KILMER BROWNFIELD EQUITY FUND L.P.

SUSTAINABLE REMEDIATION & BROWNFIELD RE-DEVELOPMENT

Former industrial site in St. Laurent, Montreal, Qc

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- Sustainable Development & Brownfield Remediation
- Former Industrial Site – Site Description
- Former Industrial Site – Site Remediation
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Introduction

Kilmer Brownfield Equity Fund

Canadian private equity fund with committed capital > $90 million

First dedicated Canadian brownfield fund and an experienced management team

Fund investment sweet spot of $5 to $15 million in land, planning and remediation costs

Fund's Mandate: "Do Good and Do Well"

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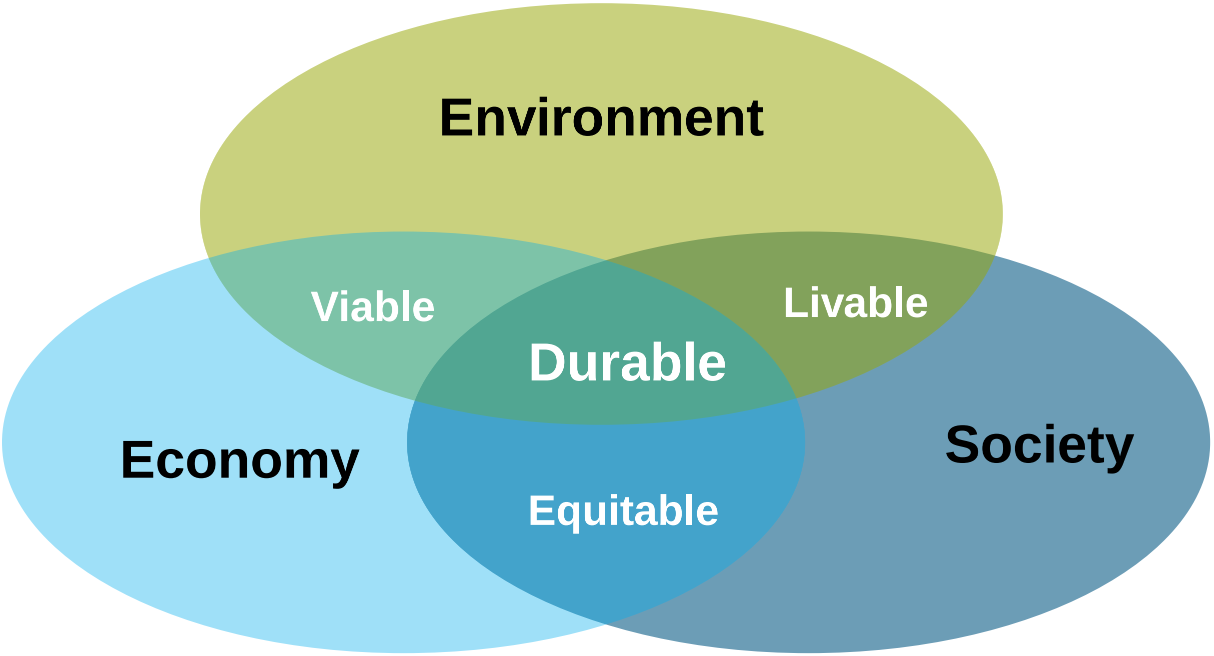
Sustainable Development (SD)

A pattern of economic growth in which resource use aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for generations to come



Urbanization Strategies

Greater Energy, Water and Material Efficiencies in the Built Environment

Public Transit Networks

Alternative and District Energy Systems

Restoration of Natural Systems

Greater Density and Intensifications

Sustainable Development & Brownfield Remediation

Brownfield Sites

Abandoned or underuse industrial or commercial sites in established locations with existing infrastructures

Various past site usages with unclear site management practices

Environmental liabilities impacting value of site

Site restoration both technically challenging and costly

Estimated 30,000 to 50,000 Brownfield Sites in Canada

Common Barriers to Brownfield Development

Potential Environmental Liabilities

- Civil and regulatory liabilities affecting both former owners and developers

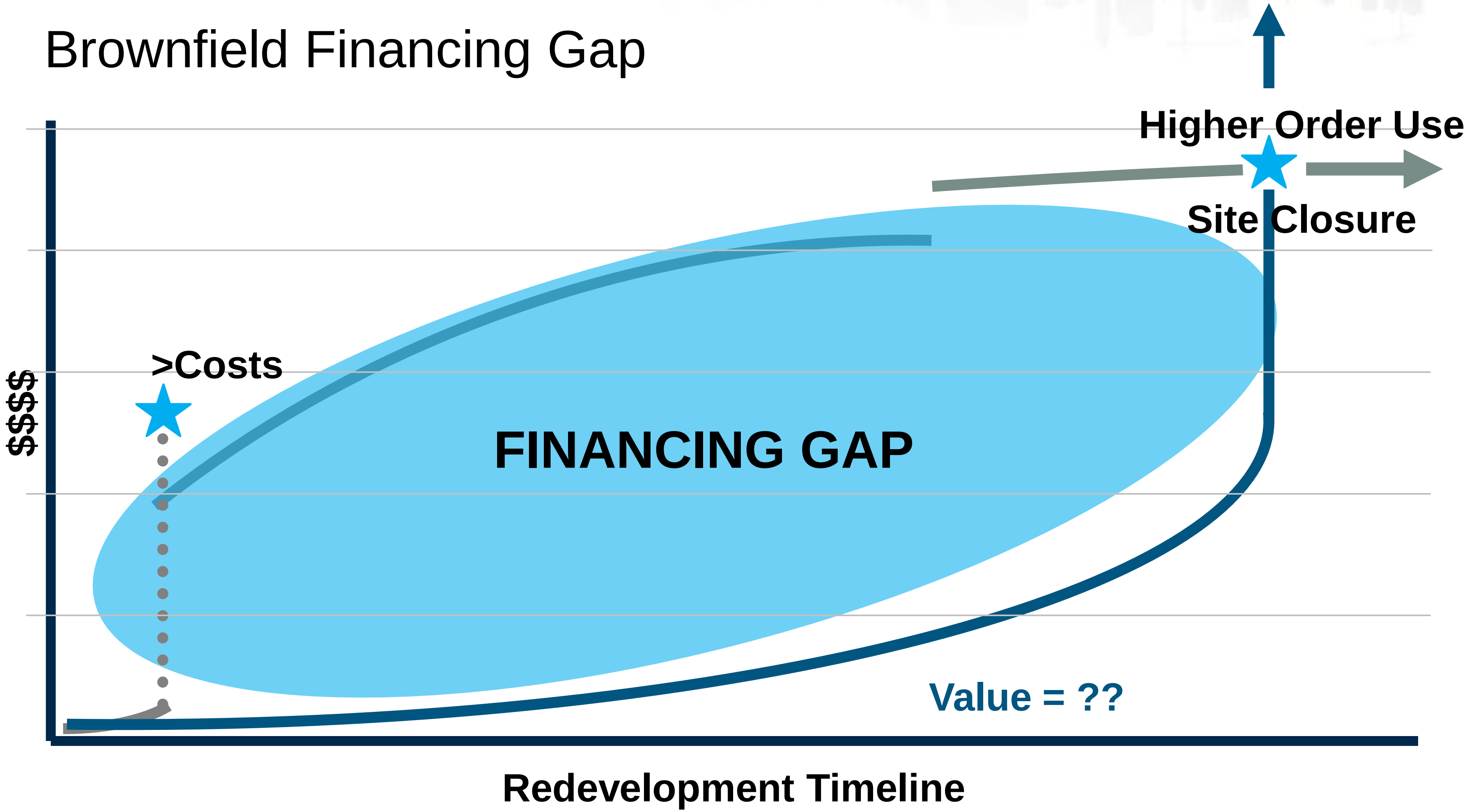
Process Uncertainties

- Timing and outcomes unclear for environmental and planning matters

Remediation Funding Gap

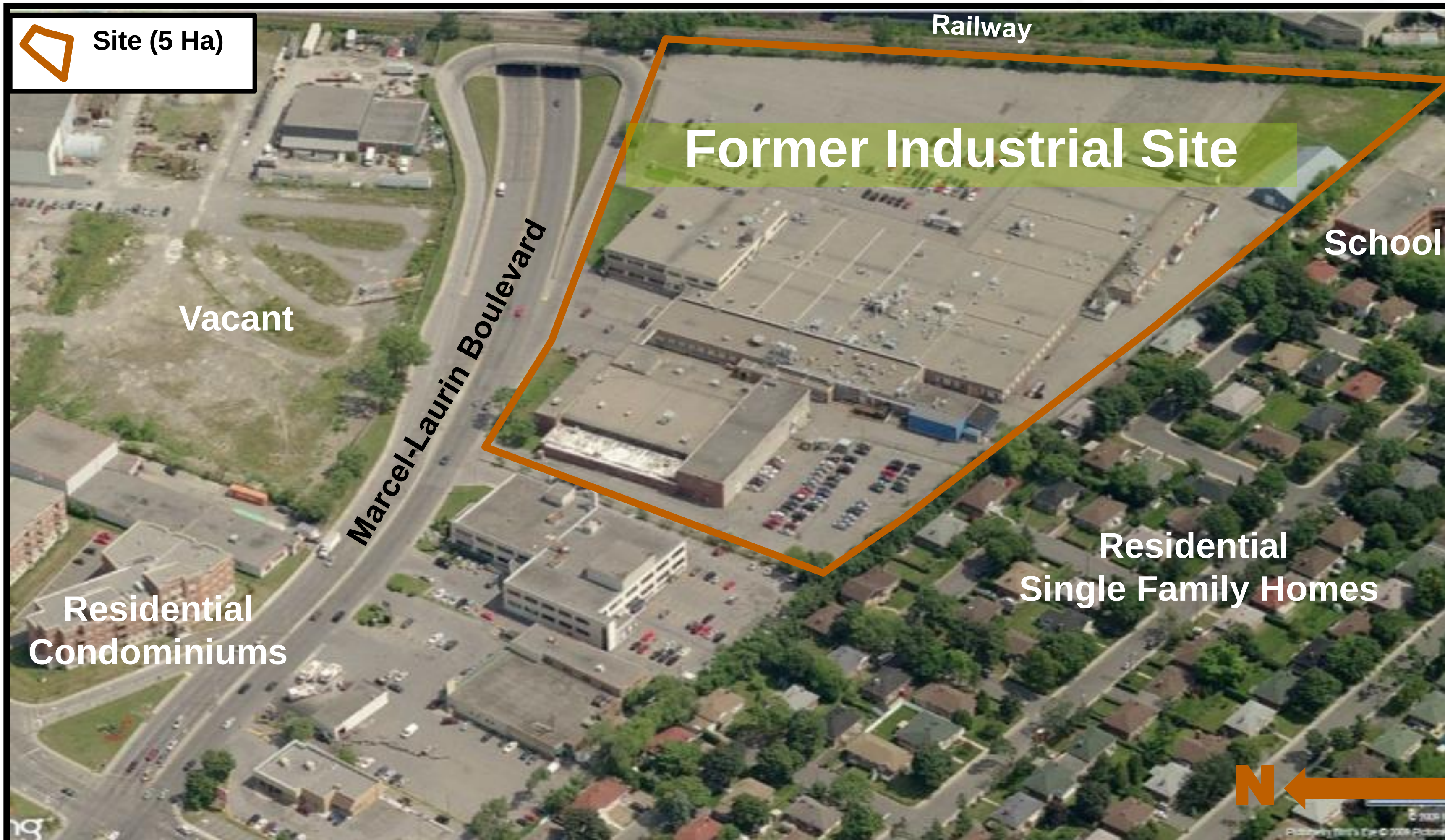
  - Conventional financing is not readily available during site restoration

Brownfield Financing Gap



The Problem: Brownfields Cannot be Valued on a Cost Basis

Sustainable Development & Brownfield Remediation



+ Sustainable Development & Brownfield Remediation

Planned redevelopment includes:

- 9 residential buildings (900-1,000 residential units)
- 1,000 underground parking spaces
- New green space with linkages to the subway station and a vegetal visual and sound barrier along the rail corridor

Sustainable Development & Brownfield Remediation

LVM

Sustainable Development & Brownfield Remediation

Traditional Remediation	Sustainable Remediation
✓ Off-site disposal of demolition material ✓ Excavation and off site disposal of impacted soil exceeding government guidelines ✓ Fill material importation on the site	✓ Environmental Risk Assessment Approach (ERA) ✓ Reuse of demolition material ✓ Use of Green Remediation Techniques ✓ Reuse of on site treated soil ✓ Risk Mitigation Plan ✓ Innovative construction design
✓ No site restriction ✓ Short remedial timeline (< 6 months)	✓ Possible site restrictions (no basement, minimum layer of clean soil under structures, etc.) ✓ Negotiation with environmental agencies and municipalities ✓ Possible site monitoring after remediation ✓ Longer remedial timeline (6 months – 2 years)
✓ Costly $$$ ✓ Production of gas emissions (GHG and others)	✓ Low gas emissions ✓ On site management of the contamination – no liabilities transferred to another site ✓ More cost effective than traditional remedial work (“dig and haul”)

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Former Industrial Site – Site Description

Assessment Data from 1990 to 2009

Soil

- 345 sampling points
- > 400 samples analysed

Groundwater

- 116 observation wells
- >100 samples analysed

Soil vapors

- 3 sampling events
- 8 samples analysed

Former Industrial Site – Site Description

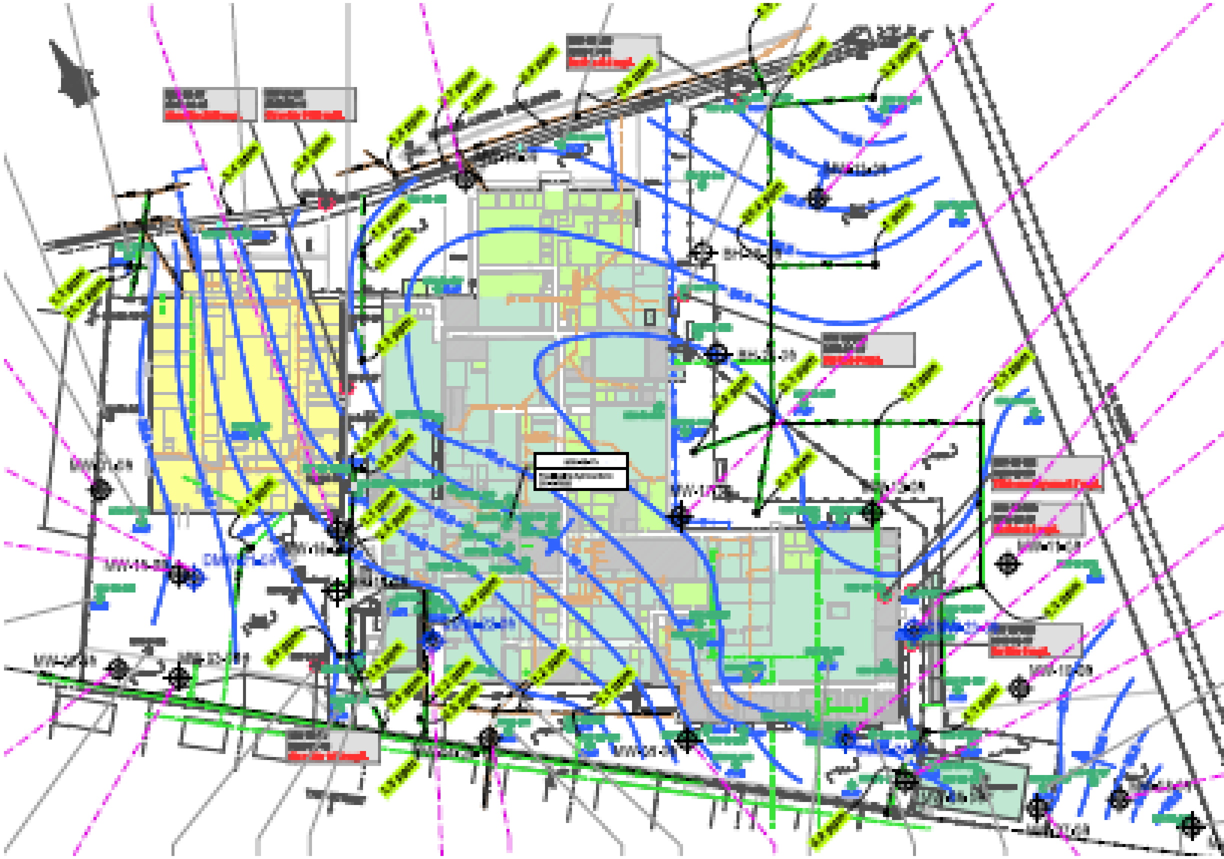
Groundwater Contamination and Flow Direction

Depth of groundwater: 2.5 to 3.5m bgs

Variable groundwater flow (W, N-E and E)

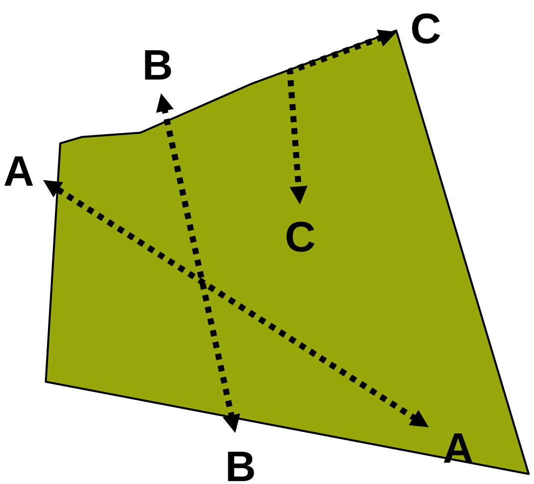
Groundwater contaminants:

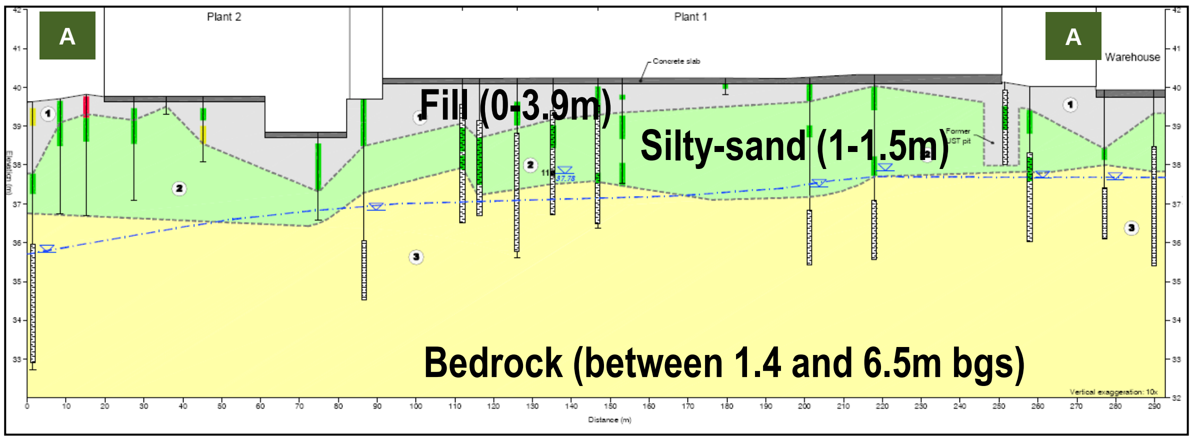
TCE, PAH, TPH C_{10}-C_{50}, Sulphide, Chloride

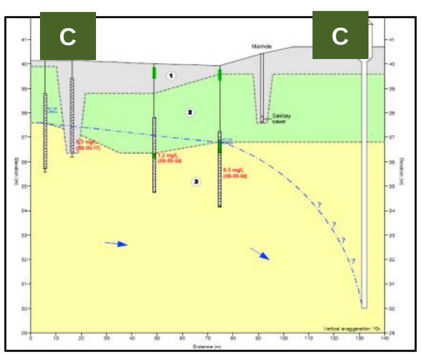


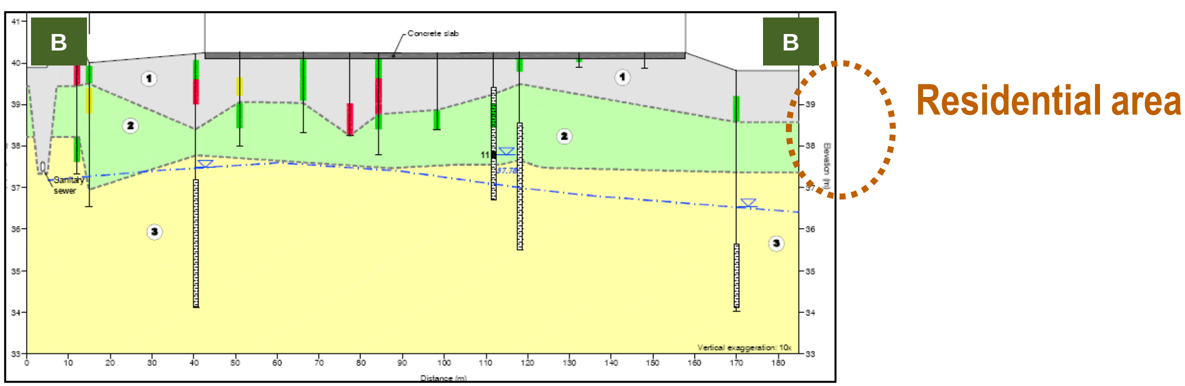
Former Industrial Site – Site Description

Site Geology





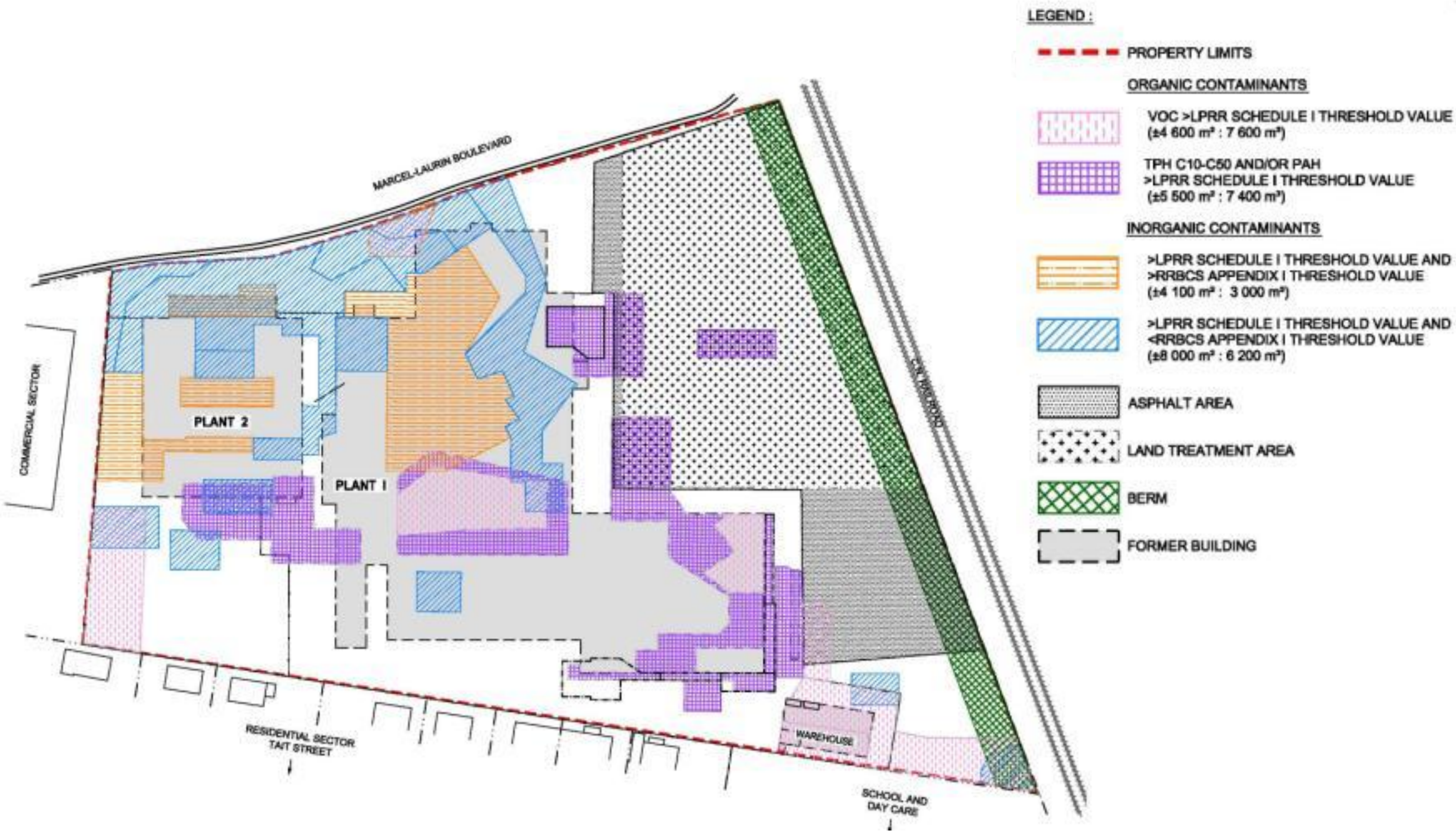




Figures adapted from Golder, 2009

Former Industrial Site – Site Description

Soil Contamination



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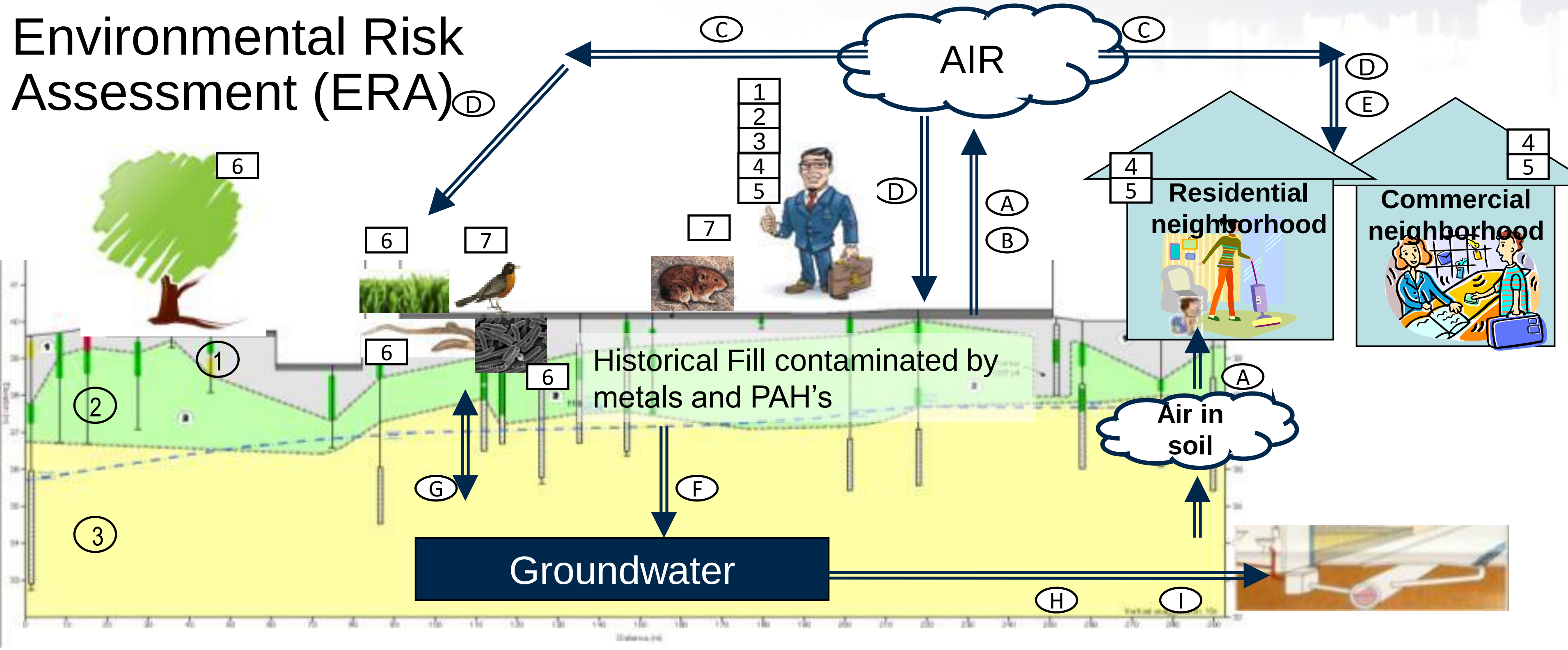
Former Industrial Site – Site Remediation

Environmental Risk Assessment (ERA)



Transportation Mechanisms

A : Evaporation, volatilisation
B : Upward movement of soil particles
C : Atmospheric dispersal
D : Precipitation/deposition
E : Outdoor air infiltration (gases and particles)
F : Infiltration to groundwater
G : Groundwater table fluctuation
H : Off-site migration by groundwater
I : Infiltration to sewers

Exposure Pathways

1 : Soil ingestion
2 : Outdoor air inhalation (gases and particles)
3 : Soil dermal contact
4 : Indoor dust inhalation
5 : Indoor air inhalation (gases and particles)
6 : Ecological receptors direct contact with soil
7 : Ingestion (plants, surface water, soil)

Stratigraphic units

1 Backfill
2 Natural soil
3 Bedrock

Former Industrial Site – Site Remediation

Approved Rehabilitation Plan and Risk Assessment

Impacted soil from former site operations (generic residential standards)

- Organic solvents (TCE) and petroleum hydrocarbons: excavation, on site bio-pile treatment and soil reuse as backfill material following treatment

Historical fills from area industries (risk based standards)

- Various metals and PAHs: remained in-place with a capping risk management measure

Former Industrial Site – Site Remediation

Approved Rehabilitation Plan and Risk Assessment

Impacted groundwater (generic sewer use guidelines)

- Free phase recovery and on-site treatment of petroleum hydrocarbons from accumulated water in excavations
- Attenuation of solvent impacts using Zero-Valent Iron (ZVI) as a soil amendment during backfilling and supplemental risk management measures
- Mitigation at the property boundary using of a permeable reactive barrier (ZVI)

Former Industrial Site – Site Remediation

Approved Rehabilitation Plan and Risk Assessment

Demolition

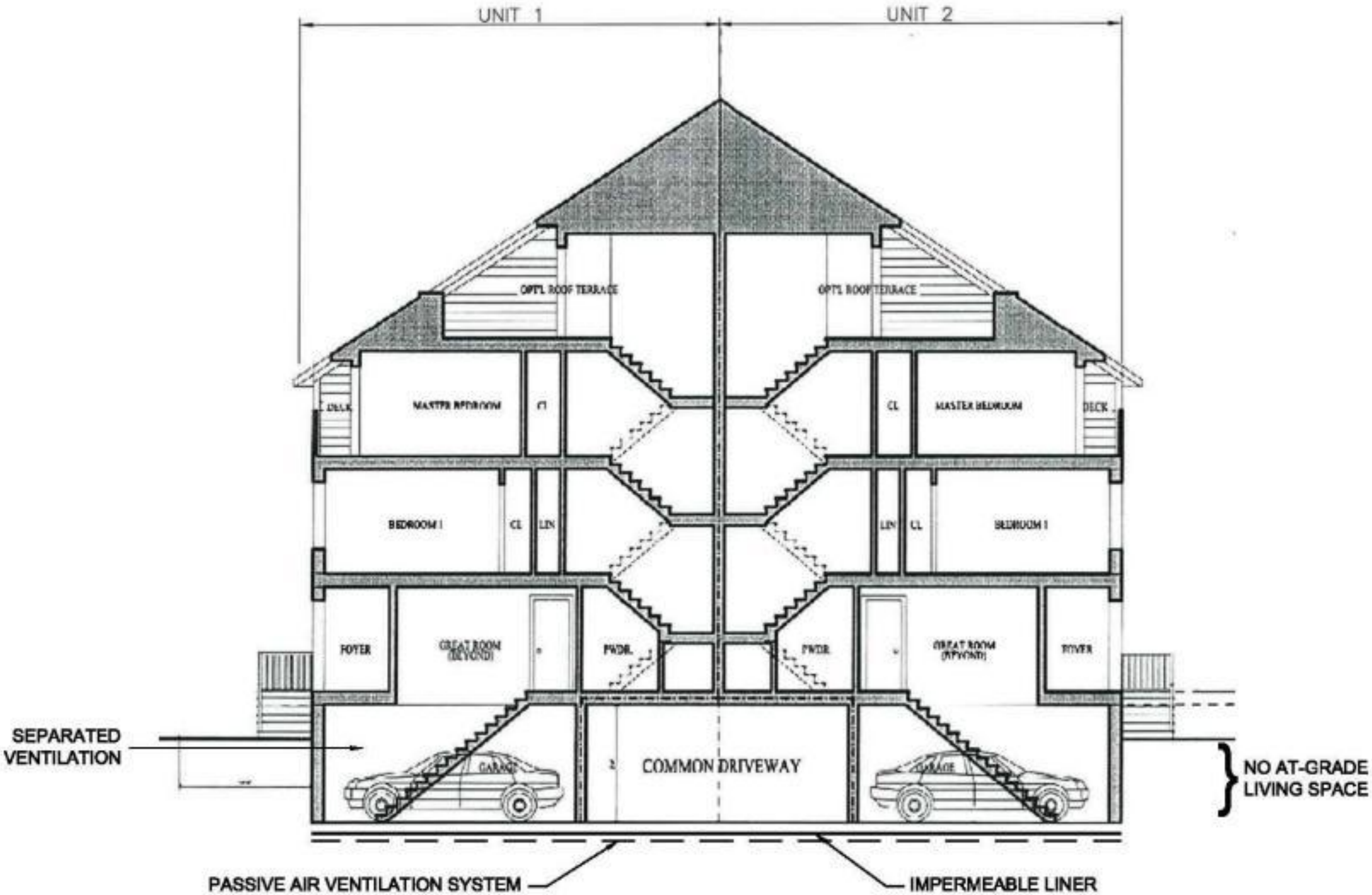
- Reuse of crushed concrete as backfill material (residential criteria)

Re-Development

- Restrictions on metals and PAH's contaminated soil (>residential) left in place

At least 0.4 m of clean fill under roads, parking, bike and pedestrian paths
At least 1 m of clean top soil cover in landscape area
At least 1m of clean fill under new buildings and along foundations

Former Industrial Site – Site Remediation



Former Industrial Site – Site Remediation

Demolition

Recycling: 89 % of materials, such as
27,000 metric tons of crushed concrete used as
backfill material or final cover and metal recycling

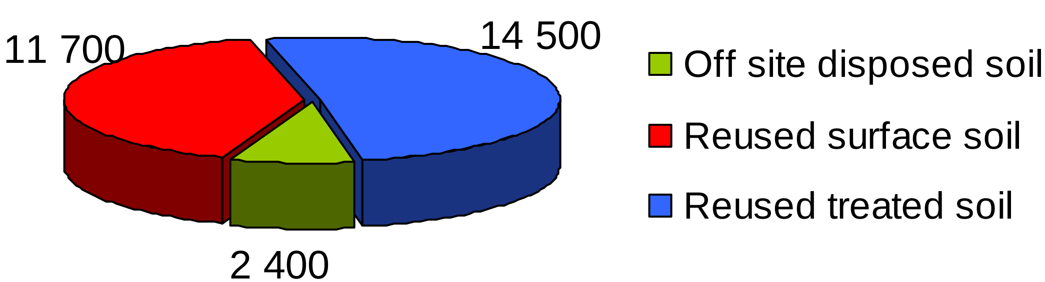
Former Industrial Site – Site Remediation

Soil

14,500 m^3 of hydrocarbon and VOC's bio-treated soil reused on site

11,700 m^3 of PAH's and metals impacted soil reused on site based on risk assessment

2,400 m^3 of heavily impacted soil treated off site at an authorized facility



Former Industrial Site – Site Remediation

Soil

Former Industrial Site – Site Remediation

Soil - "Dig and Haul" and Carbon Dioxide Emissions

(Site Specific)

Total volume of soil requiring off-site disposal	28,600 m^3
Volume of TPH and VOC's contaminated soil	16,900 m^3
Volume of PAH's and metals contaminated soil	11,700 m^3
Volume carried by each dump truck	16 $m^3$of soil
Total round trips required	**1,788 trips**

Average distance from site to disposal facilities	45 km
Total traveling distance for disposal (round trip)	160,920 km
Distance from site to clean fill location	35 km
Total traveling distance for backfill (round trip)	125,160 km
Total distance	**286,080 km**
Fuel consumption of dump truck (Source 1)	35 L/100 km
Emission coefficient (Source 2)	2.7 kg CO^2/L
Total CO^2 Emissions	270,346 kg
Total CO^2 Emissions	**270 tons**

SOURCES:

1. Reid, Lesley, Sustainability in Remediation - Calculating CO2 Emissions Associated with Varied Remediation Activities Presented at GeoEdmonton 2008
2. Environment Canada: Emission Factors for Energy Mobile Combustion Sources for Heavy-Duty Diesel Vehicles http://www.ec.gc.ca/pdb/ghg/inventory_report/2005_report/a12_eng.cfm#a12_1_4

On-site remediation can lead to 75% reduction in CO^2 emissions compared to dig and haul

Former Industrial Site – Site Remediation

Groundwater

Water treatment and management of 360,000 liters of excavation water

Amendment with ZVI to attenuate remaining cVOCs impacts to shallow groundwater after source removal and treatment

Former Industrial Site – Site Remediation

Groundwater

Installation of permeable reactive barrier to mitigate any cVOCs impacted groundwater at the site boundary after source removal and treatment

Installation of monitoring wells for groundwater monitoring

Groundwater monitoring during and after remediation at the property limits

Former Industrial Site – Site Remediation

Groundwater

Former Industrial Site – Site Remediation

On Site Monitoring and Mitigation Measures During Remedial Work

Ambient air sampling at the site boundaries

Dust control (water spray)

Visual Barrier

Excavation water and process water pumped and treated prior to disposal to sewer system

Process air (Biopile) vacuumed and treated through carbon filters

Former Industrial Site – Site Remediation

Schedule

September 2008 – Former owner put property on market

April 2009 – Following ESAs (Ph I, II & III), contamination notice for site was registered to environmental agency (MDDEP)

October to December 2009 – Kilmer negotiation with former owner to purchase brownfield site

November 2009 – Kilmer & LVM introductory meeting with environmental agency prior to purchase of site

Former Industrial Site – Site Remediation

Schedule

Summer 2010 – Demolition of plant

June 2010 to June 2011 – Negotiations with local authorities and environmental agency

April 2011 – Public meeting presenting remediation project

June to December 2011 – Remediation Plan approved and Completion of site remediation

May to July 2012 – Attested report and notice of restriction

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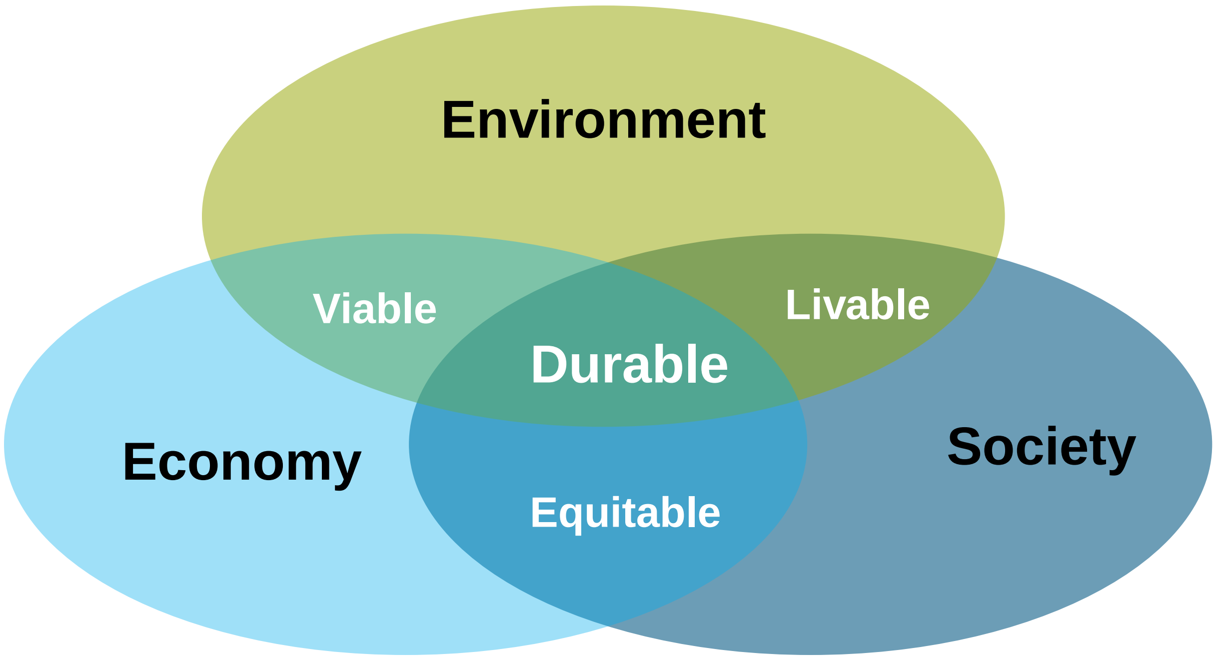
Environment

Brownfield remediation that will allow greater urban intensification

Reduced off-site disposal and increased waste recycling on site through the remediation process.

Use of green remediation technologies that reduced greenhouse gas emissions by 75%

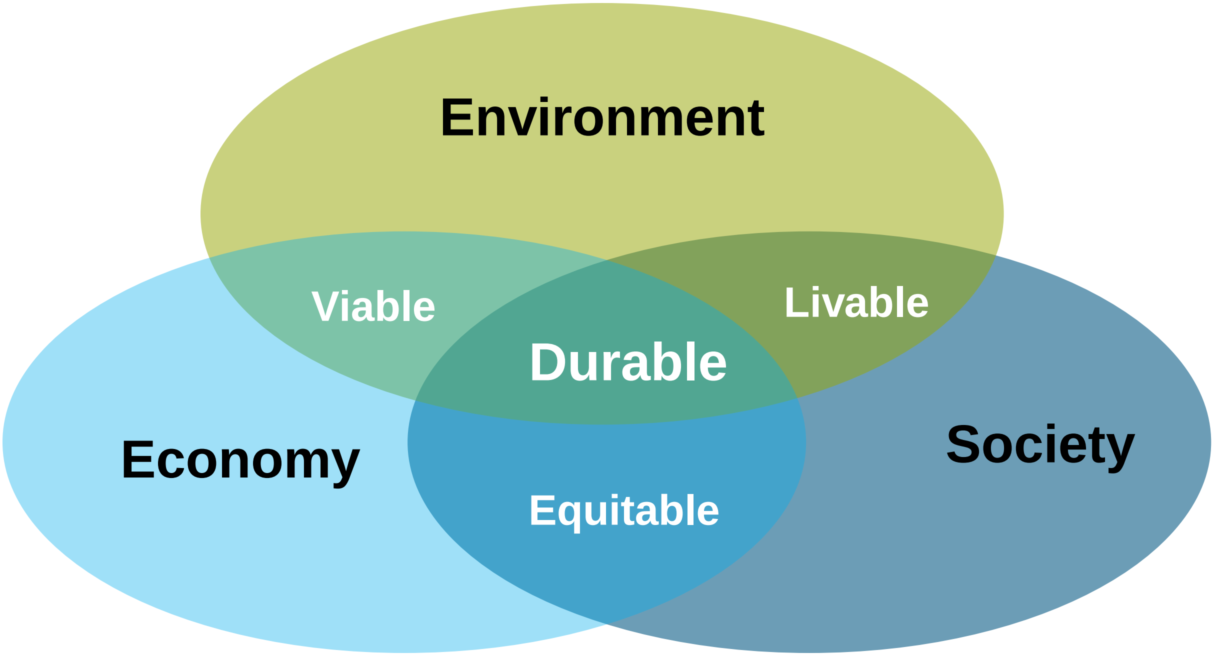


Conclusion

Society

Involvement of the population through public presentation

Reappropriation of land for community use

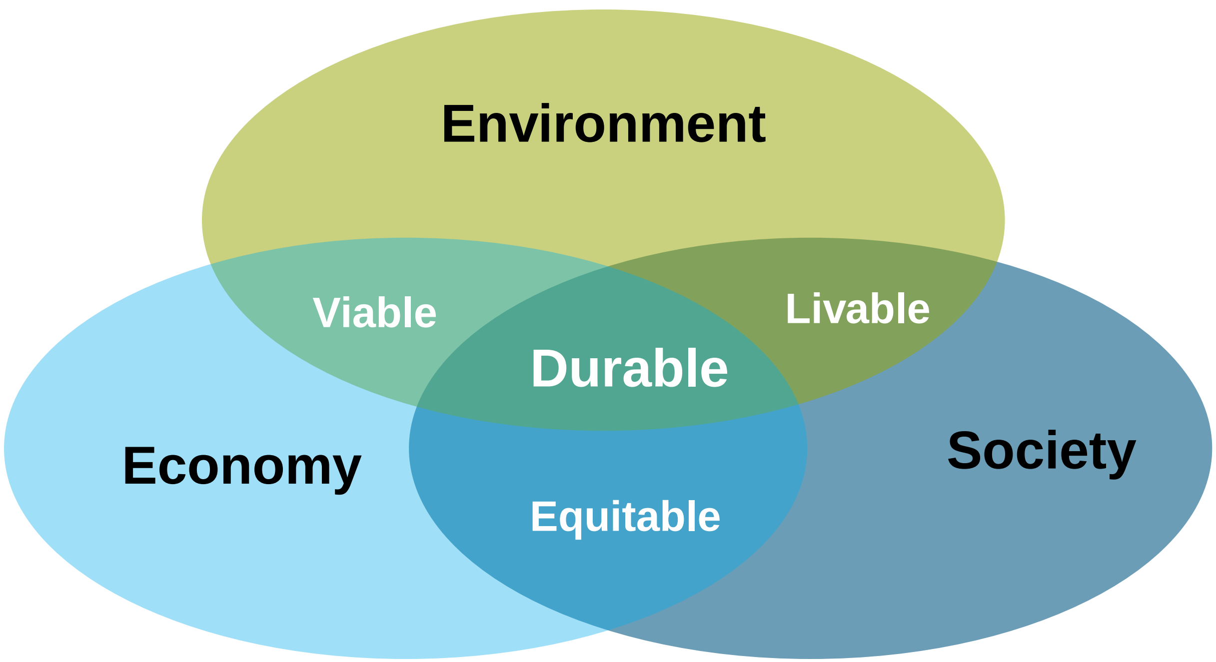


Conclusion

Economy

The rehabilitation of a brownfield was made possible through a sustainable approach that lowered the remediation costs and made the project viable

The remediation was completed on time and on budget



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Acknowledgements

MESIQ (ERA, Dr. Sylvain Loranger)

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Thank you

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