

AEL environment presents

Bioremediation – Three Case Studies



ABOUT AEL



Providing practical solutions for
property investment and management property



INNOVATIVE LAND RESTORATION SOLUTIONS
Through Site Assessment & Remediation



My property requires remediation.

What are my options?

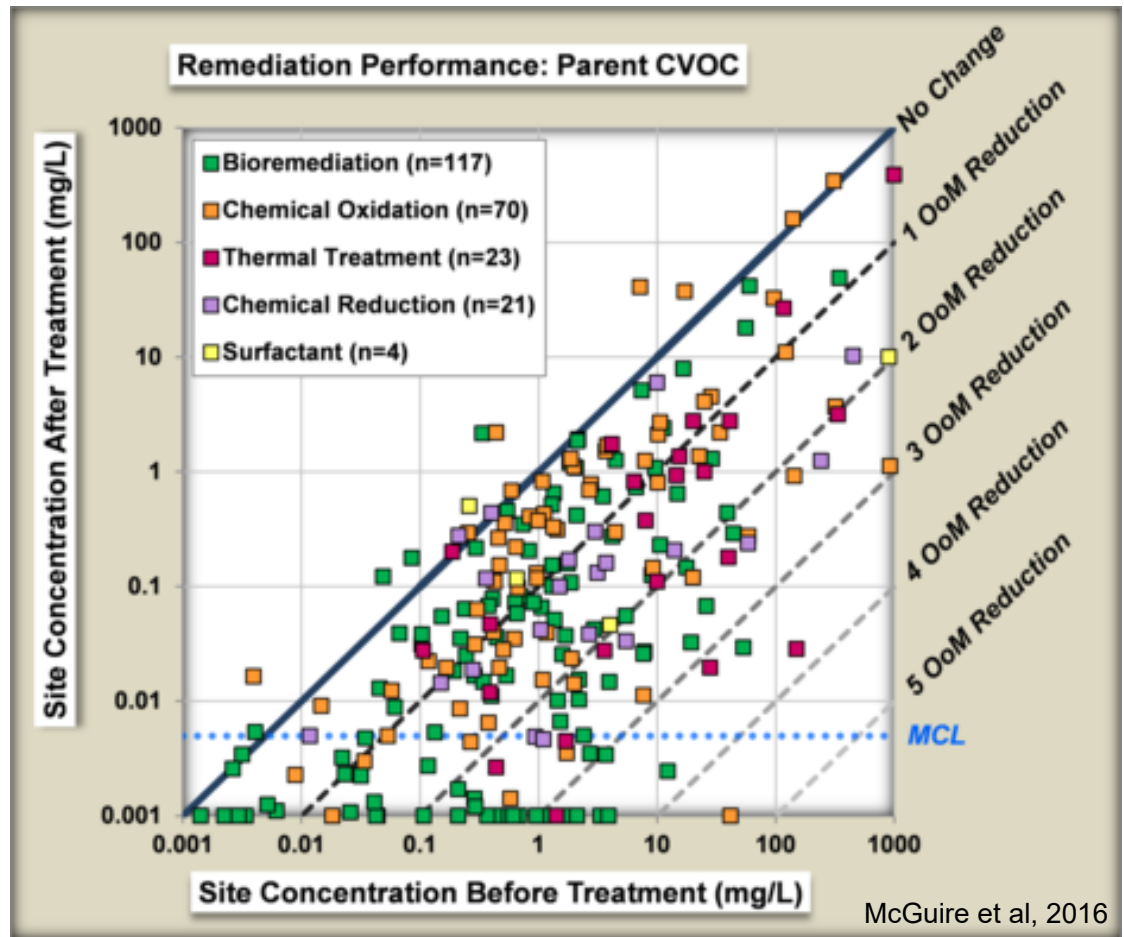


Potential Approaches

Many Options

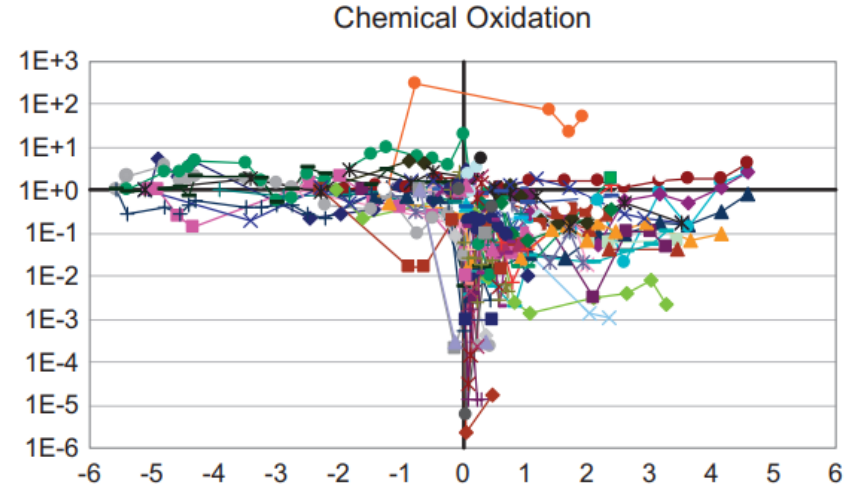
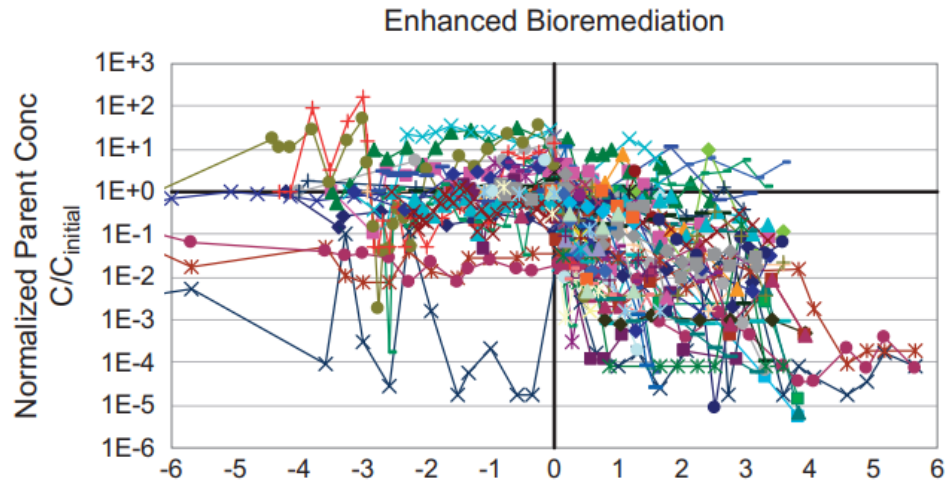
Proper Design is Key

- Contact
- Reactivity
- Longevity



Potential Approaches

A Case for Well-Designed Bioremediation



McGuire et al, 2016

CASE STUDY

TCE in Glaciolacustrine Environment



Background

GOAL:

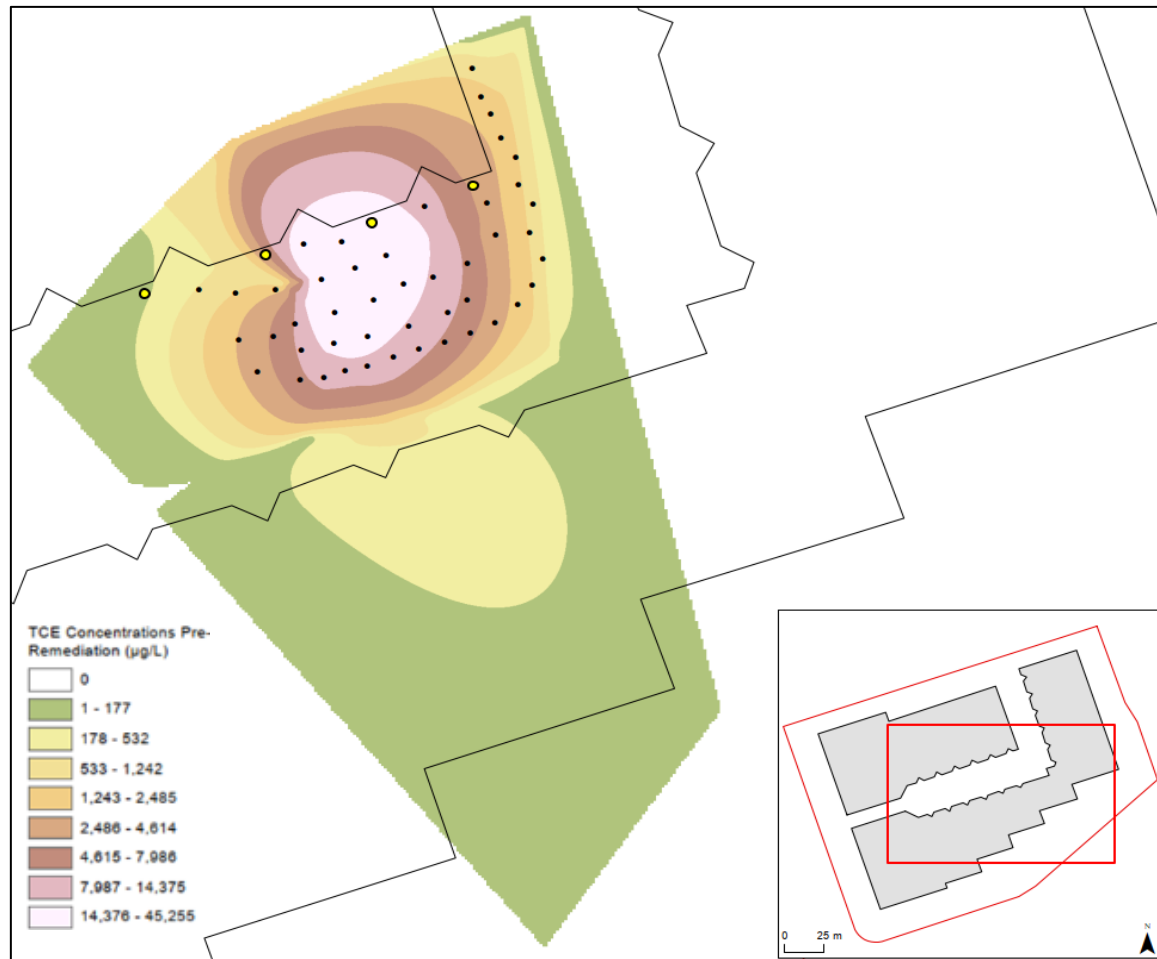
Support Upcoming Sale of Property
With Environmental Due Diligence

- Commercial/Industrial since 1970s
- Past and current waste generators
- TCE – up to 50,000 $\mu\text{g/L}$
- Silt and sand sequences



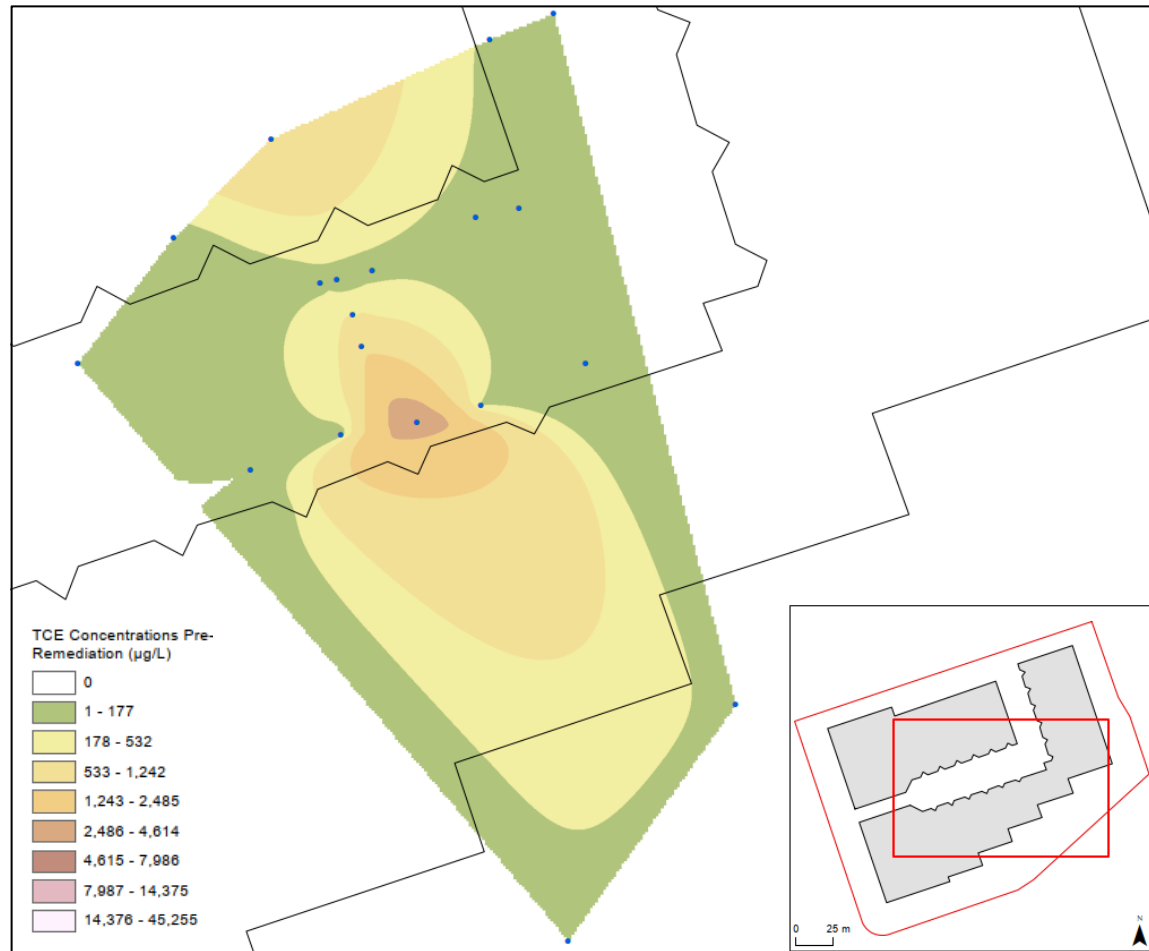
Remediation

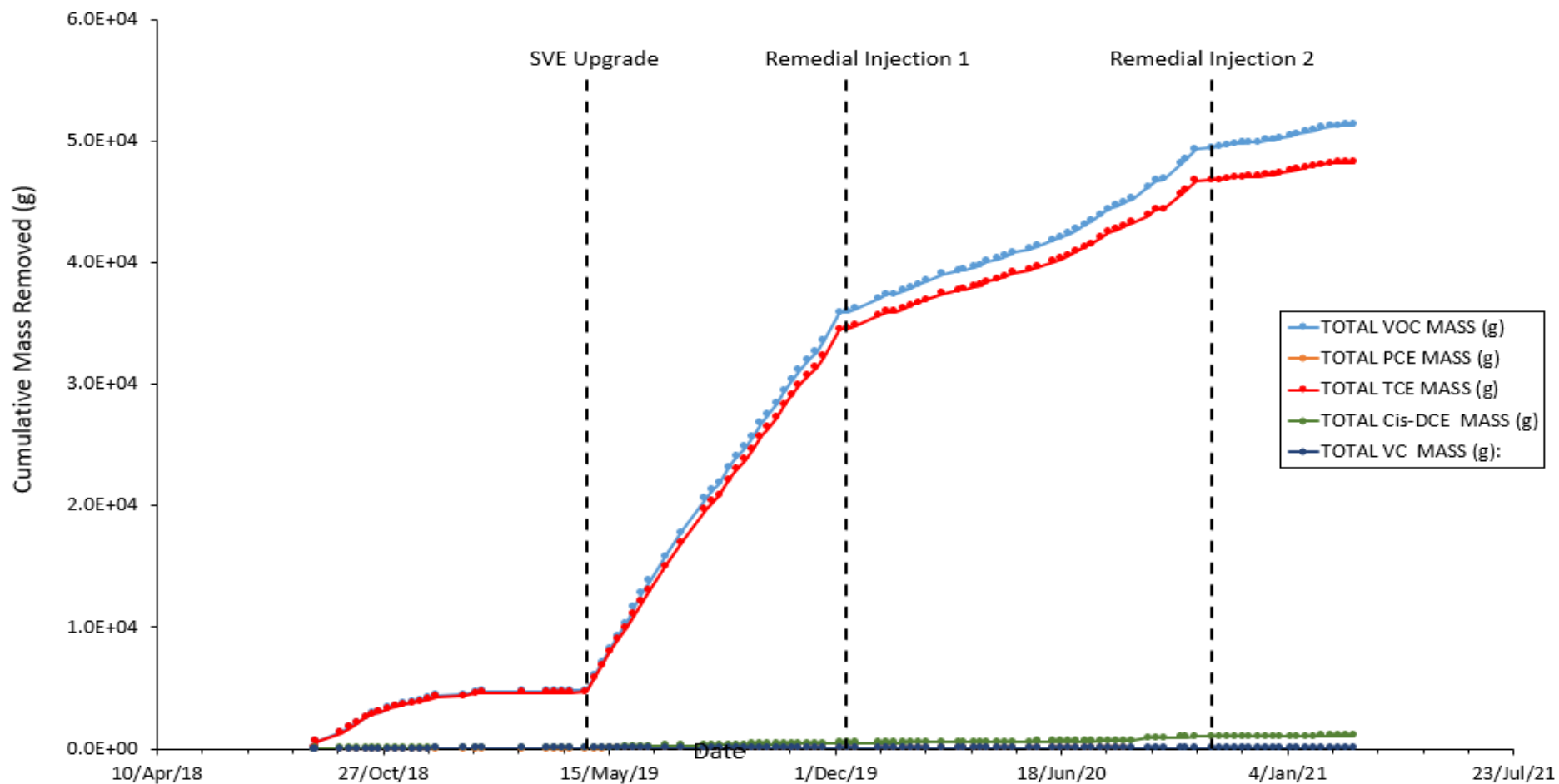
- EVO+KB1+ZVI
- Source zone + permeable reactive barrier
- Soil vapour extraction



Results

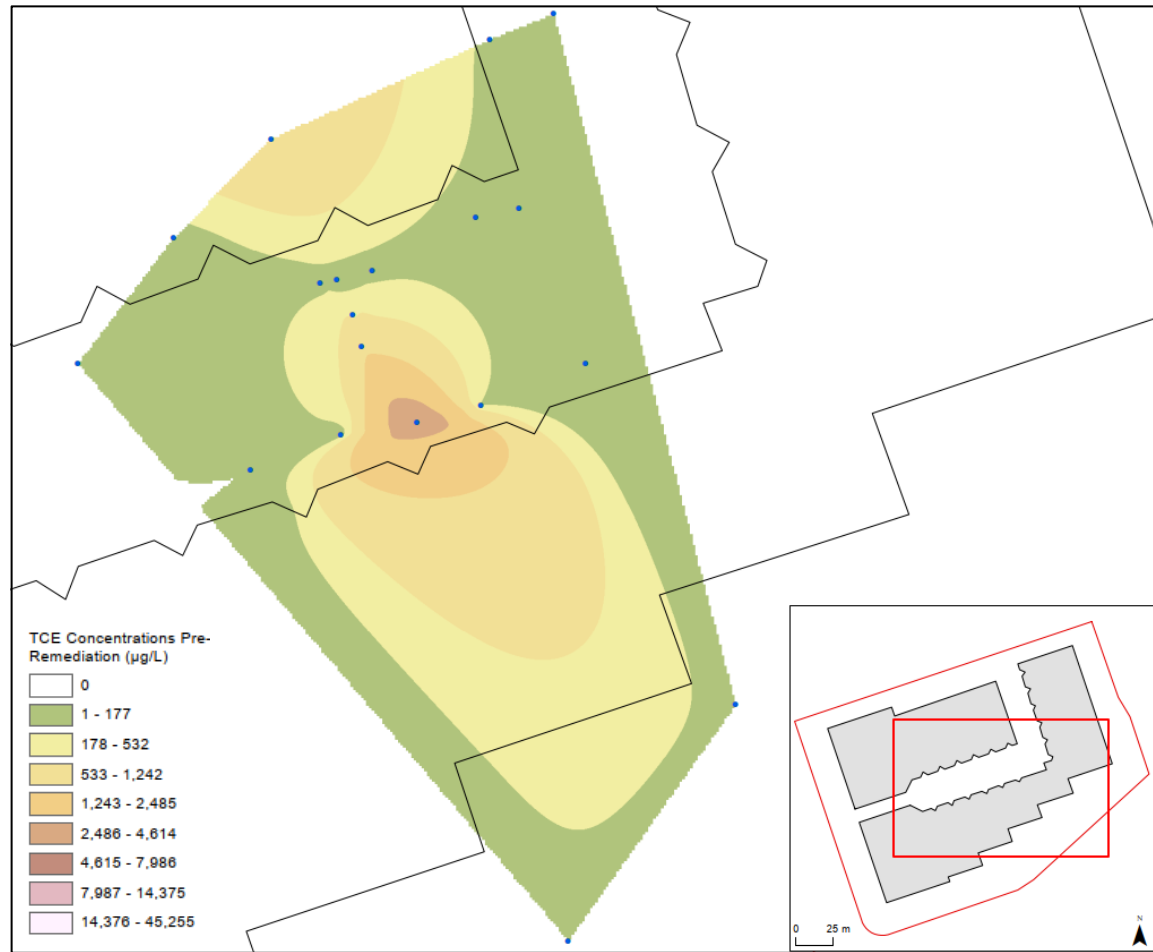
- 98-99.5% reduction after pilot (6-months)
- 94-100% reduction after full-scale (3-Months)
- Vapour controlled by SVE and muted by source injection





Results

- 98-99.5% reduction after pilot (6-months)
- 94-100% reduction after full-scale (3-Months)
- Vapour controlled by SVE and muted by source injection
- Site purchased based on preliminary results



CASE STUDY

PCE in Bedrock



Background

GOAL:

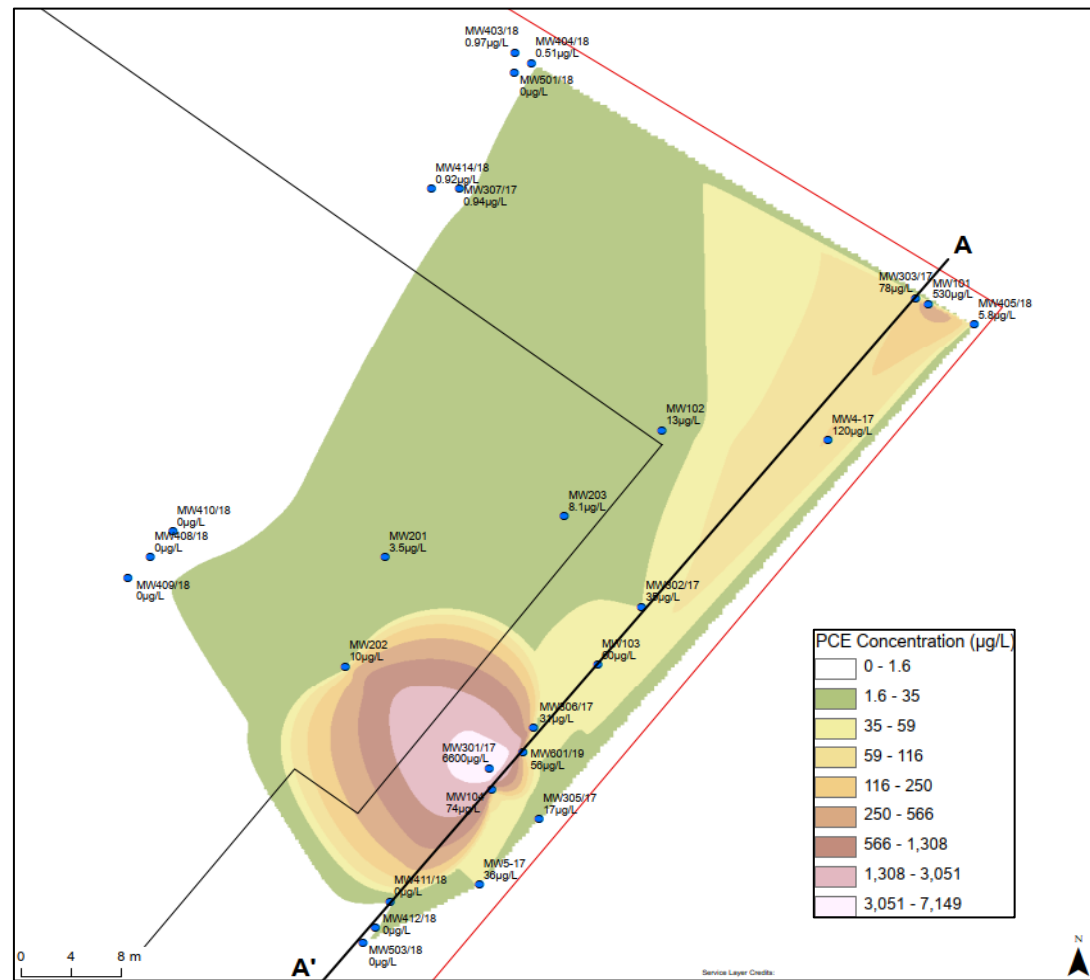
Fulfill Post-Sale Agreement Including Remedial Intervention

- Industrial since 1900s
- Past waste generator
- PCE – up to 2,100 µg/L
- Shallow channeled dolostone
- High permeability



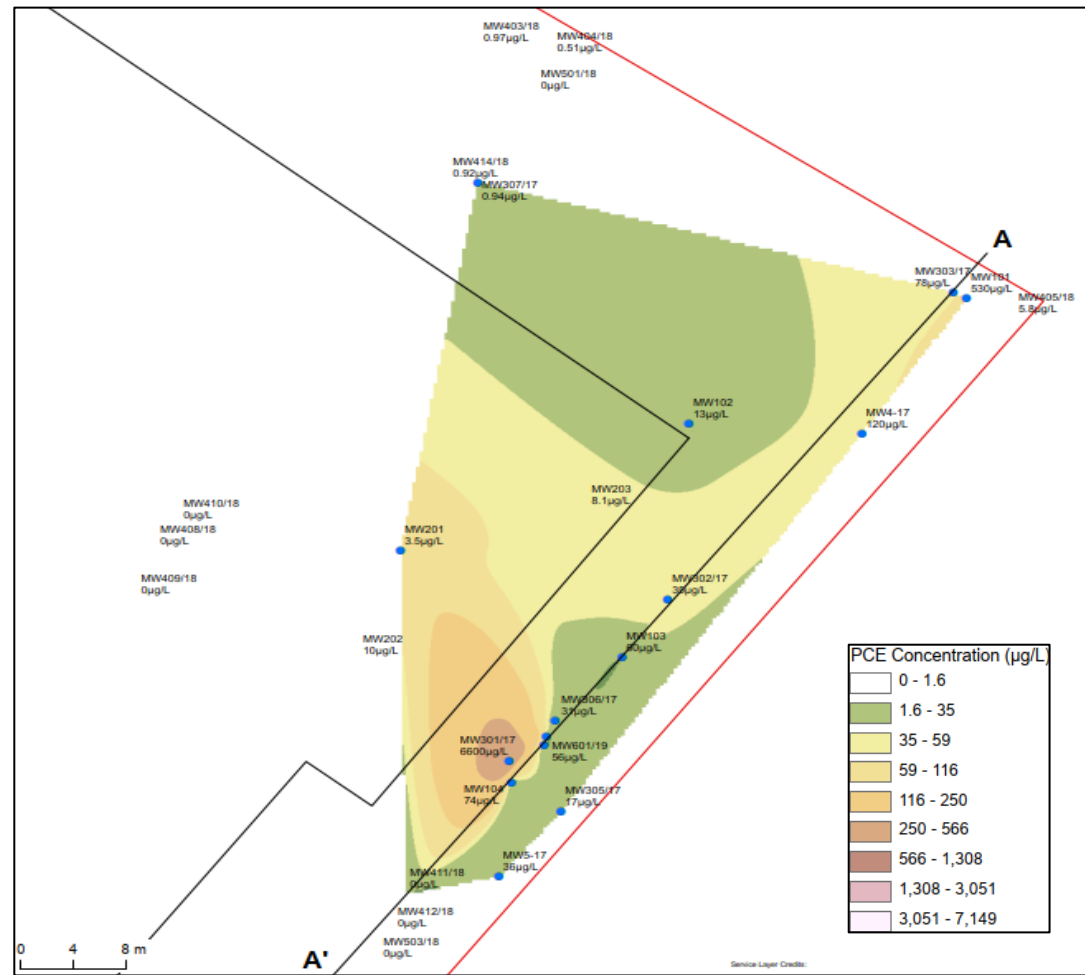
Remediation

- High permeability
 - Single injection well (8")
 - Gravity feed injection
- EVO+KB1+FeS



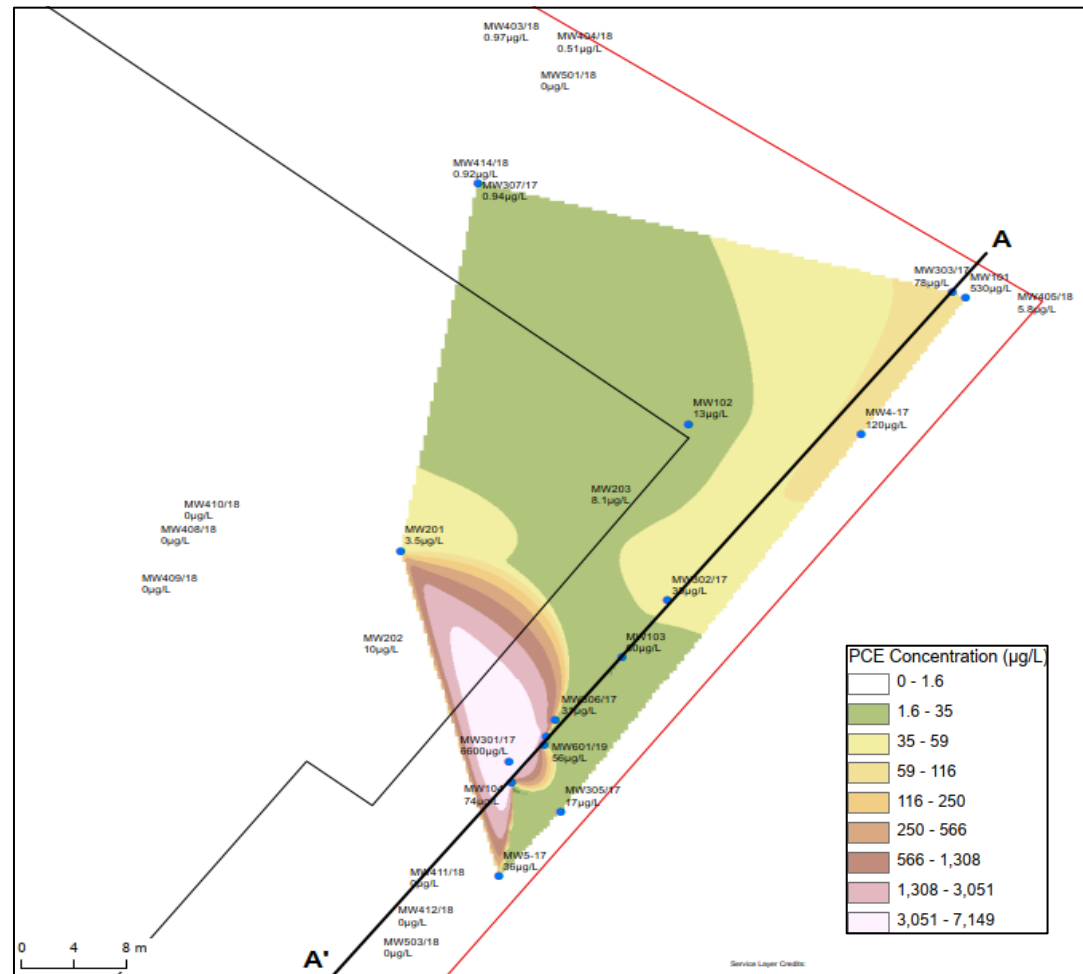
Results

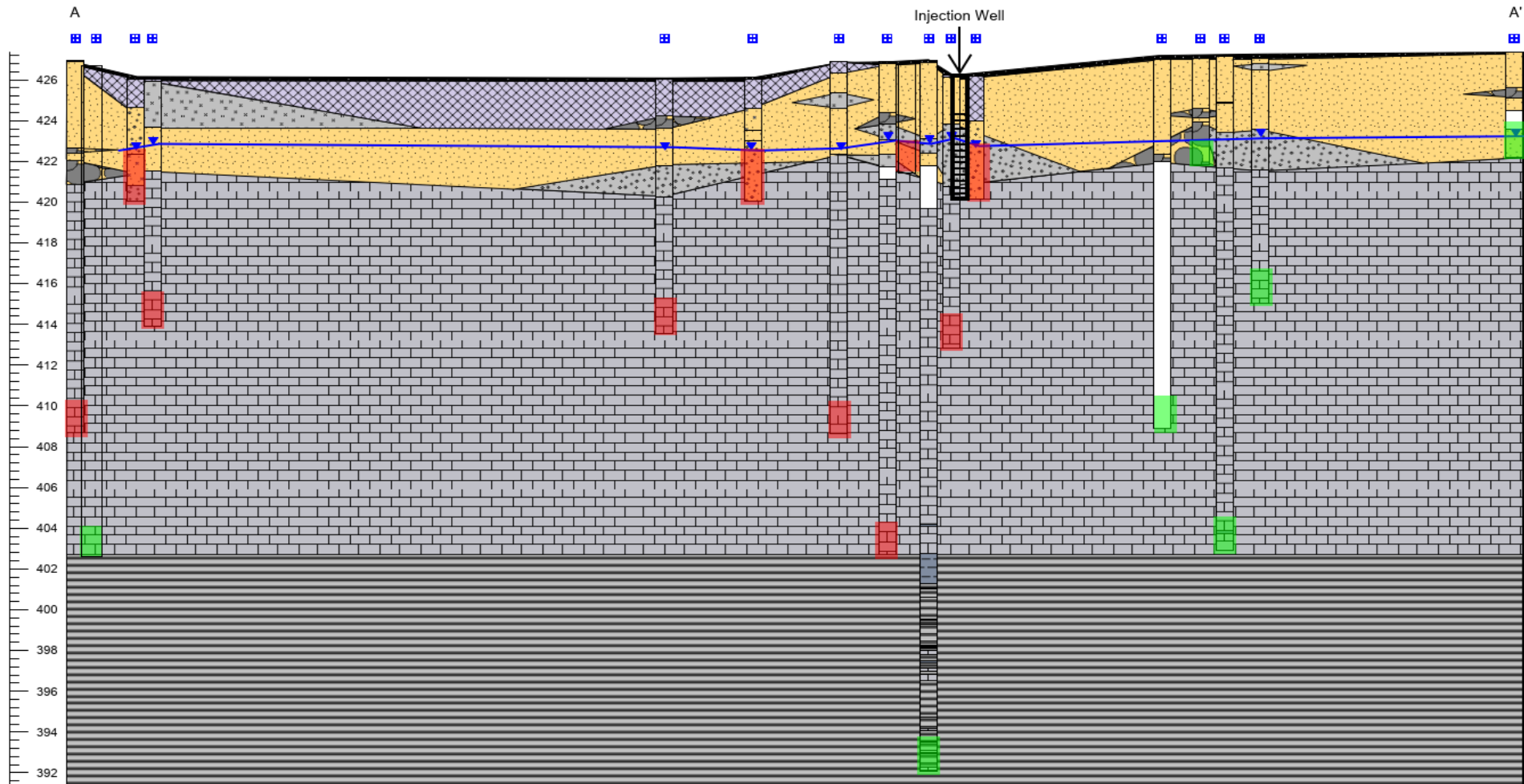
- 12 Months Post-Injection
 - >99% PCE in source area
 - ~65% reduction of PCE plume

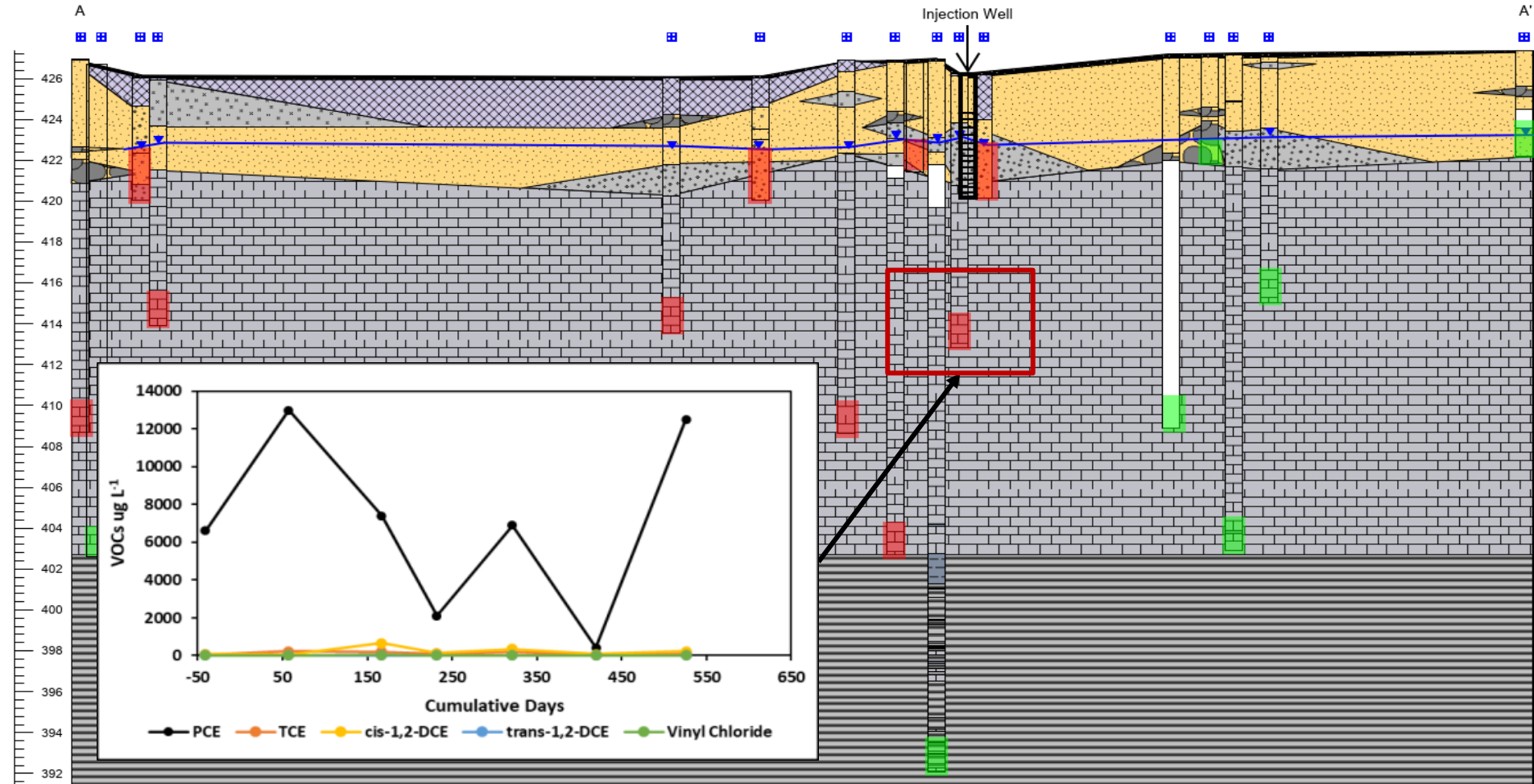


Results

- 12 months post-injection
 - >99% PCE in source area
 - ~65% reduction of PCE plume
- 15 months post-injection
 - Rebound in deeper wells
 - Controlled by Risk Assessment







CASE STUDY

TCE in Glacial Till

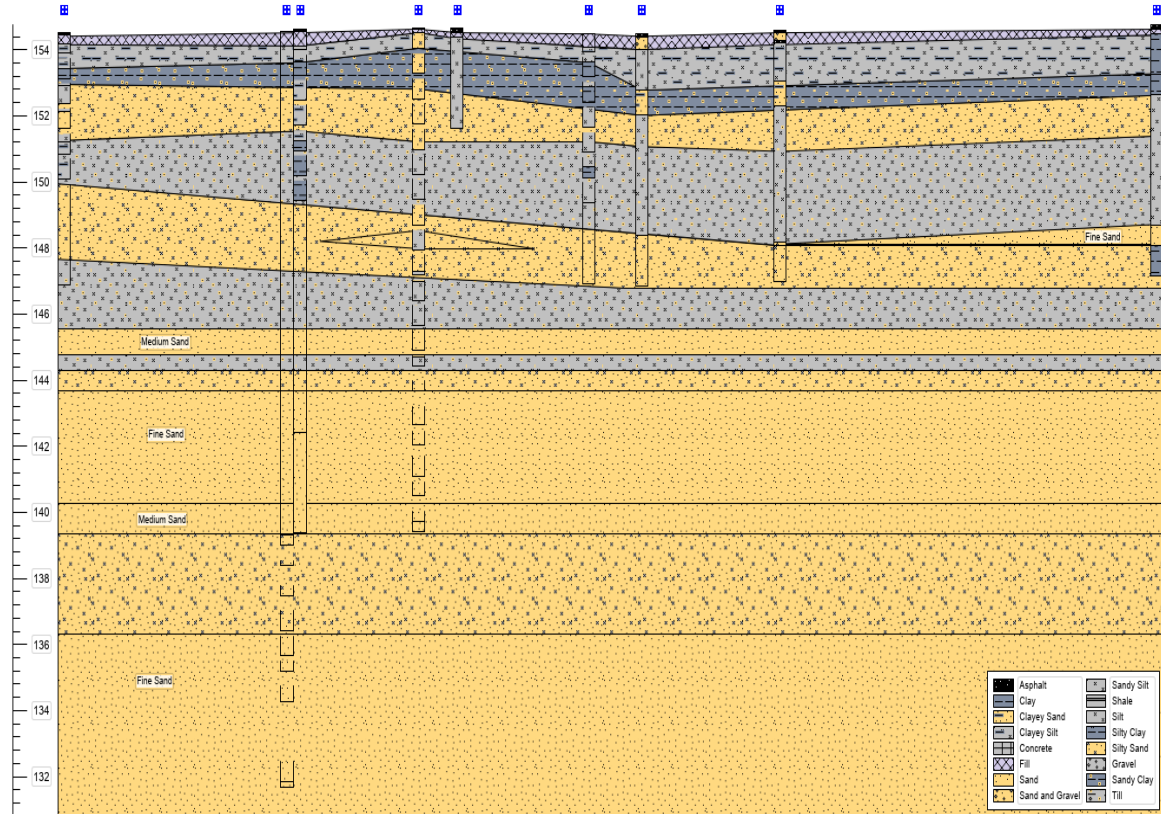


Background

GOAL:

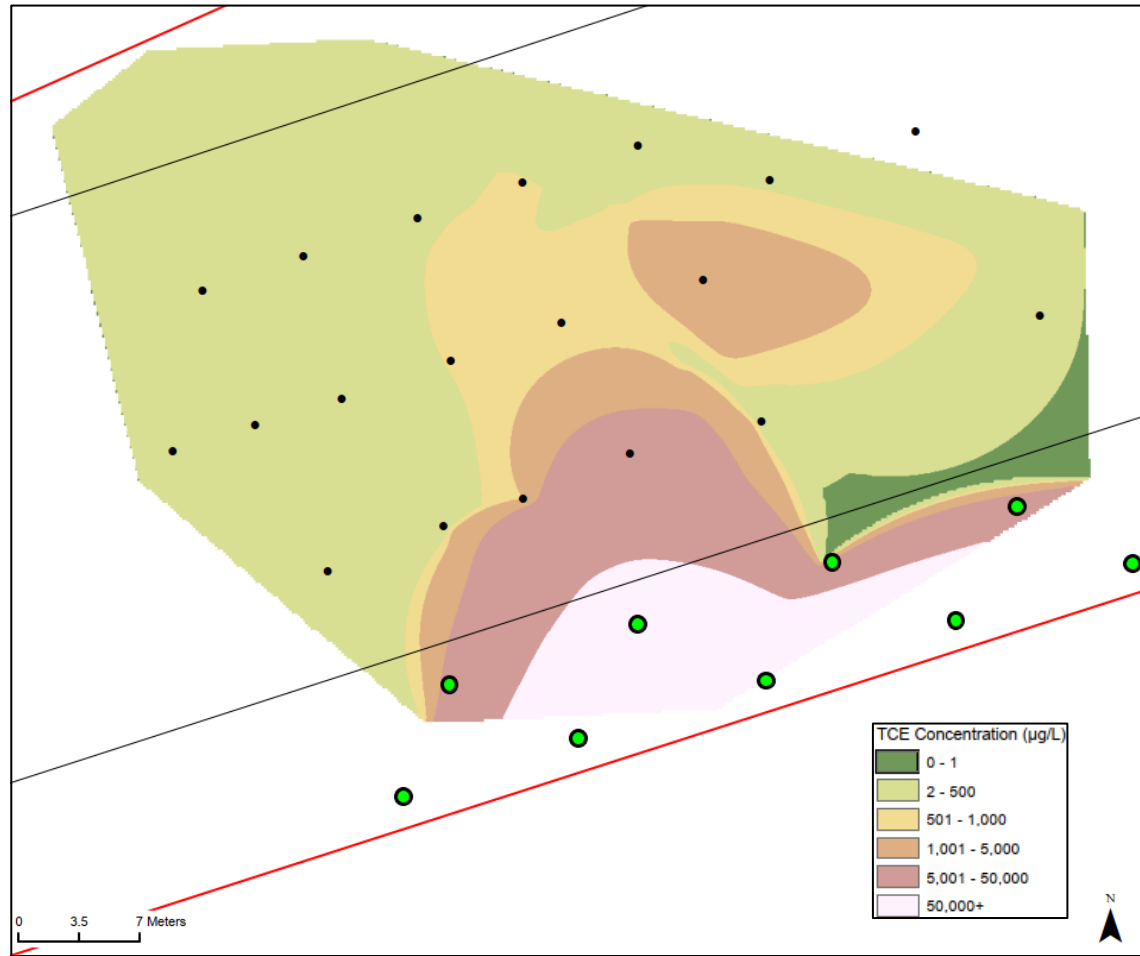
Increase Property Value +
Remove Potential Liability Via
Environmental Due Diligence

- Commercial/industrial since 1950s
- Past waste generators
- TCE – up to 200,000 µg/L
- Fine grained glacial till

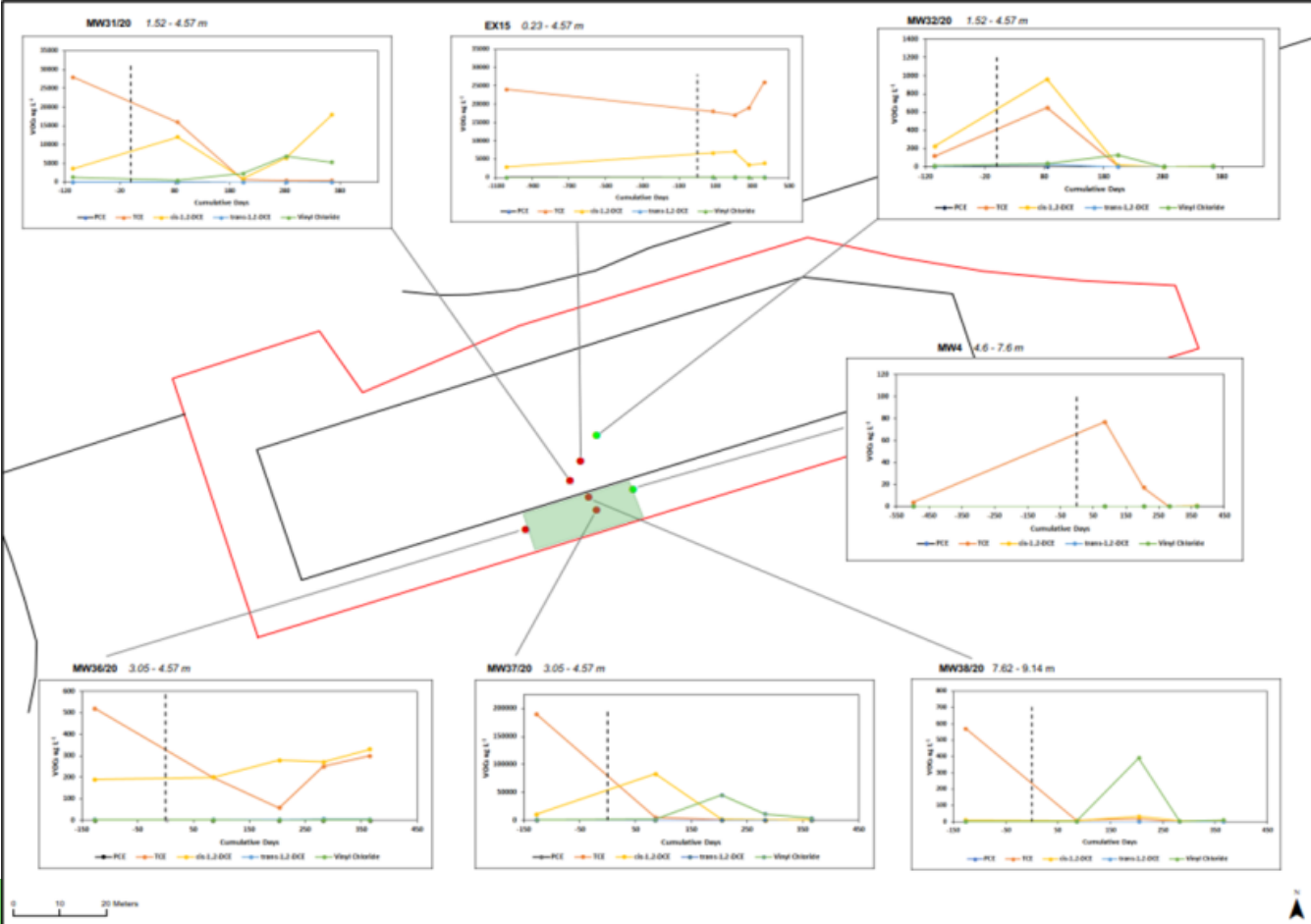


Remediation

- Source Zone Injection + Dual Phase Extraction
- EVO+KB1+ZVI

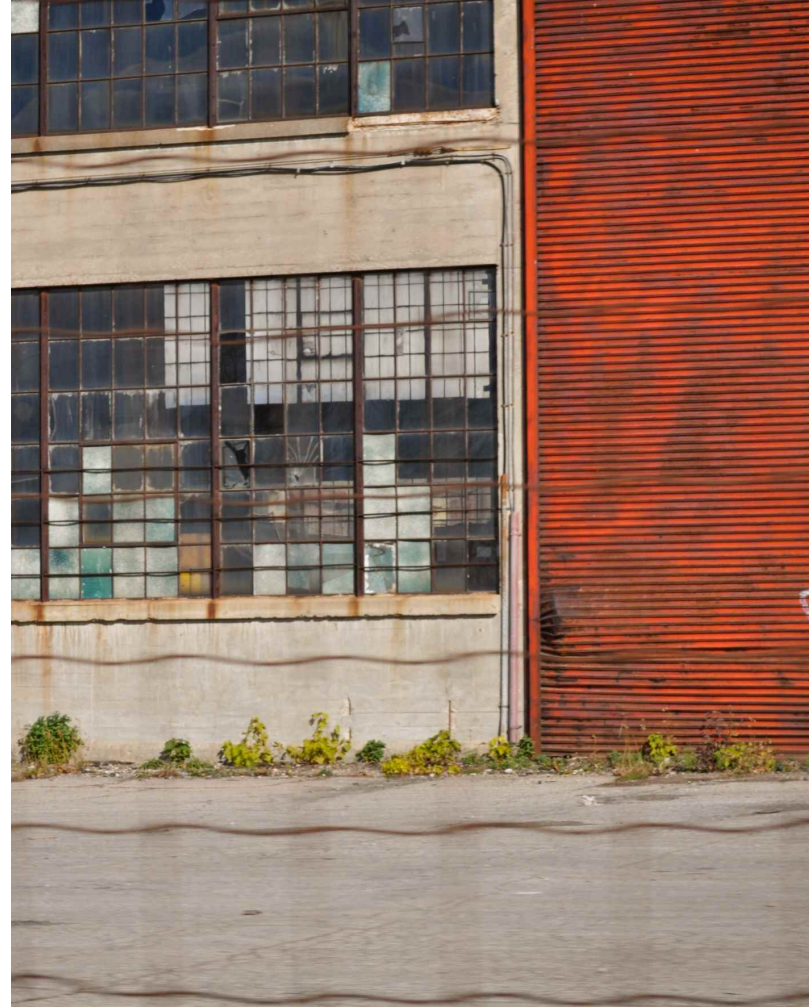


Results



Final Thoughts

- Invest in **remedial design** for success
- Bioremediation can **address back diffusion**
- **Combined remedies** often lead to a more successful remedial intervention
- **Resist the temptation to walk away** from problems
 - Quality information and advice can pay off with **realistic solutions**
 - **Creative problem-solving** can pay dividends down the line by **creating value**.



Questions?



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Questions for later?

Call us at 1-800-267-4797

Results

