School construction rules with unintended or undesirable consequences

Compiled with input from schools across Vancouver by the General Gordon Elementary Building Renewal Committee

27 March 2008

In our meeting with Premier Gordon Campbell on 14 March 2008, we mentioned a number of rules in the BC Capital Facilities plan, the Area Standards for School Facilities, and the Seismic Mitigation Guidelines which appeared to have unintended and undesirable consequences. Premier Campbell asked us to prepare a compilation of such barriers (real or perceived) as a background document to a Provincial working group to be formed in late March.

Area Standards
http://www.bced.gov.bc.ca/capitalplanning/resources/areastandards.pdf

1. **Existing school areas and functions ignored:** The Area Standards start with the number of expected students converted into a 'nominal' student population, and then assigns classroom area and non-instructional areas accordingly. This may be a reasonable model for green-field development of new schools where one is "starting from scratch", but the method completely ignores whatever services and programs are being supported in the case of an existing school being considered for renovation or replacement.

   For example, existing schools are finding that the allocations for libraries take no account of whether they have dual-language collections. Others are finding that the allocation for "Non-Enrolling Space" is sufficiently small that they must combine their music room with their special education room with their computer lab into one room. Some existing schools with auditoria are finding that their 'upgraded' or 'replacement' facilities won't have them, putting theatre programs at risk.

   Potential improvement: In the case of existing schools, an inventory of current spaces supporting current programs should be undertaken and the area allocated to a replacement or renovation school should be adjusted to ensure that there is no diminution of the school's functional capacity.

2. **Large spaces don't scale:** Many of the line items in the Area Standards such as multipurpose and gym spaces scale with school size, but only to a point. Most existing Vancouver schools have multipurpose lunchrooms of 250 SM or more, but the Area Standards allow only 100 SM for most schools. And the elementary school gym size tops out at 380 SM whether you have a nominal capacity of 175 students or 800—even though the building code restricts occupancy of a 380 SM gym (at 0.75 SM per person) to 506 persons. So larger schools cannot have all-school assemblies.

   Potential improvement: The Area Standards should reflect the real uses of multipurpose spaces and gyms, and scale realistically with school population.

3. **Corridor functions** being pushed into classrooms without area being provided. Older schools provide generous corridors that served both as break-out areas for teaching and

also as area for lockers. Current standards essentially preclude generous corridors and push these functions into the classrooms but classroom areas are not larger.

Potential improvement: Area for corridors comes out of the catch-all "Design Space" category within the Area Standards. This area could be increased across the board, or a specific allowance could be provided per classroom for cloakroom and break-out areas.

4. **Child Care**: Area Standards do not recognize before- and after-school care as a function essential to school operation, even though it is clear that when this service is downsized or eliminated that school enrollment drops. As pointed out in the letter from the Vancouver School Board to the Minister of Education in February, afterschool care is part of the larger 'expanded mandate' from the Province for schools to serve their communities—including pre-K, full-day Kindergarten, after-school care, and adult education.

   Potential improvement: The Area Standards should be adjusted to account for existing and projected before- and after-school care functions in accordance with licensing guidelines. Nominal capacities assigned to schools moving through the Seismic Mitigation process need to be adjusted in light of the full-day Kindergarten and pre-K initiatives.

5. **Pooling funds:** There is a perception among some school board planning staff that the Area Standards place a hard limit on school size for a given nominal capacity. For example, when it was realized that the allowed multipurpose room would too small to support one school's afterschool care program, it was asked if the nonprofit operating the care program or the community could raise funds to augment the budget and allow a larger multipurpose room, they were told this was not possible, that such a facility would have to be in a separate building to avoid exceeding the Ministry maximum area.

   Potential improvement: The Area Standards should explicitly allow pooling of funds from multiple sources.

Seismic Mitigation Program Guidelines, Allowed Unit Rates, and other items:

1. **Perverse split incentives: New schools are 'free', school maintenance comes out of your annual budget.** To a school board considering whether to support school upgrading vs. replacement, the incentives are clear: New schools provided by the Province are 'free', while annual maintenance of older buildings comes out of the school board's annual budget.

2. **Fund preserving child care, not just creating it:** The Provincial government offers funding for expansion of child care facilities but not for their preservation. So in the case of one school being 'upgraded' it is the plan is to fill in the space currently used by the child care program with concrete, shut down the program, and then apply for funds to 'create' new child care spaces.

3. **Post disaster facilities:** Gymnasia are being designed to serve as post-disaster facilities—at least in terms of their seismic 'importance factor'. But there is no requirement that the spaces actually can operate in this way. For example, in one 'replacement' school approaching completion, there is a plug to allow an emergency generator to be plugged in should one come rolling by after an earthquake—but no

generator is provided.

4. **Fund energy performance and LEED:** The Province has stated a goal that all provincially funded buildings meet the highest environmental performance and be consistent with the goal of moving the province to carbon neutrality. Yet the unit rate (budget) standards do not yet reflect this; LEED compliance is carried in some projects as a 'contingency' item, which means it can be cut if other budget items grow.

   Furthermore, there is a misunderstanding that 'green costs no more'—based on the observation that one can build expensive non-green buildings and moderately-priced green buildings. Nevertheless, triple glazing costs more than double glazing, and high-performance heating systems typically cost a bit more up front. If decisions are being made on the basis of cost, it should be lowest life-cycle cost, not lowest first cost.

   One example of the disconnect between "Unit Rates" (allowed cost per unit area) and the Province's environmental goals shows up in room heights. Schools built before 1940 were designed to rely on daylight for illumination, augmented with electric lighting as needed; high ceilings and generous glazing are the norm. In exact accordance with LEED guidelines, these buildings have top-of-glazing at 11—12 feet above the floor, allowing adequate daylighting to the full depth of the standard classroom (~8m / 24 feet). But most new construction projects at current unit rates find they can only afford 9 foot ceilings.

   Another example of the disconnect between "Unit Rates" (allowed cost per unit area) and the Province's environmental goals shows up in exterior wall thicknesses. The Area Guidelines allow for exterior wall thicknesses of 150mm, which is typical of cheap, low-performance 1990's construction. Pre-1940 construction uses thick walls providing high thermal mass; modern high-performance construction combines heavy thermal mass elements inside with continuous insulation, rain screen air gaps, and durable cladding—either approach leading to walls 3 times thicker than the Area Standards allow.

5. **Account for CO_2:** A related item should be that the if Provincial buildings are to be part of the province's strategy to lower CO_2 emissions, then the CO2 associated with construction needs to be taken into account as part of the upgrade vs. replacement decision.

6. **Life Cycle = 20 years?** To the extent that life-cycle costing is being done at all, it appears to being done with a 20 year cycle, according to documents released by the Vancouver School Board. Since most building elements of even the cheapest new construction will last 20 years, this again provides an incentive to demolish-and-build-cheap, leaving taxpayers facing large costs in the years that follow.

   The Premier mentioned in our March 4th meeting that this has been changed to 50 years, but this fact does not seem to have been communicated.

7. **Heritage has value:** As pointed out in the letter from the VSB Trustees, school districts face pressure from their communities and from the cities in which they operate to preserve heritage structures. Because current Area Standards result in smaller schools even for the same number of classrooms, there is an apparent 'heritage premium' to upgrade existing, larger schools, even when the cost-per-square-foot for preservation is smaller.

The experience of Seattle Public Schools, which is much further along than BC in seismically upgrading its school facilities, is that heritage renovation (including upgrades to all major building services) costs average 10% more per square foot than new construction. Yet, according to their head of schools planning and facilities, they have been able to preserve 85% of their pre-1940 facilities as schools.

8. **'Seismic' funds are restricted to structural elements:** Perhaps from a well-intentioned motivation to make the Seismic Mitigation program help as many schools as possible, program Guidelines restrict money to *either* structural upgrades only of existing facilities *or* provide entirely new 'replacement' schools. This means that schools with, for example, dilapidated windows, ancient wiring, or 80 year old plumbing cannot use program money to upgrade the facility. The only mechanism to fund these upgrades would be to tap into their Annual Facilities Grant money.

9. **The 70% rule:** The Seismic Mitigation Guidelines state that upgrade projects are supportable if their cost is less than 70% of the cost of building a 'replacement' school to Ministry minimum standards. This is perceived by some as a throwaway attitude inconsistent with the Province's environmental goals of reducing waste.

   Proposed improvement: Items 8, 9 and 10 could all be addressed by adopting the approach followed by Seattle Public Schools, namely, that the presumption is that existing structures are to be preserved, and that preservation with upgrades is assumed to be reasonable at a cost per unit area of up to 10% more than new construction.

10. **95%/100%/110% capacity policy**: The Seismic Mitigation process is going on in the context of other issues around school capacity utilization. While Vancouver has, by Ministry standards, excess capacity averaged over the District, the reality is that it also has areas that are experiencing rapid growth and need new schools to be built if the time-honoured goal of schools within walking/biking distance (800m / ½ mile) of children's homes is to be maintained.

    The BC Capital Instructions for 2008 require 95% capacity utilization district-wide, 100% for "nearby" primary schools, and 110% for secondary schools. This rule has the unintended consequence that it encourages large school districts experiencing uneven growth to close schools with less than full enrollment in order to obtain funding for new schools in high-growth areas. The students in the region of the closed school will have much longer commute distances, probably no longer being able to walk or bike to school, with well-documented negative impacts on children's health as well as Provincial CO_2 goals. The U.S. EPA report "Travel and Environmental Implications of School Siting" (www.epa.gov/dced/school_travel.htm) clearly demonstrates the links between schools, transportation, and the large social costs that result**.**

    The 8—10 years it takes to authorize and build a new school, combined with rules requiring that existing nearby schools already be at full capacity before authorizing new construction means that, realistically that a rapidly growing area will be sending its children by car. The rules need to be changed to authorize construction so that the schools are there within walking distance when the residents are.