



Toronto Fire Incidents

Data Analysis Portfolio Project

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Exploratory Analysis

With

Recommendations Based on Findings



The Analysis

Circumstance:

Raw data on Toronto Fire Incidents was compiled into a database.

Task:

Perform an exploratory analysis, and offer recommendations based on the findings.

Result:

Based on a preliminary data exploration, I began focusing on the fires themselves and their causes. The following analysis is the result.

Analysis Breakdown

1. Analyze Fire Incident Origins

Area of Origin

Ignition Source

Possible Cause

Types of Buildings

2. Mapping the Data in Toronto

Raw Data Source:

City of Toronto Open Data Portal
Fire Incidents

<https://open.toronto.ca/dataset/fire-incidents/>

Years of Data:

2011 - 2021

Project for Creating this Database :

insert link

Outcome:

Recommendation for launching a
fire safety outreach campaign,
based on the analysis findings

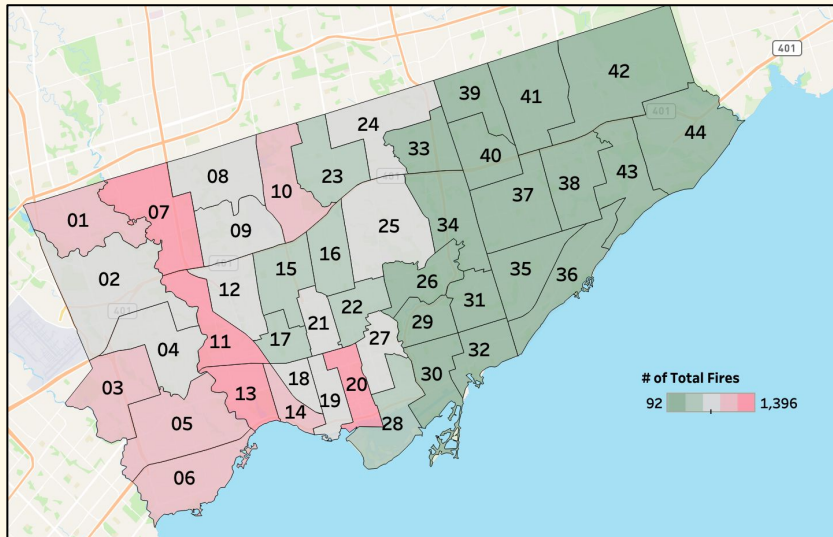
Analysis Notes

A Note on Mapping the Data

At the time of these reports, Toronto was using the 44 wards system - which the reporting reflected.

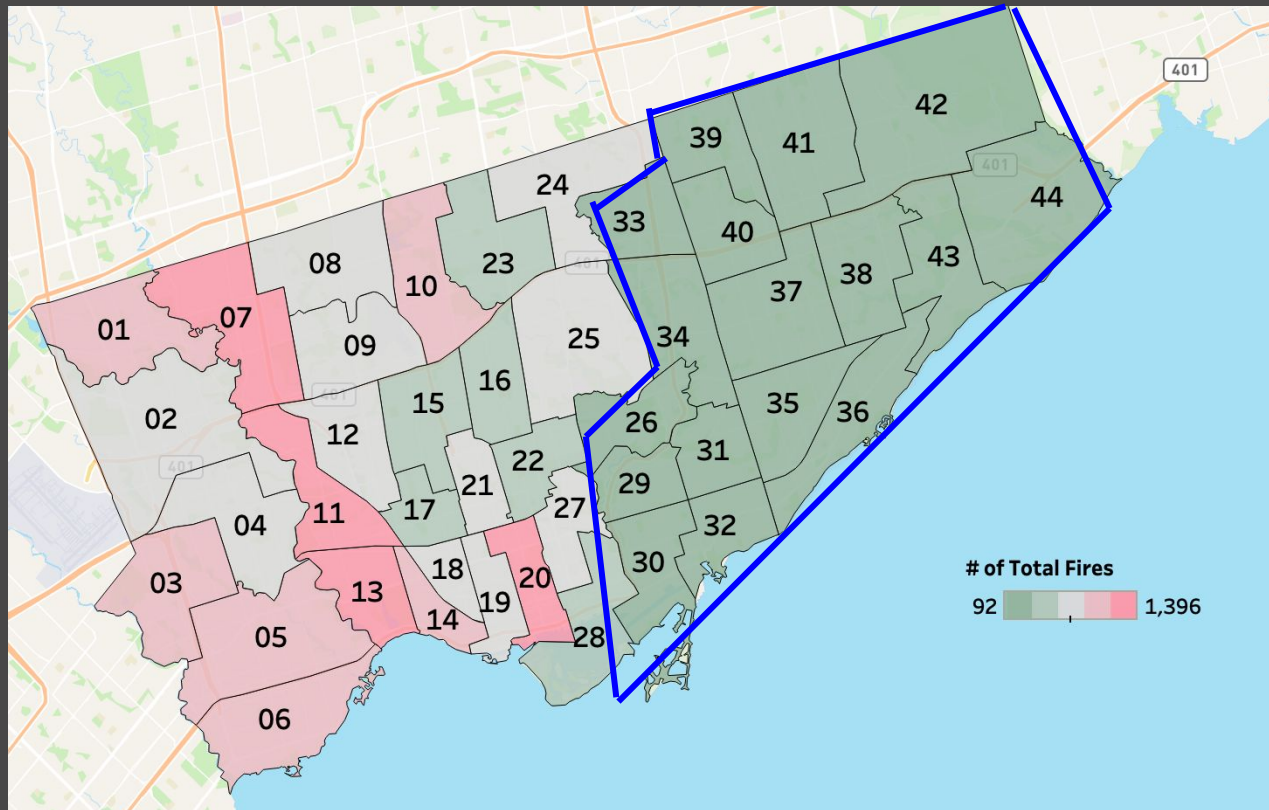
Location data will then be plotted using the 44 wards as well, instead of the new 25 wards system (which was adopted in 2018).

Total Fire Distribution (2011 - 2021)



However ...

Total Fire Distribution (2011 - 2021)



There's an oddity in fire distribution between the east and west of Toronto.

The reason: Data is missing

West Toronto

Wards 1 - 25

Has data from 2011 to 2021

Year	# of Fires
2011	1,114
2012	1,071
2013	1,077
2014	1,112
2015	1,118
2016	1,100
2017	1,077
2018	3,330
2019	2,948
2020	3,473
2021	3,422

East Toronto

Wards 26 - 44

Only has data from 2011 - 2017

Year	# of Fires
2011	697
2012	763
2013	719
2014	731
2015	698
2016	734
2017	676

West Toronto

Wards 1 - 25

Year	# of Fires
2011	1,114
2012	1,071
2013	1,077
2014	1,112
2015	1,118
2016	1,100
2017	1,077
2018	3,330
2019	2,948
2020	3,473
2021	3,422

Possible discrepancies also appear with West Toronto.

Considerable uptick in fires in 2018

Can't be sure if this due to missing data, or if the data is accurate*

* Due to the fact this is a portfolio project, and I only have access to what data was publicly available

Regarding Missing Data

- 1) Data is missing for **East Toronto** (*wards 26 - 44*) for the years 2017 - 2021.

Decision: East Toronto will be **excluded** from this analysis

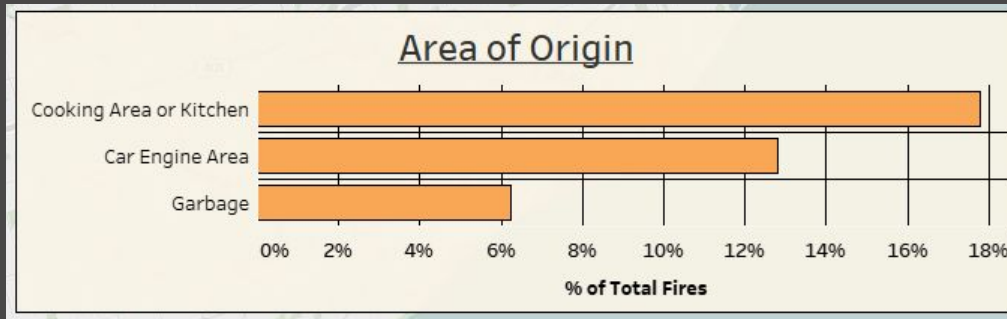
- 2) Possible data is missing for **West Toronto** (*wards 1 - 25*) for 2011 - 2018.

Assumption: Current 2011 - 2018 data is an **accurate representation** of fires during those years for the purposes of this portfolio analysis

Fire Incident Origins

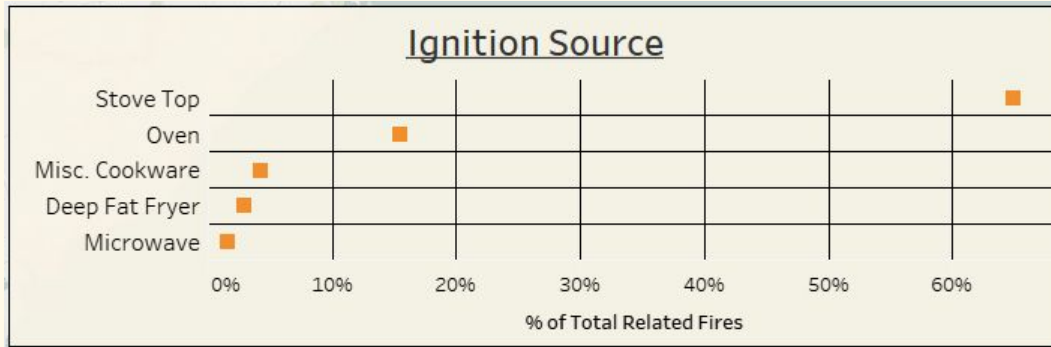
Toronto West

Wards 1 - 25



Close to 20% of all fires between 2011 - 2021 occurred in the Cooking/Kitchen area

****REFINE TO KITCHEN AREA****



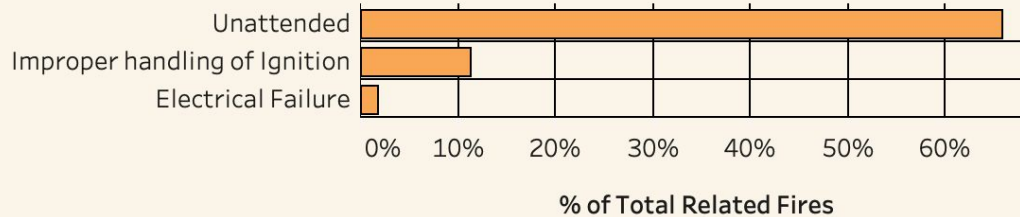
*Top 5 of all ignition sources

More than half of all Kitchen fires start on the stove top.

A very disproportionate, though not entirely surprising, number.



Possible Cause

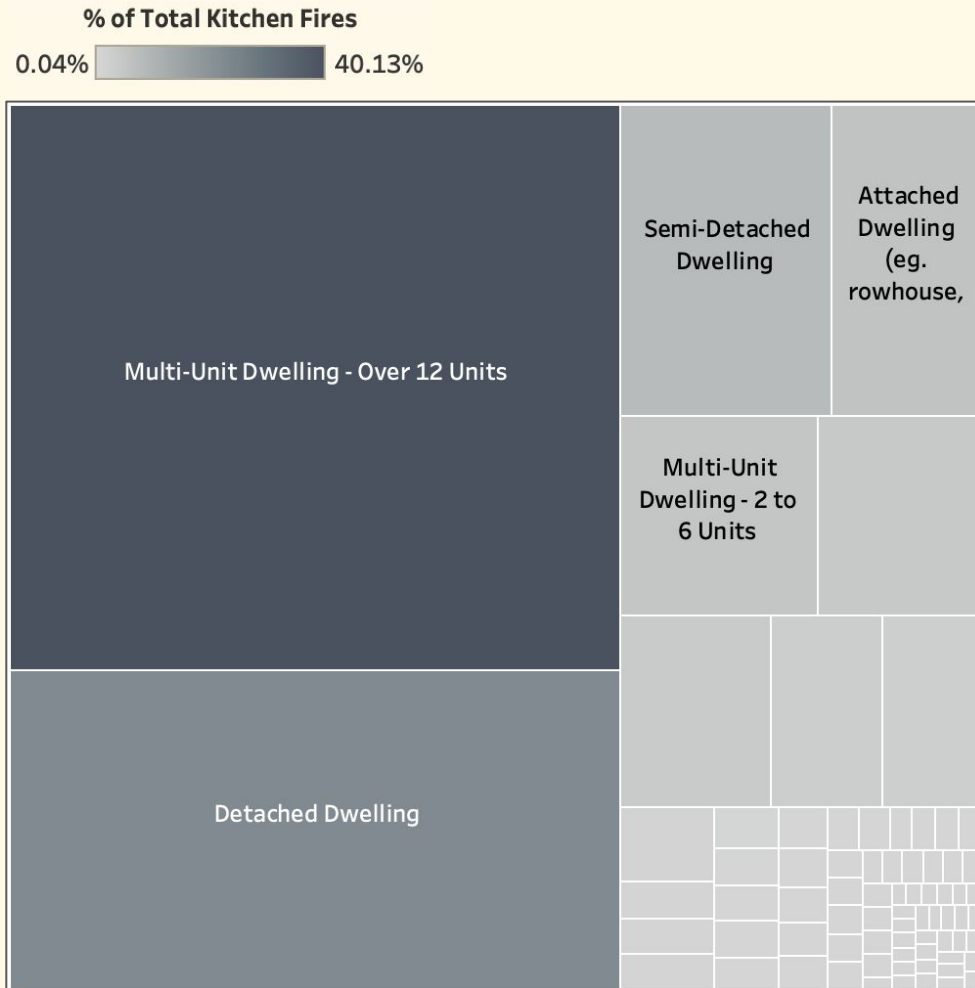


*Top 3 of all possible causes



Over half of all Kitchen Stove Top fires are caused by being left unattended.

Property Use Distribution - Kitchen Fires



40% of all Kitchen
related fires occur in
Multi-Unit Dwellings with
over 12 Units -
apartment buildings.

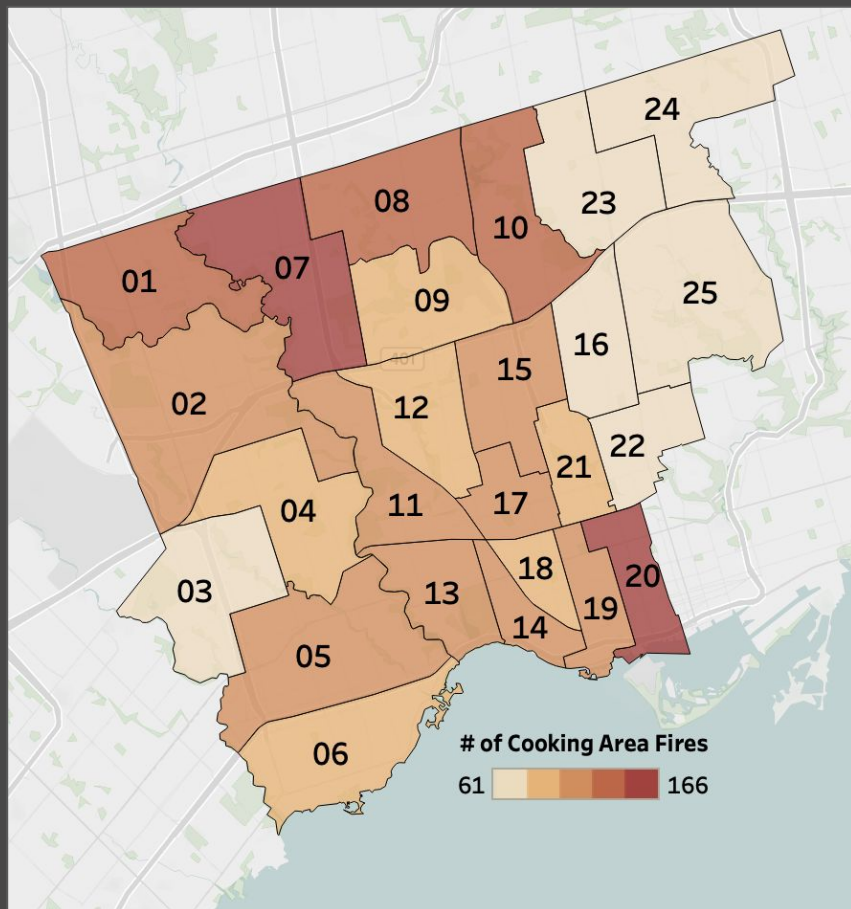
**Multi-Unit Dwelling* - Multiple housing units
contained within one building

Mapping the Data

Toronto West

Wards 1 - 25

Fire Distribution Map: *Kitchen Area Fires*



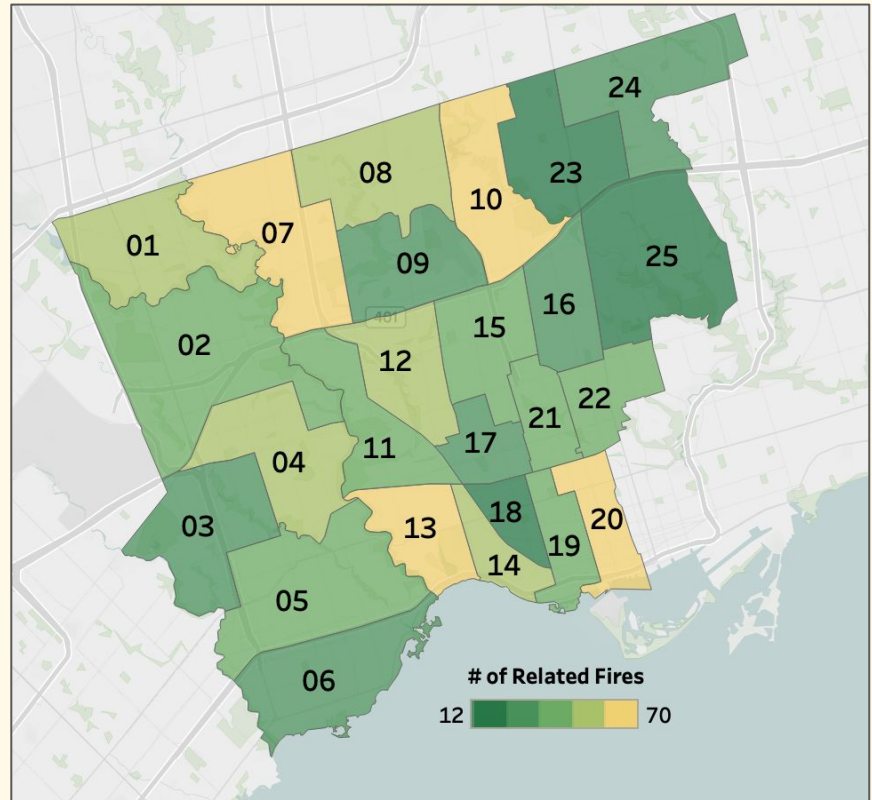
**Distribution of
Kitchen related fires
from 2011 - 2021.**

**Hotspot Wards:
07, 20**

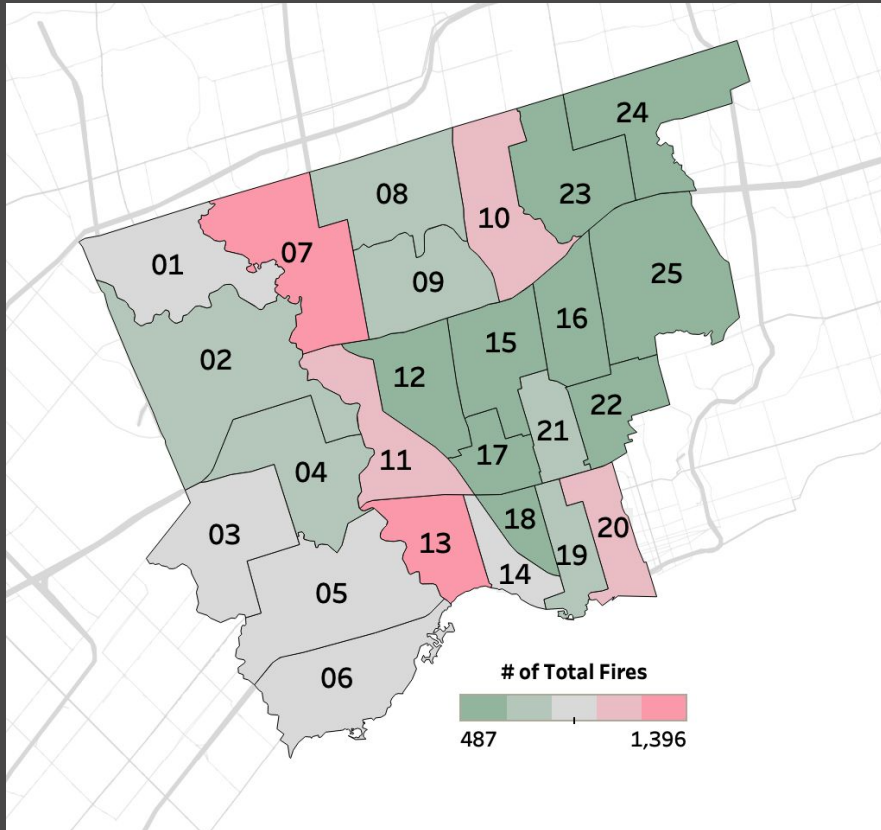
Fire Distribution Map: *Apartment Kitchen Fires*

**Distribution of
Kitchen related fires
from 2011 - 2021.**

**Hotspot Wards:
07, 10, 13, 20**

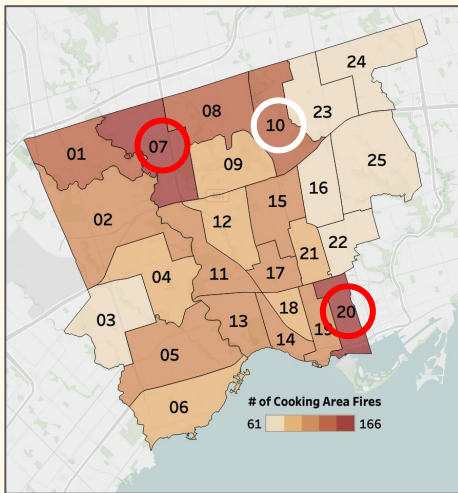


Fire Distribution Map: *All Fires*

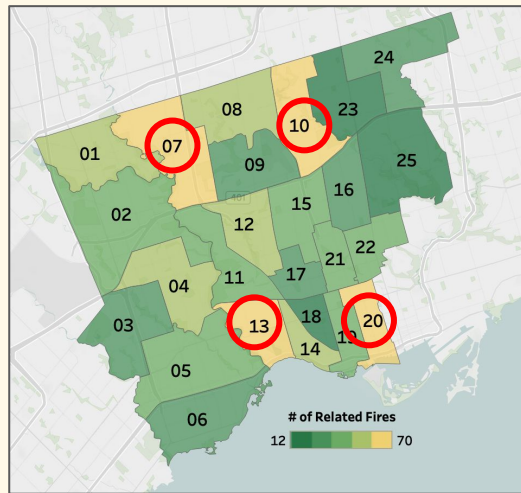


**Distribution of all
fires from 2011 -
2021.**

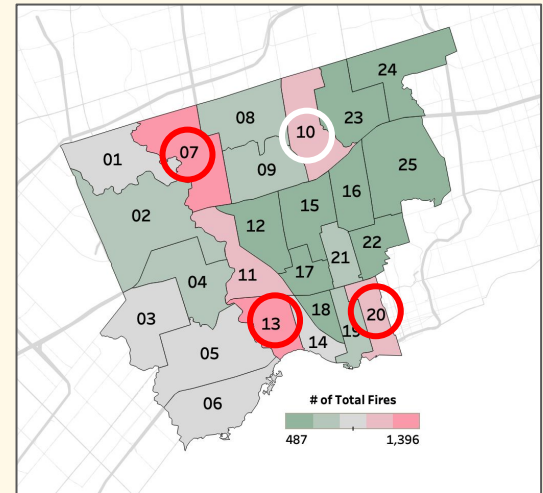
**Hotspot Wards:
07, 13**



Kitchen Fires



Apartment Kitchen Fires



All Fires

Comparing these three distribution maps, we see 3 - 4 wards stick out with hot spots.

Ward 7 - hotspot in all 3 distributions

Ward 10 - hotspot in 1 distribution (*noticeable in 2 distributions*)

Ward 13 - hotspot in 2 distributions

Ward 20 - hotspot in all 3 distributions

RECAP

20% of all fires originate from the kitchen

Main ignition source = stove top

Main possible cause = unattended

**Of all Kitchen Fires, 40% happen in apartment / condo
buildings with more than 12 units**

Recommendation

Launch a Fire Safety in the Kitchen Campaign

Targeted towards apartment and condo buildings

In Wards 1, 10, 13, 20