors photographing and evaluating properties in the field.

Snapshot

Fire is one of the most devastating forces confronting the City of Detroit.

Thousands of buildings across the city have suffered some form of fire damage, leaving physical and social holes in the urban fabric that makes up Detroit's neighborhoods.

Snapshot



1,486 structure fires broke out
between January 1st and July 31st, 2015 in Detroit.

A total of **1,653** structures were damaged by
fire, as some fires spread to adjacent buildings.

What Burned

Most fires were in residential buildings, including houses and apartments.



1,495

Residential
Structures



135

Commercial
Structures



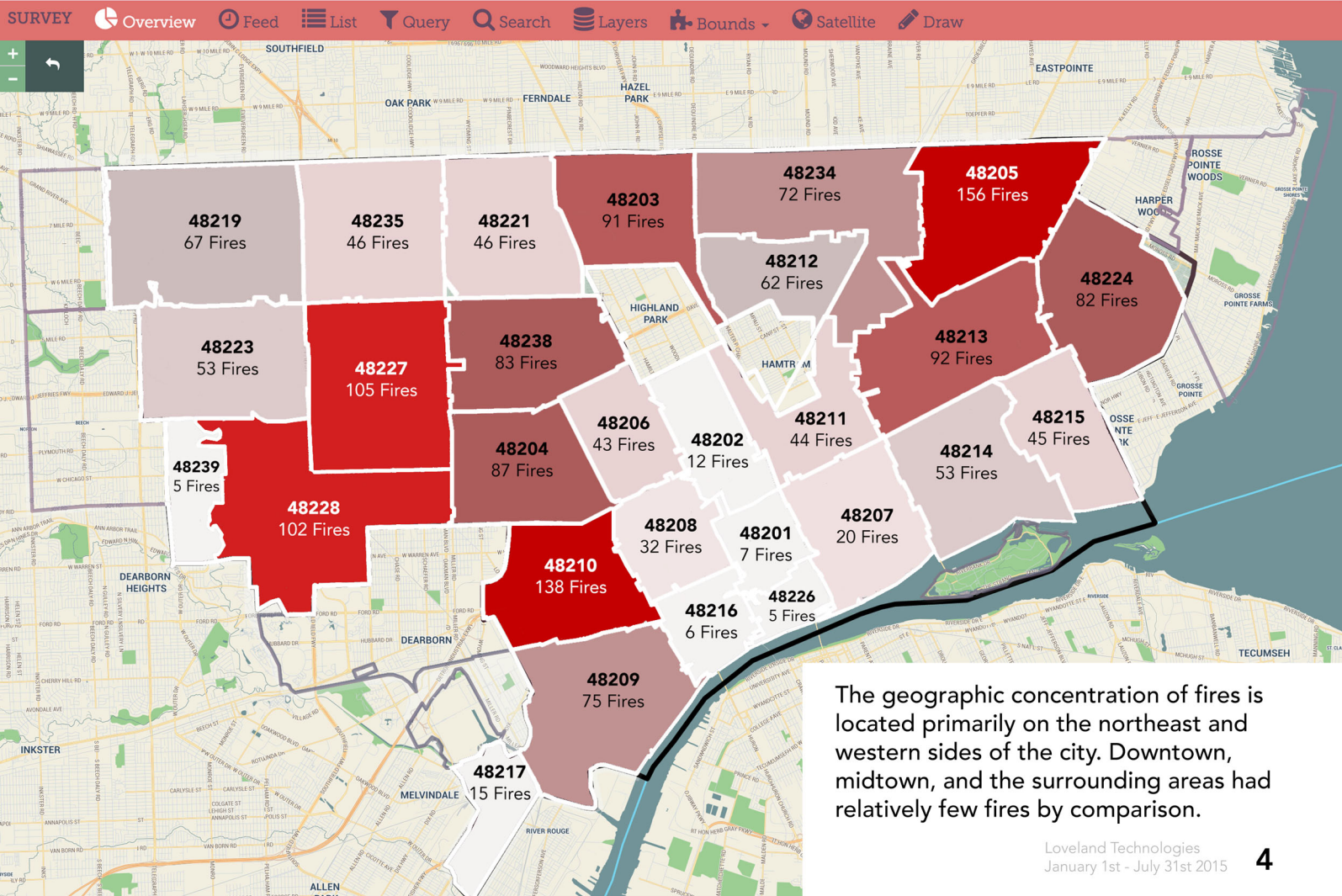
23

Churches, Schools
and Hospitals

765 structures were occupied.
786 were vacant.
102 had unknown occupancy.

Residential structures include single family and multi-family dwellings, large flats, row houses, and apartments.

Where Fires Happen in Detroit



Causes

What caused the fires?

893 fires were classified as either arson or suspicious in nature.

272 fires were of unknown origin.

167 additional fires were **exposure** fires, caused by fires that spread from one building to an adjacent building.



Statistics about fire cause are based on disposition codes given by firefighters. See the "Methodology" section for more details about how we collect this information.

Causes

Arson

Over half of fires in Detroit were either suspicious in nature or confirmed arsons.



75% of suspicious or arson fires were in single-family dwellings.



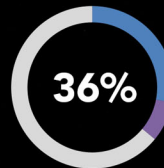
15% were in multi-family dwellings and apartments.



10% were in commercial or other buildings.



570 suspicious fires were in vacant structures.



251 suspicious fires were in occupied structures. 71 had unknown occupancy.

Fire Severity

Fire damage falls into four different categories:
Minor, moderate, major, and collapsed.



Nearly half of all fires were severe enough to cause major damage or collapse, making them uninhabitable in the aftermath of the fire.

Fires that Spread

167 Structures were damaged by fires that spread from one building to another.

In many of Detroit's neighborhoods, houses were built closely together, with just a few feet separating one from the next. Large fires that spread from one building to another are known as "exposure" fires.



32 fires spread to more than one dwelling



38 fires in vacant dwellings spread to occupied houses

Infrastructure Challenges

Fire Hydrants

When firefighters arrive at the scene of the fire, they rely on a network of over 30,000 fire hydrants spread across the city to provide water with which to fight the fire.

Due to aging infrastructure, tampering, and poor maintenance, a number of fire hydrants no longer work properly. Out of service, or "bad" hydrants, mean that firefighters lose valuable time searching for working hydrants in the early stages of a fire, causing more extensive damage.

At least 14 fires with confirmed non-working hydrants extended to adjacent dwellings.

Tax Foreclosures

665 Residential properties that went into tax foreclosure in 2014 or 2015 caught fire.

Foreclosed residential properties are more likely to burn, and have higher rates of arson than compared to other residential properties.

295

Occupied foreclosed homes burned



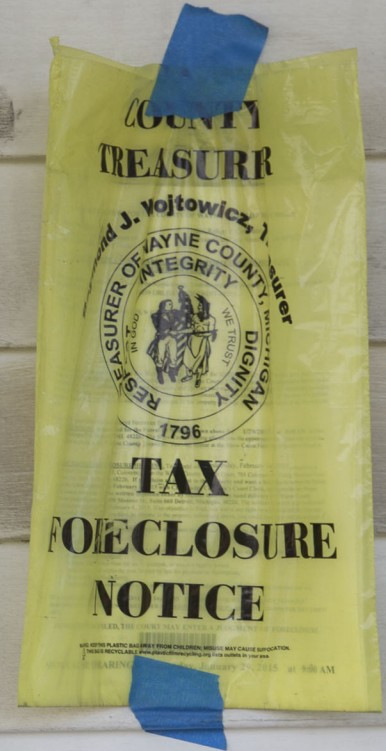
Were arson or suspicious

350

Vacant foreclosed homes burned



Were arson or suspicious



Consequences

699

Fires were in occupied residential structures.

Over **half** of all residential fires were in occupied structures.

Occupied residential fires are especially devastating, forcing people out of their homes and eating away at the stability of the city's neighborhoods.

Consequences

Over half of occupied residential fires were severe enough to cause vacancy.

To better understand what happened to homes and apartments that were occupied at the time of a fire, 662 occupied residential structures were resurveyed at least a month after the fire.

377 residential structures were partially or completely vacated.

241 have been repaired or are in the process of being repaired.

254 residential structures have been completely abandoned and are open to trespass.

166 residential structures are secured, but show no repair activity.

1,018 people were living in residences that suffered fire severe enough that the property was no longer habitable.*

**Based on census average of 2.7 people per Detroit household.*

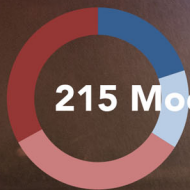
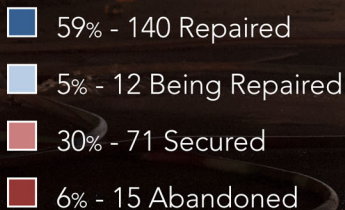
Consequences

Post-fire occupancy depended on the severity of fire damage.

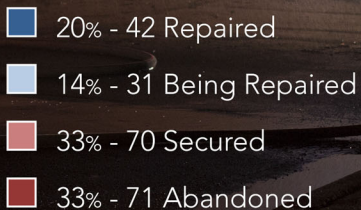
Residential structures with minor or moderate damage were more likely to be repaired than houses with major damage.



238 Minor Fires



215 Moderate



209 Major



Consequences



287 residential structures collapsed
as a result of fire damage.

A further 442 residences sustained major damage, rendering them uninhabitable and possibly requiring demolition in the future.

Consequences



Demolition of collapsed houses could cost over \$2.93 million dollars.

At an average cost of \$10,240 per structure, the total cost of demolishing 287 collapsed houses is \$2.93 million dollars.

If the 442 houses that sustained major damage go unrepaired and are abandoned, another \$4.52 million dollars will be needed to demolish them as well.

Cost

Arson

Suspicious and arson fires were more likely to occur in vacant structures than in occupied structures.

The damage caused by suspicious and arson fires was significantly higher than in non-arson fires.

Fire Damage Level	Suspicious	Non-suspicious
Minor	181	276
Moderate	175	230
Major	313	161
Collapsed	223	93

The cost to demolish 223 collapsed houses that burned in suspicious fires could cost \$2.28 million dollars.

Going Forward

New Fire Apparatus

Over the summer of 2015, ten new fire engines entered service in some of the city's busiest areas. The new engines are replacing rigs that had been in use for over 15 years.

Demolitions

Since April of 2014, over 4,300 homes have been demolished in Hardest Hit Fund zones throughout the city. HHF zones are areas where blighted houses are demolished to improve occupied neighborhoods.

Large scale demolitions have reduced the number of vacant structures in parts of the city where fires are common. Though it is still too early to determine the impact of these demolitions on fire and arson rates, HHF zones overlap with zip codes that have the highest number of fires.

The Future

Firefighters

"We hope for better things; it will arise from the ashes"

Nowhere else in the city is the spirit of the motto, written so long ago and in such different times, better embodied than by Detroit's firefighters. Their tireless work, day and night, 365 days a year holds back the tide of blight from completely engulfing the city of Detroit.

Summary

Fire has a devastating impact on the neighborhoods of the City of Detroit.

Between January 1st and July 31st, 2015, 1,486 fires broke out in structures across the city. Including fires that spread to other buildings, 1,653 structures were damaged in some way by fire. Residential structures, in particular single family dwellings, made up the majority of buildings that burned. Over half of all structures were vacant or had unknown occupancy. Damage severity ranged from minor to collapsed, with 790 or 48% causing severe damage. 167 fires were caused by fires spreading from one building to another.

Arson

Arson was the leading cause of fires in the city, with 58% of fires being suspicious in nature or confirmed arson. 64% of suspicious / arson fires were in vacant structures, and caused a significantly higher level of damage than fires with other causes.

Foreclosure

665, or 44% of residential structures that caught fire either went through foreclosure in 2014 or are in the foreclosure pipeline for 2015. Arson rates in vacant foreclosed houses was significantly higher than the city-wide rate, 85% of which were suspicious / arson. 230, or 56% of fires were severe enough to render the house unsalvageable.

Occupancy

At least 377 occupied residential structures were left uninhabited after the fire. 254 houses were abandoned after the fire, while X are vacant but secure. 241 houses were repaired or are in the process of being repaired. The level of damage had a strong correlation to repairability, as 54% of minor fires were repaired, while only 10% of fires classified as major were repaired.

Cost

The cost of demolishing the 287 residential structures that collapsed from fire damage could cost an estimated \$2.93 million dollars. If the 442 houses that had major fire damage go unrepaired, the eventual demolition cost of these houses may cost an additional \$4.52 million dollars. While city funding for arson investigations has increased and new arson investigators have been hired, the cost of demolishing houses that burned under suspicious conditions and collapsed may cost \$2.3 million dollars.

Improvement

The introduction of ten new fire engines to the fleet over the summer of 2015 in some of the most flammable parts of the city may improve response times and decrease the damage level of fires. Additionally, over 4,300 residential demolitions in Hardest Hit Fund zones are removing blight and fuel from neighborhoods that have had historically high fire rates.

Methodology

This study consists of three components: data collection, verification, and analysis.

Collection

We collect data by recording the digital radio channels used by the Detroit Fire Department to dispatch and direct fire operations. This is done with a Uniden BCD536HP digital trunking scanner, which records fire audio to a memory card. A reviewer downloads the audio files and listens to them in sequence on a computer, transcribing the incidents into a spreadsheet with columns for all pertinent data points. The reviewer determines if the fire potentially caused damage to the structure, and if so, adds it to the spreadsheet.

What we do track: Fires that cause tangible damage to a structure that requires repair.

What we don't track: False alarms, medical calls, very minor fires with no damage such as dryer fires or burning food, or garbage fires outside of a structure. We do not track automobile or garage fires unless the fire spreads and causes damage to the primary structure.

One complication is that oftentimes a fire in one building spreads to and damages adjacent buildings. If a house is set on fire, which then spreads to the house next door, how should we count those? Only one fire was set, but two buildings are damaged.

To fully account for all fires, we use two different terms:

A **fire event** is a fire that breaks out in a structure and causes damage. Fire events can cause multiple structures to be damaged, but they all share a root cause.

Structure-damaging fires are a subset of fire events. This covers every building that is damaged by a fire, whether it is an individual fire or caused by adjacent fires (known as exposure or extension fires).

For example:

A fire at 5263 Proctor Street on August 1st, 2015 was severe enough that it spread to two adjacent houses, destroying them, and caused minor damage to four houses directly across the street. If we count just the original fire, we understate the severity of damage caused by the fire. If we count all seven houses as separate fires, it overstates the number of fires that were set, as seven individual fires were not set. For this situation we would classify the fire at 5263 Proctor as a fire event, with six additional structure-damaging fires.

Methodology (cont.)

Verification

As the fire events are added to the spreadsheet, a surveyor is dispatched to the scene of the fire to verify all details and assess the level of damage. The surveyor photographs the fire, talks with neighbors and property owners, and takes notes on all details of the fire that may be of value. This information is collected and sent back to Site Control using the Loveland surveyor app, where it is checked as part of the quality control process. The reviewer then makes a final determination about the level of damage caused by the fire and checks all of the details.

Definitions in Fire data Spreadsheet:

Date, Time: All audio files collected from the scanner are time stamped. The time is the actual time of dispatch.

Orientation: This field gives details about where the fire was located, which are usually filled in later. EXT is short of extension fire, or a fire spreading from next door. ADD is for additional fires that happen in the same structure in the same month. 2ND denotes a second alarm fire.

Street name, zip code: Geographic information.

PID: Parcel ID. This is the tax assessor ID number for the property, which is how we track exact locations.

Building type: This gives details about what type of building it is, including apartments, single family dwelling, multi-unit dwellings, commercial buildings, and other specific types.

Occupancy: Occupied, Vacant, Partial Occupancy, Unknown. This is first the stated occupancy of the structure as given by the fire department at the time of the fire. When the property is surveyed, additional information from neighbors or other sources is factored into determining occupancy. If it is unclear if the property was occupied or not at the time of the fire, we use unknown.

Alarm: The number of alarms called for the fire. Mainly for large, out of control fires that require additional companies. We track multiple alarms as fire events so we can note the additional companies being sent.

Damage: Fire damage falls into four different categories.

Minor fire damage is mostly cosmetic in nature, but still requires repairs. This includes smoke / soot damage, light scorching, and water damage. Houses with minor damage are usually inhabitable after the fire.

Moderate fire damage is significant enough to require immediate repairs, and may temporarily render a house uninhabitable.

Methodology (cont.)

Major fire damage is severe enough that it would be costly to repair the structure, and makes it uninhabitable. Severe charring inside and outside the building, with damage to contents. Small holes in the roof caused by fire or by cut by firefighters to ventilate the structure

Collapsed fire damage causes partial or total structural collapse of the roof or walls. This includes buildings that have burned down to the foundation. Walls may still be standing, but parts or all of the roof have caved in.

Disposition: The fire department uses a three-digit code number to assign a cause for the fire. This code is given by the firefighters after the fire has been extinguished:

000 Unknown Undetermined	045 Improper container	065 Exposure fire
011 Incendiary	046 Combustible too close	069 Design construc. N/C
021 Suspicious	048 Children playing	070 Operational deficiency
030 Misuse of heat	049 Misuse of material	071 Collision – knockdown
031 Discarded cigarette	050 Mechanical failure	073 Careless cook
033 Falling asleep	054 Short circuit	074 Overload
034 Uncontrolled fire	055 Elec. failure – other	092 Rekindle
035 Cut/welding too close	056 Lack of maintenance	099 Fireworks
036 Kids with matches	059 Mech. failure	
039 Misuse of heat	063 Install too close to combustible	
044 Cleaning parts	064 Install deficiency – other	

We use disposition codes to determine if a fire may have been deliberately set. Disposition 011 Incendiary means that evidence of arson was found at the scene. 021 Suspicious means that the fire appears to have been deliberately set. We combine these two numbers to determine a hypothetical suspicious / arson rate.

There are some shortcomings with this method, as it is a judgment call made by fire personnel at the scene based on the information they have at the time. Some fires that are reported as 000 Unknown / Undetermined are later confirmed to be suspicious by field surveyors talking to neighbors.

Sometimes no disposition code is read over the air; in this case we note it as “no disposition given.”

C, E1, E2, E3, E4, L1, L2, S: These are short for battalion chief, first engine called, second engine, third engine, fourth engine, first ladder called, second ladder, and rescue squad. The standard response for a fire is to dispatch a battalion chief, two engine trucks, a ladder truck, and a rescue squad. Depending on the severity of the fire, some companies may be called off before they arrive, or additional companies may be requested. The numbers in the spreadsheet correspond to the company number; C1 is battalion chief 1, E1 is engine company 1, L8 is ladder company 8, and so on.

With the introduction of mutual aid agreements with the cities of Highland Park and Hamtramck, their fire companies now respond to Detroit fires and vice versa. Highland Park fire companies are denoted as HP1, while Hamtramck companies are HM1.

Methodology (cont.)

Extra: When additional companies are requested above and beyond four engines or two ladder trucks, they are noted in this column. Special units, including senior chiefs, hazardous material, or fire marshal units are noted in this column.

Arson: Denotes if the arson squad is specifically requested.

IEH: Illegal electrical hookups, or people stealing electricity. This can be a contributing factor to occupied residential fires.

BH: Bad hydrants. Some of the city's fire hydrants are old and no longer work properly. This causes delays in responding to fires, as fire engines only carry a limited amount of water in their onboard tanks, and require hydrants to provide water.

Verified: The fire location has been visited by a surveyor, and the data submitted has been checked for accuracy.

Notes: Reviewers and surveyors compile lengthy notes about the fire based on what can be heard on the digital scanner and what they learn in the field. Some of these notes have been edited to remove sensitive information or personally identifying details.

Photos



March 12th, 2012 - 3142 Heidelberg St.

Firefighters walk past a vacant house burning on Heidelberg Street in Detroit, Michigan. Water supply issues prevented firefighters from attacking the blaze, which was brought under control in 30 minutes. The house at 3142 Heidelberg Street was completely destroyed.



August 8th, 2012 - 8145 W Jefferson

Smoke plume in the distance from a dwelling fire on West Jefferson in Delray.



August 23rd, 2015 - 4688 Oregon

Fire completely consumes a vacant dwelling on Oregon Street as firefighters lay down hose. The hydrant closest to the house was inaccessible due to the heat of the fire. The primary house and an adjacent vacant house both burned to the ground.



June 3rd, 2012 - 1830 Spruce St.

A 100 year old house in the North Corktown neighborhood of Detroit goes up in flames.



August 28th, 2012 - 6362 Hazlett Ave.

Neighbors look on as two vacant dwellings burn to the ground.



October 30th, 2010 - Unknown

Firefighters watch as a ladder truck washes down the collapsed remains of a house that burned during Devil's Night, one of the busiest times of the year for the department.



April 23rd, 2012 - 8505 Quincy St.

A commercial storefront fire along Grand River Boulevard threatens to spread to adjacent buildings. Through quick action, the fire was contained to an auto repair shop.



March 28th, 2015 - Delta St.

Three houses on Delta Street on the northeast side of Detroit continue to smolder a day after they burned down.



August 26th, 2015 - Proctor St.

A broken fire hydrant is marked with caution tape. Three houses across the street were destroyed by a fire that spread out of control when firefighters were unable to get water from the hydrant, forcing them to go down the street to find a working hydrant.



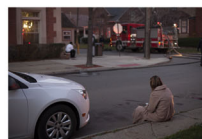
May 20th, 2015 - 14075 Orleans

Tax notice hanging from the doorway of a burned house.



April 17th, 2012 - 9119 Keller St.

Two residents pose in front of the house they had recently started renting as it burns in the background. The house, and most of their possessions, were a total loss.



November 16th, 2012 - 1415 Parker St

A resident sits on the curb in front of the Parkstone Apartments as firefighters fight a 2-alarm blaze on the fifth floor of the apartment building. The fire was contained to two units, but many residents were forced onto the street while firefighters extinguished the blaze.

Photos



December 7th, 2012 - 1134 Green St.

A firefighter hoses down the side of an apartment building fire in southwest Detroit.



June 19th, 2014 - Rosa Parks Boulevard

A collapsed house somewhere on Rosa Parks Boulevard. The fire caused much of the interior structure to collapse, leaving the walls sagging outward.



August 18th, 2012 - Oakwood

A house is demolished as part of a neighborhood clearance program by Marathon Oil, which bought out most of Oakwood, a neighborhood located next to one of its refineries.



June 12th, 2012 - 15 Waverly St.

A firefighter directs the water gun of a ladder truck at the scene of an apartment building fire in Highland Park, a suburb of Detroit.



August 21st, 2015 - 1301 Third St.

Five new Smeal fire engines are delivered to the public safety headquarters in downtown Detroit.



X - X

Replacement image



March 27th, 2012 - 3361 Charlevoix St.

A firefighter walks past a house burning on Charlevoix Street on the east side of Detroit.

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Some images as presented in this report have been digitally altered, flipped, or enhanced to improve the readability of text. No alterations have been made that change the overall content of the picture.