

West End Substation

Community consultation report May 1–31, 2018



Issued June 15, 2018



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Executive summary

In May of 2018, we held community consultation to find out what people think of our proposal to the Vancouver School Board (VSB) of a new West End Substation at the Lord Roberts Annex property which would result in an out-of-sight underground substation, topped by a playing field and allow for construction of an adjacent elementary school after the substation is complete. The largest number (49.5%) of respondents to our consultation feedback form indicated some level of agreement with the statement, “BC Hydro should continue to explore its proposal to build a new

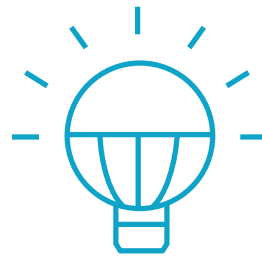
West End Substation that is underground.” For those people who provided comments during the community consultation, the top themes included concern regarding electric and magnetic fields (EMF), concern about the construction period length including construction and traffic impacts as well as general support for our proposal. If our proposal moves forward we’ll continue to engage with the community in a meaningful way for the life of the project, and work to address and mitigate the remaining community concerns.

Background

We’re providing the clean, renewable power Vancouver needs, but our electricity system serving downtown is ageing and needs upgrades. We need to replace our ageing Dal Grauer Substation on Burrard Street with a new substation in the West End. Dal Grauer has been in-service since 1953, is nearing end of life, and needs to be relocated and rebuilt close to the areas and neighbourhoods where electricity is being used, with the space to accommodate future growth when needed. We’ve approached the VSB to re-visit our proposal of a new West End Substation at their Lord Roberts Annex property which would result in an out-of-sight underground substation, topped by a playing field and allow for construction of an adjacent elementary school after the substation is complete.

In January and February 2017, we conducted community consultation about building an underground substation in the West End at the Lord Roberts Annex property. As part of our proposal at that time, we also suggested building another substation underground at Emery Barnes Park (in Yaletown) along with substantial park upgrades there and at Cathedral Square, items that are not included in our current proposal. The community consultation revealed an interest and support to examine the idea of this shared land use proposal further. We withdrew our 2017 proposal before any decisions were made, due to complications with the Emery Barnes component.

We continue to believe our proposal to build an underground substation at the Lord Roberts Annex property would benefit the downtown Vancouver school community



and provide the best outcome for the West End. Working together with the VSB, we brought this idea back to local parents and the community in the spring of 2018 to see if they agreed.

If approved, we would offer fair market value compensation in exchange for the underground property rights needed, providing VSB with funding to build a Coal Harbour school sooner. At the Lord Roberts Annex property, it will result in an out-of-sight underground substation topped by a synthetic turf playing field and allow for the construction of a new elementary school after the substation is complete.

To engage the community and gather feedback on our proposal, we held community consultation throughout May 2018. Feedback collected from the community through various feedback channels is presented in this report.

The Vancouver Board of Education (elected VSB Trustees) will decide whether or not to approve our proposal on June 25, 2018.






This report will help inform the Vancouver Board of Education in their decision, along with feedback collected through VSB’s own consultation. If our proposal moves forward, this report will be used to inform our next steps on the project where there would be many future community consultation opportunities.

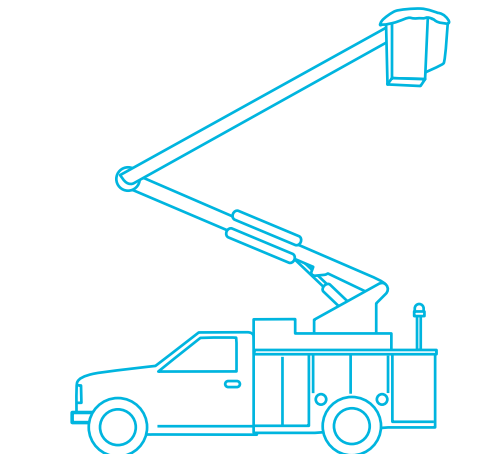
More detailed information on our proposal, as well as our Community Consultation Response Memo, can be found at bchydro.com/westendsub.

What we did

From May 1 to May 31, 2018, we held community consultation on our proposal for a new West End Substation. Through various feedback channels, more than 250 pieces of information were received.

How we heard from residents

<p>Feedback forms</p> 	<ul style="list-style-type: none"> ○ 16 paper surveys ○ 176 online surveys
<p>Public open houses May 1, 17 from 6 p.m.–8 p.m.</p> 	<ul style="list-style-type: none"> ○ 2 sessions ○ 69 attendees ○ 240 minutes / 4 hours spent with public
<p>Small group discussions May 3, 7, 10, 15 from 5 p.m.–8 p.m.</p> 	<ul style="list-style-type: none"> ○ 4 sessions ○ 57 attendees ○ 94 questions asked and answered ○ 720 minutes / 12 hours spent with public
<p>Email</p> 	<ul style="list-style-type: none"> ○ 35 email inquiries received and answered
<p>Telephone</p> 	<ul style="list-style-type: none"> ○ 17 phone calls



Communication and notification

To ensure awareness of the community consultation opportunities on our proposal for a new West End Substation, we used numerous notification and communication tools to reach businesses and residents in their homes and in the wider community.

<p>Communication</p> 	<ul style="list-style-type: none"> ○ Twitter post impressions: May 1 (3,322 impressions), May 8 (4,698 impressions), May 17 (2,926 impressions), May 21 (3,520 impressions)—total 14,457 impressions.* ○ Facebook post impressions: May 1 (391 impressions), May 16 (346 impressions)—total 737 impressions.
<p>Media</p> 	<ul style="list-style-type: none"> ○ News release to local Vancouver media ○ Media responses to Georgia Straight and Vancouver Sun ○ Interviews with Global, CKNW, and Breakfast Television ○ 4 1/4-page print advertisements in Metro Vancouver: 1,188,00 impressions ○ 5 types of online digital advertisements: 1,637 click throughs to project information ○ Elevator advertisements placed in 109 West End buildings
<p>Mailer</p> 	<ul style="list-style-type: none"> ○ 25,700 residents and businesses in a 4 block radius of Lord Roberts Annex and the proposed location for a future Coal Harbour school. ○ Distributed by Canada Post between April 20 and 25, 2018 [Appendix B].
<p>Pop-up events</p> 	<ul style="list-style-type: none"> ○ 3 pop-up events, 6 hours total, 99 people engaged at Jim Deva Plaza (on Bute St. at Davie St.).
<p>Discussion guide distribution</p> 	<ul style="list-style-type: none"> ○ Discussion guides were made available at 8 community gathering spaces including: Lord Roberts Elementary, Lord Roberts Annex, West End Community Centre, West End Library, Coal Harbour Community Centre, West End Seniors Network offices, Vancouver–West End MLA office, Mole Hill Community Housing office.

* An impression is when content is displayed on someone's social media feed. The total number of impressions is the total number of times that content was displayed.

How we did it

Information sharing

A webpage, storyboards and discussion guide with a feedback form were developed for use in the community consultation on our proposal for a new West End Substation [Appendix B]. The materials highlighted the following topics:

- The need for a new substation
- Proposal details
- Our traditional approach
- Changes since the 2017 consultation
- Tentative timeline
- Potential impacts and mitigation, including:
 - Construction impacts
 - Operational impacts
 - Substation safety
 - Electric and magnetic fields
 - Greenspace and tree canopy
 - Relocating students and the memorial playground

Gathering community input

The community was invited to share their thoughts online, in-person and by phone. The primary way we gathered input was through the feedback form [Appendix B]. People were asked to respond to questions about the proposal. Five close-ended questions gauged levels of agreement; two open-ended questions asked for any further comments and concerns about the proposal. Feedback forms were available online at bchydro.com/westendsub and at all in-person events.

In total, we received 192 responses from digital and paper feedback forms. The community was also invited to contact us via email at [**westendsub@bchydro.com**](mailto:westendsub@bchydro.com) and by phone.

We are engaging with First Nations in a parallel process, and will continue to do so for the duration of this project if the proposal moves forward. We have had initial conversations with Musqueam, Squamish and Tsleil-Waututh Nations and we will begin our regular consultation process with all the Nations if the project is formally initiated.

How did we gather feedback?

Email	35 email inquiries	
Telephone	17 calls	
Paper feedback form	16 paper forms	
Online feedback form	176 online forms	

Small group discussion	May 3, 7, 10, 15	57 Participants	
Public open house	May 1, May 17	69 Participants	

We hosted six in-person consultation sessions to provide the community, parents and businesses the opportunity to engage directly with the project team and provide their feedback.

Small group discussion

Four small group discussions were held during the evenings. Each two-hour sit-down, round-table session started with an overview of the West End Substation proposal to VSB, responses to what was heard in 2017 and a question and answer period. People were then divided into groups to discuss two key topics: 1) construction approaches and 2) community benefits.



Here are the guiding statements used in discussion and the follow-up questions used to help generate further dialogue.

Topic #1: Construction approaches (above ground and underground)	Topic #2: Community benefits
<p>Statement: BC Hydro should continue to explore its proposal to build a new West End Substation that is underground.</p> <p>Follow-up questions:</p> <ul style="list-style-type: none">○ What opportunities do you see with the proposal for an underground substation in the West End?○ What challenges do you see with the proposal for an underground substation in the West End?○ Are there any additional considerations you have with the underground substation proposal for the West End?	<p>Statement: I can see clear benefits to my community, and specifically the West End, as an outcome of this proposal.</p> <p>Statement: I'm more likely to support this proposal if I know my community is benefiting from it.</p> <p>Follow-up questions:</p> <ul style="list-style-type: none">○ Considering the proposal, what benefits to the West End resonate the most with you?○ Are there any gaps, or areas left unaddressed by the proposal?
<p>Statement: BC Hydro's alternative approach (purchasing private property to build an above-ground substation) is a better approach for the West End.</p> <p>Follow-up questions:</p> <ul style="list-style-type: none">○ What opportunities do you see with the traditional approach for a new substation in the West End?○ What challenges do you see with the traditional approach for a new substation in the West End?○ Are there any additional considerations you have with the underground substation proposal for the West End?	

Public open houses

The open houses provided information via display boards on the need for a new substation, the details of our proposal, potential impacts and mitigation measures as well as a tentative timeline. People were given a discussion guide and invited to complete the feedback form located at the end of the guide.

Large table maps presented a conceptual sketch of our proposal. The maps were designed to help participants visualize and understand the scale of the proposal. BC Hydro staff, including subject matter experts, were stationed at display panels to explain the proposal and answer questions.

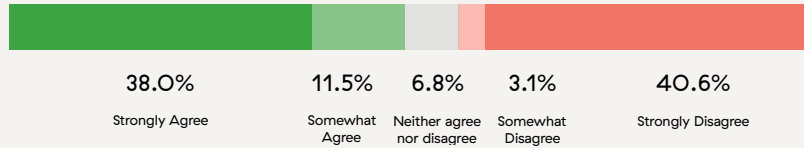


What we heard

Community input about the proposal was received from feedback forms, small group discussions, public open houses, emails and by phone.

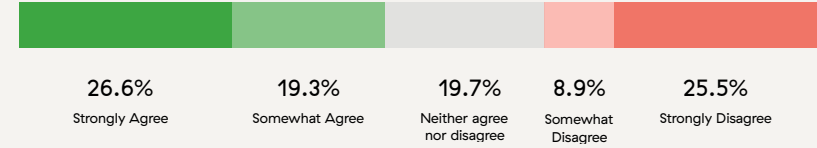
The feedback form asked people about their level of agreement on statements related to the West End Substation proposal, alternatives to the approach, potential benefits and overall level of support. In total, 192 feedback forms were completed.

Question 1: “BC Hydro should continue to explore its proposal to build a new West End Substation that is underground.”



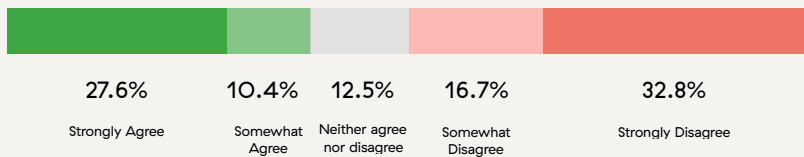
Nearly half of respondents—49.5%—agreed at some level that we should continue to explore our proposal to build a new West End Substation underground, while 43.7% disagreed at some level and 6.8% neither agreed nor disagreed.

Question 3: “I’m concerned an above-ground substation would decrease the amount of land available to build more housing in the West End.”



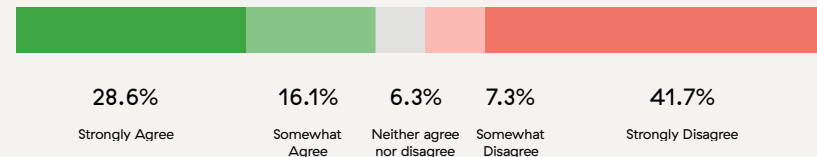
45.9% of respondents agreed on some level that they were concerned an above-ground substation would decrease the amount of land available to build more housing in the West End. 34.4% of respondents disagreed on some level with this statement, while 19.7% neither agreed nor disagreed.

Question 2: “BC Hydro’s alternative approach (purchasing private property to build an above-ground substation) is a better approach for the West End.”



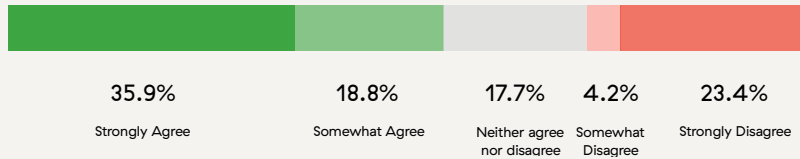
Nearly half of respondents—49.5%—disagreed at some level with the statement that our alternative approach (purchasing private property to build an above-ground substation) is a better approach. 38% agreed at some level with this statement, while 12.5% neither agreed nor disagreed.

Question 4: “I can see clear benefits to my community, and specifically to the West End, as an outcome of this proposal.”



Nearly half of respondents—49%—disagreed with the statement that at some level they could see clear benefits to their community, while 44.7% agreed at some level with the statement and 6.3% neither agreed nor disagreed.

Question 5: “I’m more likely to support this proposal if I know my community is benefiting from it.”



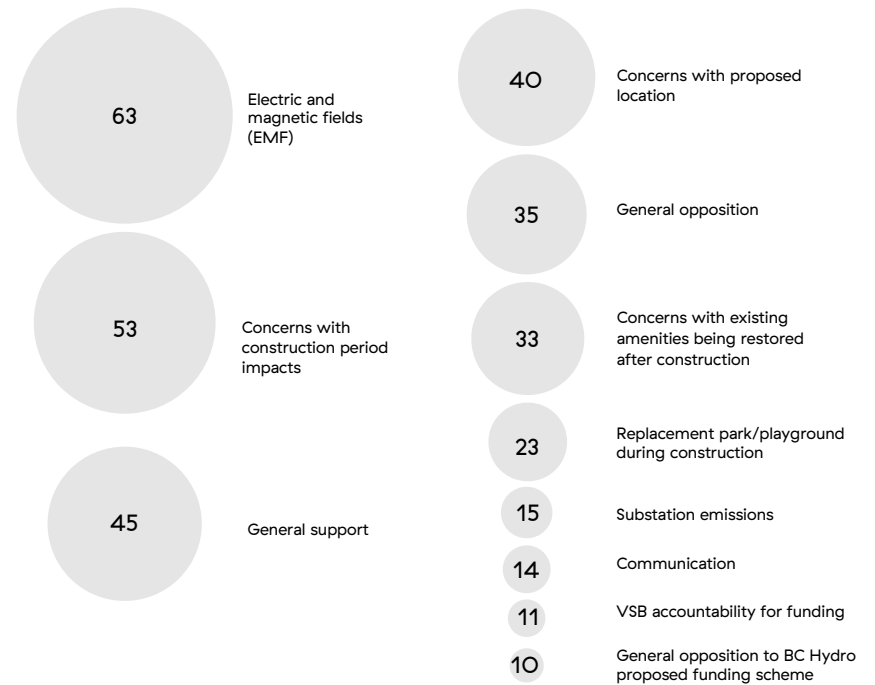
The majority of respondents—54.7%—agreed at some level with the statement that they were more likely to support the proposal if they knew their community was benefitting from it, while 27.6% disagreed at some level with the statement and 17.7% neither agreed nor disagreed.

Questions 6: “We know that construction of a substation would affect those who live, learn, work and play in the West End. Do you have concerns about our proposal that we haven’t addressed in the discussion guide? If so, please be specific.”

Question 7: “Additional comments?”

Participants were also invited to share their thoughts using open-ended questions in the feedback form. Participants provided similar comments to the two open-ended questions, as well as through email and over the phone. As a result, feedback from the two open-ended questions has been combined with that received by email and phone. Key themes are captured to the right.

Open-ended question feedback



Note: the numbers inside the bubbles indicate the number of times this theme was mentioned.

The top feedback theme noted by respondents was concern regarding electric and magnetic fields (EMF). The top comments noted about EMF were concern about the safety of building a substation so close to a school, a desire to see proven evidence that EMF is not harmful and concern about extended exposure for children.

Other major feedback themes included concern about the potential construction impacts, as well as general support for the project. Comments that expressed concern about the project's potential construction impacts noted disruption to the neighbourhood, concerns about construction noise, emissions and traffic, as well as disruption to the use of Nelson Park and the school playground. People expressed frustration about the amount of construction in the West End, and how the proposed substation would extend the foreseeable period of general construction taking place within the community.

Comments that reflected general support noted the benefit of new schools, and the efficiency of land use achieved by placing the substation underground and retaining the surface for other use. People also noted that they generally felt the proposal was a 'good idea.'

Other notable feedback themes included concerns with the proposed location, general opposition to the proposal, and concerns with existing amenities being restored after construction at the Lord Roberts Annex property. Feedback on the proposed location included the perception that the substation would be located beneath a school and suggested the St. Paul' Hospital site as an alternative.

Feedback that expressed general opposition to the proposal noted a desire for less development in the city, and so did not support a substation that would add increased electrical capacity to the West End, which was perceived to encourage further development. Feedback on restoring existing amenities to the site after construction focused on the community garden, dog park, school playground, farmers' market, and a desire for grass as opposed to an artificial turf field on top of the substation.

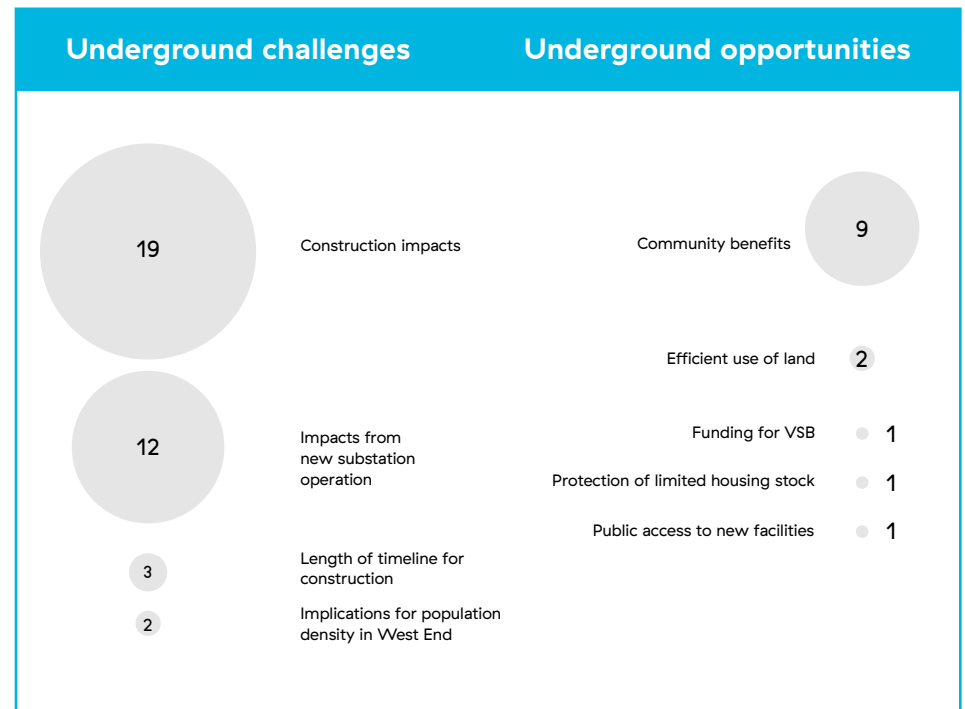
Small group discussions

Small group discussion participants were asked about our substation construction approaches (above ground or underground) as well as the community benefits associated with our proposal to VSB. Through the discussions on construction approaches, participants noted challenges and opportunities associated with above ground and underground construction, as well as any additional comments or considerations they had. Through the discussion on community benefits, participants noted any community benefits from the proposal that they supported, as well as suggested benefits they would like to see as part of the proposal.

SUBSTATION CONSTRUCTION APPROACHES

The main challenges noted by small group discussion participants were construction impacts. Participants specified noise, construction emissions, and traffic disruptions as the primary concerns in relation to construction impacts. The other major challenge noted by participants was concern about the site following construction. Specifically, people expressed concern about protecting the existing trees, concern about future soil health and contamination, and concern about future parking availability for the farmer's market.

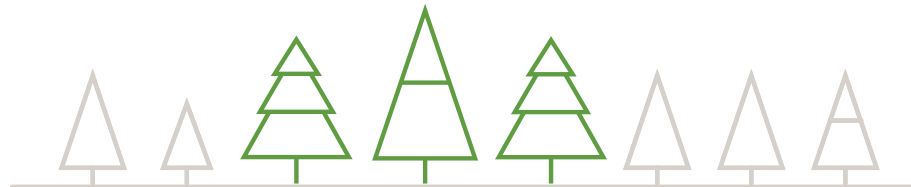
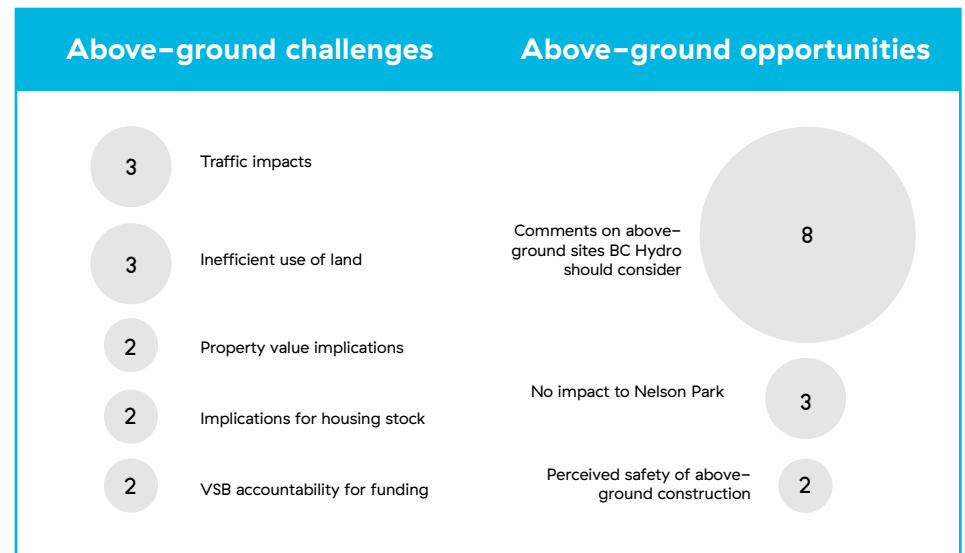
The vast majority of comments regarding underground substation opportunities focused on the community benefits associated with the proposal. This included the opportunity to use funding from BC Hydro to replace aging school facilities. Feedback also noted the benefit of a new playing field, a new school in Coal Harbour, and the suggestion to convert a decommissioned Dal Grauer Substation site into a school. Participants also noted a number of additional opportunities shown in the graphic below.



Feedback on the challenges of an above-ground substation were split nearly evenly. Comments on traffic congestion noted concern about increased congestion in the neighbourhood due to vehicles servicing the substation. Comments on the inefficient use of land were concerned an above-ground substation would take up housing stock, or land for future housing stock; compared to building the substation underground this approach was noted as inefficient. Comments on property values expressed concern that an above-ground substation would reduce housing supply and increase the cost of housing. Conversely, comments on property values also expressed concern an above-ground substation would detract from the neighbourhood and reduce property values. Comments on the implications for housing stock expressed concern an above-ground substation would remove housing supply from the West End. Finally, while not a challenge of an above-ground substation, feedback noted a concern about VSB’s accountability with the funding provided by our proposal.

Feedback on the opportunities of an above-ground substation primarily focused on alternate site suggestions. Specifically, people referenced the idea of building at the St. Paul’s Hospital site, to rebuild a substation at the current Dal Grauer Substation site, or to partner with a church or developers to find an alternate site.

Additional comments on both construction approaches included feedback about a perceived conflict of interest. Specifically, people expressed concern about school funding coming from BC Hydro and not the provincial government. Additional comments also focused on a desire to maintain current community assets and amenities. Specifically, people wanted to ensure the dog park, farmers’ market, community garden, and school playground are replaced or improved after construction of the substation is complete. Comments regarding fair compensation for VSB wanted to ensure the VSB benefited to the full extent of the land’s value.



COMMUNITY BENEFITS AND COMMENTS

Small group discussion participants were also asked about the community benefits associated with our proposal to VSB. Through a discussion on community benefits, participants noted the proposal's benefits that resonated most to them, suggested benefits they would like included in the proposal, or noted general comments about the proposal.

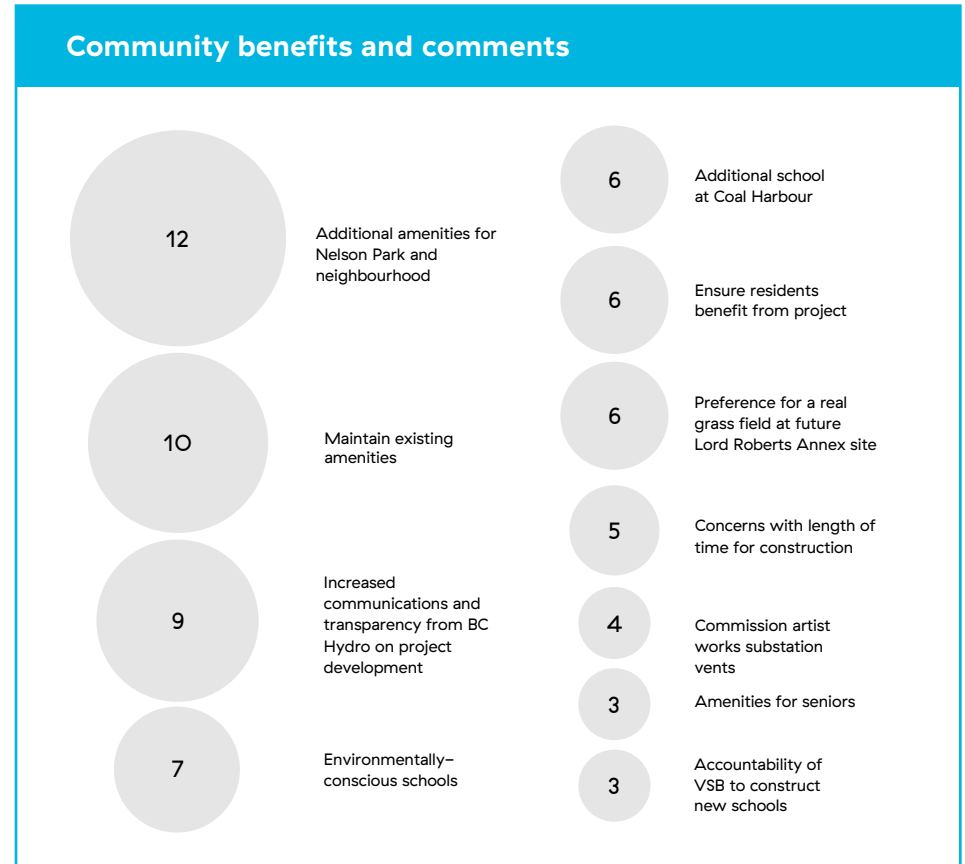
The most prominent theme noted by participants was a desire for additional amenities at Nelson Park and in the West End neighbourhood if this proposal moves forward. Specifically, people mentioned a sports field, skate park, chicken coops, daycare, electric vehicle charging stations, bee keeping facilities, green houses, a water feature for children, electrical outlets for the farmers' market, and rain shelters.

Participants also noted a desire to maintain existing Nelson Park amenities, including the community garden, farmers' market, dog park and playground. Feedback also called for increased communication and transparency from BC Hydro regarding the project. Specifically, feedback noted the potential of site tours for West End community members and for information from VSB regarding their capital plans. Increased communication and transparency were noted as ways to improve the proposal and project process.

Environmentally-conscious schools also emerged as a large theme in the community benefits discussion. Comments noted a desire for a 'green school,' and specifically supported the reclamation of heat from the substation.

A number of people also referenced an additional school at Coal Harbour as a community benefit that resonated with them. An equal number expressed a desire to ensure that the West End community are the recipients of benefits associated with the proposal. Specifically, people stated that those impacted from the construction should be the ones to be benefit from it. A similar number of people also expressed a preference for a grass field at the future school site, as opposed to the artificial turf field currently included in the proposal to VSB.

Finally, a number of people expressed concern about the construction period. While these comments do not note a specific community benefit, they reflect concerns people have with the proposal. Specifically, people noted concern about impacts to the Mole Hill community and about potential traffic congestion due to construction. Additional community benefit considerations are noted in the graphic to the right.



Additional feedback

Through the engagement period we received two submissions from organizations representing a larger group in the local community. Submission summaries can be found in Appendix A by the following organizations:

- West End Families in Action (WEFA)
- West End Business Improvement Association (West End BIA)

Appendix A – Petition summaries

West End Families in Action – BC Hydro West End Substation Community Requests petition

West End Families in Action submitted a petition letter to BC Hydro on May 9, 2018, with 37 signatures collected by May 31, 2018. The following summarizes the requests and concerns outlined in the letter:

- Request for BC Hydro and VSB to continue working with the community throughout the project's duration with guarantees to shape the consultation process so that parents and community can have their voices heard.
- Implore the Vancouver Park Board and VSB to advocate for West End families and children with respect to any and all future agreements with BC Hydro.
- Concerns regarding receiving fair value in exchange for construction impacts and permanent presence of a substation under the school field.
- Requested a list of seven community needs be addressed by the West End Substation project:
 1. Health and safety of children and staff at Lord Roberts Annex.
 - Request for an independent baseline study on current levels of EMF on the proposed site.
 - Monitor EMF levels for as long as the substation is in-service.
 - Assurance that BC Hydro will continue to seek out, develop and implement additional safety and mitigation measures.
 - Assurance that BC Hydro will be involved in addressing any emerging issues during the substation's lifespan.
 - Continued discussions with community members about health and safety concerns in meaningful way.
 2. Build the Coal Harbour School to accommodate for growth in the neighbourhood.
 3. Assurance by parties involved that the Annex school will be rebuilt on its current site as soon as the substation is complete.
 4. VSB to fund the expansion and seismic upgrade of King George High School.
 5. Transfer the Dal Grauer Substation land after it is decommissioned to VSB as the site of a future school.
 6. New playground in the West End to compensate for loss of access to Nelson Park and the Annex playground during construction.
 7. Request for a Community Advisory Panel as a part of future consultation processes.

Petition summaries cont.

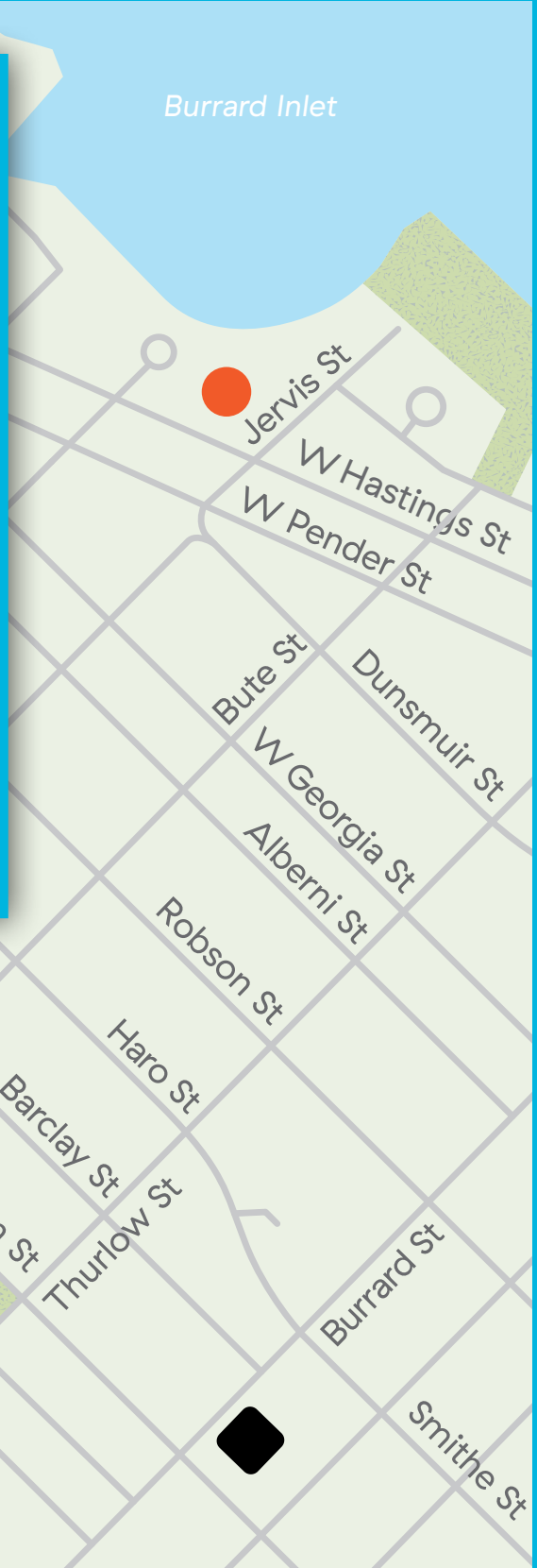
West End BIA – BC Hydro West End Substation Submission

On May 31, 2018 BC Hydro received a submission from the West End BIA, representing over 500 businesses and 140 commercial property owners. The following summarizes the organization's requests and comments.

1. The West End BIA supports BC Hydro's proposal. Specifically, there is strong support for ensuring access to adequate and reliable power for businesses within the catchment.
2. The West End BIA prefers an underground design. There is no support for an above-ground substation on the commercial streets of Davie, Denman or Robson.
3. The West End BIA Board of Directors support the underground substation proposal on the Nelson Park/Lord Roberts School property under these conditions:
 - I. Funding for schools provided by BC Hydro to stay in the West End and be applied to new and upgraded school space for local residents.
 - II. In addition to sports/recreation space already proposed, incremental funding should be allocated to the Vancouver Park Board for enhanced beautification of the substation site once completed. Additionally, a minimum of \$1 million in new investments to go towards
 - i. significant public art lighting display(s),
 - ii. access to power on site for public programming, and
 - iii. initiative to provide a weather protected community plaza space on the new site.
 - III. Incremental Community Amenity Contribution (CAC)-type cash or in-kind funding for the City of Vancouver's Engineering Department for projects along commercial streets in the West End (minimum \$1 million). Projects could include electrical infrastructure upgrades and other lighting-related infrastructure investments as they relate to the West End Community Plan.
 - IV. The West End BIA encourages BC Hydro to support a variety of West End events in a multi-year partnership to benefit and connect the community all year round. Included was a specific ask for BC Hydro to partner on the Lumiere light event.

Appendix B – consultation materials

We're proposing an underground substation.



- Proposed location of underground substation and playing field
- Area for future Vancouver School Board (VSB) school
- Proposed routing of underground power lines
- VSB proposed location for Coal Harbour School
- Existing Dal Grauer Substation (to be decommissioned)
- Existing Lord Roberts Annex

We're proposing an underground substation in your neighbourhood.

It's our job to ensure people in downtown Vancouver continue to have access to reliable power. We're providing the clean, renewable power Vancouver needs, but our electricity system serving downtown is aging and needs upgrades. A new substation in the West End is needed to replace Dal Grauer Substation.

We're working with the Vancouver School Board (VSB) to re-visit our proposal of a substation underground at the Lord Roberts Annex property. If accepted, this will provide the VSB with funding to build a new Coal Harbour School sooner, ensuring additional school spaces for West End families. At the Lord Roberts Annex property, it will result in an out-of-sight underground substation topped by a playing field, and allow for construction of a new elementary school after the substation is complete.

Your feedback will help inform the Vancouver Board of Education in making a decision on our proposal.

We want to hear from you.

Provide your feedback from May 1 to 31, 2018.

Ways to participate:

- **Attend an open house.**

- **Tuesday, May 1, 2018** | 5pm – 8pm | Century Plaza Hotel, 1015 Burrard Street, Vancouver
- **Thursday, May 17, 2018** | 5pm – 8pm | Century Plaza Hotel, 1015 Burrard Street, Vancouver

- **Attend a small group discussion.**

Please email westendsub@bchydro.com or call 604 341 1304 to sign up, as space is limited:

- **Thursday, May 3, 2018** | 6pm – 8pm | Lord Roberts Annex, 1150 Nelson Street, Vancouver
- **Monday, May 7, 2018** | 6pm – 8pm | Century Plaza Hotel, 1015 Burrard Street, Vancouver
- **Thursday, May 10, 2018** | 6pm – 8pm | Century Plaza Hotel, 1015 Burrard Street, Vancouver
- **Tuesday, May 15, 2018** | 6pm – 8pm | Century Plaza Hotel, 1015 Burrard Street, Vancouver

- **Participate online at bchydro.com/westendsub**

Available May 1 to 31, 2018.

- **Provide a submission to westendsub@bchydro.com**

We're also consulting with the Vancouver Park Board and City of Vancouver. If our proposal goes forward public consultation will be ongoing, including City and Park Board-led consultation to further explore impacts of underground power lines through Nelson Park.

West End Substation



Welcome

It's our job to keep the lights on

Our electricity system in downtown Vancouver is aging and needs upgrades. We need a new substation in the West End to ensure we continue to keep electricity flowing.

Our plan to continue supplying safe and reliable electricity to downtown Vancouver.

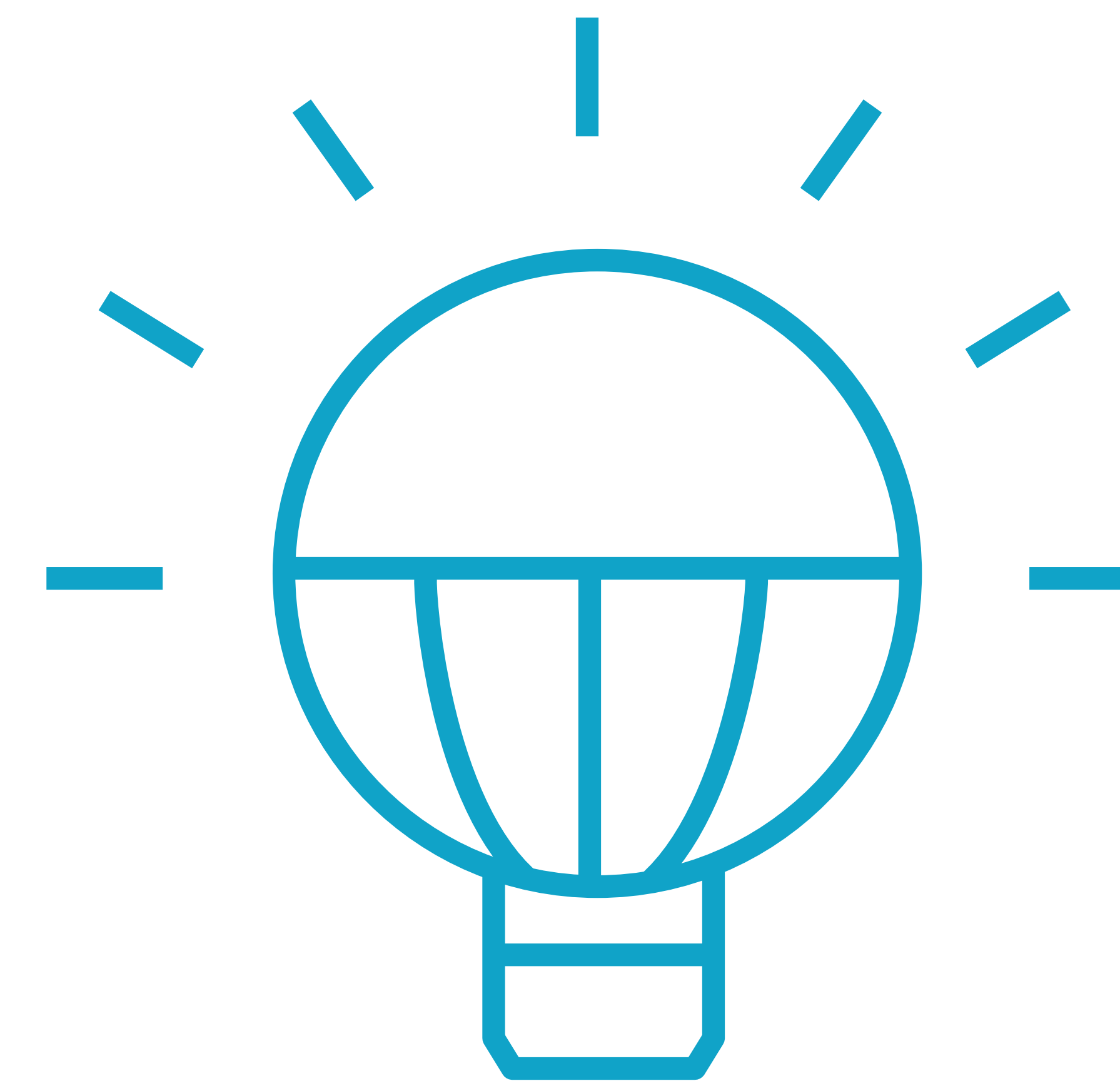
In exploring options for the future of our power system, we've identified a need for up to three new substations within the next 30 years. New substations in the West End and East Vancouver, combined with upgrades to our existing transmission system, would allow us to decommission Dal Grauer and Murrin substations within the next 12 years.

We need to decommission these aging substations as soon as possible as they're nearing end-of-life and it's not practical to rebuild them where they are. Both stations are also susceptible to significant damage from a major earthquake.

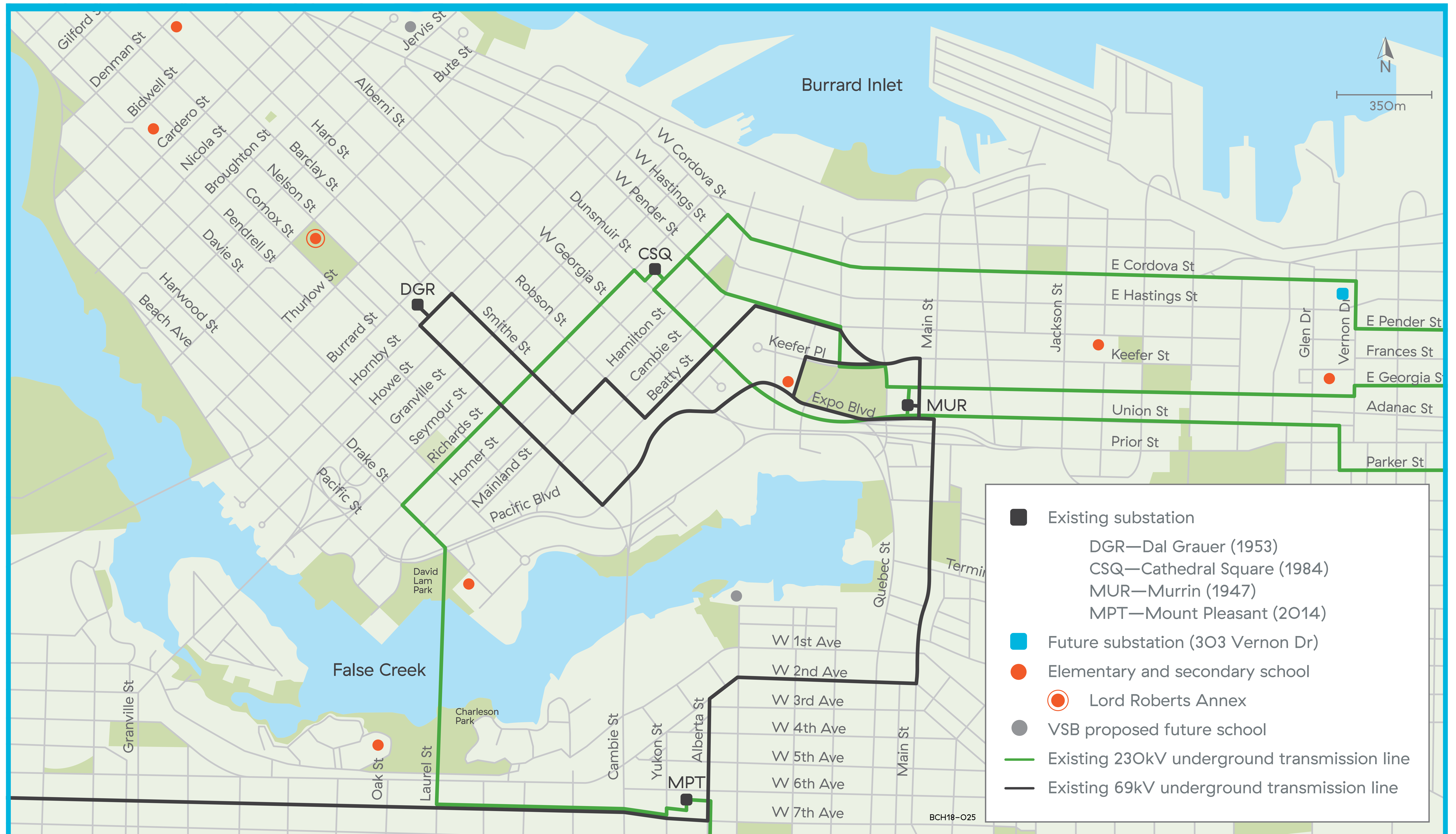
What's a substation?

Substations are a critical link between our electricity system and your light switches and sockets. They reduce the high voltage used in our big power lines to a lower voltage for use in your homes and businesses.

A new West End Substation would receive electricity at a voltage of 230 kilovolts and send it out into your community at a voltage of 12 and 25 kilovolts.



Downtown Vancouver Electricity Supply

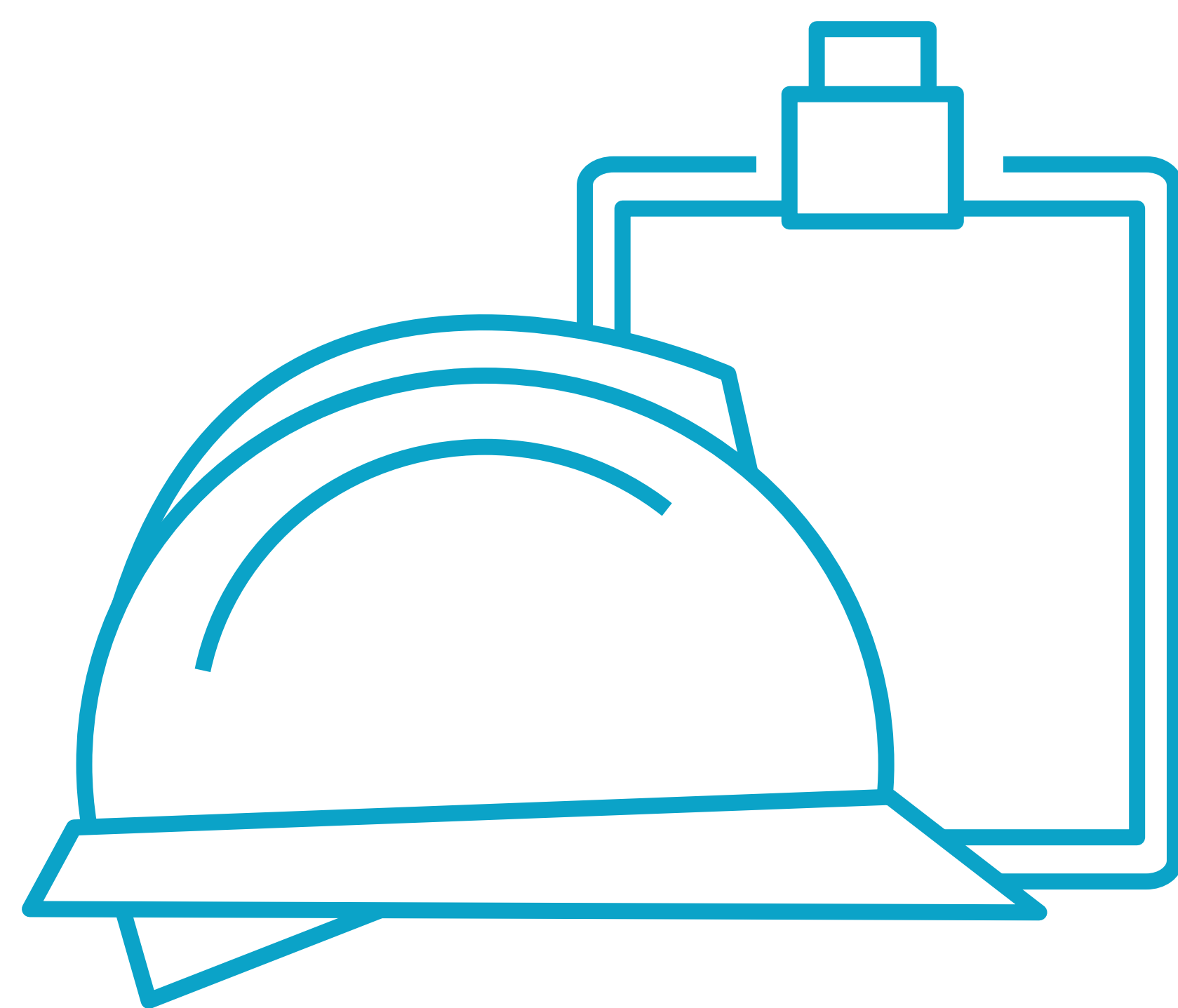


Our traditional approach

Our traditional approach to developing new substations is to determine where they're needed, search for appropriate sites, and then build them above ground.

In the West End, this approach would mean that a new indoor substation would need to be located within three to four blocks of Lord Roberts Annex, taking up almost half a city block like the Mount Pleasant Substation or Dal Grauer Substation.

We think our proposal for the Lord Roberts Annex is a better solution, as it would benefit the Vancouver school community, protect limited housing stock in the West End and result in an out-of-sight underground substation. We recognize that the West End neighbourhood is a unique one, and we think it's the right fit for a different approach.



Why can't BC Hydro build a West End Substation underground if they purchase a property?

To build a substation somewhere else, we'd need to buy the property outright, at a premium price, instead of only securing underground property rights. The additional cost of building underground, on top of the property purchase price, wouldn't be justified for our ratepayers.

Compared to our traditional approach, the business case for the Lord Roberts Annex proposal is cost neutral. By securing underground property rights rather than buying private property, we could justify the increased costs of building underground.

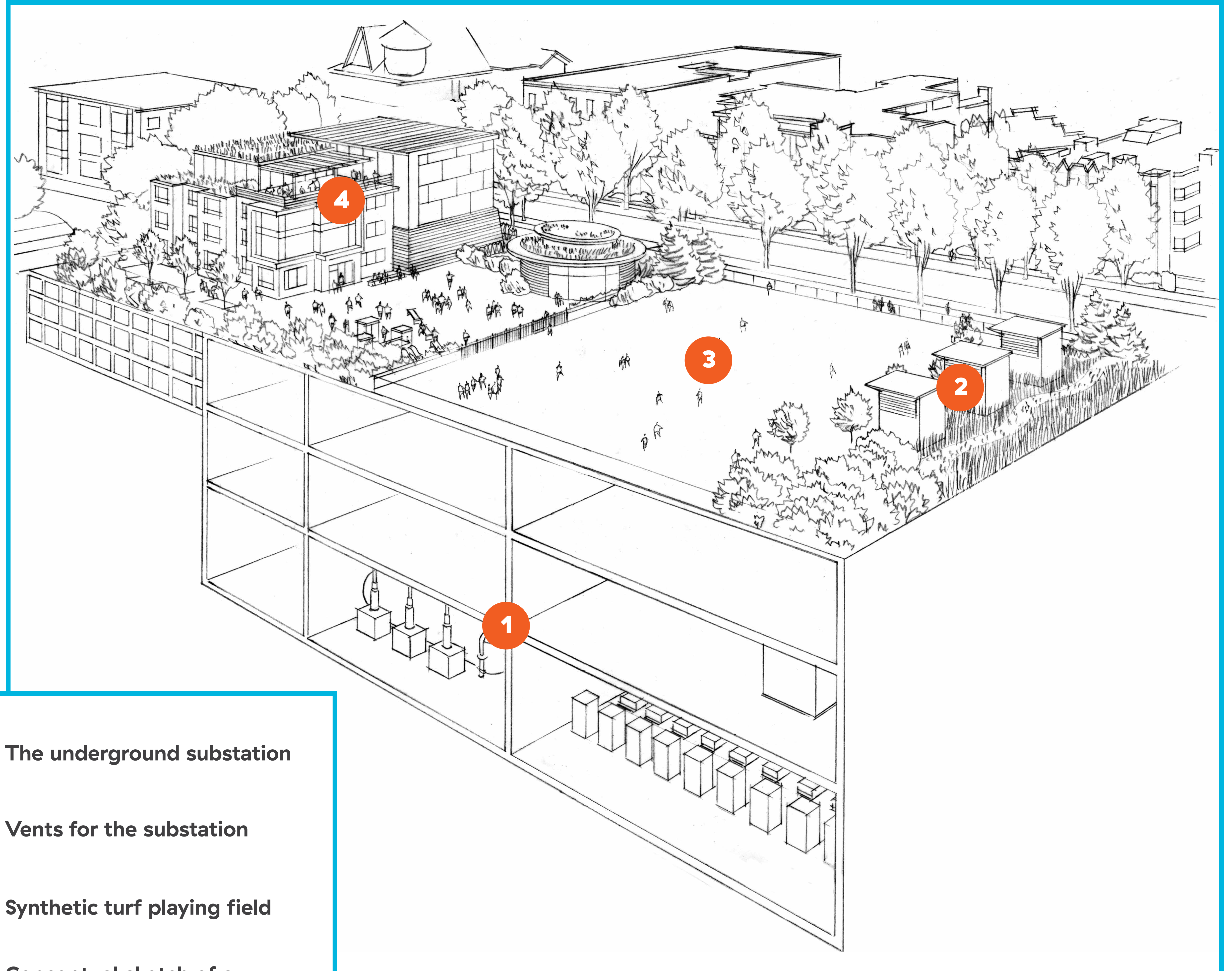
Our proposal

We've approached the Vancouver School Board (VSB) to re-visit our proposal of an underground West End Substation at the Lord Roberts Annex property. Working together with VSB, we're bringing this idea back to local parents and the community to see what you think.

We would offer fair market value compensation in exchange for the underground property rights needed to build our substation. If the proposal is accepted, it will provide VSB with funding to build a new Coal Harbour school sooner, where Lord Roberts Annex students would be relocated before substation construction at the Lord Roberts Annex property begins.

At the Lord Roberts Annex property, it would result in an out-of-sight underground substation, topped with a synthetic turf playing field, and allow for construction of a new elementary school after the substation is complete.

Artist's rendering of what our proposal could look like at the Lord Roberts Annex property



- 1 The underground substation
- 2 Vents for the substation
- 3 Synthetic turf playing field
- 4 Conceptual sketch of a new elementary school, to be built by VSB after the substation is complete.

What's changed?

In early 2017, we consulted the West End community on the idea of building a substation underground at the current location of Lord Roberts Annex, adjacent to Nelson Park. These discussions also included a proposal to build another substation underground at Emery Barnes Park (Yaletown).

Through the process we had good participation from the public. There was support and interest in further exploring the possibilities of this shared land use proposal, with more than half of respondents indicating that they preferred this new approach over our traditional approach.

Since 2017, we've continued to look for suitable properties, however, we still believe in this option and the community benefits it can deliver, and think it's worth exploring one more time. However, there are some changes we've made from our proposal last year.

We're focused on the West End

The need to find a site for the West End Substation remains a top priority. A new West End Substation will ensure we continue to deliver reliable power to the growing downtown core. We'll revisit what is needed in Yaletown once new substations are built in the West End and East Vancouver.



We have a little more time

After our 2017 proposal didn't go forward, we purchased a property in East Vancouver for a future substation. Building an East Vancouver Substation first has become a "Plan B" option for us, that will take some pressure off the system serving downtown Vancouver, giving us more time to secure the right site for a West End Substation.

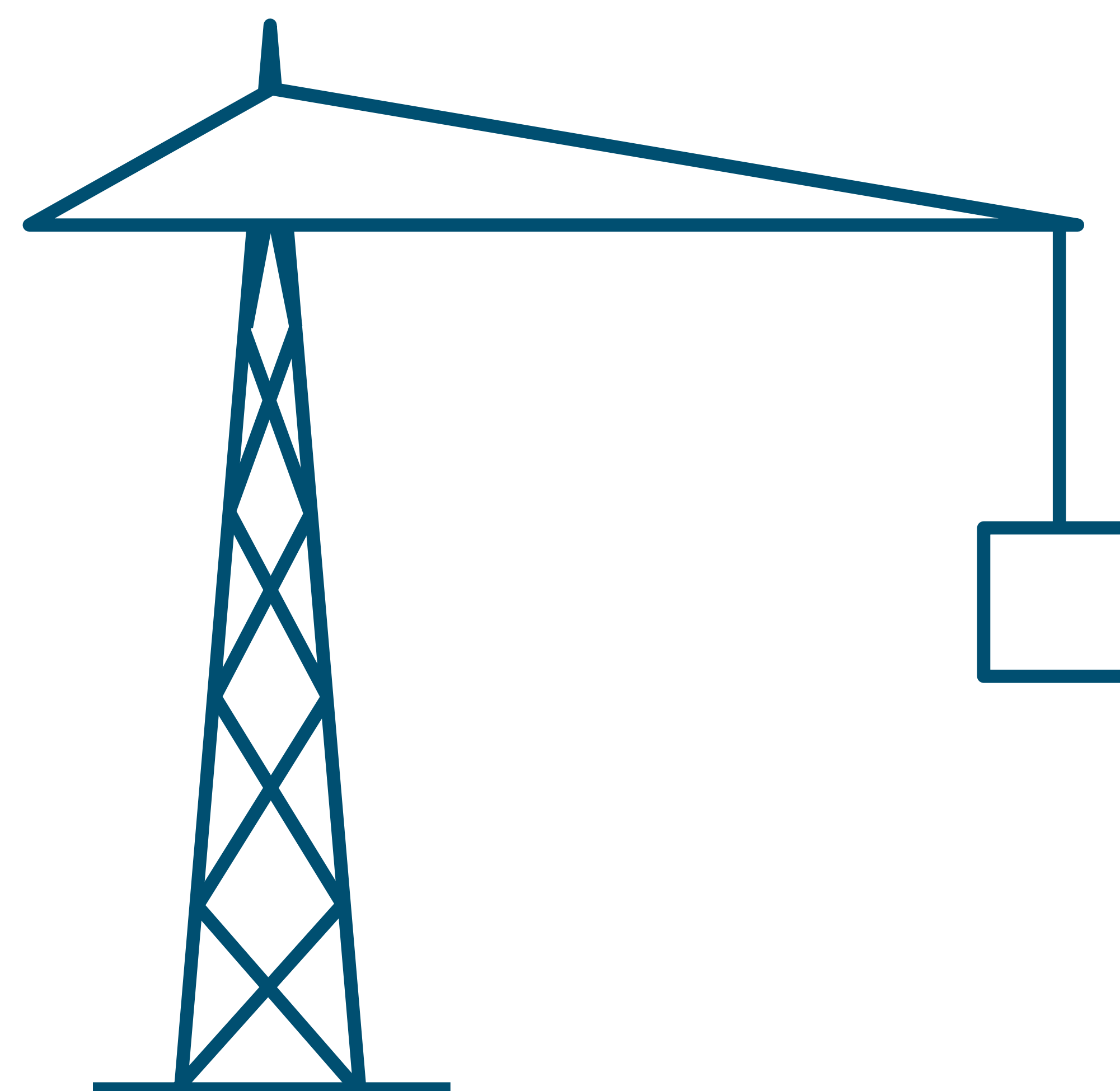
Construction impacts

We know that the construction of a substation in the West End would have temporary impacts on those who live, work, play and learn in the community, just like any other construction project.

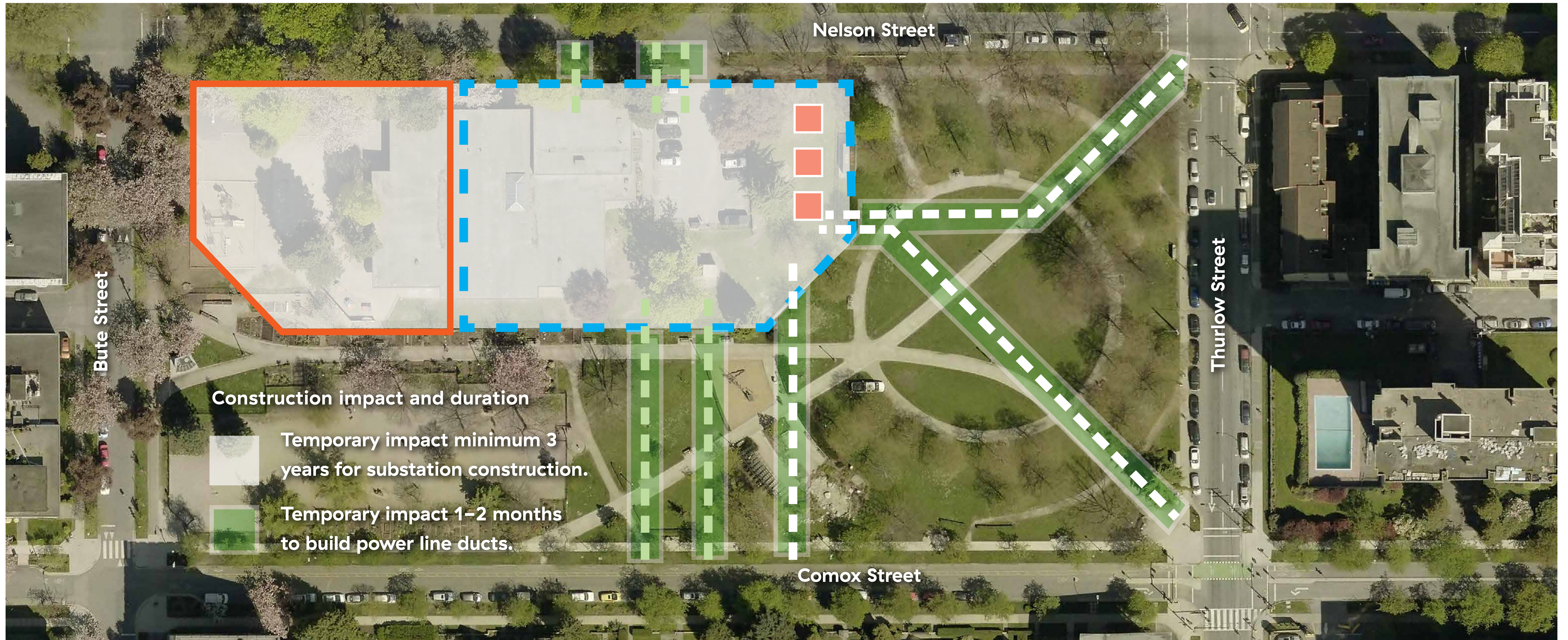
We commit to mitigating noise impacts as much as practical, using measures such as adjusting construction hours and activities to minimize disruptions, implementing noise barriers, and linking noise mitigation to construction permits and contractor remuneration. A Community Construction Liaison Committee would be created well in advance of construction to ensure two-way communication with the community.

We have an excellent history of mitigating construction impacts across a variety of projects, as demonstrated most recently with our Mount Pleasant Substation Project. This project included high voltage cables being buried in the city streets along the Fairview Slopes, the downtown core and the west side, as well as through David Lam Park.

Excavation of Mount Pleasant Substation— Alberta St at W 6th Ave



Construction impacts



Construction impact and duration

Temporary impact minimum 3 years for substation construction.

Temporary impact 1-2 months to build power line ducts.

Proposed locations:

- Future site for urban elementary school
- Underground substation
- Above ground vents
- 230 kV underground transmission lines
- 25 kV underground distribution lines

Underground power line routes through Nelson Park are only proposed. If our proposal moves forward, underground power line routing will be reviewed and potentially modified in consultation with the Vancouver Park Board.

Operational impacts

Our experience with both above ground and underground substations tell us that an underground substation would have less operational impact on the community when public safety, visual and noise considerations are factored in. It would also leave space above ground for public use.

We commit to design and build the substation ventilation infrastructure using state-of-the-art technologies to minimize the operational noise to well below the City nighttime noise by-law level.

We'll also look at different ideas for integrating the air vents and entrance structure for the substation into the surrounding landscape.



Electric and magnetic fields

What is EMF?

EMF stands for electric and magnetic fields. EMF are invisible fields produced anywhere that electricity flows, such as transmission lines, household appliances like coffee makers, vacuum cleaners and lights. EMF is present around the wiring in your walls and can be found indoors and outdoors in the environment. As magnetic fields aren't easily shielded like electric fields, our materials mainly focus on magnetic fields.

What are the guidelines for magnetic field exposure?

Health Canada and the World Health Organization endorse the guidelines created by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The guideline for residential exposure is 2,000 milligauss (mG), whereas the guideline for occupational exposure, for people like power line technicians, is 10,000 mG. There is a large safety factor applied to the occupational guideline limit; the residential guideline limit has a further additional safety factor.

Do people accumulate exposure to magnetic fields?

If someone were to use an electric blanket throughout the night, blow dry their hair in the morning, use their coffee maker and then walk under a power line, would they accumulate exposure throughout the day? The answer is no, there is no evidence for cumulative exposure or effects. There is no difference between walking under a powerline or sitting near a powerline for the afternoon—neither increase health risk at the levels we're talking about.

Because EMF dissipates very quickly with distance from the source, the EMF inside a future school would be similar to levels inside the existing Lord Roberts Annex currently. The source of any EMF within the future school would be the lights, computers and other electrical equipment found in any other school.

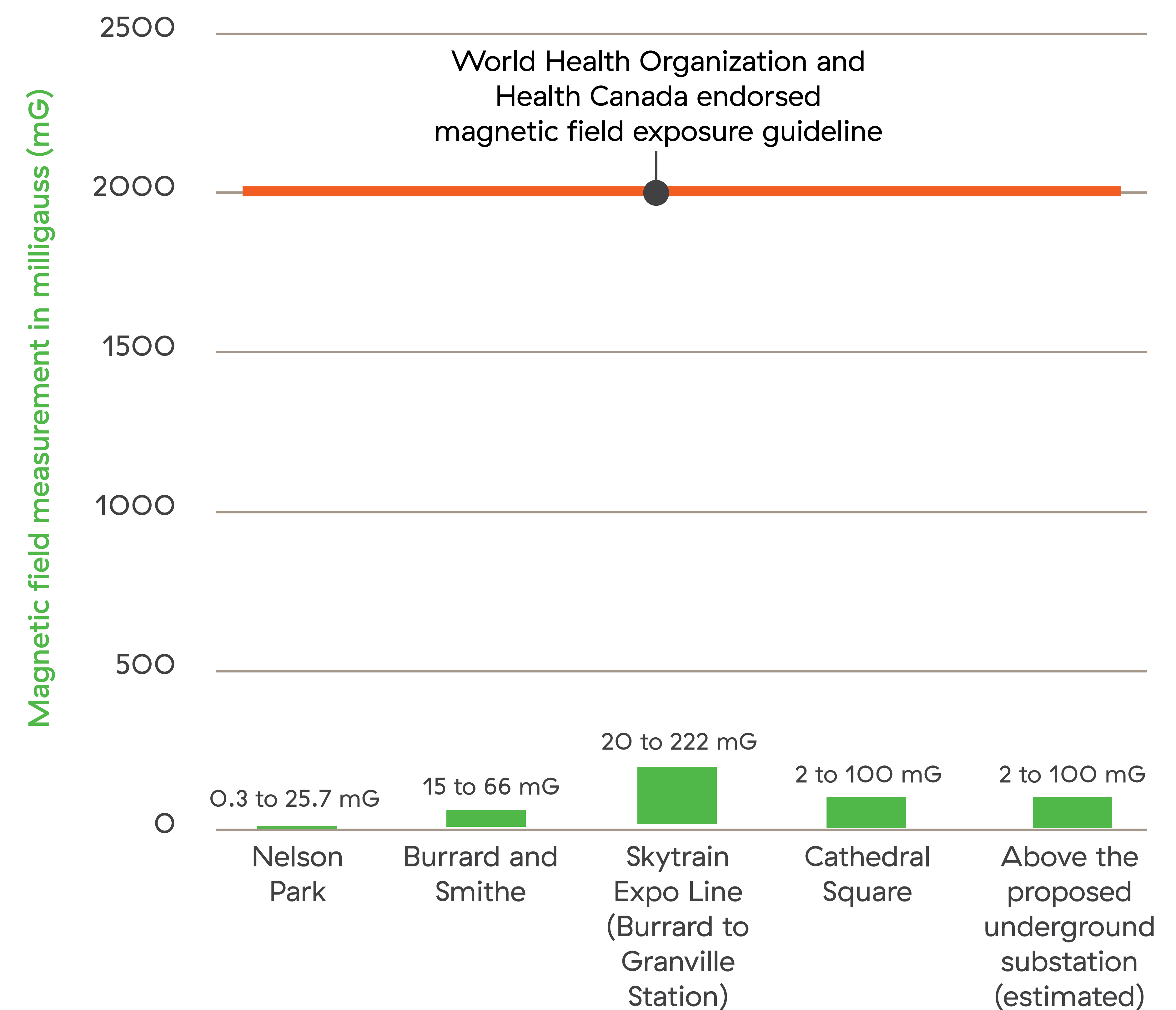
Electric and magnetic fields

Our commitment on EMF at the Lord Roberts Annex property and Nelson Park, if our proposal is accepted:

- Bury transmission cables deeper underground and implement magnetic field shielding (minimum 75% reduction in magnetic field from the estimate in the figure shown to the right) within the boundaries of Nelson Park and VSB property.
- Commission an independent study of current EMF levels at the existing Lord Roberts Annex property and Nelson Park, and report this publically.
- Confirm the EMF levels expected at and around the proposed substation, based on final design, and report this publically.
- Commission an independent study to verify EMF levels once the substation is in-service and continue to monitor EMF levels and report publically on an on-going basis.

Magnetic field levels around Vancouver:

We anticipate the levels of magnetic fields above the proposed substation will be similar to those above our underground substation at Cathedral Square.



Substation safety

Our highest priority at BC Hydro is public safety and the safety of our employees. We safely operate more than 300 substations throughout the province; 37 of those substations can be found within Metro Vancouver with about 50% of them located within 100–200 metres of busy public spaces including parks, shopping malls and schools. This includes our underground substation in downtown Vancouver beneath Cathedral Square Park, which we've been operating safely for more than 30 years.

Any new substation in downtown Vancouver would use the most modern technology available, virtually eliminating the risk of fire or explosion, and be built to rigorous safety and environmental standards.

There are also firm soils (bedrock) under the Lord Roberts Annex property which is ideal for withstanding a significant earthquake. An underground substation will also perform better than an above ground station in an earthquake.

Why can't a new substation be built somewhere else?

We understand that those who live, work, play and learn in the West End would prefer a new substation be located somewhere else, for a variety of reasons. A new West End Substation needs to be built in close proximity to the electricity demand and the customers it serves, to ensure that the power system can operate efficiently and reliably. The alternative to building an underground substation at the Lord Roberts Annex property is an above ground substation, ideally within three to four blocks of the Annex.

Substation safety

Map of our substations around Metro Vancouver



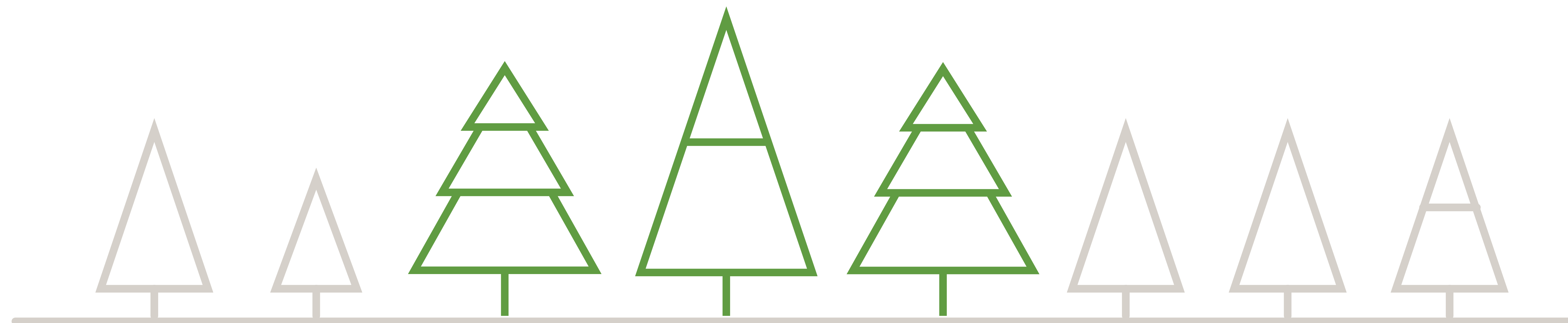
Green space and tree canopy

In any construction project, loss of green space, as well as removal of trees, is a concern.

We commit to minimizing the impact of an underground substation, as well as the resulting underground transmission and distribution cables, on green space and trees.

We're committed to minimizing the space taken by our permanent infrastructure through innovative and integrated design. The net result of this proposal could be a three-quarter synthetic turf playing field above the underground West End Substation. This playing field would offer a substantial increase of play area for school students and could be available for public use and events.

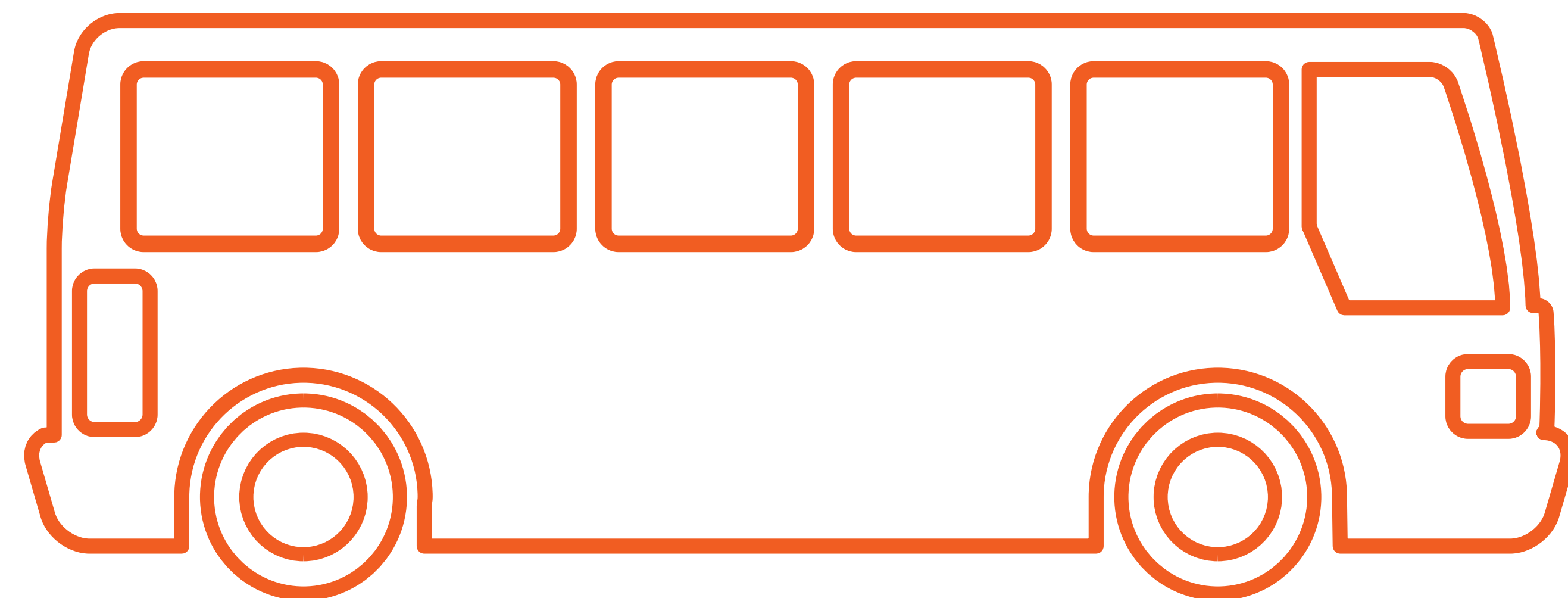
If this proposal moves forward, we'd work with the Vancouver Park Board to confirm routing of underground power lines through Nelson Park and to minimize permanent effects on parkland.



Relocating students and the memorial playground

We commit that construction will not begin for a new West End Substation until the Lord Roberts Annex students are relocated to the new Coal Harbour School.

We commit to removing the playground equipment, storing it and then working with VSB to reinstall it at our expense. We'll continue to work with the Lord Roberts Annex Parent Advisory Committee to confirm this commitment and explore other options if preferred.

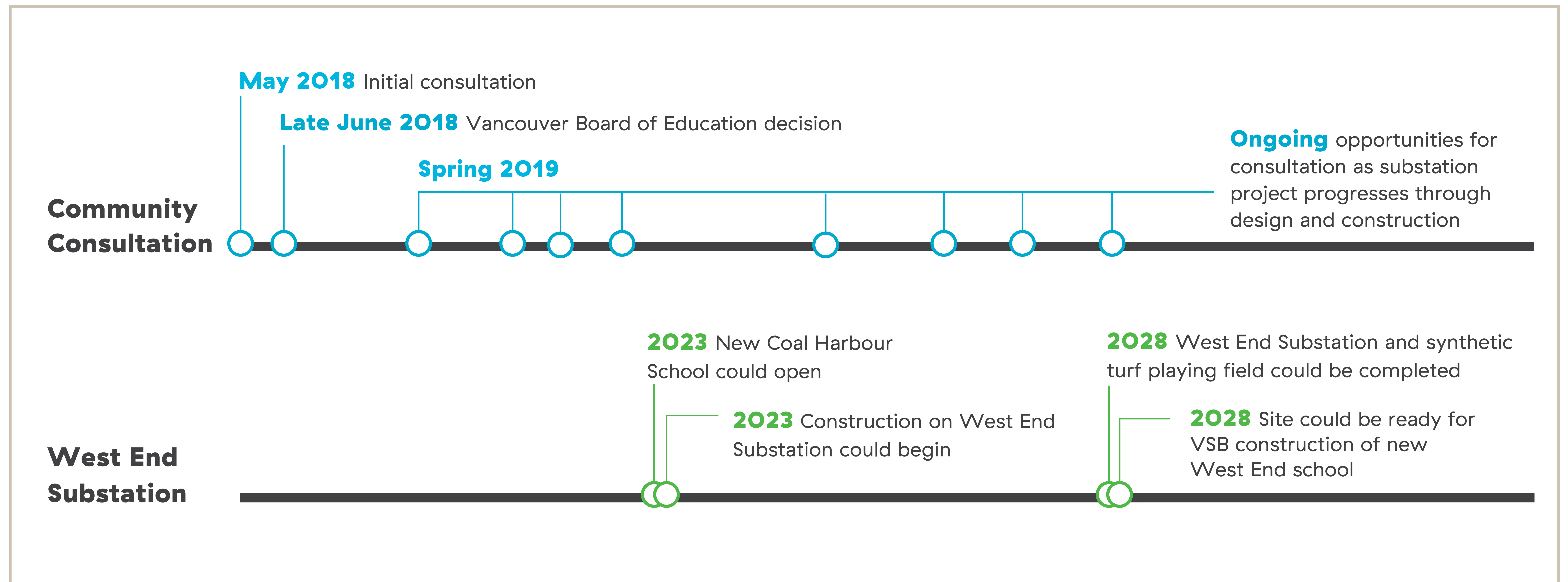


Playground at Lord Roberts Annex



What's next?

This tentative timeline shows how our proposal could move forward if approved by the Vancouver Board of Education.



If our proposal goes forward public consultation will be ongoing, including City and Park Board-led consultation to further explore impacts of underground power lines through Nelson Park.

Thank you

You can provide your feedback and learn more by:

- Reading the discussion guide and completing the feedback form (pages 18 & 19).
- Completing an online feedback form at bchydro.com/westendsub
- Emailing us: westendsub@bchydro.com
- Visiting our website: bchydro.com/westendsub



West End Substation

Public consultation May 1 – May 31, 2018



Welcome

It's our job to ensure people in downtown Vancouver continue to have access to reliable power. We're providing the clean, renewable power Vancouver needs, but our electricity system serving downtown is aging and needs upgrades. We've approached the Vancouver School Board (VSB) to re-visit our proposal of a new West End Substation underground at the Lord Roberts Annex property.

We all know downtown land is scarce and expensive—we've continued to explore all options for the location of a new substation in the West End over the last year. Most suitable and available properties in the West End are currently being used for housing, which would need to be removed if purchased for a future West End Substation. If we bought a private property, we'd follow our traditional approach of building an above ground substation as the cost of private land would make undergrounding the substation cost-prohibitive.

Our proposal for the Lord Roberts Annex property will provide VSB with funding to build a new Coal Harbour School sooner. At the Lord Roberts Annex property, it will result in an out-of-sight underground substation topped by a synthetic turf playing field, and allow for the construction of a new elementary school after the substation is complete. We continue to believe our proposal for the Lord Roberts Annex property would benefit the downtown Vancouver school community and provide the best outcome for the West End. Working together with VSB we're bringing this idea back to local parents and the community to see if they agree.

This discussion guide contains detailed information about our proposal to VSB. It also outlines some of the key themes we heard during our 2017 consultation, and our response.

The feedback form on pages 18–19 provides you with an opportunity to share your thoughts on our proposal to VSB. VSB will also be consulting with their stakeholders and parents, and will ensure the Vancouver Board of Education (elected VSB Trustees) have all feedback collected. The Vancouver Board of Education will be making a decision on our proposal as early as June 2018.

Please provide your feedback by Thursday, May 31, 2018.

How your input will be used

What we hear from you about our proposal will be included in a consultation report which we'll share publicly. This report will be given to the Vancouver Board of Education to inform their decision on our proposal for the Lord Roberts Annex property, along with feedback collected through VSB's own consultation.

If the Vancouver Board of Education decides to accept our proposal, your input will be used to inform our next steps on this project where there would be many future community consultation opportunities.

We want to hear from you

You can learn more and provide your feedback by:

- Reading this discussion guide and completing the feedback form.
- Coming to a small group discussion (please RSVP; see details to the right).
- Coming to an open house (schedule to the right).
- Completing an online feedback form: **bchydro.com/westendsub**
- Emailing us: **westendsub@bcydro.com**
- Visiting our website: **bchydro.com/westendsub**

Small group discussion schedule

Small group discussions are scheduled for two hours and will be a sit-down, round-table format. The discussions will start with our project team providing an overview of our proposal to VSB, our response to what we heard in 2017, and we'll answer your questions. To attend a small group discussion in your neighbourhood, please email westendsub@bchydro.com or call 604 341 1304 with your name, contact information and the date that you'd like to attend.

Date	Time	Location
Thursday, May 3, 2018	6 p.m.–8 p.m.	Lord Roberts Annex 1150 Nelson St, Vancouver
Monday, May 7, 2018 Thursday, May 10, 2018 Tuesday, May 15, 2018		Century Plaza Hotel 1015 Burrard Street, Vancouver

Public open house schedule

Open houses are a drop-in meeting format. You'll be able to see and read detailed information about our proposal, including maps and renderings, and members of our team will be available for discussion and to answer questions. No RSVP is needed.

Date	Time	Location
Tuesday, May 1, 2018	5 p.m.–8 p.m.	Century Plaza Hotel 1015 Burrard Street, Vancouver
Thursday, May 17, 2018		

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It's our job to keep the lights on

Our electricity system in downtown Vancouver is aging and needs upgrades. We need a new substation in the West End to ensure we continue to keep electricity flowing.

Our existing system serving downtown Vancouver includes three substations:

- Dal Grauer, located on Burrard near Smithe in downtown Vancouver, in-service since 1953.
- Murrin, located at Main and Union in Chinatown, in-service since 1947.
- Cathedral Square, an underground substation at Richards and Dunsmuir, in-service since 1984.

Dal Grauer and Murrin are aging and need to be relocated and rebuilt in areas that are more seismically stable, have the space to accommodate future growth when needed and are close to the areas and neighbourhoods where the electricity is being used.

Our plan to continue supplying safe and reliable electricity to downtown Vancouver.

In exploring options for the future of our power system, we've identified a need for up to three new substations within the next 30 years. New substations in the West End and East Vancouver, combined with upgrades to our existing transmission system, would allow us to decommission Dal Grauer and Murrin substations within the next 12 years.

We need to decommission these aging substations as soon as possible as they're nearing end-of-life and it's not practical to re-build them where they are. Both substations are also susceptible to significant damage from a major earthquake.

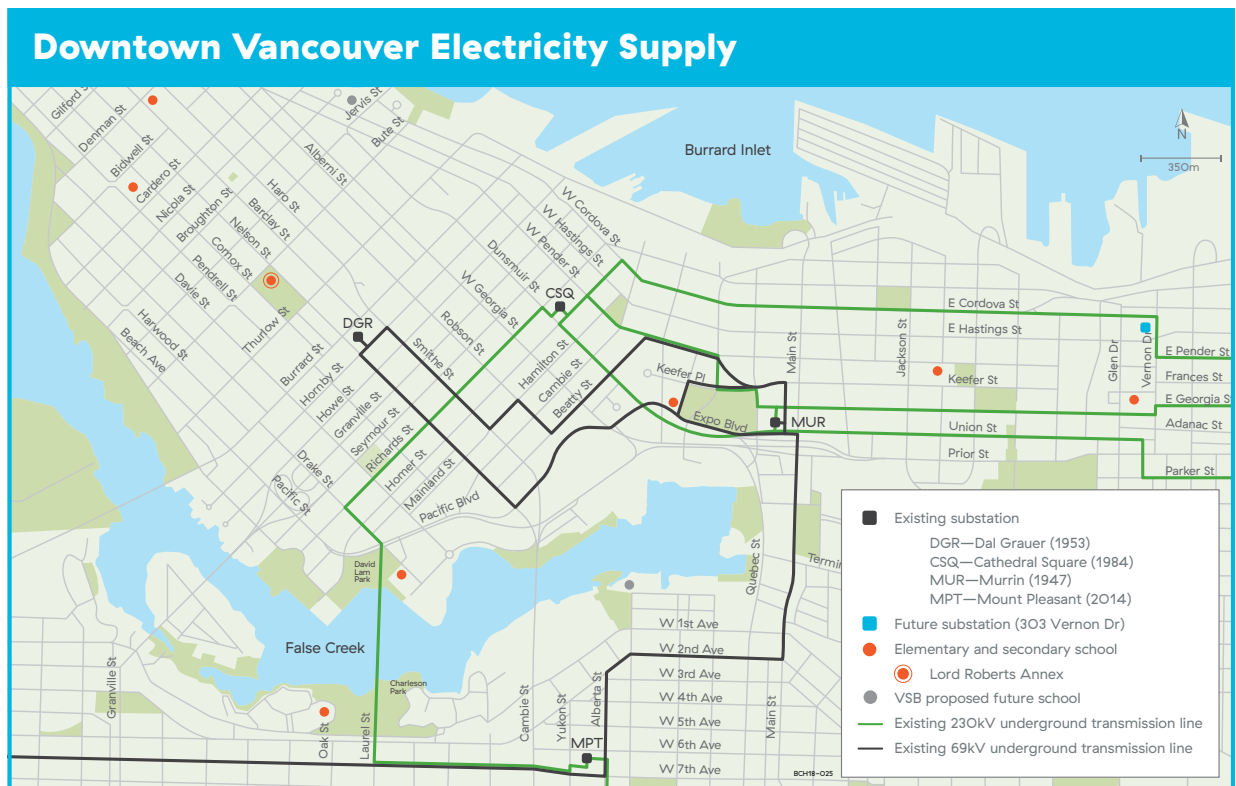
A third substation in Yaletown and upgrades to Cathedral Square Substation are also needed in as soon as 25 years, which we'll revisit once the new substations are built in the West End and East Vancouver.

We need to build a new West End Substation to replace Dal Grauer Substation and continue to explore all options to find a home for it.

What's a substation?

Substations are a critical link between our electricity system and your light switches and sockets. They reduce the high voltage used in our big power lines to a lower voltage for use in your homes and businesses.

A new West End Substation would receive electricity at a voltage of 230 kilovolts and send it out into your community at a voltage of 12 and 25 kilovolts.

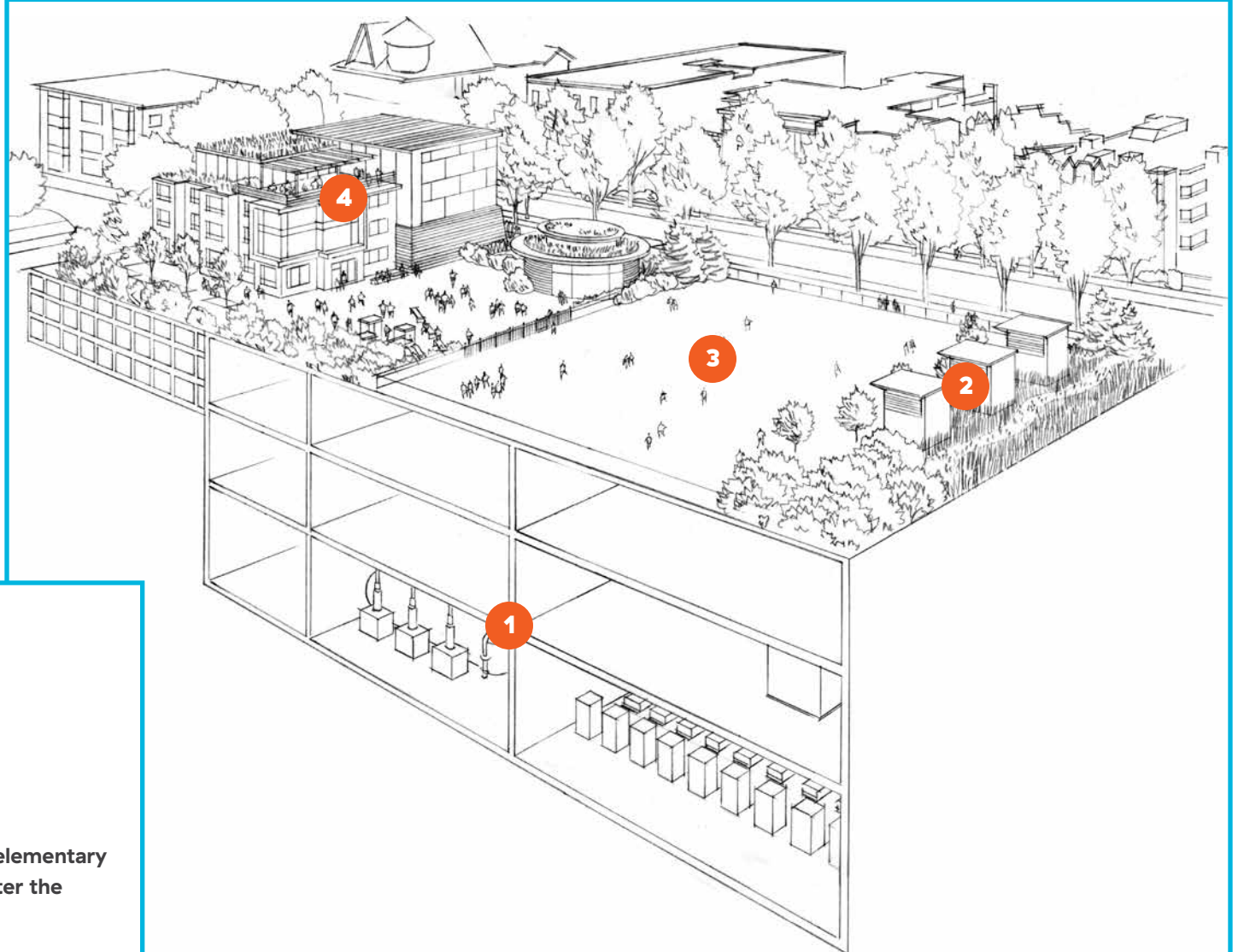


Our proposal

We've approached VSB to re-visit the idea of a new underground substation at the Lord Roberts Annex property. We continue to believe our proposal offers significant benefits to the downtown Vancouver school community. Working together with VSB we're bringing this idea back to local parents and the community to see if they agree.

We would offer fair market value compensation in exchange for the underground property rights needed, providing VSB with funding to build a Coal Harbour school sooner. At the Lord Roberts Annex property, it will result in an out-of-sight underground substation topped by a synthetic turf playing field, and allow for the construction of a new elementary school after the substation is complete.

Artist's rendering of what our proposal could look like at the Lord Roberts Annex property



- 1** The underground substation
- 2** Vents for the substation
- 3** Synthetic turf playing field
- 4** Conceptual sketch of a new elementary school, to be built by VSB after the substation is complete.

Our traditional approach

Our traditional approach to developing new substations is to determine where they're needed, search for appropriate sites, and then build them above ground. This is how we've built almost all of our nearly 300 substations throughout the province as it's safe, cost-effective for our ratepayers and offers easier maintenance for our crews compared to an underground substation.

In the West End, this approach would mean that a new indoor substation would need to be located within three to four blocks of Lord Roberts Annex, taking up almost almost half a city block like the Mount Pleasant Substation or Dal Grauer Substation. Suitable properties that we could purchase in the West End are currently occupied by housing, which would need to be removed to make way for our necessary infrastructure.

We think our proposal for the Lord Roberts Annex is a better solution, as it would benefit the Vancouver school community, protect limited housing stock in the West End and result in an out-of-sight underground substation. We recognize that the West End neighbourhood is a unique one, and we think it's the right fit for a different approach.

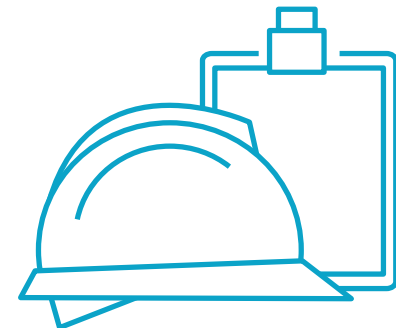
Dal Grauer Substation on Burrard St.



Why can't BC Hydro build a West End Substation underground if they purchase a property?

To build a substation somewhere else, we'd need to buy the property outright instead of only securing underground property rights. The additional cost of building underground, on top of the property purchase price, wouldn't be justified for our ratepayers.

Compared to our traditional approach, the business case for the Lord Roberts Annex proposal is cost neutral. By securing underground property rights rather than buying private property, we could justify the increased costs of building underground.



What's changed?

In early 2017, we consulted the community on the idea of building a substation underground in the West End at the current location of Lord Roberts Annex, adjacent to Nelson Park. This consultation also included a proposal to build another substation underground at Emery Barnes Park (in Yaletown) along with substantial park upgrades there and at Cathedral Square.

We had good participation from the community, and there was support and interest in further exploring the possibilities of this shared land use proposal, with more than half of respondents indicating that they preferred this new approach over our traditional approach.

After continuing to look for suitable properties over the last year, we still believe in this option and the community benefits it can deliver, and think it's worth exploring one more time. That being said, there are some changes from our proposal last year.

We're focused on the West End

The need to find a site for the West End Substation remains a top priority to ensure we continue to deliver reliable power to the growing downtown core. This is currently our priority, and we'll re-visit what is needed in Yaletown and at Cathedral Square Substation once the new substations are built in the West End and East Vancouver.

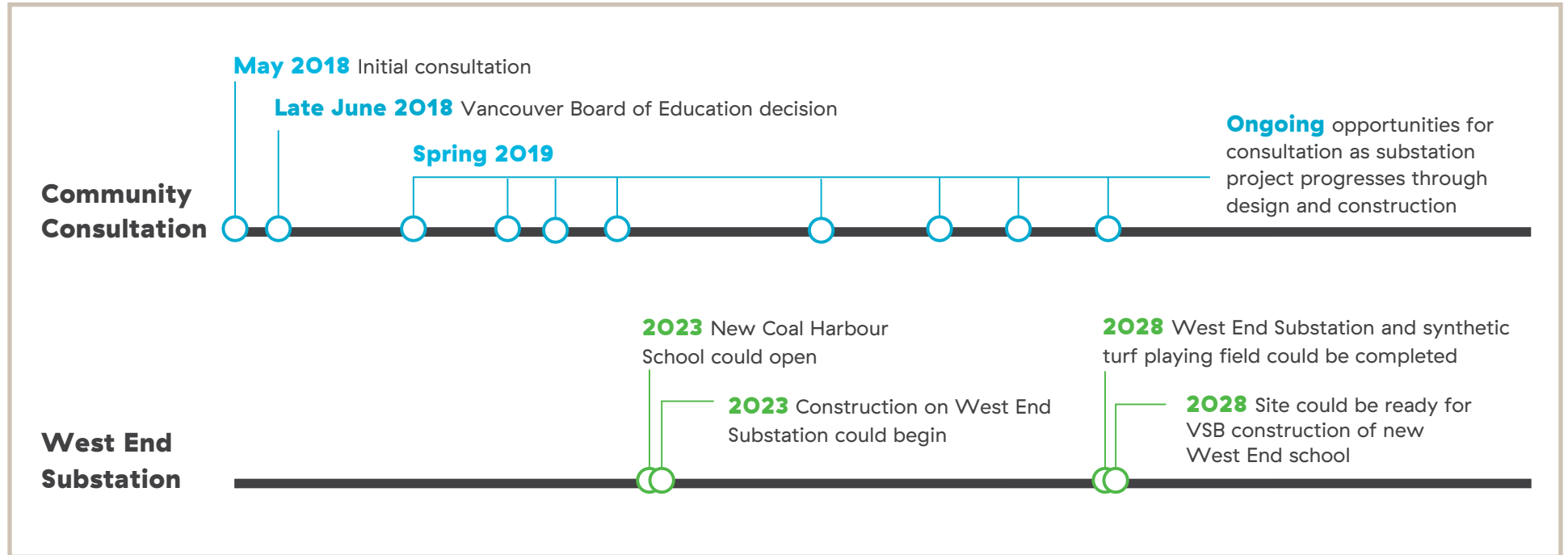
We have a little more time

After our 2017 proposal didn't go forward, we were able to purchase a property in East Vancouver for a future substation. At that point, we explored the option of building a substation in East Vancouver first. This has become a "Plan B" option for us, as we've recognized the difficulties in acquiring property for the West End Substation. Building the West End Substation first is still our preferred option for maximizing the reliability of our downtown Vancouver power system and minimizing the risk of a prolonged power outage. However, the option of first building an East Vancouver Substation will take some pressure off the system serving downtown Vancouver, giving us a little more time to secure the right site for a West End Substation.



Tentative timeline

This timeline shows how our proposal could move forward if approved by the Vancouver Board of Education.



If our proposal goes forward public consultation will be ongoing, including City and Park Board-led consultation to further explore impacts of underground power lines through Nelson Park.

Potential impacts and mitigation

We know that substation construction could affect those who live, learn, work and play in the local neighbourhood. We've been studying what these impacts may be, so that we can propose ways to avoid or mitigate them.

In 2017, Stantec, an internationally-recognized independent consulting firm, completed a preliminary technical, environmental and socio-economic study looking at the following topics in relation to the Lord Roberts Annex property and Nelson Park.¹

- Current park use
- Park feature inventory
- Vancouver Park Board strategies and initiatives
- VSB strategies and initiatives
- Park aesthetics
- Air quality
- Noise and vibration
- Public safety
- Human health
- Stormwater management
- Electric and magnetic fields
- Property values
- Subsurface hydrology (underground water)
- Urban forestry
- Environmental management during construction
- Environmental and socio-economic considerations of a new school, childcare and synthetic turf playing field

If you'd like to view the study in its entirety, we'll have copies available at our open houses and small group discussions, or you can find it online at bchydro.com/westendsub.

If our proposal moves forward we'll work with VSB, Vancouver Park Board and the City of Vancouver to complete additional technical studies, the results of which will be shared in future public consultation.

The following pages provide an overview of the potential impacts and mitigation for a new West End Substation at the Lord Roberts Annex property, which were of the most interest during our 2017 consultation, including construction and operational impacts, electric and magnetic fields, green space, substation safety, and relocating students.



¹The independent Stantec study, titled "BC Hydro Seed: Technical, Environmental, and Socio-Economic Study—February 17, 2017" looked at Nelson Park/Lord Roberts Annex as well as Emery Barnes Parks as potential sites for underground substation construction. While Emery Barnes Park is not a part of this consultation, or a property BC Hydro is currently pursuing as a substation site, the portion of the study pertaining to Nelson Park/Lord Roberts Annex is still applicable.

Construction impacts

During our 2017 consultation, people asked about construction impacts, including noise and air quality, disruption to Nelson Park as well as damage to trees and the Nelson Park community garden.

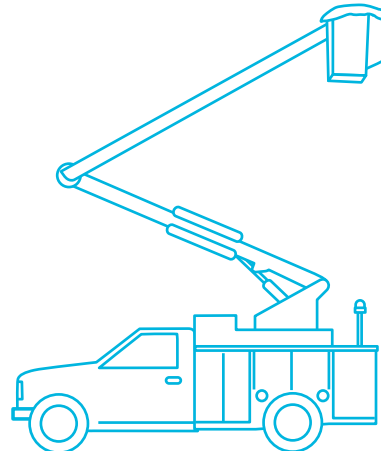
We know that the construction of a substation in the West End would have temporary impacts on those who live, work, play and learn in the community, just like any other construction project.

We're committed to addressing or mitigating the construction impact concerns raised through our 2017 consultation processes, using industry best construction practices and working collaboratively with stakeholders and neighbours who may be affected.

We commit to mitigating noise impacts as much as practical, using measures such as adjusting construction hours and activities to minimize disruptions, implementing noise barriers, and linking noise mitigation to construction permits and contractor remuneration. We would also meet regularly with stakeholders to evaluate and adjust mitigation measures. One thing this would include would be the formation of a Community Construction Liaison Committee well in advance of construction.

We have an excellent history of mitigating construction impacts across a variety of projects, as demonstrated most recently with our Mount Pleasant Substation Project. This project included high voltage cables being buried in the city streets along the Fairview Slopes, the downtown core, and the west side as well as through David Lam Park, with very little residual impacts, where we used community-based construction consultation and communication practices.

Excavation of Mount Pleasant Substation – Alberta St at W 6th Ave



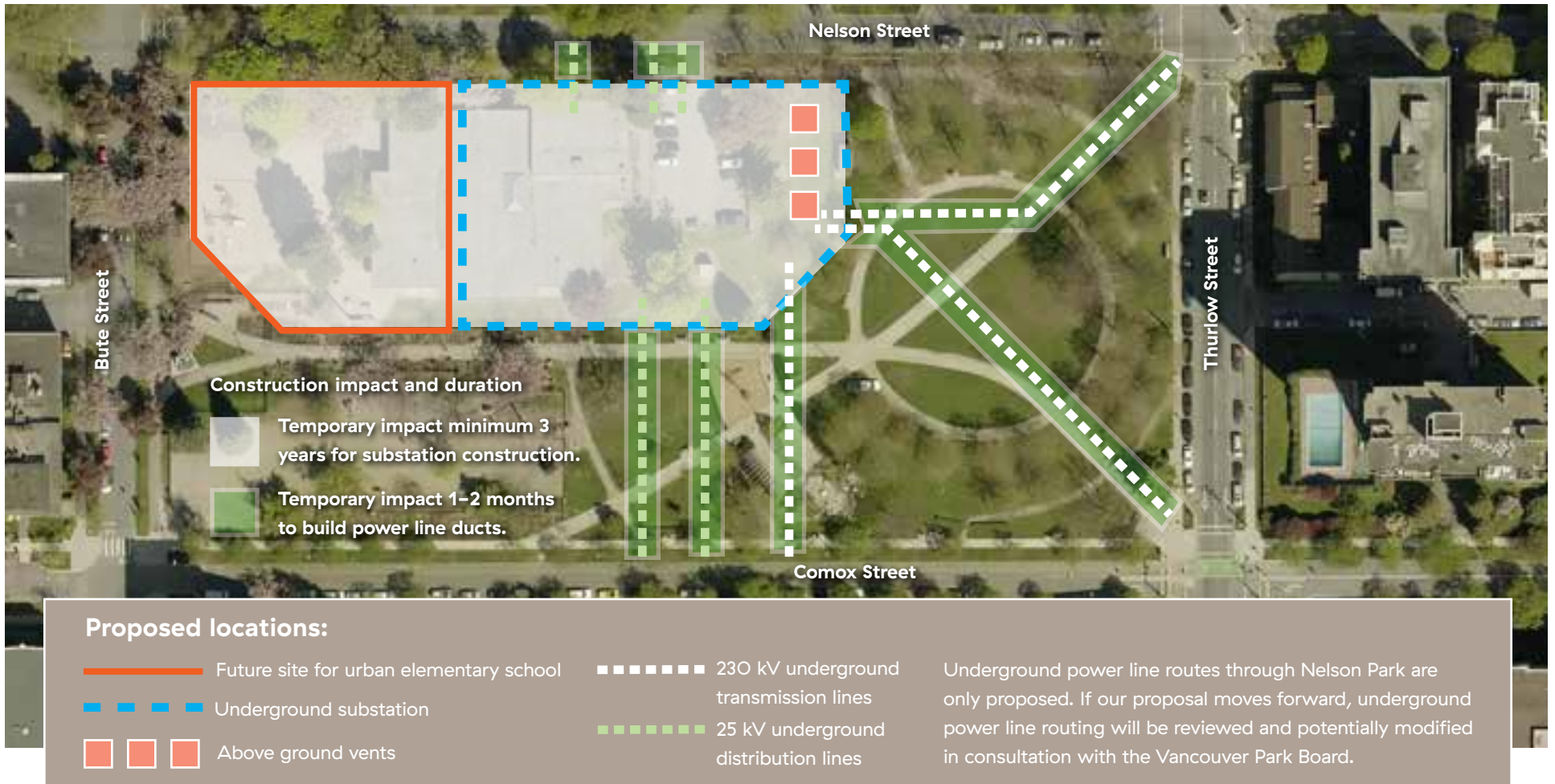
Stantec Study preliminary findings:

Typical construction impacts can be mitigated in areas adjacent to the Lord Roberts Annex property and in Nelson Park.

- Temporary increase in air contaminants, noise and vibration, similar to the construction of a new condo or office tower.
- Construction management practices would be in place, such as suppressing dust, minimizing construction emissions, building noise barriers, traffic management, and scheduling works during least impactful time of day and year.
- Total construction time approximately five years.
 - First three years will include excavation, construction of the substation underground structure, and roof install.
 - The next two years would include installing all equipment inside the building, including three transformers, and building the synthetic turf playing field on top of the substation.
 - Laying of underground cables through Nelson Park will require one to two months within the five-year timeline (not including park restoration; to be confirmed if our proposal moves forward).

If our proposal moves forward additional technical studies will be done.

Construction impacts



Why can't you put the underground cables somewhere else?

The routes shown for our underground power lines are only proposed. Power needs to enter and leave the substation on multiple sides, making it necessary for some underground power lines to be routed through Nelson Park.

The proposed routing was also designed to follow existing pathways in the park as much as possible to minimize tree removal. See page 16 for more information on our commitment to maintaining green space and tree canopy. If our proposal moves forward, we'll work with the Vancouver Park Board to confirm the routing of our underground power lines through Nelson Park, including additional technical studies and public consultation.

Operational impacts

In 2017 we also heard questions about operational impacts of the proposed underground substation, including questions about noise and substation access.

Our experience with both above ground and underground substations suggests that an underground substation has the lesser operational impact on the community when public safety, visual and noise considerations are factored in while leaving space above ground for public use.

We commit to design and build the substation ventilation infrastructure using state-of-the-art technologies to minimize the operational noise to well below the City nighttime noise by-law level.

We'll also look at different ideas for integrating the air vents and entrance structure for the substation into the surrounding landscape. If our proposal moves forward, we would further explore options for creating public art and the use of living walls and green roofs to achieve this. The map on page 11 shows the approximate footprint and proposed location of the air vents; the location and design of the entrance structure will be further developed should our proposal move forward.

Inside our underground substation at Cathedral Square



Stantec Study preliminary findings:

Minimal impacts during operations

- Through modeling of expected operational noise levels, the study found levels to be at or slightly below the City of Vancouver nighttime noise by-law levels using very conservative design assumptions.
- Operation of the underground substation wouldn't be expected to have any air quality or vibration impacts compared to current conditions.
- Warm air vented from the substation would be without any contamination or particulates.
- The substation would be operated remotely, with a team of two or three electricians typically visiting the substation two to three times per week, using a standard-size truck or van.

If our proposal moves forward additional technical studies will be done.

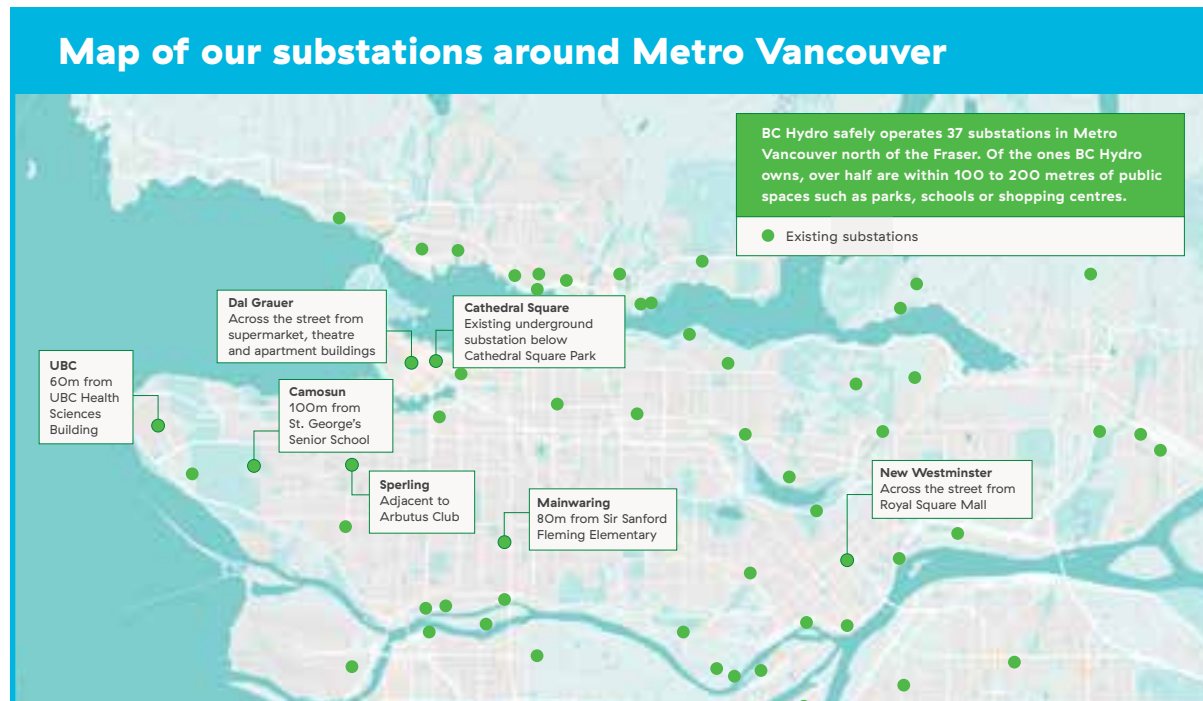
Substation safety

During our 2017 consultation, people asked about the safety of our substations, specifically the risk of fire, earthquakes and safety during construction.

Our highest priority at BC Hydro is public safety and the safety of our employees. We safely operate more than 300 substations throughout the province; 37 of those substations can be found within Metro Vancouver with about 50% of them located within 100–200 metres of busy public spaces including parks, shopping malls and schools. This includes our underground substation in downtown Vancouver beneath Cathedral Square Park, which we've been operating safely for more than 30 years.

Any new substation in downtown Vancouver would use the most modern technology available, virtually eliminating the risk of fire or explosion, and be built to rigorous safety and environmental standards. It would also be built to withstand a very large earthquake, the kind that would be expected to happen only once in every 2,475 years.

There are also firm soils (bedrock) under the Lord Roberts Annex property which is ideal for withstanding a significant earthquake. An underground substation will also perform better than an above ground substation in an earthquake.



West End Substation

Why can't a new substation be built somewhere else?

We understand that those who live, work, play and learn in the West End would prefer a new substation be located somewhere else, for a variety of reasons. A new West End Substation needs to be built in close proximity to the electricity demand and the customers it serves, to ensure that the power system can operate efficiently and reliably. The alternative to building an underground substation at the Lord Roberts Annex property is an above ground, indoor substation, ideally within three to four blocks.



Underground substation at Cathedral Square Park, Vancouver

Electric and magnetic fields

Participants in our 2017 consultation had many questions about electric and magnetic fields and our infrastructure. Some of the most frequently asked questions, and our answers, are listed below.

What is EMF?

EMF stands for electric and magnetic fields, which are invisible fields, produced anywhere that electricity flows such as transmission lines, household appliances like coffee makers, vacuum cleaners and lights. EMF is present around the wiring in your walls and can be found indoors and outdoors in the environment. People are mostly interested in magnetic fields as they are not easily shielded like electric fields, which is why we focus on magnetic fields.

What are the guidelines for magnetic field exposure?

Health Canada and the World Health Organization endorse the guidelines created by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The guideline for residential exposure is 2,000 milligauss (mG), whereas the guideline for occupational exposure, for people like power line technicians, is 10,000 mG. There is a large safety factor applied to the occupational guideline limit; the residential guideline limit has a further additional safety factor.

Are magnetic fields safe?

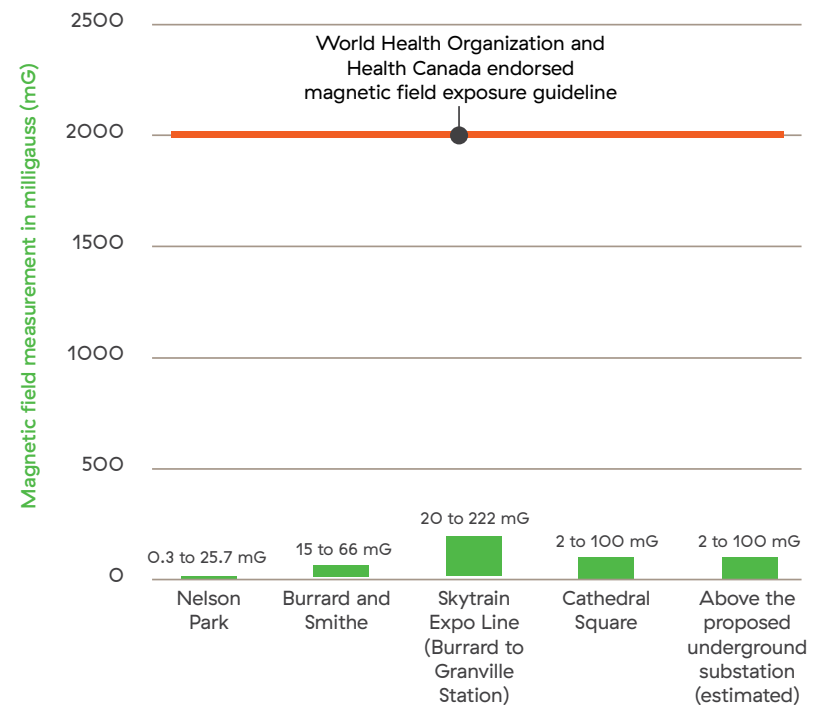
Yes, it's safe. International health agencies, such as the World Health Organization and Health Canada, have reviewed research completed over the past 40 years, assessing the strengths and weaknesses of each study and come to their own conclusions regarding health. Both conclude that there are no confirmed health consequences from low-level electric fields and magnetic fields, like those near power lines. They also refer to the magnetic field guideline value of 2,000 mG for the public as a safe level of exposure.

Do people accumulate exposure to magnetic fields?

If someone were to use an electric blanket throughout the night, blow dry their hair in the morning, use their coffee maker and then walk under a power line, would they accumulate exposure throughout the day? The answer is no, there is no evidence for cumulative exposure or effects. There is no difference between intermittent and long-term exposure, for example walking under a powerline or sitting near a powerline for the afternoon, neither increase health risk at the levels we're talking about.

Magnetic field levels around Vancouver:

We anticipate the levels of magnetic fields above the proposed substation will be similar to those above our underground substation at Cathedral Square.



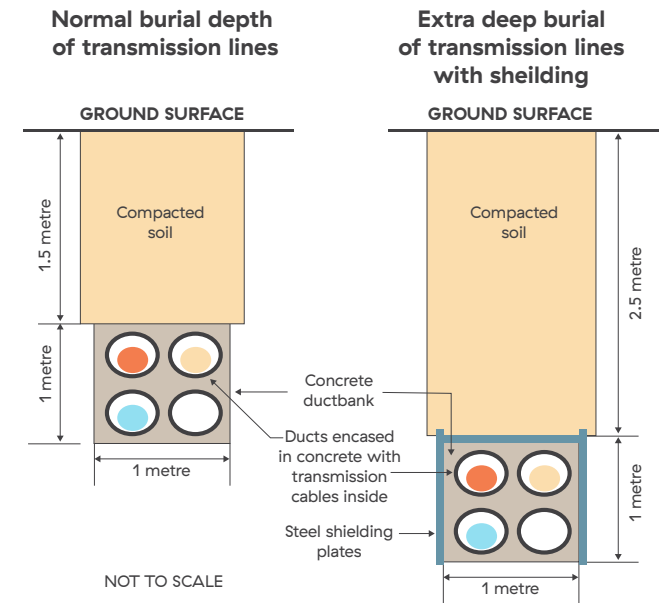
Safety is our number one priority. With that in mind, we considered EMF very carefully in developing our proposal for the Lord Roberts Annex property. Through our consultation in 2017, we were able to explain that the transmission lines leading in and out of the substation, which are the main source of EMF, would be a minimum of 70 metres from where a future new school will be located.

Because EMF dissipates very quickly with distance from the source, the EMF inside a future school would be similar to levels inside the existing Lord Roberts Annex currently. The source of any EMF within the future school would be the lights, computers and other electrical equipment found in any other school.

Levels of EMF right above the transmission lines, in Nelson Park and the proposed synthetic turf playing field, would also be very low. At peak times magnetic fields would only be 5% of the World Health Organization endorsed conservative exposure limit, and wouldn't pose any significant risk to the public.

The figure on page 14 shows some levels found around Vancouver.

While both the Stantec study and an independent review by Vancouver Coastal Health concluded that there were no health and safety issues related to EMF, both suggested we consider additional mitigation measures to alleviate negative public perception.



Our commitment on EMF at the Lord Roberts Annex property and Nelson Park, if our proposal is accepted:

- Bury transmission cables deeper underground and implement magnetic field shielding (minimum 75% reduction in magnetic field from the estimate in the figure on page 14) within the boundaries of Nelson Park and VSB property (see diagram above modelling cable depth).
- Commission an independent study of current EMF levels at the existing Lord Roberts Annex property and Nelson Park, and report this publically.
- Confirm the EMF levels expected at and around the proposed substation, based on final design, and report this publically.
- Commission an independent study to verify EMF levels once the substation is in-service and continue to monitor EMF levels and report publically on an on-going basis.

Stantec Study preliminary findings:

Risk of impacts from EMF is low

- Risk of impacts from electric and magnetic fields (EMF) in Nelson Park and on the Lord Roberts Annex property are low.
- Magnetic field levels directly above the underground transmission cables in Nelson Park and at the proposed playing field would be similar to or lower than those at Cathedral Square Substation (approximately 100mG at peak loads, and less than 25mG 95% of the time), and well below the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guideline of 2000mG, endorsed by the World Health Organization and Health Canada.
- The new school site at the Lord Roberts Annex property would be at least 70 metres from the nearest underground transmission cables which is the main source of EMF; future levels would be similar to those today.
- Concluded that there were no health and safety issues related to EMF, but recommended that BC Hydro consider additional mitigation measures in an effort to reduce the public's perception of EMF as an issue.

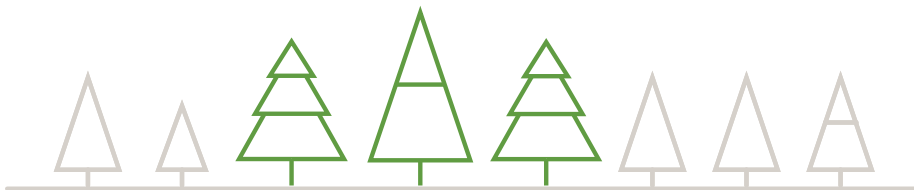
If our proposal moves forward additional technical studies will be done.

Green space and tree canopy

In any construction project, loss of green space, as well as removal of trees, is a concern. We heard this during public consultation and from Vancouver Coastal Health and the Vancouver Park Board in 2017.

We commit to minimizing the impact of an underground substation, as well as the resulting underground transmission and distribution cables, on green space and trees.

- We're committed to minimizing the space taken by our permanent infrastructure through innovative and integrated design. The net result could be a three-quarter synthetic turf playing field above the underground West End Substation, offering a substantial increase of play area for school students and could be available for public use and events.
- If our proposal moves forward we'd work with the Vancouver Park Board to confirm routing of underground power lines through Nelson Park and to minimize permanent effects on parkland. This would include additional consultation and technical studies.



Stantec Study preliminary findings:

Tree canopy

- Most of the 39 trees currently on the Lord Roberts Annex property would need to be removed.
- Some of the 127 trees currently in Nelson Park may need to be removed for installation of underground power lines.
- Should our proposal move forward, we would undertake further design in consultation with the Vancouver Park Board and VSB.
- Any trees removed would be replaced with a ratio of at least 1:1 within Vancouver, in consultation with the Vancouver Park Board and VSB.
- Clearing activities would be undertaken outside of bird breeding windows to minimize impacts to birds and wildlife.

Green space

- At the Lord Roberts Annex property, the majority of the property would be lost temporarily for construction, with up to 4% of property lost permanently to BC Hydro infrastructure.
- At Nelson Park loss of greenspace would be temporary while underground power lines are installed (not including park restoration, this will be confirmed if our proposal moves forward).

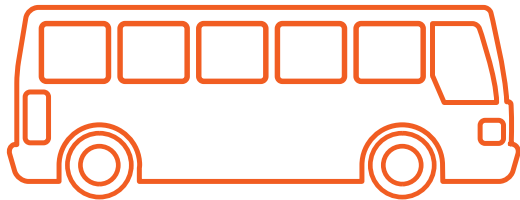
If our proposal moves forward additional technical studies will be done.

Relocating students and the memorial playground

During our 2017 consultation, parents told us how important it was to minimize disruption to students' learning and exposure to construction impacts. If our proposal moves forward, we'll work collaboratively with VSB to ensure this is achieved.

Construction for the West End Substation will not begin until the Lord Roberts Annex students are relocated to the new Coal Harbour School.

During the 2017 consultation, we also learned of the memorial playground being built by the Lord Roberts Annex Parent Advisory Committee (PAC) and met several times with the playground committee. We commit to removing the playground equipment, storing it and then working with VSB to reinstall it at our expense. We'll continue to work with the Lord Roberts Annex PAC to confirm this commitment and explore other options if preferred.



We want to hear from you.

Please complete the feedback form on pages 18 and 19 to share your thoughts on our proposal.

What we hear from you about our proposal will be included in a consultation report which we'll share publicly. This report will be given to the Vancouver Board of Education (elected VSB Trustees) to inform their decision on our proposal for the Lord Roberts Annex property. If the Vancouver Board of Education decides to approve our proposal, your input will be used to inform our next steps on this project, including ongoing consultation with the community.

If you'd like to be added to our email update list, please call **604 341 1304** or email us at westendsub@bchydro.com.

Feedback form

We've approached the Vancouver School Board (VSB) to re-visit the idea of building an underground substation at the Lord Roberts Annex property. Working together with VSB we're bringing this idea back to local parents and the community to see what they think. More information about our proposal can be found in this discussion guide. All comments will remain anonymous. When responding to the open-ended questions below, please do not identify yourself or refer to other persons.

The purpose of this feedback form is to obtain public feedback on BC Hydro's proposal to the Vancouver Board of Education (elected VSB Trustees) to acquire the underground property rights at Lord Roberts Annex to build an underground substation. BC Hydro is collecting this information in accordance with its obligations under the *Utilities Commission Act*. BC Hydro cannot accept 3rd party (private) information without the express consent of that person or entity. At BC Hydro's discretion, BC Hydro will reject surveys that are deemed to contain 3rd party information. If you have specific questions about the project or privacy concerns about this feedback survey, please contact westendsub@bchydro.com.

Now that you've heard about our proposal for the Lord Roberts Annex property, please tell us what you think. If you haven't read about our proposal, please take a moment to do so.

1. BC Hydro should continue to explore its proposal to build a new West End Substation that is underground.

- Strongly agree Somewhat agree Neither agree nor disagree Somewhat disagree Strongly disagree

2. BC Hydro's alternative approach (purchasing private property to build an above ground substation) is a better approach for the West End.

- Strongly agree Somewhat agree Neither agree nor disagree Somewhat disagree Strongly disagree

3. I'm concerned an above ground substation would decrease the amount of land available to build more housing in the West End.

- Strongly agree Somewhat agree Neither agree nor disagree Somewhat disagree Strongly disagree

4. I can see clear benefits to my community, and specifically the West End, as an outcome of this proposal.

- Strongly agree Somewhat agree Neither agree nor disagree Somewhat disagree Strongly disagree

5. I'm more likely to support this proposal if I know my community is benefiting from it.

- Strongly agree Somewhat agree Neither agree nor disagree Somewhat disagree Strongly disagree

6. We know that the construction of a substation would affect those who live, learn, work and play in the West End. Do you have concerns about our proposal that we haven't addressed in the discussion guide? If so, please be specific.

7. Additional comments?

How do you want to be involved?

We want to hear your thoughts during this early phase of consultation. If our proposal moves forward into further stages of planning and development, there will be many future community consultation opportunities.

8. How would you like to be kept informed about the development of this proposal if it moves ahead?

- Email
- Mail
- Website
- Social media
- Community update meeting
- Community Construction Liaison Group
- Through information at your local school or community centre
- Other _____

By submitting this feedback form, I consent to the potential disclosure, storage and access of my anonymous feedback by BC Hydro for the purpose of public consultation.

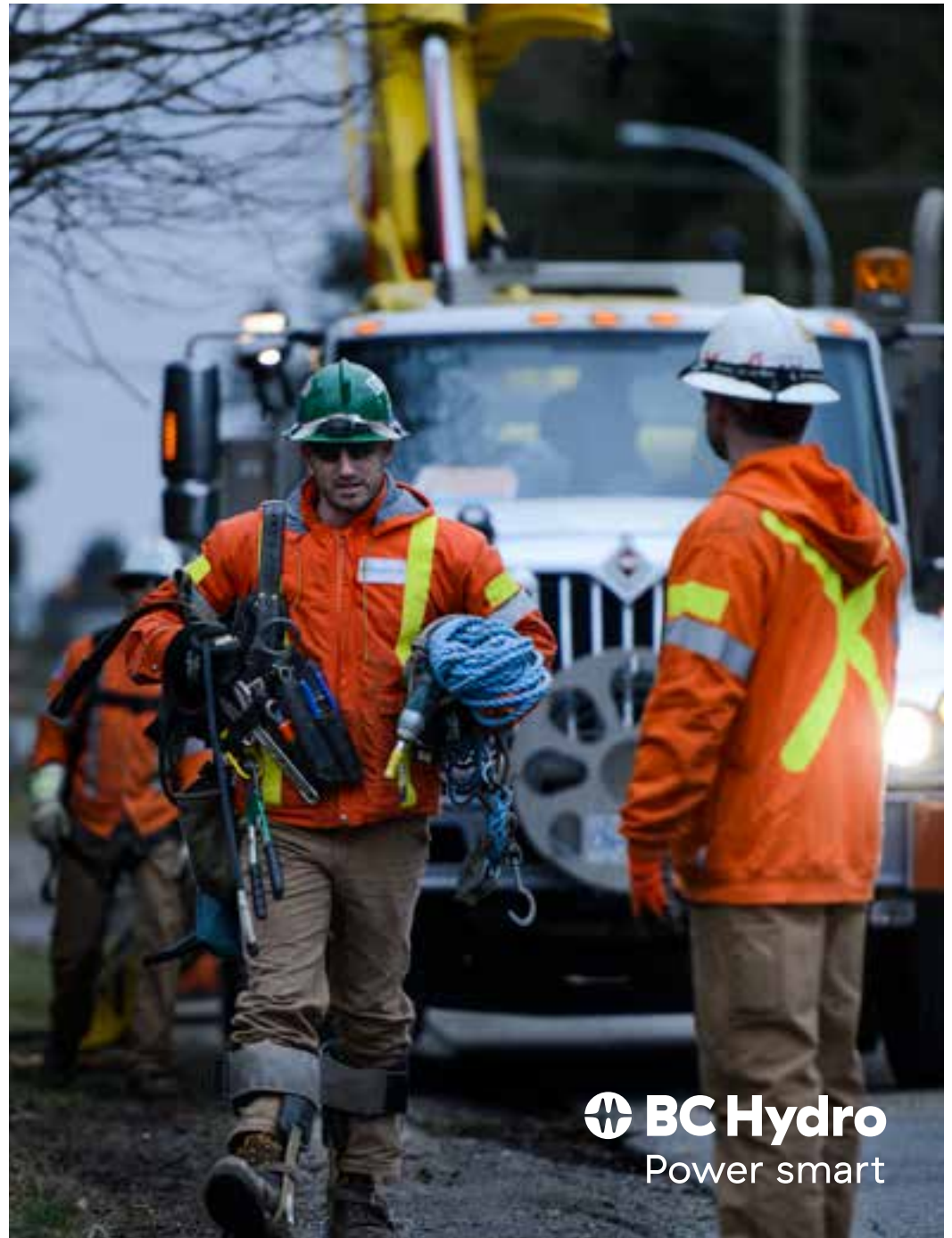
NOTE: This feedback form is anonymous. If you have a question you'd like answered, please share it with staff at our open house, or call or email us. If you'd like to subscribe for updates on this proposal and the future West End Substation, please be sure to sign-in at one of our in-person consultation events, visit our website at bchydro.com/westendsub or call or email us.

We want to hear from you.

Go to bchydro.com/westendsub to provide your feedback. Our consultation is open from May 1 – May 31, 2018.

You can provide your feedback and learn more by:

- Reading this discussion guide and completing the feedback form (pages 18 & 19).
- Coming to a small group discussion or open house – see the schedule on page 3.
- Completing an online feedback form at bchydro.com/westendsub
- Emailing us: westendsub@bchydro.com
- Visiting our website: bchydro.com/westendsub



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