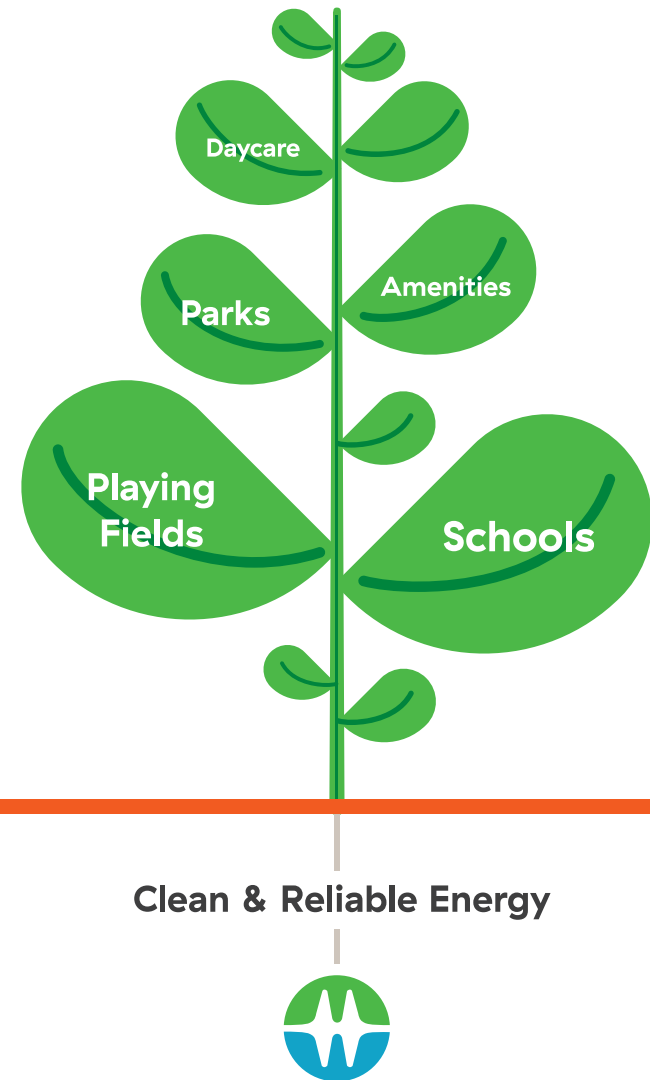


**Consideration memo:
consideration of input from
community consultation and
technical reviews**

March 6, 2017



Introduction – about seed

Vancouver is one of the greenest, most livable cities in the world. Our population is growing and so is demand for energy. In fact, demand for electricity in Vancouver is expected to grow by 75% in the next 30 years. We can provide the clean renewable power that Vancouver needs, but our substations serving downtown Vancouver are aging and need to be upgraded or replaced.

We need to build two new substations—one in the West End and one in Yaletown. Our traditional way of doing things would be to find and buy a piece of land and build a substation on it. But that means putting a substation on land that could otherwise be used for housing, businesses, schools, or parks, as well as introducing visual impacts to these neighbourhoods.

What if, instead of a traditional approach to building substations, we used money and lands more wisely and built two new electricity substations below ground while funding new schools, new daycare spaces and improved parks on the land above them?

seed is our idea to deliver a secure, reliable, clean energy future for residents and businesses of downtown Vancouver, while funding significant community benefits for future generations.

At a glance, our **seed** idea includes the following elements:

- A complete transformation of **Cathedral Square Park** to make it a more desirable place to visit (2020)
- Possible added amenities to **Emery Barnes Park** in Yaletown, if requested by the community (2020)
- New **school in Coal Harbour** (2020)
- New **school, daycare spaces** and **green space** in the West End (2025)
- New underground substation in the West End (2025)
- Refurbishment of **Emery Barnes Park** (2039)
- New underground substation under **Emery Barnes Park** (2041)
- Upgrades to the existing underground **Cathedral Square** substation (2050)
- Significant funds that the Vancouver Park Board could use to provide other potential benefits, such as a new park or recreational facilities

At this stage, we've brought this idea to the City of Vancouver, the Vancouver School Board and the Vancouver Park Board for their consideration. These three organizations, as well as BC Hydro, will decide at the end of March 2017 whether or not to enter into agreements that would allow underground substations to be built in the West End and Yaletown, and enable community benefits such as schools, daycares and park improvements.

Community consultation – January 20 to February 28, 2017

From January 20 to February 28, 2017, we shared information about **seed** to see whether you think it’s a better idea than our traditional approach, and what opportunities and impacts there might be.

We thank all of those who took the time to provide their feedback through the following methods:

- 219 feedback forms were completed (216 online, 3 hard copy)
- 104 people attended four public open houses
- 70 people attended four small group roundtable meetings
- 32 people attended two parent advisory council (PAC) meetings
- 27 written submissions were received through email, including a petition with 196 signatures

All of the consultation materials and a report summarizing the consultation input can be found at bchydro.com/seed

BC Hydro’s consideration of input from community consultation and technical reviews

Below is a table outlining our consideration of some of the key themes we have heard through the community consultation process, and through input from key stakeholders and agencies, such as Dianne Turner, Official Trustee of the Vancouver School Board.

Interest or idea	Source	BC Hydro consideration
<p>1. Consider alternative locations</p> <ul style="list-style-type: none"> • Concern regarding the locations of the proposed substations, in particular the West End substation, being in close proximity to a school with some suggestions for locating the substations in less dense areas or far from a school • Specific suggestions of alternative locations included Stanley Park, the Molson Brewery site 	<ul style="list-style-type: none"> • Community consultation 	<ul style="list-style-type: none"> • The two new substations have to be located in the West End and Yaletown, two of the fastest growing and most densely populated areas of downtown Vancouver. Whether above or underground, the new substations need to be located centrally and in close proximity to the demand load in the West End and Yaletown so that the power system can operate efficiently and reliably. • Our traditional approach to building these two new substations would require BC Hydro to find and purchase land to build above ground substations, likely within a three-block radius of the sites proposed in seed. • Instead, seed is an idea to build virtually invisible substations underground on public land and use the funds that would otherwise be required to purchase expensive land in downtown Vancouver for above ground substations to fund a number of significant community benefits including two new schools, daycare spaces, park upgrades and other recreational amenities. • We did explore the possibility of the St. Paul’s Hospital site, but there is no

Interest or idea	Source	BC Hydro consideration
<p>or the existing St. Paul's Hospital</p>		<p>possibility this could work given the timing of when that site would be available for redevelopment and the timing of when the new substation in the West End would be needed in operation.</p>
<p>2. Electric and magnetic fields (EMF)</p> <ul style="list-style-type: none"> • Questions and concerns regarding the safety of siting a substation next to a school and next to/within a park 	<ul style="list-style-type: none"> • Community consultation • Vancouver Coastal Health Letter • Stantec Report • Vancouver School Board Letter • City of Vancouver • Vancouver Park Board • West End Families in Action (WEFA) Petition 	<ul style="list-style-type: none"> • BC Hydro has carefully considered electric and magnetic fields (EMF) in developing the seed idea, as public safety is our number one priority. • Through the open houses and roundtables, we were able to explain that the transmission cables leading in and out of the substation, which are the main source of EMF, would be a minimum of 70 meters from the new school at the Lord Roberts Annex site. • Because EMF dissipates very quickly with distance from the source, the EMF inside the new school would be similar to levels inside the existing Lord Roberts Annex currently, and the source of EMF in the new school would be the lights, computers and other electrical equipment found in any other school. • Even the levels right above the transmission cables in the parks would be very low, at peak times only 5% of the World Health Organization's conservative limit for sustained exposure, and would not pose any significant health risk to the public. • While Stantec's independent report regarding seed concluded that there were no health or safety issues related to EMF, the report recommended that BC Hydro consider additional mitigation measures in an effort to reduce the public's perception of the issue. • This request for mitigation measures was also received from some consultation participants, as well as from Dianne Turner, the Official Trustee of the Vancouver School Board. • Based on this feedback, BC Hydro commits to the following additional measures related to EMF: <ul style="list-style-type: none"> ○ Within park boundaries and the Vancouver School Board property, burying transmission cables deeper underground than we normally would and implementing magnetic field shielding by encasing the cables in steel. This will reduce the very low EMF levels even further (a minimum 75% reduction) and should alleviate the public perception of health risks from EMF. ○ Commission an independent study of current EMF levels at the existing Lord Roberts Annex school, Nelson Park and Emery

Interest or idea	Source	BC Hydro consideration
		<p>Barnes Park, and report this to the public.</p> <ul style="list-style-type: none"> ○ Based on final designs, confirm the EMF levels expected at the proposed substation sites, adjacent parks and new Lord Roberts Annex school and report this publicly. ○ Commission an independent study to verify EMF levels once the substations are in-service and continue to monitor EMF levels and report publicly on an ongoing basis.
<p>3. Construction impacts</p> <ul style="list-style-type: none"> • Concern regarding construction impacts, including disruption to park and playground space, noise and air quality, damage to old-growth trees and the Nelson Park community garden • Comments regarding the mitigation measures noted in the Stantec report being unrealistic 	<ul style="list-style-type: none"> • Community consultation • Vancouver Coastal Health Letter • City of Vancouver • Vancouver Park Board Email 	<ul style="list-style-type: none"> • We have always acknowledged that the construction of the substations in the West End and Yaletown would have temporary impacts on those who live and work there, keeping in mind construction will occur whether the substations are located above or underground. • BC Hydro is committed to addressing or mitigating the construction impact concerns raised through the consultation process, using best practices and working collaboratively with stakeholders. • The Stantec report found only 10% of Nelson Park would be experience temporary disruption during construction and this would be limited to 2 months. BC Hydro would complete this work during the winter to minimize impact on the park users. • For Emery Barnes Park, 64% of the park would be impacted for 3 years, at which time the park could be restored while construction of the station continues underground. We are committed to finding a solution to this temporary loss of space which may include creating a temporary park nearby, keeping in mind BC Hydro would have funded a refurbishment to Cathedral Square Park and a new addition to the park system in the meantime. • BC Hydro commits to mitigating noise impacts as much as practicable, using measure 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. • We would also commit to minimizing any loss of mature trees in Nelson Park and Emery Barnes Park and ensuring not net loss of trees. • BC Hydro has an excellent history of mitigating construction impacts across a variety of projects, as demonstrated most recently with our Mount

Interest or idea	Source	BC Hydro consideration
		<p>Pleasant substation project. This project included high voltage cables being buried in city streets along the Fairview Slopes, the downtown core, and the west side with very little residual impacts. We also employed best practice community based construction consultation and communication.</p>
<p>4. Planning and decision-making timelines</p> <ul style="list-style-type: none"> Concerns that the timeline between the consultation period and the required decisions did not provide enough time for Park Board and School Board to appropriately consider public input. 	<ul style="list-style-type: none"> Community consultation 	<ul style="list-style-type: none"> Downtown Vancouver’s electricity system needs to be updated, starting with a new substation in operation in the West End by 2025, to ensure customers continue to have safe, reliable, and clean power. A decision is needed in March 2017 to ensure that BC Hydro has enough time to move to the next stage of planning to meet this operational timeline, regardless of whether seed moves forward. It takes a minimum of 8 years to plan, design, get regulatory approval and construct this type of substation, so BC Hydro needs certainty on a decision as soon as possible. If seed moves forward, each substation will include a multi-year, multi-phase full consultation process. If seed does not move forward, BC Hydro needs to quickly change course back to pursuing the traditional approach of developing new above-ground substations.
<p>5. Consultation process</p> <ul style="list-style-type: none"> Suggestions that consultation notification be increased Concern regarding the consultation process, stating that it appears as if this proposal will go ahead regardless of community input Requests to keep the community informed throughout the project phases and to provide more opportunities for input online or through email, including a 	<ul style="list-style-type: none"> Community consultation 	<ul style="list-style-type: none"> The decision of whether the seed idea moves forward will be made at the end of March by Vancouver School Board, Vancouver Park Board, City of Vancouver and by BC Hydro. Each of these organizations will make their decision independently based on their own assessment of the idea. The interests and ideas consultation round was five weeks long (January 20th to February 28th), which is typical of an early consultation process. The process included 10 meetings with the community, and opportunities to provide feedback online and through email. If seed moves forward, it will include a multi-year, multi-phase consultation process for each substation project. This would include multiple opportunities for public input and feedback on the project phases through a variety of methods, including online and by email. As outlined in the consultation summary report, an extensive notification program was implemented to reach residents and businesses in downtown Vancouver to notify them about the opportunity to participate in the interests and ideas consultation:

Interest or idea	Source	BC Hydro consideration
<p>suggestion to engage current Lord Roberts Annex parents and students on future new school design</p>		<ul style="list-style-type: none"> ○ BC Hydro issued a news release on January 20, 2017 introducing the seed idea and informing media about the community consultation process. ○ BC Hydro CEO Jessica McDonald gave a keynote address to more than 300 people at the Greater Vancouver Board of Trade on January 24, 2017, where she introduced seed and encouraged participation in the community consultation process, and then presented to multiple smaller follow-up forums. ○ Banner ads targeting readers in downtown Vancouver ran on Postmedia Network websites (including vancouver.sun.com and theprovince.com) from February 1 – 22, with a total of 750,000 impressions. ○ 23 advertisements between The Vancouver Sun, Vancouver Province, 24 Hours, Vancouver Courier, Westender, Metro Vancouver. ○ Two postcard drops to 23,000 mailboxes within a three-block radius of Lord Roberts Annex and Emery Barnes Park. ○ Posters were posted throughout Emery Barnes Park and Nelson Park, as well as at schools and community centres in the West End, Yaletown, Coal Harbour and Olympic Village. ○ Three emails were sent to notify and remind stakeholders about their opportunity to provide input. ○ BC Hydro sent out social media posts about seed and the opportunity to participate in the consultation process from its accounts: <ul style="list-style-type: none"> ▪ 24 tweets from @bchydro (62.8K followers) and 10 tweets from BC Hydro CEO Jessica McDonald (@bchydroceo, 1.6K followers) ▪ 11 Facebook posts through facebook.com/BCHydro (33,000 likes) ▪ 2 posts on LinkedIn (35,051 followers) ○ All consultation materials, including an introductory video, were available at bchydro.com/seed. ○ The windows of BC Hydro’s building at 333 Dunsmuir Street in downtown Vancouver were wrapped with materials driving readers to bchydro.com/seed.
<p>6. Additional community benefits</p> <ul style="list-style-type: none"> • Suggestions for 	<ul style="list-style-type: none"> • Community consultation 	<ul style="list-style-type: none"> • As proposed, seed is an idea to build virtually invisible underground substations underground on public land and use the funds that would otherwise be required to purchase expensive land in downtown Vancouver

Interest or idea	Source	BC Hydro consideration
<p>community benefits in addition to two schools, daycare and park improvements outlined in the discussion guide</p> <ul style="list-style-type: none"> • Suggestions included contributions or full funding for: <ul style="list-style-type: none"> ○ Upgrades to West End Community Centre, community spaces ○ Improved transit, pedestrian and cycling routes ○ A new King George Secondary School ○ An additional playground in the West End ○ A new aquatic centre ○ Senior centre and facilities ○ Hospital and mental health facilities, in particular to support homelessness and addiction 		<p>for above ground substations to fund a number of significant community benefits including two new schools, daycare spaces and park upgrades in downtown Vancouver.</p> <ul style="list-style-type: none"> • The business case for seed rests on it being cost-neutral to rate payers compared to the traditional approach of building above ground substations in downtown Vancouver. This comparison includes the additional complexity and cost of building substations underground. • BC Hydro has carefully considered the various suggestions for additional community benefits that have come from the community consultation process. • BC Hydro is accountable to its ratepayers and is regulated by the BC Utilities Commission, which includes reviewing its spending on capital infrastructure. • Adding any additional community benefits could increase the total cost of the proposal and result in it being deemed not in the interest of BC Hydro ratepayers. We are open to considering any ideas that fit within the business case.
<p>7. Property values</p> <ul style="list-style-type: none"> • Concern regarding project impacts on neighboring properties including a reduction in property values, increased traffic 	<ul style="list-style-type: none"> • Community consultation 	<ul style="list-style-type: none"> • There is no evidence to suggest that underground substations would have an impact on nearby property values over the long term. • New substations are required in the West End and Yaletown, and if not underground, they will be built above ground and likely within a three-block radius of the proposed underground sites. • BC Hydro’s experience with both types of substations suggests that an underground substation has comparable construction impacts to an above

Interest or idea	Source	BC Hydro consideration
<p>congestion and potential view corridor impacts.</p>		<p>ground substation. Once built, underground substations have virtually no impact on the community when public safety, visual, and noise considerations are factored in, while creating space for public use above ground. Under seed, these stations also lead to improved community amenities like new schools.</p>
<p>8. Green space and tree canopy</p> <ul style="list-style-type: none"> • Concerns about a decrease in green space as well as removal of trees from sites 	<ul style="list-style-type: none"> • Community consultation • Vancouver Coastal Health Letter 	<ul style="list-style-type: none"> • In a letter, Vancouver Coastal Health recommends protecting green space and trees by: <ul style="list-style-type: none"> ○ Maximizing the space left for greenspace (as opposed to paved areas). ○ Working with stakeholders to design greenspaces that are considered “quality” greenspace. ○ Considering tree selection in re-planting in order to achieve similar canopy cover. ○ If canopy cover cannot be replaced via re-planting, shading structures should be designed and installed. • Concerning green space, the Stantec report concludes: <ul style="list-style-type: none"> ○ At Emery Barnes Park, only 3% of the total area will be lost to permanent above grade infrastructure, such as the vents and entrance structure. ○ At the Vancouver School Board property, only 4% of their property would be lost. ○ At Nelson Park, there is no loss of green space. • Concerning tree canopy, the Stantec report concludes: <ul style="list-style-type: none"> ○ A total of 5 trees would be lost in Nelson Park and 59 trees would be lost in Emery Barnes Park. ○ A total of 37 trees would have to be removed to allow the school and substation to be built on the Lord Roberts Annex site. • Should seed proceed, BC Hydro is committed to minimizing the impact of any underground substations on green space and trees: <ul style="list-style-type: none"> ○ Tree replanting in both parks and the Vancouver School Board property would be done to achieve a no net-loss of trees for all sites. ○ BC Hydro is committed to working with the Vancouver School Board, City of Vancouver and Vancouver Park Board to further minimize the space taken by our permanent infrastructure through innovative and integrated design. The net result could be a full three-quarter all-weather turf field which would offer a substantial increase of play area

Interest or idea	Source	BC Hydro consideration
		<p>for the school students and could be available for public use and events.</p> <ul style="list-style-type: none"> ○ To minimize the number of trees to be replaced in the parks, BC Hydro would optimize cable routing, investigate transplanting and potentially trench under the trees where practicable.
<p>9. Operational impacts</p> <ul style="list-style-type: none"> • Concern regarding operational impacts of the underground substations, including noise, location and design of permanent structures. 	<ul style="list-style-type: none"> • Community consultation • Vancouver Coastal Health Letter • City of Vancouver Email • Vancouver Park Board Email 	<ul style="list-style-type: none"> • BC Hydro’s experience with both above ground and underground substations suggests that an underground substation has less operational impacts on the community than an above ground substation when public safety, visual, and noise considerations are factored in, while creating space above ground for public use. • The Stantec report modeled the operational noise levels that could be expected at both substations and determined them to be at or slightly below the City of Vancouver nighttime noise by-law levels using very conservative design assumptions. • BC Hydro is committed to working with the Vancouver School Board, City of Vancouver and the Vancouver Park Board to design and implement the substation ventilation infrastructure using state-of-the-art technologies to minimize the operational noise to well below the City nighttime noise by-law levels. • BC Hydro has already consulted with National Grid, a British utility company, to learn from their experience with a new above ground substation in London, England that is located within 7 meters of a residential building and within 27 meters of an elementary school. In the case of their project, with new technology, they limited noise levels from the ventilation units to 30 dBA at closest point of reception, the equivalent of a human whisper. • BC Hydro has also investigated different ideas for integrating the air vents and entrance structure into the park seamlessly by creating public art or the use of living walls and green roofs.
<p>10. Substation safety</p> <ul style="list-style-type: none"> • Safety-related concerns including the risk of fire, explosion, earthquakes as well as ensuring safety of construction 	<ul style="list-style-type: none"> • Community consultation 	<ul style="list-style-type: none"> • BC Hydro’s highest priority is public safety and the safety of our employees. We safely operate and maintain more than 300 substations throughout the province. • We operate 37 substations in Metro Vancouver north of the Fraser River, with about 50% of them located 100 to 200 meters of public spaces such as parks, shopping malls and schools.

Interest or idea	Source	BC Hydro consideration
<p>and maintenance workers</p> <ul style="list-style-type: none"> Requests for long-term research conducted by an independent team to address safety concerns and ensure safety of children attending the future school at Lord Roberts Annex 		<ul style="list-style-type: none"> This includes our underground substation in downtown Vancouver beneath Cathedral Square Park which has been operating safely for more than 30 years. Each BC Hydro substation is designed and built to rigorous safety and environmental standards. This includes installing monitoring equipment that detects and responds to conditions that might lead to equipment failure, before the failure occurs. An underground substation would be no different. If BC Hydro was making the choice based on public health and safety considerations alone, an underground substation would be preferred. In a modern underground substation, the use of oil is eliminated through the use of gas-insulated technology for the equipment, including gas-insulated transformers. This type of gas is not flammable so the risk of fire or explosion is virtually eliminated. BC Hydro’s substations are designed to a higher safety standard than other buildings in downtown Vancouver. Our substations would exceed the latest building code requirements and would not pose any risks to the public present on or adjacent to them at any time. Our proposed substations would be built to withstand a very large earthquake—the kind that only occurs once in every 2,475 years—and would be able to continue to operate and provide power to the downtown core following such a significant earthquake event. There are firm soils (bedrock) under both proposed underground substation locations in the West End and Yaletown which is ideal for withstanding a significant earthquake and they would perform better than above ground stations in earthquakes.
<p>11. Construction sequencing and relocating students</p> <ul style="list-style-type: none"> Minimize disruption to students learning and exposure to construction impacts 	<ul style="list-style-type: none"> Vancouver Coastal Health Letter Community consultation 	<ul style="list-style-type: none"> To ensure the least disruption to the learning environment and to minimize the exposure to construction impacts, BC Hydro would work collaboratively with the Vancouver School Board, and would commit to not requiring the Lord Roberts Annex students to be relocated until a Coal Harbour school is ready to receive them.
<p>12. Lord Roberts Annex playground</p> <ul style="list-style-type: none"> Ensure that the planned 	<ul style="list-style-type: none"> Community consultation 	<ul style="list-style-type: none"> During the consultation process, BC Hydro learned that the Lord Roberts Annex PAC was about to start building a new playground. The PAC approached BC Hydro with their concerns about how their playground

Interest or idea	Source	BC Hydro consideration
<p>new memorial playground at Lord Roberts Annex is not delayed by this process, that it would be stored safely during construction and reinstalled in an expanded form following the construction of the new school, at no cost to the PAC or school</p>		<p>project could be impacted by seed.</p> <ul style="list-style-type: none"> BC Hydro has met several times with the playground committee and agreed that it makes sense that they move forward with their playground this year. BC Hydro has committed to removing the playground equipment, storing it and then working with the Vancouver School Board to reinstall it at BC Hydro’s expense. This would include associated landscaping, additional equipment to accommodate the increased capacity of the new school, and design fees so the original concept of the memorial playground is respected and preserved.
<p>13. Use of funds for community benefits</p> <ul style="list-style-type: none"> Ensure that the Vancouver School Board uses funds provided by BC Hydro for new schools in the West End and Coal Harbor, and not for other needs elsewhere in the city or operational budgets 	<ul style="list-style-type: none"> Community consultation 	<ul style="list-style-type: none"> seed is an idea to build underground substations on public land and use the funds that would otherwise be required to purchase expensive land in downtown Vancouver for above ground substations to fund a number of significant community benefits including two new schools in downtown Vancouver. BC Hydro is committed to making sure this idea is realized, and therefore would include provisions in our agreement with the Vancouver School Board to specifically require funds be used for the purposes of building the Coal Harbour and new Lord Roberts Annex schools. Vancouver School Board has publicly stated that if seed moves forward, the funding from BC Hydro would be used for the construction of two new schools in downtown Vancouver.
<p>14. Increased traffic congestion during and after construction</p> <ul style="list-style-type: none"> Increased traffic congestion during and after construction, restricted road access and parking availability 	<ul style="list-style-type: none"> Community consultation 	<ul style="list-style-type: none"> We have always acknowledged that the construction of the substations in the West End and Yaletown would have temporary impacts on those who live and work there, keeping in mind construction will occur whether the substations are located above or underground. BC Hydro commits to developing best practice traffic management plans, in consultation with the local community and all other stakeholders, to minimize the impacts of increased traffic during the construction of the substations. One idea for minimizing this impact would be to accelerate the construction of the school parkade and then utilize it for parking for construction staff, while using the top of the structure for laydown of materials and construction offices to minimize the impact on the surrounding roads and

Interest or idea	Source	BC Hydro consideration
		sidewalks. <ul style="list-style-type: none"> BC Hydro has a long history of demonstrating this best practice in mitigating traffic impacts across a variety of large infrastructure projects. BC Hydro would work collaboratively with the Vancouver School Board, Vancouver Park Board and City of Vancouver to integrate the substation design with the school design to help minimize any impact of increased school traffic.
<p>15. Support for the seed idea</p> <ul style="list-style-type: none"> Comments that building substations underground would make good use of valuable and scarce land through efficient, multi-purpose land use Support for amenities that seed would provide Support for putting substations underground to reduce visual impacts and improve safety 	<ul style="list-style-type: none"> Community consultation 	<ul style="list-style-type: none"> BC Hydro’s substation infrastructure in downtown Vancouver is aging and in need of being upgraded or replaced. New substations are needed in the West End and Yaletown, two of the fastest growing and most densely populated areas of downtown Vancouver. The traditional approach to building new substations would require BC Hydro to find and purchase land to build above ground substations in downtown Vancouver. This would mean finding alternative sites, likely within a three-block radius of the sites proposed in seed, purchasing the land, and building two above ground substations. seed is an idea to build virtually invisible substations underground on public land and use the funds that would otherwise be required to purchase expensive land in downtown Vancouver for above ground substations to fund a number of significant community benefits including two new schools and park upgrades in downtown Vancouver. We believe seed is an idea that is strongly worth pursuing.