Remediation Technologies Symposium October 21<sup>st</sup>, 2010



# ADDRESSING ENVIRONMENTAL CONCERNS DURING THE EAST VILLAGE BROWNFIELD REDEVELOPMENT PROJECT

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Top: 1976 East Village/Fort Calgary. Source: Government of Alberta, SRD Bottom: Groundwater monitoring well on RiverWalk, 2010. Source: Stantec

- » Background and History.
- » Initial Environmental Assessments.
  - Phase I ESA.
  - Phase II ESAs.
- » Start of Brownfield Redevelopment.
  - Stormwater Management Pond.
  - Infrastructure Construction.
  - » Risk Management Plans.
  - Rationale.
  - Development.
  - Regulatory Process.
  - Implementation.
- » Current Status and Future Plans.



Outline

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#### Background & History







#### Background & History (Continued)



"North West Mounted Police, Fort Calgary". Year 1878. Source: Library and Archives Canada, www.collectionscanada.gc.ca



1924 Aerial Photograph Source: Government of Alberta, Sustainable Resource Development Air Photo Distribution, http://www.srd.alberta.ca/



"Eighth Avenue looking east from Third Street East, Calgary, Alta." . Yr 1910. Source: Library and Archives Canada, www.collectionscanada.gc.ca



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#### Background & History (Continued)

- » East Village in the 2000s:
  - Neglected neighborhood.
  - Abandoned businesses.
  - Derelict buildings, vacant lots.
- » Statistics:
  - Population of 2,437 (2009). \*
  - 83.8% rented dwellings (2006) vs. 27.2%
    in Calgary. \*\*
- » Need for redevelopment.
- » Prime location adjacent to downtown core and rivers.

\* The City of Calgary Civic Census, 2009 \*\* Statistics Canada, 2006 Census of Canada



#### Initial Environmental Assessments

## Phase I ESA, 2004

- » 42 City-owned and unencumbered properties.
- » Environmental concerns:
  - Rail lines/spur lines.
  - Lumber yards.
  - Automotive
    garages/dealers.
  - Service stations/fuel storage.
  - Tanneries and abattoir.
  - Dry-cleaners.
  - Garbage incinerator.
  - Manufacturing operations (glass, battery, metal).





## **1962 Aerial Photograph**

#### Initial Environmental Assessments (Continued)





## **1962 Aerial Photograph**

#### Initial Environmental Assessments (Continued)





C M L C





### Phase II ESAs, 2004 and 2005

- » 33 of the 42 properties assessed.
- » 100+ boreholes and monitoring wells.
- » Soil and groundwater samples analyzed for contaminants of concern.
- » Findings:
  - Fill material to varying depths.
  - Debris pockets.
  - Exceedances of CCME criteria.
    - PAHs in soil.
    - Metal components in soil.
    - Salinity parameters in soil.
    - Low levels PHCs in soil.
    - Low levels PHCs, VOCs, PAHs in groundwater.









east

village

#### Start of Brownfield Redevelopment

- » Formation of Calgary Municipal Land Corporation (CMLC) in 2007.
- » Redevelop and revitalize East Village.
- » Mixed residential/commercial neighborhood.
- » East Village Master Plan (2009).

## Environmental Management: Key Component of the Redevelopment







## Stormwater Management Pond, 2007

- » Purpose:
  - Capture and treat stormwater runoff from East Village area.
  - Wetland.
- » Pre-construction assessments:
  - Testpits, boreholes, monitoring wells.
  - Soil and groundwater analysis.
- » Results:
  - Fill materials and debris.
  - PAHs/metals in fill soil.
  - 34,000 m<sup>3</sup> excavated soil.
    - 4,400 m<sup>3</sup> re-used on-site.
    - 16,500 m<sup>3</sup> re-used as landfill cover material.
    - 13,100 m<sup>3</sup> landfilled.
  - 58,500 m<sup>3</sup> water to sanitary sewer.

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#### Infrastructure Construction Phasing Plan



#### Original Drawing by Progressive Engineering for CMLC, Nov. 25, 2009

Start of Brownfield Redevelopment (Continued)



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## Phase I Infrastructure Construction Assessment

»Findings:

- Impacted fill materials.
- Pockets of debris.
- PAHs/metals in soil.
- No NAPL.
- No elevated vapours.

»Development of Risk Management Plan for the Infrastructure.







## Rationale: Why RMPs instead of remediation?

- » Contaminant source widespread.
- » Contaminant source not clearly defined.
- » Responsible parties not easily identified.
- » Environmental criteria very stringent due to land use and location.
- Majority of contaminants exceed Tier 1 guidelines for DUA and FAL.
- » Remediation to Tier 1 for soil/groundwater not attainable.
- » Removal of impacted fill not realistic or sustainable.
- Groundwater impacts and porous geologic material clean backfill would be re-impacted.
- » Exposure Control approach Risk Management.



#### Development: Risk Assessment

- » Human and Ecological Risk Assessment (2007) recommended the following management options:
  - 0.30 m of clean cover soil to address potential human health risks.
  - Groundwater monitoring and assessment of background concentrations to address potential ecological health risks (aquatic life).
  - Utility corridor inspection and the use of liners/plugs to mitigate off-site migration and impacts to utilities.



## **Development: Objectives**

- Provide practical solution for management of impacted soil and groundwater.
- Protect workers during construction activities.
- » Mitigate risk to future users of the site.















#### Risk Management Plans (Continued)

## **Regulatory Process**

- » Communication with regulatory authorities:
  - Alberta Environment.
  - City of Calgary.
  - Calgary Health Region (now Alberta Health Services).
- » Reporting:
  - Assessment results.
  - Risk management recommendations.
  - Closure reports.



## Implementation: General Description of the Infrastructure RMPs

- » Re-use of fill and native material as backfill within utility corridors (free of debris/staining/odours and geotechnically suitable).
- » If soil with debris/staining/odours encountered stop work and reassess.
- » Soil with visible debris removed for off-site disposal.
- » If elevated vapours encountered install vapour liner.
- » Minimum of 0.30 m cap upon construction (asphalt, road subgrade, imported fill, vegetation).
- » Specific management recommendations for anomalies.







#### Risk Management Plans (Continued)

## **Implementation: Site Activities**

- » Site supervision and monitoring.
- » Collection of samples at regular intervals within the utility trench.
- » Assessing soil with debris, staining and/or odours if encountered.
- » Supervising re-use of soil within utility trenches.
- » Overseeing disposal of soil to appropriate landfill facility.
- Overseeing disposal of groundwater to sanitary sewer with proper permit.





## Groundwater Management

- Disposal of groundwater from utility trenches to sanitary sewer.
- Installation of groundwater monitoring wells along perimeter of East Village for post-development monitoring/sampling.





## Challenges

- » Large-scale project.
- » High visibility.
- » Unknowns.
- » Time constraints.
- » Contractors.

#### Successes

- » Regulator co-operation.
- » Successful implementation.
- » Re-use of soil on-site.
- » Re-use of low level impacted soil as landfill cover.
- » Economic savings.



#### Summary of Environmental Work (2004 – 2010)







#### » Current:

- Ongoing infrastructure construction (several Phases) and implementation of RMPs.
- 4<sup>th</sup> Street Underpass project.
- RiverWalk pathway.
- Ongoing groundwater monitoring of postdevelopment groundwater monitoring wells.
- » Future Plans:
  - Future infrastructure construction phases.
  - Developers to buy and redevelop land.
- » 15% of developable land sold to major developer in October 2010.





#### Questions





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