Below the Surface:
A look into BC Hydro's new West End Substation Project

British Columbia Expropriation Association
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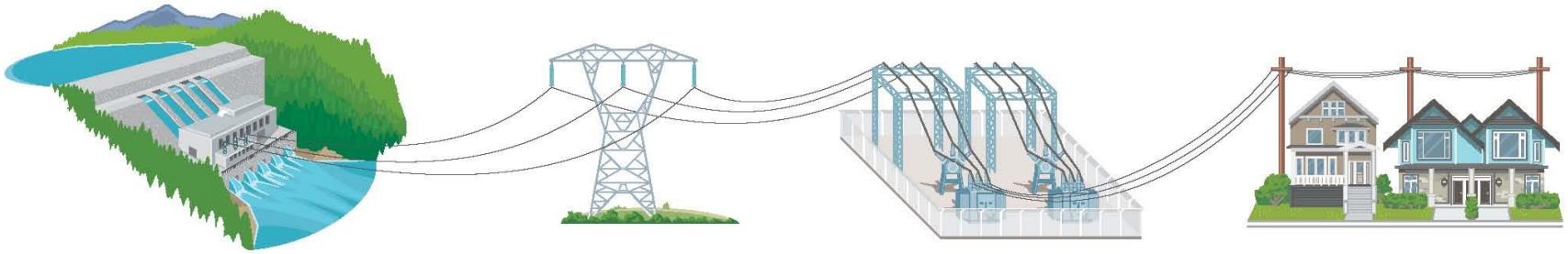
Introduction

- It’s our job to ensure people in the downtown core have access to reliable power.
- Last year, more than 98% of the electricity generated in the province was from clean or renewable resources.
- Substations serving downtown Vancouver are aging and seismically at risk, needing to be upgraded or replaced.
- We have been exploring options for where we can site a new West End Substation since 2014.

Our electricity system



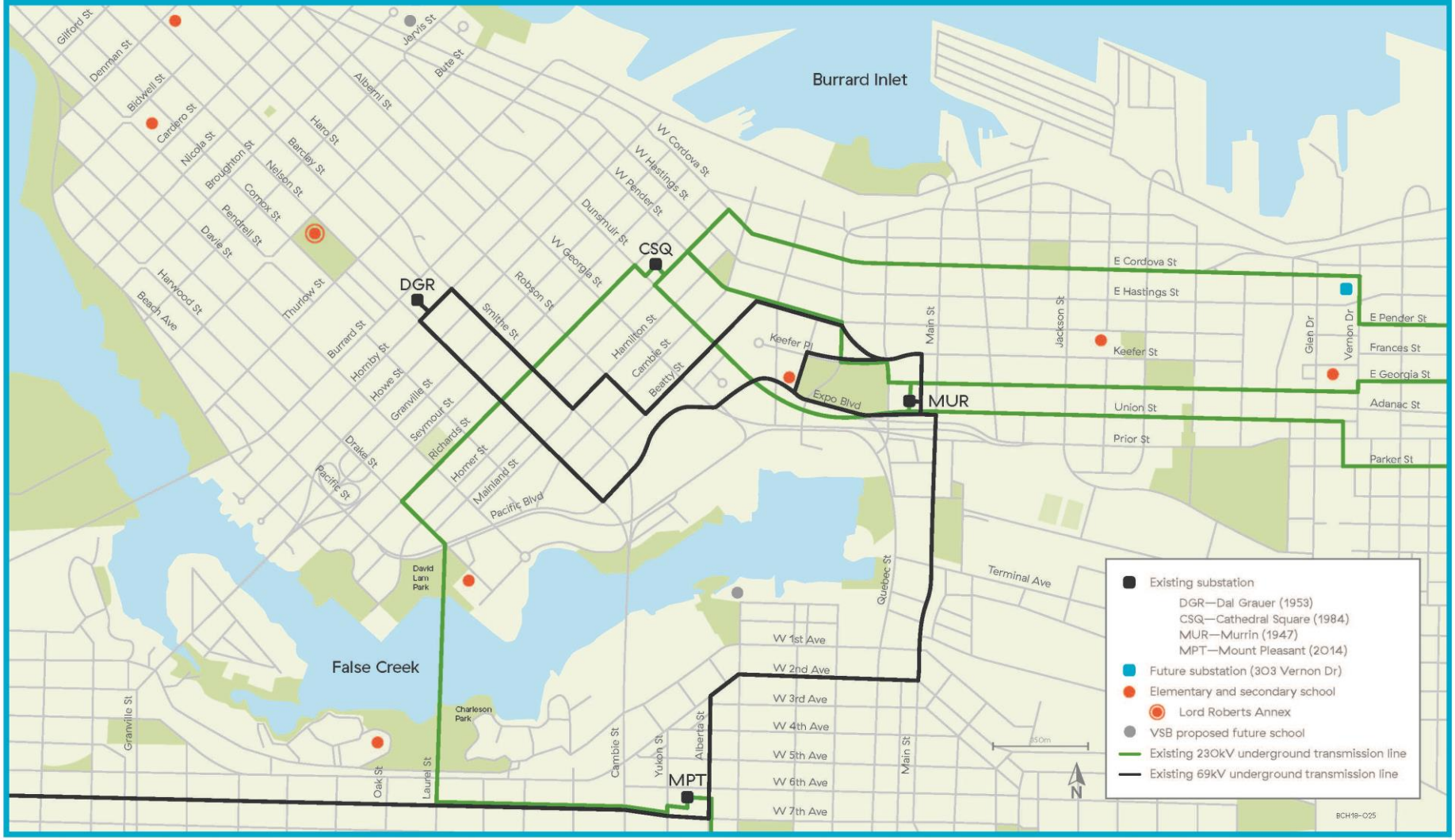
Generation:
Electricity is generated by BC Hydro and independent power producers.

Transmission:
Electricity is moved from where it is produced to where it is used.

Substations:
Voltage is reduced at substations to provide power suitable for use in homes and businesses.

Distribution:
Low-voltage electricity is provided safely to neighbourhoods and businesses.

Downtown Vancouver Electricity Supply



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Downtown Substation Service Areas

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Dal Grauer Substation - 1953 and 2017

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Cathedral Square Substation

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Murrin Substation – 2017 and 1949

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Mount Pleasant Substation

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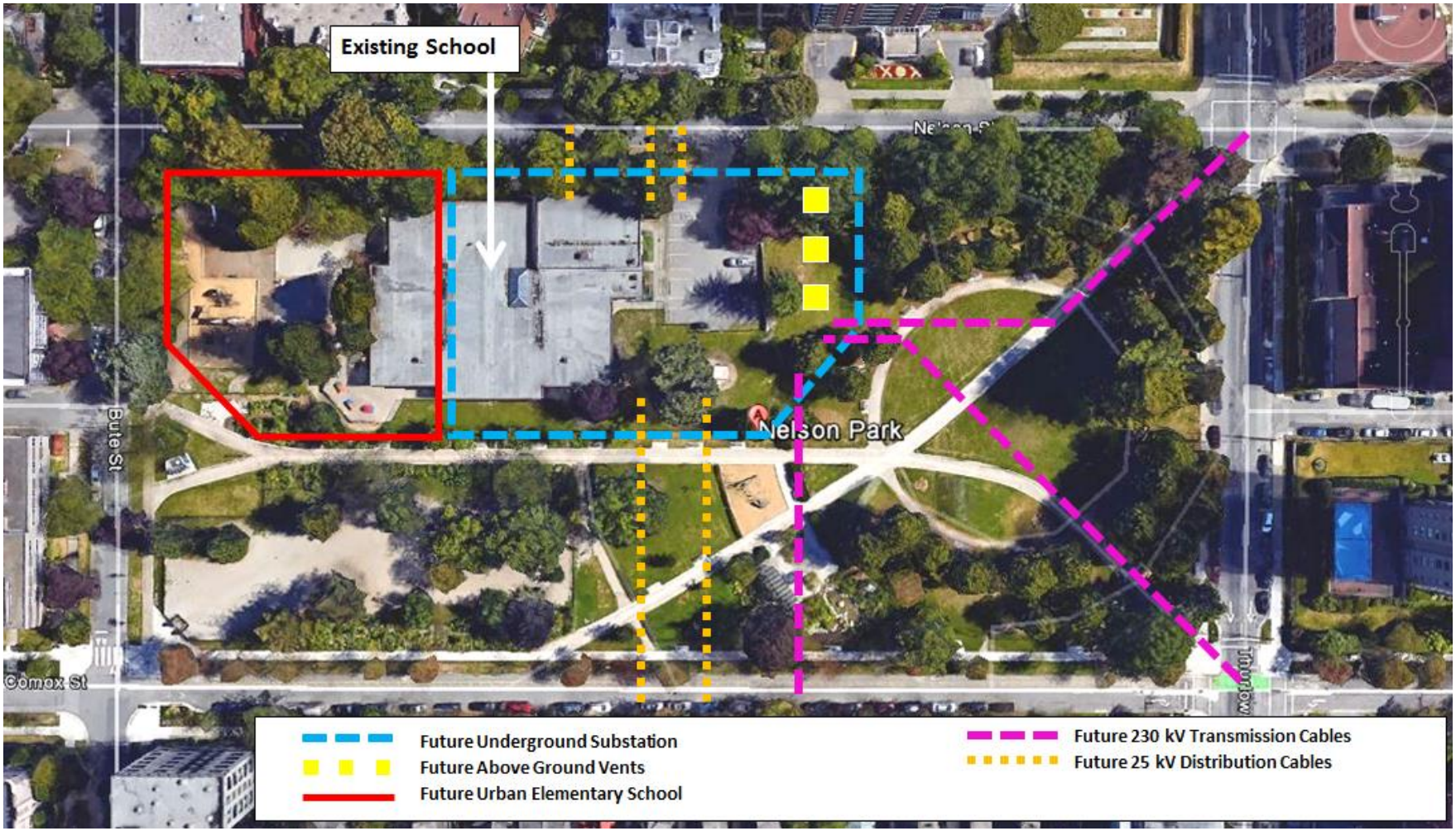
Lord Roberts Annex Proposal to the Vancouver School Board

- Earlier this year, we worked with the VSB to re-visit our proposal of a substation underground at the Lord Roberts Annex property.
- In exchange for underground property rights, the VSB would receive funds to build a new Coal Harbour Elementary school.
- After Lord Roberts Annex students relocate to a new Coal Harbour School, BC Hydro could begin underground substation construction (early as 2023).
- At the Lord Roberts Annex property, it would result in an out-of-sight underground substation topped by an all-weather playing field, and allow for construction of a new elementary school after the substation is complete.

Lord Roberts Annex Proposal to the Vancouver School Board



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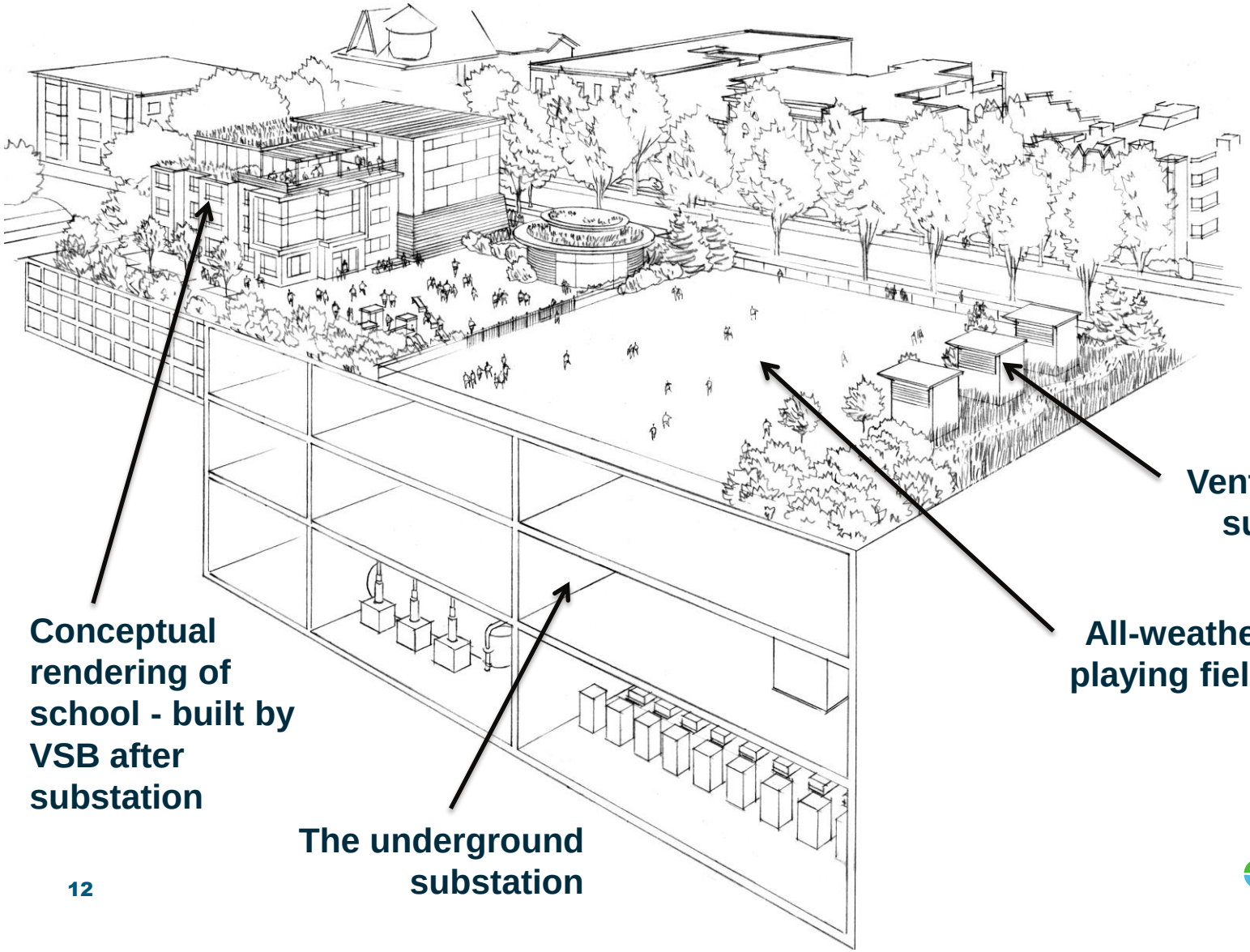
Lord Roberts Annex Proposal to the Vancouver School Board



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Lord Roberts/Nelson Park
A Visual History

1949 - Residential

1963 – Some residential removed for grassy area

1979 – All residents removed and Lord Roberts Annex built

1986 – Nelson Park developed

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How we heard from residents

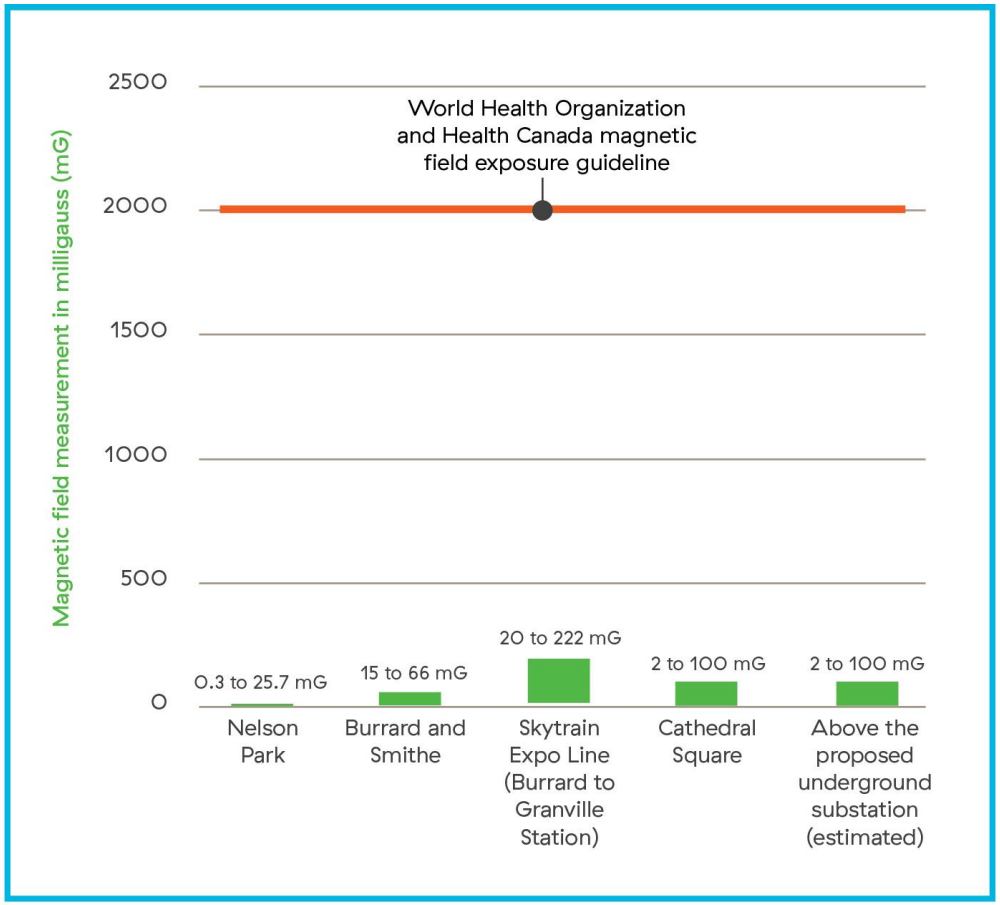
Feedback forms		○ **16** paper surveys ○ **176** online surveys
Public open houses May 1, 17 from 6 p.m.–8 p.m.		○ **2** sessions ○ **69** attendees ○ **240** minutes /**4** hours spent with public
Small group discussions May 3, 7, 10, 15 from 5 p.m.–8 p.m.		○ **4** sessions ○ **57** attendees ○ **94** questions asked and answered ○ **720** minutes /**12** hours spent with public
Email		○ **35** email inquiries received and answered
Telephone		○ **17** phone calls

What we heard in during consultation

- The largest number (49.5%) of respondents to our consultation feedback form indicated some level of agreement to *“BC Hydro should continue to explore its proposal to build a new West End Substation underground.”*
- Top themes included:
  - Concern regarding electric magnetic fields (EMF);
  - Concern regarding construction length and traffic impacts; and
  - General support for the proposal.
- Community Response Memo was issued June 2018 outlining BC Hydro’s commitments going forward to help inform the VSB Trustees’ decision, including EMF shielding on park and school property.

Electric and magnetic fields

- Public safety is BC Hydro's number one priority.
- EMF levels above proposed substation and power lines expected to be similar to those in Cathedral Square Park, 5% or less of the World Health Organization and Health Canada endorsed limit.



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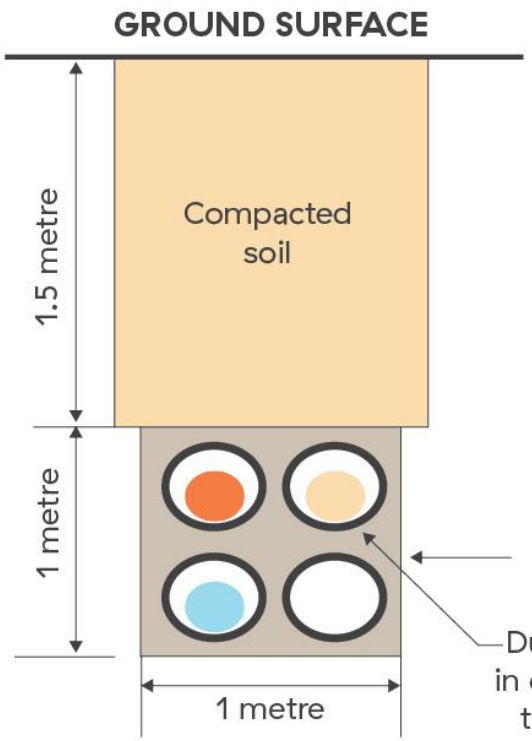
Electric and magnetic fields

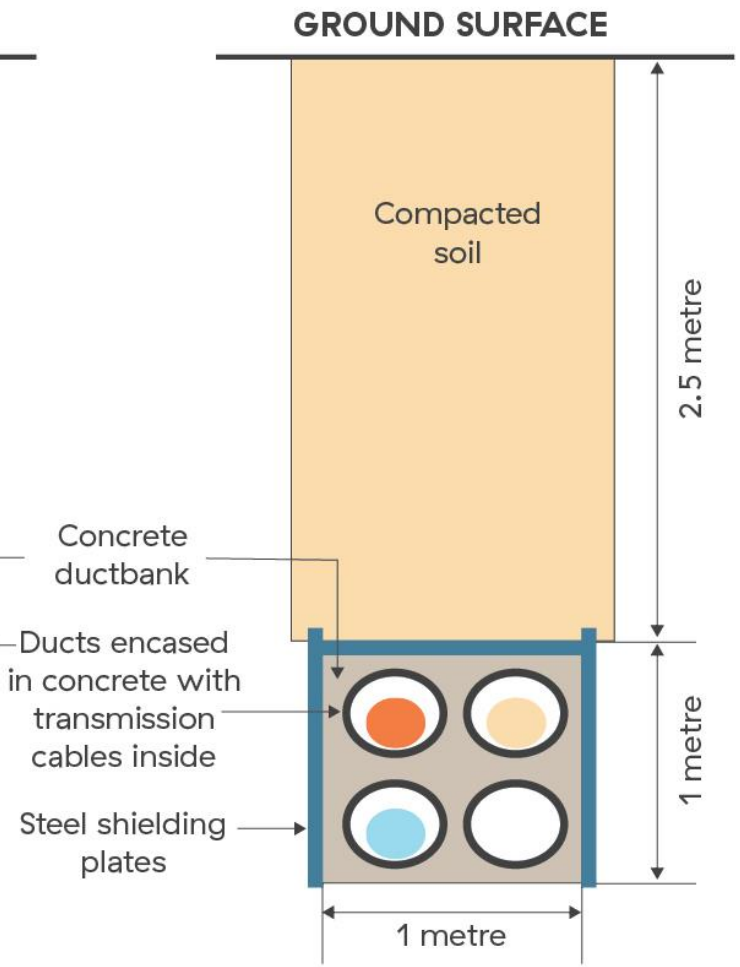
Our commitment at Lord Roberts Annex property and Nelson Park

- bury transmission cables deeper underground and implement magnetic field shielding (minimum 75% reduction from chart).
- commission an independent study of current EMF levels at the existing site.
- based on final design, confirm the EMF levels expected at the proposed substation site.
- commission an independent study to verify EMF levels once the substation is in-service and continue to monitor and report EMF levels.

Normal burial depth of transmission lines



Extra deep burial of transmission lines with sheilding



NOT TO SCALE

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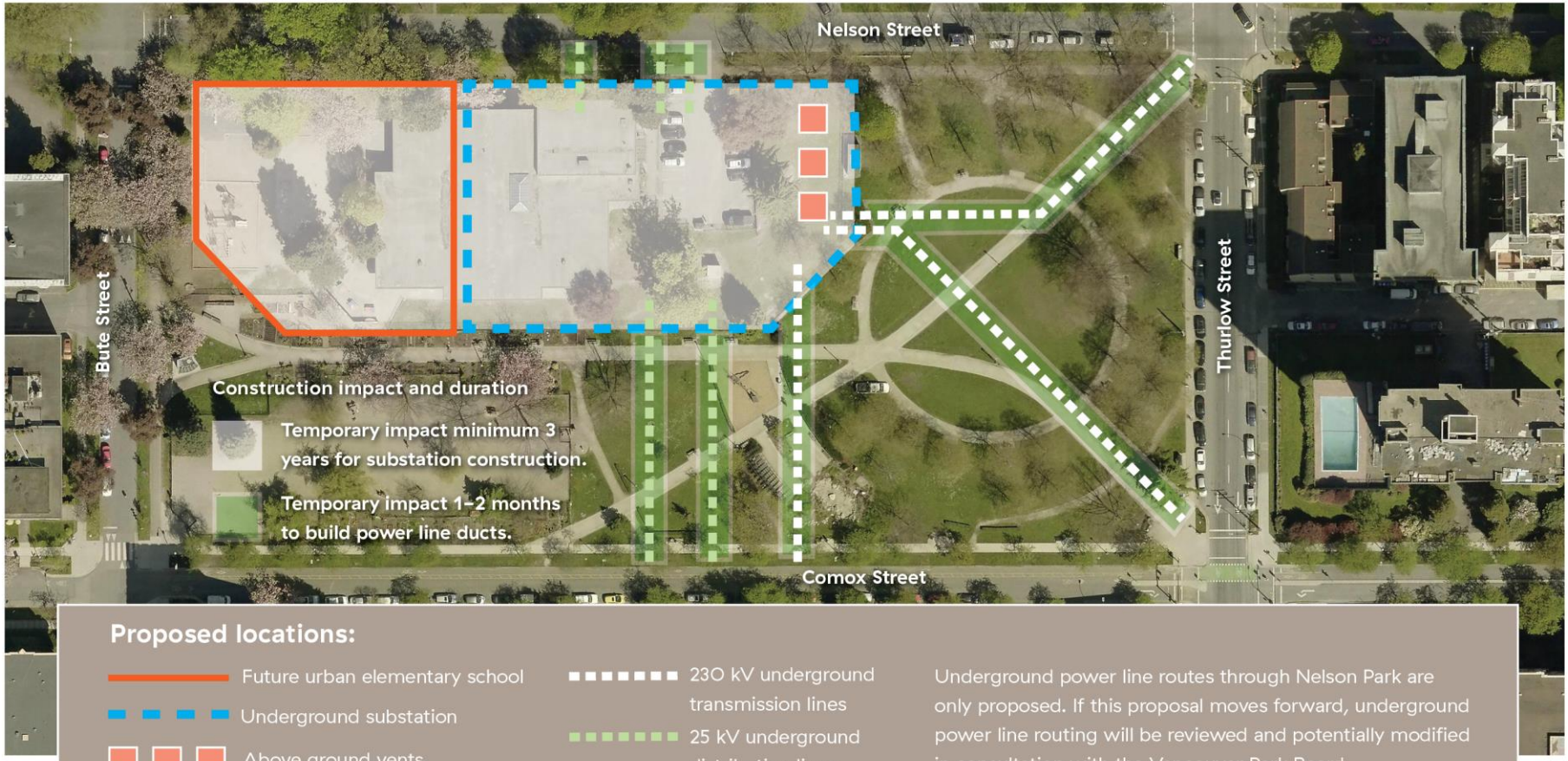
Construction impacts and greenspace



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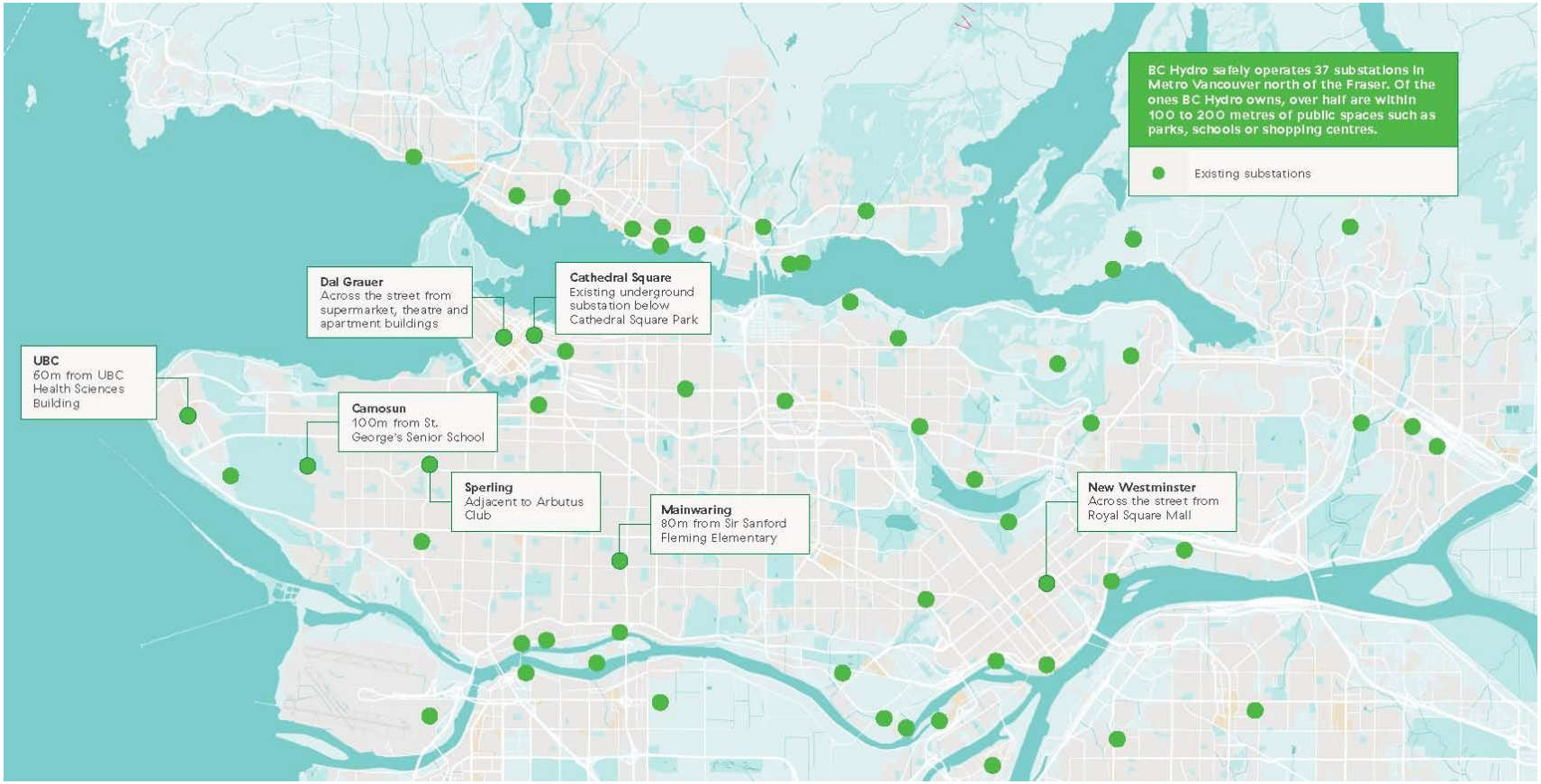
Substation safety

Specifically the risk of fire, earthquakes, and sharing a site with an elementary school.



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How it unfolded in 2018

- Working together with the VSB, we brought our idea back to parents and the local community to see what they think.
- May 2018
  - VSB led engagement with the parents and their stakeholder groups.
  - BC Hydro held open houses, small group meetings and online consultation to engage the larger community.
- June 2018
  - Vancouver Board of Education made a decision on this proposal. The Board of Education Trustees voted 6-2 in favor of proceeding.
- July 2018
  - BC Hydro and VSB each completed final due diligence and removed subjects
- September 2018
  - Successful transfer of land and rights to BC Hydro

Substation Site Search Parameters

To accommodate the West End Substation, the ideal property needs to be:

- large enough for a 230kV, 400MVA (ultimate) substation - minimum of 40,000 sq.ft., with one side at least 138 ft. long;
- environmentally and seismically acceptable;
- close to existing or planned transmission corridors & central to the substation's load-serving area;
- close to existing Dal Grauer substation to facilitate efficient off-loading;
- open on at least 3 sides for distribution and transmission cable ducts;
- accessible for initial construction and on-going operations, and
- aligned with stakeholder's expectations post-acquisition.

The Search

BC Hydro considered 11 sites before narrowing down to 4 before selecting Lord Roberts and another site as the 2 leading alternatives.

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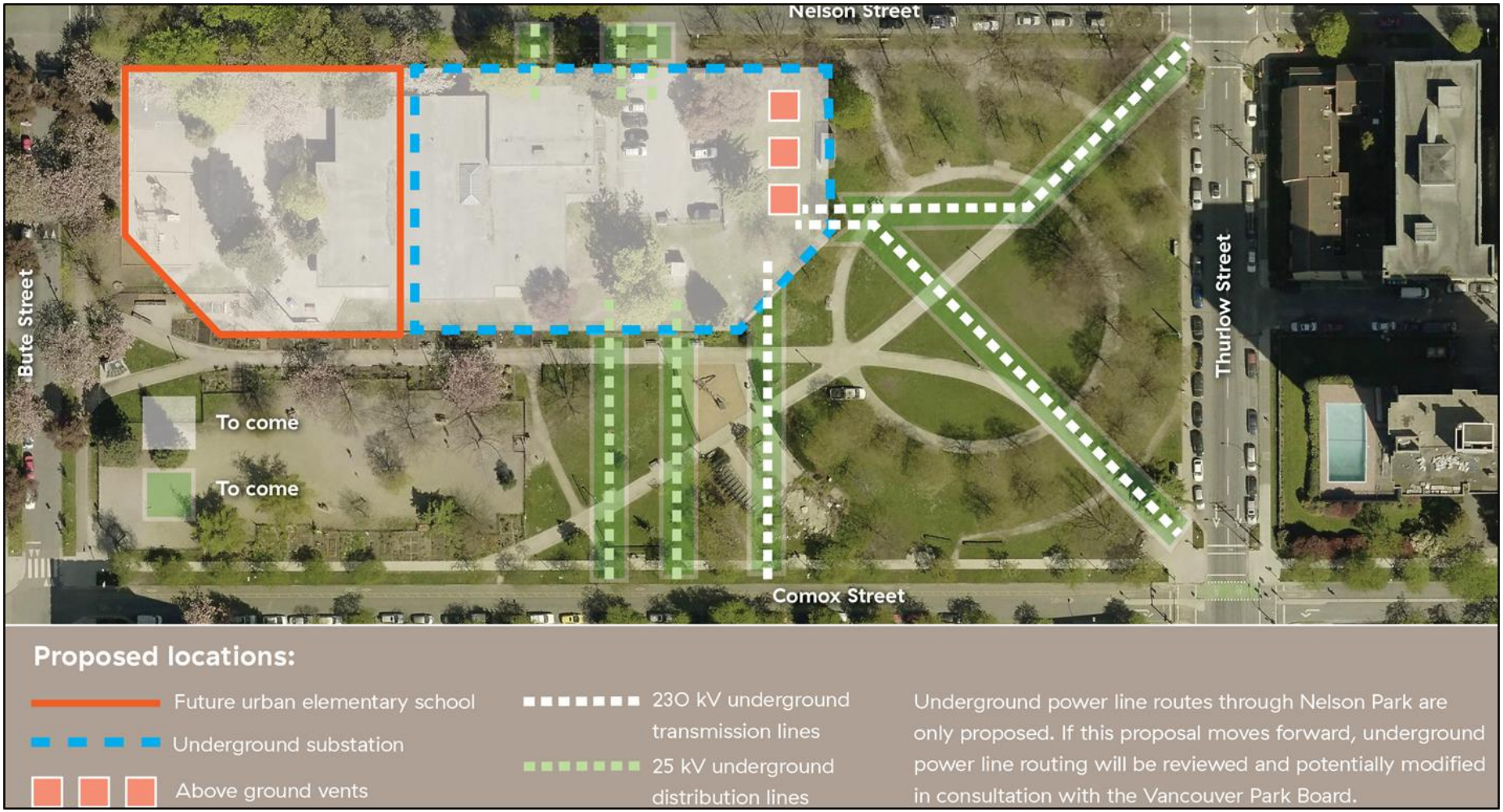
Lord Roberts Annex Site



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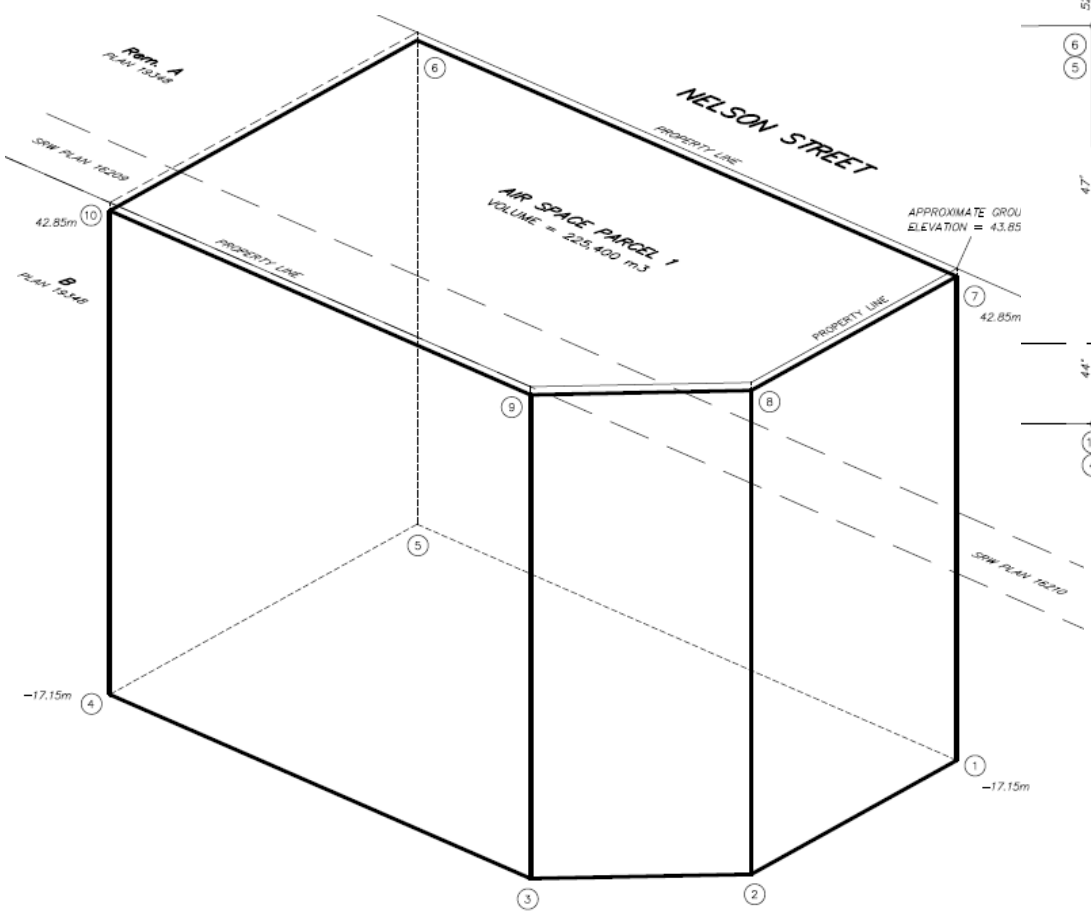
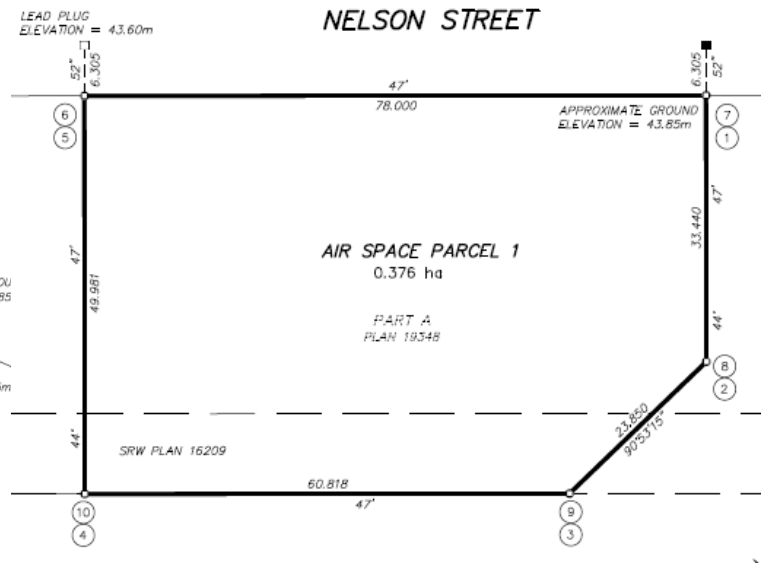
Lord Roberts Annex

Vancouver School Board Property





- Unique property acquisition – a fee-simple volumetric air space parcel underground

- Additional VSB property rights being granted include restrictive covenant, rights-of-way, and five year construction lease (starting no earlier than 2023)

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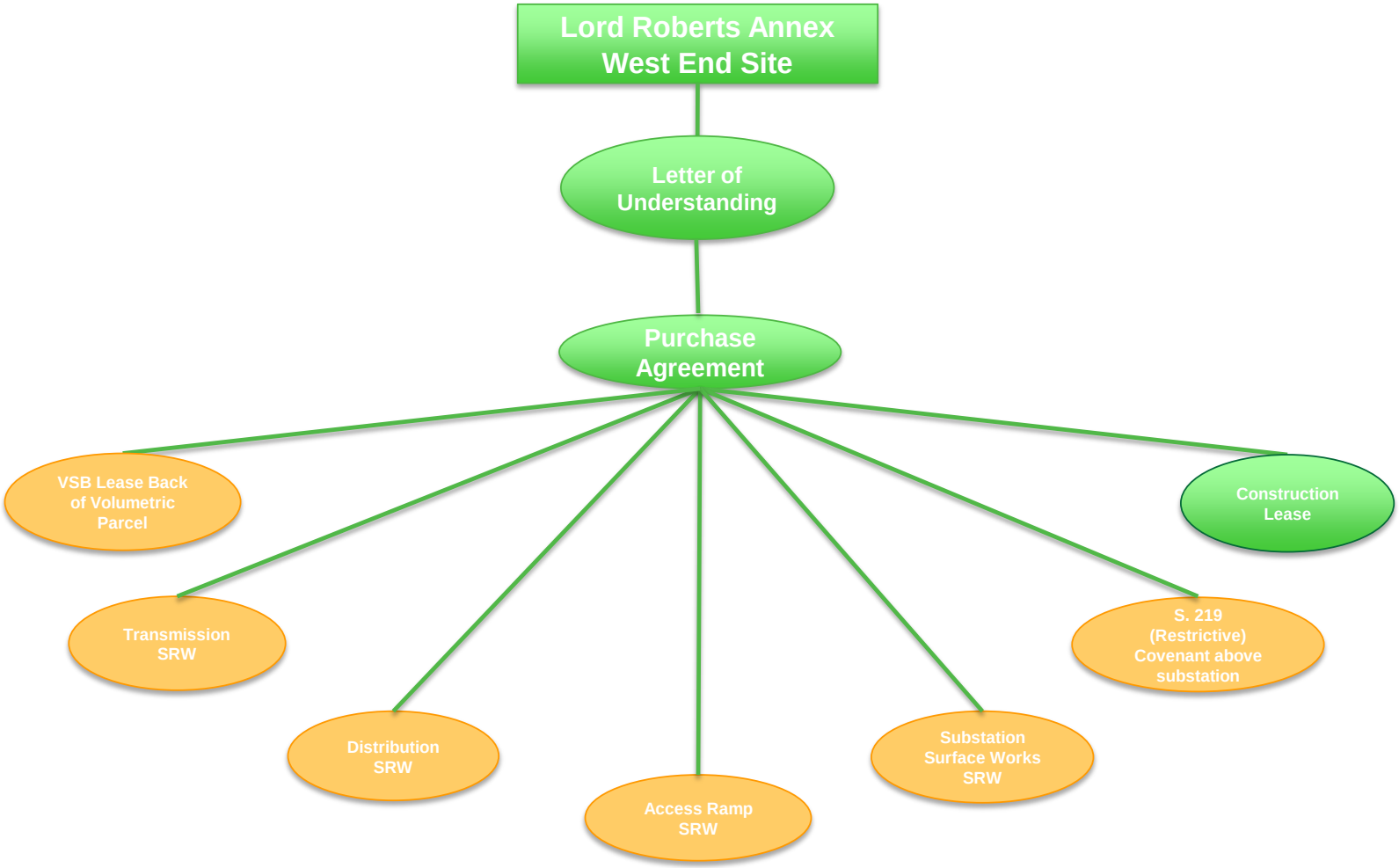
VANCOUVER SCHOOL BOARD



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VSB and BC Hydro Final Agreement

Under the terms of the agreement, the VSB will receive from BC Hydro a minimum of $73 million (up to $75 million):

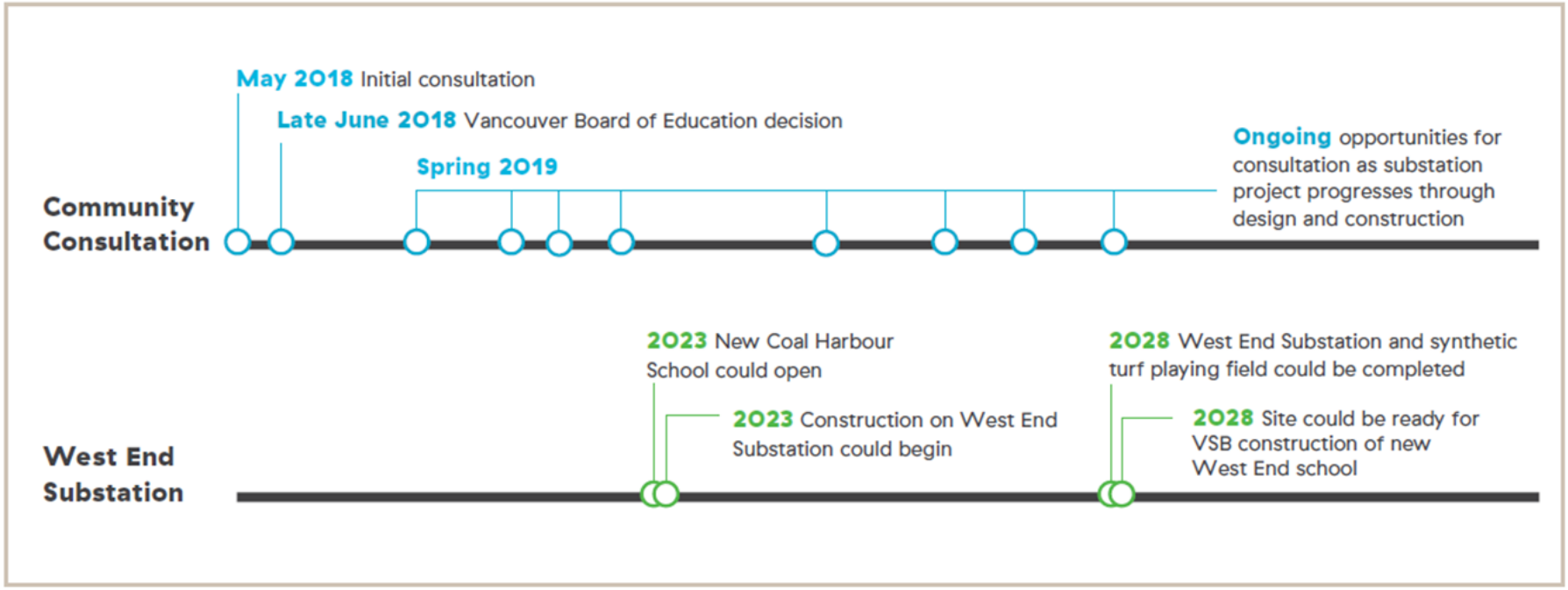
	($ million)
Volumetric Subsurface Parcel (fee simple)	48.3
SRWs and Covenants	16.7
5 Year Construction Lease*	8.0
Playing field at Lord Robert Annex**	2.0
Total	**75.0**

* Payable in 2023 when construction of the substation is planned to begin

** Up to $2.0 million for construction of an all-weather playing field at the Lord Roberts Annex site following completion of substation construction, anticipated in 2028.

What's next?

This tentative timeline shows how our project is proposed to move forward.



Public consultation will be ongoing, including City of Vancouver and Park Board led consultation to further explore impact of underground power lines through Nelson Park.

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Summary

- Building a new substation in the West End is not optional – BC Hydro is mandated to provide reliable power to its customers.
- Locating a new substation in the downtown core presents a significant challenge.
- The West End Substation at Lord Roberts Annex is a unique & innovative idea that will result in significant benefits to the community including two brand new schools and a new all-weather playing field.


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