

Neighbourhood amenity & energy centres for EcoDensity

A schools-centred opportunity to add amenities within walking distance for every resident, and provide carbon-neutral district energy systems at the same time

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Dense cities can be great places to live and work. The EcoDensity initiative is built on the recognition that dense cities have lower environmental footprints. One of the challenges will be to maintain and enhance our quality of life as we accommodate more residents and workplaces.

One component of a livable city is its amenities—parks, community centres, day care facilities, libraries. Adding amenities is hard. But the Draft EcoDensity Initial Actions list approved by Council identifies, as item #14, the importance that we add amenities to accommodate growth. We have the added challenge of making these amenities reachable with less reliance on cars. Public transit is essential, but the ideal solution would be to have the amenities you want within walking distance of your home or workplace. As it stands now, less than 40% of Vancouver is within a 10-minute walk of one of our great community centres.

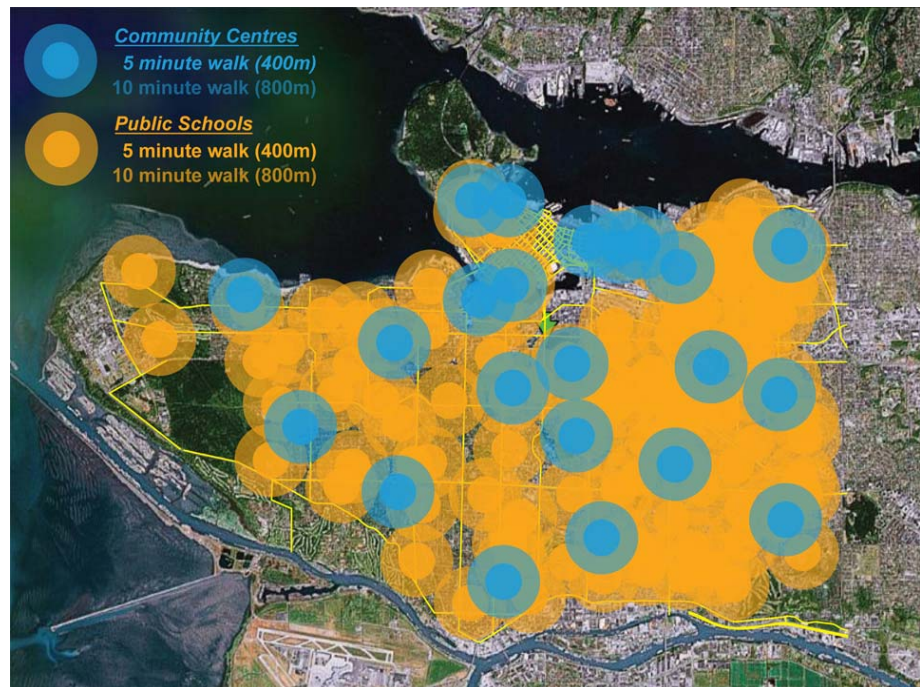
But the goal of walkable amenities isn't as impossible as it might seem.

During its period of explosive growth in the 1920s, Vancouver's city planners established the concept of locating an amenity centre within a 10 minute walk of any location in the city.

These amenity centres were called public schools. Today, well over 90% of Vancouver is within a 10 minute walk of one of our 109 schools.

While the role of funding and constructing schools has been transferred to the Province, and the operation of the schools is in the hands of the Vancouver School Board, schools remain a key civic building at the centre of every neighbourhood.

In this time of reduced enrollments and excess classroom capacity, the VSB is under pressure to shed capacity. The provincial Seismic Mitigation Program is triggering a re-evaluation of most our schools. Current standards for schools are much smaller than what the residents of Vancouver thought were necessary in 1920; even with the same



number of classroom spaces, a new school built to Ministry of Education standards is typically 2/3 as large as the heritage building it would replace. And these ‘replacement’ schools don’t provide the area that’s currently used by programs like after-school care, music, or theatre.

So we have two contrary trajectories:

- A city that is adding population and needs to add amenities
- A school system under pressure to shed capacity and area

An ecologically effective response to these trends is to co-locate neighbourhood amenities at every school.

Seattle is showing us the way

Since 1995, Seattle’s “Building Excellence” program has been renovating and expanding their schools into multi-use neighbourhood educational and amenity facilities. 85% of the pre-1940 schools they’ve dealt with have been seismically



upgraded and renovated. Typically, they replace the gym with a facility that can be used by the kids during the day and the community at night—and the gym serves as a post-disaster facility in case of a major earthquake. Their school libraries are for the kids during the day but provide a community reading room at night. And child-care and after-school care facilities are built in.

Putting a building to use for more hours of a day is a very sustainable notion, and supports EcoDensity.

The citizens of Seattle must like what they see, because they’ve passed three bond issues to pay for this construction. Yet while they’re growing their amenity infrastructure, what’s happening to our schools represents a shrinking of amenity capacity—and a needless waste.

The environmental implications of heritage retention

A key notion of any environmental program is to move from a throwaway society to one that thinks on long time scales and makes things last. A well-maintained heritage structure serves as a reminder to each of us that we can benefit from the actions of those who lived a hundred years ago, and have a responsibility to think about the world a hundred years from now. 68 of Vancouver’s 109 public school buildings are heritage structures. Not every heritage building is structurally suitable for seismic upgrading. But when they are, the environmental implications of heritage preservation can be huge.

The CO₂ emissions associated with new construction are substantial; a rough estimate provided by buildcarbonneutral.org is that constructing a 35,000 SF new school using concrete results in the emissions of 1,500 tons of CO₂. To put this in perspective, the typical Vancouver school has

greenhouse gas emissions of 100 tons per year. So even if a new school were CO₂ neutral, it would take 15 years before it ‘paid off’ the CO₂ associated with its construction. And, perhaps surprisingly, it’s tough for new construction to match the superior energy consumption of our massive old schools; according to Natural Resources Canada Office of Energy Efficiency, schools older than 25 years use the *least* energy per square foot of schools in our climate. A seismically upgraded heritage structure with energy efficiency upgrades (such as state-of-the-art windows and heating systems) can provide the best of both words—low CO₂ associated with construction, and low annual energy use.

The district energy opportunity

In Vancouver, we have the opportunity to match Seattle and go them one better. We can base a geothermal district heating and cooling system underneath each schoolyard and provide a carbon-neutral source of heating and cooling for nearby commercial strips or residential projects. These systems use electricity to draw heat from the ground when we need it or deposit heat back in the earth when we need cooling. Since our provincial electric supply is moving towards carbon neutrality, this allows us to turn off natural-gas fired boilers and reduce greenhouse gas emissions. The illustration shows how this might work in the case of General Gordon Elementary, sandwiched between the dense commercial and residential zones of Broadway and 4th Avenue.

The infrastructure put in place to distribute the heating and cooling allows one business’s “waste”—say, the waste heat being rejected from a supermarket refrigerator—to become another building’s “food”—say, the heat needed by a school or library. Revenue from selling the heating or cooling could provide a revenue stream to repay construction costs or even fund amenity operations.

Rough estimates are that such a system could allow 300—600 dwelling units and several dozen businesses to turn down or turn off their natural-gas fired furnaces, reducing CO₂ emissions by 500—1000 tons per year per centre.



In this way, our rejuvenated school / amenity centres fit in with EcoDensity Initial Action #13, “Enabling District Energy”.

Community gathering places

Our proposal also provides a walkable-neighbourhood response to EcoDensity Initial Action #16, “Community Gathering Places”. Already, our public schoolyards provide settings for spring fairs and the like. Imagine what we might be able to do if we did this intentionally. Building on the examples of such joint use facilities as the Lord Byng Pool and the Thunderbird Community Centre, we could design indoor facilities like auditoria to serve as neighbourhood performance spaces, and outdoor plazas to support farmers markets or summer concerts.

How to pay for it?

All this sounds great, but how can we find the money to pay for a program this ambitious? There are plenty of existing and potential funding sources. What is needed is for the City to take the leadership role in bringing them together:

- Provincial
 - The schools component is already present in the form of the Seismic Mitigation Program and the Annual Facilities Grant program
 - The Innovative Clean Energy Fund
 - Child Care capacity expansion grants
- City
 - Development Cost Levies raised from growth in area added under existing zoning or increases allowed under EcoDensity
 - If the school in question is being preserved rather than replaced, there is an opportunity to create a Localized Heritage Bank. Preliminary estimates indicate that the money available from selling unused floor space on a school site should be able to cover the costs premium associated with heritage restoration, based on the Seattle experience.
 - The Seattle experience with voter-approved bonds suggests this mechanism is worth exploring. Bonding has been used in the past in Vancouver—reportedly, City Hall was built with bonds.
- Private
 - Firms like Terasen Energy Services frequently underwrite large geothermal energy projects and make their money on the spread between the costs of conventional heating & cooling and that provided by these systems.
 - Mixed-use developments: The VSB is already considering selling off some sites to developers and consolidating to fewer schools. The eco-effective approach would keep our schools within walking distance and, where appropriate, consider mixed use developments providing, say, residences and workplaces as well as classrooms and neighbourhood amenities.

How do we get started?

This opportunity could be studied to death. Or we could get started with a pilot project and learn from it. A number of schools are moving through the Seismic Mitigation Program pipeline, but community around the General Gordon Elementary School has already begun discussions about this opportunity with the VSB and the Premier’s office. I recommend that the next step would be for Council to direct City staff to get started immediately working with community groups to explore these opportunities further and return to the Council with actions.

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