Mitigation Measures for Redevelopment over a Former Dry Cleaner Site

Canadian Brownfield Network – Remediation Technologies Symposium - 2015

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Agenda for Today

- The Issue
- Background
- How to Overcome
- Implementation
- Final Thoughts
- Q&A

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The Issue

- How do we get from A to B in 9 months?

- *Business as usual for a developer/constructor?*

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The Issue

- How do we get from A to B in 9 months with contaminants from a former dry-cleaner?

- *Experience would say …it is a challenge*

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Background

- Former Mall Property … 19xx
- Full Property Redevelopment – demolition in 200x

- Phase One Environmental Site Assessment in 2013 (to O. Reg. 153/04 Standards)
- Identified former dry-cleaner operation in Mall
  - one source: 1965 City Directory
    - Location unknown

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Background

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Background

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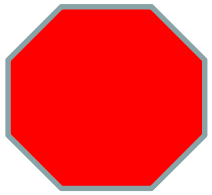
Background

- Plans for Redevelopment – new stand-alone building – tenant

- Wait !!! Phase One → Former Dry-cleaner possibly in area



- Phase Two ESA in January 2015 … dry-cleaner impacts? Yes/No?

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Background

- Phase Two ESA …
  - Drilling and sampling … standard methods
  - Groundwater sampling in fractured shale bedrock
    - Volatile Organic Compounds
      - Perchloroethylene (Perc, PCE)
      - Trichloroethylene (TCE)
      - Cis-1,2-dichloroethylene (c-DCE)
      - Vinyl Chloride (VC)
    - Typical residuals from historical dry-cleaning operations

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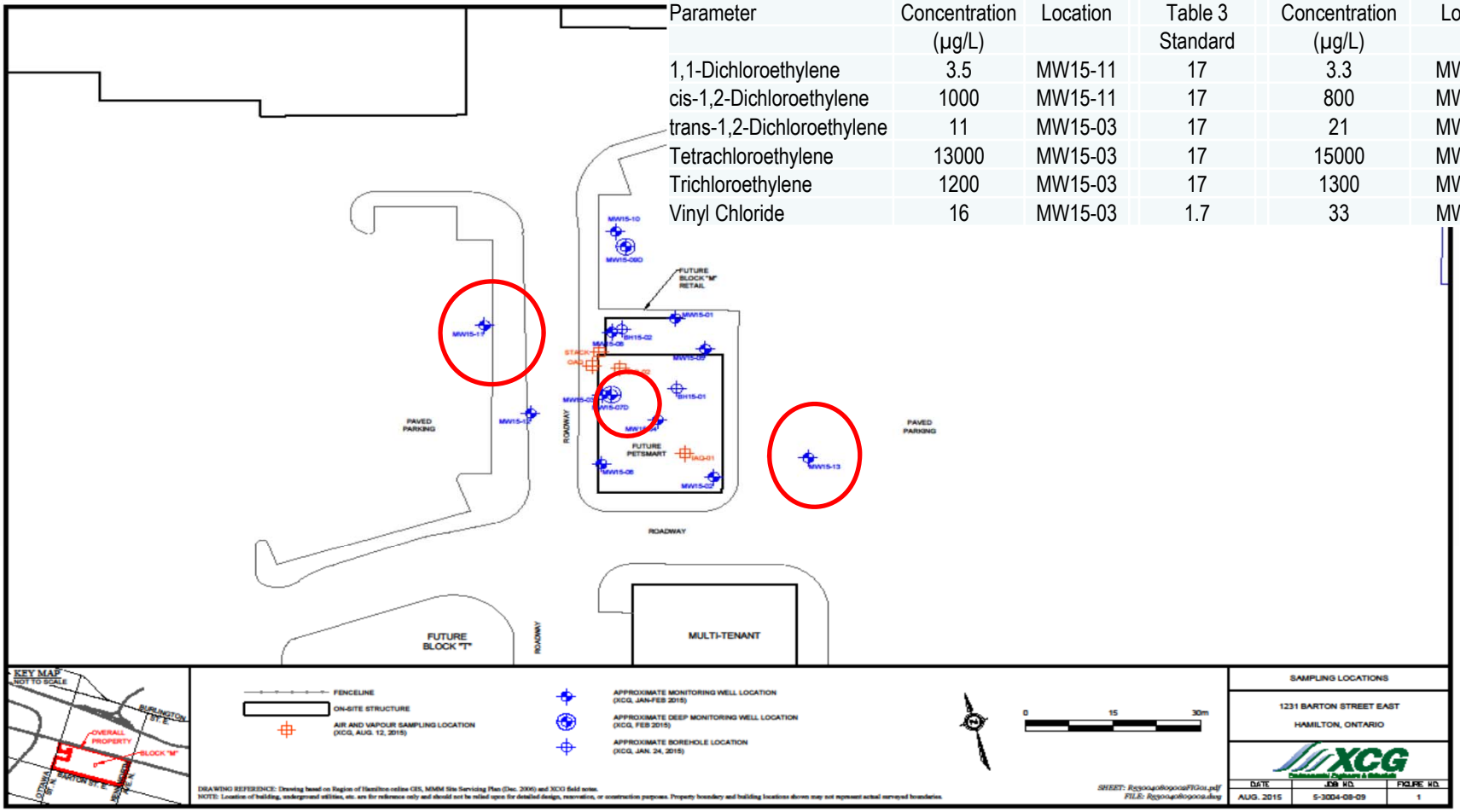
Background

Parameter	Highest Concentration (µg/L)	Location	MOECC Table 3 Standard	Highest Concentration (µg/L)	Location
1,1-Dichloroethylene	3.5	MW15-11	17	3.3	MW15-11
cis-1,2-Dichloroethylene	1000	MW15-11	17	800	MW15-11
trans-1,2-Dichloroethylene	11	MW15-03	17	21	MW15-13
Tetrachloroethylene	13000	MW15-03	17	15000	MW15-13
Trichloroethylene	1200	MW15-03	17	1300	MW15-13
Vinyl Chloride	16	MW15-03	1.7	33	MW15-15



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How to Overcome

- Development plans …
  - Tenant wanted location
  - Owner wants to gain long term lease
- Schedule … Fall 2015
- Issues with impacted groundwater below location
- Can it be done? How?
  - Determine the Critical Path
  - Review possible options and related costs

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How to Overcome

- Two issues (Critical Path):

A) Future Remediation once Built

» Need for access, minimal interruption to tenants, method?

B) Vapour Intrusion into Building

» Health and safety of occupants, risk assessed acceptable?

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How to Overcome

- Impacted Groundwater and new Building
  - Impacts at depth
  - No source/soil identified (below the building footprint)
  - Impacts within bedrock … difficult to reach, difficult to predict movement and migration
  - Excavation … not possible, past shows pump-and-treat is not a viable option
  - *In-situ* chemical oxidation (ISCO)?

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How to Overcome

Contaminant of Concern (COC)	RME Concentration	Property Specific Standards based on MGRA Model			
		Ecological		Human Health	
		Groundwater Discharge to Surface Water	½ Chemical Solubility Limit	Groundwater to Indoor Air (without RMM)	Groundwater to Indoor Air (with RMM)
1,2-cis-Dichloroethylene	612	770,000	1,800,000	**510**	51000
1,2-trans-Dichloroethylene	13.2	1,200,000	1,800,000	510	51000
Tetrachloroethylene	15,600	46,000	100,000	**510**	51000
Trichloroethylene	1,440	1,200,000	640,000	**210**	21000
Vinyl Chloride	19.2	2,000,000	4,400,000	51	5100

Notes:
All concentrations are in µg/L.
RME = Reasonable Maximum Estimate (maximum detected concentration in groundwater multiplied by 1.2)
Shaded values indicate that the maximum detected concentration is greater than the site specific criterion.
Property Specific Standards derived assuming non-residential use and RMM consisting of a SVE system with passive venting.

- Risk Assessment calculations …
- Possible issues with vapour intrusion (c-DCE, PCE and TCE)
- RMM increases highest allowable possible concentration by factor of 100

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How to Overcome

- Determined that Vapour Intrusion may be an issue
- Team with Vapour Barrier Professionals
  - Terrafix … detailed design
  - Work with Development Team – Constructor
- Application/Installation of vapour collection system and Liquid Boot® impermeable barrier

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Implementation

- *In-situ* chemical oxidation (ISCO)
  - Recall that new building
  - minimize tenant disruption
  - drains constructed to provide future access

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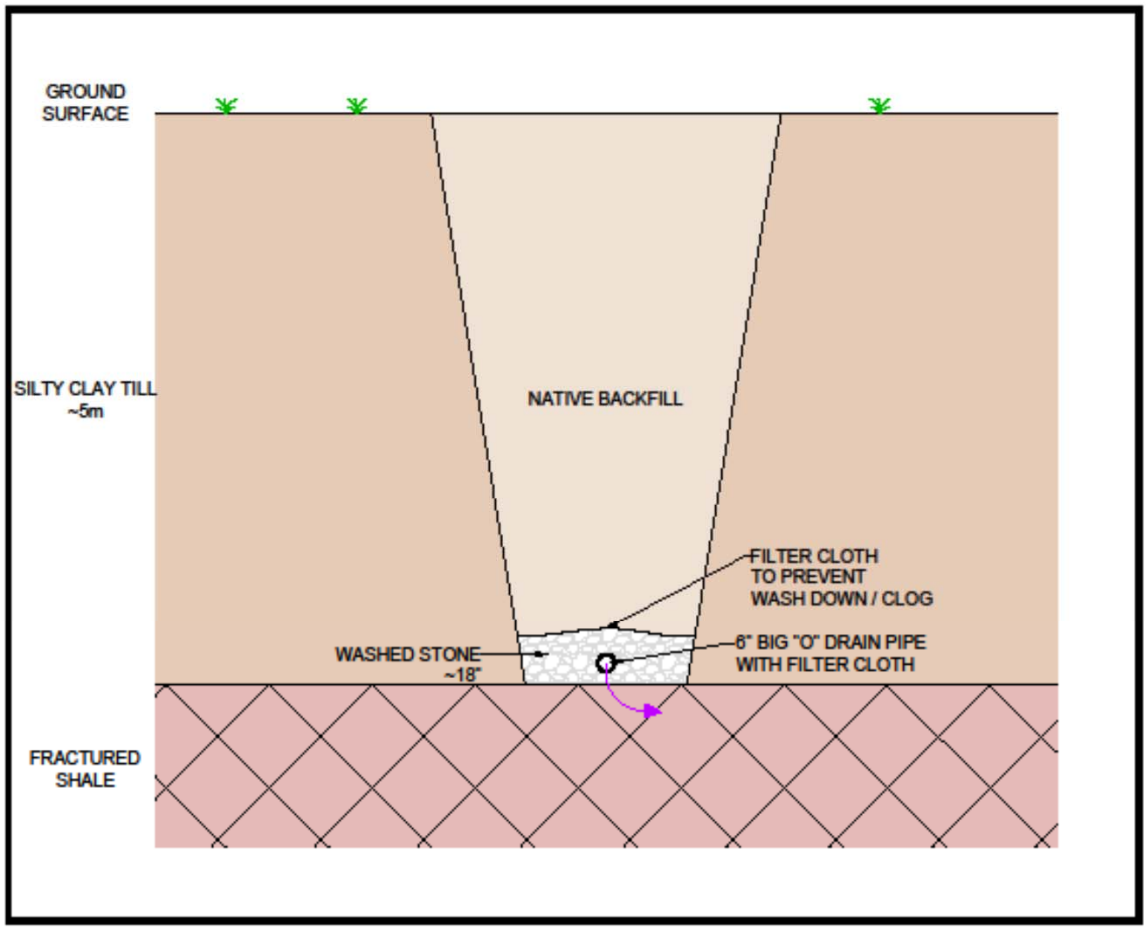
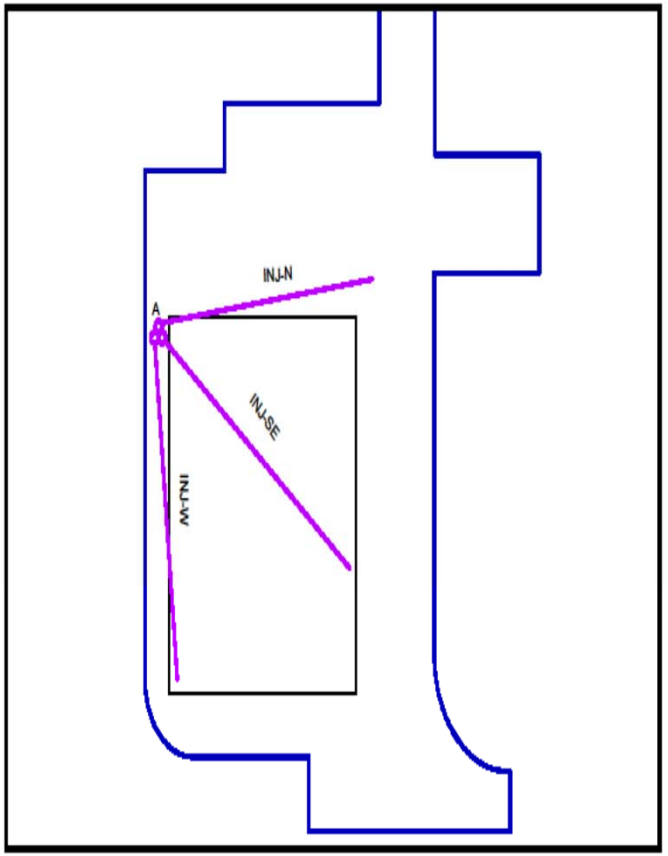
Implementation





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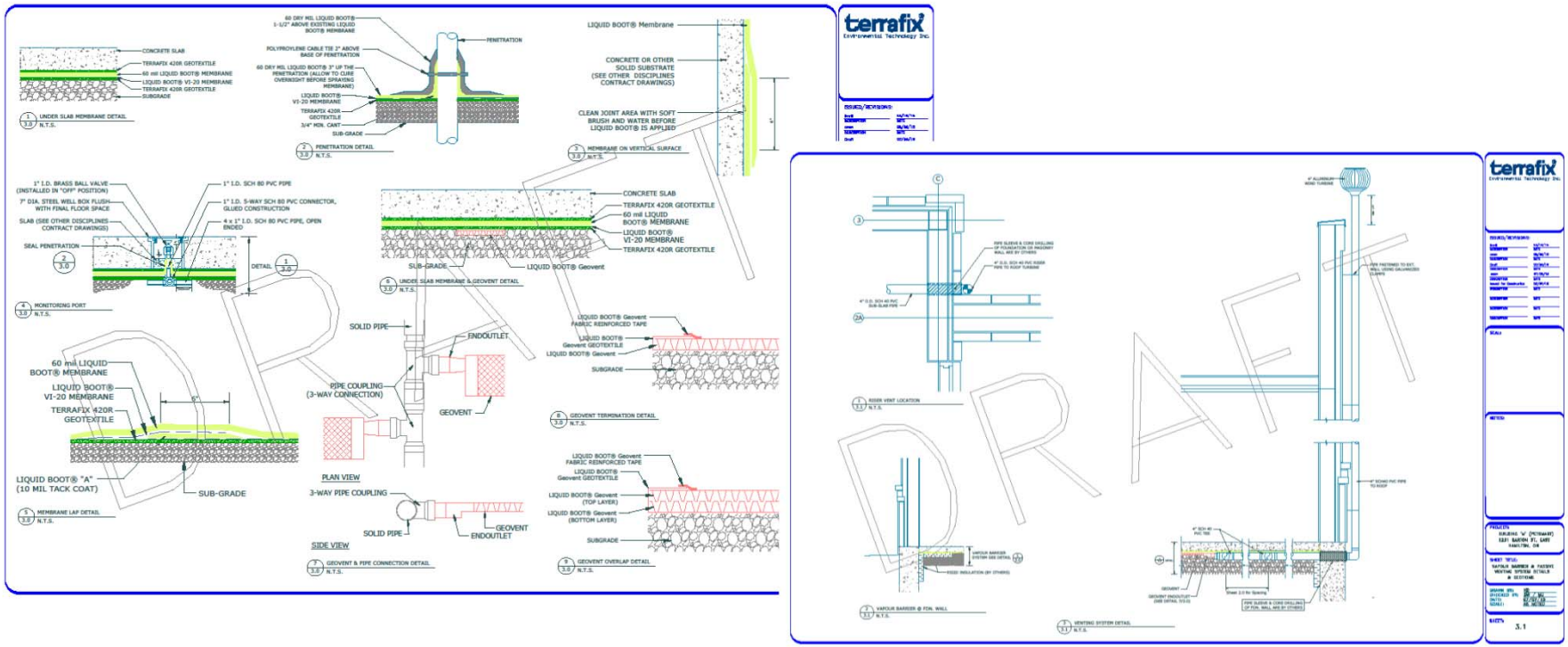
Implementation

- Design system to work with building construction



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Implementation

Passive SVE and Liquid Boot® Vapour Barrier Application

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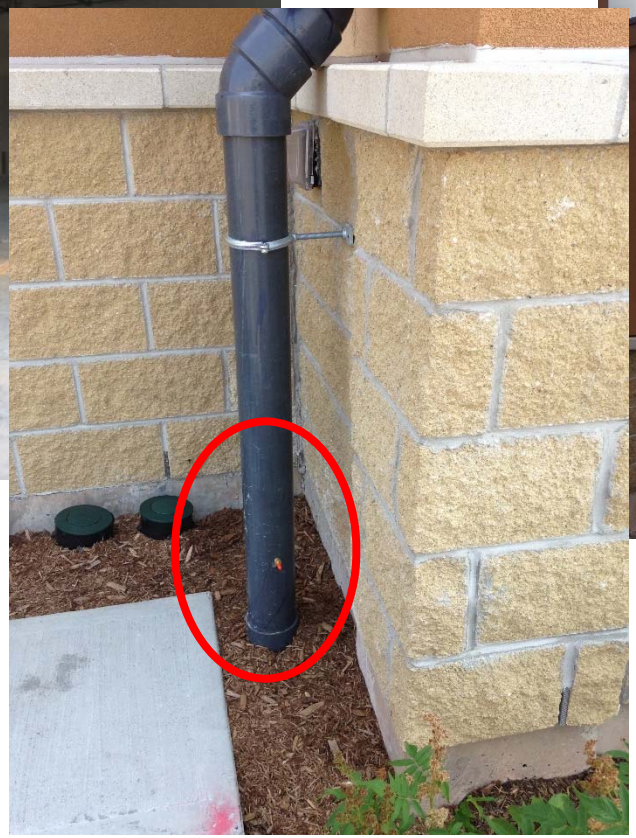
Implementation

↑ Testing Indoor Air



Testing Sub-slab Vapour →

↑ Sub-slab Vent

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Implementation

- Tested indoor air quality → Release to Tenant
- Summa Canisters
- Results show no Concentrations of COCs
  (c-DCE, PCE and TCE)
- Outdoor Air and Sub-slab – Detections
- Now … focus on groundwater remediation

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Final Thoughts

- Contaminants … Redevelopment (Brownfields)
  - Doesn't have to be an impediment to progress
- Apply new technologies and products, methods
  - i.e. Liquid Boot®, Vapour Collection, MGRA tools
- Planning and Communications
  - Early stages, co-operative teamwork, knowledge

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Final Thoughts

- Contributing Factors to Success
  - Stream-lined Process
  - Early Involvement … Planning
  - no Detailed Regulatory Approvals needed (timing)
  - Trusted Network of Professionals – co-operation

  - Added Cost to Development minimized
  - Timeframe met … actually early
  - Big Picture vision … know where needed to be

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Q&A

Thank you

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