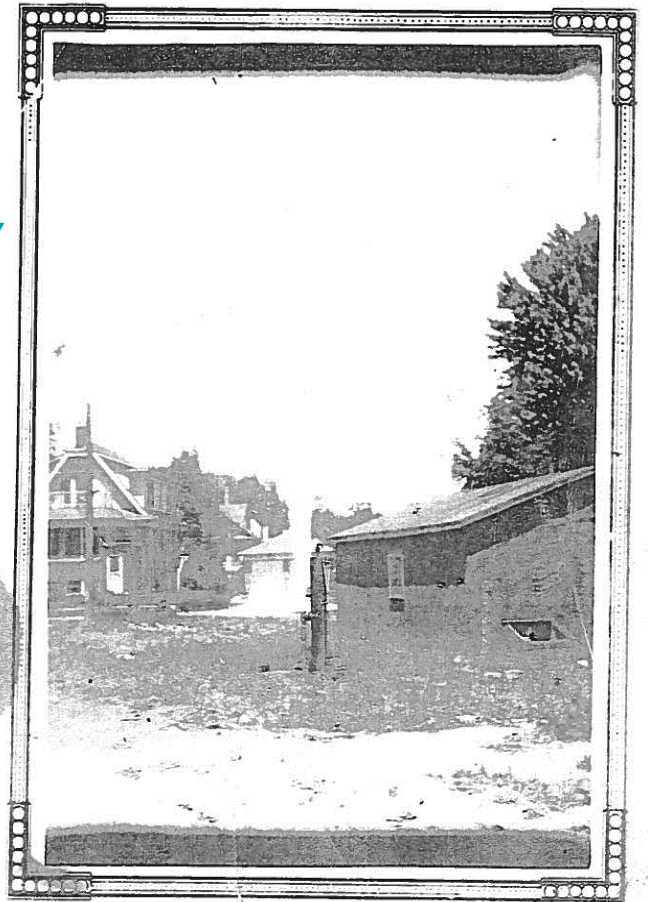


# Wheatley Gas Well Investigation Update

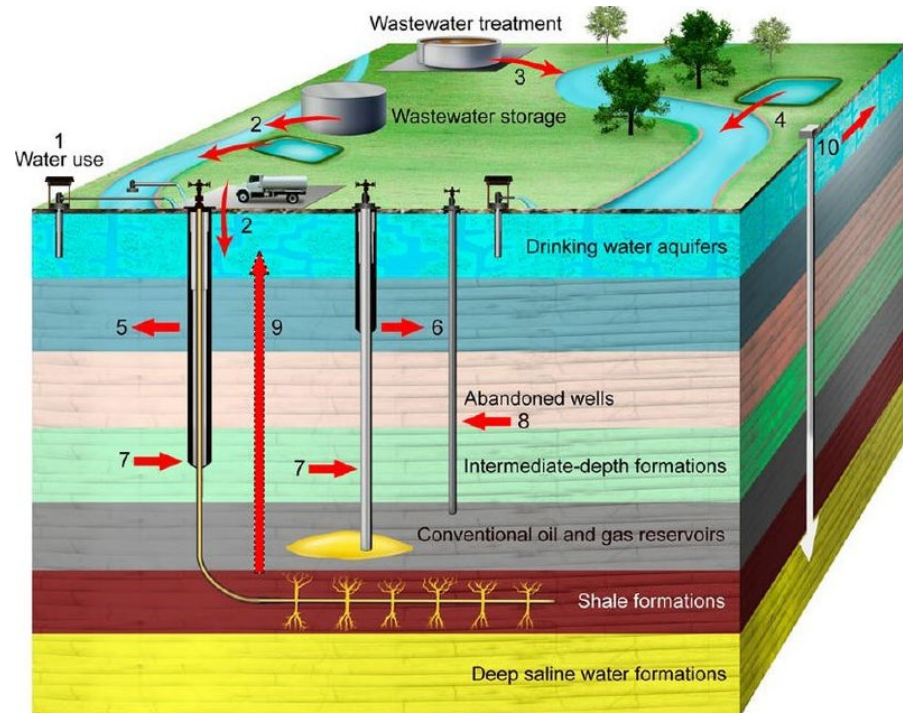
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# Oil and Gas 101



## Definitions:

-  **Distribution Gas**
-  **Mercaptan**
-  **Sour Gas (H<sub>2</sub>S)**
-  **C1-C7 Hydrocarbons**

Credit: ACS, Vengosh et al.

# Wheatley, ON



Wheatley, On

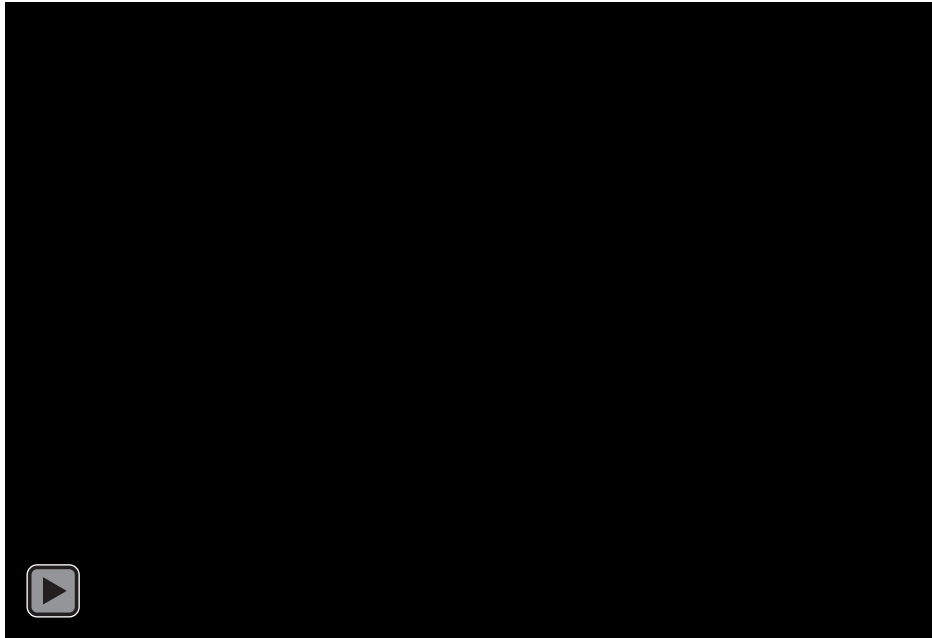
## Background

- **June 2, 2021 - hydrogen sulphide (~3000 ppm) is detected in the basement of a commercial building in the downtown core of Wheatley. Owner reports floor drain emitting water and gas.**
- **A state of emergency resulted in an evacuation order for several blocks in the immediate vicinity of where the gas was detected.**
- **Gas monitoring was implemented. The evacuation lasted approximately two weeks.**

## Background

- **July 19, 2021 - Hydrogen sulphide was again detected by monitors.**
- **Samples are collected and confirm presence of H<sub>2</sub>S, Methane (C<sub>1</sub>), C<sub>3</sub>-C<sub>8</sub>, non-detect Mercaptan.**
  - Results not consistent with distribution system gas
- **2<sup>nd</sup> Evacuation is implemented.**

# Background



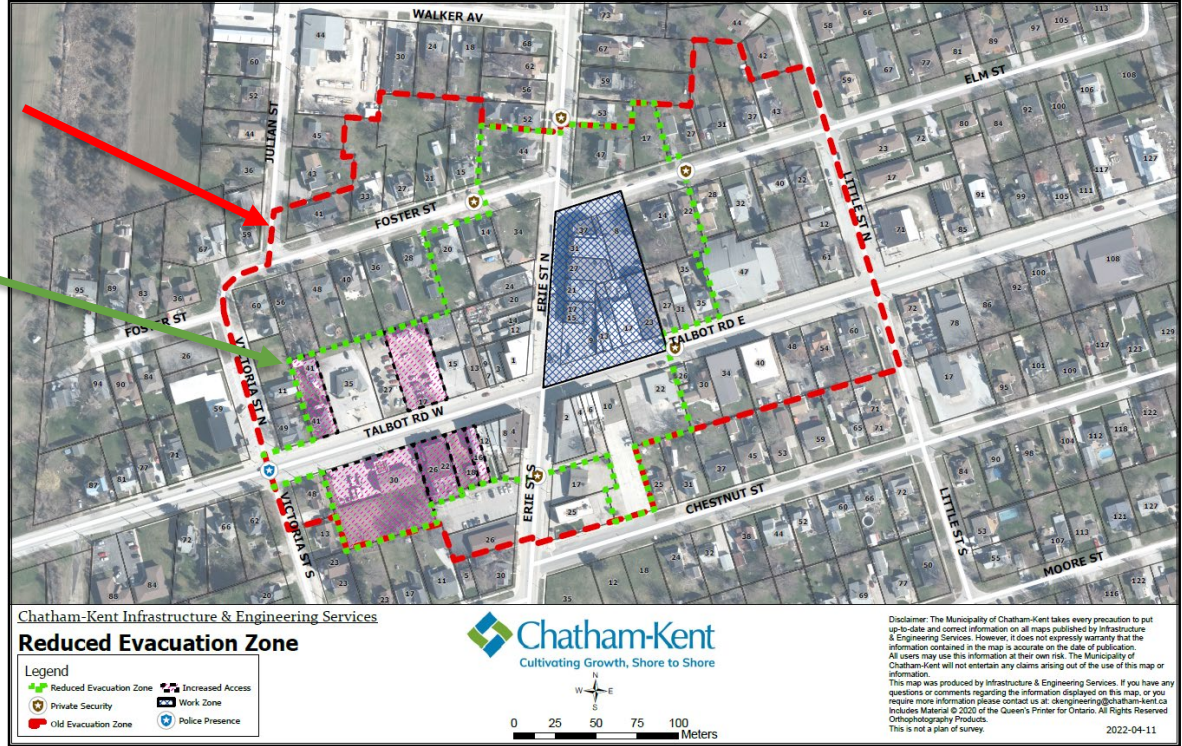
## Background

- **August 26, 2021 – A further release triggered monitors. As an evacuation was being performed, an explosion occurred.**
  - Several major injuries but no fatalities
- **An evacuation of portions of the downtown has been in place since, with successive reductions in the evacuation zone based on engineering advice and the installation of safety systems.**

# Evacuation Zone

August 26<sup>th</sup>, 2021

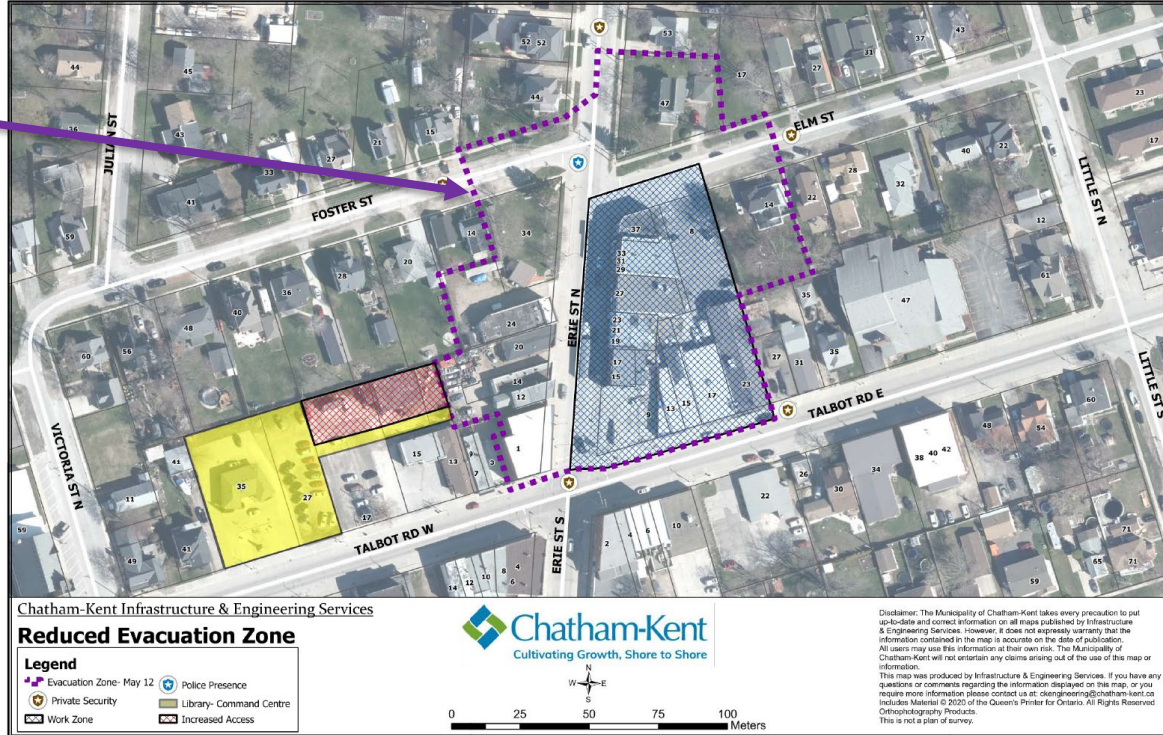
April, 2022





# Evacuation Zone

June, 2022



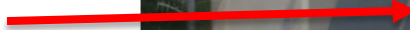
## Actions Taken

- **The Ministry of Natural Resources and Forestry retained WSP Golder to perform a pathways analysis.**
  - The goal is to determine the pathway and source of the gas. Golder will also be recommending mitigation measures.
- **The Ministry of Labour, Immigration, Training and Skills Development has an open investigation.**
- **The Ontario Ombudsman has performed an investigation.**
- **The Office of the Fire Marshall has performed an investigation.**

## Identification

- Through historical information gathering, gas migration testing and ground penetrating radar, 3 Areas of Potential Environmental Concern (APEC) are identified - 2 on municipal property, 1 on private.

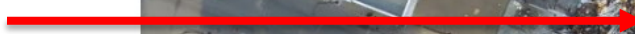
APEC 2



APEC 3



APEC 1



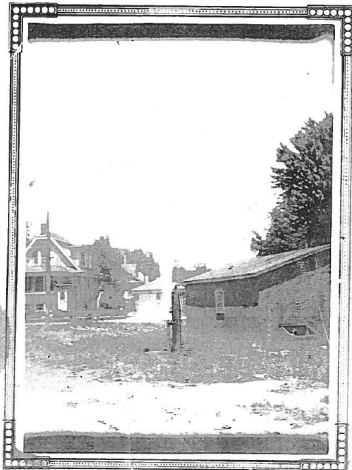
## Apec 1

**Apec 1 is determined to be a ~100' deep, 2" diameter water well at the bottom of a buried casing which the building's floor drain is tapped into.**



## Apec 2

**Apec 2 gas well is the “Tait Well” documented in MNRF Archives. Abandoned in 1950’s and cut below surface. Drilled in 1890’s to approx. ~1000 feet deep.**



*Geo. Tait A.S. Tait Property*



## Apec 3

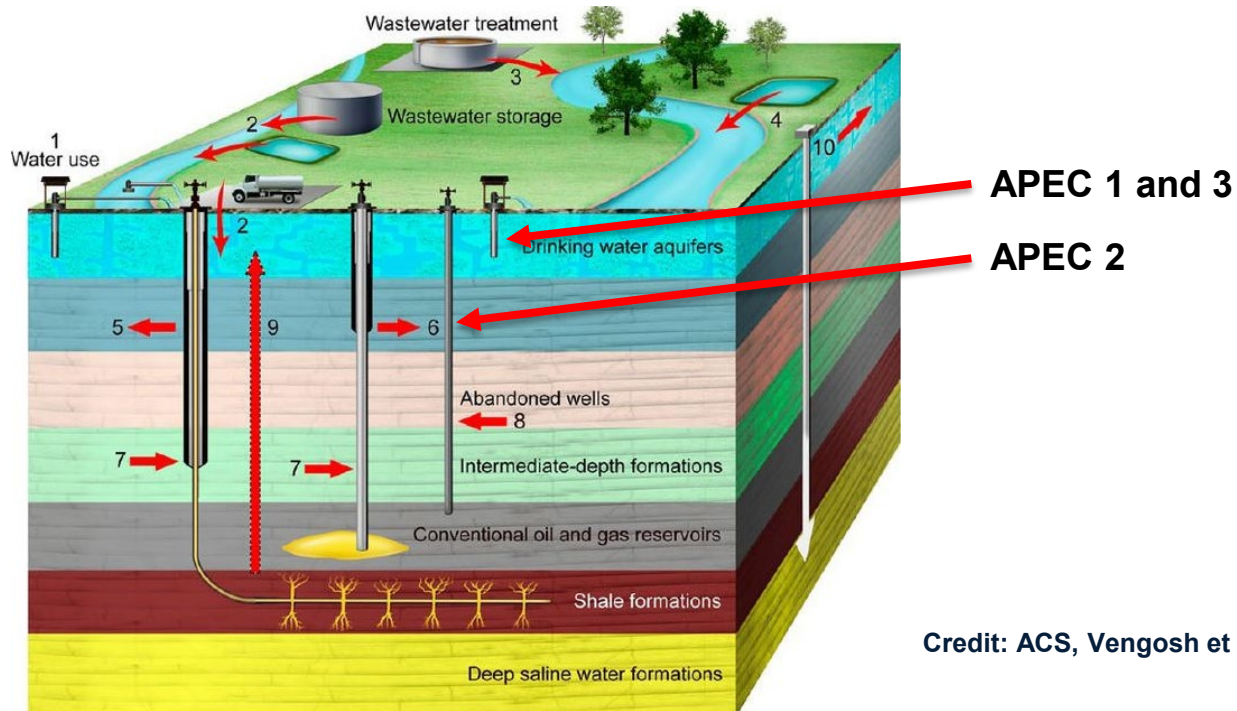
- Apec 3 is a wooden cased water well at the bottom of a brick well buried beneath a catch basin.**



## Preliminary Pathway Investigation Conclusions

- Three wells were found and have been “abandoned” or “re-abandoned” under the Provincial Abandoned Works Program.
- One water well, near the explosion, was found to be the “conduit” of the gas to the surface.
- The gas is “thermogenic” meaning it came from deep underground.
- The gas was in the shallow aquifer, allowing it to get to surface through an old water well.
- How the gas got into the aquifer, and when, is unclear. Further work is being done by Golder to investigate the source of the gas.

# Preliminary Pathway Investigation Conclusions



Credit: ACS, Vengosh et al.

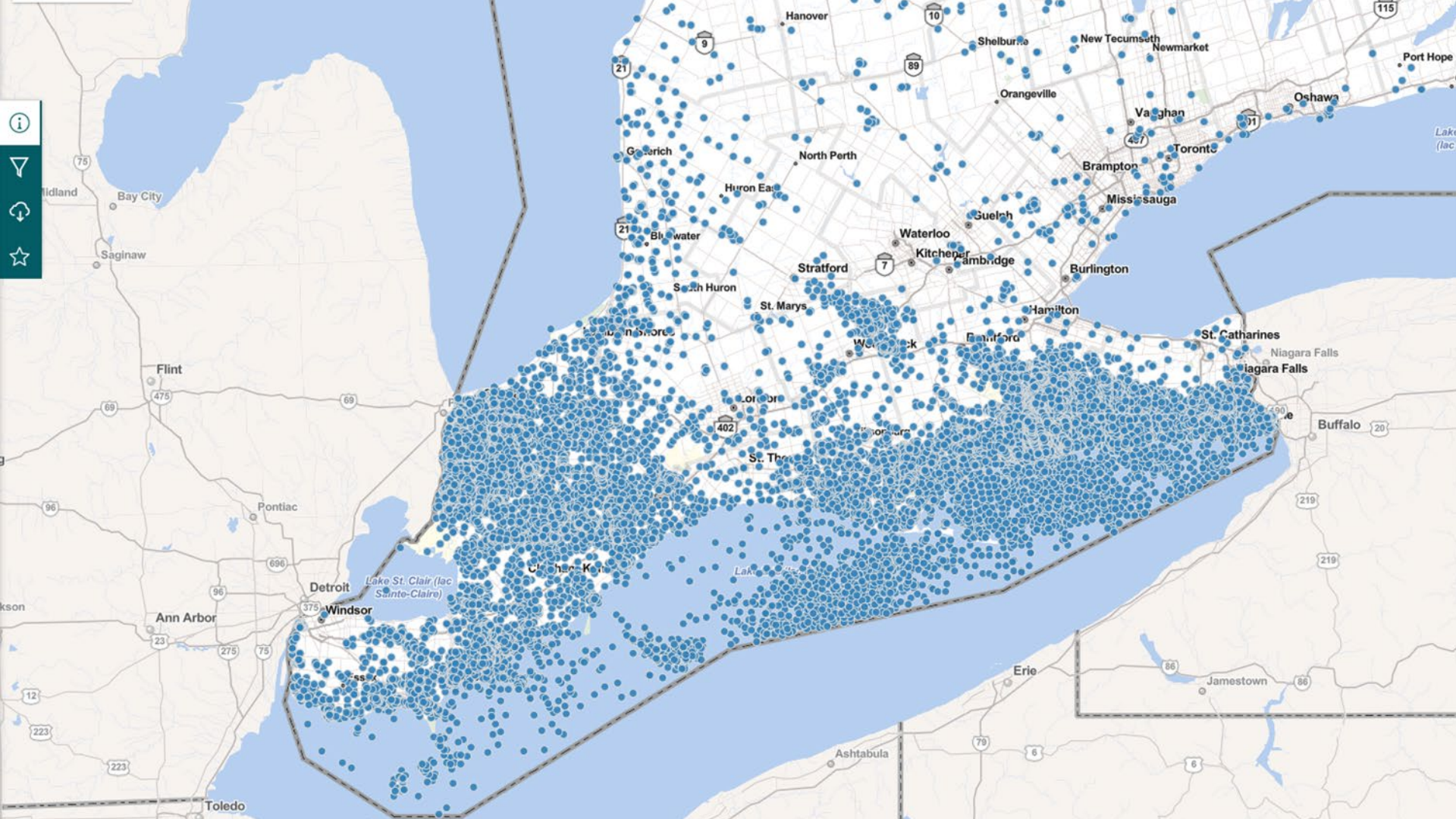


## On going work

- Properties that have been removed from evacuation zone continue to remediate.
- Ongoing air monitoring, transition from temporary to semi-permanent.
- Design and potential installation of permanent venting well.
- Isotopic analysis of gas samples collected to try to further identify a specific gas producing zone.

## Realizing Opportunities to Meet Future Demands

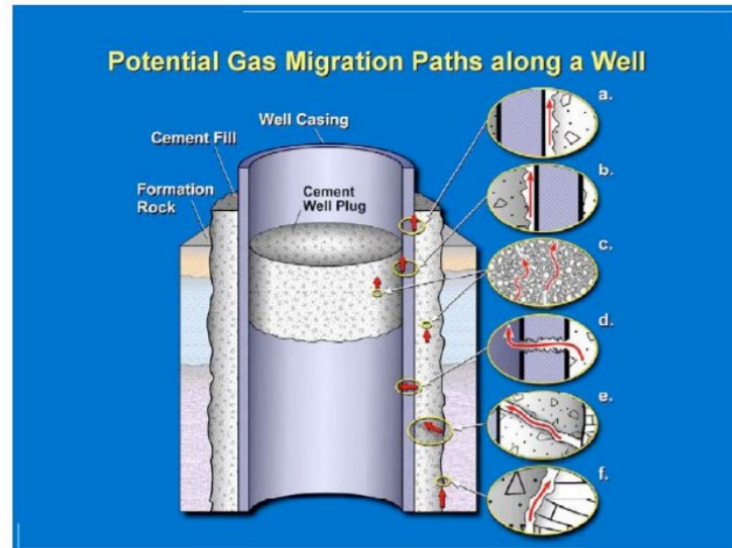
- Most municipalities are going to have to work through legacy oil and gas infrastructure as communities expand.
- Not just a rural municipality issue, each dot on the following slide represents a known oil and gas well; petroleum exploration in Ontario pre-dates accurate record keeping.
- Water wells (which can also emit gas) record keeping is even less accurate.



## Challenges and Barriers

- **Plugging of wells is not a perfect science, plugs can fail over time**

Figure 5 Pathways of Leaks From Gas Wells



## Challenges and Barriers

### ■ Powers and Jurisdictional Uncertainty

- Municipalities are not regulators within the Oil and Gas field and therefore have limited powers.

### ■ Expertise

- Municipalities do not have staff that are experts in this field.

### ■ Data

- Data is insufficient to allow for risk assessment in land use
- No Provincial Policy Statement on appropriate setbacks from abandoned gas wells.

## Challenges and Barriers

### ■ Disincentives to Property Owners

- Property owners potentially being left with well capping obligations, results in a potential disincentive to find and report wells.
- In the absence of a lease holder, the property owner is the default operator.

### ■ Funding

- With 26,000+ wells in Ontario, significant funding from both senior levels of government is needed to:
  - Find and rate wells for risk levels
  - Recap any higher risk wells
  - Assist citizens who are impacted

## Opportunities: Abandoned Works Program

### ■ **“Any oil or gas well qualifies if:**

- it was drilled before 1963
- you haven’t used or tampered with it
- it is visible from the surface
- there is no current operator”

### ■ **Limited funding, wells are prioritized**

### ■ **Program should be expanded and improved to address the potential risk at hand**

## Opportunities

**Ontario Municipalities can grow to meet future demands if we can work towards the following goals:**

- Acknowledge the risk
- Have open information on the risks
- Study the risks
- Have funding opportunities to implement risk mitigation solutions



## Why is this important



# Thank You!

Any questions?

You can find me at:

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Wheatley strong sign at CK Fire Hall 20. (Photo by Paul Pedro)