

# 150 Harrison Modular Housing Project

*or, How to Build Homes on a Brownfield in 8 Months*

RemTech East 2022

Niagara Falls, ON

June 2, 2022

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# 150 Harrison Modular Housing Project



*How was a supportive housing project constructed on a brownfield in just 8 months?*

# 150 Harrison Modular Housing Project



Project Context



Keys to Success



Project Overview



Project Outcome



Strategy



Wider Applicability

***How can this project serve as an example for consultants, municipalities, and affordable housing advocates?***

# TERRAPEX

- Founded in 1995
- Offices located in Toronto, Hamilton, and Ottawa
  - Satellite Office in British Columbia
- Inogen Alliance partner for Canada



# TERRAPEX

- Full-service multi-disciplinary engineering firm
  - Environmental
  - Geotechnical
  - Hydrogeology
  - Ecology
  - Building Science
  - EHS
- Diverse client base
  - Real Estate Development
  - Petroleum
  - Insurance
  - Government agencies
  - Municipalities



# Project Context

- HousingTO 2020-2030 Action Plan
  - Large-scale plan to improve housing for all residents
    - Homelessness
    - Long-term care
    - Purpose-based rentals
    - Home ownership





# Homelessness in Toronto

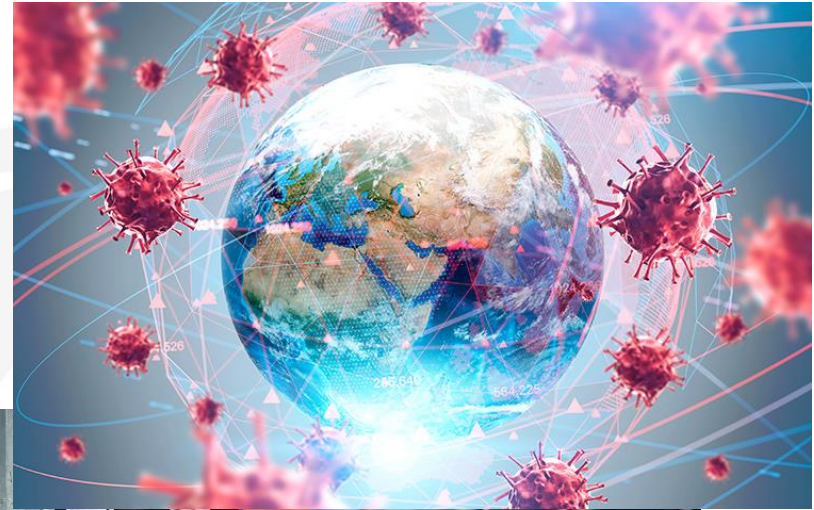
- Estimated more than 8,000 people are experiencing homelessness in Toronto
- Toronto's Shelter System routinely runs at capacity
- January and February 2020, almost 6,800 shelter spaces were occupied daily





# Homelessness in Toronto

- Emergence of COVID-19 in March 2020
- Shelter capacity limited
- Accelerated the existing HousingTO 2020-2030 Action Plan
  - Modular Housing Initiative
  - Create more supportive housing







# Modular Housing Initiative



- Provide supported housing
  - 1,000 homes planned by 2030 as part of initiative
  - Over 200 homes constructed by 2022
- Design
  - Small-scale infill
  - Modular
  - Rapid construction



# Project Overview

- Use of a brownfield
- Property met both social and physical considerations outlined by City
- New supported housing for 44 individuals, complete with municipal and provincial approvals
- Project was not measured based on direct economic return





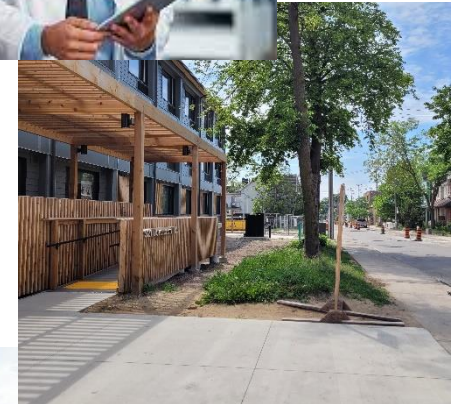
# Project Considerations

## Social Aspects

- Community benefit vs financial benefit
- Public transit access
- Health and community access
- Local demand

## Physical Aspects

- Site Plan included housing, amenity space, and public park
- Size, configuration
- Available infrastructure
- Development potential – environmental/geotechnical





# Opportunities

## City Ownership

- 5,600 properties, some of which are not being used
- Former police station property

## Social Aspects

- 150 Harrison was already earmarked for a redevelopment
- Satisfied the social aspects

## Physical Aspects

- Environmental and geotechnical suitability
- Environmental quality of Site already largely known





# Challenges



## Timeline

- Urgent occupancy



## Environmental Contamination

- Brownfield property
- Known concerns associated with fuel, PCBs, and poor fill quality
- Limited ability to manage advanced RMMs



## Regulatory Requirements

- Record of Site Condition required by O. Reg. 153/04

GTA

## Toronto has picked two sites for new modular housing for the homeless. Here's what they look like

Toronto is on track to move the first 100 people into the homes this fall, according to the mayor.

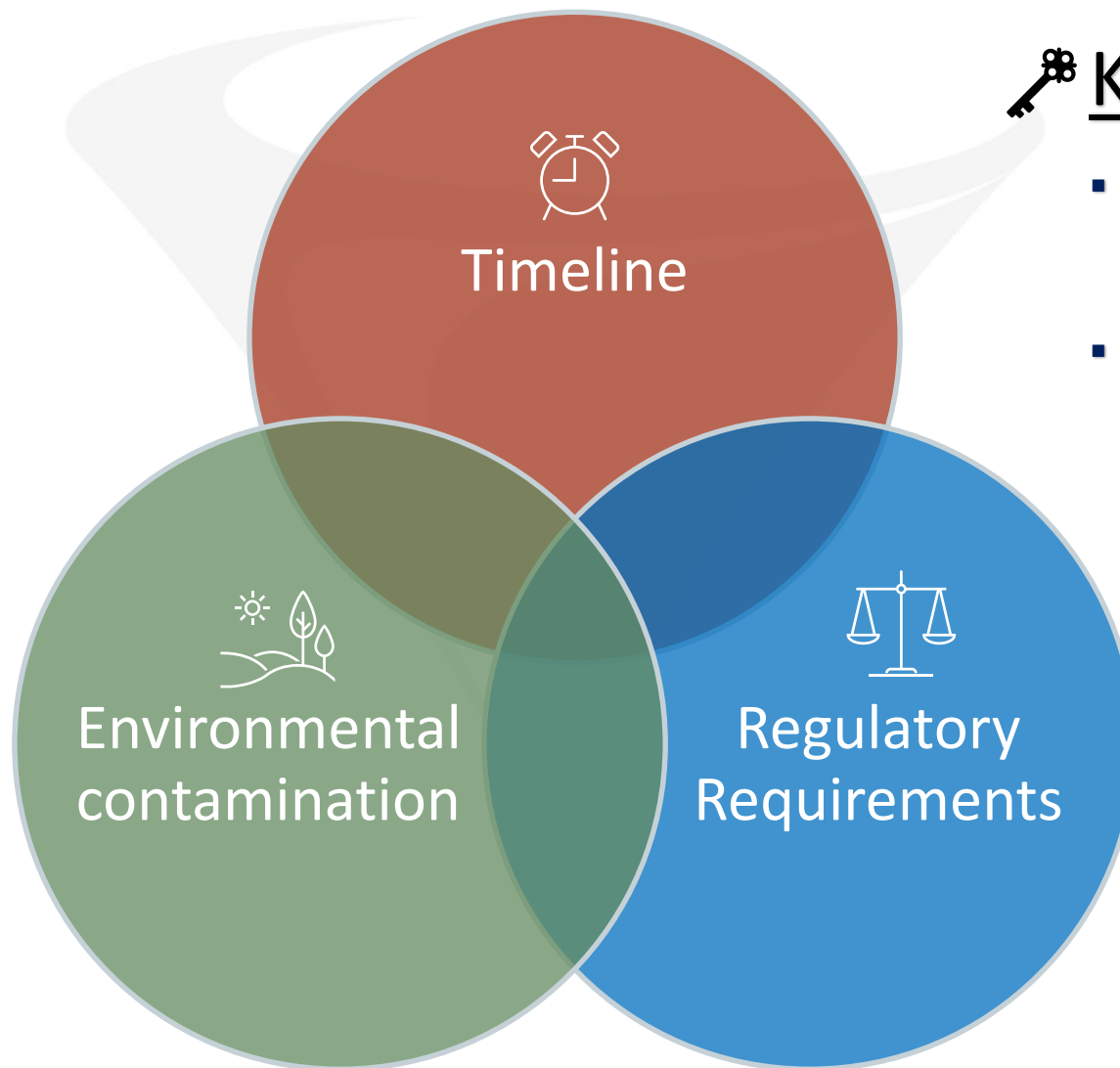


By **Francine Kopun** City Hall Bureau

🚨 Tue., June 2, 2020 | ⌚ 2 min. read



# Developing the Strategy



## Keys to Success

- Maximizing timeline efficiency
- Maintaining flexibility

# Timeline Efficiency

## Modified Generic Risk Assessment



- Allowed for contaminants to remain in place
- Risk management consistent with Client needs
- Accelerated process

### MGRA (Tier 2) Input

#### Site Descriptors (determines correct Table)

Proposed Land Use	Residential/Parkland/Institutional
Site Soil Texture	Coarse
Is the ground water potable or non-potable?	Non-potable
Is this a stratified clean-up?	Full Depth
Is site within 30 m of surface water?	More than 30 m to surface water
Is the soil less than 2 m deep?	More than 2 m

#### TIER 2 INPUT PARAMETERS

Distance from source centre to downgradient surface water body

Tier 2 Adjustable Values		
36.5		m

#### SUBSURFACE PROPERTIES

	Coarse Soil Setting	Medium/Fine Soil Setting	
Fraction of organic carbon (FOC) – water table to soil surface	0.005	0.005	g/g
Fraction of organic carbon (FOC) – in upper 0.5 m	0.01	0.035	g/g
Minimum depth below soil surface to the highest annual water table	300		cm
Soil Type – vadose zone	Generic Coarse	Generic Medium&Fine	
Soil Type – capillary fringe	Sand	Loam	
Number of frozen ground days per year	100		days
Aquifer horizontal hydraulic conductivity	3.0E-05		m/sec
Aquifer hydraulic gradient	0.003		m/m
Aquifer dry bulk density	1.81		g/cm <sup>3</sup>
Aquifer fraction organic carbon	0.0003		g/g
Depth below soil surface to soil vapour measurement	258		cm

**IMPORTANT** - Ensure that "Analysis Tool Pak" and "Solver Add-in" are activated (Tools/Add-Ins...)

**NOTE** : Soil Type should normally be consistent with Site Soil Texture

# Timeline Efficiency

## Targeted Remediation



- Some conventional removals targeting priority contaminants
  - Electrical substation (PCBs)
  - Poor fill quality (PAHs, Metals)
- Reduce concentrations to minimize risk management recommended by MGRA
- There are limitation to the risks that the MGRA can manage



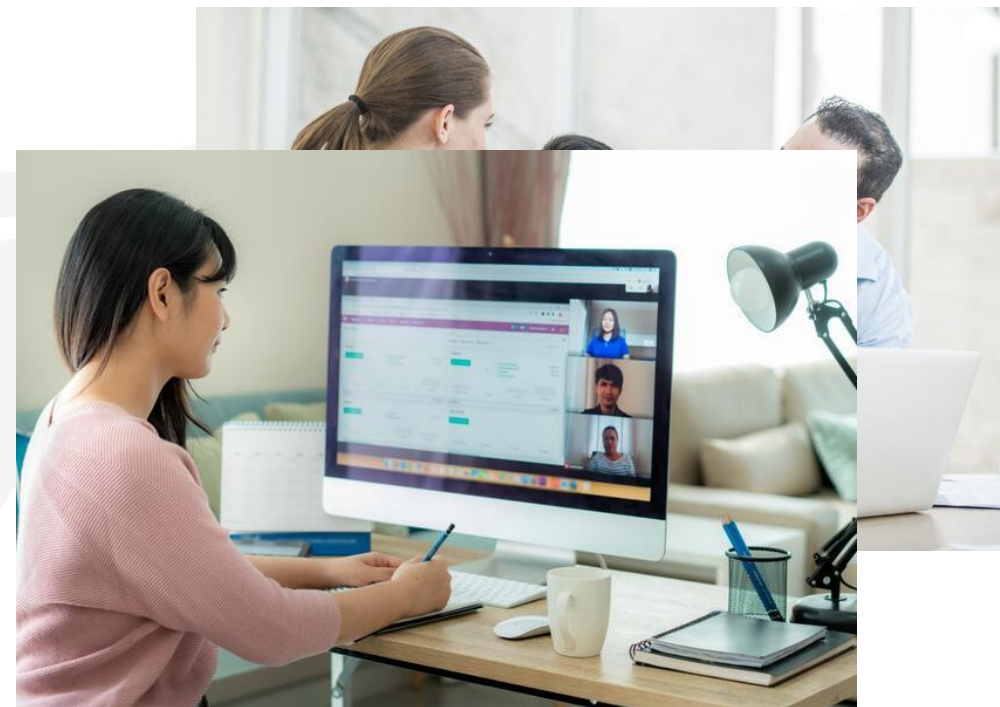


# Timeline Efficiency

## Collaborative Approach



- Emphasized collaboration with regulator to understand their concerns and needs
- Consulted on approaches for site characterization and risk management



# Timeline Efficiency

## Modular Housing Technology



- Pre-fabricated units – 27,000 sq.ft. total
- Constructed in Grimsby, ON
- Vendor responsible for design, manufacture, transport, install
- Constructed and installed in 5 months
- Allowed for unhindered site assessment and remediation

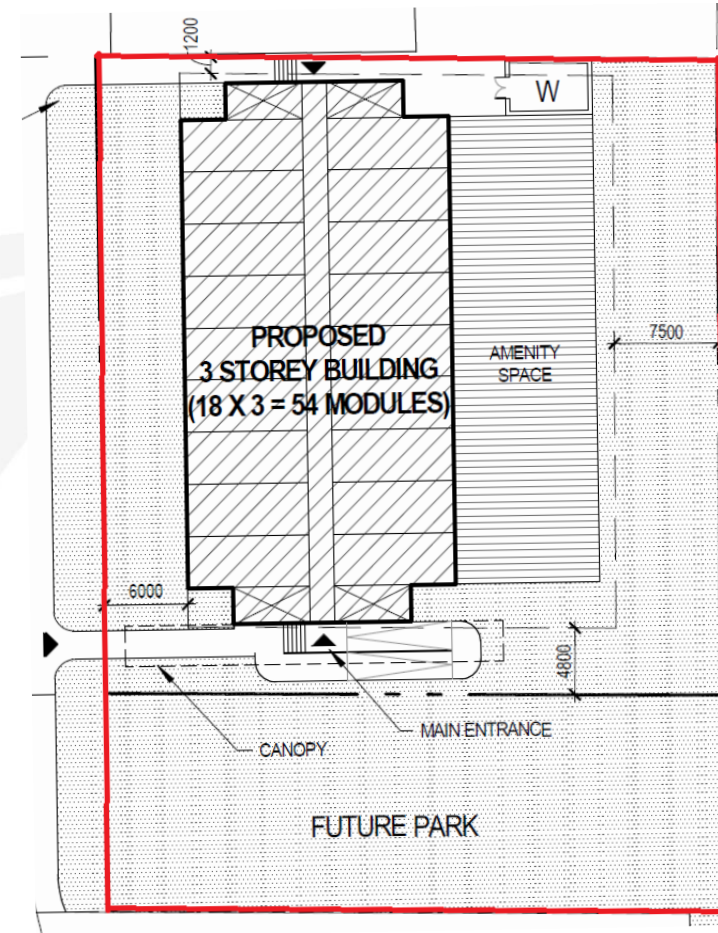


# 🔑 Maintain Flexibility

## Site Configuration



- Development orientation and layout dependent on environmental condition
- Residential and parkland uses

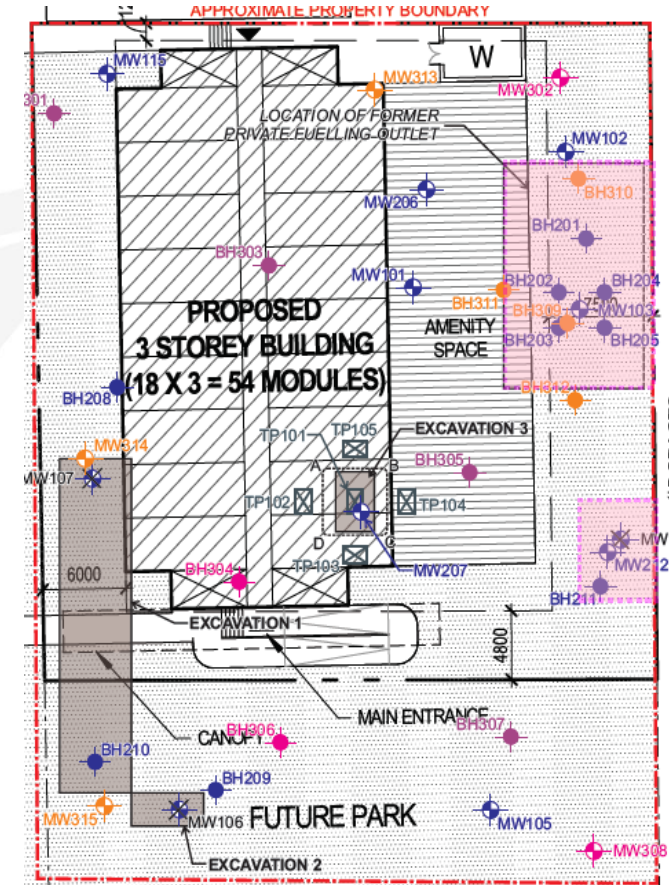


# 🔑 Maintain Flexibility

## Site Configuration



- Groundwater impacts located on one portion of property
- Impacts not fully delineated
- Fuel-related parameters represented a vapour intrusion concern
- Vapour intrusion risk mitigation was not achievable based on time constraints
  - MGRA cannot be used for advanced RMMs

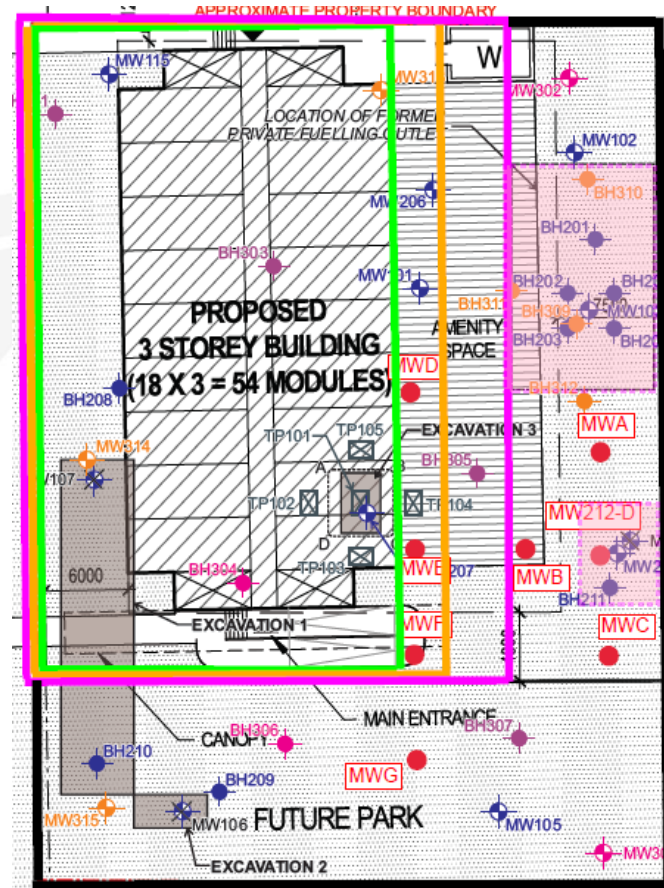


# 🔑 Maintain Flexibility

## Site Configuration



- Investigation used to delineate final risk assessment properties
- Installed sampling locations in a step-wise manner to maximize development parcel area
- MGRAs were not submitted until groundwater delineation was largely complete

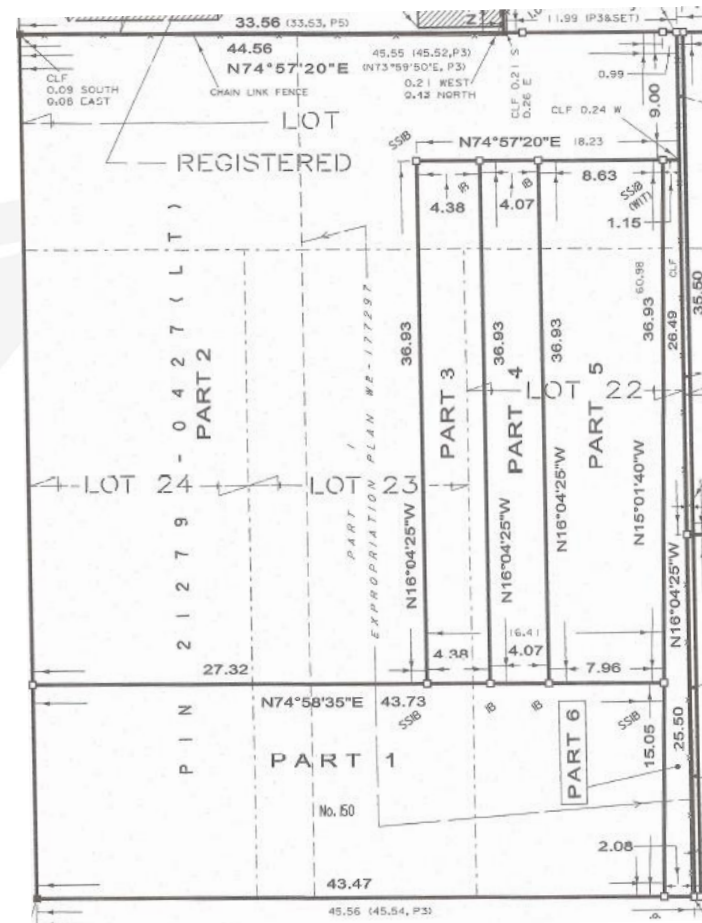


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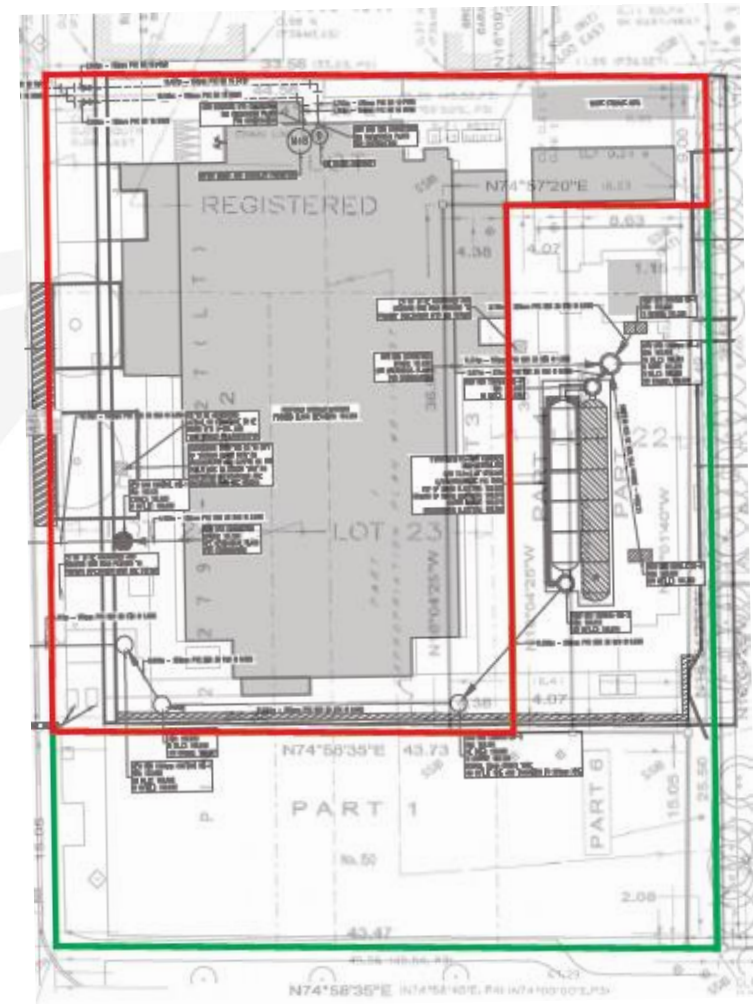


# 🔑 Maintain Flexibility

## Site Configuration



- Property was divided to separate groundwater impacts from the residential use
- Residential property area was maximized





# Project Outcome

- Property was divided to separate groundwater impacts from the residential use
- Vapour Intrusion Risk Management Measures avoided for residential RSC
- Prioritized residential development over parkland



Record of Site Condition  
Under Part XV.1 of the Environmental Protection Act

Summary

Record of Site Condition Number	227379
Date Filed to Environmental Site Registry	2020/10/15
Certification Date	2020/08/07
Current Property Use	Commercial
Intended Property Use	Residential
Certificate of Property Use Number	6884-BTXG22
Applicable Site Condition Standards	Full Depth Generic Site Conditions Standard, with Non-potable Ground Water, Coarse Textured Soil, for Residential property use, with RA
Property Municipal Address	150 HARRISON STREET, TORONTO, ON, M6J 2A4



Record of Site Condition  
Under Part XV.1 of the Environmental Protection Act

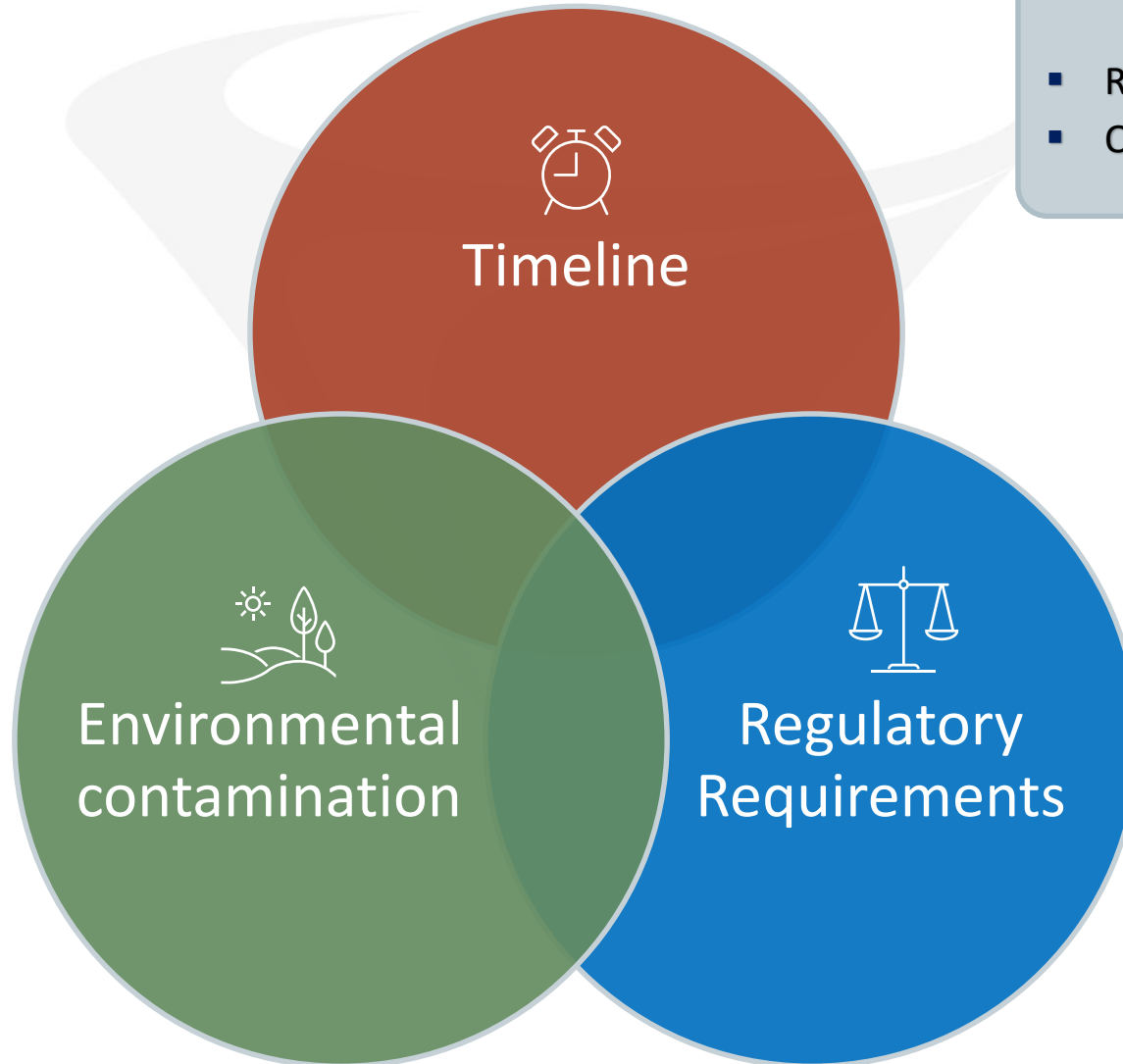
Summary


Record of Site Condition Number	227883
Date Filed to Environmental Site Registry	2021/03/30
Certification Date	2020/11/16
Current Property Use	Commercial
Intended Property Use	Parkland
Certificate of Property Use Number	0401-BXGPWF
Applicable Site Condition Standards	Full Depth Generic Site Conditions Standard, with Non-potable Ground Water, Coarse Textured Soil, for Parkland property use, with RA
Property Municipal Address	150 HARRISON STREET, TORONTO, ON, M6J 2A4






# Project Outcome



- Impacts managed in-place 
- Groundwater impacts isolated to park parcel
- Limited RMMs

- 
- Residential RSC in 5 months
- Occupancy in 8 months

- 
- Two accepted MGRAs
- Two RSCs filed



# Project Outcome



- Development was informed by the environmental condition
- Success judged on social benefit, not solely on direct economic considerations



# Wider Applicability

- Brownfields represent opportunity to address housing crisis
  - Large number of brownfields throughout Canada
  - Historical employment lands are being repurposed for residential use



Royal Oak Dairy, Hamilton

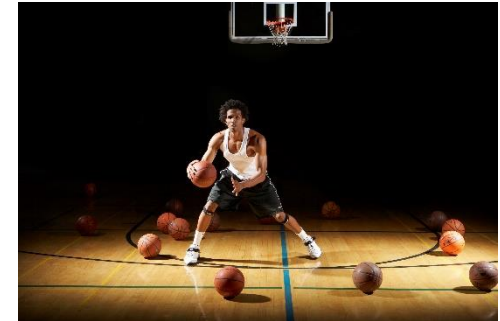


Schneider's, Kitchener



# Wider Applicability

- Environmental consulting can drive or inform development process
- Understanding environmental condition of lands is key to nimble decision making
- Information is available but not always consolidated or evaluated in a purposeful way





# Wider Applicability

- Municipalities can develop their properties
  - Divestment is not the only option
  - Room for collaboration with private developers to leverage expertise



Regent Park, Toronto



Alexandria Park, Toronto



# Wider Applicability

- Land holdings are typically judged on a transactional analysis/market capitalization basis
- Value of property can be judged on longer-term potential
- Opportunity to consider social benefit





# Wider Applicability

- Modular Housing Technology
  - Allowed for site assessment and remediation activities to continue
  - Substantial time savings for infill-type development





# Project Team

**OWNER / DEVELOPER:** City of Toronto and CreateTO

**OPERATOR / SUPPORT:** The Neighbourhood Group  
COTA Health

**ARCHITECT:** MontgomerySisam  
Baker Turner

**ENVIRONMENTAL:** Terrapex

**DESIGN / ENGINEERING:** Terrapex  
Design Works Engineering  
Nextrans Consulting Engineers  
NRB Canada/Horizon North

**GENERAL CONTRACTOR:** Husky General Contractors



# Contact

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