Soil Reuse Strategies on Toronto's Waterfront

October 12, 2017

RemTech

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Agenda

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Overview

Case Study #1

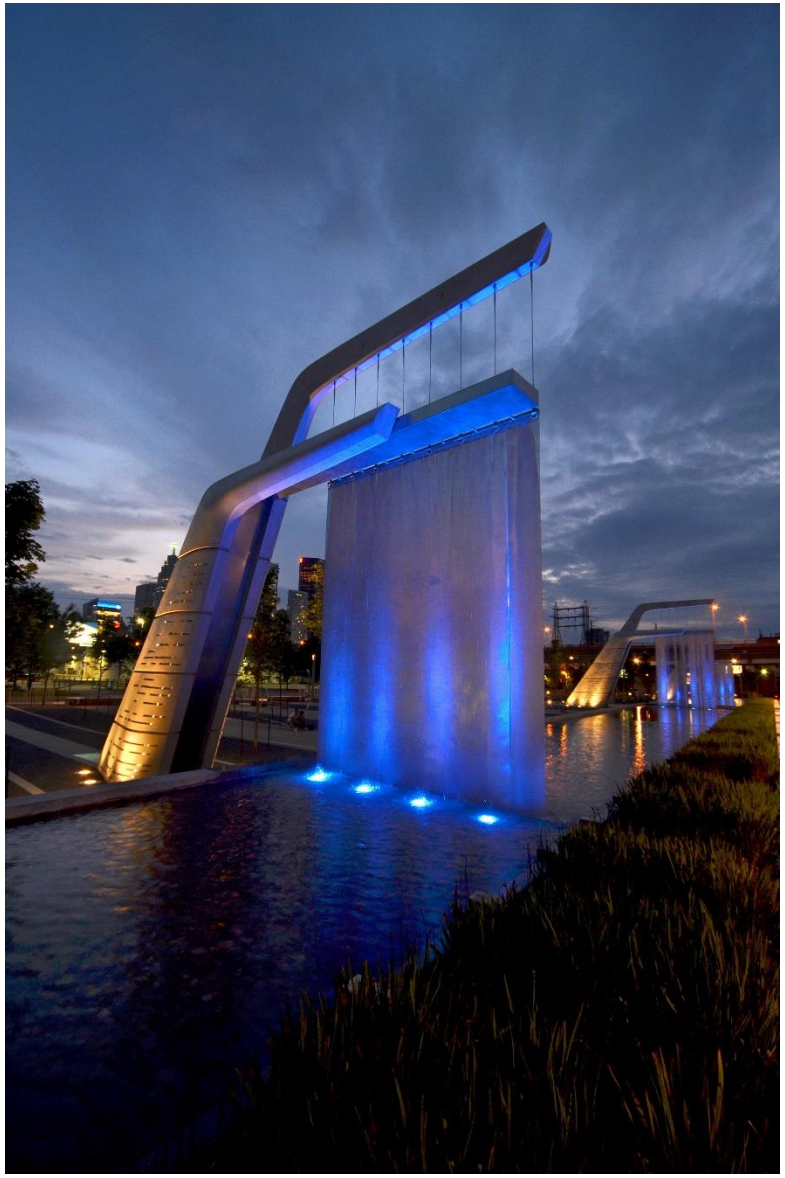
Case Study #2

Case Study #3

Case Study #4

Conclusions

Overview



- Evolving regulations for excess soil
- Cost impact of soil disposal
- Sustainability framework prioritizes leaving soil in place or recycling soil at treatment facilities

Case Study #1 – Park Construction Soil import

- 4 ha park under elevated expressway
- Historic site (Fort York)
- Risk Assessment with development of surface cap as RMM
- Documentation of RMM quality and placement
- Imported soil to meet Ontario Table 3 Standard

Imported Material

- 22 different landscape materials/composites/planting mixes
- 9 different aggregates types from 12 different suppliers
- Is it Soil? Does it need testing?

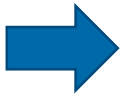
3000 m^3
Soil ✓
Testing ✓

40m^3
Soil = No
Testing ✓

10m^3
Soil =No
Testing = No

Soil Testing

- Source soil north of Toronto in former agricultural land
- Composite of compost, sand, peat, topsoil to create planting soil mixes



Soil Testing

- Quality requirements from duty of care risk assessment
- DCSLRA updated to accept imported soil meeting risk based criteria

	Table 3	Soil Pile	Risk Based Criteria
EC	0.7	0.726 to 0.914	2.0
cyanide	0.051	<0.050 to 0.083	0.11
PHC F3	300	302 to 415	No change Attributable to natural organics

Case Study #2 – Ferry Terminal Infrastructure Project Soil On-site Repurposing

- Ferry terminal revamp
- Phase 1 includes tree-lined granite walkway
- Will require soil excavation

Case Study #2 – Ferry Terminal Infrastructure Project Soil On-site Repurposing

- Trees planted in soil cells
- 1500 m^3 of soil to be relocated to install soil cells
- Cost estimates indicate soil disposal significant

Level of Estimate	Soil disposal cost	Assessment
Class B (-10+15%)	$360,000	10% of overall project cost
Class A (-5+10%)	$57,000	<5% of overall project cost

Case Study #2 – Ferry Terminal Infrastructure Project Soil On-site Re-purposing

Potential opportunity:

- Soil to be repurposed within the project area in hill features capped with 0.5m of planting soil
- Use inspection procedures to assess soil prior to repurposing

Case Study #3 –Lakefilling Soil Import

- Lakefilling to remove flood restriction from existing bridge, relocate bridge and road, build new park
- Create 12,000 m^2 of aquatic habitat, two cove beaches, kayak/canoe launch area

Case Study #3 –Lakefilling Soil Import

- 320,000 m^3 of fill required
- Fill Quality?

Case Study #3 –Lakefilling Soil Import

- Source QP Documentation on Quality
- Transit
  - Pre-established weigh bills
  - Tracked route/license plate
- Receiving
  - Visual inspection
  - Audit/possibility of rejecting load
- Receiving QP Documentation on Placement

Case Study #4 – Building a river

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Case Study #4 – Building a river

Unique and Unprecedented:

- River Mouth concept as flood protection
- No established regulatory approval process for creating a river in brownfield

After Flood Protection:

- New Don River mouth
- Don Greenway (north of the Ship Channel)
- Improved Keating Channel
- Additional Infrastructure to drive development

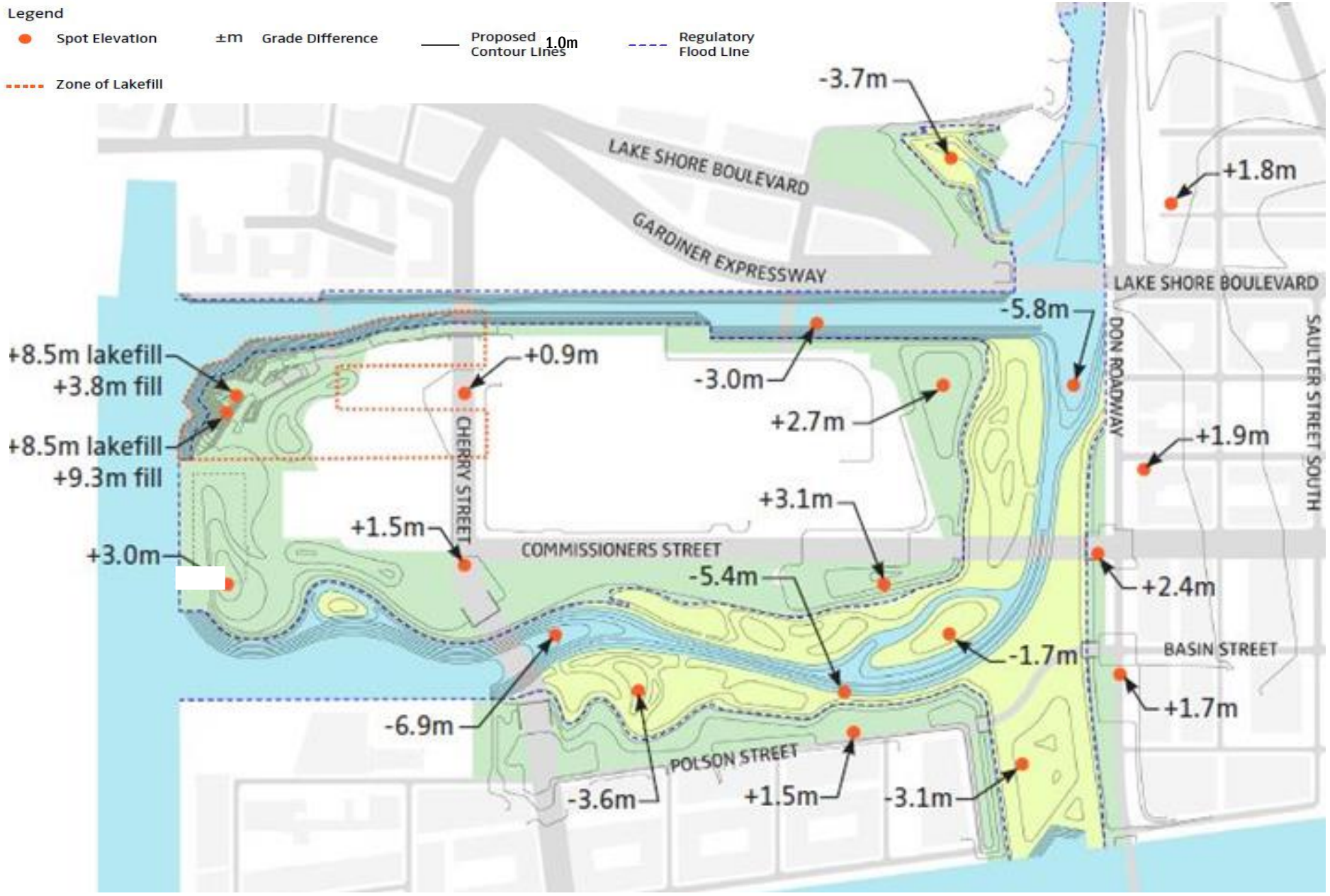
Case Study #4 – Building a river

Flood Plain

Flood Protected

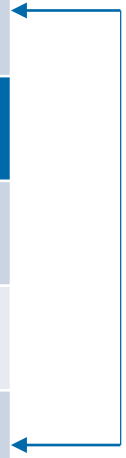
Flood Protection Landform

Case Study #4 – Building a river



Case Study #4 – Building a river

Excavated Soil	
Dry soil	581,000 m^3
Wet soil	616,000 m^3
Total Excavated soil	1,197,000 m^3
Soil to Raise Grades	
Below Barrier	162,000 m^3
Barrier Soil	611,000 m^3
Total Fill required	773,000 m^3



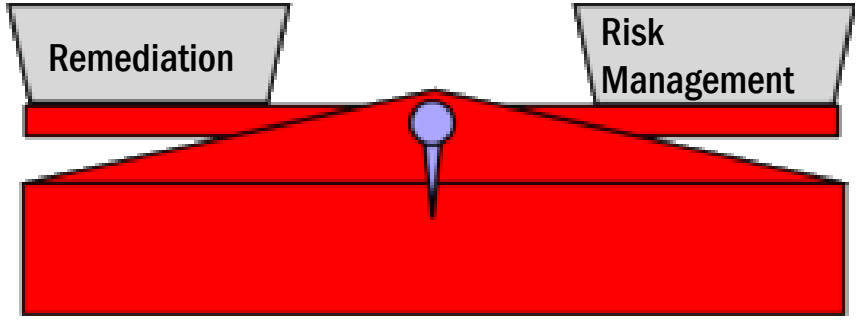
Case Study #4 – Building a river

Challenges:

- Environmental: widespread environmental contamination, free phase, metals in some areas (lead >120 ug/g)
- Geotechnical: compressible peat, flowing sand, low strength soil

Case Study #4 – Building a river

- Quest for innovative but proven technologies to address the environmental and geotechnical challenges
- 13 bench-scale tests using soil samples from the Port Lands
- Six teams completing field-scale pilot tests



Conclusions

- Each project has a unique disposition on soil
- Challenge the project team to maximize opportunities for managing soil
- Early soil vetting allows ranges of options
- Validate and document procedures for due diligence

Questions?