Smart Growth on the Ground

FOUNDATION RESEARCH BULLETIN:
Squamish

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PARKING STRATEGIES

1.0 Introduction

Underground parking in Squamish, particularly in the downtown, is not feasible due to its location on an active floodplain and consequent high water table. Additionally, given the projected massive population increase to 33,100 by 2031 from the current 14,435 (2001)[1], conventional surface parking lots would consume large areas of developable land. As well, large surface lots negatively impact the environment, affecting natural drainage cycles by increasing runoff volume and peak rate and by delivering pollutants into adjacent water bodies.

Innovative and low impact alternatives for parking design exist which do not compromise the environment or social spaces, and are economically feasible. This bulletin will address strategies for dealing with the aforementioned challenges.

2.0 Parking Standards

Although parking standards vary greatly, they are generally based on maximum demand for parking, with parking provided at no charge to users. Often the spaces are underused for most of the year. This creates a surplus of parking area that is costly for developers to provide, subsidizes personal vehicle use and encourages vehicle use in areas where convenient alternative modes of transportation exist.[2] For instance, a conventional standard for shopping centres is 5 spaces per 1000ft^2 of gross floor area, but the actual demand is just under 4 spaces.[3]

Residential requirements often do not take into account proximity to transit and commercial areas that allows for pedestrian and bicycle travel nor the availability of on-street parking[4].

Higher densities of development encourage increased transit use, as service availability and frequency of service are higher. Safe, pedestrian-scaled environments encourage walking and cycling, thereby decreasing vehicle use and reducing parking demand. Scaling parking to neighbourhood needs recognizes variables like density, demographics and surrounding land use mix, as well as transit availability and other alternative transportation options which may influence vehicle use.

The following are some recent standards implemented in the region which reflect the idea of scaling parking to neighbourhood need:

Vancouver
Multiple dwelling uses shall provide a minimum of 1 space for each 250 square metres of gross residential floor area plus 0.75 space for each dwelling unit, except that no more than 1.1

spaces per dwelling unit need be provided for each dwelling unit less than 50 square metres of gross floor area.

Vancouver has parking programs where developers can contribute towards off-site facilities (average cost is $15,000 per stall) or to a general fund aimed at reducing the need for parking spaces.

Burnaby
The compact, transit-oriented P11-E District has very low parking requirements, featuring 1.0 per unit with a 0.2 increase for every bedroom above the baseline, and 0.2 per unit for visitors.[5]

Oliver
In section 6.4.1 of its zoning bylaw, the Town of Oliver allows council to reduce the number of parking stalls for residential developments restricted by a housing agreement to a class of persons whose automobile ownership is below normal rates. Under section 6.8, council may allow a partial or total relaxation of on-site parking requirements where the property is located within 200 metres of a public parking area owned and operated by the Town, and where the developer pays $4500 per stall to the Town's collective parking fund.[6]

3.0 Parking Design Guidelines[7]

Some useful planning principles and guidelines for parking include the following:[8]

- To prevent wasteful parking areas, set low minimum requirements to ensure that adequate parking is provided but not overbuilt.
- A development that requires excessive parking within a neighbourhood suggests that the intended development is not appropriate for the area.
- Any surface parking should not separate the sidewalk or street from the primary frontage of a building.
- The building type, rather than its use, should determine the parking standard in order to accommodate future change in use within the building.
- Minimize parking driveway intersections with sidewalks and other pedestrian spaces.
- All commercial and non-residential zones in mixed-use areas must provide bicycle parking.
- For special events, look for opportunities in parks, open spaces, streets and lanes for temporary overflow parking.
- Allow developments to include nearby on-street parking as part of their parking requirements.
- Utilize brownfield sites for parking structures.
- Parking lots for both residential and non-residential uses should be located behind buildings with lane access.
- Any front entrance garages should be setback from the front façade of the building to maintain accessibility to the entrance.

Squamish has a downtown specific parking regulation (Bill 1620 - 2000) that reduces the quantity and size of parking and loading from the standard regulations to:

- Residential – one space per unit
- All other uses – 1 space per 46.5 m^2 (500 ft^2) gross floor area
- Size of parking space - 2.4 x 5.5 m (8 x 18 ft)
- No loading is required

Figure 1: Coconut Grove in Miami Florida utilized in-lieu parking fees to develop with continuous commercial street frontage.[9]

Figure 2: Back-in angled and parallel on-street parking in Washington DC[11]

Other innovative parking strategies include the following:

- **In-lieu fees -** where developers are able to circumvent constructing parking on-site by paying the city a fee. The city then provides centralized off-site parking that is available for use by the development's tenants and visitors (Figure 1).
- **Shared parking** - where a use that has peak parking demand during the day can share the same parking area with a use whose demand peaks in the evening (eg. office and restaurant). Mixed use developments, like Granville Island allow customers to use one parking space for many destinations, which results in considerable cost and land area savings.
- **Centralized parking** - combines all parking for an area into a large facility. It is efficient from an economic, environmental and urban design perspective. Concerns about proximity to destinations can be mitigated by providing shuttle services to and from the city centre or through the design of pleasant pedestrian and bicycle routes.
- **On-Street parking** - should be maximized, especially along main commercial and mixed use streets. Such parking is a key factor in promoting street-front businesses, allowing people to frequent multiple destinations, utilizing less land per parking space, creating a traffic-calmed buffer between pedestrians on the sidewalk and moving traffic on the street (Figure 2).[10]
- **Maximum limits** - restrict the total number of spaces that can be constructed. This is based on square footage of a specific land use. Retail use in Portland, Oregon, is restricted to 1.0 space per 1,000ft^2 of net building area, and offices to 0.7 space per 1,000ft^2. Because of transit alternatives in the area, this has not led to a parking shortage.[12] Additionally, business owners report increased sales because of proximity to a transit stop.
- **Parking freezes** - serve to cap the total number of parking spaces in certain metropolitan areas. Downtown Boston, Massachusetts capped commercial parking spaces through the zoning board and APCC (Air Pollution Control Commission). The goal was to limit parking to an overall ratio of 0.4 spaces per 1,000ft^2 of floor space. An excellent transit system is key to making this option work.
- **Pedestrian and bicycle amenities** - help alleviate traffic congestion and demand for parking. Design improvements include increasing walkability and pedestrian orientation. Interconnecting sidewalks, pathways, and trails will encourage non-vehicle modes of transportation, as will pedestrian-oriented streets. Trees, shrubs, pedestrian and bicycle amenities, shade and rain protection, awnings, shallow building setbacks with closely spaced doors and windows, as well as a minimum number of vehicular entries crossing sidewalks and paths are all key to healthy and well-used pedestrian spaces.

Figure 3: Gastown Parkade, Vancouver.

Figure 4: Chapman street parkade, Kelowna.

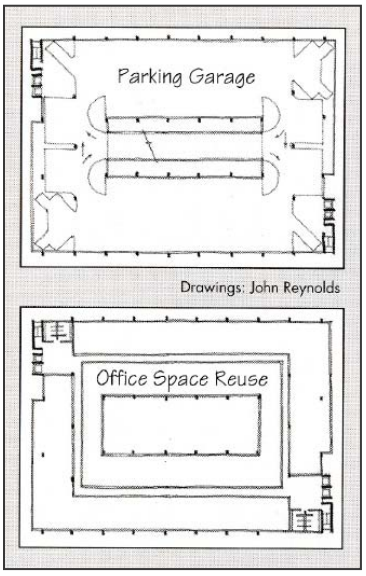

Figure 5: Adaptive parkade design.

4.0 Parking Design Alternatives

Current parking space requirements result in parking lots that are much larger than needed. A conventional parking space is 8-10 feet (2.4-3.0 meters) wide and 18-20 feet (5.5-6.0 meter) deep, totaling 144-200 square feet (13-19 sq meters).[13] As these stall dimensions are often much larger than the widest sport utility vehicles, minimizing the length and width of parking spaces can save space and construction costs. The length and width of conventional spaces can be reduced by a foot or more, and compact spaces can reduce dimensions further.[14]

Above-ground parking

Above-ground parking, parking garages or parkades have many benefits over surface lot parking. A multi-layered parkade has a smaller footprint, thereby conserving valuable land space and allowing for more rainwater infiltration because its impervious layer is only as large as one layer of parking. Parkade structures encourage infill development, more compact development and retain greenspace, habitat and aesthetic qualities.

Although the costs of building parkades versus surface parking tend to be higher at the outset, because construction costs generally exceed the cost of land per parking space, the benefits of parkade configurations outweigh surface lot designs over the long term, since the large footprint of surface lot parking reduces and disconnects the supply of affordable housing, commercial, office and service land uses, pushing them out of the city centre into less accessible areas which require expensive new infrastructure. Furthermore, unlike surface lots, parkades can be designed with shallow setbacks and in aesthetic congruity with neighbouring buildings.[15] A parkade in Gastown illustrates this example (Figure 3).[16]

Since the direct feasibility of parkade construction is based on the cost of land versus the cost of construction, economic incentives may be needed to encourage parkade over surface-lot development. Such incentives include tax credits, stormwater waivers and bonuses for density, floor area or building height. Locating garages on the first floor of buildings saves structural costs and can provide a wet floodproofing space for flood management.[17]

Parkades can also incorporate many uses. The design of the Chapman Street parkade in Kelowna, for example (Figure 4), enlivens the streetscape of the parkade with ground-floor retail and office spaces which generate extra on-site revenue. The design uses brick and cornice details to further integrate the building into its historic neighbourhood.[18]

Design for Flexibility and Reuse

To save the potentially enormous costs of demolition and rebuilding, existing buildings are being adapted to serve other uses than those for which they were initially intended. A strategy that can significantly reduce parkade construction costs is the re-use of construction materials from former industrial and commercial buildings. Some reusable materials include: columns, steel beams and studs, electrical equipment, light fixtures, lumber, insulation, siding, brick, plumbing

Figure 6: The Rose Garden Parkade at UBC

Figure 7: A green parkade in South Beach, Miami

Figure 8a: The Natural Capital Centre Parking Lot, Portland Oregon

Figure 8b: Bioswale detail

fittings, and interior doors and windows.[19] Additionally, parkade construction should meet the LEED (Leadership in Energy and Environmental Design) Green Building Rating System® criteria for optimum performance.[20]

Adapting a parkade building is usually difficult however, because the ramped floors of a typical multistory parking garage prevent its capability to serve other uses. John Reynolds, an architecture professor at the University of Oregon, designs adaptable parking garages which feature ramped floors at the centre of the structure, rather than on the perimeter. The design is such that the ramped floors can be removed to create a daylit atrium as well as a space for mechanical and electrical infrastructure which can be incorporated to serve a number of future building uses (Figure 5).[21]

Green Parking

Incorporating green infrastructure into parking developments increases environmental benefits by allowing rainwater infiltration and absorption on an otherwise impervious concrete surface. Further, it can increase the economic value and strengthen the aesthetic of the location with vegetation and landscape details. The Rose Garden parkade at the University of British Columbia is a multi-level, 900-vehicle parkade which is nearly invisible, as it is built beneath a tiered rose-garden (Figure 6). The design incorporates a desirable place into the structure, and the garden is a popular site for weddings and parties, featuring a prime viewing location of Burrard Inlet.[22] In South Beach, Miami, a parkade integrates numerous layers of planting within its structure, enclosing it in a dense green cloak (Figure 7).[23]

If surface lot parking is to be used, it is possible to incorporate extensive green infrastructure to the site. The Natural Capital Centre building in Portland, Oregon for example, built a parking lot which functions to divert 100% of the entire site's stormwater away from the city's sewer system and into the ground (Figures 8a, 8b, 8c). The parking lot has bioswales which are planted with native plant species that capture, clean and infiltrate rainwater from both the building and parking lot. Rainwater enters the swales through notches cut into the curbs. The surface material of the lot is permeable asphalt, which also allows for water infiltration, additionally reducing the need for expensive stormwater infrastructure.[24]

5.0 Conclusion

Squamish can design and accommodate parking to maximize land use availability in the downtown for more economically and socially productive uses, while minimizing negative ecological impacts. This necessitates a re-thinking of traditional parking lot strategies that plan for maximum numbers yet remain empty most of the time and thereby waste valuable land, fragment the community, and contribute to increased vehicle dependence.

Land and building material costs can be reduced through designing parking more efficiently by using more compact building forms, integrating parking more fully into the downtown, setting maximums for parking spaces, minimizing stall dimensions, creating shared parking areas, reusing construction material, and building for future adaptation. Implementing green parking techniques will further reduce storm water management costs. These methods, together with providing for alternative transportation options to and from downtown nodes, enable socially, economically, and environmentally responsible parking design in Squamish.

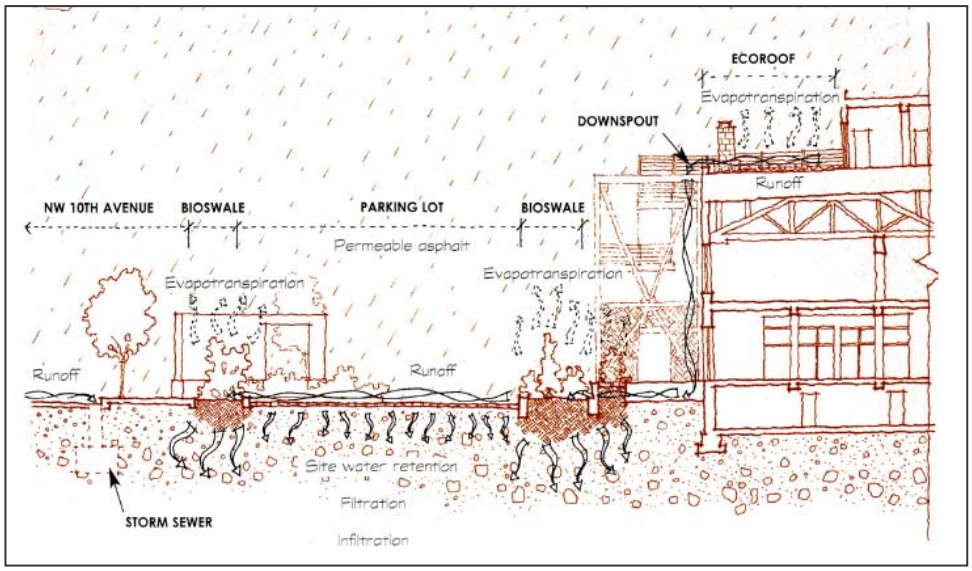

Figure 8c: Illustration of rainwater infiltration in the Natural Capital Centre parking lot

6.0 Additional Resources

Parking Design Guidelines:
The Whole Building Design Guide
http://www.wbdg.org/design/park_outside.php

Examples of On-Street Parking:
Project for Public Spaces
http://www.pps.org

Sustainable Building Design:
LEED (Leadership in Energy and Environmental Design)
http://www.usgbc.org/DisplayPage.aspx?CategoryID=19

Notes

[1] Population Profile and Projection for the District of Squamish, 2001-2031, The Sheltair Group, March 2005 and Statistics Canada Community Profile, 2001.
[2] Environmental Protection Agency: Parking Alternatives: Making Way for Urban Infill and Brownfield Redevelopment, 1999 http://www.smartgrowth.org/pdf/PRKGDE04.pdf
[3] Environmental Protection Agency Post-Construction Storm Water Management in New Development & Redevelopment: Green Parking, http://cfpub.epa.gov/npdes/stormwater/menuofbmps/post_12.cfm
[4] West Coast Environmental Law: Urban Growth & Development, Smart Bylaws Guide http://www.wcel.org/issues/urban/sbg/Part4/parking/
[5] Schedule VIII of the Burnaby Zoning Bylaw, Section 800.4(d).
[6] West Coast Environmental Law: Urban Growth & Development, Smart Bylaws Guide http://www.wcel.org/issues/urban/sbg/Part4/parking/
[7] For more design recommendations see: The Whole Building Design Guide http://www.wbdg.org/design/park_outside.php
[8] West Coast Environmental Law: Urban Growth & Development, Smart Bylaws Guide and Steve Tracy, Local Government Commission. Smart Growth Zoning Codes: A Resource Guide, 2003.
[9] http://index.loopnet.com/xNet/MainSite/Listing/Profile/14087817
[10] Allison L. C. de Cerreño, The Dynamics of On-Street Parking in Large Central Cities, http://www.planning.dot.gov/Documents/TransPlanning/OnStreetPkg.htm
[11] Project for Public Spaces, http://www.pps.org
[12] Parking Alternatives: Making Way for Urban Infill and Brownfield Redevelopment, 1999
[13] Victoria Transport Policy Institute Transportation Cost and Benefit Analysis – Parking Costs http://www.vtpi.org/tca/tca0504.pdf
[14] Centre for Watershed Protection: Article 45: An Introduction to Better Site Design, 1998 http://www.cwp.org/45-Intro_to_Better_Site_Design.pdf
[15] Victoria Transport Policy Institute, Transportation Cost & Benefit Analysis- Parking Costs, 2004 http://www.vtpi.org/tca/tca0504.pdf
[16]http://www.urbanvancouver.com/images/storyeum_and_gastown_parkade_facade_516p.m._mon17may2004-317.jpg\
[17] Centre for Watershed Protection: Article 45: An Introduction to Better Site Design, 1998 http://www.cwp.org/45-Intro_to_Better_Site_Design.pdf
[18] http://www.pbkarchitectsinc.com/pimg/transportation/chapman/pds.html
[19] From Parking Place to Office Space, Environmental Building News, February 2003. Also see http://www.ecohome.com/slsg/Leading_By_Design.pdf
[20] RecycleWorks: Salvage & Reuse of Construction Materials http://www.recycleworks.org/con_dem/salvage.html
[21] http://www.wbdg.org/design/parking.php
[22] http://www.library.ubc.ca/archives/bldgs/rosegardenparkade.htm
[23] ocw.mit.edu/.../f01/ lectureimages/5/image9.html
[24] Rebuilt Green: The Natural Capital Centre and the Transformative Power of Building, Bettina von Hagen et al., eds. Ecotrust, Portland, 2003.

Contact Us

Design Centre for Sustainability
University of British Columbia, 394-2357 Main Mall, V6T 1Z4 t. 604-822-5148, f. 604-822-2184
For more information visit the following websites: www.designcentreforsustainability.org, ww.sgog.bc.ca